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SIEMENS




Catalog
FI 01

Edition
2024

PROCESS AUTOMATION

# Products for Process Instrumentation

## US Edition

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# Products for Process Instrumentation

Process Automation



## Catalog FI 01 · 2024 US Edition

Supersedes:
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The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with DIN EN ISO 9001 (Certified Registration No. 000656 QM08). The certificate is recognized by all IQNet countries.

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# Measuring everything that matters

Siemens offers a complete service package as well as all measuring instruments to assist you in engineering, designing, supplying, installing and commissioning measurement solutions for complete industrial plants. Our “one-stop shop” concept supports selection of all process instrumentation and analytics all the way to integration with your process control system. Additional industrial components and systems are easily incorporated into the overall plant and ensure smooth process flows.






Whether process instrumentation, process analytics or weighing and dosing systems, our solutions meet the requirements of process industries such as chemicals, oil and gas and hydrocarbon processing, water and wastewater, pharmaceuticals, mining, aggregates, cement, pulp and paper, food and beverage or shipbuilding.

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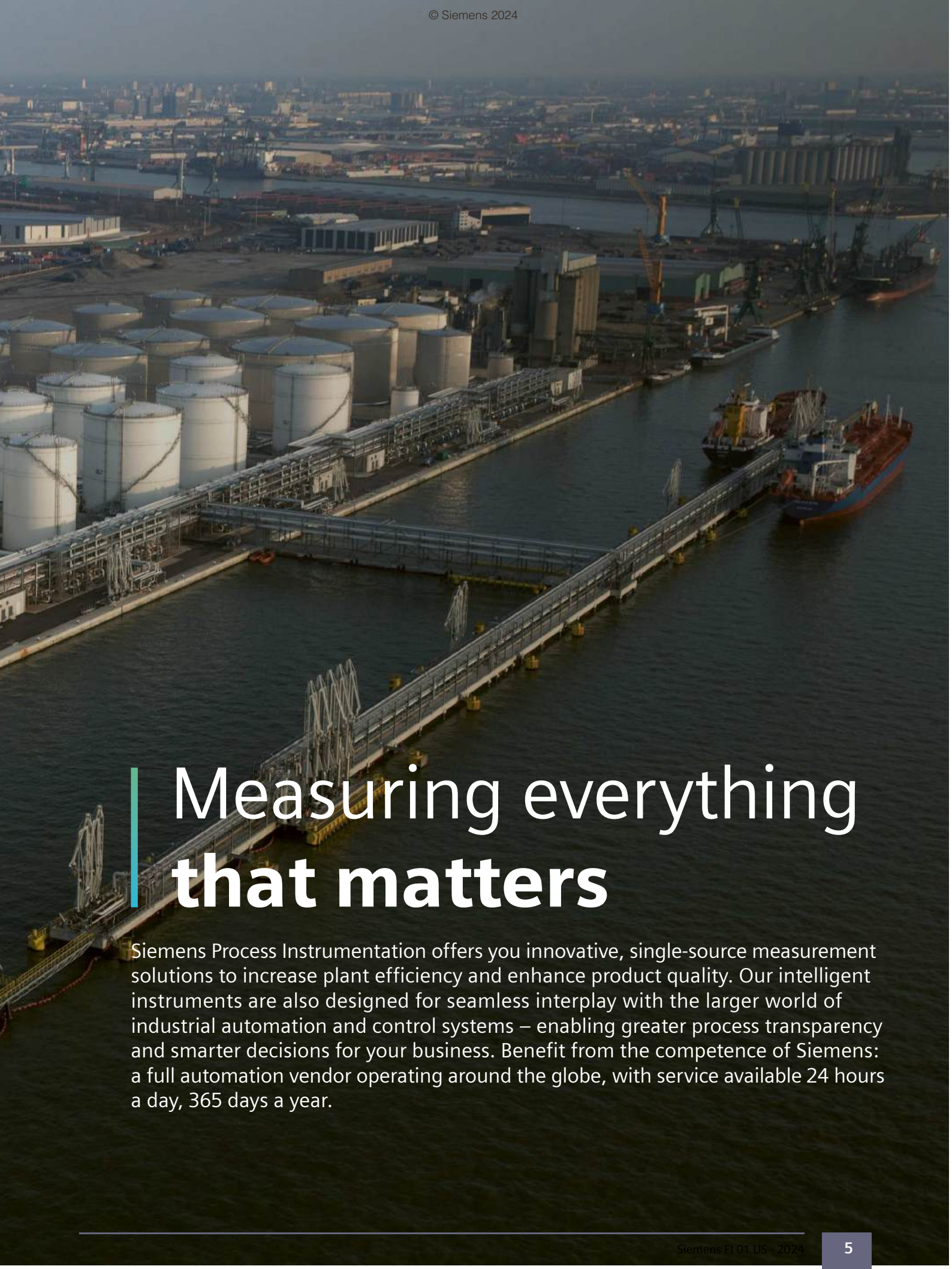
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# Measuring everything **that matters**

Siemens Process Instrumentation offers you innovative, single-source measurement solutions to increase plant efficiency and enhance product quality. Our intelligent instruments are also designed for seamless interplay with the larger world of industrial automation and control systems – enabling greater process transparency and smarter decisions for your business. Benefit from the competence of Siemens: a full automation vendor operating around the globe, with service available 24 hours a day, 365 days a year.

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# Takes pressure off your business: **SITRANS P**

SITRANS P is a complete range of measurement instruments for measuring relative pressure, differential pressure and absolute pressure. In addition to high measuring accuracy and ruggedness, the modular system features superb operating convenience and functionality as well as a perfect safety concept.





**SITRANS P320/420** – the first pressure transmitter for remote commissioning of functional safety

- Time and effort savings due to remote commissioning of SIL devices
- Developed in accordance with the IEC 61508 standard for use in SIL 2/3
- Reduced response time increases process efficiency by speeding up the control system's response to changing process conditions
- Ready for plant digitalization with the HART 7 pressure transmitter: Data logging functions and event control deliver users in-depth control and analysis.
- User-friendly display due to clear display and diagnostic icons in accordance with NAMUR NE107
- Maintenance cost reduction due to proof test interval of up to 10 years
- FM-approved

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**SITRANS LH100/LH300**

- Suitable for applications ranging from drinking water or wastewater to corrosive liquids thanks to stainless steel enclosure
- Rugged submersible sensors for hydrostatic level measurement
- Installation possible in pipes with 1" inner diameter



**SITRANS P200/210/220**

- Single-range transmitter for relative, absolute and hydrostatic pressure
- Pressure sensors: stainless steel sensors (SITRANS P210 and SITRANS P220) as well as sensors with ceramic membrane (SITRANS P200)
- Conversion of measured pressure into either 4–20 mA or 0–10 V signal



**SITRANS P300**

- More than 90 different process connection variants offer the highest degree of flexibility
- Versatile communication connection via HART protocol, PROFIBUS PA or FOUNDATION Fieldbus
- Fulfills EHEDG, FDA and 3A requirements
- Maximum measurement deviation of 0.075%
- Can be combined with flushmounted absolute or relative pressure measuring cells



**SITRANS P compact**

- Analog transmitter for absolute and relative pressure
- Hygienic design in accordance with EHEDG, FDA and GMP recommendations
- Stainless steel process connections and enclosure
- Measurement deviation ≤ 0.2%

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# Because every degree matters: **SITRANS T**

SITRANS T products are the temperature measurement champions, even in extreme conditions. Whether used in hot, cold or hazardous environments – the communicative SITRANS T product family meets all expectations. Not matter whether head, rail or field mounting – all transmitters or sensors are available individually or as complete measuring points. They offer high precision in every application and are quick and easy to connect to thermocouples or resistance thermometers. The SIMATIC PDM intelligent software package permits parameterization in just minutes, and input errors are avoided.



**SITRANS TS500** temperature sensors for pipes and vessels – from simple applications to solutions for harsh environments

- Modular system with thermowell made of tubular or barstock material, extension, connection head and optional transmitter or display
- Intrinsic safety, flameproof and nonsparking versions are available

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## Transmitters for head mounting




**SITRANS TH100**

- Pt100 single-input transmitter
- Diagnostics LED
- Supports four-wire Pt100
- 4–20 mA
- Low-cost and compact



**SITRANS TH320**

- Universal single-input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- 4–20 mA
- Interface for local HMI



**SITRANS TH100slim**

- Pt100 single-input transmitter
- Supports four-wire Pt100
- 4...20mA output with M12 socket
- Low-cost and compact in stainless steel enclosure to weld on compact thermometer



**SITRANS TH420**

- Universal dual-input transmitter
- Hot backup function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- Interface for local HMI

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## Transmitters for rail mounting



### SITRANS TR320

- Universal and single-input transmitter
- Diagnostics LED
- Supports four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)
- 4–20 mA

### SITRANS TR420

- Universal dual-input transmitter
- Hot backup function
- Diagnostics LED
- Supports two four-wire RTD/TC/mV and resistances
- Supports Callendar-van Dusen
- HART 7 + SIL 2/3 (IEC 61508)

## Transmitters for field installation



### SITRANS TS100

- For multiple applications
- Supplied with directly installed cable
- ATEX and IEC EX approvals; can be operated in Zone 0
- Wide range of options thanks to modular principle



### SITRANS TS200 compact design

- For multiple applications
- Compact design with directly installed fixed connection (M12, Lemo, etc.)
- ATEX and IEC EX approvals; can be operated in Zone 0
- Wide range of options thanks to modular principle



### SITRANS TR320/420

- Stainless steel or aluminum enclosure
- Temperature field transmitter for multiple applications
- Configurable via local display
- Full redundancy via hot backup function (TF420)
- SIL 2/3-certified
- HART 7
- 4–20mA
- Combined types of protection available, such as Ex d + Ex i

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**SITRANS TS300**

- Clamp-on temperature sensor
- Design meets EHEDG recommendations and is therefore suitable for use in the food and beverage and pharmaceutical industries
- Replaceable measuring inserts



**SITRANS TS Thermowell**

- Wide range of lengths and materials
- Comprehensive coverage of applications
- Customer-specific options are possible
- High stability thanks to high-quality materials
- Comprehensive material and quality controls available

# Everything flows: **SITRANS F**

Whether measuring gases, liquids or steam – choosing the right flowmeter is decisive for productivity. This is where the SITRANS F line comes in. Our portfolio contains the fitting flowmeter for every application and medium, with five different flow technologies available to suit a wide range of operating conditions: electromagnetic, Coriolis, ultrasonic, vortex and differential pressure.




**SITRANS FCT070/FST070 transmitter: flowmeter solutions**

- Full control and parameterization via the control system
- Direct integration into SIMATIC S7, TIA Portal and PCS 7
- Coriolis or ultrasonic technology module for ET 200SP
- Selection via TIA Selector (secures easy integration in SIMATIC)
- Fast digital signal to sensor with 10 ms update rate
- Full advanced transmitter functionality via automation control
- Via PROFINET, the measurement data is transmitted to the automation system in real time
- Full hazardous area solutions with use of SITRANS I300 barrier
- Coriolis-specific flowmeter: SITRANS FC230
- Ultrasonic-specific flowmeter: SITRANS FS230
- Integration function blocs available for all Siemens automation systems

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## SITRANS FC
## Coriolis mass flowmeters

Our multivariable devices measure the direct mass flow rate of liquids and gases in almost any application. They deliver reliable and repeatable information on mass flow, volume flow, temperature, density and concentration (for example, Brix or Plato). They are available in sensor sizes DN 1.5 to 150 mm with different flowmeter transmitter versions to fulfill requirements for high performance in oil and gas, chemicals, food and beverage, pharmaceuticals and automotive applications.

Full range of digital transmitters: The uniform sensor and transmitter platform offers solutions for sizes from Di 1.5 to DN 150 mm with three different transmitters.

The innovative and user-friendly FCT030, FCT010 and FCT070 transmitters feature audit trails, trend curves, data logger and advanced diagnostic functionalities.



**SITRANS FCT010 single digital channel transmitter**

- Full multiparameter Modbus output ideal for PLC integration
- Robust aluminum housing mounted directly on the different sensors, for most sensor sizes
- Small in size, ideal for skids and compact machines
- Full performance in a cost-efficient solution



**SITRANS FCT030 advanced full-range transmitter**

- Available as compact, remote field-mounting and remote wall-mounting enclosures
- Four I/O channels, freely configurable and programmable
- Full communication package: HART; PROFIBUS PA and DP; Modbus
- Advanced, large-size graphical display including trend curve and multilevel display views
- Integrated data logger, ideal for diagnostics on advanced applications
- Advanced diagnostic functionality
- Built-in programmable settings for optimizing pulsating flow and aerated flow
- 16+ integrated unique fraction tables for concentration measurements
- Built-in batch controller for two-stage batch applications



**SITRANS FCS300**

- Dual splitflow design in sizes from DN 15 to DN 150 in different versions, wetted material in AISI 316 as well as nickel alloy
- Remote- or compact-mounted
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- Solid performance with mass flow accuracy of 0.1% or 0.2% and density accuracy of down to 2 kg/m³
- Robust frame and housing isolate from external vibrations, allowing ideal measurement in difficult environments
- Ideal for the chemical, petrochemical and oil and gas industries

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**SITRANS FCS low flow**

- Single-tube design in sizes from DI 1.5 to DI 15, with a wide selection of available connections
- High-performance accuracy: 0.1% on massflow and down to 0.5 kg/m³ density
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- DN 4 design withstands pressure rates up to 1000 bar
- Ideal for a broad range of low-flow applications within the automotive, chemicals, and food and beverage industries
- Easy installation using a plug-and-play interface
- Optimal hygiene and CIP cleanability for the food and beverage industry as well as pharmaceutical applications, thanks to single-tube construction without internal welds, reductions or flow splitters



**SITRANS FCS400**

- Dual splitflow design in sizes DN 15 to DN 50
- Most compact design on the market
- Available with all common process connections including a variety of common sanitary connections
- Available with broad range of FCT030, FCT010 and FCT070 transmitters
- High-performance accuracy: 0.1% on massflow and down to 0.5 kg/m³ density
- Ideal for OEM, skids, machine builder, marine, sanitary and chemical applications

## SITRANS FM electromagnetic flowmeters

SITRANS FM electromagnetic flowmeters measure flow volumes of electrically conducting fluids such as water, chemicals, food and beverage, slurries, sludge, paper stock, and mining slurries with magnetic particles.



**Modular pulsed DC meters: SITRANS FM MAG (DN 2 to DN 2200)**

- Full transmitter program includes MAG 5000/MAG 6000/MAG 6000 I; compact- or remote-mounted
- Multiple I/O as standard and communication modules PROFIBUS PA/DP
- DeviceNet, FOUNDATION Fieldbus, HART and Modbus RTU are available
- MAG 5100 W sensor for water and wastewater applications
- MAG 3100 P sensor for process industries and the harsh requirements in the chemical industry
- MAG 3100 P available as quick ship variant
- MAG 3100/MAG 3100 HT sensor for general process industries
- MAG 1100/1100 HT sensor for general process industries
- MAG 1100 F sensor for food and beverage and pharmaceutical industries

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**Battery-operated water meters: SITRANS FM MAG 8000/MAG 8000 CT (DN 25 to DN 1200)**

- Battery lifetime of up to 15 years*
- IP68 (NEMA 6P) enclosure and sensor painting in accordance with ISO 12944 class C5M (up to 15 years protection) corrosivity for burial and submerged applications
- Easy installation without straight inlet/outlet
- Rich add-on communication modules: Modbus RTU, encoder card, 3G/UMTS module and IIoT Wireless communication module
- IIoT Wireless Communication Module consisting of a hardware part and a Web-hosted application for device management and measurement data transfer
- Remote configuration of all parameters, remote diagnostics

**SITRANS FM MAG 8000 with 3G/UMTS module**

- Built-in Remote Qualification Certificate enables comprehensive device diagnostics and off-site audits
- Configurable analog input for external ratiometric pressure transmitter
- MAG 8000 clock synchronization with Internet NTP server



**High-powered AC meters: SITRANS FM TRANSMAG 2 / (DN 15 to DN 1000)**

- Specially designed for heavy mining slurries with or without magnetic particles as well
- Also suitable for the most difficult applications in the pulp and paper industry
- Low conductive medias ≥1 µS/cm (0.1 µS/cm depending on medium)
- No movable parts
- Stable zero point/pulsed alternating field for accurate flow signal and excellent signal strength
- SmartPLUG concept
- Comprehensive self-diagnostics




**Threaded SITRANS FM100: Making engineering and design even simpler**

- Measuring and monitoring small and medium flows. Robust stainless steel design (threaded: 1/2", 3/4", 1", 2")
- Generation of two process values, simultaneous flow and temperature measurement
- Dosing function with external control input
- Four optical buttons, easy local operation in the field possible with gloves
- The display can be electronically rotated in 90° steps
- Bidirectional measurement
- Integration in many standard applications possible, since there are two individually configurable outputs (pulse/frequency/alarm and analog output)
- Total and partial volume counters to track flow rates
- IO-Link communication available

*for 4 D-cell external battery pack

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## SITRANS FS – Flow Sonic

Our ultrasonic flow measurements work as inline systems or with clamp-on.

### Inline systems

Inline systems come into contact with media and are mostly complete and calibrated pipe segments. Suitable for operational measurements in industrial areas and heat quantity measurements that are subject to billing, but can also be retrofitted in existing systems.



**SITRANS FS SONO 3100 / SONO 3300**

- Suitable for water applications in sizes DN 50 to DN 500
- Available as 1- or 2-path systems in combination with SITRANS FUS060 transmitter
- Choice between mild steel and stainless steel on request
- Sensors can be exchanged without interrupting operation



**SITRANS FS SONOKIT**

- The SONOKIT system is designed for inline retrofitting on existing water pipelines up to DN 1200 as a 1- or 2-track flowmeter
- For use with the dedicated SITRANS FUS060 transmitter (up to DN 500) or battery-powered FUS080 transmitter (up to DN 1200)
- The unique design enables installation on empty pipes or pipes under pressure without process shutdown
- Robust version can be buried and withstands constant flooding
- Outstanding accuracy; the bigger the pipe, the more accurate the result



**SITRANS FUS380 and FUE380**

- FUE380 for billable energy measurements according to MID004
- FUS380 for industrial billing measurements without MID004 requirements with more extensive measuring ranges available
- FUS/FUE380 in dual-track version for measuring water flow in district heating systems, local networks, boiler stations, substations and other general water applications
- Also suitable for chiller plants (including glycol mixes without type approval)
- Suitable for pipe diameters from DN50 to DN1200 and approved for billable heat measurements with official approval (MID MI-004)
- With SITRANS FUS 080 transmitter for battery or mains power supply, battery life up to 6 years
- Ideal for energy metering together with the SITRANS FUE950 energy calculator
- With heat meter type approval for FUE380 (MID MI-004)

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## SITRANS FS – clamp-on ultrasonic flowmeters

Clamp-on is the ideal technology for retrofits in existing systems. Sensors can be strapped onto existing pipes without disrupting or stopping the process. Since these sensors measure without direct contact with the liquid, this type of measurement is also becoming increasingly important for new systems. The transmitter is designed for very fast and highly accurate measurements. Up to four measuring paths per pipe enable significantly better flow-profile recording even under non-ideal measuring conditions and thus results that only calibrated measuring devices actually deliver.



**SITRANS FSS200 –**
**clamp-on sensor family**

- Available as high-precision, universal and high-temperature sensor
- High-precision sensor: typical Lamb-wave sensors, working in harmony with steel pipes; selection according to pipe wall thickness; mandatory for oil and gas as well as other liquids when accuracy is required; different sizes with different frequencies for wall thickness up to 35 mm
- High-temperature sensor: for applications up to 230°C
- Universal sensor: for portable purposes and non-steel pipes, but also for steel pipes with lower performance and accuracy requirements; available in five basic sizes for pipes up to DN 6000 and special versions for difficult applications
- Suitable material for simple and permanent mounting, even with different requirements



**SITRANS FS290 –**
**portable clamp-on system**

- With FSS200 ultrasonic flow sensor family 200 (clamp-on) and FST090 ultrasonic flow transmitter
- For quick and easy checking of the flow in pipes
- Portable SITRANS FST090 transmitter in use with SITRANS FSS220 clamp-on sensors
- For pipes up to DN5000 and a wall thickness up to 40 mm, for temperatures of 120°C or higher
- Operation with mains unit or alternatively with rechargeable batteries for more than 24 hours
- Time-limited measured value monitoring and control measurement to validate built-in flow meters
- Four pushbuttons, illuminated graphical display, 240 x 160 pixels
- Inputs/outputs, Communication Modbus RTU RS 485, USB service port, 4GB SD-Card

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**SITRANS FS230 with FSS200 sensors and FST030 transmitter**

- Designed as a wall housing (Ex zone 2) or as an industrial housing (Ex zone 1) with external DSL
- External Digital Sensor Link (DSL) contains 4-path measured value electronics and generates the measured value directly with the FSS200 sensors
- High-precision measurement of slightly viscous liquids (industrial version), different crude oil mixtures or petroleum products with temperature, pressure and viscosity consideration (oil version), natural and industrial gases from approx. 8 bar (gas version)
- WideBeam® transit time technology with FSS200 high-precision sensors for high accuracy and the best signal quality in all areas of use
- Transmitter electronics for billable measurement accuracy better than 0.15%
- Anomaly tool, patented bi-directional flow profile correction for anomalies in the upstream and downstream areas of the pipe
- High EMC security and secure digital data transmission to the transmitter, up to 150 m and more



**SITRANS FS220 – with FSS200 sensors and FST020 transmitter**

- For simple measurement tasks with one pair of sensors (single-path) and a practical accuracy of 1%.
- Highly reliable, cost-effective system for simple accuracy
- Enhanced zero stability results in minimal need to set a zero point, ideal for use in municipal utilities for network monitoring and leak detection
- Frequently used in the water and wastewater sector, for energy and HVAC as well as in the chemical industry (non Ex)
- WideBeam® transit time technology with FSS200 universal and high-precision sensors

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## SITRANS FP differential pressure flow measurement

The SITRANS FP product line offers a complete solution for differential pressure flow measurements. SITRANS FP330 and SITRANS FPS230 are both suitable for a vast range of different applications under various process conditions and parameters.





**SITRANS FPS230/FP330**

- Flexible mounting
- One pressure transmitter for all applications
- Single source supplier for the hole measuring point
- Pre-mounted flowmeter delivered in “one box”
- Easy traceability throughout the ordering process

**SITRANS FX330**

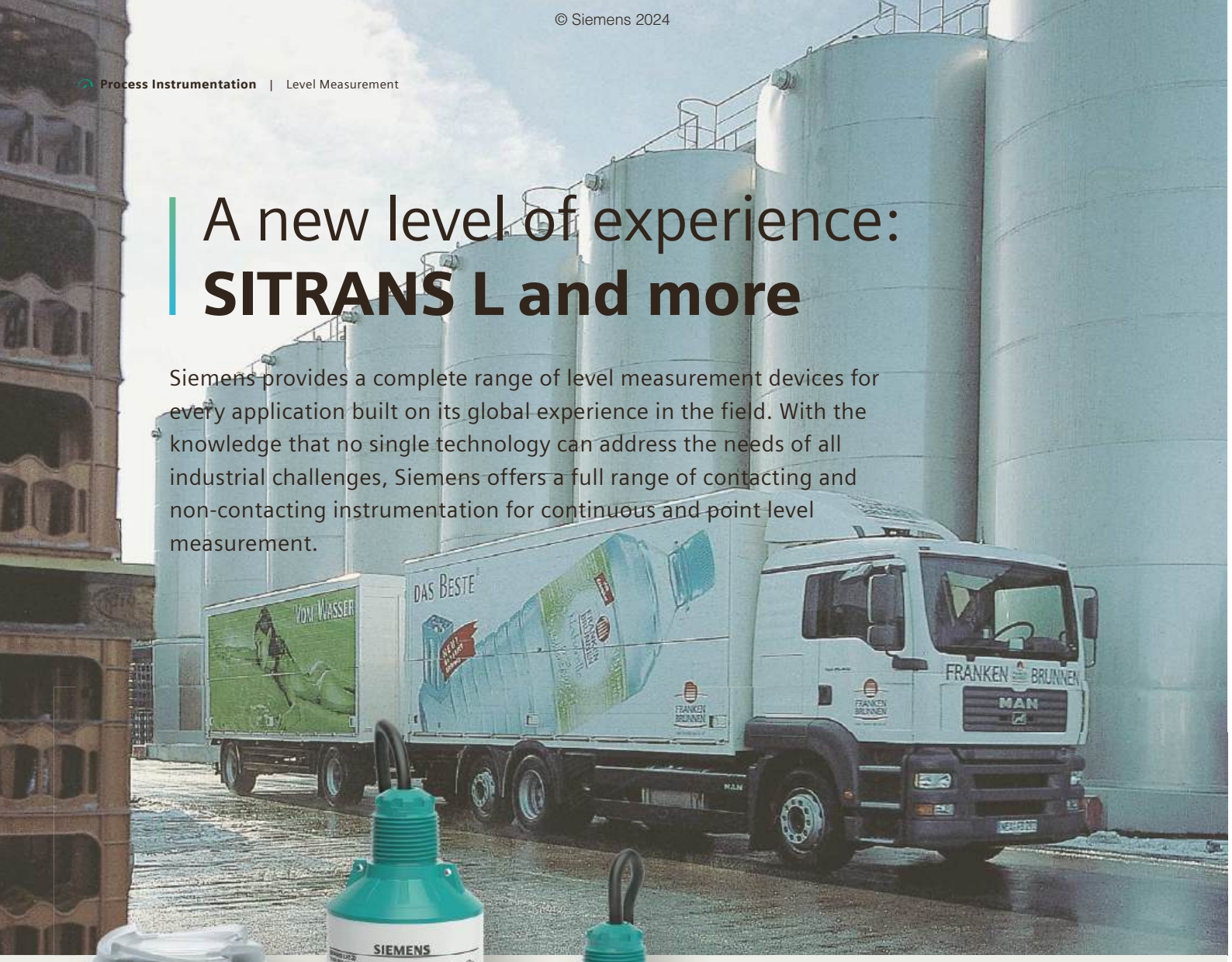
- Accurate measurement of steam, gas, and both conductive and non-conductive liquids
- Available in sizes DN 15 to DN 300 mm
- Integrated pressure and temperature compensation for lower installation costs and increased accuracy
- Integrated reduction of nominal diameter results in a large turndown ratio, reducing installation costs and potential for leakage
- Provides redundant storage of all calibration and configuration data within the display memory and the electronics module
- Designed from the ground up to be fully compliant with the IEC 61508 SIL 2 safety standard
- Cost-efficient energy calculation including net heat measurement
- Remote version available with cable length up to 50 m

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# A new level of experience: **SITRANS L and more**

Siemens provides a complete range of level measurement devices for every application built on its global experience in the field. With the knowledge that no single technology can address the needs of all industrial challenges, Siemens offers a full range of contacting and non-contacting instrumentation for continuous and point level measurement.







**SITRANS LR100 series –**
for hassle-free level measurement

- Compact 80 GHz radar transmitter for liquid and solid applications
- Featuring Bluetooth® wireless technology for easy and quick setup with Siemens SITRANS mobile IQ App
- Ideal for chemical storage vessels, bulk solids hoppers, produced water and drilling mud

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## Continuous level measurement

Continuous level measurement constantly monitors dynamic processes. The measurements are transmitted as an analog signal or digital value. We offer a wide range of transmitters based on a variety of technologies, including ultrasonic, radar, guided wave radar, capacitance, gravimetric and hydrostatic.

## Process intelligence

The signal processing technologies differentiate between the true echo from the material and false echoes from obstructions or electrical noise. The sophisticated software is supported by field data gained from more than a million applications. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is a repeatable, fast and reliable measurement.



**SITRANS LR250**

- 2-wire, 25 GHz pulse radar level transmitter up to a range of 20 m
- For liquids and slurries in storage and process vessels with high temperatures and pressures
- 316L stainless horns, flanged antenna with PTFE facing and budget-friendly polypropylene lens and flange options for versatile applications

## Radar level measurement with intelligent signal processing

- Non-contacting and low-maintenance
- Microwaves require no carrier medium for precise measurements even under harsh process conditions
- High performance and easy implementation using just a few parameter entries



**SITRANS LR560**

- The world's first 78 GHz level transmitter
- 2-wire, 78 GHz FMCW for ranges up to 100 m (328 ft)
- Very narrow 4-degree beam angle with 3" lens antenna
- Aiming flanges with purge, easy to install
- Integrated Process Intelligence and plug-and-play performance



**SITRANS LR200**

- 2-wire, 6 GHz pulse radar level transmitter for liquids with a range of up to 20 m
- Ideal for process vessels with turbulence and heavy deposit, as well as high temperatures and pressures with a range of up to 20 m

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## Ultrasonic level measurement

Our market-leading ultrasonic level measurement is an extremely cost-effective solution. The self-cleaning face makes it suitable for harsh environmental conditions. The non-contacting technology is used in numerous industries to monitor liquids, bulk solids and slurries.



**SITRANS Probe LU240**

- Cost-effective, compact, intelligent level solution for liquid chemical inventory, monitoring small process vessels and level monitoring measurement in the environmental industry



**Echomax transducers**

- Fully encapsulated robust ultrasonic transducers for use with Siemens ultrasonic controllers
- Various approvals for use in hazardous applications
- Self-cleaning face for harsh applications with buildup



## Level controllers

Our product portfolio of level controllers feature intuitive navigation via the local user interface and are ideal for applications in all industries. Whether you need the world's highest accuracy in your open channels, rugged wet well pump control or dual point monitoring, Siemens controllers have you covered.

## Continuous capacitance

Our unique inverse frequency shift approach to capacitance technology ensures accurate, reliable and repeatable measurements, even in dusty, turbulent and vaporous environments or in situations with product buildup. Because even a small level change creates a large change in frequency, our instruments provide better resolution and consistently outperform conventional devices. With special features such as Active-Shield technology, they protect the measurement from the effects of moisture, vapors, foam, temperature and pressure variations, and buildup. Together with the modular probe options available on various models, they offer practical solutions to a wide variety of continuous level and interface applications.



**SITRANS LC300**

- Ideal for standard and industrial applications in the chemicals, hydrocarbon processing, food and beverage, mining, aggregate and cement industries

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## Guided wave radar

SITRANS LG guided wave radar transmitter for a range of contact level and interface applications from general to harsh conditions and everything in between. With little to no configuration necessary you'll be operational in minutes, saving you time and money.

Extreme process conditions don't stand a chance, and these transmitters feature SIL options for applications requiring functional safety. Advanced diagnostics including trending, profiles and event logging give you the data you need at every step of your process. Rapid response times and advanced echo processing deliver accurate and reliable readings over the full application range, even in small containers and in low dielectric constant material. And with field-replaceable and adjustable probes, if your process changes, your measurement device can, too.



**SITRANS LG240**

- For use in hygienic and corrosive applications

**SITRANS LG250**

- Highly flexible solution for liquid level and interface applications. Extremely versatile for many applications

**SITRANS LG260**

- Ideal for measuring the level in medium-range solids applications, including grains, plastics and cement

**SITRANS LG270**

- Offers configuration options for extreme conditions, including high-temperature and high-pressure applications

**All versions include:**

- Automatic buildup adjustment
- Remote display and electronics options
- 2 mm accuracy
- Backlight with full graphic display, top- or side-mountable
- SIL 2/3 approval options
- Field-replaceable probes
- Quick setup wizards
- USB service port option

## Hydrostatic

Low-cost level measurement for direct mounting or mounting with remote seals on tanks and vessels



**SITRANS LH100 and SITRANS P DS III**

- Suitable for a wide range of applications in the chemical and petrochemical industries
- Highly resistant to extreme chemical and mechanical loads as well as electromagnetic interference

## Gravimetric

Gravimetric level measurement with SIWAREX weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts or material characteristics.



**SIWAREX WP321**

- Technology module for the SIMATIC ET 200SP distributed I/O system
- For level measurements in silos and bunkers; convenient and seamless integration of platform scales directly into the automation environment

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## Point level detection

We offer you a comprehensive portfolio for extremely reliable and precise point level detection. Our wide selection includes ultrasonic, rotating and vibrating level switches as well as RF capacitance switches with inverse frequency shift technology that are cost-effective and suitable for point level, interface detection, dry run and safety back-up applications including bulk solids, liquids and slurries.

**Vibrating, rotary paddle**

- Especially suitable for low bulk density applications
- Ideal for use in harsh and abrasive environments, thanks to their rugged design
- For detecting high, low and demand levels in solids, liquids and slurry applications
- A wide variety of configuration options makes them suitable for any environment
- Simple to use with no complicated setup or configuration
- Stainless steel, aluminum and plastic enclosure options and highgrade steel process connections provide exceptional resistance to mechanical forces, a long service life and low cost of ownership
- Options for SIL 2 / redundant SIL 3



**SITRANS LPS200**

- Rotary paddle switch that detects solids with densities as low as 15 g/l
- Motor protection
- SIL 2 certification for best-in-class reliability and performance
- Options for fail-safe rotation monitoring and alarming



**SITRANS LVL100 and LVL200**

- Vibrating level switches for liquid and slurry applications, including high, low and demand level alarms and pump protection
- Wide application range including high temperatures and pressures, hygienic versions, large variety of enclosure materials, SIL 2/redundant SIL 3 options and remote testing



**SITRANS LVS100, LVS200 and LVS300**

- Vibrating level switches that detect solids with densities as low as 5 g/l
- Best-in-class sensitivity detection
- Ability to handle and monitor buildup
- Options to detect solids interface within a liquid

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## RF Capacitance

Pointek RF capacitance point level switches measure interfaces, solids, liquids, slurries and foam. The inverse frequency shift technology provides accurate and reliable measurement results even in dusty, turbulent and vaporous environments or in applications with product buildup. Small changes in level create large changes in frequency. Consequently, Pointek devices have greater sensitivity and consistently outperform conventional devices. With their rugged aluminum or chemically resistive plastic enclosures and wide variety of process connections, Siemens Pointek switches are compatible with most applications



**SITRANS LCS100, LCS050 and Pointek CLS100**

- Suitable for level detection in constricted spaces
- Options available
- Starting from 1/2 inch process connections
- IO-Link communication
- M12 connector
- Sensguard protection of probe for harsh and abrasive environments and chemically resistive probe types available



**Pointek CLS200 and CLS300**

- Suitable for level detection in demanding conditions with high pressures and temperatures
- Suitable for aggressive applications including very high temperatures and pressures
- SIL 2 options
- Smart PROFIBUS versions with digital display
- Remote operation via PROFIBUS for status and function testing
- Remote detection of buildup and monitoring of other process condition changes

## Ultrasonic



**Pointek ULS200**

- Non-contacting ultrasonic level switch with two switch points
- Ideal for sticky materials and an effective solution for bulk solids, liquids and slurries

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# Always in pole position: **SIPART Positioners**

As the interface between control system and valves, positioners play an important role in ensuring reliability and optimal performance in process plants around the world. Our proven portfolio with the SIPART PS2 and SIPART PS100 precisely controls the entire range of valves and masters even special tasks with absolute reliability.




**SIPART PS100** – easy to use, fast to commission and simply robust

- One-push initialization: fast commissioning at the push of a button
- Application parameters to select different modes of valve positioning, such as exact, fast, on-off or booster
- Internal non-contacting sensor: non-wearing and vibration-resistant
- Non-corrosive sound absorber for use in harsh environments
- Plain-text display with status icons in accordance with NAMUR NE107 and four operation buttons
- Remote operation via smartphone or tablet with retrofit-table Bluetooth adapter and SITRANS mobile IQ app

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**SIPART PS2 – the all-around positioner**

SIPART PS2 has grown to become the most widely used positioner for linear and part-turn actuators. It is constructed to meet a wide variety of requirements:

- Polycarbonate, aluminum or stainless steel enclosure
- 316L stainless steel enclosure for nearshore, offshore as well as oil and gas applications in hazardous areas
- Ex d explosion-proof version
- Communication via PROFIBUS PA, FOUNDATION Fieldbus or HART
- Integrated booster option for quick control of large drives
- Low operating costs thanks to minimal air consumption



**More functions, more possibilities**

SIPART PS2 comes with an extensive range of functions and diagnostic capabilities, which we have improved even further:

- Optional pressure sensors: improved valve diagnostics and parameter monitoring
- Ready for digitalization: fast and predictive determination of valve maintenance requirements using the valve monitoring app
- Regular partial stroke tests: ensured movement of emergency shutdown (ESD) valves and other open/close valves in the event of an emergency
- Fail in Place: the valve remains in its last position upon loss of electrical and/or pneumatic power
- Fail Safe: the valve moves to the safety position; also suitable for SIL2 applications
- Valve perfomance tests (VPT): immediate, on-site assessment of valve maintenance requirements



**Positioner with remote control electronics**

- Suitable for use in environmental conditions with high-energy radiation



**Positioner with various external position transmitters**

- Easier access to positioner for valves at not easily accessible locations

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# Early detection **protects** your process

Process protection devices can be used as early-warning systems to avoid costly interruptions and breakdowns of equipment. They detect flow problems, blockages, screen faults, machinery slowdowns or burst filter bags. Their rugged construction makes them impervious to dust, dirt, buildup and moisture.




**SITRANS AS100 –** acoustic sensor used for solids flow detection, featuring a compact, stainless steel construction for harsh environments and non-invasive mounting

- Detection of high-frequency acoustic emissions from friction or the impact of dust, powders, granulates and other solids
- Signaling of flow/no flow or high/low flow
- Compatible with SITRANS CU02, which processes signals from the sensor
- Provision of relay and analog outputs for connection into a process or direct connection to a PLC analog output

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## Acoustic sensors

Non-invasive acoustic sensors detect inaudible, high-frequency acoustic emissions generated by friction and impact, caused by materials in motion.



**SITRANS DA400**

- Acoustic analyzer for condition monitoring of oscillating displacement pumps
- Simultaneous and continuous monitoring of up to four independent delivery valves
- Easy system operation and configuration either locally by LCD and keyboard or via PROFIBUS DP/PA

## Motion sensors

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.



**SITRANS WM100**

- For detecting the absence or presence of motion of rotating, reciprocating and conveying equipment
- Heavy-duty alarm switch



**SITRANS WM300 MFA**

- Motion failure alarm (MFA), differential speed detection (DSD) and non-contacting tachometer (NCT)
- Multiple alarms powered by four relays for overspeed or underspeed conditions from the sensors
- Intuitive programming thanks to a simple menu structure, along with an on-board display and push buttons




**Milltronics MFA 4p**

- Plant protection through the detection of absence of motion, as well as underspeed or overspeed conditions
- Probes usable in hazardous, high-temperature and harsh conditions, thanks to their superior design
- With MSP or XPP probes

## Process controllers

SIPART DR controllers are outstanding thanks to their extreme reliability and ease of use. Various software packages are available to make their handling easy and intuitive and to extend their scope of application. The standard version already offers comprehensive controller hardware that can be upgraded quickly and easily for specific applications by means of a large number of optional input and output modules. Plug-in modules for communications over RS 232/RS 485 or PROFIBUS DP are also available.



## Process recorders

SIREC D200, 300 and 400 display recorders are used for continuous monitoring of process quantities, plant maintenance, process optimization or troubleshooting. Our complete range of process recorders offers state-of-the-art solutions for the most demanding requirements.



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# Information **where it is needed**

Supplementary components enhance your operations through seamless wireless communications, remote displays and remote monitoring solutions. Data capturing and alarming anywhere, at anytime? Remote monitoring is your answer. Opening up new communications options? WirelessHART meets that challenge. Whatever your need, Siemens' supplementary components are here to help.



Four versions are available:

- RTU3010C – only IE interface
- RTU3030C – 3G modem integrated
- RTU3031C – 3G modem and GPS modem integrated
- RTU3041C – 4G modem and GPS modem integrated

**SIMATIC RTU3000C**

The compact remote terminal unit enables remote measuring points, even when no local power grid is available

- Easy configuration using a Web browser instead of programming
- Flexible power supply from batteries, solar energy or 24 V DC
- Connection of process instrumentation by means of integrated digital or analog inputs (4...20 mA) or HART and Modbus RTU devices via Extension Board HART/RS485
- Works with every instrumentation via 4...20mA, HART and Modbus RTU
- Secure communication via integrated mobile wireless modem or via LAN port and industrial router such as SCALANCE M
- Extended temperature range from –40 °C to +70 °C as well as an optional enclosure meeting the IP68 standard
- Perfect companion for SITRANS serve IQ (csv files & emails) or direct interaction to Mindsphere apps (such as SITRANS store IQ) with MQTT native communication

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## Remote digital displays

The universal remote digital displays allow users to view and access measurement data remotely from a convenient location. Our advanced range of remote displays includes options for pump control with communications including HART and Modbus RTU with flexible output options.



**SITRANS RD150**

- Remote display for 4 to 20 mA and HART devices
- Easy-to-use basic configuration of HART instruments using HART commands
- Ease of use through backlit menu-driven display with four buttons and flexible mounting options



**SITRANS RD200 and RD300**

- Universal and full-featured versions
- Ideal for flow rate, total and control applications as well as for use with most field devices
- Data logged and displayed on the PC with the free RD software
- Sunlight-readable display
- Standard serial communications output (Modbus RTU)
- Pump alternation control, linearization and square root and math functions



**SITRANS RD100**

- Loop-powered display
- Suitable for level, flow, pressure, temperature and weighing applications
- Can be used in a large variety of environments (low/high temperatures, hazardous areas)
- Simple setup and installation



**IE/PB Link PN IO**

- Can constitute the gateway between PROFINET and PROFIBUS
- From the IO-controller viewpoint, all DP slaves are treated like IO devices with a PROFINET interface
- Use as a data records router for parameter assignment of field devices via SIMATIC PDM (Process Device Manager) in all plants with PROFIBUS DP

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# Fully exploit the potential of **your process data**

From design and commissioning to operation and performance monitoring – Siemens provides software, tools and services for digitalization in every phase of a plant's lifecycle. End-to-end digitalization from a single source optimizes plant operations by reducing downtime and improving cost efficiency.

## Ensure Asset Uptime

- AE Thyro App
- Asset Performance Suite
- Valve Monitoring
- SIMATIC PCS myExpert
- SITRANS SCM IQ
- Siemens Predictive Analytics
- SIWA Burst
- SIWA LeakPlus

## Improve Processes

- Control Performance Analytics
- Process Event Analytics
- eBatch Reviewer
- Water Quality Inspector
- SieTrace
- SIWA Optim Dynamics
- SIWA Blockage Predictor
- SIWA Optim
- SIWA Pump Guardian

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The smart interaction of our digital services and extensive portfolio of applications gives you complete transparency over the entire plant lifecycle. Select the right app suite to investigate root causes quickly, allocate resources efficiently and achieve significant cost savings. Take advantage of advanced data analytics that provide easy and secure collection and processing of plant data, allowing you to implement optimization measures and reach the highest operational efficiency.

## Manage Operations







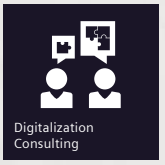






## Digital Services



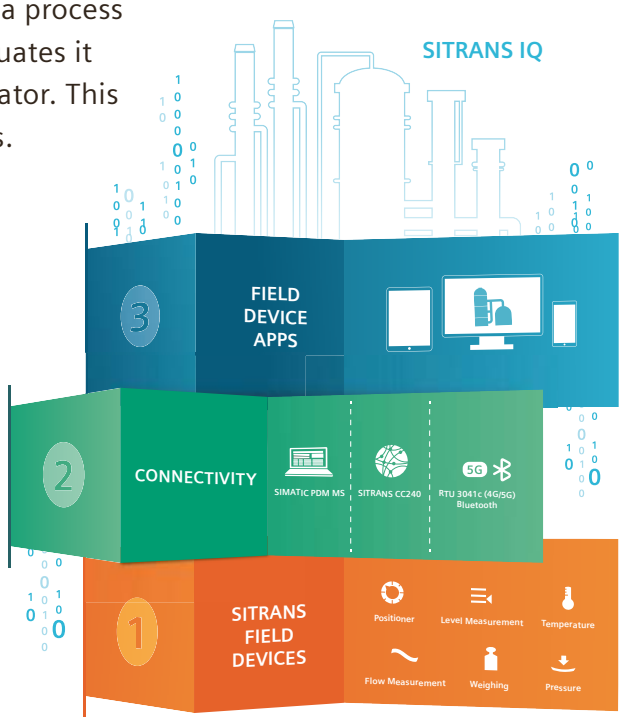



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# **SITRANS IQ** lets you talk with your plant

An immense amount of condition data is generated in a process plant. Our SITRANS IQ portfolio extracts this data, evaluates it and edits it according to the specific needs of the operator. This sets completely new standards for improving processes.




Our SITRANS IQ portfolio provides a flexible, scalable suite of solutions to capitalize on your already smart instrumentation. Typically, we only read a primary variable from these smart instruments and dig deeper once we have a problem. But there is an immense amount of other valuable, but unused condition data in a plant. Why not read this stranded data and prevent problems in commissioning, operation or maintenance? Our SITRANS IQ connectivity solutions establish a second data channel to access stranded data without affecting your process.

Free yourself of routine tasks like manually capturing remote measurements, monitoring thresholds yourself or doing extra rounds to check your mechanical assets. SITRANS IQ sets completely new standards for improving processes, enabling predictive maintenance and increasing plant performance. Start now!

**SITRANS SCM IQ**

SITRANS SCM IQ provides smart condition monitoring for mechanical plant assets to detect imminent equipment failures and prevent unexpected plant downtimes.

- Condition monitoring of all vibrating or rotating plant components, such as pumps, compressors, gearboxes, agitators, etc.
- Mechanical assets are equipped with SITRANS MS200 multisensors and a SITRANS CC220 industry gateway for data collection and transmission
- Already existing smart machinery with data integration in Siemens MindSphere can also be monitored
- Analysis of condition data based on artificial intelligence, allowing early detection of potential failures before they occur
- Event-related warnings enable predictive maintenance
- Graphical status display of monitored assets in SITRANS SCM IQ app



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### SITRANS store IQ

SITRANS store IQ is a cloud-based tool for intelligent inventory monitoring and management.

- Real-time monitoring of fill levels, for example of tank farms or silos, as well as stock levels on shelves
- Variety of scaling possibilities like strapping table, linear scaling function or via silo geometries
- Configurable dashboard allows adaptation to every specific use case scenario
- Alarms and notifications via SMS or e-mail
- Possibility to integrate a wide range of measured variables and technologies providing extra information beyond inventory
- Benefits from broad Siemens MindSphere connectivity options – data transmission directly from HART devices but also from PLC level





### Analyzer System Manager (ASM)

ASM is a monitoring & optimization solution for process analyzers.

- Monitoring of all analyzer-related assets
- Analysis of measurement values and device data for anomalies
- Execution and evaluation of validation/calibration data
- Maintenance management
- KPI reporting

### SITRANS serve IQ

The server-based SITRANS serve IQ application is used to acquire and monitor process data from remote measuring points.

- Suitable for all remote measurements, including flow, level or pressure, in industrial or municipal applications, for example for environmental or customer reporting needs
- Data transmission to local server (on premises) via mobile network, such as 3G or 4G
- Access to measurement data via Web browser application, with overview of device locations and detailed trend recording of all process values
- Integration into existing SCADA system possible through standard interface



### SITRANS AID IQ

SITRANS AID IQ is an on-premise solution to predict the need for maintenance of Siemens Analyzer.

- Provision of diagnostic data of each analyzer to evaluate health status
- Analysis of diagnostic data to predict device downtime
- Provision of service recommendations
- Access via HMI or Web-based application
- Plug & play principle for easy comissioning

### SITRANS mobile IQ

SITRANS mobile IQ is a free app for easy commissioning, parameterization and monitoring of Bluetooth-enabled field instrumentation via smartphone or tablet.

- Automatically detects and displays all supported and difficult-to-access field devices in the vicinity
- Convenient quick commissioning or detailed setup, including graphical support
- Displays device status and profile of selected measured and diagnostic values
- Currently supported field devices:
  - SITRANS LR1xx series
  - SITRANS Probe LU240 with retrofittable SITRANS AW050 Bluetooth adapter
  - SIPART PS100 with retrofittable SITRANS AW050 Bluetooth adapter
- Free download: www.siemens.com/siossitransmobileiq



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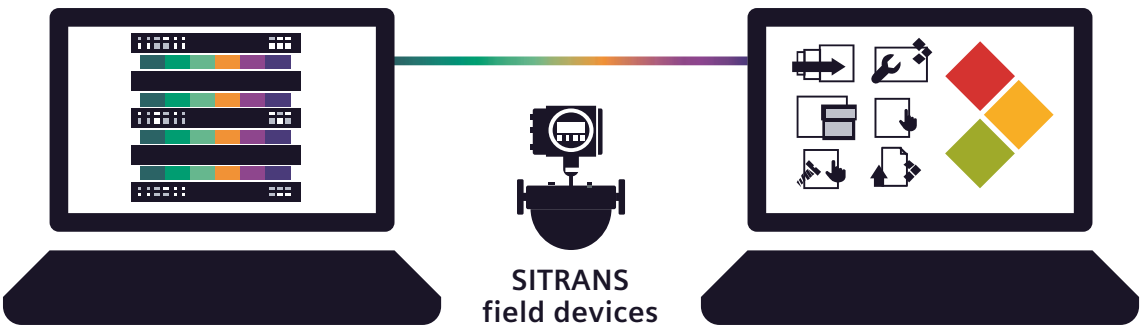
# **Seamless data flow** throughout the entire lifecycle of your plant

Empower your data! Clever, integrated engineering tools and solutions such as COMOS and SIMIT let you take control – and greatly increase the efficiency of processing and manufacturing plants.

**SIMIT**
The SIMIT simulation platform enables comprehensive tests of automation applications and provides a realistic training environment for operators even before the real startup. This creates opportunities for process optimization and know-how retention, which results in a reduced commissioning time and significantly shortened time-to-market.

**COMOS**
COMOS is the engineering tool from Siemens for the entire lifecycle of your plant. Through direct integration of our PIA Lifecycle Portal, we guarantee the seamless integration of our field devices in the engineering environment. We can offer you the field devices best suited to your processes, properties and measuring requirements.

**PIA Lifecycle Portal**
This portal helps you select, size and configure your ideal piece of instrumentation. Interfaces to COMOS and exports to the online ordering portal of Siemens: the Industry Mall (mall. industry. siemens.com). You are able to track the lifecycle of your instrument, see warranty and extended exchange option information as well additional information such as factory certificates (for example for calibration or validation).



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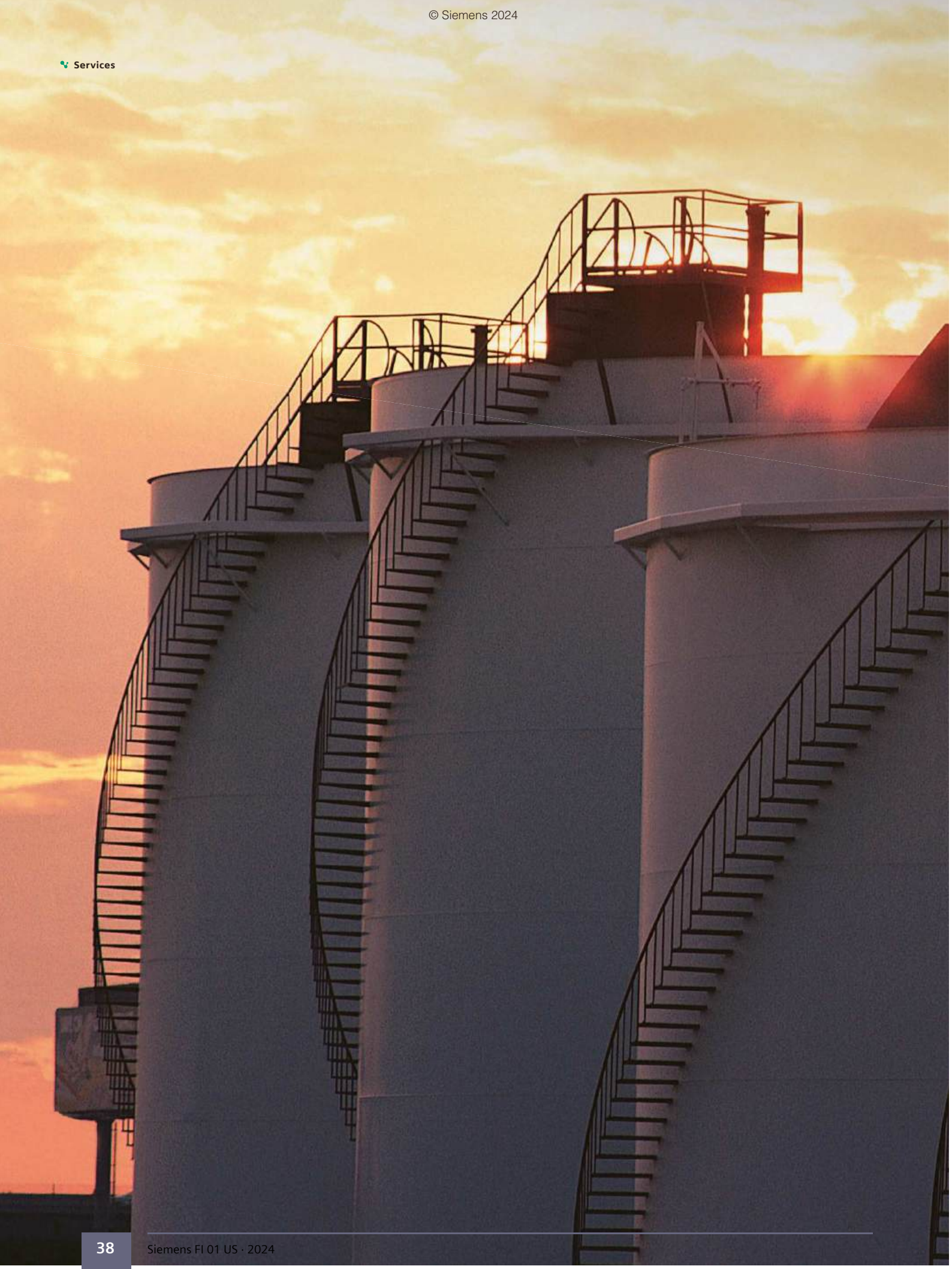



**SITRANS Library**

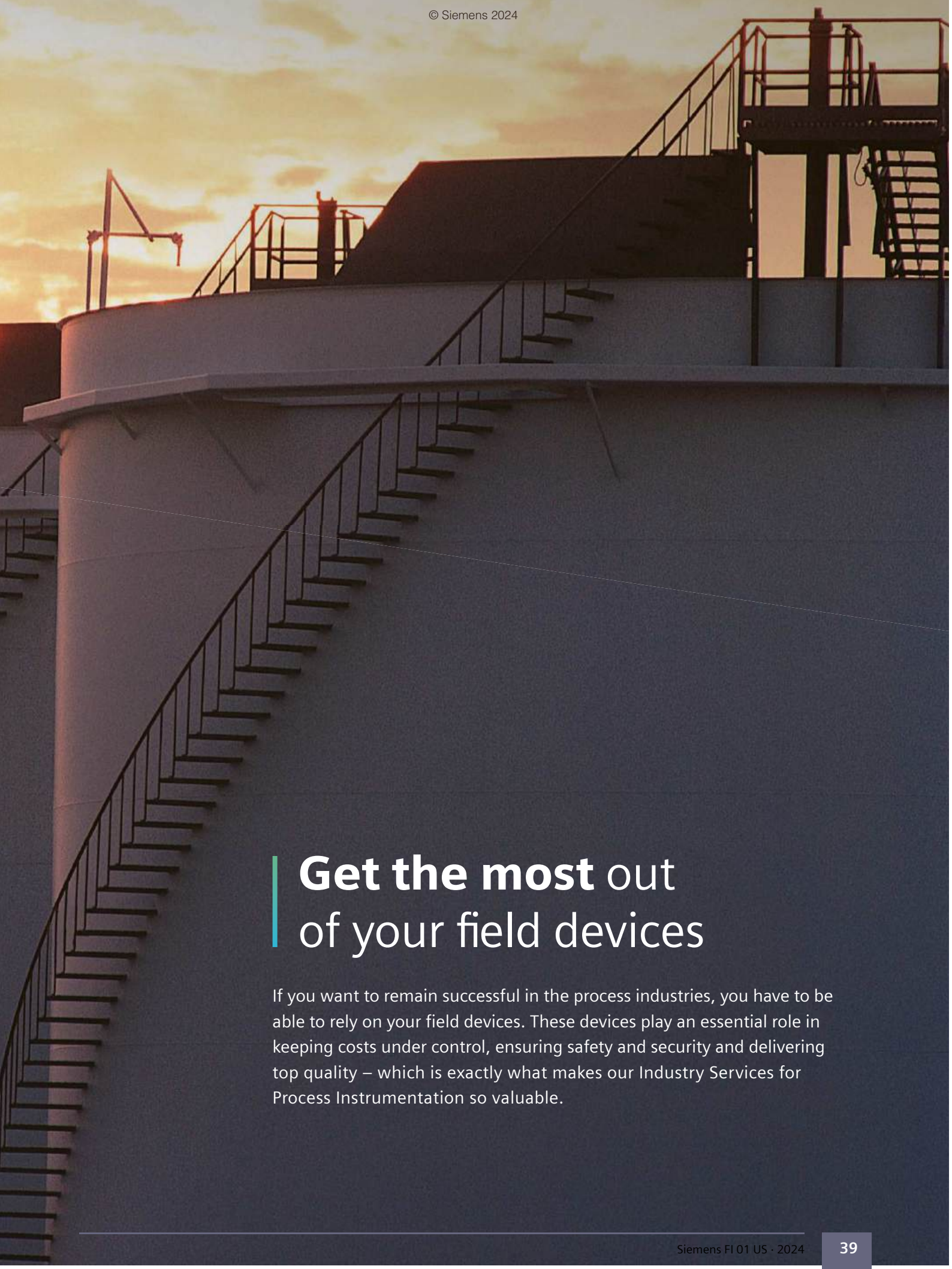
- Easy use of device-specific functions and data from devices of the SITRANS and SIPART product families, such as dosing or totalizer functions in solutions with SIMATIC PCS 7
- Library with device-specific function blocks, block symbols and faceplates
- Fully compatible with SIMATIC PCS 7 Standard Advanced Process Library (APL) throughout the entire lifecycle, from engineering to running of the plant

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# **Get the most** out of your field devices

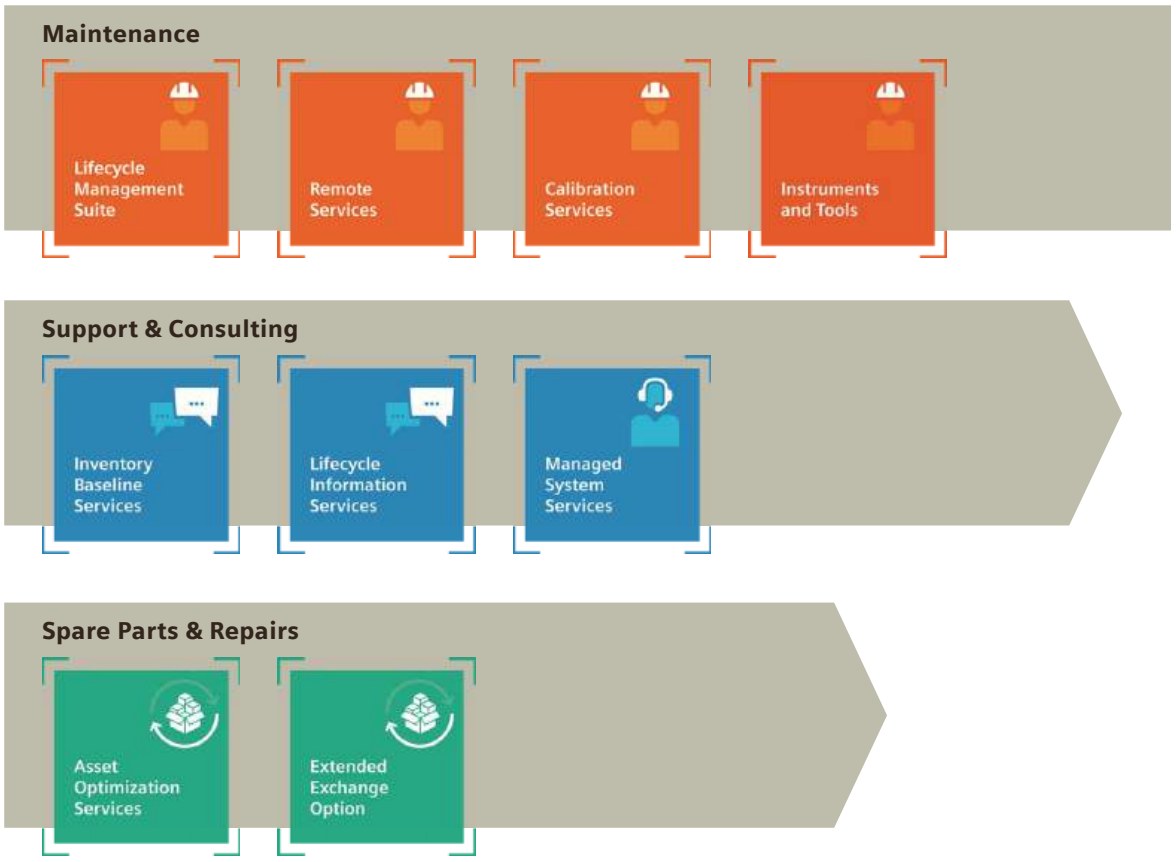
If you want to remain successful in the process industries, you have to be able to rely on your field devices. These devices play an essential role in keeping costs under control, ensuring safety and security and delivering top quality – which is exactly what makes our Industry Services for Process Instrumentation so valuable.

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# Individually adaptable range of **expert services**

Whether you want to protect your investments, ensure the availability of your plant, plan your maintenance costs over the long term or modernize your plant at optimized costs – with our comprehensive range of services and support for all aspects of process instrumentation, we provide you with an efficient lever for achieving these goals. Our modular service portfolio can be tailored precisely to your specific requirements.



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**Maintenance**
Maintaining field instruments is time-consuming, labor-intensive and – depending on whether it's performed inside or outside explosion-risk zones – involves a substantial outlay. In addition, the ever-growing demands for IT security play an increasingly important role. Our range of on-site services, platform-based remote services and comprehensive calibration services supports you in all your activities, from engineering and commissioning to maintenance.

**Support and consulting**
Siemens' Inventory Baseline Services and Lifecycle Information Services provide convenient and powerful portfolio elements for your installed base. We offer a comprehensive training program for design, operation and maintenance personnel that can take place either at the Siemens Training Center or on your premises. Managed System Services are focused on the efficient, centrally coordinated processing of complex support requests. They not only make all service and support activities transparent, they also significantly reduce service time.

**Spare parts and repairs**
Asset Optimization Services take a structured, systematic approach to the comprehensive optimization of your supply of spare parts. With the Extended Exchange Option, you can protect any Siemens process instrumentation products you order from unforeseeable repair costs.

**Lifecycle services contracts**
A modular lifecycle services contract is composed of defined service elements and contract-specific parameters. Long-term investment protection and assured of serviceability are the essential benefits of a contract solution.

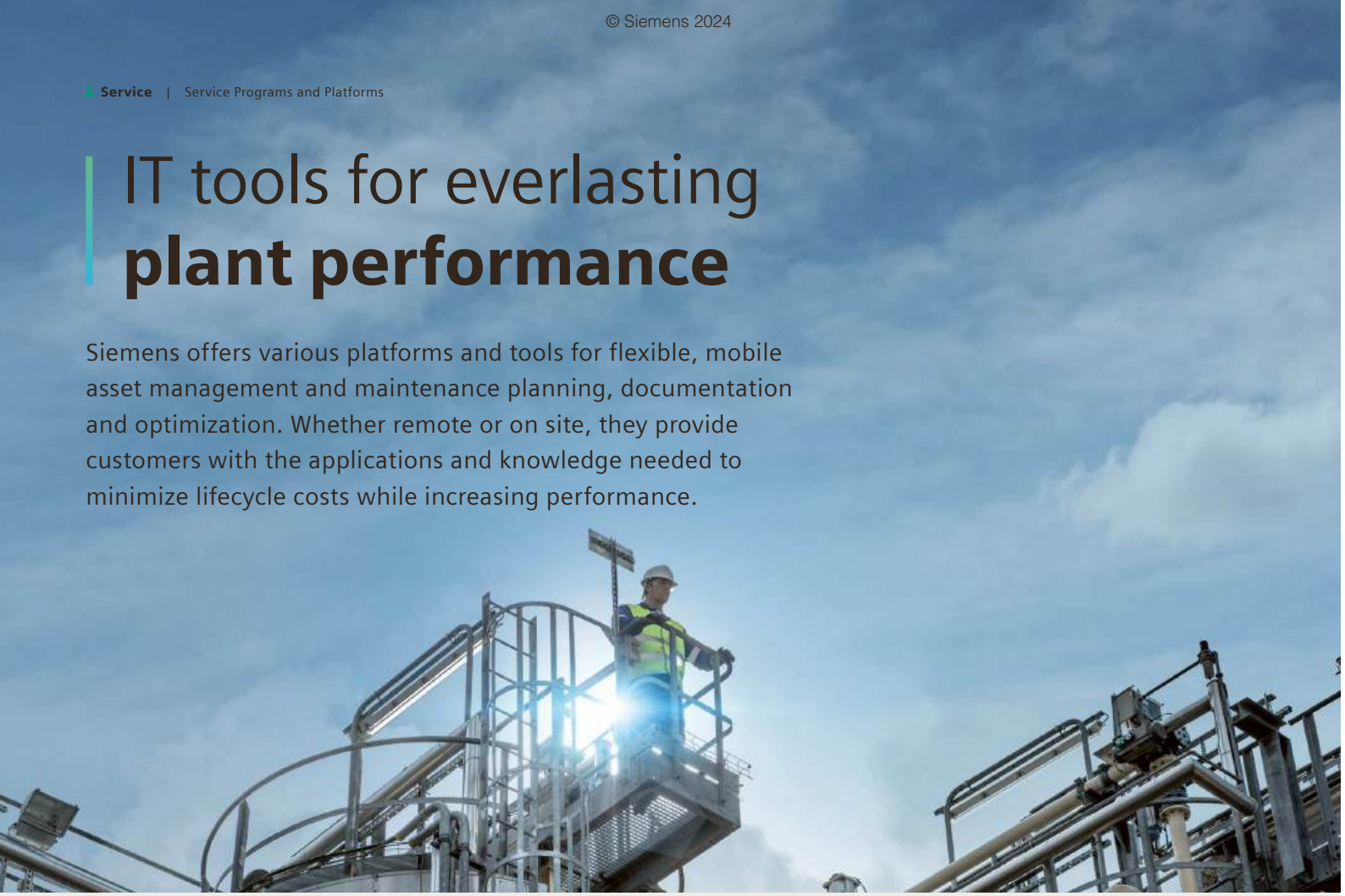


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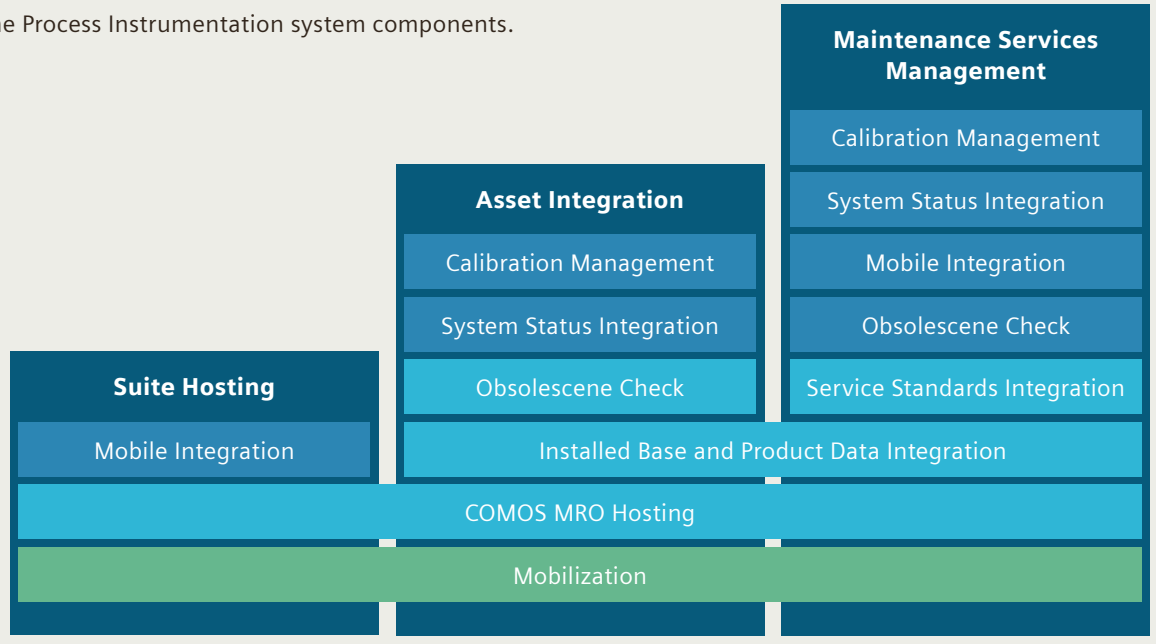
# IT tools for everlasting **plant performance**

Siemens offers various platforms and tools for flexible, mobile asset management and maintenance planning, documentation and optimization. Whether remote or on site, they provide customers with the applications and knowledge needed to minimize lifecycle costs while increasing performance.



**Lifecycle Management Suite**

The Lifecycle Management Suite optimizes plant maintenance during the planning, execution and documentation of all service activities. The pre-configured, COMOS MRO-based system provides Standard Operating Procedures (SOPs) for lifecycle services that are already assigned to the SIMATIC PCS 7 and the Process Instrumentation system components.




**Lifecycle Management Suite** – Module structure

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## Mobile Asset Management Program

Our SIPIX-based Mobile Asset Management Program is your virtual service technician for flexible process monitoring and optimized maintenance. It enhances service efficiency in every phase of the plant life cycle: from data acquisition of the installed base and mobile processing of maintenance orders to augmented reality-supported remote services by Siemens or manufacturer-independent experts. The platform series is robust, powerful and preconfigured with many service apps, making it ready for efficient service operations at the field level or for remote service access.

### Engineering

If required, the project engineer can involve a Siemens expert in a specific task at short notice so that they can solve it together on the same screen. The Siemens expert also has the possibility to guide the project engineer through the engineering tool and to make entries independently.

### Commissioning

Devices that have already been installed are not yet connected to the higher-level control system. In addition, there are often no networks available for communication with the outside world. This is where our Remote Assisted Collaboration approach comes into play. The SIPIX SD Tablet offers numerous communication options.

### Maintenance

In general, maintenance is mostly carried out on site at the unit and in the installed state. This makes it particularly difficult to call in experts from outside during the maintenance phase. Here, Remote Assisted Collaboration based on SIPIX SD offers a wide range of options for technical support by a Siemens expert.

**Field device management**

Wireless connection via Bluetooth HART modem for parameterization and trouble-shooting of process instrumentation with SIMATIC PDM

**Recurring mobile maintenance**

Targeted maintenance with the COMOS mobile app and standard checklists with the aid of the Lifecycle Management Suite

**Installation, commissioning, operation and modernization**

Versatile use of the SIPIX tool in every phase of the plant life cycle – in the PLC/control room, over networks via Wi-Fi, point-to-point directly to assets such as field devices, etc.

**Universally expandable**

Application-specific and customer-specific use cases are possible by installing additional software tools and using existing interfaces such as RFID HF readers, GPS and Bluetooth



**Remote services**

Fully integrated remote service solution for on-site support with the SIPIX RC video/audio app using the remote infrastructure of Siemens or customers

**PCS 7 process visualization and monitoring**

Process-level access to information and operation of the plant and asset management, including contactless identification of the assets (RFID scanner), even in hazardous areas

**Data recording**

Measuring point recording during service call or digitalization of the plant by means of app-driven manual data recording with SASDCmobile

**Calibration services**

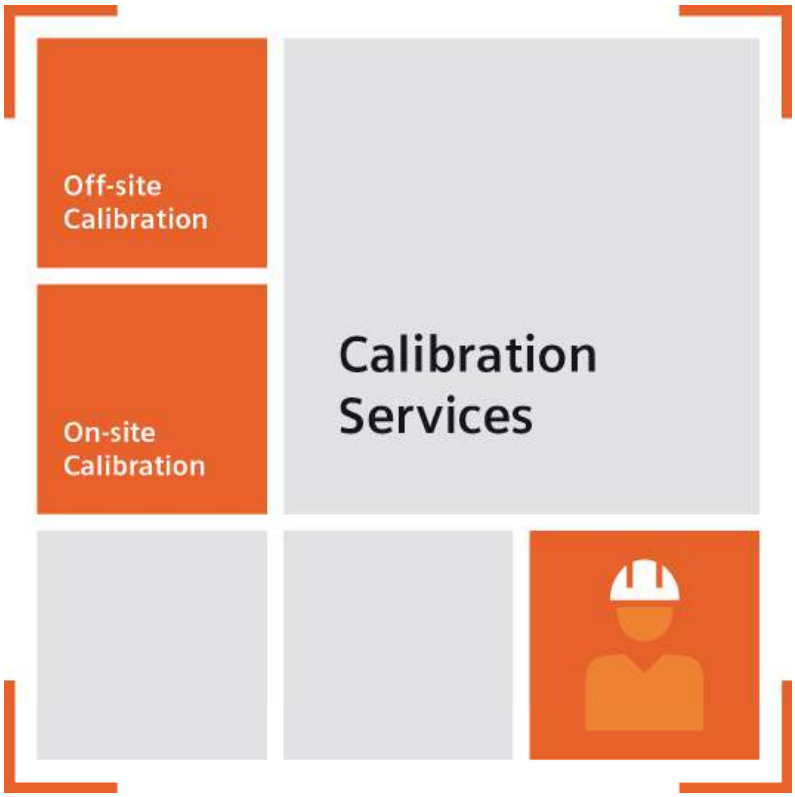
Paperless solution for execution and documentation of calibration for process instrumentation with bMobile app and CMX cloud-based calibration management

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# Ensuring the highest level of **precision and process quality**

Calibration of the measuring and inspection equipment used is vital for precision, quality assurance and compliance in production, maintenance and service. Calibrating measuring and inspection equipment, like any precision engineering activity, requires proper expertise: This is the only way to ensure that equipment performs to long-term expectations and can be trusted for the job at hand.




**Off-site Calibration**
Make sure your measuring equipment meets industry standards and remains operational throughout its lifecycle. Regular certification of the accuracy of your measuring instruments provides peace of mind.
Our DIN EN ISO/IEC 17025:2018-accredited lab is fully equipped with state-of-the-art precision instrumentation providing a broad range of calibrations for dimensional, electronic and process equipment.

**On-site Calibration**
Maintaining and calibrating measuring equipment in time is an important matter during the operational phase of a plant's lifecycle. In selected regions, we can also provide our calibration services directly at your facility to ensure your processes do not suffer from extended downtime.

| | Pressure | Temperature | Flow | Dynamic Weighing |
|---|---|---|---|---|
| Off-site Calibration according to ISO 9001 | x | x | x | |
| Off-site Calibration according to ISO 17025 | x | x | x | |
| Off-site Domestic Custody Transfer Verification | | | x | |
| On-site Calibration according to ISO 9001* | | | | x |

* On-site services will be performed by local Siemens Customer Services. Please contact the Siemens office in your region for further information.

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# Our global **support database**

Access to accurate information is a huge asset in the field. Siemens Industry Online Support (SIOS) provides up-to-date information about specific products quickly and easily. Available in the online portal or in the downloadable smartphone app for maximum convenience.

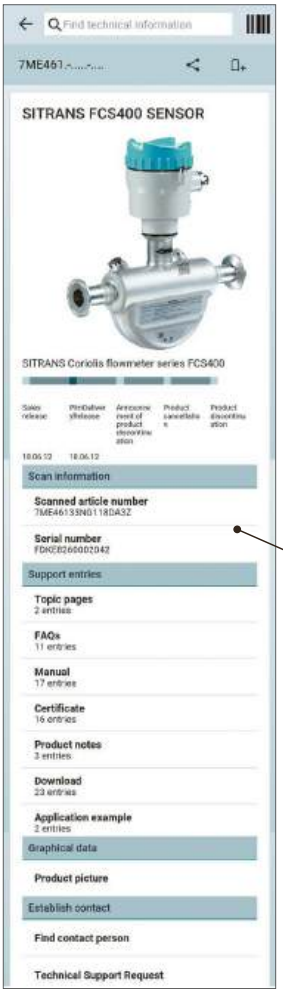


**SIOS Portal**

24 hours a day, 365 days a year – this portal provides comprehensive information on the entire Siemens portfolio for process and discrete industries.

Find information on automation, communication and process instrumentation under:

- Product support: handbooks, manuals, FAQs, product notes, certificates
- Services: the service portfolio
- Support request: help – just state your issue and we will contact you within four working hours
- My support: activate notifications according to your needs




**Industry Support App**

- Download and install the app on your smartphone
- Scan the QR code of any device in the field
- Access comprehensive information including device-specific information like handbooks, manuals, FAQs, product notes
- Submit a support request and we will contact you within four working hours (even quicker with a premium service contact)

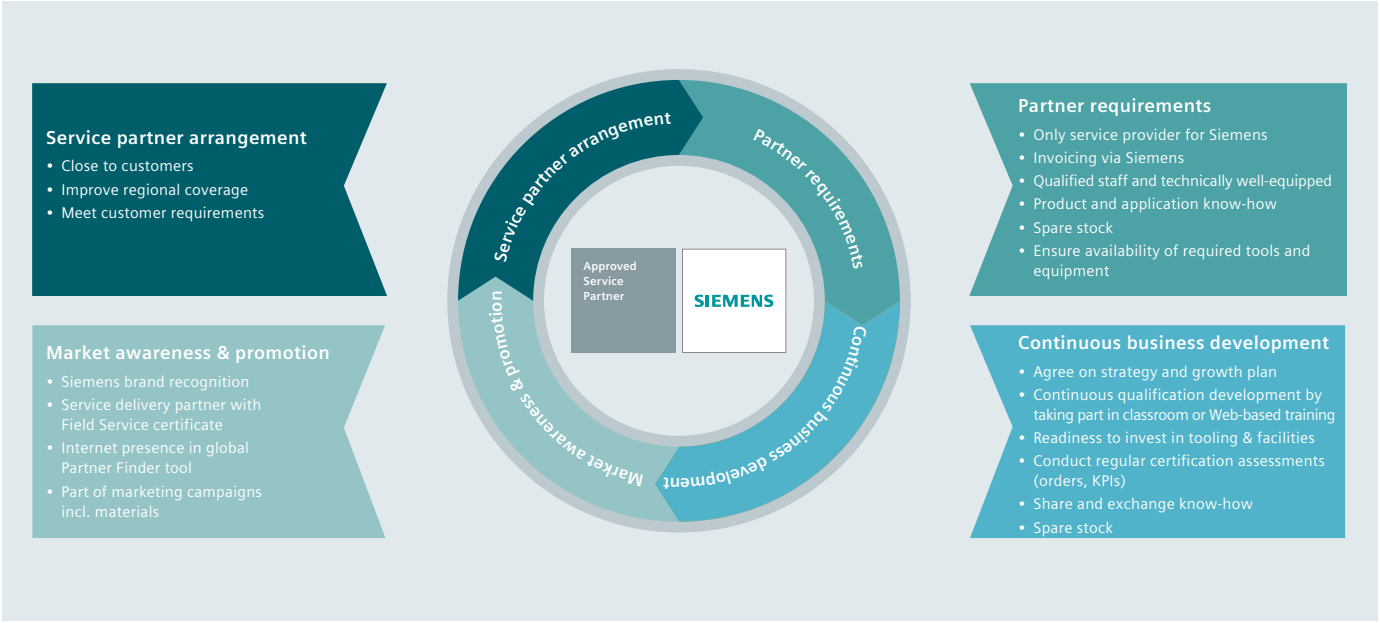


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# Approved and certified – near you

Siemens partners stand for proven expertise and excellent customer support. The companies we accept as partners have proven their capabilities and been certified in accordance with rigorous standards. At the same time, we support our partners with the same criteria we apply to the training of our own employees.




**Role of partners**

- Act as a competent service provider on behalf of Siemens
- Regional on-site support
- Bring expertise and service capability
- Secure ongoing development of new service offers together with Siemens
- Win new service customers

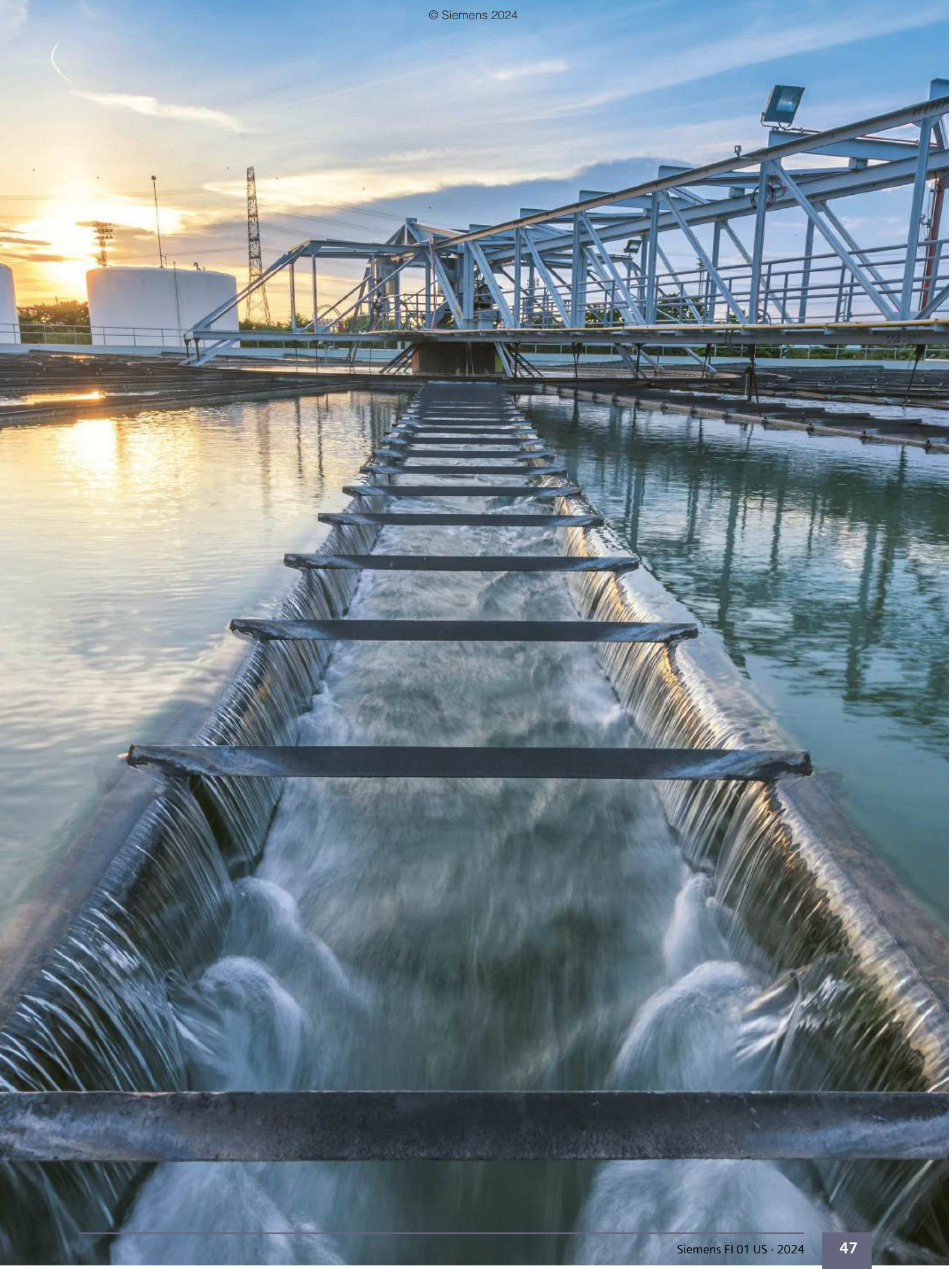
**Siemens delivers quality**

- Based on shared interest (Siemens and partner)
- Partners attend Siemens training programs on a regular basis
- Build on existing long-term relationships between Siemens and partners
- An extensive and standardized process for selection, onboarding and management of partners provides globally uniform quality and standards

**Your benefits**

- Competent service delivery
- Close to customers (short reaction time)
- Fast access to critical spares (partner stock)
- Increased flexibility
- Partners typically enjoy a high degree of regional acceptance

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| | |
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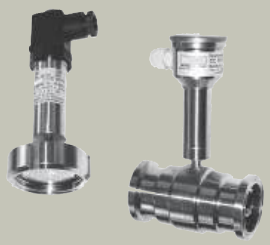

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## Overview

**SITRANS P single-range transmitters for general applications**

| | Area of application | Device description | Software for parameterization |
|---|---|---|---|
| **SITRANS P2xx**<br>  | 2-wire or 3-wire transmitters for measuring gauge and absolute pressure | **SITRANS P200**<br>• Single-range transmitters for gauge and absolute pressure<br>• Ceramic measuring cell<br>• For general applications<br>**SITRANS P210**<br>• Single-range transmitters for gauge pressure<br>• Stainless steel measuring cell<br>• For low-pressure applications<br>**SITRANS P220**<br>• Single-range transmitters for gauge pressure<br>• Stainless steel measuring cell, fully welded version<br>• For high-pressure applications and refrigeration technology | –<br>–<br>– |
| **SITRANS LH100**<br>  | 2-wire transmitter for measuring hydrostatic level | • For measuring liquid levels in wells, vessels, channels, dams etc.<br>• With ceramic diaphragm, Ø 23.4 mm (0.92 inch) | |
| **SITRANS LH300**<br>  | 2-wire transmitter for measuring hydrostatic level | • For measuring liquid levels in wells, vessels, channels, dams etc.<br>• With ceramic diaphragm, Ø 30 mm (1.18 inches)<br>• Suitable for small measuring ranges | – |
| **SITRANS P Compact**<br>  | Transmitters for gauge and absolute pressure for food, pharmaceuticals and biotechnology | • Single-range transmitters with 2-wire system<br>• Hygienic design with various aseptic connections in accordance with EHEDG, FDA and GMP recommendations | – |

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## Overview (continued)

### SITRANS P transmitters for food, pharmaceuticals and biotechnology

| | Area of application | Device description | Software for parameterization |
|---|---|---|---|
| **SITRANS P300**<br>  | 2-wire transmitter for measuring gauge and absolute pressure | • Hygiene-based design according to EHEDG, 3A, FDA and GMP<br>• Parameterization using 3 buttons and communication over HART, PROFIBUS PA or FOUNDATION Fieldbus<br>• Standard process connection G½", ½-NPT and flush-mounted process connections available<br>• Measuring range adjustment 100: 1 | SIMATIC PDM |
| **Factory mounting of valve manifolds**<br>  | | Factory-mounting of valve manifolds on SITRANS P300 gauge or absolute pressure transmitters<br>• Simplified assembly<br>• With pressure test<br>• Stainless steel valve manifolds | – |

### SITRANS P transmitters for the paper industry

| | Area of application | Device description | Software for parameterization |
|---|---|---|---|
| **SITRANS P300 with PMC connection**<br>  | 2-wire transmitter for measuring gauge pressure | • Measuring range adjustment 100: 1<br>• Process connections for the paper industry<br>• Parameterization using 3 pushbuttons and HART, PROFIBUS PA or FOUNDATION Fieldbus | SIMATIC PDM |

### SITRANS P transmitters for applications with advanced requirements

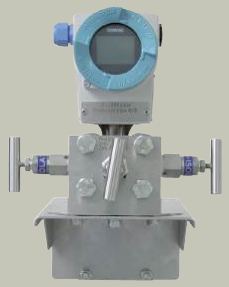
| | Area of application | Device description | Software for parameterization |
|---|---|---|---|
| **SITRANS P320/P420**<br>  | 2-wire transmitter for measuring:<br>• Gauge pressure,<br>• Absolute pressure,<br>• Differential pressure and<br>• Flow or<br>• Level | • Measuring accuracy<br>- SITRANS P320: 0.065%<br>- SITRANS P420: 0.04%<br>• Fast step response time of up to 105 ms<br>• Developed according to IEC 61508, SIL2/3 applications<br>• SIL validation remotely<br>• Diagnostics according to Namur NE107<br>• 4-button operation | SIMATIC PDM |

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## Overview (continued)

| Remote seal for SITRANS P transmitters | | | |
|---|---|---|---|
|  | **Area of application**<br>Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures) | **Device description**<br>Remote seal for SITRANS P300 and SITRANS P320/420<br>• Remote seal in sandwich and flange designs<br>• Remote seal with quick-release for the food and beverages industry<br>• Wide range of diaphragm materials and filling liquid available | **Software for parameterization**<br>– |

| Valves | | | |
|---|---|---|---|
| | **Area of application** | **Device description** | **Software for parameterization** |
| **Shut-off valves and valve manifolds**<br>  | Shutting off the medium and differential pressure lines<br>Mounting of transmitter on valve manifold or shut-off valve | Shut-off valves and valve manifolds available in steel, brass or stainless steel<br>Valve manifolds available for the various process connections of the SITRANS P transmitters | – |
| **Accessories for valves**<br>  | | The following parts are available as accessories for valves:<br>• Oval flange<br>• Connection pieces<br>• Connection glands<br>• Connection parts G½<br>• Water traps<br>• Sealing rings acc. to EN 837-1<br>• Pressure surge reducers<br>• Primary shut-off valves<br>• Compensation vessels<br>• Connection parts | – |

***Supplied product documentation on DVD and safety notes***



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For more information, refer to section 10 "Appendix".

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## Overview



The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- With ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

## Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

## Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

## Design

***Device structure without explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

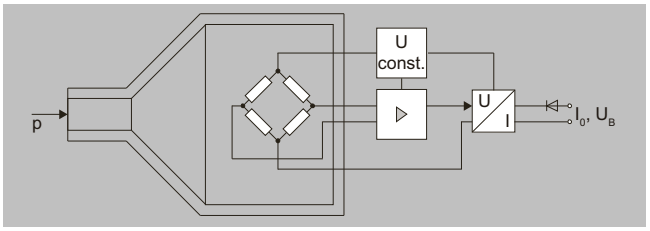
***Device structure with explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

## Function

The pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

***Mode of operation***




SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thick-film resistance bridge, to which the operating pressure p is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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## Selection and ordering data

| SITRANS P200 pressure transmitter, for pressure and absolute pressure for general applications | | | | | | | | Article No. 7MF1565- | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● |
| Typical characteristic curve deviation 0.25 %, material of wetted parts: Ceramic and stainless steel + gasket material<br>Material of non-wetted parts: Stainless steel | | | | | | | | | | | | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | |
| **Measuring range** | | **Minimum overload limit** | | **Maximum overload limit** | | **Burst pressure** | | | | | | | | | | | | | | |
| **For gauge pressure** | | | | | | | | | | | | | | | | | | | | |
| 0 ... 1 bar | (0 ... 14.5 psi) | -1 bar | (-14.5 psi) | 2.5 bar | (36.26 psi) | > 2.5 bar | (> 36.3 psi) | 3 | B | A | | | | | | | | | | |
| 0 ... 1.6 bar | (0 ... 23.2 psi) | -1 bar | (-14.5 psi) | 4 bar | (58.02 psi) | > 4 bar | (> 58.0 psi) | 3 | B | B | | | | | | | | | | |
| 0 ... 2.5 bar | (0 ... 36.3 psi) | -1 bar | (-14.5 psi) | 6.25 bar | (90.65 psi) | > 6.25 bar | (> 90.7 psi) | 3 | B | D | | | | | | | | | | |
| 0 ... 4 bar | (0 ... 58.0 psi) | -1 bar | (-14.5 psi) | 10 bar | (145 psi) | > 10 bar | (> 145 psi) | 3 | B | E | | | | | | | | | | |
| 0 ... 6 bar | (0 ... 87.0 psi) | -1 bar | (-14.5 psi) | 15 bar | (217 psi) | > 15 bar | (> 217 psi) | 3 | B | G | | | | | | | | | | |
| 0 ... 10 bar | (0 ... 145 psi) | -1 bar | (-14.5 psi) | 25 bar | (362 psi) | > 25 bar | (> 362 psi) | 3 | C | A | | | | | | | | | | |
| 0 ... 16 bar | (0 ... 232 psi) | -1 bar | (-14.5 psi) | 40 bar | (580 psi) | > 40 bar | (> 580 psi) | 3 | C | B | | | | | | | | | | |
| 0 ... 25 bar | (0 ... 363 psi) | -1 bar | (-14.5 psi) | 62.5 bar | (906 psi) | > 62.5 bar | (> 906 psi) | 3 | C | D | | | | | | | | | | |
| 0 ... 40 bar | (0 ... 580 psi) | -1 bar | (-14.5 psi) | 100 bar | (1450 psi) | > 100 bar | (> 1450 psi) | 3 | C | E | | | | | | | | | | |
| 0 ... 60 bar | (0 ... 870 psi) | -1 bar | (-14.5 psi) | 150 bar | (2175 psi) | > 150 bar | (> 2175 psi) | 3 | C | G | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... bar (psi) | | | | | | | | 9 | A | A | | | | | | | | H | 1 | Y |
| **For absolute pressure** | | | | | | | | | | | | | | | | | | | | |
| 0 ... 0.6 bar a | (0 ... 8.7 psi a) | 0 bar a | (0 psi a) | 2.5 bar a | (36.26 psi a) | > 2.5 bar a | (> 36.3 psi a) | 5 | A | G | | | | | | | | | | |
| 0 ... 1 bar a | (0 ... 14.5 psi a) | 0 bar a | (0 psi a) | 2.5 bar a | (36.26 psi a) | > 2.5 bar a | (> 36.3 psi a) | 5 | B | A | | | | | | | | | | |
| 0 ... 1.6 bar a | (0 ... 23.2 psi a) | 0 bar a | (0 psi a) | 4 bar a | (58.02 psi a) | > 4 bar a | (> 58.0 psi a) | 5 | B | B | | | | | | | | | | |
| 0 ... 2.5 bar a | (0 ... 36.3 psi a) | 0 bar a | (0 psi a) | 6.25 bar a | (90.65 psi a) | > 6.25 bar a | (> 90.7 psi a) | 5 | B | D | | | | | | | | | | |
| 0 ... 4 bar a | (0 ... 58.0 psi a) | 0 bar a | (0 psi a) | 10 bar a | (145 psi a) | > 10 bar a | (> 145 psi a) | 5 | B | E | | | | | | | | | | |
| 0 ... 6 bar a | (0 ... 87.0 psi a) | 0 bar a | (0 psi a) | 15 bar a | (217 psi a) | > 15 bar a | (> 217 psi a) | 5 | B | G | | | | | | | | | | |
| 0 ... 10 bar a | (0 ... 145 psi) | 0 bar a | (0 psi a) | 25 bar a | (362 psi a) | > 25 bar a | (> 362 psi a) | 5 | C | A | | | | | | | | | | |
| 0 ... 16 bar a | (0 ... 232 psi) | 0 bar a | (0 psi a) | 40 bar a | (580 psi a) | > 40 bar a | (> 580 psi a) | 5 | C | B | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... mbar a (psi a) | | | | | | | | 9 | A | A | | | | | | | | H | 2 | Y |
| **Measuring ranges for gauge pressure** | | | | | | | | | | | | | | | | | | | | |
| | 0 ... 15 psi | | -14.5 psi | | 35 psi | | > 35 psi | 4 | B | B | | | | | | | | | | |
| | 3 ... 15 psi | | -14.5 psi | | 35 psi | | > 35 psi | 4 | B | C | | | | | | | | | | |
| | 0 ... 20 psi | | -14.5 psi | | 50 psi | | > 50 psi | 4 | B | D | | | | | | | | | | |
| | 0 ... 30 psi | | -14.5 psi | | 80 psi | | > 80 psi | 4 | B | E | | | | | | | | | | |
| | 0 ... 60 psi | | -14.5 psi | | 140 psi | | > 140 psi | 4 | B | F | | | | | | | | | | |
| | 0 ... 100 psi | | -14.5 psi | | 200 psi | | > 200 psi | 4 | B | G | | | | | | | | | | |
| | 0 ... 150 psi | | -14.5 psi | | 350 psi | | > 350 psi | 4 | C | A | | | | | | | | | | |
| | 0 ... 200 psi | | -14.5 psi | | 550 psi | | > 550 psi | 4 | C | B | | | | | | | | | | |
| | 0 ... 300 psi | | -14.5 psi | | 800 psi | | > 800 psi | 4 | C | D | | | | | | | | | | |
| | 0 ... 500 psi | | -14.5 psi | | 1 400 psi | | > 1400 psi | 4 | C | E | | | | | | | | | | |
| | 0 ... 750 psi | | -14.5 psi | | 2 000 psi | | > 2 000 psi | 4 | C | F | | | | | | | | | | |
| | 0 ... 1 000 psi | | -14.5 psi | | 2 000 psi | | > 2 000 psi | 4 | C | G | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... psi | | | | | | | | 9 | A | A | | | | | | | | H | 1 | Y |
| **Measuring ranges for absolute pressure** | | | | | | | | | | | | | | | | | | | | |
| | 0 ... 10 psi a | | 0 psi a | | 35 psi a | | > 35 psi a | 6 | A | G | | | | | | | | | | |
| | 0 ... 15 psi a | | 0 psi a | | 35 psi a | | > 35 psi a | 6 | B | A | | | | | | | | | | |
| | 0 ... 20 psi a | | 0 psi a | | 50 psi a | | > 50 psi a | 6 | B | B | | | | | | | | | | |
| | 0 ... 30 psi a | | 0 psi a | | 80 psi a | | > 80 psi a | 6 | B | D | | | | | | | | | | |
| | 0 ... 60 psi a | | 0 psi a | | 140 psi a | | > 140 psi a | 6 | B | E | | | | | | | | | | |
| | 0 ... 100 psi a | | 0 psi a | | 200 psi a | | > 200 psi a | 6 | B | G | | | | | | | | | | |
| | 0 ... 150 psi a | | 0 psi a | | 350 psi a | | > 350 psi a | 6 | C | A | | | | | | | | | | |
| | 0 ... 200 psi a | | 0 psi a | | 550 psi a | | > 550 psi a | 6 | C | B | | | | | | | | | | |
| | 0 ... 300 psi a | | 0 psi a | | 800 psi a | | > 800 psi a | 6 | C | C | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... psi a | | | | | | | | 9 | A | A | | | | | | | | H | 2 | Y |
| **Output signal** | | | | | | | | | | | | | | | | | | | | |
| 4 ... 20 mA; 2-wire system; auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices) | | | | | | | | | | | | | | 0 | | | | | | |
| 0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC | | | | | | | | | | | | | | 1 | 0 | | | | | |

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## Selection and ordering data (continued)

| SITRANS P200 pressure transmitter, for pressure and absolute pressure for general applications | Article No. 7MF1565- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● |
| 0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC | | | | 2 | 0 | | | | | | | | | |
| Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10% | | | | 3 | 0 | | | | | | | | | |
| ***Explosion protection (only 4 ... 20 mA)*** | | | | | | | | | | | | | | |
| None | | | | | 0 | | | | | | | | | |
| With explosion protection Ex ia IIC T4 | | | | | 1 | | | | | | | | | |
| **Electrical connection** | | | | | | | | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling) | | | | | | | 1 | | | | | | | |
| M12 device plug according to IEC 61076-2-101 | | | | | | | 2 | | | | | | | |
| Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection | | | | | 0 | | 3 | | | | | | | |
| Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection | | | | | 0 | | 4 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) | | | | | | | 5 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling) | | | | | | | 6 | | | | | | | |
| Permanently installed cable, length 5 m (16.4 ft) | | | | | 0 | | 7 | | | | | | | |
| Special design | | | | | | | 9 | | | | | N | 1 | Y |
| **Process connection** | | | | | | | | | | | | | | |
| G½" male according to EN 837-1 (½" BSP male): Standard for metric pressure ranges mbar, bar | | | | | | | | A | | | | | | |
| G½" male and G1/8" female | | | | | | | | B | | | | | | |
| G¼" male according to EN 837-1 (¼" BSP male) | | | | | | | | C | | | | | | |
| 7/16"-20 UNF male | | | | | | | | D | | | | | | |
| ¼"-18 NPT male: Standard for pressure ranges in$H_2O$ and psi | | | | | | | | E | | | | | | |
| ¼"-18 NPT female | | | | | | | | F | | | | | | |
| ½"-14 NPT male | | | | | | | | G | | | | | | |
| ½"-14 NPT female | | | | | | | | H | | | | | | |
| 7/16"-20 UNF female | | | | | | | | J | | | | | | |
| M20×1.5 male | | | | | | | | P | | | | | | |
| G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | Q | | | | | | |
| G½" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | R | | | | | | |
| Special design | | | | | | | | Z | | | | P | 1 | Y |
| **Gasket material between sensor and enclosure** | | | | | | | | | | | | | | |
| Viton (FPM, standard) | | | | | | | | | A | | | | | |
| Neoprene (CR) | | | | | | | | | B | | | | | |
| Perbunan (NBR) | | | | | | | | | C | | | | | |
| EPDM | | | | | | | | | D | | | | | |
| Special design | | | | | | | | | Z | | | Q | 1 | Y |
| **Version** | | | | | | | | | | | | | | |
| Standard version | | | | | | | | | | | 1 | | | |

| Options | Order code |
|---|---|
| Add **"-Z"** to article number and specify order code. | |
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 | **C11** |
| Oxygen version, free of oil and degreased, max. operating pressure 60 bar (870.2 psi), max. medium temperature +85 °C (185 °F) | **E10** |
| ***Notice*** | |
| Only with Viton gasket material between sensor and enclosure, and not with explosion protection version! | |

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## Technical specifications

| SITRANS P200 for gauge and absolute pressure | |
|---|---|
| **Area of application** | |
| Gauge and absolute pressure measurement | Liquids, gases and vapors |
| **Mode of operation** | |
| Measuring principle | Piezo-resistive measuring cell (ceramic diaphragm) |
| Measured variable | Gauge and absolute pressure |
| **Input** | |
| Measuring range | |
| • Gauge pressure | |
| - Metric | 1 ... 60 bar (15 ... 870 psi) |
| - US measuring range | 15 ... 1000 psi |
| • Absolute pressure | |
| - Metric | 0.6 ... 16 bar a (10 ... 232 psi a) |
| - US measuring range | 10 ... 300 psi a |
| **Output** | |
| Current signal | 4 ... 20 mA |
| • Load | ($U_B$ - 10 V)/0.02 A |
| • Auxiliary power $U_B$ | 7 ... 33 V DC (10 ... 30 V for Ex) |
| Voltage signal | 0 ... 10 V DC |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | 12 ... 33 V DC |
| • Current consumption | < 7 mA at 10 kΩ |
| Radiometric output | 10 ... 90% |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | DC 5 V ± 10% |
| • Current consumption | < 7 mA at 10 Ω |
| Characteristic curve | Linear rising |
| **Measuring accuracy** | |
| Measurement deviation at limit setting including hysteresis and reproducibility | • Typical: 0.25% of measuring span<br>• Maximum: 0.5% of measuring span |
| Step response time $T_{99}$ | < 5 ms |
| Long-term stability | |
| • Lower range value and measuring span | 0.25% of measuring span/year |
| Effect of ambient temperature | |
| • Lower range value and measuring span | 0.25%/10 K of measuring span |
| • Influence of power supply | 0.005%/V |
| **Operating conditions** | |
| Process temperature with gasket made of: | |
| • FPM (standard) | -15 ... +125 °C (5 ... 257 °F) |
| • Neoprene | -35 ... +100 °C (-31 ... +212 °F) |
| • Perbunan | -20 ... +100 °C (-4 ... +212 °F) |
| • EPDM | -40 ... +125 °C (-40 ... +257 °F), usable for drinking water |
| Ambient temperature | -25 ... +85 °C (-13 ... +185 °F) |
| Storage temperature | -50 ... +100 °C (-58 ... +212 °F) |
| Degree of protection according to IEC 60529 | • IP65 with plug according to EN 175301-803-A<br>• IP67 with M12 device plug<br>• IP67 with cable<br>• IP67 with cable quick screw connection |
| Electromagnetic compatibility | • According to IEC 61326-1/-2/-3<br>• According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of ≤ 1% |
| **Structural design** | |
| Weight | Approx. 0.090 kg (0.198 lbs) |
| Process connections | See dimension drawings |

## Technical specifications (continued)

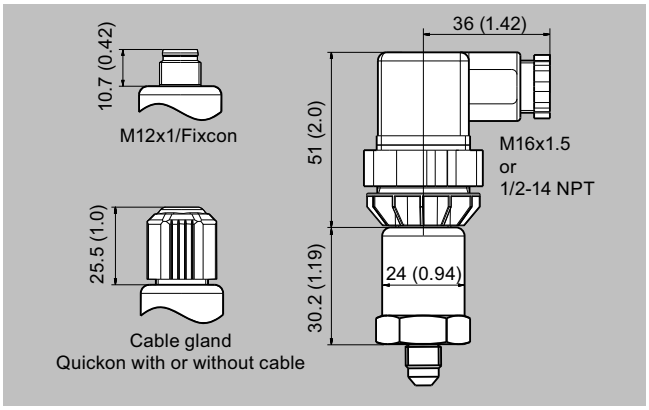
| SITRANS P200 for gauge and absolute pressure | |
|---|---|
| Electrical connections | • Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or ½-14 NPT or Pg 11<br>• Device plug M12<br>• 2 or 3-wire (0.5 mm²) cable (Ø ± 5.4 mm)<br>• Quickon cable quick screw connection |
| Material of wetted parts | |
| • Measuring cell | $Al_2O_3$ - 96% |
| • Process connection | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| • Gasket | • FPM (standard)<br>• Neoprene<br>• Perbunan<br>• EPDM |
| Material of non-wetted parts | |
| • Enclosure | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| • Connector housing | Plastic |
| • Cable | PVC |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Lloyd's Register of Shipping (LR)[1)] | 12/20010 |
| Germanischer Lloyd (GL)[1)] | GL19740 11 HH00 |
| American Bureau of Shipping (ABS)[1)] | ABS_11_HG 789392_PDA |
| Bureau Veritas (BV)[1)] | BV 271007A0 BV |
| Det Norske Veritas (DNV)[1)] | A 12553 |
| Drinking water approval (ACS)[1)] | ACS 15 ACC NY 360 |
| EAC[1)] | № ТС RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ» |
| Underwriters Laboratories (UL)[1)] | |
| • For USA and Canada | UL 20110217 - E34453 |
| • Worldwide | IEC UL DK 21845 |
| **Explosion protection** | |
| Intrinsic safety "i" (only with current output) | Ex II 1/2 G Ex ia IIC T4 Ga/Gb<br>Ex II 1/2 D Ex ia IIIC T125 °C Da/Db |
| EC type-examination certificate | SEV 10 ATEX 0146 |
| Connection to certified intrinsically safe ohmic circuits with maximum values | $U_i$ ≤ DC 30 V; $I_i$ ≤ 100 mA; $P_i$ ≤ 0.75 W |
| Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12 | $L_i$ = 0 nH; $C_i$ = 0 nF |

[1)] For variants with output signal 0 ... 5 V and radiometric output available soon.

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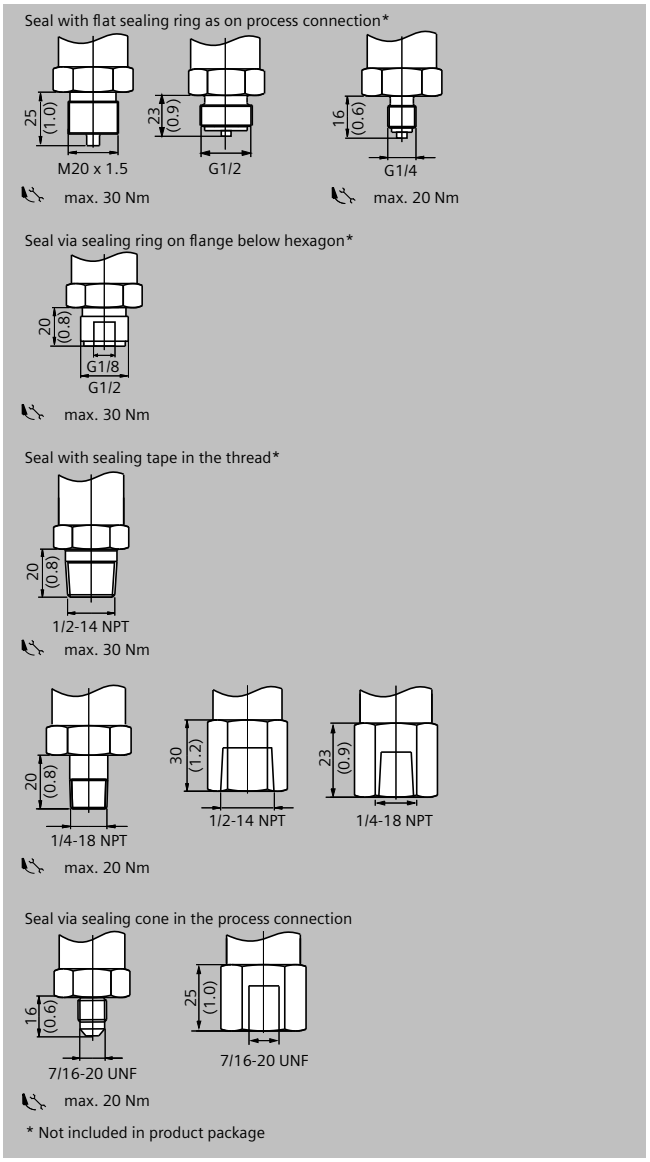


## Dimensional drawings




SITRANS P200, electrical connections, dimensions in mm (inch)

## Dimensional drawings (continued)

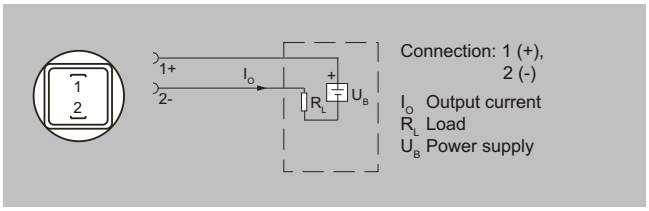



SITRANS P200, process connections, dimensions in mm (inch)

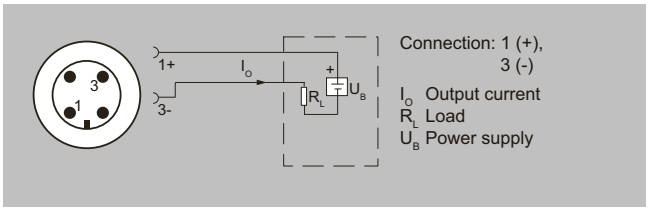
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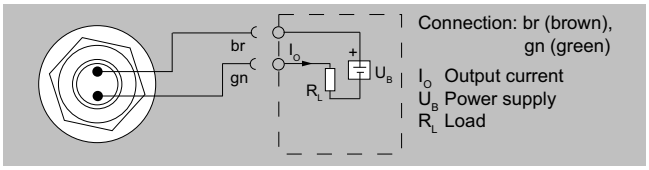
## Circuit diagrams



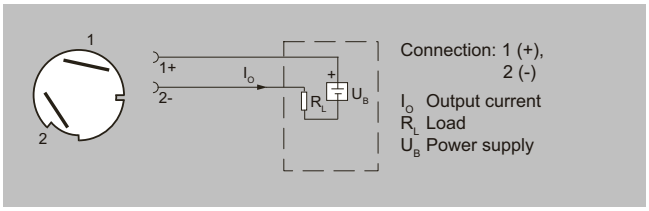

Connection with current output and plug according to EN 175301



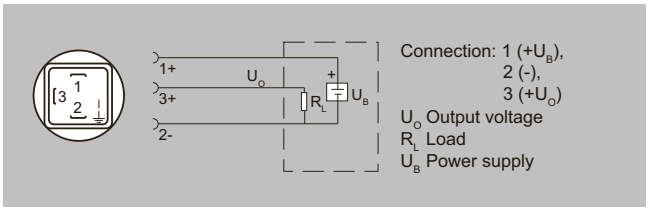

Connection with current output and M12x1 device plug




Connection with current output and cable

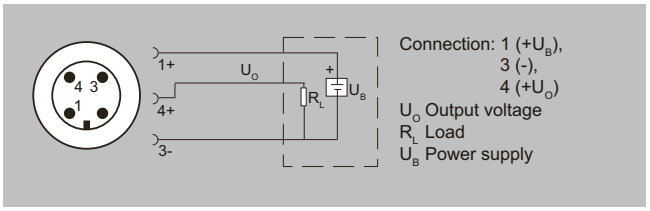



Connection with current output and Quickon cable quick screw connection

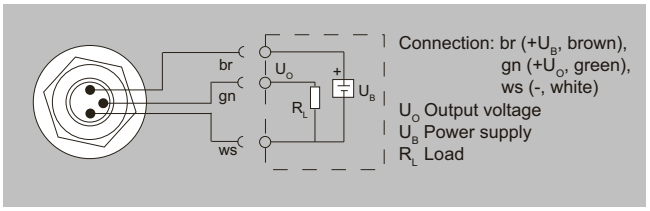



Connection with voltage output, ratiometric output and plug according to EN 175301

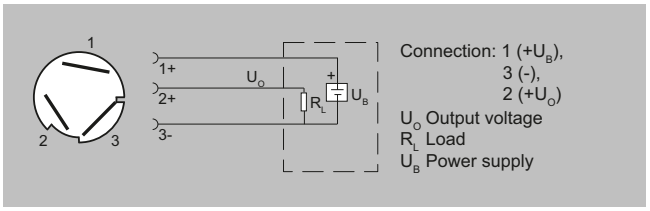
## Circuit diagrams (continued)




Connection with voltage output, ratiometric output and M12x1 device plug



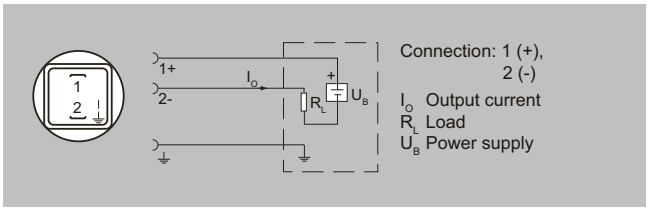

Connection with voltage output, ratiometric output and cable



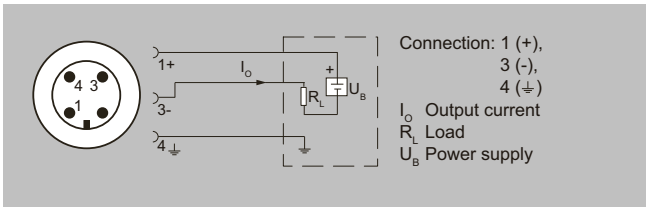

Connection with voltage output, ratiometric output and Quickon fast cable termination

***Device design with explosion protection: 4 to 20 mA***

The grounding connection is conductively bonded to the transmitter enclosure.




Connection with current output and plug according to EN 175301 (Ex)




Connection with current output and M12x1 (Ex) device plug

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## Overview



The SITRANS P210 pressure transmitter measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell
- Measuring ranges 100 to 600 mbar (1.45 to 8.7 psi) relative
- For low-pressure applications

## Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

## Application

The SITRANS P210 pressure transmitter for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Energy development
- Chemical industry
- Water supply

## Design

***Device structure without explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

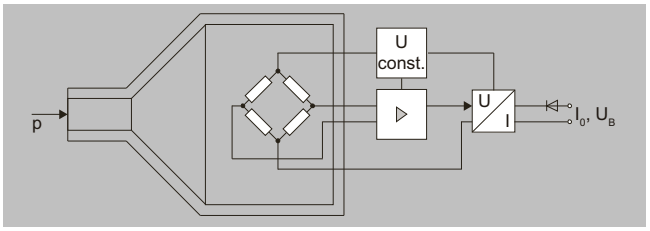
***Device structure with explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

## Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

***Mode of operation***




SITRANS P210 pressure transmitter (7MF1566-...), functional diagram

The stainless steel measuring cell with silicone oil filling has a thin-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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## Selection and ordering data

| SITRANS P210 pressure transmitter for gauge pressure, for low-pressure applications | | | | | | | | Article No. 7MF1566- | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | ● | ● | ● |
| Measurement deviation typ. 0.25%<br>Material of wetted parts: Stainless steel + gasket material<br>Material of non-wetted parts: Stainless steel | | | | | | | | | | | | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | |
| **Measuring range** | | **Minimum overload limit** | | **Maximum overload limit** | | **Burst pressure** | | | | | | | | | | | | | | |
| **For gauge pressure** | | | | | | | | | | | | | | | | | | | | |
| 0...100 mbar | (1.45 psi) | -400 mbar | (-5.8 psi) | 400 mbar | (5.8 psi) | 1 bar | (14.5 psi) | 3 | A | A | | | | | | | | | | |
| 0...160 mbar | (2.32 psi) | -400 mbar | (-5.8 psi) | 400 mbar | (5.8 psi) | 1 bar | (14.5 psi) | 3 | A | B | | | | | | | | | | |
| 0...250 mbar | (3.63 psi) | -800 mbar | (-11.6 psi) | 1 000 mbar | (14.5 psi) | 2 bar | (29.0 psi) | 3 | A | C | | | | | | | | | | |
| 0...400 mbar | (5.8 psi) | -800 mbar | (-11.6 psi) | 1 000 mbar | (14.5 psi) | 2 bar | (29.0 psi) | 3 | A | D | | | | | | | | | | |
| 0...600 mbar | (8.7 psi) | -1 000 mbar | (-14.5 psi) | 2 000 mbar | (29.0 psi) | 3 bar | (43.5 psi) | 3 | A | G | | | | | | | | | | |
| Other version; Add order code and plain text:<br>Measuring range: ... to ... mbar (psi) | | | | | | | | 9 | A | A | | | | | | | | H | 1 | Y |
| **Output signal** | | | | | | | | | | | | | | | | | | | | |
| 4 ... 20 mA; 2-wire system; auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices) | | | | | | | | | | | 0 | | | | | | | | | |
| 0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC | | | | | | | | | | | 1 | 0 | | | | | | | | |
| 0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC | | | | | | | | | | | 2 | 0 | | | | | | | | |
| Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10% | | | | | | | | | | | 3 | 0 | | | | | | | | |
| **Explosion protection (only 4 ... 20 mA)** | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | 0 | | | | | | | | |
| With explosion protection Ex ia IIC T4 | | | | | | | | | | | | 1 | | | | | | | | |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling) | | | | | | | | | | | | | 1 | | | | | | | |
| M12 device plug according to IEC 61076-2-101 | | | | | | | | | | | | | 2 | | | | | | | |
| Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection | | | | | | | | | | | | 0 | 3 | | | | | | | |
| Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection | | | | | | | | | | | | 0 | 4 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling) | | | | | | | | | | | | | 5 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling) | | | | | | | | | | | | | 6 | | | | | | | |
| Permanently installed cable, length 5 m (16.4 ft) | | | | | | | | | | | | 0 | 7 | | | | | | | |
| Special design | | | | | | | | | | | | | 9 | | | | | N | 1 | Y |
| **Process connection** | | | | | | | | | | | | | | | | | | | | |
| G½" male according to EN 837-1 (½" BSP male): Standard for metric pressure ranges mbar, bar | | | | | | | | | | | | | | A | | | | | | |
| G½" male and G1/8" female | | | | | | | | | | | | | | B | | | | | | |
| G¼" male according to EN 837-1 (¼" BSP male) | | | | | | | | | | | | | | C | | | | | | |
| 7/16"-20 UNF male | | | | | | | | | | | | | | D | | | | | | |
| ¼"-18 NPT male: Standard for pressure ranges in$H_2O$ and psi | | | | | | | | | | | | | | E | | | | | | |
| ¼"-18 NPT female | | | | | | | | | | | | | | F | | | | | | |
| ½"-14 NPT male | | | | | | | | | | | | | | G | | | | | | |
| ½"-14 NPT female | | | | | | | | | | | | | | H | | | | | | |
| 7/16"-20 UNF female | | | | | | | | | | | | | | J | | | | | | |
| M20×1.5 male | | | | | | | | | | | | | | P | | | | | | |
| G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | | | | | | | Q | | | | | | |
| G½" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | | | | | | | R | | | | | | |
| Special design | | | | | | | | | | | | | | Z | | | | P | 1 | Y |
| **Gasket material between sensor and enclosure** | | | | | | | | | | | | | | | | | | | | |
| Viton (FPM, standard) | | | | | | | | | | | | | | | A | | | | | |
| Neoprene (CR) | | | | | | | | | | | | | | | B | | | | | |
| Perbunan (NBR) | | | | | | | | | | | | | | | C | | | | | |
| EPDM | | | | | | | | | | | | | | | D | | | | | |
| Special design | | | | | | | | | | | | | | | Z | | | Q | 1 | Y |
| **Version** | | | | | | | | | | | | | | | | | | | | |
| Standard version | | | | | | | | | | | | | | | | 1 | | | | |

| Options | Order code |
|---|---|
| Add **"-Z"** to article number and specify order code. | |
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 | **C11** |

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## Technical specifications

| SITRANS P210 for gauge pressure | |
|---|---|
| **Area of application** | |
| Gauge pressure measurement | Liquids, gases and vapors |
| **Mode of operation** | |
| Measuring principle | Piezoresistive measuring cell (stainless steel diaphragm) |
| Measured variable | Gauge pressure |
| **Input** | |
| Measuring range | |
| • Gauge pressure | 100 ... 600 mbar (1.45 ... 8.7 psi) |
| **Output** | |
| Current signal | 4 ... 20 mA |
| • Load | ($U_B$ - 10 V)/0.02 A |
| • Auxiliary power $U_B$ | 7 ... 33 V DC (10 ... 30 V for Ex) |
| Voltage signal | 0 ... 10 V DC |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | 12 ... 33 V DC |
| • Current consumption | < 7 mA at 10 kΩ |
| Radiometric output | 10 ... 90% |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | DC 5 V ± 10% |
| • Current consumption | < 7 mA at 10 kΩ |
| Characteristic curve | Linear rising |
| **Measuring accuracy** | |
| Measurement deviation at limit setting including hysteresis and reproducibility | • Typical: 0.25% of measuring span<br>• Maximum: 0.5% of measuring span |
| Step response time $T_{99}$ | < 5 ms |
| Long-term stability | |
| • Lower range value and measuring span | 0.25% of measuring span/year |
| Effect of ambient temperature | |
| • Lower range value and measuring span | • 0.25%/10 K of measuring span<br>• 0.5%/10 K of measuring span for a measuring range 100 ... 400 mbar (40 ... 240 in$H_2O$) |
| • Influence of power supply | 0.005%/V |
| **Operating conditions** | |
| Process temperature with gasket made of: | |
| • FPM (standard) | -15 ... +125 °C (5 ... 257 °F) |
| • Neoprene | -35 ... +100 °C (-31 ... +212 °F) |
| • Perbunan | -20 ... +100 °C (-4 ... +212 °F) |
| • EPDM | -40 ... +125 °C (-40 ... +257 °F), usable for drinking water |
| Ambient temperature | -25 ... +85 °C (-13 ... +185 °F) |
| Storage temperature | -50 ... +100 °C (-58 ... +212 °F) |
| Type of protection according to IEC 60529 | • IP65 with plug according to EN 175301-803-A<br>• IP67 with M12 device plug<br>• IP67 with cable<br>• IP67 with cable quick screw connection |
| Electromagnetic compatibility | • According to IEC 61326-1/-2/-3<br>• According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of ≤ 1% |
| Mounting position | Vertical, facing up |
| **Structural design** | |
| Weight | Approx. 0.090 kg (0.198 lbs) |
| Process connections | See dimension drawings |

## Technical specifications (continued)

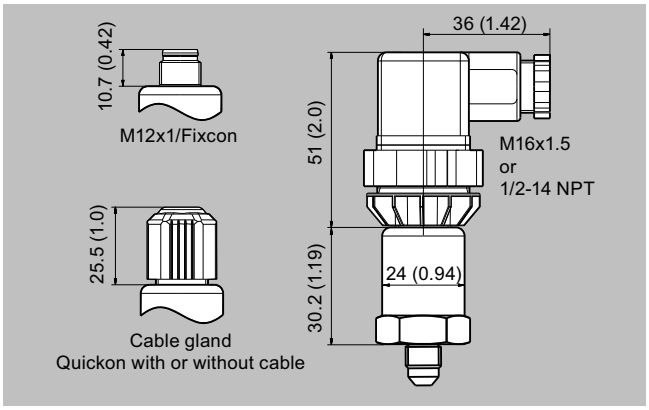
| SITRANS P210 for gauge pressure | |
|---|---|
| Electrical connections | • Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or ½-14 NPT or Pg 11<br>• Device plug M12<br>• 2 or 3-wire (0.5 mm²) cable (Ø ± 5.4 mm)<br>• Quickon cable quick screw connection |
| Material of wetted parts | |
| • Measuring cell | Stainless steel, mat. no. 1.4435 |
| • Process connection | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| • Gasket | • FPM (standard)<br>• Neoprene<br>• Perbunan<br>• EPDM |
| Material of non-wetted parts | |
| • Enclosure | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| • Connector housing | Plastic |
| • Cable | PVC |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; meets requirements as per article 4, paragraph 3 (sound engineering practice) |
| Lloyd's Register of Shipping (LR)[1] | 12/20010 |
| Germanischer Lloyd (GL)[1] | GL19740 11 HH00 |
| American Bureau of Shipping (ABS)[1] | ABS_11_HG 789392_PDA |
| Bureau Veritas (BV)[1] | BV 271007A0 BV |
| Det Norske Veritas (DNV)[1] | A 12553 |
| Drinking water approval (ACS)[1] | ACS 15 ACC NY 360 |
| EAC[1] | № ТС RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ» |
| Underwriters Laboratories (UL)[1] | |
| • For the USA and Canada | UL 20110217 - E34453 |
| • Worldwide | IEC UL DK 21845 |
| **Explosion protection** | |
| Intrinsic safety "i" (only with current output) | Ex II 1/2 G Ex ia IIC T4 Ga/Gb<br>Ex II 1/2 D Ex ia IIIC T125 °C Da/Db |
| EC type-examination certificate | SEV 10 ATEX 0146 |
| Connection to certified intrinsically safe ohmic circuits with maximum values | $U_i$ ≤ DC 30 V; $I_i$ ≤ 100 mA; $P_i$ ≤ 0.75 W |
| Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12 | $L_i$ = 0 nH; $C_i$ = 0 nF |

[1] For variants with output signal 0 ... 5 V and radiometric output available soon.

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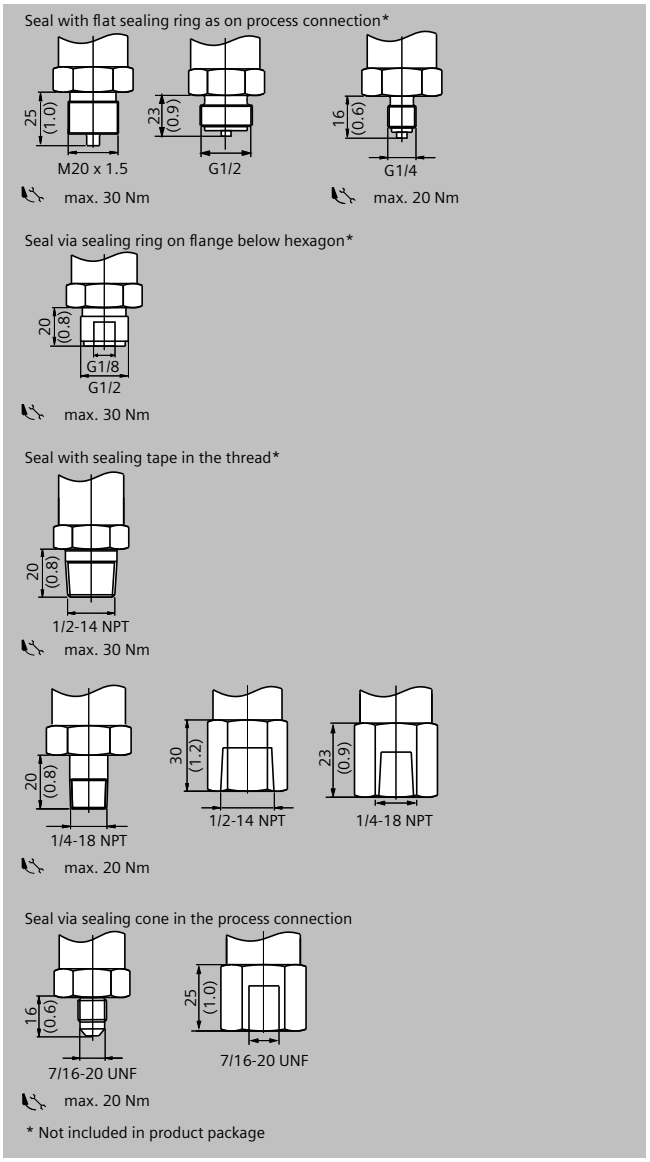


## Dimensional drawings




SITRANS P210, electrical connections, dimensions in mm (inch)

## Dimensional drawings (continued)

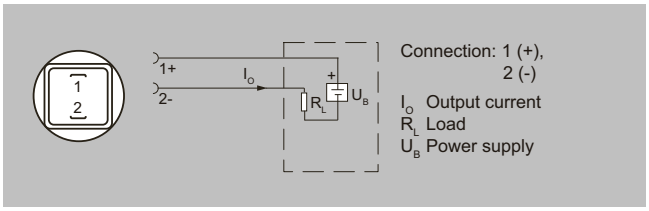



SITRANS P210, process connections, dimensions in mm (inch)

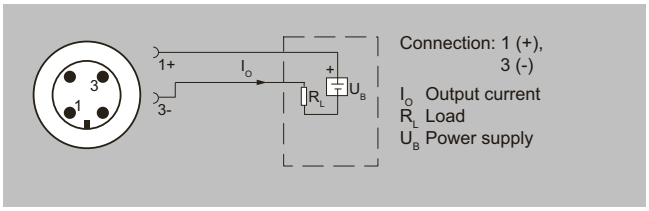
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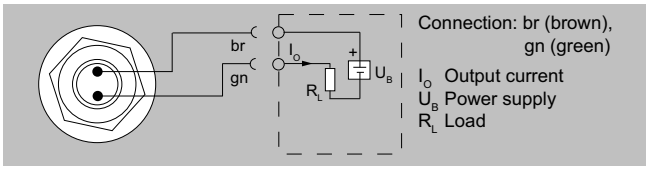
## Circuit diagrams



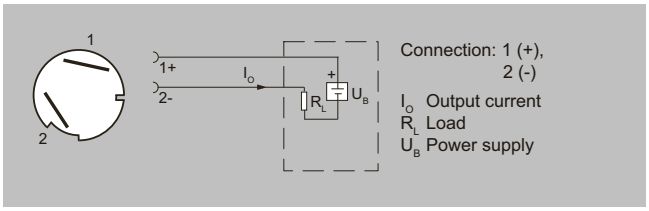

Connection with current output and plug according to EN 175301



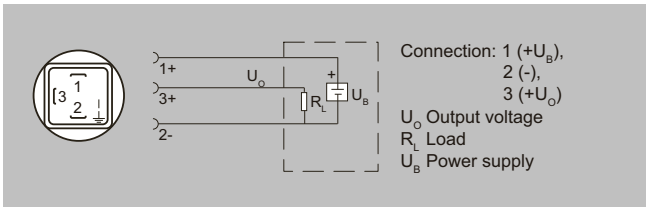

Connection with current output and M12x1 device plug




Connection with current output and cable

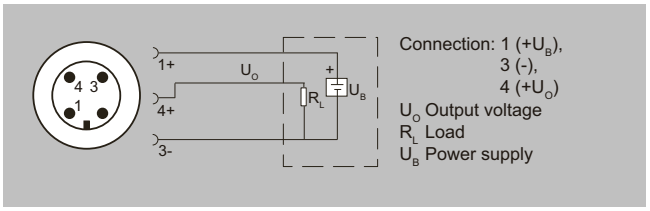



Connection with current output and Quickon cable quick screw connection

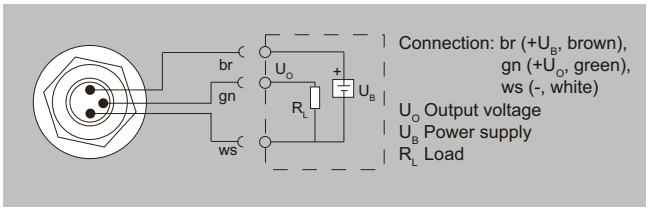



Connection with voltage output, ratiometric output and plug according to EN 175301

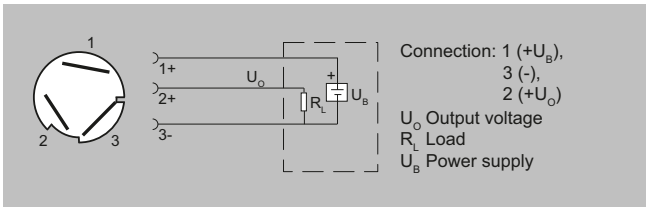
## Circuit diagrams (continued)




Connection with voltage output, ratiometric output and M12x1 device plug



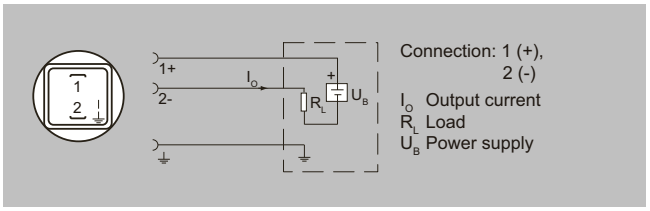

Connection with voltage output, ratiometric output and cable



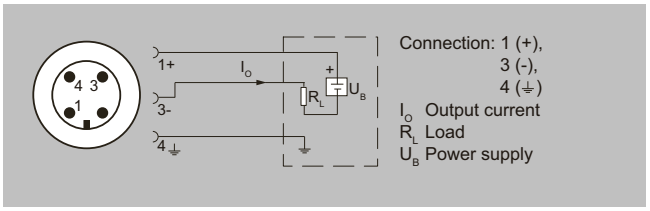

Connection with voltage output, ratiometric output and Quickon fast cable termination

***Device design with explosion protection: 4 to 20 mA***

The grounding connection is conductively bonded to the transmitter enclosure.




Connection with current output and plug according to EN 175301 (Ex)




Connection with current output and M12x1 (Ex) device plug

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## Overview



The SITRANS P220 pressure transmitter measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell, fully welded
- Measuring ranges 2.5 to 1 000 bar (36.3 to 14 500 psi) relative
- For high-pressure applications and refrigeration technology

## Benefits

- High measurement accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For corrosive and non-corrosive media
- For measuring the pressure of liquids, gases and vapors
- Compact design
- Gasket-less

## Application

The SITRANS P220 pressure transmitter for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Energy development
- Chemical industry
- Water supply

## Design

***Device structure without explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug to EN 175301-803-A (IP65), an M12 device plug (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67). The output signal is between 4 and 20 mA or 0 and 10 V

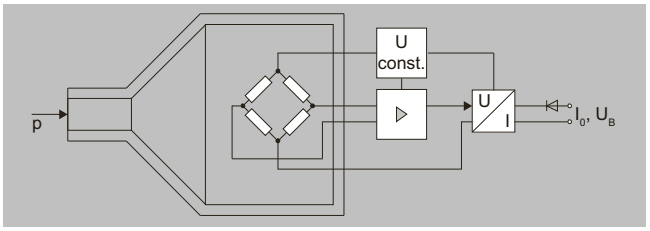
***Device structure with explosion protection***

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm, installed in a stainless steel enclosure. It can be connected electrically with a device plug fulfilling EN 175301-803-A (IP65) or an M12 device plug (IP67). The output signal is between 4 and 20 mA.

## Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

***Mode of operation***




SITRANS P220 pressure transmitters (7MF1567-...), functional diagram

The stainless steel measuring cell has a thick-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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## Selection and ordering data

| SITRANS P220 pressure transmitter for gauge pressure, for high-pressure and cold applications, fully-welded version | | | | | | | | Article No. 7MF1567- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ● | ● | ● | ● | ● | - | ● | ● | A | ● | | ● | ● | ● |
| Measurement deviation typ. 0.25%<br>Material of wetted parts: Stainless steel<br>Material of non-wetted parts: Stainless steel | | | | | | | | | | | | | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | | |
| **Measuring range** | | **Minimum overload limit** | | **Maximum overload limit** | | **Burst pressure** | | | | | | | | | | | | | | | |
| **For gauge pressure** | | | | | | | | | | | | | | | | | | | | | |
| 0 ... 2.5 bar | (0 ... 36.3 psi) | -1 bar | (-14.5 psi) | 6.25 bar | (90.7 psi) | 25 bar | (363 psi) | 3 | B | D | | | | | | | | | | | |
| 0 ... 4 bar | (0 ... 58 psi) | -1 bar | (-14.5 psi) | 10 bar | (145 psi) | 40 bar | (580 psi) | 3 | B | E | | | | | | | | | | | |
| 0 ... 6 bar | (0 ... 87 psi) | -1 bar | (-14.5 psi) | 15 bar | (217 psi) | 60 bar | (870 psi) | 3 | B | G | | | | | | | | | | | |
| 0 ... 10 bar | (0 ... 145 psi) | -1 bar | (-14.5 psi) | 25 bar | (362 psi) | 60 bar | (870 psi) | 3 | C | A | | | | | | | | | | | |
| 0 ... 16 bar | (0 ... 232 psi) | -1 bar | (-14.5 psi) | 40 bar | (580 psi) | 96 bar | (1 392 psi) | 3 | C | B | | | | | | | | | | | |
| 0 ... 25 bar | (0 ... 363 psi) | -1 bar | (-14.5 psi) | 62.5 bar | (906 psi) | 150 bar | (2 176 psi) | 3 | C | D | | | | | | | | | | | |
| 0 ... 40 bar | (0 ... 580 psi) | -1 bar | (-14.5 psi) | 100 bar | (1 450 psi) | 240 bar | (3 481 psi) | 3 | C | E | | | | | | | | | | | |
| 0 ... 60 bar | (0 ... 870 psi) | -1 bar | (-14.5 psi) | 150 bar | (2 175 psi) | 360 bar | (5 221 psi) | 3 | C | G | | | | | | | | | | | |
| 0 ... 100 bar | (0 ... 1450 psi) | -1 bar | (-14.5 psi) | 250 bar | (3 625 psi) | 600 bar | (8 702 psi) | 3 | D | A | | | | | | | | | | | |
| 0 ... 160 bar | (0 ... 2320 psi) | -1 bar | (-14.5 psi) | 400 bar | (5 801 psi) | 960 bar | (13 924 psi) | 3 | D | B | | | | | | | | | | | |
| 0 ... 250 bar | (0 ... 3625 psi) | -1 bar | (-14.5 psi) | 625 bar | (9 064 psi) | 1 500 bar | (21 756 psi) | 3 | D | D | | | | | | | | | | | |
| 0 ... 400 bar | (0 ... 5801 psi) | -1 bar | (-14.5 psi) | 1 000 bar | (14 503 psi) | 2 400 bar | (34 809 psi) | 3 | D | E | | | | | | | | | | | |
| 0 ... 600 bar | (0 ... 8702 psi) | -1 bar | (-14.5 psi) | 1 500 bar | (21 755 psi) | 3 600 bar | (52 200 psi) | 3 | D | G | | | | | | | | | | | |
| 0 ... 1000 bar | (0 ... 14500 psi) | -1 bar | (-14.5 psi) | 1 500 bar | (21 755 psi) | 5 000 bar | (72 520 psi) | 3 | E | A | | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... bar (psi) | | | | | | | | 9 | A | A | | | | | | | | | H | 1 | Y |
| **Measuring ranges for gauge pressure** | | | | | | | | | | | | | | | | | | | | | |
| | 0 ... 30 psi | | -14.5 psi | | 75 psi | | 360 psi | 4 | B | E | 1) | | | | | | | | | | |
| | 0 ... 60 psi | | -14.5 psi | | 150 psi | | 580 psi | 4 | B | F | 1) | | | | | | | | | | |
| | 0 ... 100 psi | | -14.5 psi | | 250 psi | | 580 psi | 4 | B | G | 1) | | | | | | | | | | |
| | 0 ... 150 psi | | -14.5 psi | | 375 psi | | 870 psi | 4 | C | A | 1) | | | | | | | | | | |
| | 0 ... 200 psi | | -14.5 psi | | 500 psi | | 1 390 psi | 4 | C | B | 1) | | | | | | | | | | |
| | 0 ... 300 psi | | -14.5 psi | | 750 psi | | 2 170 psi | 4 | C | D | 1) | | | | | | | | | | |
| | 0 ... 500 psi | | -14.5 psi | | 1 250 psi | | 3 481 psi | 4 | C | E | 1) | | | | | | | | | | |
| | 0 ... 750 psi | | -14.5 psi | | 1 875 psi | | 5 220 psi | 4 | C | F | 1) | | | | | | | | | | |
| | 0 ... 1 000 psi | | -14.5 psi | | 2 500 psi | | 5 220 psi | 4 | C | G | 1) | | | | | | | | | | |
| | 0 ... 1 500 psi | | -14.5 psi | | 3 750 psi | | 8 700 psi | 4 | D | A | 1) | | | | | | | | | | |
| | 0 ... 2 000 psi | | -14.5 psi | | 5 000 psi | | 13 920 psi | 4 | D | B | 1) | | | | | | | | | | |
| | 0 ... 3 000 psi | | -14.5 psi | | 7 500 psi | | 21 750 psi | 4 | D | D | 1) | | | | | | | | | | |
| | 0 ... 5 000 psi | | -14.5 psi | | 12 500 psi | | 34 800 psi | 4 | D | E | 1) | | | | | | | | | | |
| | 0 ... 6 000 psi | | -14.5 psi | | 15 000 psi | | 34 800 psi | 4 | D | F | 1) | | | | | | | | | | |
| | 0 ... 8 700 psi | | -14.5 psi | | 21 755 psi | | 52 200 psi | 4 | D | G | 1) | | | | | | | | | | |
| | 0 ... 14 500 psi | | -14.5 psi | | 21 755 psi | | 72 520 psi | 4 | E | A | | | | | | | | | | | |
| Other version; Add order code and plain text: Measuring range: ... to ... psi | | | | | | | | 9 | A | A | | | | | | | | | H | 1 | Y |
| **Output signal** | | | | | | | | | | | | | | | | | | | | | |
| 4 ... 20 mA; 2-wire system, auxiliary power 7 ... 33 V DC (10 ... 30 V DC for ATEX devices)[1] | | | | | | | | | | | 0 | | | | | | | | | | |
| 0 ... 10 V; 3-wire system; auxiliary power 12 ... 33 V DC | | | | | | | | | | | 1 | 0 | | | | | | | | | |
| 0 ... 5 V; 3-wire system; auxiliary power 7 ... 33 V DC | | | | | | | | | | | 2 | 0 | | | | | | | | | |
| Ratiometric 10 ... 90%; 3-wire system; auxiliary power 5 V DC ± 10% | | | | | | | | | | | 3 | 0 | | | | | | | | | |
| **Explosion protection (only 4 ... 20 mA)** | | | | | | | | | | | | | | | | | | | | | |
| None | | | | | | | | | | | | 0 | | | | | | | | | |
| With explosion protection Ex ia IIC T4[1] | | | | | | | | | | | | 1 | | | | | | | | | |
| **Electrical connection** | | | | | | | | | | | | | | | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread M16 (with coupling)[1] | | | | | | | | | | | | | | 1 | | | | | | | |
| M12 device plug according to IEC 61076-2-101 | | | | | | | | | | | | | | 2 | | | | | | | |
| Connection via permanently installed cable, 2 m (6.6 ft); not for "Intrinsic safety" type of protection | | | | | | | | | | | | 0 | | 3 | | | | | | | |
| Quick-screw cable gland Quickon PG9; not for "Intrinsic safety" type of protection | | | | | | | | | | | | 0 | | 4 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)[1] | | | | | | | | | | | | | | 5 | | | | | | | |
| Plug according to EN 175301-803-A, stuffing box thread PG11 (with coupling)[1] | | | | | | | | | | | | | | 6 | | | | | | | |
| Permanently installed cable, length 5 m (16.4 ft) | | | | | | | | | | | | 0 | | 7 | | | | | | | |
| Special design | | | | | | | | | | | | | | 9 | | | | | N | 1 | Y |

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## Selection and ordering data (continued)

| SITRANS P220 pressure transmitter for gauge pressure, for high-pressure and cold applications, fully-welded version | Article No. 7MF1567- | | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | A | ● | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | |
| G½" male according to EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar) | | | | | | | | A | | | | | | | | |
| G½" male and G1/8" female | | | | | | | | B | | | | | | | | |
| G¼" male according to EN 837-1 (¼" BSP male) | | | | | | | | C | | | | | | | | |
| 7/16"-20 UNF male | | | | | | | | D | | | | | | | | |
| ¼"-18 NPT male (standard for pressure ranges in$H_2O$ and psi)[1] | | | | | | | | E | | | | | | | | |
| ¼"-18 NPT female | | | | | | | | F | | | | | | | | |
| ½"-14 NPT male | | | | | | | | G | | | | | | | | |
| ½"-14 NPT female | | | | | | | | H | | | | | | | | |
| 7/16"-20 UNF female | | | | | | | | J | | | | | | | | |
| M20×1.5 male | | | | | | | | P | | | | | | | | |
| G¼" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | Q | | | | | | | | |
| G½" according to EN ISO 1179-2 (formerly DIN 3852 form E) | | | | | | | | R | | | | | | | | |
| Special design | | | | | | | | Z | | | | | | P | 1 | Y |
| **Version** | | | | | | | | | | | | | | | | |
| Standard version[1] | | | | | | | | | | 1 | | | | | | |

[1] Order code E21 required for complete configurations with CRN and $_cCSA_{us}$ Ex approval.

| Options | Order code |
|---|---|
| Add **"-Z"** to article number and specify order code. | |
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 (not possible for measuring ranges > 0 ... 600 bar/0 ... 8 702 psi) | **C11** |
| Oxygen version, free of oil and degreased (not in combination with explosion protection version!) | **E10** |
| With CRN and $_cCSA_{us}$ Ex approval (only for measuring ranges 0 ... 30 psi to 0 ... 8 700 psi) | **E21** |

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## Technical specifications

| SITRANS P220 for gauge pressure | |
|---|---|
| **Area of application** | |
| Gauge pressure measurement | Liquids, gases and vapors |
| **Mode of operation** | |
| Measuring principle | Piezoresistive measuring cell (stainless steel diaphragm) |
| Measured variable | Gauge pressure |
| **Input** | |
| Measuring range | |
| • Gauge pressure | |
| - Metric | 2.5 ... 1 000 bar (36 ... 14 500 psi) |
| - US measuring range | 30 ... 14 500 psi |
| **Output** | |
| Current signal | 4 ... 20 mA |
| • Load | ($U_B$ - 10 V)/0.02 A |
| • Auxiliary power $U_B$ | 7 ... 33 V DC (10 ... 30 V for Ex) |
| Voltage signal | 0 ... 10 V DC |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | 12 ... 33 V DC |
| • Current consumption | < 7 mA at 10 kΩ |
| Radiometric output | 10 ... 90% |
| • Load | ≥ 10 kΩ |
| • Auxiliary power $U_B$ | DC 5 V ± 10% |
| • Current consumption | < 7 mA at 10 kΩ |
| Characteristic curve | Linear rising |
| **Measuring accuracy** | |
| Measurement deviation at limit setting including hysteresis and reproducibility | • Typical: 0.25% of measuring span<br>• Maximum: 0.5% of measuring span |
| Step response time $T_{99}$ | < 5 ms |
| Long-term stability | |
| • Lower range value and measuring span | 0.25% of measuring span/year |
| Effect of ambient temperature | |
| • Lower range value and measuring span | 0.25%/10 K of measuring span |
| • Influence of power supply | 0.005%/V |
| **Operating conditions** | |
| Process temperature | -40 ... +120 °C (-40 ... +248 °F) |
| Ambient temperature | -25 ... +85 °C (-13 ... +185 °F) |
| Storage temperature | -50 ... +100 °C (-58 ... +212 °F) |
| Degree of protection according to IEC 60529 | • IP65 with plug according to EN 175301-803-A<br>• IP67 with M12 device plug<br>• IP67 with cable<br>• IP67 with cable quick screw connection |
| Electromagnetic compatibility | • According to IEC 61326-1/-2/-3<br>• According to NAMUR NE21 for ATEX devices only, and with a max. measurement error of ≤ 1% |
| **Structural design** | |
| Weight | Approx. 0.090 kg (0.198 lbs) |
| Process connections | See dimension drawings |
| Electrical connections | • Plug according to EN 175301-803-A Form A with cable entry M16x1.5 or ½-14 NPT or PG 11<br>• Device plug M12<br>• 2 or 3-wire (0.5 mm²) cable (Ø ± 5.4 mm)<br>• Quickon cable quick screw connection |
| Material of wetted parts | |
| • Measuring cell | Stainless steel, mat. no. 1.4016 |

## Technical specifications (continued)

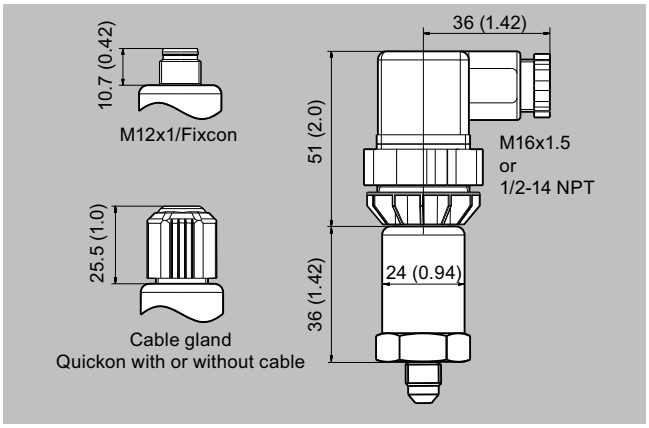
| SITRANS P220 for gauge pressure | |
|---|---|
| • Process connection | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| Material of non-wetted parts | |
| • Enclosure | Stainless steel, mat. no. 1.4404 (SST 316 L) |
| • Connector housing | Plastic |
| • Cable | PVC |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Lloyd's Register of Shipping (LR)[1] | 12/20010 |
| Germanischer Lloyd (GL)[1] | GL19740 11 HH00 |
| American Bureau of Shipping (ABS)[1] | ABS_11_HG 789392_PDA |
| Bureau Veritas (BV)[1] | BV 271007A0 BV |
| Det Norske Veritas (DNV)[1] | A 12553 |
| Drinking water approval (ACS)[1] | ACS 15 ACC NY 360 |
| EAC[1] | № ТС RU C-DE.ГБ05.В.00732<br>ОС НАНИО «ЦСВЭ» |
| CRN[2] | 0F18659.5C |
| Underwriters Laboratories (UL)[1] | |
| • For USA and Canada | UL 20110217 - E34453 |
| • Worldwide | IEC UL DK 21845 |
| **Explosion protection** | |
| Intrinsic safety "i" (only with current output) | Ex II 1/2 G Ex ia IIC T4 Ga/Gb<br>Ex II 1/2 D Ex ia IIIC T125 °C Da/Db |
| EC type-examination certificate | SEV 10 ATEX 0146 |
| Connection to certified intrinsically safe ohmic circuits with maximum values | $U_i$ ≤ DC 30 V; $I_i$ ≤ 100 mA; $P_i$ ≤ 0.75 W |
| Effective internal inductance and capacity for versions with plugs according to EN 175301-803-A and M12 | $L_i$ = 0 nH; $C_i$ = 0 nF |
| CSA[2] | 70006348<br>Class I, Division I, Groups A, B, C&D; Class II, Division 1, Groups E, F and G, Class III<br>Class I, Division 2,Groups A, B, C and D;<br>Class II, Division 2, Groups F and G, Class III<br>A/Ex ia IIC T4 Ga/Gb<br>A/Ex ia IIIC T125°C Da/Db |

1) For variants with output signal 0 ... 5 V and radiometric output available soon.
2) See ordering data for available versions.

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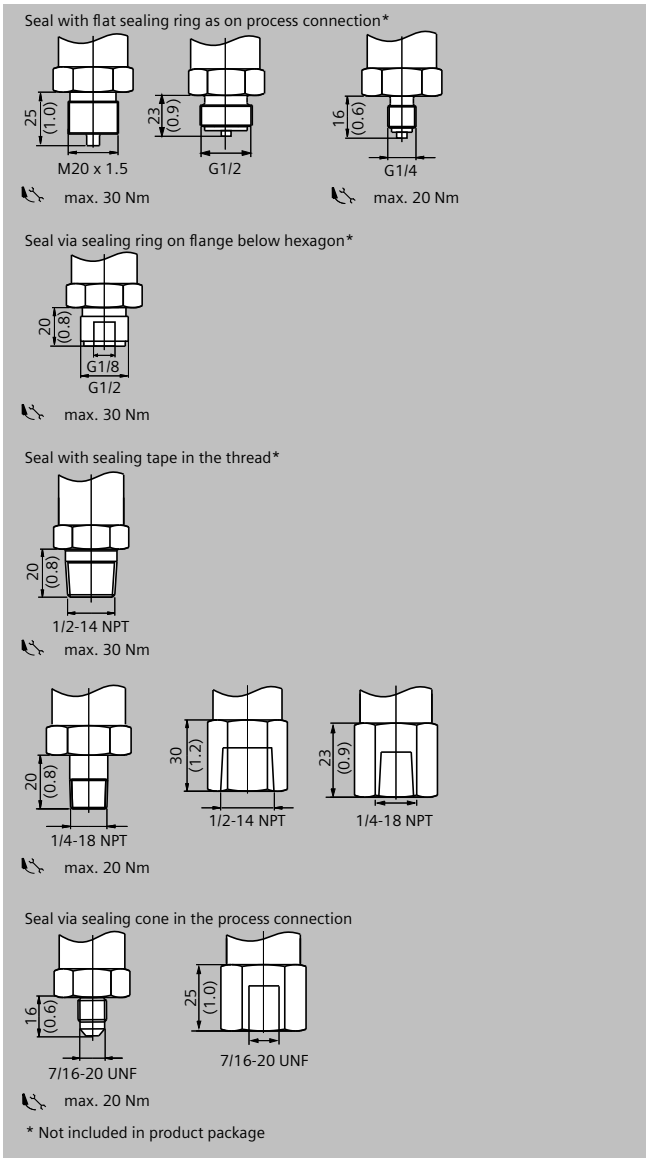


## Dimensional drawings




SITRANS P220, electrical connections, dimensions in mm (inch)

## Dimensional drawings (continued)

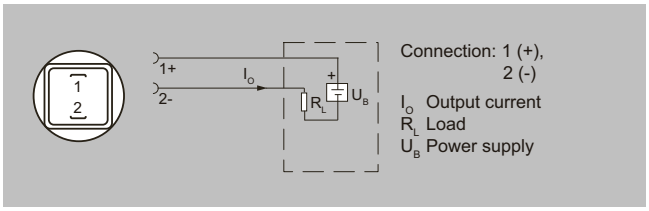



SITRANS P220, process connections, dimensions in mm (inch)

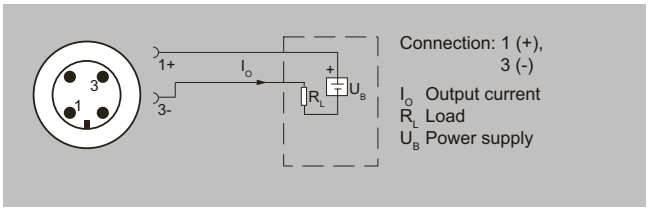
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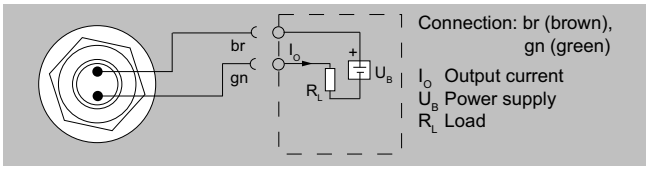
## Circuit diagrams



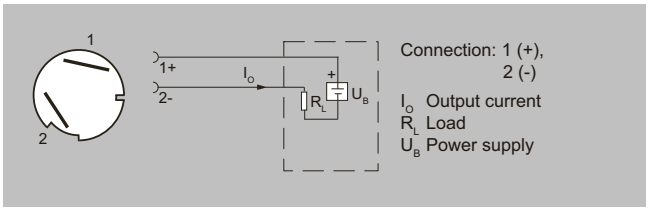

Connection with current output and plug according to EN 175301



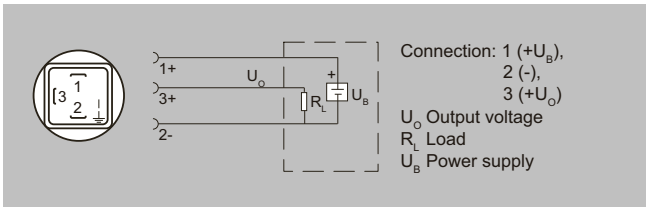

Connection with current output and M12x1 device plug




Connection with current output and cable

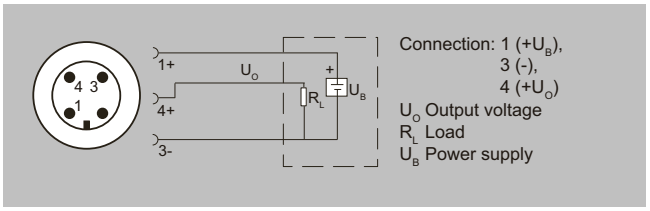



Connection with current output and Quickon cable quick screw connection

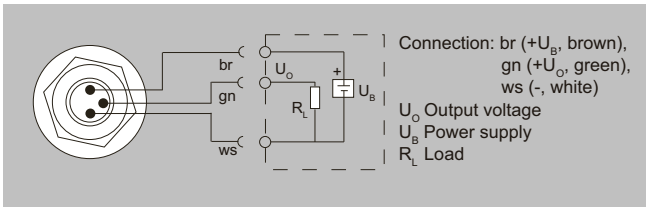



Connection with voltage output, ratiometric output and plug according to EN 175301

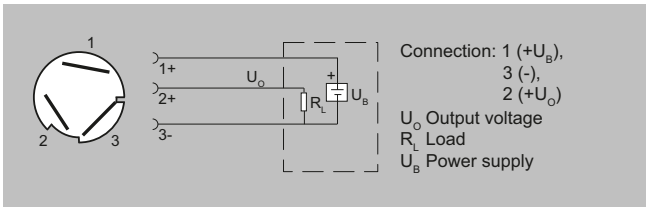
## Circuit diagrams (continued)




Connection with voltage output, ratiometric output and M12x1 device plug



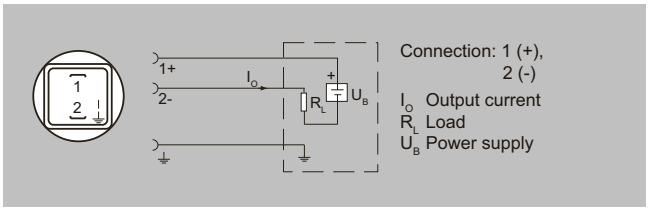

Connection with voltage output, ratiometric output and cable



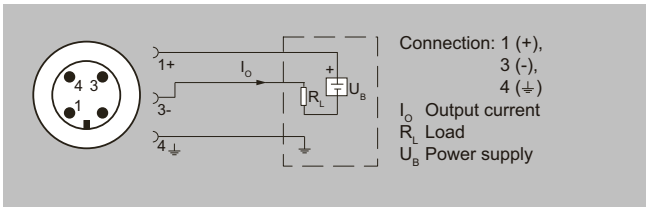

Connection with voltage output, ratiometric output and Quickon fast cable termination

***Device design with explosion protection: 4 to 20 mA***

The grounding connection is conductively bonded to the transmitter enclosure.




Connection with current output and plug according to EN 175301 (Ex)




Connection with current output and M12x1 (Ex) device plug

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## Overview



The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A cable box and an anchoring clamp are available as accessories for simple installation.

## Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

## Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

## Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

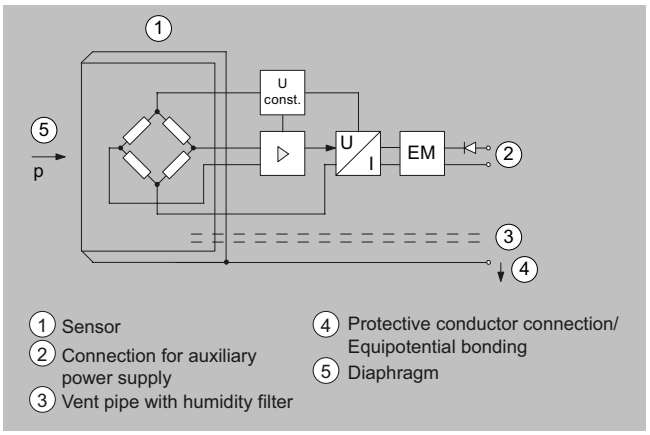
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

## Function




SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

The output voltage signal of the sensor is applied to the electronic circuit where it is converted into an output current signal of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

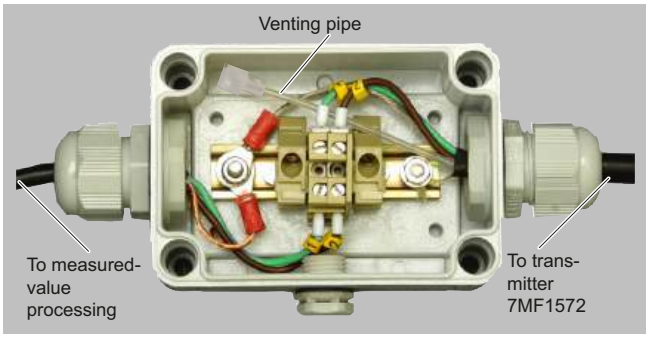
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## Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the cable box, which can be ordered separately, and secured with the anchoring clamp, also available separately. The cable box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.




Cable box 7MF1572-8AA, open, schematic diagram



Measuring point setup, generally with cable box 7MF1572-8AA and 7MF1572-8AB cable hanger

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## Selection and ordering data

| SITRANS LH100 pressure transmitter | | Article No. 7MF1572- | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | A | ● | ● | ● | ● | ● |
| For the measurement of the hydrostatic fill level through submersion<br>2-wire system, 4 ... 20 mA, enclosure material mat. no. 1.4404 (316 L)<br>Measuring cell Al2O3 ceramic, with permanently mounted PE cable | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | |
| **Measuring range** | **Cable length** | | | | | | | | |
| 0 ... 3 $mH_2O$ | 10 m (≈ 30 ft) | 1 | C | | | | | | |
| 0 ... 4 $mH_2O$ | 10 m (≈ 30 ft) | 1 | D | | | | | | |
| 0 ... 5 $mH_2O$ | 10 m (≈ 30 ft) | 1 | E | | | | | | |
| 0 ... 6 $mH_2O$ | 10 m (≈ 30 ft) | 1 | F | | | | | | |
| 0 ... 10 $mH_2O$ | 20 m (≈ 60 ft) | 1 | H | | | | | | |
| 0 ... 20 $mH_2O$ | 30 m (≈ 90 ft) | 1 | K | | | | | | |
| 0 ... 9 $ftH_2O$[1)] | 33 ft | 2 | C | | | | | | |
| 0 ... 12 $ftH_2O$ | 33 ft | 2 | D | | | | | | |
| 0 ... 15 $ftH_2O$ | 33 ft | 2 | E | | | | | | |
| 0 ... 18 $ftH_2O$ | 33 ft | 2 | F | | | | | | |
| 0 ... 30 $ftH_2O$ | 66 ft | 2 | H | | | | | | |
| 0 ... 60 $ftH_2O$ | 98 ft | 2 | K | | | | | | |
| 0 ... 0.3 bar[1)] | 10 m (≈ 30 ft) | 3 | C | | | | | | |
| 0 ... 0.4 bar | 10 m (≈ 30 ft) | 3 | D | | | | | | |
| 0 ... 0.5 bar | 10 m (≈ 30 ft) | 3 | E | | | | | | |
| 0 ... 0.6 bar | 10 m (≈ 30 ft) | 3 | F | | | | | | |
| 0 ... 1 bar | 20 m (≈ 60 ft) | 3 | H | | | | | | |
| 0 ... 2 bar | 30 m (≈ 90 ft) | 3 | K | | | | | | |
| ***Special designs*** | | | | | | | | | |
| Measuring ranges for special designs between:<br>• 0 ... 3 $mH_2O$ and 0 ... 30 $mH_2O$<br>• 0 ... 9 $ftH_2O$ and 0 ... 100 $ftH_2O$<br>• 0 ... 0.3 bar and 0 ... 3 bar | | | | | | | | | |
| ***Special cable length/special measuring range*** | | 9 | A | | | | H | . | . |
| Add **"-Z"** to article number, specify order code and plain text.<br>Note: Specification of the measuring range Y01 is mandatory! | | | | | | | +<br>Y | <br>0 | <br>1 |
| The following applies to determining the maximum cable length for Ex versions:<br>Transmitters:<br>• $C_i$ = 0 µF, $L_i$ = 0 µH<br>Cables:<br>• $C_k$ = 0.19 nF per meter cable<br>• $L_k$ = 1.5 µH per meter cable<br>The max. permissible data of the transmitter infeed device must be taken into account! | | | | | | | | | |
| 3 m (10 ft) | | | | | | | H | 1 | A |
| 5 m (16 ft) | | | | | | | H | 1 | B |
| 7 m (23 ft) | | | | | | | H | 1 | C |
| 10 m (33 ft) | | | | | | | H | 1 | D |
| 15 m (49 ft) | | | | | | | H | 1 | E |
| 20 m (66 ft) | | | | | | | H | 1 | F |
| 25 m (82 ft) | | | | | | | H | 1 | G |
| 30 m (98 ft) | | | | | | | H | 1 | H |
| 40 m (131 ft) | | | | | | | H | 1 | J |
| 50 m (164 ft) | | | | | | | H | 1 | K |
| 60 m (198 ft) | | | | | | | H | 1 | L |
| 70 m (231 ft) | | | | | | | H | 1 | M |
| 80 m (264 ft) | | | | | | | H | 1 | N |
| 90 m (297 ft) | | | | | | | H | 1 | P |
| 100 m (330 ft) | | | | | | | H | 1 | Q |
| **Gasket material between sensor and enclosure** | | | | | | | | | |
| FPM (standard) | | | | | 1 | | | | |
| EPDM (for drinking water applications) | | | | | 2 | | | | |
| **Explosion protection** | | | | | | | | | |
| None | | | | | | 0 | | | |
| With explosion protection ATEX II1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga | | | | | | 1 | | | |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 | **C11** |
| Specification of measuring range (only with special cable lengths) in:<br>"... to ... $mH_2O$" or "... to ... $ftH_2O$" or "... to ... bar" | **Y01** |

***Accessories/spare parts***

| | Article No. |
|---|---|
| Cable plug for connecting the transmitter cable | **7MF1572-8AA** |
| Anchoring clamp<br>For mounting the pressure transmitter | **7MF1572-8AB** |
| Protective caps<br>As a replacement (pack of 10) | **7MF1572-8AD** |
| Humidity filter<br>As a replacement (pack of 10) | **7MF1572-8AE** |

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## Technical specifications

| Pressure transmitter SITRANS LH100 (submersible sensor) | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Piezo-resistive |
| ***Input*** | |
| Measured variable | Hydrostatic level |
| Measuring range | Max. permissible operating pressure |
| • 0 ... 3 $mH_2O$ (0 ... 9 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 4 $mH_2O$ (0 ... 12 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 5 $mH_2O$ (0 ... 15 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 6 $mH_2O$ (0 ... 18 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 10 $mH_2O$ (0 ... 30 $ftH_2O$) | • 3.0 bar (43.5 psi) (corresponds to 30 mH2O (90 ftH2O)) |
| • 0 ... 20 $mH_2O$ (0 ... 60 $ftH_2O$) | • 5.0 bar (72.5 psi) (corresponds to 50 $mH_2O$ (150 $ftH_2O$)) |
| • 0 ... 0.3 bar | • 1.5 bar |
| • 0 ... 0.4 bar | • 1.5 bar |
| • 0 ... 0.5 bar | • 1.5 bar |
| • 0 ... 0.6 bar | • 1.5 bar |
| • 0 ... 1 bar | • 3.0 bar |
| • 0 ... 2 bar | • 5.0 bar |
| **Output** | |
| Output signal | 4 ... 20 mA |
| **Measuring accuracy** | According to IEC 62828-1 |
| Measurement deviation at limit setting including hysteresis and reproducibility | |
| Measuring range | |
| • 0 ... 3 $mH_2O$ (0 ... 9 $ftH_2O$ or 0 ... 0.3 bar) | • 0.5% measuring range end value (typical)<br>• 1.0% of measuring range end value (maximum) |
| • For all other measuring ranges | • 0.3% of measuring range end value (typical)<br>• 0.6% of measuring range end value (maximum) |
| ***Effect of ambient temperature*** | |
| Measuring range | Zero and span |
| • 3 $mH_2O$ (9 $ftH_2O$ or 0.3 bar) | 0.45%/10 K of measuring range end value |
| • 4 ... 6 $mH_2O$ (12 ... 18 $ftH_2O$ or 0.4...0.6 bar) | 0.45%/10 K of measuring range end value |
| • > 6 $mH_2O$ (> 18 $ftH_2O$ or > 0.6 bar) | 0.3%/10 K of measuring range end value |
| ***Long-term stability*** | |
| Measuring range | Zero and span |
| • 3 $mH_2O$ (9 $ftH_2O$ or 0.3 bar) | 0.4% of measuring range end value/year |
| • 4 ... 6 $mH_2O$ (12 ... 18 $ftH_2O$ or 0.4...0.6 bar) | 0.25% of measuring range end value/year |
| • > 6 $mH_2O$ (> 18 $ftH_2O$ or > 0.6 bar) | 0.2% of measuring range end value/year |
| **Operating conditions** | |
| Ambient conditions | |
| • Process temperature | -10 ... +80 °C (14 ... 176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Degree of protection according to IEC 60529 | IP68 |
| **Structural design** | |
| Weight | |
| • Pressure transmitter | ≈ 0.2 kg (≈ 0.44 lb) |

## Technical specifications (continued)

| Pressure transmitter SITRANS LH100 (submersible sensor) | |
|---|---|
| • Cable; maximum cable length 100 m (330 ft) | 0.025 kg/m (≈ 0.015 lb/ft) |
| Electrical connection | Cable with 3 conductors, vent pipe and integrated humidity filter |
| Material | |
| • Seal diaphragm | $Al_2O_3$ ceramic, 96% |
| • Enclosure | Stainless steel, mat. no. 1.4404/316L |
| • Gasket | • FPM (standard)<br>• EPDM (optional) |
| • Connecting cable | • PE-HD (standard)<br>• PE-LD (in the case of versions with EPDM seal, suitable for drinking water applications) |
| **Auxiliary power** | |
| Terminal voltage on pressure transmitter $U_B$ | • 10 ... 33 V DC<br>• 10 ... 30 V DC for transmitter with intrinsic safety explosion protection |
| **Certificates and approvals** | |
| Drinking water approval (ACS) | 15 ACC NY 360 |
| EAC | № ТС RU C-DE.ГБ05.В.00732<br>ОС НАНИО «ЦСВЭ» |
| Underwriters Laboratories (UL) | 2014-11-17 - E344532 |
| The device is not subject to the pressure equipment directive (PED 2014/68/EU) | |
| Explosion protection | |
| • Intrinsic safety "i" | IECEx SEV 14.0003<br>SEV 14 ATEX 0109 |
| - Marking | II 1 G Ex ia IIC T4 Ga |
| • EAC Ex | TC RU C-DE.AA87.B.00324 |

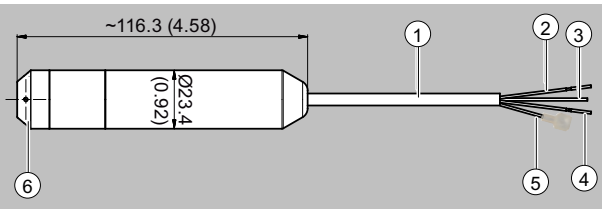
| Cable box | |
|---|---|
| **Area of application** | For connecting the transmitter cable |
| **Structural design** | |
| Weight | 0.2 kg (0.44 lb) |
| Electrical connection | 2 x 3-way (28 to 18 AWG) |
| Cable entry | 2 × Pg 9 |
| Enclosure material | Polycarbonate |
| Vent valve for atmospheric pressure | |
| **Operating conditions** | |
| Degree of protection according to IEC 60529 | IP65 |

| Anchoring clamp | |
|---|---|
| **Area of application** | For mounting the transmitter |
| **Structural design** | |
| Weight | 0.16 kg (0.35 lb) |
| Material | Zinc-plated steel, polyamide |

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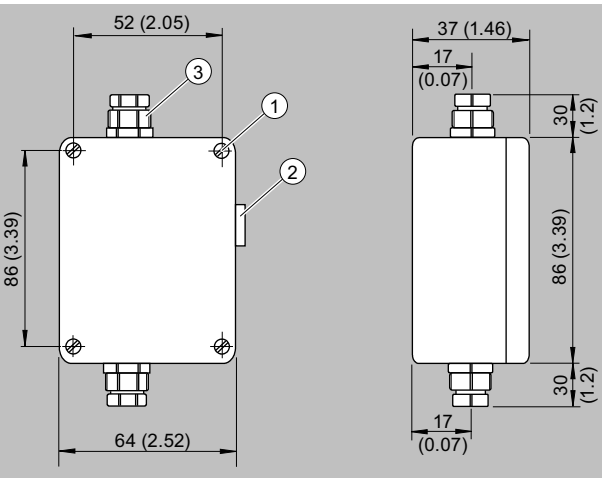


## Dimensional drawings




1. Cable, sheat Ø 4.8 (0.19) (black, PE)
2. - (green)
3. + (brown)
4. Protective conductor connection/Equipotential bonding (white)
5. Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
6. Protective cap with 4 x Ø 2.5 (0.10) holes (black, PPE)

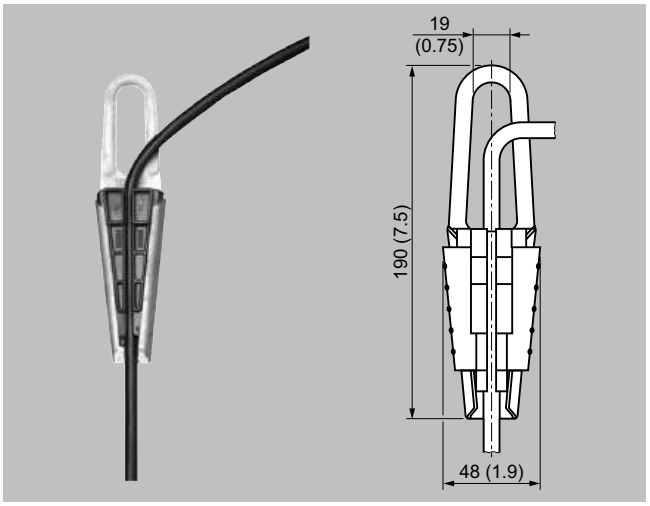
SITRANS LH100 pressure transmitter, dimensions in mm (inch)




1. Fastening hole
2. Vent valve
3. Cable gland Pg 9, cable diameter 4 ... 8 mm (0.16 ... 0.31)

Junction box, dimensions in mm (inch)

## Dimensional drawings (continued)



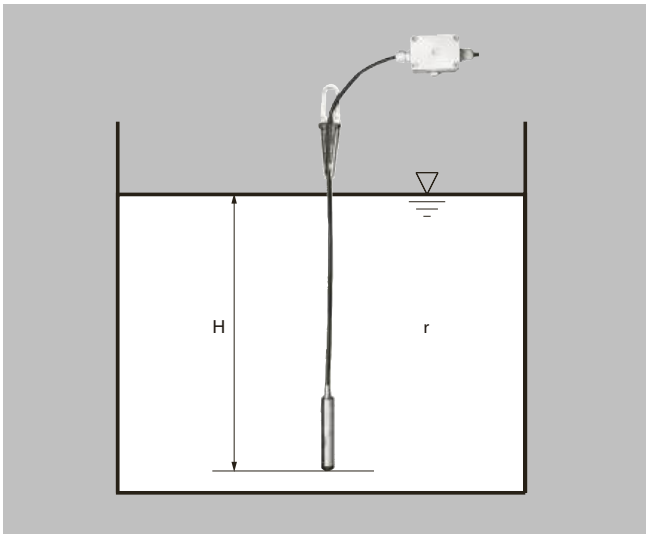

Anchoring clamp, dimensions in mm (inch)

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## More information

***Establishing the measuring range with water as process medium***




Calculation of the measuring range

***p = ρ x g x H***

with:

ρ = density of medium
g = local gravitational acceleration
H = maximum level

Example:

Medium: Water, ρ = 1 000 kg/m$^3$
Gravitational acceleration: 9.81 m/s$^2$
Lower range value: 0 m
Maximum level: 6.0 m
Cable length: 10 m

Calculation:

p = 1 000 kg/m$^3$ x 9.81 m/s$^2$ x 6.0 m
p = 58 860 N/m$^2$
p = 589 mbar

Transmitter to be ordered:

***7MF1572-1FA10***

Plus, if required, cable box 7MF1572-8AA and anchoring clamp 7MF1572-8AB

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## Overview



The pressure transmitter SITRANS LH300 is a submersible sensor for hydrostatic level measurement with a protective capability made of PPE (left), stainless steel (center) and ETFE (right).

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH300 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A cable box and an anchoring clamp are available as accessories for simple installation.

## Benefits

- Compact design
- Simple installation
- Small error in measurement (typically 0.15%)
- Degree of protection IP68

## Application

SITRANS LH300 pressure transmitters are used in the following fields of industry, for example:

- Shipbuilding
- Water/waste water supply
- Drinking water treatment plants
- For use in unpressurized/open vessels and wells
- Desalinization plants

## Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

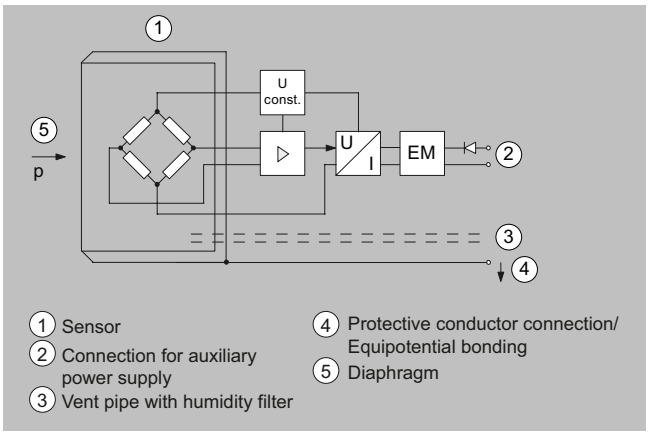
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

## Function




SITRANS LH300 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

The output voltage signal of the sensor is applied to the electronic circuit where it is converted into an output current signal of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

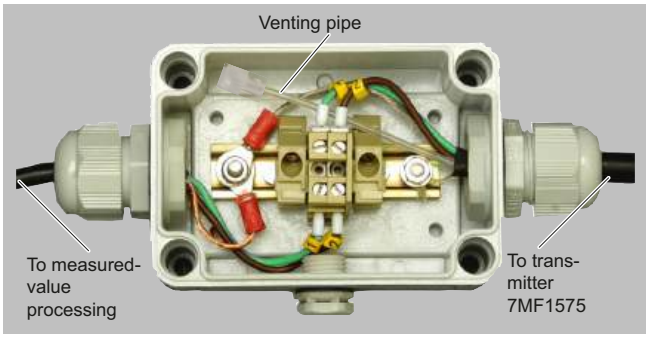
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## Integration

It is generally recommended that the connecting cable of the SITRANS LH300 transmitter is connected to the cable box, which can be ordered separately, and secured with an anchoring clamp, also available separately. The cable box is to be installed near the measuring point, but outside the process medium.

Likewise, in the case of process media other than water, the compatibility with the specified materials of the transmitter, cable and seal must be checked.




Cable box 7MF1575-8AA, opened, schematic representation



Measurement location setup, in principle with cable box 7MF1575-8AA and anchoring clamp 7MF1575-8AB

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## Selection and ordering data

| SITRANS LH300 pressure transmitter | | Article No. 7MF1575- | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | | ● | ● | ● |
| For the measurement of the hydrostatic level, immersion probe, 2-wire system, 4 ... 20 mA, for enclosure material see ordering option, measuring cell $Al_2O_3$ ceramic (99.6% purity), with permanently mounted cable.<br>Material of protective cap for PE cable: PPE (color: black).<br>Material of protective cap for FEP cable: PPE (color: white)<br>Note: Cable box and cable hanger must be ordered separately. | | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | |
| **Measuring range** | **Cable length (PE cable)** | | | | | | | | | |
| 0 ... 1 $mH_2O$ | 5 m (≈ 15 ft) | 1 | A | | | | | | | |
| 0 ... 2 $mH_2O$ | 5 m (≈ 15 ft) | 1 | B | | | | | | | |
| 0 ... 3 $mH_2O$ | 10 m (≈ 30 ft) | 1 | C | | | | | | | |
| 0 ... 4 $mH_2O$ | 10 m (≈ 30 ft) | 1 | D | | | | | | | |
| 0 ... 5 $mH_2O$ | 10 m (≈ 30 ft) | 1 | E | | | | | | | |
| 0 ... 6 $mH_2O$ | 10 m (≈ 30 ft) | 1 | F | | | | | | | |
| 0 ... 10 $mH_2O$ | 20 m (≈ 60 ft) | 1 | H | | | | | | | |
| 0 ... 20 $mH_2O$ | 30 m (≈ 90 ft) | 1 | K | | | | | | | |
| 0 ... 40 $mH_2O$ | 50 m (≈ 150 ft) | 1 | L | | | | | | | |
| 0 ... 3 $ftH_2O$ | 5 m (≈ 15 ft) | 2 | A | | | | | | | |
| 0 ... 6 $ftH_2O$ | 5 m (≈ 15 ft) | 2 | B | | | | | | | |
| 0 ... 9 $ftH_2O$ | 10 m (≈ 30 ft) | 2 | C | | | | | | | |
| 0 ... 12 $ftH_2O$ | 10 m (≈ 30 ft) | 2 | D | | | | | | | |
| 0 ... 15 $ftH_2O$ | 10 m (≈ 30 ft) | 2 | E | | | | | | | |
| 0 ... 18 $ftH_2O$ | 10 m (≈ 30 ft) | 2 | F | | | | | | | |
| 0 ... 30 $ftH_2O$ | 20 m (≈ 60 ft) | 2 | H | | | | | | | |
| 0 ... 60 $ftH_2O$ | 30 m (≈ 90 ft) | 2 | K | | | | | | | |
| 0 ... 120 $ftH_2O$ | 50 m (≈ 150 ft) | 2 | L | | | | | | | |
| 0 ... 0.1 bar | 5 m (≈ 15 ft) | 3 | A | | | | | | | |
| 0 ... 0.2 bar | 5 m (≈ 15 ft) | 3 | B | | | | | | | |
| 0 ... 0.3 bar | 10 m (≈ 30 ft) | 3 | C | | | | | | | |
| 0 ... 0.4 bar | 10 m (≈ 30 ft) | 3 | D | | | | | | | |
| 0 ... 0.5 bar | 10 m (≈ 30 ft) | 3 | E | | | | | | | |
| 0 ... 0.6 bar | 10 m (≈ 30 ft) | 3 | F | | | | | | | |
| 0 ... 1 bar | 20 m (≈ 60 ft) | 3 | H | | | | | | | |
| 0 ... 2 bar | 30 m (≈ 90 ft) | 3 | K | | | | | | | |
| 0 ... 4 bar | 50 m (≈ 150 ft) | 3 | L | | | | | | | |
| ***Special designs*** | | | | | | | | | | |
| Measuring ranges for special designs between:<br>0 ... 1 $mH_2O$ and 0 ... 160 $mH_2O$ or<br>0 ... 3 $ftH_2O$ and 0 ... 530 $ftH_2O$ or<br>0 ... 0.1 bar and 0 ... 16 bar possible. | | | | | | | | | | |
| **PE cable for general applications and drinking water applications** | | | | | | | | | | |
| ***Special cable length*** | | 9 | X | | | | H | . | . |
| Add **"-Z"** to article number, specify order code and plain text:<br>Y01: Cable length ..... | | | | | | | + | | |
| | | | | | | | Y | 0 | 1 |
| 3 m (≈ 10 ft) | | | | | | | H | 1 | A |
| 5 m (≈ 16 ft) | | | | | | | H | 1 | B |
| 7 m (≈ 23 ft) | | | | | | | H | 1 | C |
| 10 m (≈ 33 ft) | | | | | | | H | 1 | D |
| 15 m (≈ 50 ft) | | | | | | | H | 1 | E |
| 20 m (≈ 65 ft) | | | | | | | H | 1 | F |
| 25 m (≈ 80 ft) | | | | | | | H | 1 | G |
| 30 m (≈ 100 ft) | | | | | | | H | 1 | H |
| 40 m (≈ 130 ft) | | | | | | | H | 1 | J |
| 50 m (≈ 160 ft) | | | | | | | H | 1 | K |
| 60 m (≈ 200 ft) | | | | | | | H | 1 | L |
| 70 m (≈ 230 ft) | | | | | | | H | 1 | M |
| 80 m (≈ 265 ft) | | | | | | | H | 1 | N |
| 90 m (≈ 295 ft) | | | | | | | H | 1 | P |
| 100 m (≈ 330 ft) | | | | | | | H | 1 | Q |
| 125 m (≈ 410 ft) | | | | | | | H | 1 | R |
| 150 m (≈ 495 ft) | | | | | | | H | 1 | S |

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## Selection and ordering data (continued)

| SITRANS LH300 pressure transmitter | Article No. 7MF1575- ● ● ● ● ● | Order code ● ● ● |
|---|---|---|
| 175 m (≈ 575 ft) | | H 1 T |
| 200 m (≈ 650 ft) | | H 1 U |
| 225 m (≈ 740 ft) | | H 1 V |
| 250 m (≈ 820 ft) | | H 1 W |
| 275 m (≈ 900 ft) | | H 1 X |
| 300 m (≈ 990 ft) | | H 2 A |
| 350 m (≈ 1150 ft) | | H 2 B |
| 400 m (≈ 1320 ft) | | H 2 C |
| 450 m (≈ 1480 ft) | | H 2 D |
| 500 m (≈ 1650 ft) | | H 2 E |
| 550 m (≈ 1815 ft) | | H 2 F |
| 600 m (≈ 1980 ft) | | H 2 G |
| 650 m (≈ 2145 ft) | | H 2 H |
| 700 m (≈ 2310 ft) | | H 2 J |
| 750 m (≈ 2475 ft) | | H 2 K |
| 800 m (≈ 2640 ft) | | H 2 L |
| 850 m (≈ 2800 ft) | | H 2 M |
| 900 m (≈ 2970 ft) | | H 2 N |
| 950 m (≈ 3135 ft) | | H 2 P |
| 1 000 m (≈ 3300 ft) | | H 2 Q |
| ***Additional special cable lengths*** | 9 X | H 1 Y |
| Add **"-Z"** to article number, specify order code and plain text:<br>H1Y: Cable length .....<br>Y01: Measuring range ..... | | + Y 0 1 |
| **FEP cable for corrosive process media** | | |
| ***Special cable length*** | 9 X | H . . |
| Add **"-Z"** to article number, specify order code and plain text:<br>Y01: Cable length ..... | | + Y 0 1 |
| 3 m (≈ 10 ft) | | H 5 A |
| 5 m (≈ 16 ft) | | H 5 B |
| 7 m (≈ 23 ft) | | H 5 C |
| 10 m (≈ 33 ft) | | H 5 D |
| 15 m (≈ 50 ft) | | H 5 E |
| 20 m (≈ 65 ft) | | H 5 F |
| 25 m (≈ 80 ft) | | H 5 G |
| 30 m (≈ 100 ft) | | H 5 H |
| 40 m (≈ 130 ft) | | H 5 J |
| 50 m (≈ 160 ft) | | H 5 K |
| 60 m (≈ 200 ft) | | H 5 L |
| 70 m (≈ 230 ft) | | H 5 M |
| 80 m (≈ 265 ft) | | H 5 N |
| 90 m (≈ 295 ft) | | H 5 P |
| 100 m (≈ 330 ft) | | H 5 Q |
| 125 m (≈ 410 ft) | | H 5 R |
| 150 m (≈ 495 ft) | | H 5 S |
| 175 m (≈ 575 ft) | | H 5 T |
| 200 m (≈ 650 ft) | | H 5 U |
| 225 m (≈ 740 ft) | | H 5 V |
| 250 m (≈ 820 ft) | | H 5 W |
| 275 m (≈ 900 ft) | | H 5 X |
| 300 m (≈ 990 ft) | | H 6 A |
| 350 m (≈ 1150 ft) | | H 6 B |
| 400 m (≈ 1320 ft) | | H 6 C |
| 450 m (≈ 1480 ft) | | H 6 D |
| 500 m (≈ 1650 ft) | | H 6 E |
| 550 m (≈ 1815 ft) | | H 6 F |
| 600 m (≈ 1980 ft) | | H 6 G |

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## Selection and ordering data (continued)

| SITRANS LH300 pressure transmitter | | Article No. 7MF1575- | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | | ● | ● | ● |
| 650 m (≈ 2145 ft) | | | | | | | | H | 6 | H |
| 700 m (≈ 2310 ft) | | | | | | | | H | 6 | J |
| 750 m (≈ 2475 ft) | | | | | | | | H | 6 | K |
| 800 m (≈ 2640 ft) | | | | | | | | H | 6 | L |
| 850 m (≈ 2800 ft) | | | | | | | | H | 6 | M |
| 900 m (≈ 2970 ft) | | | | | | | | H | 6 | N |
| 950 m (≈ 3135 ft) | | | | | | | | H | 6 | P |
| 1000 m (≈ 3300 ft) | | | | | | | | H | 6 | Q |
| ***Additional special cable lengths*** | | 9 | X | | | | | H | 5 | Y |
| Add **"-Z"** to article number, specify order code and plain text:<br>H1Y: Cable length .....<br>Y01: Measuring range ..... | | | | | | | | +<br>Y | <br>0 | <br>1 |
| **Material of the enclosure** | **Protective cap material** | | | | | | | | | |
| Stainless steel 316L (1.4404) | Protective cap made of PPE (recommended for PE cable) | | | A | | | | | | |
| Stainless steel 316L (1.4404) | Protective cap made of ETFE (standard with FEP cable) | | | B | | | | | | |
| Stainless steel 316L (1.4404) | Stainless steel 316L (1.4404) | | | C | | | | | | |
| Stainless steel 904L (1.4539) for seawater applications | Protective cap made of PPE | | | D | | | | | | |
| Stainless steel 904L (1.4539) for seawater applications | Protective cap made of ETFE | | | E | | | | | | |
| Stainless steel 904L (1.4539) for seawater applications | Stainless steel 904L (1.4539) for seawater applications | | | F | | | | | | |
| **Gasket material between sensor and enclosure** | | | | | | | | | | |
| FPM (standard) | | | | | 1 | | | | | |
| EPDM (for drinking water applications) | | | | | 2 | | | | | |
| **Explosion protection** | | | | | | | | | | |
| None | | | | | | 0 | | | | |
| With ATEX II1 G Ex ia IIC T4 Ga, IECEx Ex ia IIC T4 Ga and EAC Ex explosion protection (only possible for cable length ≤ 300 m (990 ft)) | | | | | | 1 | | | | |

| Options | Order code |
|---|---|
| Quality test certificate (factory calibration) according to IEC 62828-2 (6 points upward) | **C11** |

### *Accessories/spare parts*

| | Article No. |
|---|---|
| Cable box | **7MF1575-8AA** |
| Anchoring clamp | **7MF1575-8AB** |
| Protective cap, PPE<br>As spare part (pack of 10) | **7MF1575-8AD** |
| Protective cap, ETFE<br>As spare part (pack of 10) | **7MF1575-8AE** |
| Humidity filter<br>As spare part (pack of 10) | **7MF1575-8AF** |
| Protective cap, stainless steel 316L (1.4404)<br>For wastewater applications | **7MF1575-8AG** |
| Protective cap, stainless steel 904L (1.4539)<br>For seawater applications | **7MF1575-8AH** |

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## Technical specifications

| Pressure transmitter SITRANS LH300 (submersible sensor) | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Piezo-resistive |
| **Input** | |
| Measured variable | Hydrostatic level |
| Measuring range | Max. permissible operating pressure |
| • 0 ... 1 $mH_2O$ (0 ... 3 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 2 $mH_2O$ (0 ... 6 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 3 $mH_2O$ (0 ... 9 $ftH_2O$) | • 1.5 bar (21.8 psi) (corresponds to 15 $mH_2O$ (45 $ftH_2O$)) |
| • 0 ... 4 $mH_2O$ (0 ... 12 $ftH_2O$) | • 2 bar (29 psi) (corresponds to 20 $mH_2O$ (60 $ftH_2O$)) |
| • 0 ... 5 $mH_2O$ (0 ... 15 $ftH_2O$) | • 2 bar (29 psi) (corresponds to 20 $mH_2O$ (60 $ftH_2O$)) |
| • 0 ... 6 $mH_2O$ (0 ... 18 $ftH_2O$) | • 2 bar (29 psi) (corresponds to 20 $mH_2O$ (60 $ftH_2O$)) |
| • 0 ... 10 $mH_2O$ (0 ... 30 $ftH_2O$) | • 5 bar (72.5 psi) (corresponds to 50 $mH_2O$ (150 $ftH_2O$)) |
| • 0 ... 20 $mH_2O$ (0 ... 60 $ftH_2O$) | • 10 bar (145 psi) (corresponds to 100 $mH_2O$ (300 $ftH_2O$)) |
| • 0 ... 40 $mH_2O$ (0 ... 120 $ftH_2O$) | • 20 bar (290 psi) (corresponds to 200 $mH_2O$ (600 $ftH_2O$)) |
| Special measuring ranges | |
| • Up to 100 $mH_2O$ (0 ... 300 $ftH_2O$) | • 20 bar (290 psi) (corresponds to 200 $mH_2O$ (600 $ftH_2O$)) |
| • Up to 160 $mH_2O$ (0 ... 480 $ftH_2O$) | • 24 bar (348 psi) (corresponds to 240 $mH_2O$ (720 $ftH_2O$)) |
| Measuring range | |
| • 0 ... 0.1 bar | • 1.5 bar |
| • 0 ... 0.2 bar | • 1.5 bar |
| • 0 ... 0.3 bar | • 1.5 bar |
| • 0 ... 0.4 bar | • 2 bar |
| • 0 ... 0.5 bar | • 2 bar |
| • 0 ... 0.6 bar | • 2 bar |
| • 0 ... 1 bar | • 5 bar |
| • 0 ... 2 bar | • 10 bar |
| • 0 ... 4 bar | • 20 bar |
| Special measuring ranges | |
| • Up to 10 bar | • 20 bar |
| • Up to 20 bar | • 24 bar |
| **Output** | |
| Output signal | 4 ... 20 mA |
| **Measuring accuracy** | According to IEC 62828-1 |
| Measurement deviation at limit setting including hysteresis and reproducibility | • ≤ 0.15% of the measuring range end value (typical)<br>• ≤ 0.3% of the measuring range end value (max.) |
| Effect of ambient temperature | ≤ 0.05%/10 K of the measuring range end value (zero point and span) |
| Long-term stability | ≤ 0.15% of the measuring range end value/year (zero point and span) |
| **Operating conditions** | |
| Ambient conditions | |
| • Process temperature | -10 ... +80 °C (14 ... 176 °F) |
| • Storage temperature | -20 ... +80 °C (-4 ... +176 °F) |
| Degree of protection according to IEC 60529 | IP68 |
| **Structural design** | |
| Weight | |
| • Pressure transmitter | ≈ 0.4 kg (≈ 0.88 lb) |

## Technical specifications (continued)

| Pressure transmitter SITRANS LH300 (submersible sensor) | |
|---|---|
| • Cable | 0.08 kg/m (≈ 0.059 lb/ft) |
| Maximum of freely hanging length | 300 m (990 ft) |
| Electrical connection | Cable with 2 wires, vent pipe and integrated humidity filters |
| Material | |
| • Seal diaphragm | $Al_2O_3$ ceramic, 96% |
| • Enclosure | Stainless steel, mat. no. 1.4404/316L or 1.4539/904L for seawater applications |
| • Gasket | • FPM (standard)<br>• EPDM (optional) |
| • Connecting cable | • PE (standard/drinking water applications)<br>• FEP (for corrosive process media) |
| • Protective cap | Stainless steel, PPE or ETFE |
| **Auxiliary power** | |
| Terminal voltage on pressure transmitter $U_B$ | • 10 ... 33 V DC for transmitter without explosion protection<br>• 10 ... 30 V DC for transmitter with intrinsic safety explosion protection |
| **Certificates and approvals** | |
| Drinking water approval (ACS) | 17 ACC NY 055 |
| EAC | TC N RU Д-DE.ГА02.B.05092 |
| Underwriters Laboratories (UL) | ML File No. E344532, issued 2017-08-17 |
| Marine approval (LR) | LR_18/20074 |
| Marine approval (DNV/GL) | TAA00000CE |
| Marine approval (BV) | 56926/A0 BV |
| Marine approval (ABS) | HG1881314_P |
| Marine approval (RINA) | ELE067319XG |
| Pressure Equipment Directive | The transmitter is not subject to the pressure equipment directive (DGRL 2014/68/EU) |
| Explosion protection | |
| • ATEX | SEV 16 ATEX 0121 |
| • IEC Ex | IEC Ex SEV 16.0003 |
| • EAC Ex | TC RU C-DE.AA87.B.00324 |
| Intrinsic safety "i" | |
| • Marking | II 1 G Ex ia IIC T4 Ga |

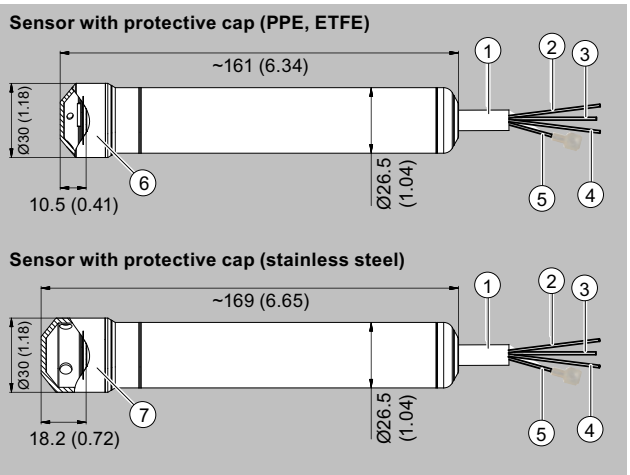
| Cable box | |
|---|---|
| **Area of application** | For connecting the transmitter cable |
| **Structural design** | |
| Weight | 0.2 kg (0.44 lb) |
| Electrical connection | 2 x 3-way (28 to 18 AWG) |
| Cable entry | 2 x PG 13.5 |
| Enclosure material | Polycarbonate |
| Vent valve for atmospheric pressure | |
| **Operating conditions** | |
| Degree of protection according to IEC 60529 | IP65 |

| Anchoring clamp | |
|---|---|
| **Area of application** | For mounting the transmitter |
| **Structural design** | |
| Weight | 0.16 kg (0.35 lb) |
| Material | Zinc-plated steel, polyamide |
| Terminal area | For cable with a diameter of 5.5 ... 9.5 mm |

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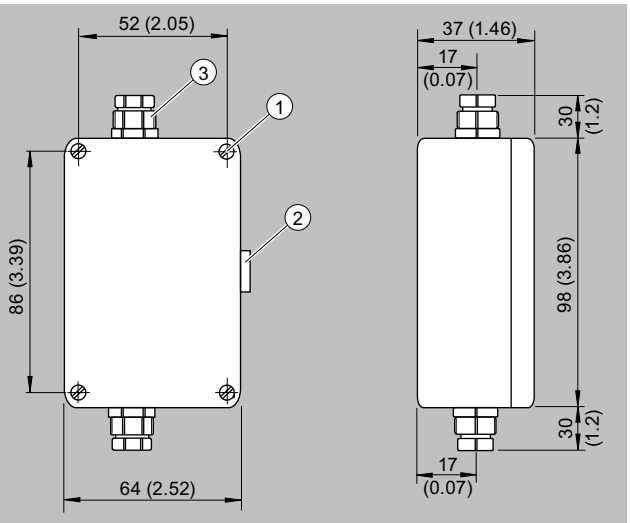


## Dimensional drawings




1. Cable, sheat Ø 8.3 (0.33)
2. - (blue)
3. + (brown)
4. Protective conductor connection/Equipotential bonding (black)
5. Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
6. Protective cap (PPE or PTFE) with 4 x Ø 2.5 (0.10) holes
7. Protective cap (stainless steel) with 4 x Ø 5 (0.20) holes

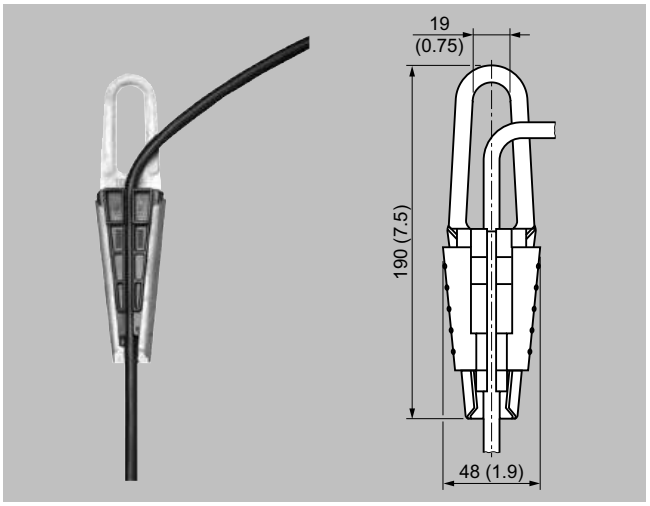
SITRANS LH300 pressure transmitter, dimensions in mm (inch)




1. Fastening hole
2. Vent valve
3. Cable gland Pg 13.5, cable diameter 6 ... 12 (0.23 ... 0.47)

Cable box, dimensions in mm (inch)

## Dimensional drawings (continued)



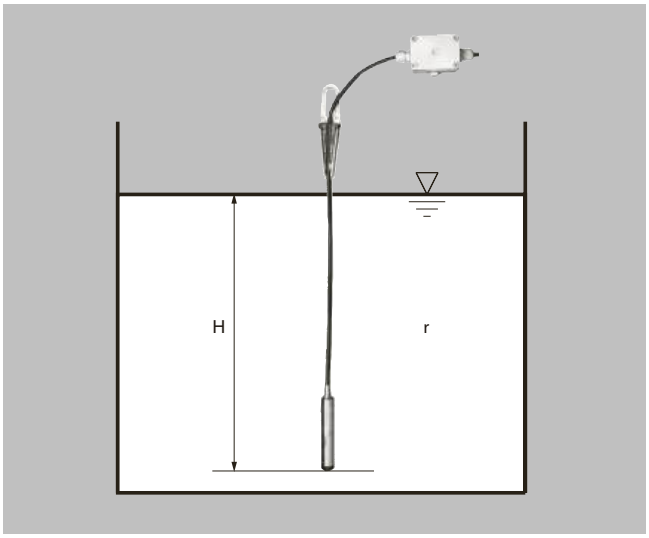

Anchoring clamp, dimensions in mm (inch)

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## More information

***Determination of the measuring range for water as process medium***




Calculation of the measuring range:

***p = ρ x g x H***

with:

ρ = density of medium
g = local gravitational acceleration
H = maximum level

Example:

Medium: Water, ρ = 1 000 kg/m$^3$
Gravitational acceleration: 9.81 m/s$^2$
Lower range value: 0 m
Maximum level: 6.0 m
Cable length: 10 m

Calculation:

p = 1 000 kg/m$^3$ x 9.81 m/s$^2$ x 6.0 m
p = 58 860 N/m$^2$
p = 589 mbar

Transmitter to be ordered:

***7MF1575-1FA10***

Plus, if required, cable box 7MF1575-8AA and anchoring clamp 7MF1575-8AB

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## Overview



The SITRANS P Compact pressure transmitter is designed for the specific requirements of the food, pharmaceuticals and biotechnology industries.

The use of high-quality materials guarantees adherence to hygiene provisions.

Particular importance was placed on high surface quality. In addition, the system can be electropolished.

A further important feature is the hygienic design of the process connection with different aseptic connections.

The fully welded stainless steel enclosure can be designed with degree of protection up to IP67.

By means of corresponding temperature decouplers, the SITRANS P Compact transmitter can be used for temperatures up to 200 °C (392 °F).

## Benefits

- Measuring ranges from 0 to 160 mbar (0 to 2.32 psi) to 0 to 40 bar (0 to 580 psi)
- Linearity error incl. hysteresis < +0.2% of the full-scale value
- Piezo-resistive measurement system, vacuum-proof and overload-proof
- Hygiene-based design according to EHEDG, FDA and GMP recommendations
- Material and surface quality according to hygiene requirements
- Wetted parts made of stainless steel; completely welded
- Signal output 4 to 20 mA (0 to 20 mA as option)
- Stainless steel enclosure with degree of protection IP65 (IP67 as option)
- Process temperature up to 200 °C (392 °F)
- Explosion protection II 2G EEx [ib] IIC T6 to ATEX
- Easy and safe to clean

## Application

The SITRANS P Compact pressure transmitter is designed for the specific requirements of the food, pharmaceuticals and biotechnology industries.

The use of high-quality materials guarantees adherence to hygiene provisions.

The SITRANS P Compact pressure transmitter can be ordered in a large number of different variants. This enables precise adaptation of the pressure transmitter to the conditions of the usage location.

## Design

The electronics are potted for protection against humidity, corrosive atmospheres and vibrations.

***Operating instructions for the pressure transmitter***

Atmospheric internal pressure compensation

The atmospheric internal pressure compensation of the SITRANS P Compact pressure transmitter is designed as follows in the overpressure measuring range:

- With connector designs via plug cable gland (IP65)
- In field enclosures via an integrated sinter filter (IP65) or a ventilated connecting cable (IP67)
- In versions with cable outlet via ventilated connecting cable (IP67)

In the absolute pressure area, no internal pressure compensation to the atmosphere is necessary.

**Note**: The degrees of protection specified above are only achieved under the following conditions:

- Proper mounting of the pressure transmitter
- Firmly tightened plug cable glands
- Cable diameters match nominal diameters of sealing inserts in the enclosure

**Note**: The integrated measures for EMC are only effective with a properly connected ground connection.

CE marking

The CE marking of the pressure transmitter certifies adherence with the guidelines of the European Council (9/336/EEC), the EMC legislation (13 Nov. 1992) and the applicable generic standards.

Problem-free operation in systems and plants is only achieved when the conditions for shielding, grounding, cable routing and electrical isolation are complied with during installation and mounting.

Hazardous areas

**Note**: In hazardous areas, electrical equipment can only be installed and operated by qualified expert personnel.

Changes at devices and connections void the Ex protection and the warranty.

In intrinsically safe circuits, equipotential bonding must be ensured over the entire course of the cable run, within and outside of the hazardous area. The limit values listed in the ATEX approval need to be considered.

## Function

Process pressure acts on a piezo-resistive semi-conductor measuring bridge via a remote seal diaphragm by means of a transfer fluid. The pressure transmitter converts the measured pressure values into a load-independent current signal.

A compensation network achieves a large degree of independence of the output signal from the ambient temperature. With a specially adapted remote seal connection with minimized system volume, the influence of the process temperature on the output signal is reduced significantly as compared to a conventional screw connection.

The pressure transmitters can be supplied with an unregulated DC voltage of 10 to 30 V. The output signals common in measuring technology are available.

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## Selection and ordering data

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm | Article No. 7MF8010- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● |
| 2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA | | | | | | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | |
| **Diaphragm seal with quick-release** | | | | | | | | | | | | | | |
| Milk pipe union acc. to DIN 11851 with slotted union nut | | | | | | | | | | | | | | |
| • DN 25 | | A | D | | | | | | | | | | | |
| • DN 32 | | A | E | | | | | | | | | | | |
| • DN 40 | | A | F | | | | | | | | | | | |
| • DN 50 | | A | G | | | | | | | | | | | |
| • DN 65 | | A | H | | | | | | | | | | | |
| Dairy connection according to DIN 11851 with screwed connector | | | | | | | | | | | | | | |
| • DN 25 | | B | D | | | | | | | | | | | |
| • DN 32 | | B | E | | | | | | | | | | | |
| • DN 40 | | B | F | | | | | | | | | | | |
| • DN 50 | | B | G | | | | | | | | | | | |
| • DN 65 | | B | H | | | | | | | | | | | |
| Clamp connection acc. to DIN 32676 | | | | | | | | | | | | | | |
| • DN 25 | | C | D | | | | | | | | | | | |
| • DN 40 | | C | F | | | | | | | | | | | |
| • DN 50 | | C | G | | | | | | | | | | | |
| Clamp connection acc. to ISO 2852 | | | | | | | | | | | | | | |
| • 1 inch | | D | M | | | | | | | | | | | |
| • 1½ inches | | D | N | | | | | | | | | | | |
| • 2 inches | | D | P | | | | | | | | | | | |
| • 2½ inches | | D | Q | | | | | | | | | | | |
| IDF standard with slotted union nut | | | | | | | | | | | | | | |
| • 1 inch | | E | M | | | | | | | | | | | |
| • 1½ inches | | E | N | | | | | | | | | | | |
| • 2 inches | | E | P | | | | | | | | | | | |
| IDF standard with screwed connector | | | | | | | | | | | | | | |
| • 1 inch | | F | M | | | | | | | | | | | |
| • 1½ inches | | F | N | | | | | | | | | | | |
| • 2 inches | | F | P | | | | | | | | | | | |
| SMS standard with slotted union nut | | | | | | | | | | | | | | |
| • 1 inch | | G | M | | | | | | | | | | | |
| • 1½ inches | | G | N | | | | | | | | | | | |
| • 2 inches | | G | P | | | | | | | | | | | |
| SMS standard with screwed connector | | | | | | | | | | | | | | |
| • 1 inch | | H | M | | | | | | | | | | | |
| • 1½ inches | | H | N | | | | | | | | | | | |
| • 2 inches | | H | P | | | | | | | | | | | |
| DRD flange without welded flange | | | | | | | | | | | | | | |
| • DN 50, PN 40 | | J | H | | | | | | | | | | | |
| Varivent connection (Tuchenhagen Co.) | | | | | | | | | | | | | | |
| • D = 50 for Varivent enclosure DN 25 and 1 inch | | K | F | | | | | | | | | | | |
| • D = 68 for Varivent enclosure DN 40 ... DN 125 and 1½ ... 6 inches | | K | L | | | | | | | | | | | |
| Special design (specify order code and plain text) | | Z | A | | | | | | | | | J | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | |
| Food-grade oil, FDA-listed | | | | 3 | | | | | | | | | | |
| Special design (specify order code and plain text) | | | | 9 | | | | | | | | L | 1 | Y |

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## Selection and ordering data (continued)

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm | Article No. 7MF8010- 1 ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| **Output signal** | | |
| 4 ... 20 mA | 1 | |
| Special design (specify order code and plain text) | 9 | M 1 Y |
| **Diaphragm seal with aseptic connection** | | |
| Aseptic screw gland according to DIN 11864-1, Form A, with slotted union nut | | |
| • 1 inch | P M | |
| • 1½ inches | P N | |
| • 2 inches | P P | |
| • 2½ inches | P Q | |
| Aseptic screw gland according to DIN 11864-1, Form A, with screwed connector | | |
| • 1 inch | Q M | |
| • 1½ inches | Q N | |
| • 2 inches | Q P | |
| • 2½ inches | Q Q | |
| NEUMO BioConnect aseptic screw gland with slotted union nut[1)] | | |
| • DN 25 | R D | |
| • DN 32 | R E | |
| • DN 40 | R F | |
| • DN 50 | R G | |
| NEUMO BioConnect aseptic screw gland with screwed connector[1)] | | |
| • DN 25 | S D | |
| • DN 32 | S E | |
| • DN 40 | S F | |
| • DN 50 | S G | |
| NEUMO BioConnect aseptic clamp connection, form R[1)] | | |
| • DN 25 | T D | |
| • DN 32 | T E | |
| • DN 40 | T F | |
| • DN 50 | T G | |
| NEUMO BioConnect aseptic clamp connection, form V[1)] | | |
| • DN 25 | U D | |
| • DN 32 | U E | |
| • DN 40 | U F | |
| • DN 50 | U G | |
| Male thread according to DIN 3852, form A | | |
| • G1", min. measuring span. 0.4 bar (5.8 psi) | X C | |
| • G1½", min. measuring span. 0.25 bar (3.63 psi) | X D | |
| • G2", min. measuring span. 0.16 bar (2.32 psi) | X E | |
| Special design (specify order code and plain text) | Z A | J 1 Y |
| **Filling liquid** | | |
| Food-grade oil, FDA-listed | 3 | |
| Special design (specify order code and plain text) | 9 | L 1 Y |
| **Output signal** | | |
| 4 ... 20 mA | 1 | |
| Special design (specify order code and plain text) | 9 | M 1 Y |
| **Enclosure version (stainless steel, mat. no. 1.4404/316L) / electrical connection** | | |
| Enclosure with angled device plug according to DIN 43650, IP65 | 1 | |
| Enclosure with M12 device plug, IP65, fastening union nut made of polyamide | 2 | |
| Enclosure with M12 device plug, IP65, fastening union nut made of stainless steel | 3 | |
| Field enclosure (small) made of stainless steel with cable gland, IP65 | 4 | |
| Field enclosure (small) made of stainless steel with cable gland, IP67, internal ventilation for measuring ranges < 16 bar (< 232 psi) | 5 | |

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## Selection and ordering data (continued)

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with flush-mounted diaphragm | Article No. 7MF8010- 1 ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| **Measuring range** | **Overload pressure** | |
| 0 ... 160 mbar (0 ... 2.32 psi) | 1 bar (14.5 psi) | B B |
| 0 ... 250 mbar (0 ...3.63 psi) | 1 bar (14.5 psi) | B C |
| 0 ... 400 mbar (0 ... 5.8 psi) | 3 bar (43.5 psi) | B D |
| 0 ... 600 mbar (0 ... 8.7 psi) | 3 bar (43.5 psi) | B E |
| 0 ... 1 bar (0 ... 14.5 psi) | 3 bar (43.5 psi) | C A |
| 0 ... 1.6 bar (0 ... 23.2 psi) | 10 bar (145 psi) | C B |
| 0 ... 2.5 bar (0 ... 36.3 psi) | 10 bar (145 psi) | C C |
| 0 ... 4 bar (0 ... 58 psi) | 20 bar (290 psi) | C D |
| 0 ... 6 bar (0 ... 87 psi) | 60 bar (870 psi) | C E |
| 0 ... 10 bar (0 ... 145 psi) | 60 bar (870 psi) | D A |
| 0 ... 16 bar (0 ... 232 psi) | 60 bar (870 psi) | D B |
| 0 ... 25 bar (0 ... 363 psi) | 60 bar (870 psi) | D C |
| 0 ... 40 bar (0 ... 580 psi) | 100 bar (1450 psi) | D D |
| -160 ... 0 mbar (-2.32 ... 0 $inH_2O$) | 1 bar (14.5 psi) | E B |
| -250 ... 0 mbar (-3.73 ... 0 $inH_2O$) | 1 bar (14.5 psi) | E C |
| -400 ... 0 mbar (-5.8 ... 0 $inH_2O$) | 3 bar (43.5 psi) | E D |
| -600 ... 0 mbar (-8.7 ... 0 $inH_2O$) | 3 bar (43.5 psi) | E E |
| -1 ... 0 bar (-14.5 ... 0 psi) | 3 bar (43.5 psi) | F A |
| -1 ... 0.6 bar (-14.5 ... 8.7 psi) | 10 bar (145 psi) | F B |
| -1 ... 1.5 bar (-14.5 ... 21.8 psi) | 10 bar (145 psi) | F C |
| -1 ... 3 bar (-14.5 ... 43.5 psi) | 20 bar (290 psi) | F D |
| -1 ... 5 bar (-14.5 ... 72.5 psi) | 20 bar (290 psi) | F E |
| -1 ... 9 bar (-14.5 ... 130.5 psi) | 60 bar (870 psi) | G A |
| -1 ... 15 bar (-14.5 ... 217.6 psi) | 60 bar (870 psi) | G B |
| 0 ... 1 bar a (0 ... 14.5 psi a) | 3 bar a (43.5 psi a) | H A |
| 0 ... 1.6 bar a (0 ... 23.2 psi a) | 10 bar a (145 psi a) | H B |
| 0 ... 2.5 bar a (0 ... 36.3 psi a) | 10 bar a (145 psi a) | H C |
| 0 ... 4 bar a (0 ... 58 psi a) | 10 bar a (145 psi a) | H D |
| 0 ... 6 bar a (0 ... 87 psi a) | 60 bar a (870 psi a) | H E |
| 0 ... 10 bar a (0 ... 145 psi a) | 60 bar a (870 psi a) | J A |
| Special design (specify order code and plain text) | | Z A P 1 Y |
| **Explosion protection** | | |
| None | | 1 |
| With, according to ATEX 100a, II 2 G, Ex ib IIC T6 | | 2 |

[1] Please make sure to also specify: Connections for pipes: R01, R02 or R03, see "Options" table.

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal 2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA | Article No. 7MF8010- 2 ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Inline seal (screw gland at each end) with quick-release clamps** | | |
| Dairy connection according to DIN 11851 with screwed connector | | |
| • DN 25 | A D | |
| • DN 32 | A E | |
| • DN 40 | A F | |
| • DN 50 | A G | |
| • DN 65 | A H | |
| Clamp connection acc. to DIN 32676 | | |
| • DN 25 | C D | |
| • DN 32 | C E | |
| • DN 40 | C F | |
| • DN 50 | C G | |

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## Selection and ordering data (continued)

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal<br>2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA | Article No.<br>7MF8010-<br>2 ● ● ● ● - ● ● ● ● | Order code<br>● ● ● |
|---|---|---|
| • DN 65 | C H | |
| Clamp connection acc. to ISO 2852[1] | | |
| • 1 inch | D M | |
| • 1½ inches | D N | |
| • 2 inches | D P | |
| • 2½ inches | D Q | |
| Special design (specify order code and plain text) | Z A | J 1 Y |
| **Filling liquid** | | |
| Food-grade oil, FDA-listed | 3 | |
| Special design (specify order code and plain text) | 9 | L 1 Y |
| **Output signal** | | |
| 4 ... 20 mA | 1 | |
| Special design (specify order code and plain text) | 9 | M 1 Y |
| **Inline seals with aseptic connection** | | |
| Aseptic screw gland according to DIN 11864-1, Form A, with screwed connector | | |
| • 1 inch | Q M | |
| • 1½ inches | Q N | |
| • 2 inches | Q P | |
| NEUMO BioConnect aseptic screw gland with screwed connector[2] | | |
| • DN 25 | S D | |
| • DN 32 | S E | |
| • DN 40 | S F | |
| • DN 50 | S G | |
| • DN 65 | S H | |
| NEUMO BioConnect aseptic clamp connection, form R[2] | | |
| • DN 25 | T D | |
| • DN 32 | T E | |
| • DN 40 | T F | |
| • DN 50 | T G | |
| SÜDMO aseptic screw gland with W 501 screwed connector[2] | | |
| • 1 inch | V M | |
| • 1½ inches | V N | |
| • 2 inches | V P | |
| SÜDMO aseptic screw gland with W 601 clamp connection[2] | | |
| • 1 inch | W M | |
| • 1½ inches | W N | |
| • 2 inches | W P | |
| Special design (specify order code and plain text) | Z A | J 1 Y |
| **Filling liquid** | | |
| Food-grade oil, FDA-listed | 3 | |
| Special design (specify order code and plain text) | 9 | L 1 Y |
| **Output signal** | | |
| 4 ... 20 mA | 1 | |
| Special design (specify order code and plain text) | 9 | M 1 Y |
| **Enclosure version (stainless steel, mat. no. 1.4404/316L) / electrical connection** | | |
| Enclosure with angled device plug according to DIN 43650, IP65, securing union nut made of polyamide | 1 | |
| Enclosure with M12 device plug, IP65, fastening union nut made of polyamide | 2 | |
| Enclosure with M12 device plug, IP65, fastening union nut made of stainless steel | 3 | |
| Field enclosure (small) made of stainless steel with cable gland, IP65 | 4 | |
| Field enclosure (small) made of stainless steel with cable gland, IP67, internal ventilation for measuring ranges < 16 bar (< 232 psi) | 5 | |

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## Selection and ordering data (continued)

| SITRANS P Compact pressure transmitter for gauge and absolute pressure, with inline seal<br>2-wire system, process temperature up to 140 °C (284 °F), measurement deviation: 0.2% of full-scale value, output 4 ... 20 mA | Article No.<br>7MF8010-<br>2 ● ● ● ● - ● ● ● ● | Order code<br>● ● ● |
|---|---|---|
| **Measuring range** | **Overload pressure** | |
| 0 ... 160 mbar (0 ... 2.32 psi) | 1 bar (14.5 psi) | B B |
| 0 ... 250 mbar (0 ...3.63 psi) | 1 bar (14.5 psi) | B C |
| 0 ... 400 mbar (0 ... 5.8 psi) | 3 bar (43.5 psi) | B D |
| 0 ... 600 mbar (0 ... 8.7 psi) | 3 bar (43.5 psi) | B E |
| 0 ... 1 bar (0 ... 14.5 psi) | 3 bar (43.5 psi) | C A |
| 0 ... 1.6 bar (0 ... 23.2 psi) | 10 bar (145 psi) | C B |
| 0 ... 2.5 bar (0 ... 36.3 psi) | 10 bar (145 psi) | C C |
| 0 ... 4 bar (0 ... 58 psi) | 20 bar (290 psi) | C D |
| 0 ... 6 bar (0 ... 87 psi) | 60 bar (870 psi) | C E |
| 0 ... 10 bar (0 ... 145 psi) | 60 bar (870 psi) | D A |
| 0 ... 16 bar (0 ... 232 psi) | 60 bar (870 psi) | D B |
| 0 ... 25 bar (0 ... 363 psi) | 60 bar (870 psi) | D C |
| 0 ... 40 bar (0 ... 580 psi) | 100 bar (1450 psi) | D D |
| -160 ... 0 mbar (-2.32 ... 0 psi) | 1 bar (14.5 psi) | E B |
| -250 ... 0 mbar (-3.63 ... 0 psi) | 1 bar (14.5 psi) | E C |
| -400 ... 0 mbar (-5.8 ... 0 psi) | 3 bar (43.5 psi) | E D |
| -600 ... 0 mbar (-8.7 ... 0 psi) | 3 bar (43.5 psi) | E E |
| -1 ... 0 bar (-14.5 ... 0 psi) | 3 bar (43.5 psi) | F A |
| -1 ... 0.6 bar (-14.5 ... 8.7 psi) | 10 bar (145 psi) | F B |
| -1 ... 1.5 bar (-14.5 ... 21.8 psi) | 10 bar (145 psi) | F C |
| -1 ... 3 bar (-14.5 ... 43.5 psi) | 20 bar (290 psi) | F D |
| -1 ... 5 bar (-14.5 ... 72.5 psi) | 20 bar (290 psi) | F E |
| -1 ... 9 bar (-14.5 ... 130.5 psi) | 60 bar (870 psi) | G A |
| -1 ... 15 bar (-14.5 ... 217.6 psi) | 60 bar (870 psi) | G B |
| 0 ... 1 bar a (0 ... 14.5 psi a) | 3 bar a (43.5 psi a) | H A |
| 0 ... 1.6 bar a (0 ... 23.2 psi a) | 10 bar a (145 psi a) | H B |
| 0 ... 2.5 bar a (0 ... 36.3 psi a) | 10 bar a (145 psi a) | H C |
| 0 ... 4 bar a (0 ... 58 psi a) | 10 bar a (145 psi a) | H D |
| 0 ... 6 bar a (0 ... 87 psi a) | 60 bar (870 psi a) | H E |
| 0 ... 10 bar a (0 ... 145 psi a) | 60 bar (870 psi a) | J A |
| Special design (specify order code and plain text) | | Z A P 1 Y |
| **Explosion protection** | | |
| None | | 1 |
| With explosion protection according to ATEX 100a, II 2 G, Ex ib IIC T6 | | 2 |

1) Observe inside diameter of the pipe. Please specify pipe classes (see "Options").
2) Please make sure to also specify: Connections for pipes: R01, R02 or R03, see "Options" table.

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Hygiene version**<br>Roughness process connection: Foil $R_a$ < 0.8 µm ($3.15 \cdot 10^{-8}$ inches); welding seams $R_a$ < 1.5 µm ($5.9 \cdot 10^{-8}$ inches) | **P01** |
| **Integrated cooling element**<br>Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F) | **K01** |
| **Connections for pipes** | |
| Pipes according to DIN 11850 | **R01** |
| ISO pipes according to DIN 2463 | **R02** |
| Pipes acc. to >>O. D. Tubing "BS 4825 Part 1"<< | **R03** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Certificates** | |
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 | **C11** |
| Inspection certificate according to EN 10204-3.1 | **C12** |
| Use of FDA-listed remote seal filling liquids certified with a factory certificate according to EN 10204-2.2 | **C17** |
| Roughness depth measurement $R_a$ certified with a factory certificate according to EN 10204-3.1 | **C18** |
| Certification according to EHEDG for inline seal with aseptic screw gland according to DIN 11864 | **C19** |

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## Technical specifications

| Pressure transmitters for food, pharmaceuticals and biotechnology | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Piezo-resistive |
| **Input** | |
| Measured variable | Gauge or absolute pressure |
| Measuring range | 0 ... 160 mbar (0 ... 2.32 psi)<br>...<br>0 ... 40 bar (0 ... 580 psi) |
| **Output** | |
| Output signal | |
| • 2-wire system | 4 ... 20 mA |
| • 3-wire system | 0 ... 20 mA |
| **Measuring accuracy** | According to IEC 62828-1 |
| Measurement deviation at limit setting including hysteresis and reproducibility | ≤ 0.2% of full-scale value |
| Adjustment accuracy | ≤ ±0.2% of full-scale value |
| Step response time | < 20 ms |
| ***Effect of ambient temperature*** | |
| On the enclosure | |
| • Zero point | < 0.2%/10 K of full-scale value |
| • Measuring span | < 0.2%/10 K of full-scale value |
| On the process connection (remote seals) | Zero-point error (dependent on design)[1] |
| • Flange remote seal | |
| - DN 25/1" | 4.8 mbar/10 K (0.069 psi/10 K) |
| - DN 32/1¼" | 2.3 mbar/10 K (0.033 psi/10 K) |
| - DN 40/1½" | 1.6 mbar/10 K (0.023 psi/10 K) |
| - DN 50/2" | 0.6 mbar/10 K (0.009 psi/10 K) |
| • Inline seal | |
| - DN 25/1" | 9.5 mbar/10 K (0.138 psi/10 K) |
| - DN 32/1¼" | 4.1 mbar/10 K (0.060 psi/10 K) |
| - DN 40/1½" | 3.9 mbar/10 K (0.057 psi/10 K) |
| - DN 50/2" | 3.9 mbar/10 K (0.057 psi/10 K) |
| **Operating conditions** | |
| Installation conditions | |
| • Mounting position | Any, vertical as standard |
| Ambient conditions | |
| • Ambient temperature | -10 ... +70 °C (14 ... 158 °F) |
| • Storage temperature | -10 ... +90 °C (14 ... 194 °F) |
| • Process temperature | Max. 200 °C (392 °F), depending on design |
| • Vacuum-resistant | 0 mbar (0 psi) absolute at max. 50 °C. Higher process temperatures on request. |
| • Degree of protection according to IEC 60529 | IP65, optional IP67 |
| • Electromagnetic Compatibility | |
| - Emitted interference | To EN 50081 Part 1, issue 1993 (residential and industrial areas). The device has no own emissions. |
| - Noise immunity to | EN 50082 Part 2, issue March 1995 (industrial areas) |
| **Structural design** | |
| Weight (without remote seal) | |
| • Field enclosure | ≈ 460 G (≈ 1.01 lb) |

## Technical specifications (continued)

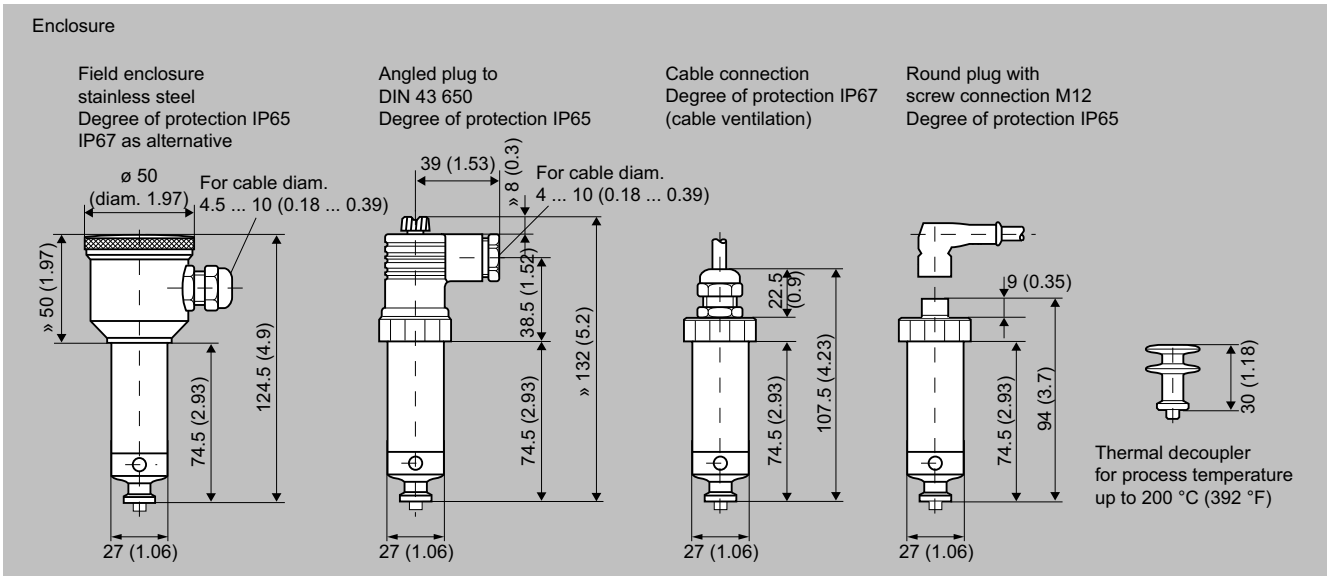
| Pressure transmitters for food, pharmaceuticals and biotechnology | |
|---|---|
| • Enclosure with plug | ≈ 200 g (≈ 0.44 lb) |
| Enclosure | |
| • Designs | • Field enclosure IP65 or IP67, with screw gland<br>• Angled device plug DIN 43650, IP65<br>• Cable connection, IP67<br>• M12 device plug, IP65 |
| • Material | Stainless steel, mat. no. 1.4404/316L/1.4305 |
| Material of union nut | Polyamide (with electrical connection using plug or cable)<br>Electronics unit potted with silicone<br>Internal ventilation for measuring ranges < 16 bar (< 232 psi), through enclosure thread or connecting cable depending on design |
| Process connection | |
| • Versions | See ordering data |
| • Material of coupling | Stainless steel, mat. no. 1.4404/316L |
| **Auxiliary power** | |
| Terminal voltage on transmitter | 10 ... 30 V DC |
| Nominal voltage | 24 V DC |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | |
| • For 7MF8010-1... (with diaphragm seal) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| • For 7MF8010-2... (with inline seal) | For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 4, paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord |
| Explosion protection | |
| • Intrinsic safety "i" | TÜV 03 ATEX 2099 X |
| - Marking | Ex II 2G EEx ib IIC T6 |

[1] The zero-point error specified for the process connection should be considered as a guide value for a standard design. We will make a detailed system calculation on request. Systems with reduced remote seal error are available on request.

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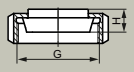
## Dimensional drawings

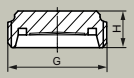


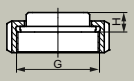

SITRANS P Compact, dimensions in mm (inch)

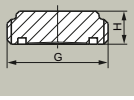
***Process connections***

Quick-release diaphragm seals

| Dairy connection according to DIN 11851 with slotted union nut | | | | |
|---|---|---|---|---|
|  | **DN** | **PN** | **H mm (inch)** | **G** |
| | 25 | 40 | 24 (0.95) | Radius 52 x 1/6 inch |
| | 32 | 40 | 24 (0.95) | Radius 58 x 1/6 inch |
| | 40 | 40 | 24 (0.95) | Radius 65 x 1/6 inch |
| | 50 | 25 | 25.1 (0.99) | Radius 78 x 1/6 inch |
| | 65 | 25 | 28.6 (1.13) | Radius 95 x 1/6 inch |

| Dairy connection according to DIN 11851 with screwed connector | | | | |
|---|---|---|---|---|
|  | **DN** | **PN** | **H mm (inch)** | **G** |
| | 25 | 40 | - | Radius 52 x 1/6 inch |
| | 32 | 40 | 20 (0.79) | Radius 58 x 1/6 inch |
| | 40 | 40 | 20 (0.79) | Radius 65 x 1/6 inch |
| | 50 | 25 | 20 (0.79) | Radius 78 x 1/6 inch |
| | 65 | 25 | 22 (0.87) | Radius 95 x 1/6 inch |

| SMS standard with union nut | | | | |
|---|---|---|---|---|
|  | **DN** | **PN** | **H mm (inch)** | **G** |
| | 1 inch | 40 | 16 (0.63) | Radius 40 x 1.6 inches |
| | 1½ inches | 40 | 16 (0.63) | Radius 60 x 1.6 inches |
| | 2 inches | 25 | 16 (0.63) | Radius 70 x 1.6 inches |

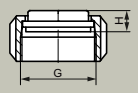
| SMS standard with threaded socket | | | | |
|---|---|---|---|---|
|  | **DN** | **PN** | **H mm (inch)** | **G** |
| | 1 inch | 40 | 16 (0.63) | Radius 40 x 1.6 inches |
| | 1½ inches | 40 | 20 (0.79) | Radius 60 x 1.6 inches |
| | 2 inches | 25 | 20 (0.79) | Radius 70 x 1.6 inches |

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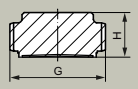
## Dimensional drawings (continued)

**IDF standard with union nut**



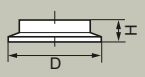

| DN | PN | H mm (inch) | G |
|---|---|---|---|
| 1 inch | 40 | 21 (0.83) | 1 inch |
| 1½ inches | 40 | 13.5 (0.53) | 1½ inches |
| 2 inches | 25 | 15 (0.59) | 2 inches |

**IDF standard with screwed connector**



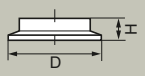

| DN | PN | H mm (inch) | G |
|---|---|---|---|
| 1 inch | 40 | 21 (0.83) | 1 inch |
| 1½ inches | 40 | 13.5 (0.53) | 1½ inches |
| 2 inches | 25 | 15 (0.59) | 2 inches |

**Clamp connection according to DIN 32676**



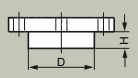

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 16 | 14 (0.55) | 50.5 (2) |
| 40 | 16 | 14 (0.55) | 50.5 (2) |
| 50 | 16 | 14 (0.55) | 64 (2.52) |

**Clamp connection according to ISO 2852**



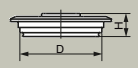

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 1 inch | 16 | 14 (0.55) | 50.5 (2) |
| 1½ inches | 16 | 12 (0.47) | 50.5 (2) |
| 2 inches | 16 | 14 (0.55) | 64 (2.52) |
| 2½ inches | 16 | 14 (0.55) | 77.5 (3.05) |

**DRD flange without welded flange**




| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 50 | 40 | 16.7 (0.66) | 65.5 (2.58) |

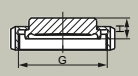
**Varivent connection**




| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 25 | 19 (0.75) | 50 (1.97) |
| 40 ... 125 | 25/10 | 19 (0.75) | 68 (2.68) |

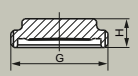
Diaphragm seal with aseptic connection

**Aseptic screw gland according to DIN 11864-1, form A, with slotted union nut**




| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 1 inch | 40 | 20 (0.79) | Radius 52 x 1/6 inch |
| 1½ inches | 40 | 20 (0.79) | Radius 58 x 1/6 inch |
| 2 inches | 25 | 20 (0.79) | Radius 65 x 1/6 inch |
| 2½ inches | 25 | 20 (0.79) | Radius 78 x 1/6 inch |

**Aseptic screw gland according to DIN 11864-1, form A, with screwed connector**



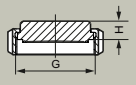

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 1 inch | 40 | 15 (0.59) | Radius 52 x 1/6 inch |
| 1½ inches | 40 | 15 (0.59) | Radius 58 x 1/6 inch |
| 2 inches | 25 | 15 (0.59) | Radius 65 x 1/6 inch |
| 2½ inches | 25 | 15 (0.59) | Radius 78 x 1/6 inch |

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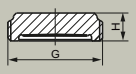
## Dimensional drawings (continued)

**NEUMO BioConnect aseptic screw gland with slotted union nut**



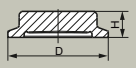

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 16 | 15 (0.59) | M 42 x 2 |
| 32 | 16 | 15 (0.59) | M 52 x 2 |
| 40 | 16 | 15 (0.59) | M 56 x 2 |
| 50 | 16 | 15 (0.59) | M 68 x 2 |

**NEUMO BioConnect aseptic screw gland with screwed connector**



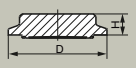

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 16 | 20 (0.79) | M 42 x 2 |
| 32 | 16 | 20 (0.79) | M 52 x 2 |
| 40 | 16 | 20 (0.79) | M 56 x 2 |
| 50 | 16 | 20 (0.79) | M 68 x 2 |

**NEUMO BioConnect aseptic clamp connection, form R**



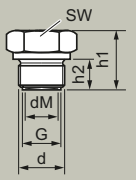

| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 40 | 20 (0.79) | 50.5 (2) |
| 32 | 40 | 20 (0.79) | 50.5 (2) |
| 40 | 40 | 20 (0.79) | 64 (2.52) |
| 50 | 25 | 20 (0.79) | 77.4 (3.05) |

**NEUMO BioConnect aseptic clamp connection, form V**




| DN | PN | H mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 40 | 15 (0.59) | 50.5 (2) |
| 32 | 40 | 15 (0.59) | 50.5 (2) |
| 40 | 40 | 20 (0.79) | 64 (2.52) |
| 50 | 25 | 20 (0.79) | 77.4 (3.05) |

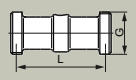
**Connecting socket for screw-in thread according to DIN 3852, form A**




| G | d mm (inches) | $d_M$ mm (inch) | $h_1$ mm (inch) | $h_2$ mm (inch) | SW mm (inch) |
|---|---|---|---|---|---|
| G½A | 26 (1.02) | 17.5 (0.69) | 27 (1.06) | 14 (0.55) | 27 (1.06) |
| G¾A | 32 (1.26) | 22.6 (0.89) | 31 (1.22) | 16 (0.63) | 32 (1.26) |
| G1A | 39 (1.54) | 27 (1.06) | 33 (1.30) | 18 (0.71) | 51 (2.01) |
| G1½A | 55 (2.17) | 40 (1.57) | 40 (1.57) | 22 (0.87) | 55 (2.17) |
| G2A | 68 (2.68) | 51 (2.00) | 42 (1.65) | 24 (0.94) | 70 (2.76) |

Inline seal (screw gland at each end) with quick-release clamps

**Dairy connection according to DIN 11851 with screwed connector**



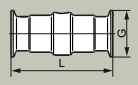

| DN | PN | L mm (inch) | G |
|---|---|---|---|
| 25 | 40 | 110 (4.33) | Radius 52 x 1/6 inch |
| 32 | 40 | 110 (4.33) | Radius 58 x 1/6 inch |
| 40 | 40 | 110 (4.33) | Radius 65 x 1/6 inch |
| 50 | 25 | 110 (4.33) | Radius 78 x 1/6 inch |
| 65 | 25 | 110 (4.33) | Radius 95 x 1/6 inch |

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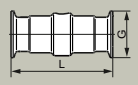
## Dimensional drawings (continued)

**Clamp connection according to DIN 32676**




| DN | PN | L mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 16 | 110 (4.33) | 50.5 (2) |
| 32 | 16 | 110 (4.33) | 50.5 (2) |
| 40 | 16 | 110 (4.33) | 50.5 (2) |
| 50 | 16 | 110 (4.33) | 64 (2.52) |
| 65 | 10 | 110 (4.33) | 91 (3.58) |

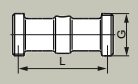
**Clamp connection according to ISO 2852**




| DN | PN | L mm (inch) | D mm (inches) |
|---|---|---|---|
| 1 inch | 16 | 110 (4.33) | 50.5 (2) |
| 1½ inches | 16 | 110 (4.33) | 50.5 (2) |
| 2 inches | 16 | 110 (4.33) | 64 (2.52) |
| 2½ inches | 16 | 110 (4.33) | 91 (3.58) |

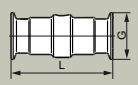
Inline seals with aseptic connection

**Aseptic screwed gland according to DIN 11864-1, form A, with screwed connector**



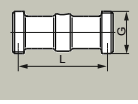

| DN | PN | L mm (inch) | G |
|---|---|---|---|
| 1 inch | 40 | 110 (4.33) | Radius 52 x 1/6 inch |
| 1½ inches | 40 | 110 (4.33) | Radius 65 x 1/6 inch |
| 2 inches | 25 | 110 (4.33) | Radius 78 x 1/6 inch |

**NEUMO BioConnect aseptic screwed gland with screwed connector**



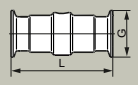

| DN | PN | L mm (inch) | G |
|---|---|---|---|
| 25 | 16 | 110 (4.33) | M 42 x 2 |
| 32 | 16 | 110 (4.33) | M 52 x 2 |
| 40 | 16 | 110 (4.33) | M 56 x 2 |
| 50 | 16 | 110 (4.33) | M 68 x 2 |
| 65 | 16 | 110 (4.33) | M 90 x 3 |

**SÜDMO aseptic screwed gland with W 501 screwed connector**



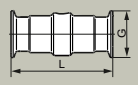

| DN | PN | L mm (inch) | G |
|---|---|---|---|
| 1 inch | 25 | 110 (4.33) | Radius 44 x 1/6 inch |
| 1½ inches | 25 | 110 (4.33) | Radius 58 x 1/6 inch |
| 2 inches | 20 | 110 (4.33) | Radius 78 x 1/6 inch |

**NEUMO BioConnect aseptic screwed gland clamp connection, form R**




| DN | PN | L mm (inch) | D mm (inches) |
|---|---|---|---|
| 25 | 16 | 110 (4.33) | 50.4 (2) |
| 32 | 16 | 110 (4.33) | 50.4 (2) |
| 40 | 16 | 110 (4.33) | 64 (2.52) |
| 50 | 16 | 110 (4.33) | 77.4 (3.05) |

**SÜDMO aseptic screwed gland with W 601 screwed connector**

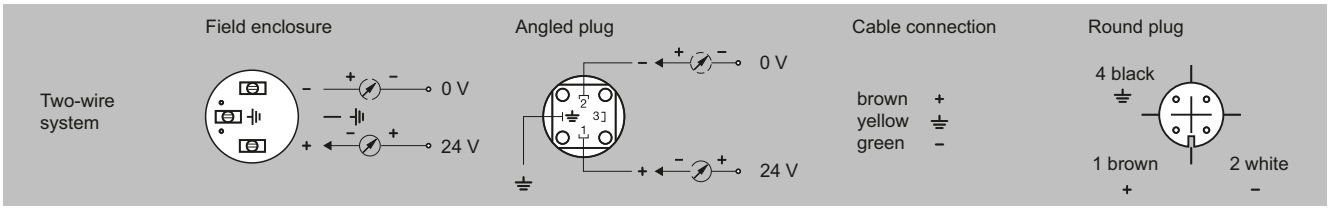



| DN | PN | L mm (inch) | D mm (inches) |
|---|---|---|---|
| 1 inch | 16 | 110 (4.33) | 50.5 (2) |
| 1½ inches | 16 | 110 (4.33) | 64 (2.52) |
| 2 inches | 16 | 110 (4.33) | 77.5 (3.05) |

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## Circuit diagrams




SITRANS P Compact, connection diagram

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## Overview




The SITRANS P300 is a digital pressure transmitter for relative and absolute pressure. The conventional thread versions are available as process connections, as are flush-mounted versions. A large number of the flush-mounted versions are suitable for food and pharmaceutical applications, and satisfy the EHEDG and 3A hygiene requirements.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbus signal, which is linearly proportional to the input pressure. Communication is via HART protocol or PROFIBUS PA or FOUNDATION Fieldbus interface. The basic settings of the pressure transmitter can be made easily on-site by means of three buttons.

The SITRANS P300 has a single-chamber stainless steel enclosure. The pressure transmitter is approved for "intrinsically safe" type of protection. It can be used in zone 1 or zone 0.

## Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (e.g., stainless steel, Hastelloy)
- Measuring range 0.008 bar to 400 bar (0.1 psi to 5802 psi)
- High measuring accuracy
- Parameterization using control keys and HART and/or PROFIBUS PA or FOUNDATION Fieldbus

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## Application

The pressure transmitter is available in versions for gauge pressure and for absolute pressure. The output signal is always a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbus signal, which is linearly proportional to the input pressure. The pressure transmitter measures corrosive, non-corrosive and hazardous gases, vapors and liquids.

It can be used for the following measurement types:

- Gauge pressure
- Absolute pressure

With appropriate parameter settings, it can also be used for the following additional measurement types:

- Level
- Volume
- Mass

The "intrinsically safe" Ex ia type of protection version of the transmitter can be installed in hazardous areas (Zone 1). The devices are provided with an EC type-examination certificate and comply with the respective harmonized European standards of ATEX.

***Gauge pressure***

This variant measures the gauge pressure of corrosive, non-corrosive and hazardous gases, vapors and liquids.

The smallest measuring span is 0.01 bar (0.15 psi), the largest 400 bar (5802 psi).

***Level***

With appropriate parameter settings, the gauge pressure variant measures the level of corrosive, non-corrosive and hazardous liquids.

For level measurement in an open vessel, you require one device; for level measurement in a closed vessel, you require two devices and a process control system.

***Absolute pressure***

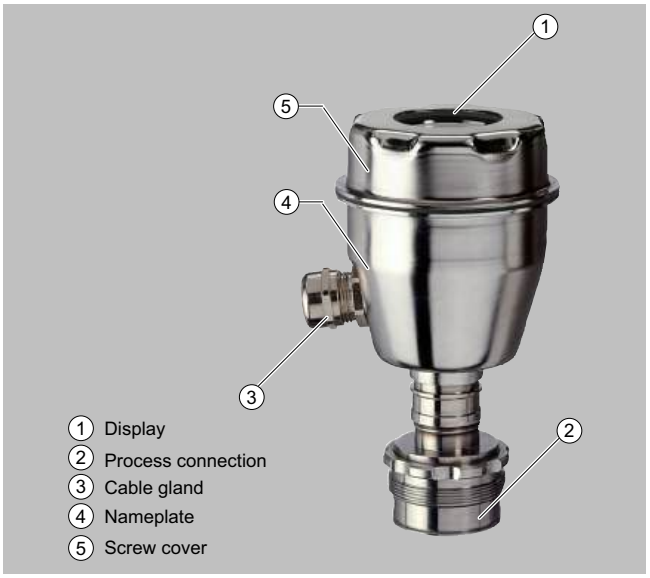
This variant measures the absolute pressure of corrosive, non-corrosive and hazardous gases, vapors and liquids.

The smallest measuring span is 0.008 bar a (0.12 psi a), the largest is 30 bar a (435 psi a).

## Design

The device comprises:

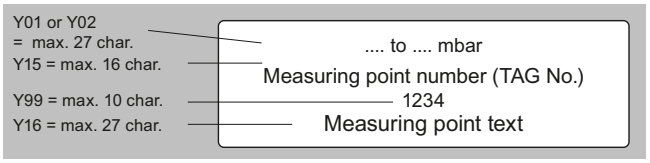
- electronics
- Enclosure
- Measuring cell




Perspective view of SITRANS P300

The enclosure has a screw-on cover (5) and, depending on the version, comes with or without an inspection window. The electrical terminal compartment, the buttons for operation of the device are located under this cover and, depending on the version, the display. The connections for the auxiliary power $U_H$ and the shield are in the terminal compartment. The cable gland is mounted on the side of the enclosure. The measuring cell with the process connection (2) is located on the bottom of the enclosure. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

***Example of attached measuring points sign***

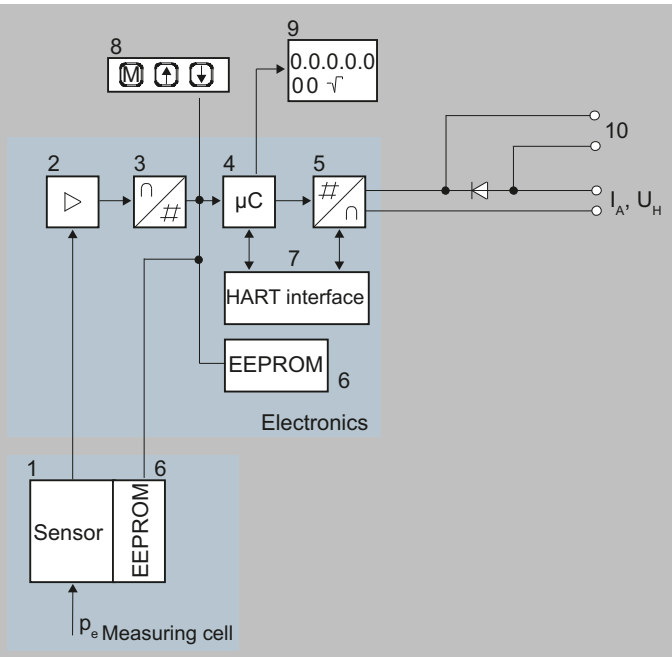


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## Function

***Mode of operation of electronics with HART communication***




1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
$I_A$ Output current 4 ... 20 mA
$U_H$ Power supply
$P_e$ Input variable

Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the instrument amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected for linearity and temperature response. In a digital-to-analog converter (5) it is then converted into the output current of 4 to 20 mA. A diode circuit provides reverse polarity protection. You can make an uninterrupted current measurement with a low-ohm ammeter at the connection (10). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first storage is linked to the measuring cell, the second to the electronics.

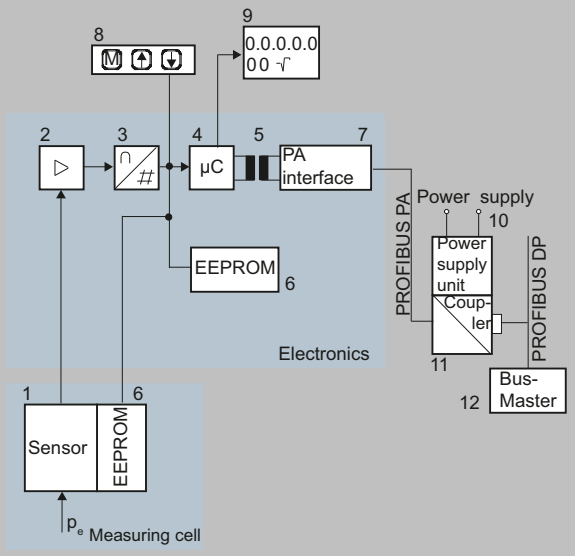
The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a local display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer via the HART modem (7).

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## Function (continued)

***Mode of operation of electronics with PROFIBUS PA communication***




| | | | |
|---|---|---|---|
| 1 | Measuring cell sensor | 8 | Three input keys (local operation) |
| 2 | Instrument amplifier | 9 | Digital display |
| 3 | Analog-to-digital converter | 10 | Power supply |
| 4 | Microcontroller | 11 | DP/PA coupler or link |
| 5 | Electrical isolation | 12 | Bus master |
| 6 | One non-volatile memory each in the measuring cell and electronics | $p_e$ | Input variable |
| 7 | PROFIBUS PA interface | | |

Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the instrument amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected for linearity and temperature response. It is then made available on the PROFIBUS PA via an electrically isolated PROFIBUS PA interface (7). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first storage is linked to the measuring cell, the second to the electronics.

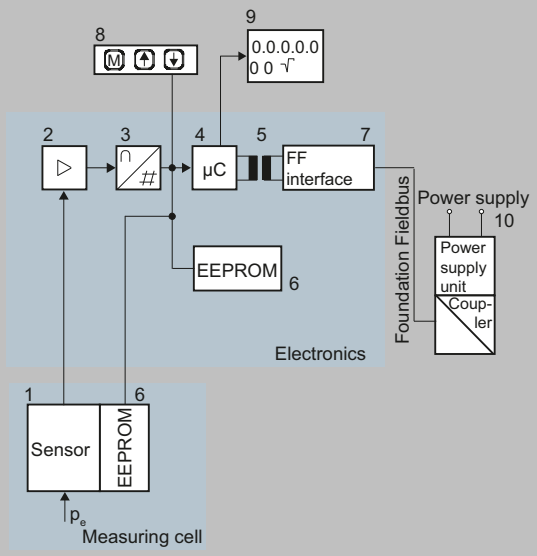
The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a local display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer over the bus master (12).

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## Function (continued)

***Mode of operation of electronics with FOUNDATION Fieldbus communication***




| | | | |
|---|---|---|---|
| 1 | Measuring cell sensor | 8 | Three input keys (local operation) |
| 2 | Instrument amplifier | 9 | Digital display |
| 3 | Analog-to-digital converter | 10 | Power supply |
| 4 | Microcontroller | | |
| 5 | Electrical isolation | $p_e$ | Input variable |
| 6 | One non-volatile memory each in the measuring cell and electronics | | |
| 7 | FOUNDATION Fieldbus interface | | |

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the instrument amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response and made available on the FOUNDATION Fieldbus via an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One storage is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input keys (8), you can assign parameters to the pressure transmitter directly at the measuring point. The input keys can also be used to control the view of the measurement results, the error messages and the operating modes on the local display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

***Mode of operation of the measuring cells***

The process connections available include the following:

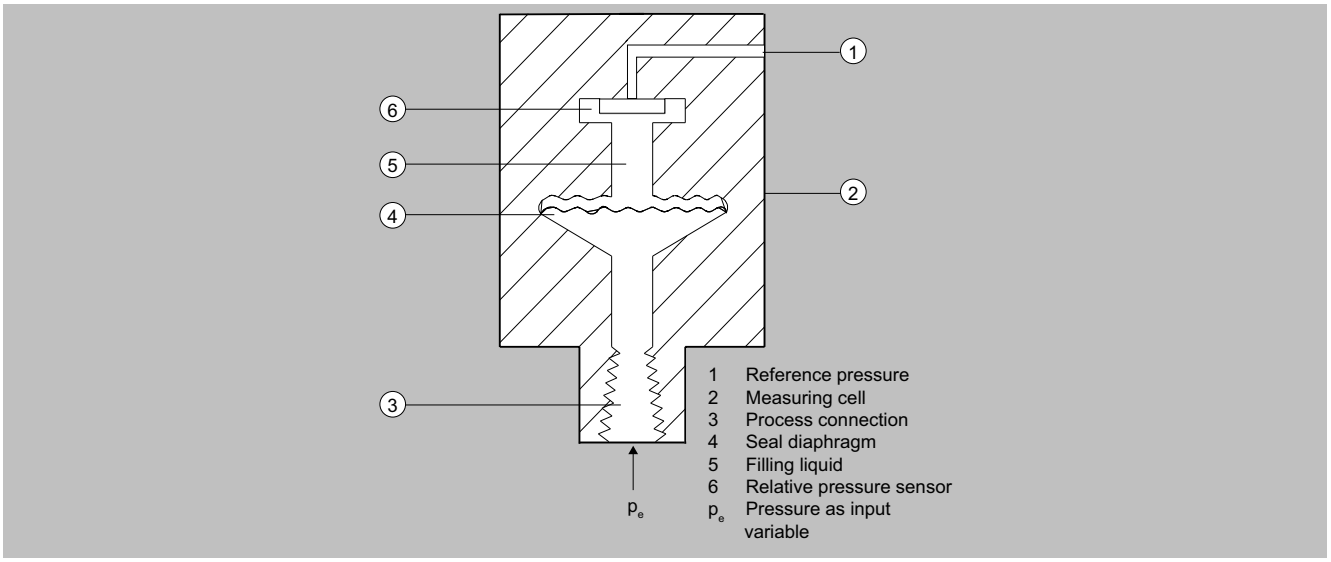
- G½
- ½-14 NPT
- Flush-mounted diaphragm:
  - Flanges according to EN
  - Flanges according to ASME
  - NuG and pharmaceutical connections

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## Function (continued)

Measuring cell for gauge pressure

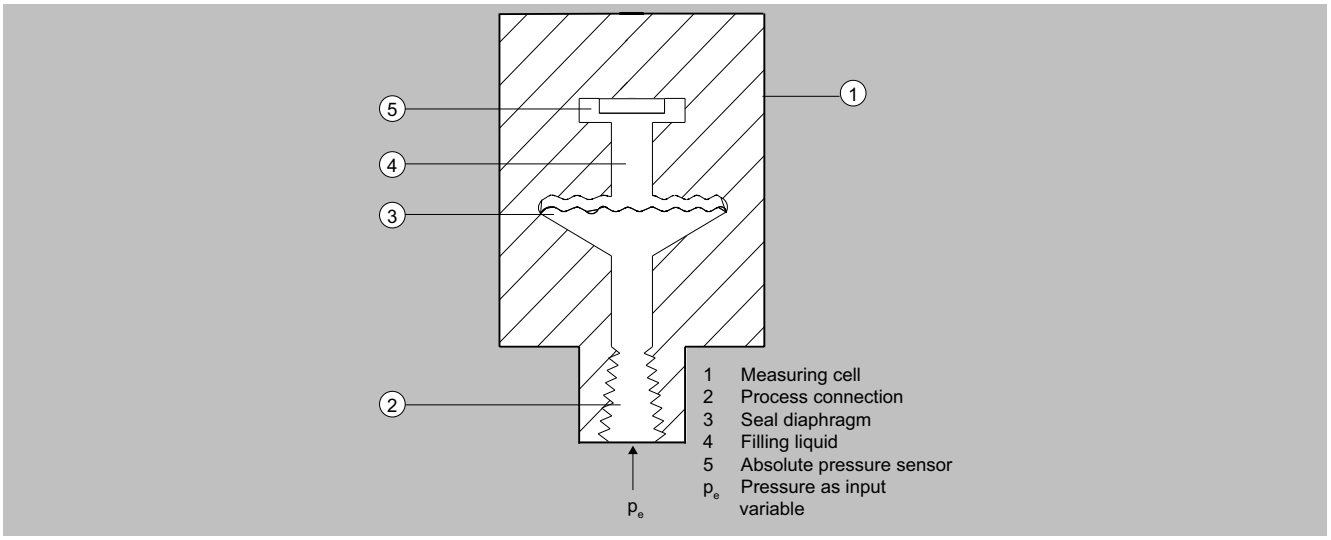



Measuring cell for gauge pressure, function diagram

The input pressure ($p_e$) is transferred via the seal diaphragm (4) and the filling liquid (5) to the gauge pressure sensor (6), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with measuring spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with measuring spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure




Measuring cell for absolute pressure, function diagram

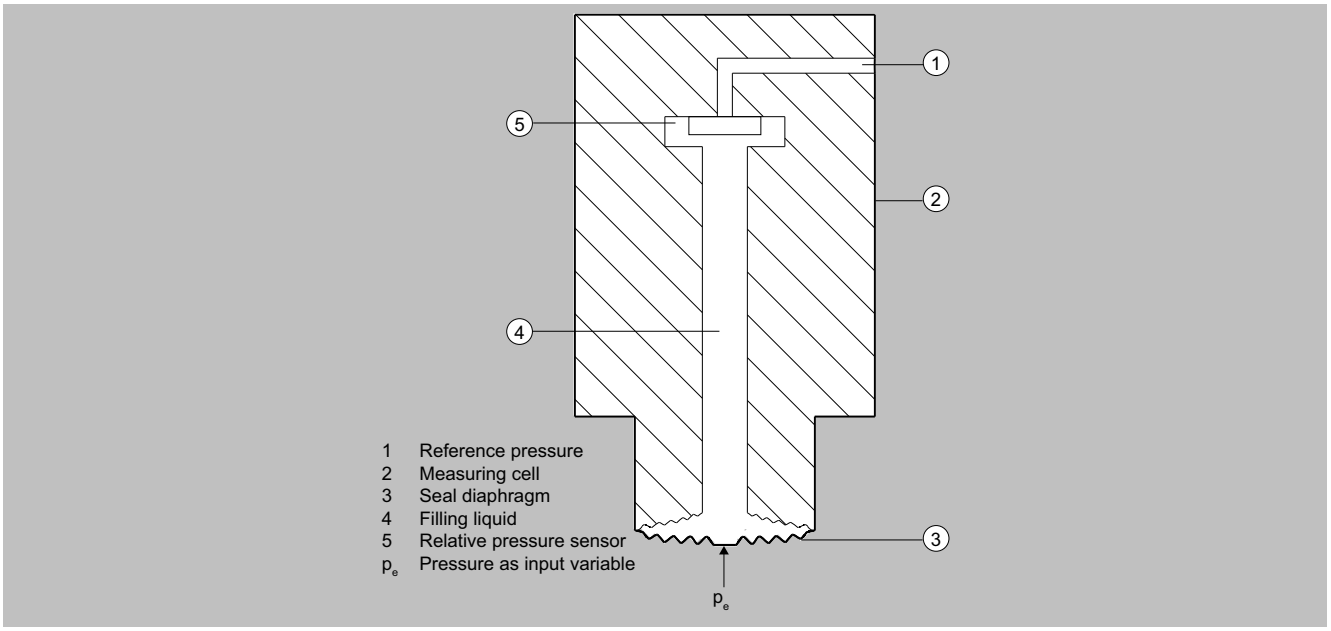
The input pressure ($p_e$) is transferred via the seal diaphragm (3) and the filling liquid (4) to the absolute pressure sensor (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

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## Function (continued)

Measuring cell for gauge pressure, flush-mounted diaphragm

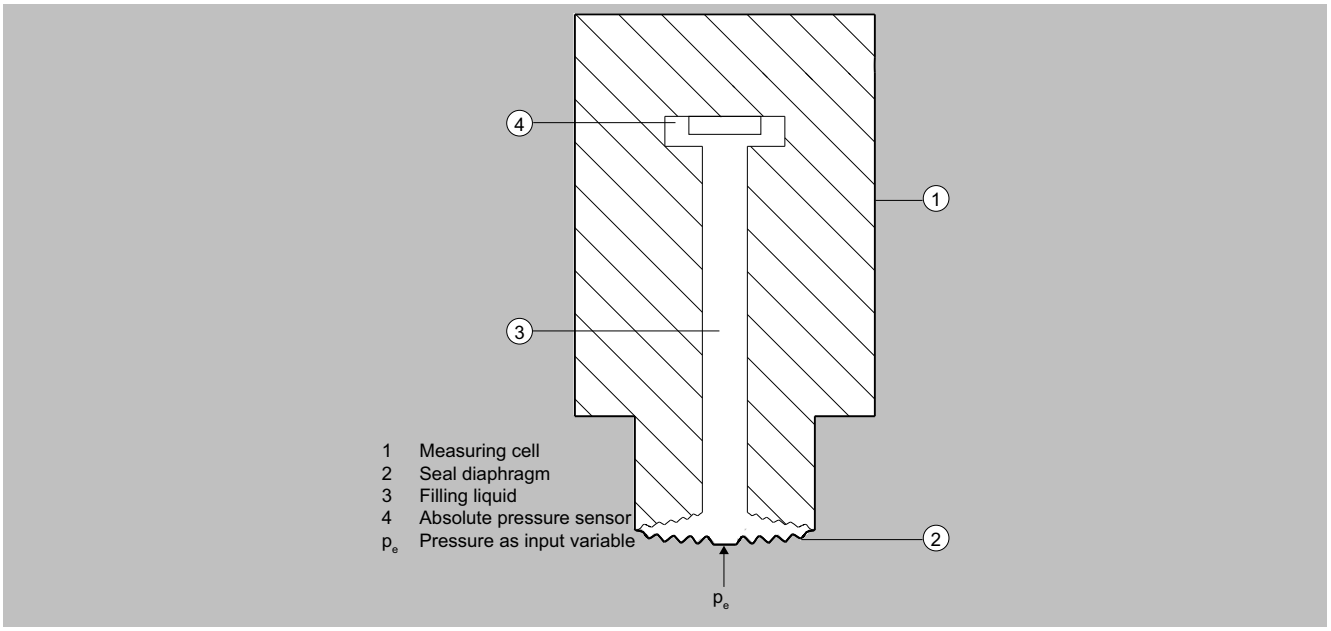



Measuring cell for gauge pressure, flush-mounted diaphragm, function diagram

The input pressure ($p_e$) is transferred via the seal diaphragm (3) and the filling liquid (4) to the gauge pressure sensor (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with measuring spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with measuring spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure, front-flush membrane




Measuring cell for absolute pressure, flush-mounted diaphragm, function diagram

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## Function (continued)

The input pressure ($p_e$) is transferred via the seal diaphragm (2) and the filling liquid (3) to the absolute pressure sensor (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

***Parameterization***

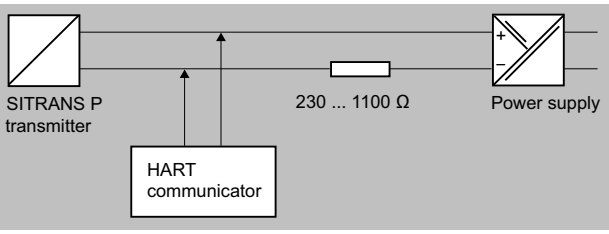
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input keys (local operation)

With the input keys, you can easily set the most important parameters without any additional equipment.

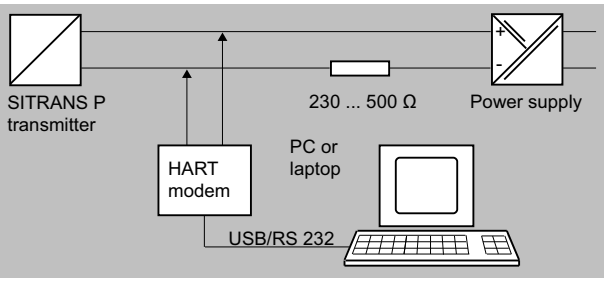
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.




Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.




HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using FSK (Frequency Shift Keying).

Adjustable SITRANS P300 parameters with HART

| Parameters | Input keys | HART |
|---|---|---|
| Lower range value | x | x |
| Upper range value | x | x |
| Electrical damping | x | x |
| Blind adjustment of the lower range value | x | x |
| Blind adjustment of the upper range value | x | x |
| Zero adjustment | x | x |
| Current simulator | x | x |
| Fault current | x | x |
| Disabling of buttons, write protection | x | x [1] |
| Type of unit, unit | x | x |
| Input of characteristic curve | | x |
| Freely-programmable LCD | | x |
| Diagnostic functions | | x |

[1] Except cancel write protection.

Diagnostic functions for SITRANS P300 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Min/max pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART

| Physical variable | Physical units |
|---|---|
| Pressure (can also be preset in the factory) | Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², in $H_2O$, in $H_2O$ (4 °C), mm$H_2O$, ft$H_2O$ (20 °C), inHg, mmHg |
| Level (height data) | m, cm, mm, ft, in |
| Volume | m³, dm³, hl, yd³, ft³, in³, US gallon, Imp. gallon, bushel, barrel, barrel liquid |
| Mass | g, kg, t, lb, Ston, Lton, oz |
| Temperature | K, °C, °F, °R |
| Other | %, mA |

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## Function (continued)

Parameterization through PROFIBUS interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. PROFIBUS connects the SITRANS P300 PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a hazardous area.

For parameter assignment via PROFIBUS, you need suitable software, e.g. SIMATIC PDM (Process Device Manager)

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the P300 is connected to a process control system. Communication is possible even in a hazardous area.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

| Adjustable parameters | Input keys | PROFIBUS PA and FOUNDATION Fieldbus |
|---|---|---|
| Electrical damping | x | x |
| Zero adjustment (correction of position) | x | x |
| Buttons and/or function disabling | x | x |
| Source of measured value display | x | x |
| Physical unit of display | x | x |
| Position of decimal point | x | x |
| Bus address | x | x |
| Adjustment of characteristic curve | x | x |
| Input of characteristic curve | | x |
| Freely-programmable LCD | | x |
| Diagnostic functions | | x |

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Min/max pointer
- Maintenance timer
- Simulation functions
- Zero correction display
- Limit transmitter
- Saturation alarm

Physical units available for the display

| Physical variable | Physical units |
|---|---|
| Pressure (can also be preset in the factory) | Mpa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm², kg/cm², $mmH_2O$, $mmH_2O$ (4 °C), in $H_2O$, in $H_20$ (4 °C), $ftH_2O$ (20 °C), mmHg, inHg |
| Level (height data) | m, cm, mm, ft, in, yd |
| Mass | g, kg, t, lb, Ston, Lton, oz |
| Volume | m³, dm³, hl, yd³, ft³, in³, US gallon, Imp. gallon, bushel, barrel, barrel liquid |
| Volume flow | m³/s, m³/min, m³/h, m³/d, l/s, l/min, l/h, l/ d, Ml/d, ft³/s, ft³/min, ft³/h, ft³/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d |
| Mass flow | g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d |
| Temperature | K, °C, °F, °R |
| Other | % |

Hygiene version

In the case of the SITRANS P300 with 7MF812.-... flush-mounted diaphragm, selected connections comply with the requirements of the EHEDG or 3A. You can find further details in the order form. Please note in particular that the seal materials used must comply with the requirements of 3A. Similarly, the filling liquids used must be FDA-compliant.

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## Selection and ordering data

| SITRANS P300 pressure transmitters for gauge pressure and absolute pressure, single chamber enclosure, nameplate inscription in English | | Article No. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **4 ... 20 mA / HART** | | **7MF8023-** | | | | | | | | | |
| **PROFIBUS PA (PA)** | | **7MF8024-** | | | | | | | | | |
| **FOUNDATION Fieldbus (FF)** | | **7MF8025-** | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | |
| **Measuring cell filling** | **Measuring cell cleaning** | | | | | | | | | | |
| Silicone oil | Normal | **1** | | | | | | | | | |
| Inert liquid | Cleanliness level 2 according to DIN 25410 | **3** | | | | | | | | | |
| **Measuring span (min. ... max.)** | | | | | | | | | | | |
| 8.3 ... 250 mbar (0.12 ... 3.63 psi) | | | **A** | | | | | | | | |
| 0.01 ... 1 bar (0.15 ... 14.5 psi) | | | **B** | | | | | | | | |
| 0.04 ... 4 bar (0.58 ... 58 psi) | | | **C** | | | | | | | | |
| 0.16 ...16 bar (2.32 ... 232 psi) | | | **D** | | | | | | | | |
| 0.63 ... 63 bar (9.14 ... 914 psi) | | | **E** | | | | | | | | |
| 1.6 ... 160 bar (23.2 ... 2320 psi) | | | **F** | | | | | | | | |
| 4 ... 400 bar (58 ... 5802 psi) | | | **G** | | | | | | | | |
| 8.34 ... 250 mbar a (0.13 ... 3.63 psi a) | | | **Q** | | | | | | | | |
| 43.34 ... 1300 mbar a (0.63 ... 18.86 psi a) | | | **S** | | | | | | | | |
| 0.17 ... 5 bar a (2.43 ... 72.5 psi a) | | | **T** | | | | | | | | |
| 1 ... 30 bar a (14.6 ... 435 psi a) | | | **U** | | | | | | | | |
| **Material of wetted parts** | | | | | | | | | | | |
| ***Seal diaphragm*** | ***Measuring cell*** | | | | | | | | | | |
| Stainless steel | Stainless steel | | | **A** | | | | | | | |
| Hastelloy | Stainless steel | | | **B** | | | | | | | |
| Hastelloy | Hastelloy | | | **C** | | | | | | | |
| Version for diaphragm seal in combination with "internal thread ½-14 NPT" process connection **(recommended version)**[1) 2) 3) 4) 5)] | | | | **Y** | **1** | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Connection shank G½B according to EN 837-1 | | | | | **0** | | | | | | |
| Internal thread ½-14 NPT | | | | | **1** | | | | | | |
| Oval flange with process connection out of stainless steel (oval flange has no internal thread)[6)] | | | | | | | | | | | |
| • Fastening thread $^{7}/_{16}$ 20 UNF according to EN 61518 | | | | | **2** | | | | | | |
| • Fastening thread M10 according to DIN 19213 | | | | | **3** | | | | | | |
| • Mounting thread M12 according to DIN 19213 | | | | | **4** | | | | | | |
| External thread M20 × 1.5 | | | | | **5** | | | | | | |
| External thread ½-14 NPT | | | | | **6** | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | |
| Stainless steel, deep-drawn and electrolytically polished | | | | | | **4** | | | | | |
| **Version** | | | | | | | | | | | |
| Standard version | | | | | | | **1** | | | | |
| **Explosion protection** | | | | | | | | | | | |
| None | | | | | | | | **A** | | | |
| With ATEX, type of protection: | | | | | | | | | | | |
| "Intrinsic safety (Ex ia)" | | | | | | | | **B** | | | |
| Zone 20/21/22[7)] | | | | | | | | **C** | | | |
| Ex nA/nL (Zone 2)[8)] | | | | | | | | **E** | | | |
| With FM "Intrinsic safety" ($cFM_{US}$) | | | | | | | | **M** | | | |
| **Electrical connection/cable entry** | | | | | | | | | | | |
| Screw gland M20×1.5 (polyamide)[9)] | | | | | | | | | **A** | | |
| Screw gland M20×1.5 (metal) | | | | | | | | | **B** | | |
| Screw gland M20×1.5 (stainless steel) | | | | | | | | | **C** | | |
| Device plug M12 (stainless steel, without cable socket) | | | | | | | | | **G** | | |
| ½-14 NPT gland threading metal[10)] | | | | | | | | | **H** | | |
| ½-14 NPT gland threading stainless steel[10)] | | | | | | | | | **J** | | |
| **Display** | | | | | | | | | | | |
| Without local display, with buttons, closed lid | | | | | | | | | | **1** | |
| With local display and buttons, closed lid[11)] | | | | | | | | | | **2** | |

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## Selection and ordering data (continued)

| | Article No. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **SITRANS P300 pressure transmitters for gauge pressure and absolute pressure, single chamber enclosure, nameplate inscription in English** | | | | | | | | | | |
| **4 ... 20 mA / HART** | **7MF8023-** | | | | | | | | | |
| **PROFIBUS PA (PA)** | **7MF8024-** | | | | | | | | | |
| **FOUNDATION Fieldbus (FF)** | **7MF8025-** | | | | | | | | | |
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: Pressure units[11)] | | | | | | | | | | **4** |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane[11)] | | | | | | | | | | **5** |
| With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS and FOUNDATION Fieldbus devices: Pressure units)[11)] | | | | | | | | | | **6** |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane[11)] | | | | | | | | | | **7** |

Note:

See section "Supplementary components" for supply units. A quick-start guide is included in the scope of delivery of the device.

1) If the quality inspection certificate (factory calibration) according to IEC 60770-2 is to be ordered for transmitters with mounted diaphragm seals, it is recommended that this certificate be ordered exclusively for the remote seals. Here, the measuring accuracy of the entire combination is certified.
2) If Inspection Certificate 3.1. is to be ordered for transmitters with mounted diaphragm seals, this certificate must also be ordered with the respective remote seals.
3) The diaphragm seal is to be specified with a separate article number and must be included with the transmitter article number, for example 7MF802.-..Y..-.... and 7MF0810-.....-0...
4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.
5) Remote seal for direct mounting only available in combination with process connection ½-14 NPT.
6) M10 fastening thread: Max. measuring span 160 bar (2320 psi) fastening thread $^{7}/_{16}$-20 UNF and M12: Max. measuring span 400 bar (5802 psi)
7) Can only be ordered together with electrical connection option A.
8) Can only be ordered together with electrical connection option B, C or G.
9) Only together with HART electronics.
10) Without cable gland.
11) Local display cannot be rotated.

| | | Article No. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SITRANS P300 pressure transmitters for gauge pressure and absolute pressure with flush mounted membrane, single chamber enclosure, nameplate inscription in English** | | | | | | | | | | | |
| **4 ... 20 mA / HART** | | **7MF8123-** | | | | | | | | | |
| **PROFIBUS PA (PA)** | | **7MF8124-** | | | | | | | | | |
| **FOUNDATION Fieldbus (FF)** | | **7MF8125-** | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Measuring cell filling** | **Measuring cell cleaning** | | | | | | | | | | |
| Silicone oil | Normal | **1** | | | | | | | | | |
| Inert liquid | | **3** | | | | | | | | | |
| Food grade oil | | | | | | | | | | | |
| • Neobee oil | Normal | **4** | | | | | | | | | |
| **Measuring span (min. ... max.)** | | | | | | | | | | | |
| 0.01 ... 1 bar (0.15 ... 14.5 psi) | | | **B** | | | | | | | | |
| 0.04 ... 4 bar (0.58 ... 58 psi) | | | **C** | | | | | | | | |
| 0.16 ... 16 bar (2.32 ... 232 psi) | | | **D** | | | | | | | | |
| 0.63 ... 63 bar (9.14 ... 914 psi) | | | **E** | | | | | | | | |
| 43.34 ... 1300 mbar a (0.63 ... 18.86 psi a)[1)] | | | **S** | | | | | | | | |
| 0.17 ... 5 bar a (2.43 ... 72.5 psi a)[1)] | | | **T** | | | | | | | | |
| 1 ... 30 bar a (14.6 ... 435 psi a)[1)] | | | **U** | | | | | | | | |
| **Material of wetted parts** | | | | | | | | | | | |
| ***Seal diaphragm*** | ***Measuring cell*** | | | | | | | | | | |
| Stainless steel | Stainless steel | | | **A** | | | | | | | |
| Hastelloy[2)] | Stainless steel | | | **B** | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Flange version with order code M.., N.., R.. or Q.. (see "Options") | | | | | **7** | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | |
| Stainless steel, deep-drawn and electrolytically polished | | | | | | **4** | | | | | |
| **Version** | | | | | | | | | | | |
| Standard version | | | | | | | | **1** | | | |
| **Explosion protection** | | | | | | | | | | | |
| None | | | | | | | | | **A** | | |
| With ATEX, type of protection: | | | | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS P300 pressure transmitters for gauge pressure and absolute pressure with flush mounted membrane, single chamber enclosure, nameplate inscription in English | Article No. |
|---|---|
| 4 ... 20 mA / HART | 7MF8123- |
| PROFIBUS PA (PA) | 7MF8124- |
| FOUNDATION Fieldbus (FF) | 7MF8125- |
| | ● ● ● ● ● - ● ● ● ● |
| "Intrinsic safety (Ex ia)" | B |
| Zone 20/21/22[3] | C |
| Ex nA/nL (Zone 2)[4] | E |
| With FM "Intrinsic safety" ($cFM_{US}$) | M |
| **Electrical connection/cable entry** | |
| Screw gland M20×1.5 (polyamide)[5] | A |
| Screw gland M20×1.5 (metal) | B |
| Screw gland M20×1.5 (stainless steel) | C |
| Device plug M12 (stainless steel, without cable socket) | G |
| Screw gland ½-14 NPT threading metal[6] | H |
| ½-14 NPT gland threading stainless steel[6] | J |
| **Display** | |
| Without local display, with buttons, closed lid | 1 |
| With local display and buttons, closed lid[7] | 2 |
| With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: Pressure units[7] | 4 |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane[7] | 5 |
| With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS and FOUNDATION Fieldbus devices: pressure units)[7] | 6 |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane[7] | 7 |

Note:

See section "Supplementary components" for supply units. A quick-start guide is included in the scope of delivery of the device.

1) Not with temperature decoupler P00, not for process connections R01, R02, R04, R10 and R11 and can only be ordered together with silicone oil.
2) Only available for flanges with option M.., N.. and Q...
3) Can only be ordered together with electrical connection option A.
4) Can only be ordered together with electrical connection option B, C or G.
5) Only together with HART electronics.
6) Without cable gland.
7) Local display cannot be rotated.

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| **Pressure transmitter with mounting bracket (2 brackets, 4 nuts, 4 U washers, 1 angle)** Completely of stainless steel, for wall and pipe mounting | A02 | HART / PQ / FF |
| **Cable socket for M12 device plug, stainless steel** | A51 | HART / PQ / FF |
| **Nameplate inscription (in place of English)** | | HART / PQ / FF |
| • German | B10 | HART / PQ / FF |
| • French | B12 | HART / PQ / FF |
| • Spanish | B13 | HART / PQ / FF |
| • Italian | B14 | HART / PQ / FF |
| **English nameplate** Pressure units in $inH_20$ or psi | B21 | HART / PQ / FF |
| **Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2[1]** | C11 | HART / PQ / FF |
| **Inspection certificate according to EN 10204-3.1[2]** | C12 | HART / PQ / FF |
| **Factory certificate according to EN 10204-2.2** | C14 | HART / PQ / FF |
| **IP65/IP68 degree of protection, only for M20×1.5 and ½-14 NPT** | D12 | HART / PQ / FF |
| **IP6k9k degree of protection, only for M20×1.5** | D46 | HART / PQ / FF |

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| **CRN Approval Canada (Canadian Registration Number)** | E22 | HART / PQ / FF |
| **Export approval Korea** | E11 | HART / PQ / FF |
| **Explosion protection Ex ia according to EAC Ex (Russia)** | E80 | HART / PQ / FF |
| **Ex approval Ex ia/ib NEPSI** | E55 | HART / PQ / FF |
| **Only for SITRANS P300 with flush-mounted diaphragm (7MF81..-...)** | | |
| **Flange according to EN 1092-1 Form B1** | | |
| DN 25, PN 40[3] | M11 | HART / PQ / FF |
| DN 40, PN 40 | M13 | HART / PQ / FF |
| DN 40, PN 100 | M23 | HART / PQ / FF |
| DN 50, PN 16 | M04 | HART / PQ / FF |
| DN 50, PN 40 | M14 | HART / PQ / FF |
| DN 80, PN 16 | M06 | HART / PQ / FF |
| DN 80, PN 40 | M16 | HART / PQ / FF |
| **Flange according to ASME B16.5** | | |
| 1", Class 150[3] | M40 | HART / PQ / FF |
| 1½", Class 150 | M41 | HART / PQ / FF |
| 2", Class 150 | M42 | HART / PQ / FF |
| 3", Class 150 | M43 | HART / PQ / FF |
| 4", Class 150 | M44 | HART / PQ / FF |
| 1½", Class 300 | M46 | HART / PQ / FF |
| 2", Class 300 | M47 | HART / PQ / FF |
| 3", Class 300 | M48 | HART / PQ / FF |
| 4", Class 300 | M49 | HART / PQ / FF |
| **Threaded connection according to DIN 3852-2 Form A, thread according to ISO 228** | | |
| G ¾" A, flush mounted[4] | R01 | HART / PQ / FF |
| G 1" A, flush mounted[4] | R02 | HART / PQ / FF |
| G 2" A, flush mounted | R04 | HART / PQ / FF |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| **Tank connection[5]**<br>Seal not included in scope of delivery | | |
| TG 52/50, PN 40 | **R10** | HART / PQ / FF |
| TG 52/150, PN 40 | **R11** | HART / PQ / FF |
| **Sanitary process connection according to DIN 11851 (dairy connection with slotted union nut)** | | |
| DN 50, PN 25 | **N04** | HART / PQ / FF |
| DN 80, PN 25 | **N06** | HART / PQ / FF |
| **Tri-Clamp connection according to DIN 32676/ ISO 2852**<br>3A compliant[6] | | |
| DN 50/2", PN 16 | **N14** | HART / PQ / FF |
| DN 65/2.5", PN 10 | **N15** | HART / PQ / FF |
| Clamp 2" ISO 2852, PN 16 | **N22** | HART / PQ / FF |
| Clamp 3" ISO 2852, PN 10 | **N23** | HART / PQ / FF |
| **Varivent connection**<br>3A and EHEDG compliant[6] | | |
| Type N = 68 for Varivent enclosure DN 40 ... 125 and 1½" ... 6", PN 40 | **N28** | HART / PQ / FF |
| **Temperature decoupler up to 200 °C[7]**<br>For version with flush-mounted diaphragm | **P00** | HART / PQ / FF |
| **Sanitary process connection according to DRD** | | |
| DN 50, PN 40 | **M32** | HART / PQ / FF |
| **SMS screwed connector** | | |
| 2" | **M73** | HART / PQ / FF |
| 2½" | **M74** | HART / PQ / FF |
| 3" | **M75** | HART / PQ / FF |
| **Sanitary process screw connection according to NEUMO BioConnect screw connection, 3A and EHEDG compliant[6]** | | |
| DN 50, PN 16 | **Q05** | HART / PQ / FF |
| DN 65, PN 16 | **Q06** | HART / PQ / FF |
| DN 80, PN 16 | **Q07** | HART / PQ / FF |
| DN 100, PN 16 | **Q08** | HART / PQ / FF |
| DN 2", PN 16 | **Q13** | HART / PQ / FF |
| DN 2½", PN 16 | **Q14** | HART / PQ / FF |
| DN 3", PN 16 | **Q15** | HART / PQ / FF |
| DN 4", PN 16 | **Q16** | HART / PQ / FF |
| **Sanitary process flange connection according to NEUMO Connect S** | | |
| DN 2", PN 16 | **Q72** | HART / PQ / FF |
| **Aseptic screwed connector according to DIN 11864-1 Form A**<br>3A compliant[6] | | |
| DN 50, PN 25 | **N33** | HART / PQ / FF |
| DN 65, PN 25 | **N34** | HART / PQ / FF |
| DN 80, PN 25 | **N35** | HART / PQ / FF |
| DN 100, PN 25 | **N36** | HART / PQ / FF |
| **Aseptic flange with notch according to DIN 11864-2 Form A**<br>3A compliant[6] | | |
| DN 50, PN 16 | **N43** | HART / PQ / FF |
| DN 65, PN 16 | **N44** | HART / PQ / FF |
| DN 80, PN 16 | **N45** | HART / PQ / FF |
| DN 100, PN 16 | **N46** | HART / PQ / FF |
| **Aseptic flange with groove according to DIN 11864-2 Form A**<br>3A compliant[6] | | |
| DN 50, PN 16 | **N43 + P11** | HART / PQ / FF |
| DN 65, PN 16 | **N44 + P11** | HART / PQ / FF |

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| DN 80, PN 16 | **N45 + P11** | HART / PQ / FF |
| DN 100, PN 16 | **N46 + P11** | HART / PQ / FF |
| **Aseptic clamp with groove according to DIN 11864-3 Form A**<br>3A compliant[6] | | |
| DN 50, PN 25 | **N53** | HART / PQ / FF |
| DN 65, PN 25 | **N54** | HART / PQ / FF |
| DN 80, PN 16 | **N55** | HART / PQ / FF |
| DN 100, PN 16 | **N56** | HART / PQ / FF |
| **Additional information**<br>Add "**-Z**" to article number, specify order code and plain text. | | |
| **Measuring range to be set**<br>Specify in plain text (max. 5 digits):<br>Y01: ... to ... mbar, bar, kPa, MPa, psi | **Y01** | HART / PQ[8] |
| **Tag plate made of stainless steel and entry in the device variable (measuring point description)**<br>Max. 16 characters; specify in plain text: Y15:<br>..... | **Y15** | HART / PQ / FF |
| **Measuring point text (entry in device variable)**<br>Max. 27 characters; specify in plain text: Y16:<br>..... | **Y16** | HART / PQ / FF |
| **Entry of HART TAG**<br>Max. 8 characters; specify in plain text: Y17:<br>..... | **Y17** | HART |
| **Setting of the local display in pressure units**<br>Specify in plain text (default setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...<br>***Note***<br>The following pressure units can be selected:<br>bar, mbar, mm $H_2O$[10], in$H_2O$[10], ft$H_2O$[10], mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % | **Y21** | HART / PQ / FF |
| **Setting of the local display in non-pressure units[9]**<br>Specify in plain text: Y22: ..... to ..... l, m³, m, USg, ...<br>(Specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters) | **Y22 + Y01** | HART |
| **Preset bus address, possible range 1 ... 126**<br>Specify in plain text: Y25: ..... | **Y25** | PQ / FF |

Note:

Factory-mounting of valve manifolds, see Accessories. Only Y01, Y15, Y16, Y17, Y21, Y22 and Y25 are possible as factory preset.

1) If the quality inspection certificate (factory calibration) according to IEC 60770-2 is to be ordered for transmitters with mounted diaphragm seals, it is recommended that this certificate be ordered exclusively for the remote seals. Here, the measuring accuracy of the entire combination is certified.
2) If Inspection Certificate 3.1. is to be ordered for transmitters with mounted diaphragm seals, this certificate must also be ordered with the respective remote seals.
3) Special Viton seal included in scope of delivery (FKM; temperature range -20 ... +200 °C (-4 ... +392 °F))
4) Cannot be combined with order code P00. Can only be ordered together with silicon oil measuring cell filling.
5) Weld-in sockets can be ordered under Accessories.
6) 3A compliance ensured only when 3A compliant sealing rings are used.
7) Conformity according to 3A and EHEDG. The maximum permissible medium temperatures depend on the respective measuring cell fillings (see process conditions).
8) Measuring accuracies for PROFIBUS PA transmitters with option Y01 are calculated in the same way as for HART devices.
9) Preset value can only be change via SIMATIC PDM
10) 20 °C reference temperature.

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## Selection and ordering data (continued)

| Spare parts/accessories | Article number |
|---|---|
| **Mounting bracket and fastening parts kit**<br>Made of stainless steel | **7MF8997-1AA** |
| **Lid without inspection window**<br>Gasket not included | **7MF8997-1BA** |
| **Lid with glass inspection window**<br>Gasket not included | **7MF8997-1BD** |
| **NBR enclosure sealing** | **7MF8997-1BG** |
| **Measuring point label**<br>Unlabeled | **7MF8997-1CA** |
| **Cable gland** | |
| • Metal | **7MF8997-1EA** |
| • Plastic (blue) | **7MF8997-1EB** |
| **Weldable sockets for PMC connection** | |
| • PMC style Standard: Thread 1½" | **7MF4997-2HA** |
| • PMC style Minibolt: Flush-mounted 1" | **7MF4997-2HB** |
| **Gaskets for PMC connection**<br>(Packing unit: 5 units) | |
| • PTFE seal for PMC Style Standard: Thread 1½" | **7MF4997-2HC** |
| • Gasket made of Viton for PMC Style Minibolt: Flush-mounted 1" | **7MF4997-2HD** |
| **Weldable sockets for TG 52/50 and TG 52/150 connection** | |
| • TG 52/50 connection | **7MF4997-2HE** |
| • TG 52/150 connection | **7MF4997-2HF** |
| **Seals for TG 52/50 and TG 52/150 made of silicone** | **7MF4997-2HG** |

| Spare parts/accessories | Article number |
|---|---|
| **Seals for flange connection with flush-mounted diaphragm**<br>Material FKM (Viton); temperature range:-20 ... +200 °C (-4 ... +392 °F), 10 units | |
| • DN 25, PN 40 (M11) | **7MF4997-2HH** |
| • 1", Class 150 (M40) | **7MF4997-2HK** |

| Documentation | Article number |
|---|---|
| The entire documentation is available for download free of charge in various languages at:<br>http://www.siemens.com/processinstrumentation/documentation | |
| Compact operating instructions | |
| • English, German, Spanish, French, Italian, Dutch | **A5E03434657** |
| **HART modem** | |
| With USB interface | **7MF4997-1DB** |

Note:

See section "Supplementary components" for supply units.

| Ordering example | |
|---|---|
| Item line: | 7MF8023-1DB24-1AB7-Z |
| B line | A02 + Y01 + Y21 |
| C-line | Y01: 1 ... 10 bar (14.5 ... 145 psi) |
| C-line | Y21: bar (psi) |

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## Technical specifications

**SITRANS P300 for gauge and absolute pressure**

**Gauge pressure input**

Measured variable: Gauge pressure

Measuring span (infinitely adjustable) or nominal measuring range, max. permissible operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. permissible test pressure (pursuant to DIN 16086)
(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)

| HART | PROFIBUS PA/FOUNDATION Fieldbus | | |
|---|---|---|---|
| Measuring span | Nominal measuring range | Max. permissible operating pressure MAWP (PS) | Max. permissible test pressure |
| 8.3 ... 250 mbar<br>0.83 ... 25 kPa<br>0.12 ... 3.6 psi | 250 mbar<br>25 kPa<br>3.6 psi | 4 bar<br>400 kPa<br>58 psi | 6 bar<br>600 kPa<br>87 psi |
| 0.01 ... 1 bar<br>1 ... 100 kPa<br>0.15 ... 14.5 psi | 1 bar<br>100 kPa<br>14.5 psi | 4 bar<br>400 kPa<br>58 psi | 6 bar<br>600 kPa<br>87 psi |
| 0.04 ... 4 bar<br>4 ... 400 kPa<br>0.58 ... 58 psi | 4 bar<br>400 kPa<br>58 psi | 7 bar<br>0.7 Mpa<br>102 psi | 10 bar<br>1 MPa<br>145 psi |
| 0.16 ... 16 bar<br>16 ... 1600 kPa<br>2.3 ... 232 psi | 16 bar<br>1600 kPa<br>232 psi | 21 bar<br>2.1 MPa<br>305 psi | 32 bar<br>3.2 MPa<br>464 psi |
| 0.63 ... 63 bar<br>63 ... 6300 kPa<br>9.1 ... 914 psi | 63 bar<br>6300 kPa<br>914 psi | 67 bar<br>6.7 MPa<br>972 psi | 100 bar<br>10 MPa<br>1450 psi |
| 1.6 ... 160 bar<br>0.16 ... 16 MPa<br>23 ... 2321 psi | 160 bar<br>16 MPa<br>2321 psi | 167 bar<br>16.7 MPa<br>2422 psi | 250 bar<br>25 MPa<br>3626 psi |
| 4 ... 400 bar<br>0.4 ... 40 MPa<br>58 ... 5802 psi | 400 bar<br>40 MPa<br>5802 psi | 400 bar<br>40 MPa<br>5802 psi | 600 bar<br>60 MPa<br>8702 psi |

***Lower measuring limit***

For 250 mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a.

- Measuring cell with silicone oil filling: 30 mbar a/3 kPa a/0.44 psi a
- Measuring cell with inert filling liquid: 30 mbar a/3 kPa a/0.44 psi a

***Upper measuring limit***

100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature)

**Absolute pressure input**

Measured variable: Absolute pressure

Measuring span (continuously adjustable) or nominal measuring range, max. permissible operating pressure (in accordance with 2014/68/EU Pressure Equipment Directive) and max. permissible test pressure (pursuant to DIN 16086)

| HART | PROFIBUS PA/FOUNDATION Fieldbus | | |
|---|---|---|---|
| Measuring span | Nominal measuring range | Max. permissible operating pressure MAWP (PS) | Max. permissible test pressure |
| 8.34 ... 250 mbar a<br>0.83 ... 25 kPa a<br>3.35 ... 100 in$H_2O$ a<br>0.13 ... 3.63 psi a | 250 mbar a<br>25 kPa a<br>100 in$H_2O$ a | 1.5 bar a<br>150 kPa a<br>21.8 psi a | 6 bar a<br>600 kPa a<br>87 psi a |
| 43.34 ... 1300 mbar a<br>4.33 ... 130 kPa a<br>17.42 ... 522.4 in$H_2O$ a<br>0.63 ... 18.86 psi a | 1300 mbar a<br>130 kPa a<br>525 in$H_2O$ a | 2.6 bar a<br>260 kPa a<br>37.7 psi a | 10 bar a<br>1 MPa a<br>145 psi a |
| 0.17 ... 5 bar a<br>17 ... 500 kPa a<br>2.43 ... 72.5 psi a | 5000 mbar a<br>500 kPa a<br>72.5 psi a | 10 bar a<br>1 MPa a<br>145 psi a | 30 bar a<br>3 MPa a<br>435 psi a |
| 1 ... 30 bar a<br>0.1 ... 3 MPa a<br>14.6 ... 435 psi a | 30 bar a<br>3 MPa a<br>435 psi a | 45 bar a<br>4.5 MPa a<br>653 psi a | 100 bar a<br>10 MPa a<br>1450 psi a |

***Lower measuring limit***

- Measuring cell with silicone oil filling: 0 mbar a/3 kPa a/0.44 psi a
- Measuring cell with inert liquid
  - For medium temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F): 30 mbar a/0 kPa a/0 psi a

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## Technical specifications (continued)

| SITRANS P300 for gauge and absolute pressure | | | | |
|---|---|---|---|---|
| - For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi)) | 30 mbar a + 20 mbar a · (ϑ -60 °C)/°C<br>3 kPa a + 2 kPa a · (ϑ -60 °C)/°C<br>0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F | | | |
| ***Upper measuring limit*** | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | | |
| Lower range value | Between the measuring limits (continuously adjustable) | | | |
| **Input of gauge pressure with front-flush diaphragm** | | | | |
| Measured variable | Gauge pressure, flush-mounted | | | |
| Measuring span (continuously adjustable) or nominal measuring range, max. permissible operating pressure and max. permissible test pressure | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** | | |
| | Measuring span | Nominal measuring range | Max. permissible operating pressure MAWP (PS) | Max. permissible test pressure |
| | 0.01 ... 1 bar<br>1 ... 100 kPa<br>0.15 ... 14.5 psi | 1 bar<br>100 kPa<br>14.5 psi | 4 bar<br>400 kPa<br>58 psi | 6 bar<br>600 kPa<br>87 psi |
| | 0.04 ... 4 bar<br>4 ... 400 kPa<br>0.58 ... 58 psi | 4 bar<br>400 kPa<br>58 psi | 7 bar<br>0.7 Mpa<br>102 psi | 10 bar<br>1 MPa<br>145 psi |
| | 0.16 ... 16 bar<br>16 ... 1600 kPa<br>2.3 ... 232 psi | 16 bar<br>1600 kPa<br>232 psi | 21 bar<br>2.1 MPa<br>305 psi | 32 bar<br>3.2 MPa<br>464 psi |
| | 0.63 ... 63 bar<br>63 ... 6300 kPa<br>9.1 ... 914 psi | 63 bar<br>6300 kPa<br>914 psi | 67 bar<br>6.7 MPa<br>972 psi | 100 bar<br>10 MPa<br>1450 psi |
| ***Lower measuring limit*** | 100 mbar a (1.45 psi a) | | | |
| • Measuring cell with silicone oil | 100 mbar a/10 kPa a/1.45 psi a | | | |
| • Measuring cell with inert liquid | 100 mbar a/10 kPa a/1.45 psi a | | | |
| • Measuring cell with neobee | 100 mbar a/10 kPa a/1.45 psi a | | | |
| ***Upper measuring limit*** | 100% of max. measuring span | | | |
| **Input of absolute pressure, with flush-mounted diaphragm** | | | | |
| Measured variable | Absolute pressure, flush-mounted | | | |
| Measuring span (continuously adjustable) or nominal measuring range and<br>max. permissible test pressure | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** | | |
| | Measuring span | Nominal measuring range | Max. permissible operating pressure MAWP (PS) | Max. permissible test pressure |
| | 43 ... 1300 mbar a<br>4.3 ... 130 kPa a<br>17 ... 525 in$H_2O$ a | 1300 mbar a<br>130 kPa a<br>525 in$H_2O$ a | 2.6 bar a<br>260 kPa a<br>37.7 psi a | 10 bar a<br>1 MPa a<br>145 psi a |
| | 160 ... 5000 mbar a<br>16 ... 500 kPa a<br>2.32 ... 72.5 psi a | 5000 mbar a<br>500 kPa a<br>72.5 psi a | 10 bar a<br>1 MPa a<br>145 psi a | 30 bar a<br>3 MPa a<br>435 psi a |
| | 1 ... 30 bar a<br>0.1 ... 3 MPa a<br>14.5 ... 435 psi a | 30 bar a<br>3 MPa a<br>435 psi a | 45 bar a<br>4.5 MPa a<br>653 psi a | 100 bar a<br>10 MPa a<br>1450 psi a |
| | Depending on the process connection, the measuring span may differ from these values | | | |
| ***Lower measuring limit*** | 0 mbar a/0 kPa a/0 psi a | | | |
| ***Upper measuring limit*** | 100% of max. measuring span | | | |
| **Output** | **HART** | | **PROFIBUS PA/FOUNDATION Fieldbus** | |
| Output signal | 4 ... 20 mA | | Digital PROFIBUS PA signal | |
| Physical bus | - | | IEC 61158-2 | |
| Protection against polarity reversal | Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage. | | Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage. | |
| Electrical damping (step width 0.1 s) | Set to 2 s (0 ... 100 s) | | Set to 2 s (0 ... 100 s) | |

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## Technical specifications (continued)

| SITRANS P300 for gauge and absolute pressure | |
|---|---|
| **Measuring accuracy for gauge pressure** | According to IEC 62828-1 |
| Reference conditions | • Rising characteristic curve<br>• Lower range value 0 bar<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil<br>• Room temperature 25 °C (77 °F) |
| Measuring span ratio (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range |
| ***Measurement deviation at limit setting including hysteresis and reproducibility*** | |
| • Linear characteristic curve | |
| - 250 mbar/25 kPa/3.6 psi | r ≤ 1.25: ≤ 0.075%<br>1.25 < r ≤ 30: ≤ (0.008 · r +0.065)% |
| - 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi | r ≤ 5: ≤ 0.075%<br>5 < r ≤ 100: ≤ (0.005 · r +0.05)% |
| - 400 bar/40 MPa/5802 psi | r ≤ 3: ≤ 0.075%<br>3 < r ≤ 10: ≤ (0.0029 · r +0.071)%<br>10 < r ≤ 100: ≤ (0.005 · r +0.05)% |
| ***Influence of ambient temperature (in percent per 28 °C (50 °F))*** | |
| • 250 mbar/25 kPa/3.6 psi | ≤ (0.16 · r +0.1)% |
| • 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi<br>400 bar/40 MPa/5802 psi | ≤ (0.07 · r +0.08)% |
| ***Long-term stability (temperature change ±30 °C (± 54 °F))*** | |
| • 250 mbar/25 kPa/3.6 psi | ≤ (0.16 · r)% per year |
| • 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi | ≤ (0.25 · r)% in 5 years |
| • 16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi<br>400 bar/40 MPa/5802 psi | ≤ (0.125 · r)% in 5 years |
| Influence of mounting position | ≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline (zero offset is possible with position error compensation) |
| Effect of auxiliary power (in percent per voltage change) | 0.005% per 1 V |
| Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus | $3 \cdot 10^{-5}$ of nominal measuring range |
| **Measuring accuracy for absolute pressure** | According to IEC 62828-1 |
| Reference conditions<br>(All error information always refers to the set measuring span) | • Rising characteristic curve<br>• Lower range value 0 bar<br>• Seal diaphragm stainless steel<br>• Silicone oil filling<br>• Room temperature 25 °C (77 °F) |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range |
| ***Measurement deviation at limit setting including hysteresis and reproducibility*** | |
| • Linear characteristic curve | |
| - r ≤ 10 | ≤ 0.1% |
| - 10 < r ≤ 30 | ≤ 0.2% |
| ***Influence of ambient temperature (in percent per 28 °C (50 °F))*** | |
| • 250 mbar a/25 kPa a/3.6 psi a | ≤ (0.15 · r +0.1)% |

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## Technical specifications (continued)

| SITRANS P300 for gauge and absolute pressure | | |
|---|---|---|
| • 1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a | ≤ (0.08 · r +0.16)% | |
| Long-term stability (temperature change ±30 °C (± 54 °F)) | ≤ (0.25 · r)% in 5 years | |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline<br>(zero-point correction is possible with position error compensation) | |
| Effect of auxiliary power (in percent per voltage change) | 0.005% per 1 V | |
| Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus | $3 \cdot 10^{-5}$ of nominal measuring range | |
| **Measuring accuracy for gauge and absolute pressure, with flush-mounted diaphragm** | According to IEC 62828-1 | |
| Reference conditions<br>(All error information always refers to the set measuring span) | • Rising characteristic curve<br>• Lower range value 0 bar<br>• Seal diaphragm stainless steel<br>• Silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | |
| ***Measurement deviation at limit setting including hysteresis and reproducibility*** | | |
| • Linear characteristic curve | **Gauge pressure with flush-mounted diaphragm** | **Absolute pressure with flush-mounted diaphragm** |
| - r ≤ 5 | ≤ 0.075% | - |
| - 5 < r ≤ 100 | ≤ (0.005 · r +0.05)% | - |
| - r ≤ 10 | - | ≤ 0.2% |
| - 10 < r ≤ 30 | - | ≤ 0.4% |
| Influence of ambient temperature<br>(in percent per 28 °C (50 °F)) | ≤ (0.08 · r +0.16)% | ≤ (0.16 · r +0.24)% |
| ***Influence of the medium temperature (in pressure per temperature unit)*** | | |
| • Temperature difference between medium temperature and ambient temperature | 3 mbar/0.3 kPa/0.04 psi per 10 K | |
| Long-term stability (temperature change ±30 °C (± 54 °F)) | ≤ (0.25 · r)% in 5 years | |
| Effect of mounting position (in pressure per change of angle) | 0.4 mbar/0.04 kPa/0.006 per 10° incline (zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in percent per voltage change) | 0.005% per 1 V | |
| Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus | $3 \cdot 10^{-5}$ of nominal measuring range | |

| Operating conditions | |
|---|---|
| ***Installation conditions*** | |
| Ambient temperature | Observe the temperature class in hazardous areas. |
| • Measuring cell with silicone oil | -40 ... +85 °C (-40 ... +185 °F) |
| • Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm) | -10 ... +85 °C (14 ... 185 °F) |
| • Measuring cell with inert liquid | -40 ... +85 °C (-40 ... +185 °F) |
| • Display readable | -30 ... +85 °C (-22 ... +185 °F) |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F)<br>- For Neobee: -20 ... +85 °C (-4 ... +185 °F)<br>- For high-temperature oil: -10 ... +85 °C (14 ... +185 °F) |
| • Climatic class | |
| - Condensation | Relative humidity 0 ... 100%<br>Condensation permissible, suitable for use in the tropics |

| Operating conditions | |
|---|---|
| Degree of protection | |
| • According to IEC 60529 | IP65, IP68 |
| • According to NEMA 250 | Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F) |
| Electromagnetic compatibility | |
| • Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 |
| ***Process conditions*** | |
| Medium temperature | The max. medium temperature of the flush-mounted process connections is to be taken into account in accordance with the relevant connection standards (e.g. DIN 32676, DIN 11851, etc.). |
| • Measuring cell with silicone oil | -40 ... +100 °C (-40 ... +212 °F) |
| • Measuring cell with silicone oil (with flush-mounted diaphragm) | -40 ... +150 °C (-40 ... +302 °F) |

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## Technical specifications (continued)

| Operating conditions | |
|---|---|
| • Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm) | -10 ... +150 °C (14 ... 302 °F) |
| • Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm) | -40 ... +200 °C (-40 ... +392 °F) |
| • Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm) | -10 ... +200 °C (14 ... 392 °F) |
| • Measuring cell with inert liquid | -20 ... +100 °C (-4 ... +212 °F) |
| **Structural design (standard version)** | |
| Weight (without options) | Approx. 800 g (1.8 lbs) |
| Enclosure material | Stainless steel, mat. no. 1.4301/304 |
| Material of wetted parts | |
| • Connection shank | Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 |
| • Oval flange | Stainless steel, mat. no. 1.4404/316L |
| • Seal diaphragm | Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 |
| • Measuring cell filling | • Silicone oil<br>• Inert filling liquid |
| Process connection | • G½B according to EN 837-1<br>• Internal thread ½-14 NPT<br>• Oval flange PN 160 (MAWP 2320 psi) with fastening thread:<br>- $^{7}/_{16}$-20 UNF according to with IEC 61518/EN 61518<br>- M10 according to DIN 19213 |
| **Structural design (version with flush-mounted diaphragm)** | |
| Weight (without options) | Approx. 1 ... 13 kg (2.2 ... 29 lbs) |
| Enclosure material | Stainless steel, mat. no. 1.4301/304 |
| Material of wetted parts | |
| • Process connection | Stainless steel, mat. no. 1.4404/316L |
| • Seal diaphragm | Stainless steel, mat. no. 1.4404/316L |
| • Measuring cell filling | • Silicone oil<br>• Inert filling liquid<br>• Food grade oil (Neobee oil) |
| Process connection | • Flanges according to EN and ASME<br>• F&B and pharmaceutical flanges |
| Surface quality touched-by-media | $R_a$ values ≤ 0.8 µm (32 µ-inch)/welds $R_a$ ≤ 1.6 µm (64 µ-inch)<br>(Process connections according to 3A; $R_a$ values ≤ 0.8 µm (32 µ inch)/welds $R_a$ ≤ 0.8 µm (32 µ inch) |

| **Auxiliary power $U_H$** | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** |
|---|---|---|
| Terminal voltage on transmitter | 10.5 ... 42 V DC<br>10.5 ... 30 V DC for intrinsically safe operation | - |
| Auxiliary power | - | Bus-powered |
| Separate supply voltage | - | Not necessary |
| Bus voltage | | |
| • Without Ex | - | 9 ... 32 V |
| • With intrinsically safe operation | - | 9 ... 24 V |
| Current consumption | | |
| • Max. basic current | - | 12.5 mA |

| Operating conditions | | |
|---|---|---|
| • Starting current ≤ basic current | - | Yes |
| • Max. fault current in the event of an error | - | 15.5 mA |
| Fault disconnection electronics (FDE) available | - | Yes |

| **Certificates and approvals** | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** |
|---|---|---|
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gasses of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 4, Paragraph 3 (sound engineering practice) | |
| Water, waste water | Available soon | |
| ***Explosion protection*** | | |
| Intrinsic safety "i" | PTB 05 ATEX 2048 | |
| • Marking | II1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb | |
| • Permissible ambient temperature | | |
| - Temperature class T4 | -40 ... +85 °C (-40 ... +185 °F) | |
| - Temperature class T5 | -40 ... +70 °C (-40 ... +158 °F) | |
| - Temperature class T6 | -40 ... +60 °C (-40 ... +140 °F) | |
| • Connection | To certified intrinsically safe circuits with peak values: $U_i$ = 30 V, $I_i$ = 100 mA, $P_i$ = 7-50 mW, $R_i$ = 300 Ω | To certified intrinsically safe circuits with peak values:<br>***FISCO supply unit:***<br>$U_i$ = 17.5 V, $I_i$ = 380 mA, $P_i$ = -5.32 W<br>***Linear barrier:***<br>$U_i$ = 24 V, $I_i$ = 250 mA, $P_i$ = 1.-2 W |
| • Effective internal capacitance | $C_i$ = 6 nF | $C_i$ = 1.1 nF |
| • Effective internal inductance | $L_i$ = 0.4 mH | $L_i$ = 7 µH |
| Explosion protection to FM for USA and Canada ($cFM_{US}$) | | |
| • Identification (DIP) or (IS); (NI) | Certificate of Compliance 3025099<br>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III;<br>CL I, ZN 0/1 AEx ia IIC T4 ... T6<br>CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III | |
| • Identification (DIP) or (IS) | Certificate of Compliance 3025099C<br>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6<br>CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III | |
| Dust explosion protection for Zone 20/21/22 | PTB 05 ATEX 2048 | |
| • Marking | II 1 D Ex ia IIIC $T_{200}$122 °C Da<br>II 1/2 D Ex ia IIIC $T_{200}$ 122°C Da/Db<br>II 2 D Ex ib IIIC $T_{200}$122 °C Db | |
| • Permissible ambient temperature | | |
| - Temperature class T4 | -40 ... +85 °C (-40 ... +185 °F) (for mineral glass window -20 ... +85 °C (-4 ... +185 °F)) | |
| - Temperature class T5 | -40 ... +70 °C (-40 ... +158 °F) (for mineral glass window -20 ... +70 °C (-4 ... +158 °F)) | |
| - Temperature class T6 | -40 ... +60 °C (-40 ... +140 °F) (for mineral glass window -20 ... +60 °C (-4 ... +140 °F)) | |
| • Connection | To certified intrinsically safe circuits with peak values: $U_i$ = 30 V, Ii = 100 mA, Pi = 750 mW | To certified intrinsically safe circuits with peak values: $U_i$ = 24 V, Ii = 380 mA, $P_i$ = 5.-32 W |
| • Effective internal capacitance | $C_i$ = 6 nF | $C_i$ = 5 nF |
| • Effective internal inductance | $L_i$ = 0.4 µH | $L_i$ = 10 µH |
| Type of protection Ex nA/nL/ic (Zone 2) | PTB 05 ATEX 2048 | |
| • Marking | II 3 G Ex ic IIC T6 ... T4 Gc<br>II 3 G Ex ec IIC T6 ... T4 Gc<br>II 3 G Ex ic IIC T6 ... T4 Gc | |

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## Technical specifications (continued)

| Operating conditions | | |
|---|---|---|
| • Permissible ambient temperature | | |
| - Temperature class T4 | -40 ... +85 °C (-40 ... +185 °F) (only for mineral glass window -20 ... +85 °C (-4 ... +185 °F)) | |
| - Temperature class T5 | -40 ... +70 °C (-40 ... +158 °F) (only for mineral glass window -20 ... +70 °C (-4 ... +158 °F)) | |
| - Temperature class T6 | -40 ... +60 °C (-40 ... +140 °F) (only for mineral glass window -20 ... +60 °C (-4 ... +140 °F)) | |
| • Ex nA/nL connection | To certified intrinsically safe circuits with peak values: $U_m$ = 45 V | To certified intrinsically safe circuits with peak values: $U_m$ = 32 V |
| • Ex ic connection | To certified intrinsically safe circuits with peak values: $U_i$ = 45 V | To certified intrinsically safe circuits with peak values: $U_i$ = 32 V |
| • Effective internal capacitance | $C_i$ = 6 nF | $C_i$ = 5 nF |
| • Effective internal inductance | $L_i$ = 0.4 mH | $L_i$ = 20 µH |

### *Communication*

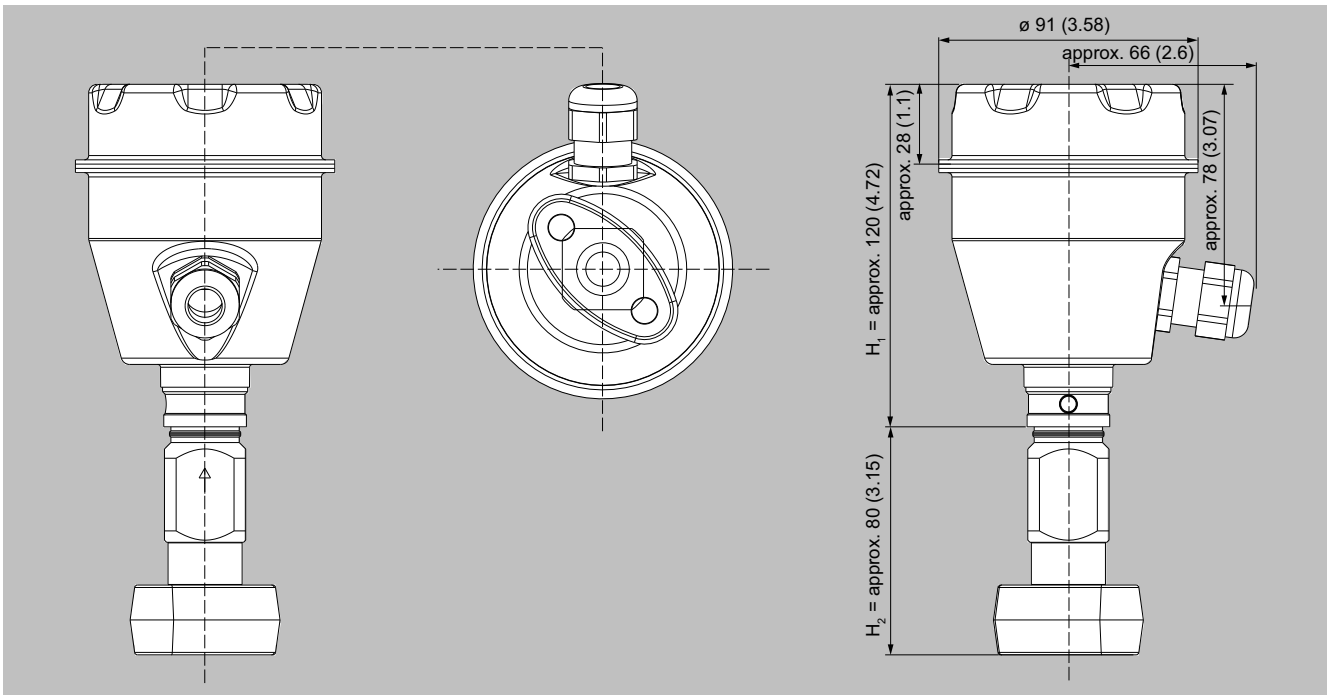
| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1100 Ω |
| Protocol | HART version 5.x |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (standard setting Address 126) |
| Cyclic data usage | |
| • Output byte | 5 (one measured value) or 10 (two measured values) |
| • Input byte | 0, 1 or 2 (totalizer mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B |
| Function blocks | 2 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |

| Communication | |
|---|---|
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Failure mode | Parameterizable (summation with last good value, continuous summation, summation with incorrect value) |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 2 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard-FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: Measured pressure value, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

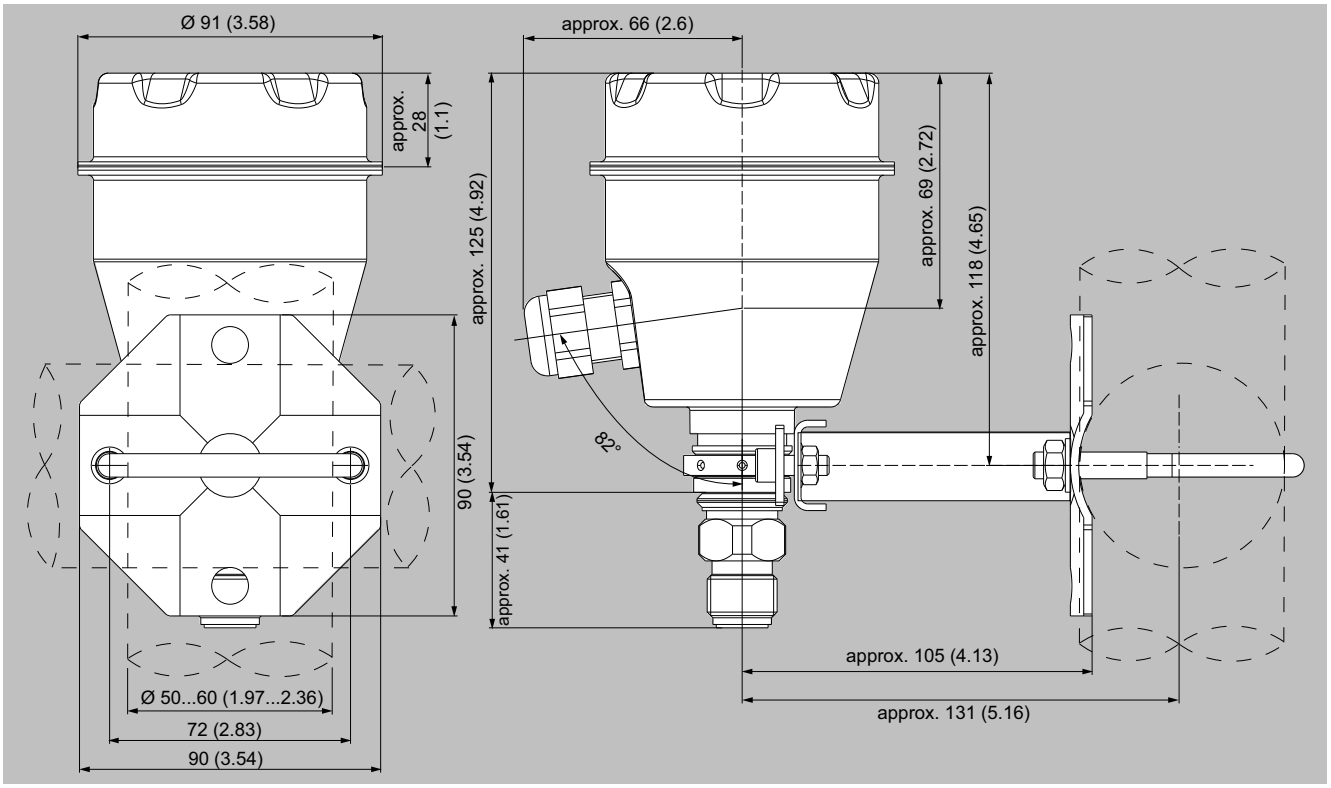
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## Dimensional drawings




SITRANS P300, with oval flange, dimensions in mm (inch)

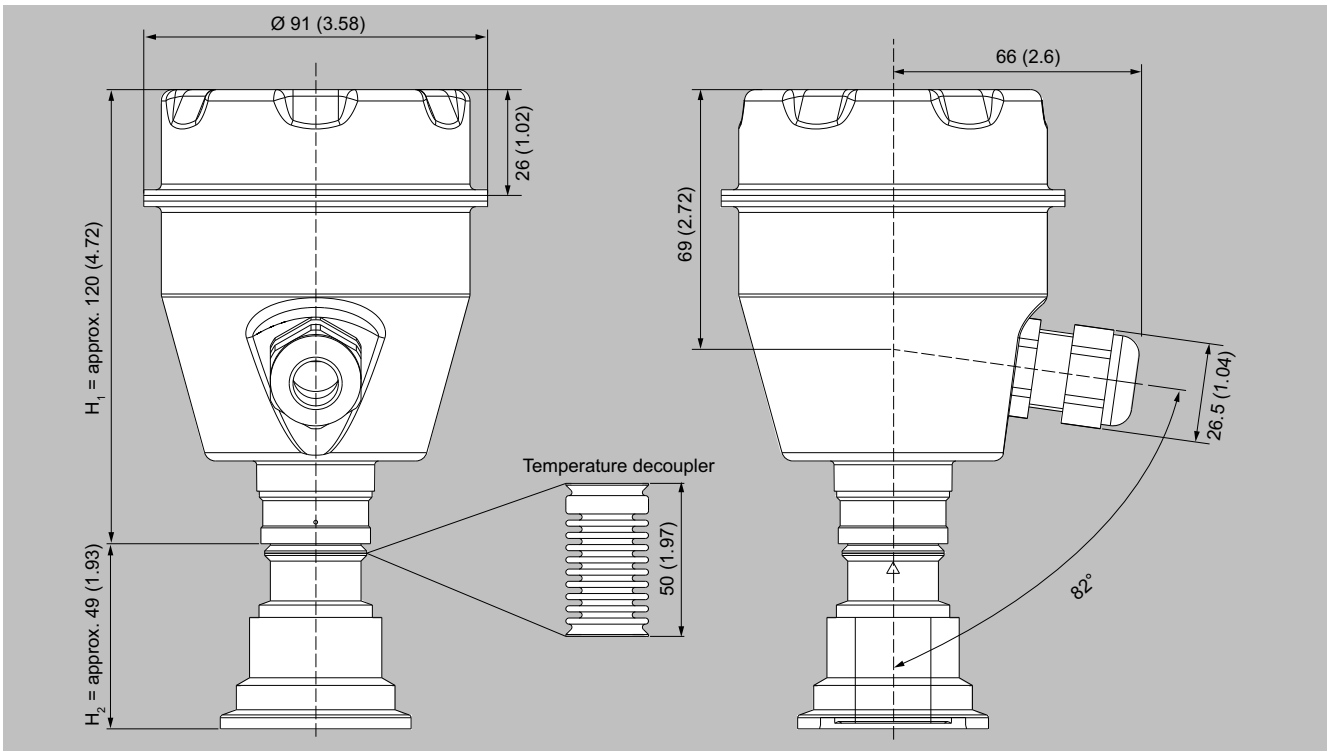



SITRANS P300, process connection M20 × 1.5, with built-in mounting bracket, dimensions in mm (inch)

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## Dimensional drawings (continued)




SITRANS P300, flush-mounted, dimensions in mm (inch)

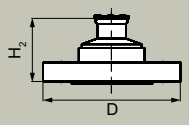
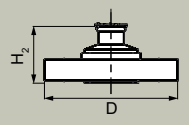
The figure shows a SITRANS P300 with an example flange. In this drawing the height is subdivided into $H_1$ and $H_2$.

$H_1$ = Height of the SITRANS P300 up to a defined cross-section

$H_2$ = Height of the flange up to this defined cross-section

Only the height $H_2$ is indicated in the dimensions of the flanges.

***Flanges according to EN and ASME***

| Flange | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **EN 1092-1** | | | | | |
|  | M11 | 25 | 40 | 115 mm (4.5 inches) | Approx. 52 mm (2 inches) |
| | M13 | 40 | 40 | 150 mm (5.9 inches) | |
| | M23 | 40 | 100 | 170 mm (6.7 inches) | |
| | M04 | 50 | 16 | 165 mm (6.5 inches) | |
| | M14 | 50 | 40 | 165 mm (6.5 inches) | |
| | M06 | 80 | 16 | 200 mm (7.9 inches) | |
| | M16 | 80 | 40 | 200 mm (7.9 inches) | |
| **ASME B16.5** | | | | | |
|  | M40 | 1 inch | 150 | 110 mm (4.3 inches) | Approx. 52 mm (2 inches) |
| | M41 | 1½ inches | 150 | 130 mm (5.1 inches) | |
| | M42 | 2 inches | 150 | 150 mm (5.9 inches) | |
| | M43 | 3 inches | 150 | 190 mm (7.5 inches) | |
| | M44 | 4 inches | 150 | 230 mm (9.1 inches) | |
| | M45 | 1 inch | 300 | 125 mm (4.9 inches) | |
| | M46 | 1½ inches | 300 | 155 mm (6.1 inches) | |
| | M47 | 2 inches | 300 | 165 mm (6.5 inches) | |
| | M48 | 3 inches | 300 | 210 mm (8.1 inches) | |
| | M49 | 4 inches | 300 | 255 mm (10.0 inches) | |

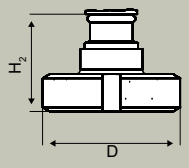
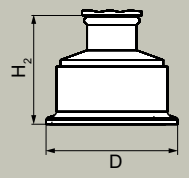
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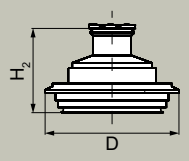
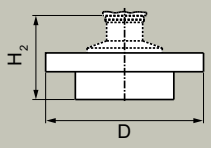
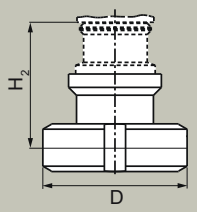
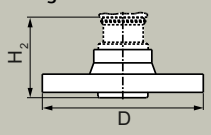
## Dimensional drawings (continued)

***NuG and pharmaceutical connections***

Connections according to DIN

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **DIN 11851 (dairy connection with slotted union nut)**   | N04 | 50 | 25 | 92 mm (3.6 inches) | Approx. 52 mm (2 inches) |
| | N06 | 80 | 25 | 127 mm (5.0 inches) | |
| **Tri-Clamp acc. to DIN 32676**   | N14 | 50 | 16 | 64 mm (2.5 inches) | Approx. 52 mm (2 inches) |
| | N15 | 65 | 10 | 91 mm (3.6 inches) | |

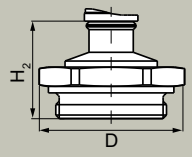
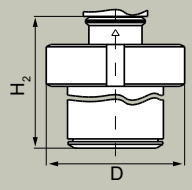
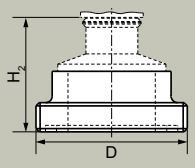
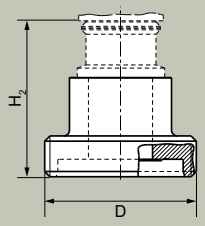
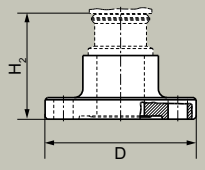
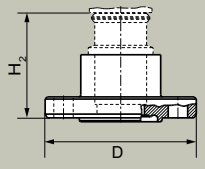
Other connections

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Varivent connection**   | N28 | 40 ... 125 | 40 | 84 mm (3.3 inches) | Approx. 52 mm (2 inches) |
| **Sanitary process connection according to DRD**   | M32 | 50 | 40 | 105 mm (4.1 inches) | Approx. 52 mm (2 inches) |
| **Sanitary process screw connection according to NEUMO BioConnect**   | Q05 | 50 | 16 | 82 mm (3.2 inches) | Approx. 52 mm (2 inches) |
| | Q06 | 65 | 16 | 105 mm (4.1 inches) | |
| | Q07 | 80 | 16 | 115 mm (4.5 inches) | |
| | Q08 | 100 | 16 | 145 mm (5.7 inches) | |
| | Q13 | 2 inches | 16 | 82 mm (3.2 inches) | |
| | Q14 | 2½ inches | 16 | 105 mm (4.1 inches) | |
| | Q15 | 3 inches | 16 | 105 mm (4.1 inches) | |
| | Q16 | 4 inches | 16 | 145 mm (5.7 inches) | |
| **Sanitary process connection according to NEUMO BioConnect S flange connection**   | Q72 | 2 inches | 16 | 125 mm (4.9 inches) | Approx. 52 mm (2 inches) |

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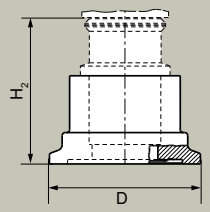
## Dimensional drawings (continued)

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Threaded connection G¾ inch, G1 inch and G2 inch according to DIN 3852-2 Form A**   | R01 | ¾ inch | 60 | 37 mm (1.5 inches) | Approx. 45 mm (1.8 inches) |
| | R02 | 1 inch | 60 | 48 mm (1.9 inches) | Approx. 47 mm (1.9 inches) |
| | R04 | 2 inches | 60 | 78 mm (3.1 inches) | Approx. 52 mm (2 inches) |
| **Tank connection TG 52/50 and TG 52/150**   | R10 | 25 | 40 | 63 mm (2.5 inches) | Approx. 63 mm (2.5 inches) |
| | R11 | 25 | 40 | 63 mm (2.5 inches) | Approx. 170 mm (6.7 inches) |
| **SMS screwed connector**   | M73 | 2 inches | 25 | 70 x 1/6 mm | Approx. 52 mm (2.1 inches) |
| | M74 | 2½ inches | 25 | 85 x 1/6 mm | |
| | M75 | 3 inches | 25 | 98 x 1/6 mm | |
| **Aseptic screwed connector according to DIN 11864-1 Form A**   | N33 | 50 | 25 | 78 x 1/6 inch | Approx. 52 mm (2.1 inches) |
| | N34 | 65 | 25 | 95 x 1/6 inch | |
| | N35 | 80 | 25 | 110 x ¼ inch | |
| | N36 | 100 | 25 | 130 x ¼ inch | |
| **Aseptic flange with notch according to DIN 11864-2 Form A**   | N43 | 50 | 16 | 94 | Approx. 52 mm (2.1 inches) |
| | N44 | 65 | 16 | 113 | |
| | N45 | 80 | 16 | 133 | |
| | N46 | 100 | 16 | 159 | |
| **Aseptic flange with groove according to DIN 11864-2 Form A**   | **N43 + P11** | 50 | 16 | 94 | Approx. 52 mm (2.1 inches) |
| | **N44 + P11** | 65 | 16 | 113 | |
| | **N45 + P11** | 80 | 16 | 133 | |
| | **N46 + P11** | 100 | 16 | 159 | |

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## Dimensional drawings (continued)

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Aseptic clamp with groove according to DIN 11864-3 Form A**   | N53 | 50 | 25 | 77.5 | Approx. 52 mm (2.1 inches) |
| | N54 | 65 | 25 | 91 | |
| | N55 | 80 | 16 | 106 | |
| | N56 | 100 | 16 | 130 | |

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## Overview

The SITRANS P300 transmitter for gauge and absolute pressure can be delivered factory-fitted with the following valve manifold 7MF9011-4EA and 7MF9011-4FA.

## Design

The 7MF9011-4EA valve manifolds are sealed with PTFE sealings between the transmitter and the valve manifold as standard. Soft iron, stainless steel and copper sealings are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

The complete unit is checked for leaks under pressure after assembly (air pressure 6 bar (87 psi)) and certified with a factory certificate according to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the corresponding mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory-mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an inspection certificate 3.1 to EN 10204 after choosing the option "Factory-mounting of valve manifolds", a separate certificate is provided for the transmitter and for the valve manifold.

## Selection and ordering data

### *Valve manifolds*

**7MF9011-4FA valve manifold on gauge and absolute pressure transmitters**



| Add **-Z** to the article number of the transmitter and specify order codes | **Order code** |
|---|---|
| SITRANS P300 | T03 |
| ***7MF802.-...1.-...*** | |
| With process connection internal thread ½-14 NPT, in-sealed with PTFE sealing tape<br>Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2 | |
| **Additional versions:** | |
| Delivery includes mounting bracket and stainless steel mounting clips (instead of the mounting bracket supplied with the transmitter) | A02 |
| Inspection certificate according to EN 10204-3.1 for transmitter and mounted valve manifold | C12 |

**7MF9011-4EA valve manifold on gauge and absolute pressure transmitters**



| Add **-Z** to the article number of the transmitter and specify order codes | **Order code** |
|---|---|
| SITRANS P300 | T02 |
| ***7MF802.-...0.-...*** | |
| With process connection shank G½ A according to EN 837-1, gasket made of PTFE between valve manifold and transmitter | |
| **Alternative gasket material:** | |
| • Soft iron | A70 |
| • Stainless steel, mat. no. 14571 | A71 |
| • Copper | A72 |
| Delivery including high-pressure test certified by factory certificate according to EN 10204-2.2 | |
| **Additional versions:** | |
| Delivery includes mounting bracket and stainless steel mounting clips (instead of the mounting bracket supplied with the transmitter) | A02 |
| Inspection certificate according to EN 10204- 3.1 for transmitters and mounted valve manifold | C12 |

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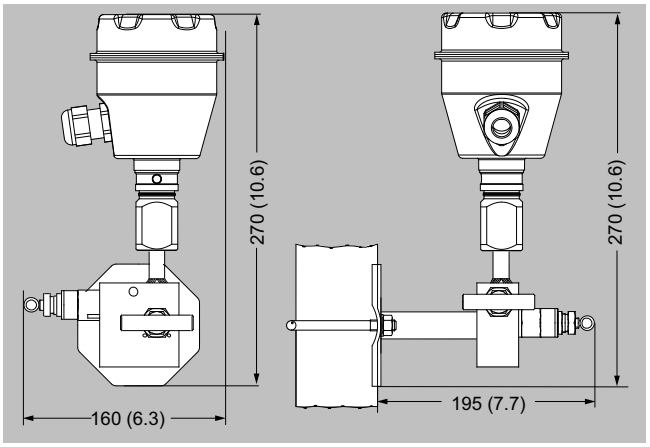


## Dimensional drawings

***Valve manifolds mounted on SITRANS P300***



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters

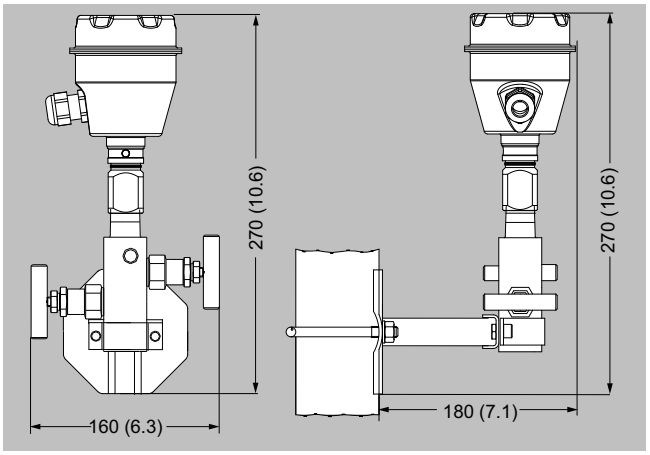



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

## Dimensional drawings (continued)



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters




7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

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## Overview



SITRANS P300, pressure transmitter with PMC connection for paper industry

The SITRANS P300 pressure transmitter has been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 transmitter can be used in all processes of the paper industry.

The SITRANS P300 pressure transmitter is a digital pressure transmitter featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART communication or via PROFIBUS PA or FOUNDATION Fieldbus interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very simple in spite of the numerous setting options.

Pressure transmitters of the "Intrinsic safety" and "Flameproof" type of protection can be installed within hazardous areas (zone 1) or in zone 0. The devices are provided with an EC type-examination certificate and comply with the corresponding harmonized European standards (ATEX).

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Volume level
- Mass level

## Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Minimal conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Continuously adjustable measuring spans from 0.03 bar to 16 bar (0.43 psi to 232 psi) with HART interface
- Nominal measuring ranges from 1 bar to 16 bar (14.5 psi to 232 psi) with PROFIBUS PA interface
- High measuring accuracy
- Parameterization using control keys or HART and/or PROFIBUS PA or FOUNDATION Fieldbus

## Application

The SITRANS P300 pressure transmitter for gauge pressure with PMC connection is used in the paper industry.

Pressure transmitters of the "Intrinsic safety" and "Flameproof" type of protection can be installed within hazardous areas (zone 1) or in zone 0. The pressure transmitters are provided with an EC type-examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The pressure transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 input buttons or programmed externally over HART or over PROFIBUS PA or FOUNDATION Fieldbus interface.

Measuring span (continuously adjustable)

P300 with HART: 0.01 to 16 bar (0.15 to 232 psi)

Nominal measuring range

For P300 with PROFIBUS PA and FOUNDATION Fieldbus:
1 to 16 bar (14.5 to 232 psi)

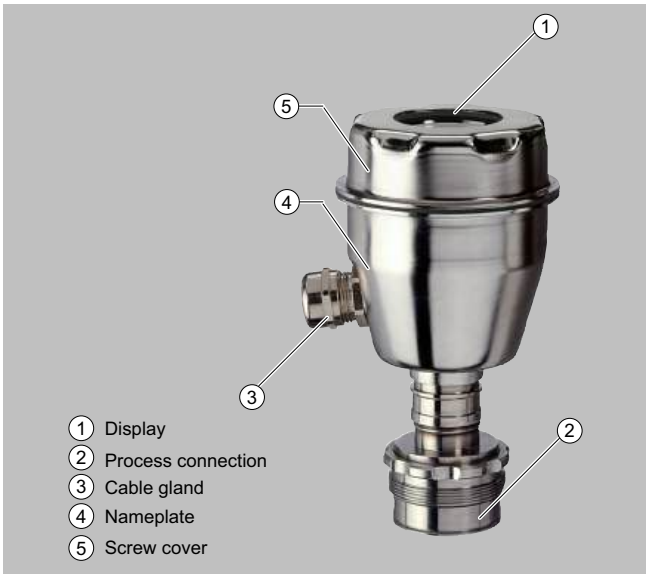
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## Design

The SITRANS P300 pressure transmitter consists of:

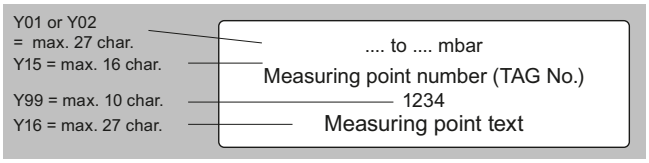
- electronics
- Enclosure
- Measuring cell




Perspective view of the SITRANS P300

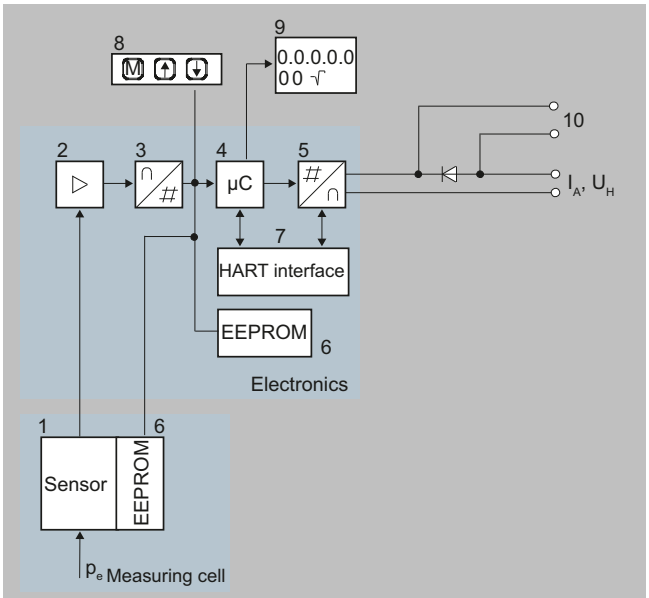
The enclosure has a screw-on cover (5) and, depending on the version, comes with or without an inspection window. The electrical terminal compartment, the buttons for operation of the device and, depending on the version, the display are located under this cover. The connections for the auxiliary power $U_H$ and the shield are in the terminal compartment. The cable gland is on the side of the enclosure. The measuring cell with the process connection (2) is located on the bottom of the enclosure. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device design.

***Example of attached measuring point label***




## Function

***Operation of electronics with HART communication***




1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
$I_A$ Output current 4 ... 20 mA
$U_H$ Power supply
$P_e$ Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, corrected for linearity and temperature response, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

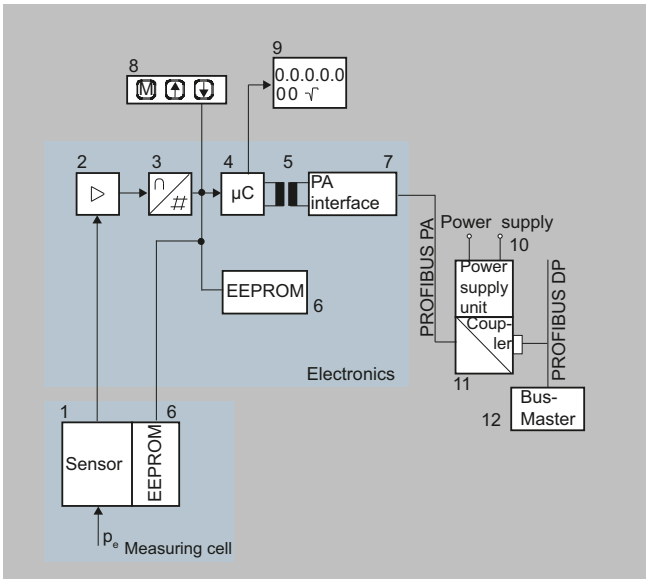
The pressure transmitters with measuring spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar the input pressure compared to vacuum.

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## Function (continued)

***Operation of electronics with PROFIBUS PA communication***




| | | | |
|---|---|---|---|
| 1 | Measuring cell sensor | 8 | Three input keys (local operation) |
| 2 | Instrument amplifier | 9 | Digital display |
| 3 | Analog-to-digital converter | 10 | Power supply |
| 4 | Microcontroller | 11 | DP/PA coupler or link |
| 5 | Electrical isolation | 12 | Bus master |
| 6 | One non-volatile memory each in the measuring cell and electronics | $p_e$ | Input variable |
| 7 | PROFIBUS PA interface | | |

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response, and made available on the PROFIBUS PA via an electrically isolated PA interface (7).

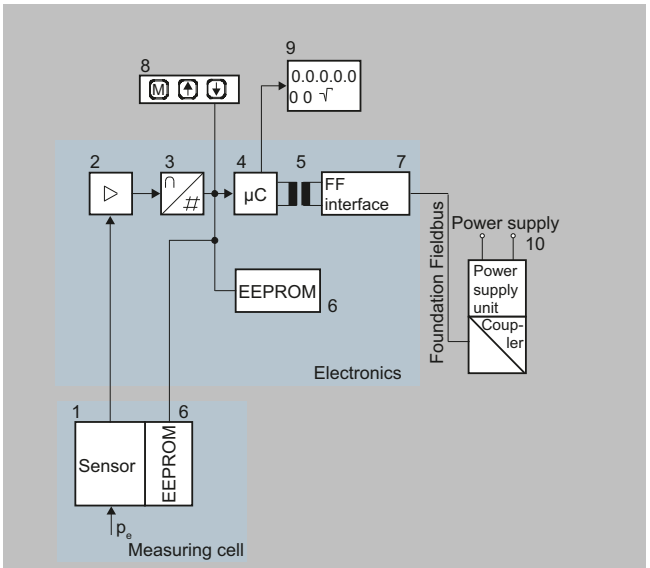
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

## Function (continued)

***Operation of electronics with FOUNDATION Fieldbus communication***




| | | | |
|---|---|---|---|
| 1 | Measuring cell sensor | 8 | Three input keys (local operation) |
| 2 | Instrument amplifier | 9 | Digital display |
| 3 | Analog-to-digital converter | 10 | Power supply |
| 4 | Microcontroller | | |
| 5 | Electrical isolation | | |
| 6 | One non-volatile memory each in the measuring cell and electronics | $p_e$ | Input variable |
| 7 | FOUNDATION Fieldbus interface | | |

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitalized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, corrected for linearity and temperature response and made available on the FOUNDATION Fieldbus via an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). One memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8), you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the measurement results, the error messages and the operating modes on the display (9).

The results with status values and diagnostics data are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

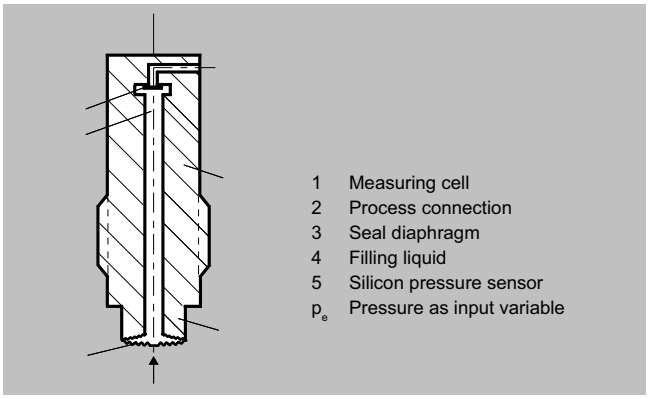
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## Function (continued)

***Mode of operation of the measuring cell***

Measuring cell for gauge pressure with flush-mounted diaphragm




Measuring cell for gauge pressure, with flush-mounted diaphragm for paper industry, function diagram

The pressure $p_e$ is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with flush-mounted diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the input pressure.

***Parameterization***

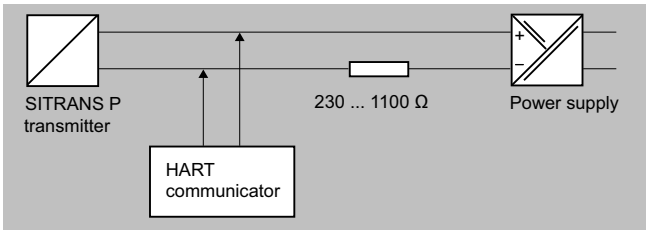
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons, you can easily set the most important parameters without any additional equipment.

Parameterization using HART

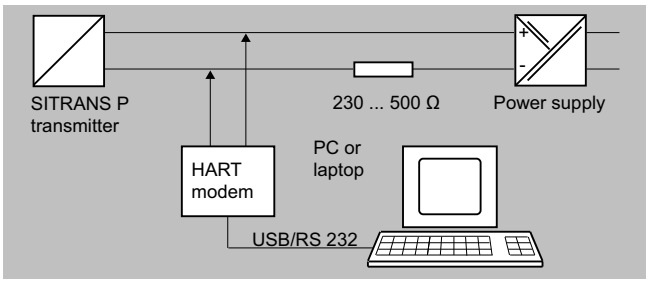
Parameterization using HART is performed with a HART Communicator or a PC.




Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.

## Function (continued)




HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using FSK (Frequency Shift Keying).

Adjustable parameters for SITRANS P300 with HART

| Parameters | Input buttons | HART |
|---|---|---|
| Lower range value | x | x |
| Upper range value | x | x |
| Electrical damping | x | x |
| Blind adjustment of the lower range value | x | x |
| Blind adjustment of the upper range value | x | x |
| Zero adjustment | x | x |
| Current simulator | x | x |
| Fault current | x | x |
| Disabling of buttons, write protection | x | x [1] |
| Type of unit, unit | x | x |
| Characteristic curve (linear) | x | x |
| Input of characteristic curve | | x |
| Freely-programmable LCD | | x |
| Diagnostic functions | | x |

[1] Except cancel write protection.

Diagnostic functions for SITRANS P300 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Min/max pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART

| Physical variable | Physical units |
|---|---|
| Pressure (can also be preset in the factory) | Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm², kg/cm², $inH_2O$, $inH_2O$ (4 °C), $mmH_2O$, $ftH_2O$ (20 °C), inHg, mmHg |
| Level (height data) | m, cm, mm, ft, in |
| Volume | m³, dm³, hl, yd³, ft³, in³, US gallon, Imp. gallon, bushel, barrel, barrel liquid |
| Mass | g, kg, t, lb, Ston, Lton, oz |
| Temperature | K, °C, °F, °R |
| Other | %, mA |

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## Function (continued)

Parameterization through PROFIBUS interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Communication is possible even in a hazardous area.

For parameter assignment via PROFIBUS, you need suitable software, e.g. SIMATIC PDM (Process Device Manager)

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Communication is possible even in a hazardous area.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

| Adjustable parameters | Input buttons | PROFIBUS PA and FOUNDATION Fieldbus |
|---|---|---|
| Electrical damping | x | x |
| Zero adjustment (correction of position) | x | x |
| Buttons and/or function disabling | x | x |
| Source of measured value display | x | x |
| Physical unit of display | x | x |
| Position of decimal point | x | x |
| Bus address | x | x |
| Adjustment of characteristic curve | x | x |
| Input of characteristic curve | | x |
| Freely-programmable LCD | | x |
| Diagnostic functions | | x |

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Min/max pointer
- Maintenance timer
- Simulation functions
- Zero correction display
- Limit transmitter
- Saturation alarm

Physical units available for the display

| Physical variable | Physical units |
|---|---|
| Pressure (can also be preset in the factory) | MPa, hPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm$^2$, kg/cm$^2$, mm$H_2O$, mm$H_2O$ (4 °C), in$H_2O$, in$H_2O$ (4 °C), ft$H_2O$, mmHg, inHg |
| Level (height data) | m, cm, mm, ft, in, yd |
| Mass | g, kg, t, lb, Ston, Lton, oz |
| Volume | m$^3$, dm$^3$, hl, yd$^3$, ft$^3$, in$^3$, US gallon, Imp. gallon, bushel, barrel, barrel liquid |
| Temperature | K, °C, °F, °R |
| Other | % |

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## Selection and ordering data

| SITRANS P300 pressure transmitters with PMC connection, single chamber enclosure, nameplate inscription in English | | Article No. |
|---|---|---|
| 4 ... 20 mA / HART | | 7MF8123- |
| PROFIBUS PA | | 7MF8124- |
| FOUNDATION Fieldbus (FF) | | 7MF8125- |
| | | ● ● ● ● ● - ● ● ● ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | |
| **Measuring cell filling** | **Measuring cell cleaning** | |
| Silicone oil | Normal | 1 |
| Inert liquid | Cleanliness level 2 according to DIN 25410 | 3 |
| **Measuring span** | | |
| 1 bar(14.5 psi)[1] | | B |
| 4 bar (58 psi) | | C |
| 16 bar (232 psi) | | D |
| **Material of wetted parts** | | |
| ***Seal diaphragm*** | ***Measuring cell*** | |
| Hastelloy | Stainless steel | B |
| **Process connection** | | |
| PMC style Standard: Thread 1½" | | 2 |
| PMC style Minibolt: Flush-mounted 1" (minimum measuring span: 500 mbar (200 in$H_2O$), cannot be ordered with 1 bar measuring cell (option B)) | | 3 |
| **Material of non-wetted parts** | | |
| Stainless steel, deep-drawn and electrolytically polished | | 4 |
| **Version** | | |
| Standard version | | 1 |
| **Explosion protection** | | |
| None | | A |
| With ATEX, type of protection: | | |
| • "Intrinsic safety (Ex ia)" | | B |
| • Zone 20/21/22[2] | | C |
| • Ex nA/nL (Zone 2)[3] | | E |
| With FM + CSA, type of protection: | | |
| • "Intrinsic Safe (is)" (planned)[4] | | M |
| **Electrical connection/cable entry** | | |
| Screw gland M20×1.5 (polyamide)[5] | | A |
| Screw gland M20×1.5 (metal) | | B |
| Screw gland M20×1.5 (stainless steel) | | C |
| Device plug M12 (stainless steel, without cable socket) | | G |
| ½-14 NPT threaded metal[6] | | H |
| ½-14 NPT threaded stainless steel[6] | | J |
| **Display** | | |
| Without local display, with buttons, closed lid | | 1 |
| With local display and buttons, closed lid[7] | | 2 |
| With local display and buttons, lid with polycarbonate pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: pressure units)[7] | | 4 |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with polycarbonate pane[7] | | 5 |
| With local display and buttons, lid with glass pane (setting for HART devices: mA, for PROFIBUS PA and FOUNDATION Fieldbus devices: pressure unit)[7] | | 6 |
| With local display and buttons (setting acc. to specifications, order code "Y21" or "Y22" required), lid with glass pane[7] | | 7 |

Note

See section "Supplementary components" for supply units. The device's scope of delivery includes a brochure and a sealing ring.

1) Only with "Standard" process connection
2) Can only be ordered together with electrical connection option A.
3) Can only be ordered together with electrical connection option B, C or G.
4) Explosion protection acc. to FM/CSA: suitable for installations according to NEC 500/505. 5) Only together with HART electronics.
6) Without cable gland.
7) Local display cannot be rotated.

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| **Cable socket for M12 device plug** | | |
| Stainless steel | **A51** | HART / PQ / FF |
| **Nameplate inscription (in place of English)** | | |
| • German | **B10** | HART / PQ / FF |
| • French | **B12** | HART / PQ / FF |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code | Communication |
|---|---|---|
| • Spanish | **B13** | HART / PQ / FF |
| • Italian | **B14** | HART / PQ / FF |
| **English nameplate, pressure units in $inH_20$ or psi** | **B21** | HART / PQ / FF |
| **Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2**[1] | **C11** | HART / PQ / FF |
| **Inspection certificate according to EN 10204-3.1**[2] | **C12** | HART / PQ / FF |
| **Factory certificate according to EN 10204-2.2** | **C14** | HART / PQ / FF |
| **Setting of the upper saturation limit of the output signal to 22.0 mA** | **D05** | HART / PQ / FF |
| **IP65/IP68 degree of protection only for M20x1.5 and ½-14 NPT** | **D12** | HART / PQ / FF |
| **Mounting** | | |
| Weld-in sockets for standard threaded connection 1½" | **P01** | HART / PQ / FF |
| Weld-in sockets for minibolt connection 1" (including screw 5/16-18 UNC-2B and washer) | **P02** | HART / PQ / FF |
| **Additional information**<br>Add "**-Z**" to article number, specify order code and plain text. | | |
| **Measuring range to be set**<br>Specify in plain text (max. 5 digits):<br>Y01: ... to ... mbar, bar, kPa, MPa, psi | **Y01** | HART / PQ[1] |
| **Tag plate made of stainless steel and entry in the device variable (measuring point description)**<br>Max. 16 characters; specify in plain text: Y15:<br>..... | **Y15** | HART / PQ / FF |
| **Measuring point text (entry in device variable)**<br>Max. 27 characters; specify in plain text: Y16:<br>..... | **Y16** | HART / PQ / FF |
| **Entry of HART TAG**<br>Max. 8 characters; specify in plain text: Y17:<br>..... | **Y17** | HART |
| **Setting of the local display in pressure units**<br>Specify in plain text (default setting: bar): Y21: mbar, bar, kPa, MPa, psi, ...<br>***Note***<br>The following pressure units can be selected: bar, mbar, mm $H_2O$[3], $inH_2O$[3], $ftH_2O$[3], mmHG, inHG, psi, Pa, kPa, MPa, $g/cm^2$, $kg/cm^2$, Torr, ATM or % | **Y21** | HART / PQ / FF |
| **Setting of the local display in non-pressure units**[9]<br>Specify in plain text: Y22: ..... to ..... l, $m^3$, m, USg, ...<br>(Specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters) | **Y22 + Y01** | HART |
| **Preset bus address, possible range 1 ... 126**<br>Specify in plain text: Y25: ..... | **Y25** | PQ / FF |

Note:

Only "Y01" and "Y21" can be factory preset.

1) Measuring accuracies for PROFIBUS PA transmitters with option Y01 are calculated in the same way as for HART devices.
2) Preset values can only be changed via SIMATIC PDM.
3) 20 °C reference temperature.

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## Technical specifications

| SITRANS P300 for gauge pressure with PMC connection for the paper industry | | | | |
|---|---|---|---|---|
| **Input** | | | | |
| Measured variable | Gauge pressure (flush-mounted) | | | |
| | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** | | |
| Measuring span (continuously adjustable) or nominal measuring range and max. permissible test pressure | Measuring span | Nominal measuring range | Max. permissible operating pressure MAWP (PS) | Max. permissible test pressure |
| | 0.01 ... 1 bar<br>1 ... 100 kPa<br>0.15 ... 14.5 psi | 1 bar<br>100 kPa<br>14.5 psi | 4 bar<br>400 kPa<br>58 psi | 6 bar<br>600 kPa<br>87 psi |
| | 0.04 ... 4 bar<br>4 ... 400 kPa<br>0.58 ... 58 psi | 4 bar<br>400 kPa<br>58 psi | 7 bar<br>0.71 MPa<br>102 psi | 10 bar<br>1 MPa<br>145 psi |
| | 0.16 ... 16 bar<br>16 ... 1600 kPa<br>2.3 ... 232 psi | 16 bar<br>1600 kPa<br>232 psi | 21 bar<br>2.1 MPa<br>305 psi | 32 bar<br>3.2 MPa<br>464 psi |
| Lower measuring limit (for PMC Style Minibolt no measuring span < 500 mbar adjustable) | 100 mbar a/10 kPa a/1.45 psi a | | | |
| Upper measuring limit | 100% of max. measuring span | | | |
| **Output** | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** | | |
| Output signal | 4 ... 20 mA | Digital PROFIBUS PA signal | | |
| • Lower limit (continuously adjustable) | 3.55 mA, factory set to 3.84 mA | - | | |
| • Upper limit (continuously adjustable) | 23 mA, factory-set to 20.5 mA or optionally set to 22.0 mA | - | | |
| Load | | | | |
| • Without HART | $R_B \leq (U_H - 10.5\ V) / 0.023\ A$ in Ω, $U_H$: Auxiliary power in V | - | | |
| • With HART | $R_B$ = 230 ... 500 Ω (SIMATIC PDM) or $R_B$ = 230 ... 1100 Ω (HART communicator) | - | | |
| Physical bus | - | IEC 61158-2 | | |
| Protection against polarity reversal | Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage. | | | |
| Electrical damping (step width 0.1 s) | Set to 2 s (0 ... 100 s) | | | |
| **Measuring accuracy** | According to IEC 62828-1 | | | |
| Reference conditions | • Rising characteristic curve<br>• Lower range value 0 bar<br>• Seal diaphragm stainless steel<br>• Silicone oil filling<br>• Room temperature (25 °C (77 °F)) | | | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | | | |
| Measurement deviation at limit setting including hysteresis and reproducibility | | | | |
| • Linear characteristic curve | | | | |
| - $r \leq 5$ | ≤ 0.075% | | | |
| - $5 < r \leq 100$ | ≤ (0.005 · r +0.05)% | | | |
| Effect of ambient temperature | ≤ (0.08 · r + 0.16)% | | | |
| Long-term stability (temperature change ±30 °C (± 54 °F)) | ≤ (0.25 · r)% in 5 years | | | |
| Influence of mounting position | ≤ 0.1 mbar/0.01 kPa/0.00145 psi per 10° incline (zero offset is possible with position error compensation) | | | |
| Effect of auxiliary power (in percent per voltage change) | 0.005% per 1 V | | | |
| Measured value resolution for PROFIBUS PA and FOUNDATION Fieldbus | $3 \cdot 10^{-5}$ of nominal measuring range | | | |
| **Operating conditions** | | | | |
| ***Installation conditions*** | | | | |
| Ambient temperature | Observe the temperature class in hazardous areas. | | | |
| • Measuring cell with silicone oil | -40 ... +85 °C (-40 ... +185 °F) | | | |
| • Display readable | -30 ... +85 °C (-22 ... +185 °F) | | | |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) | | | |

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## Technical specifications (continued)

| SITRANS P300 for gauge pressure with PMC connection for the paper industry | | |
|---|---|---|
| Climatic class | | |
| Condensation | Relative humidity 0 ... 100%<br>Condensation permissible, suitable for use in the tropics | |
| Degree of protection | | |
| • According to EN 60529 | IP65, IP68 | |
| • According to NEMA 250 | Type 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F) | |
| Electromagnetic compatibility | | |
| • Emitted interference and interference immunity | Acc. to EN 61326 and NAMUR NE 21 | |
| ***Process conditions*** | | |
| Medium temperature | | |
| • Measuring cell with silicone oil | -40 ... +100 °C (-40 ... +212 °F) | |
| **Structural design** | | |
| Weight (without options) | Approx. 1 kg (2.2 lbs) | |
| Enclosure material | Stainless steel, mat. no. 1.4301/304 | |
| Material of wetted parts | | |
| • Seal diaphragm | Hastelloy C276, mat. no. 2.4819 | |
| • Measuring cell filling | Silicone oil | |
| Surface quality touched-by-media | $R_a$-values ≤ 0.8 µm (32 µ-inch)/welds Ra ≤ 1.6 µm (64 µ-inch) | |
| **Auxiliary power $U_H$** | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** |
| Terminal voltage on transmitter | 10.5 ... 42 V DC<br>for intrinsically safe operation:<br>10.5 ... 30 V DC | - |
| Auxiliary power | - | Bus-powered |
| Separate supply voltage | - | Not necessary |
| Bus voltage | | |
| • Without EEx | - | 9 ... 32 V |
| • With intrinsically safe operation | - | 9 ... 24 V |
| Current consumption | | |
| • Max. basic current | - | 12.5 mA |
| • Starting current ≤ basic current | - | Yes |
| • Max. fault current in the event of an error | - | 15.5 mA |
| Fault disconnection electronics (FDE) available | - | Yes |
| **Certificates and approvals** | **HART** | **PROFIBUS PA/FOUNDATION Fieldbus** |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) | |
| Explosion protection | | |
| Intrinsic safety "i" | PTB 05 ATEX 2048 | |
| Marking | II 1/2 G Ex ia IIC/IIB T4/T5/T6 Ga/Gb | |
| Permissible ambient temperature | | |
| • Temperature class T4 | -40 ... +85 °C (-40 ... +185 °F) | |
| • Temperature class T5 | -40 ... +70 °C (-40 ... +158 °F) | |
| • Temperature class T6 | -40 ... +60 °C (-40 ... +140 °F) | |
| Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 100 mA, $P_i$ = 750 mW, $R_i$ = 300 Ω | To certified intrinsically safe circuits with peak values:<br>***FISCO supply unit:***<br>$U_i$ = 17.5 V, $I_i$ = 380 mA, $P_i$ = 5.32 W<br>***Linear barrier:***<br>$U_i$ = 24 V, $I_i$ = 250 mA, $P_i$ = 1.2 W |
| Effective internal capacitance | $C_i$ = 6 nF | $C_i$ = 1.1 nF |
| Effective internal inductance | $L_i$ = 0.4 mH | $L_i$ = 7 µH |

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## Technical specifications (continued)

| SITRANS P300 for gauge pressure with PMC connection for the paper industry | |
|---|---|
| Explosion protection to FM for USA and Canada ($cFM_{US}$) | |
| • Identification (DIP) or (IS); (NI) | Certificate of Compliance 3025099<br>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6<br>CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Identification (DIP) or (IS) | Certificate of Compliance 3025099C<br>CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6<br>CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |

### *Communication*

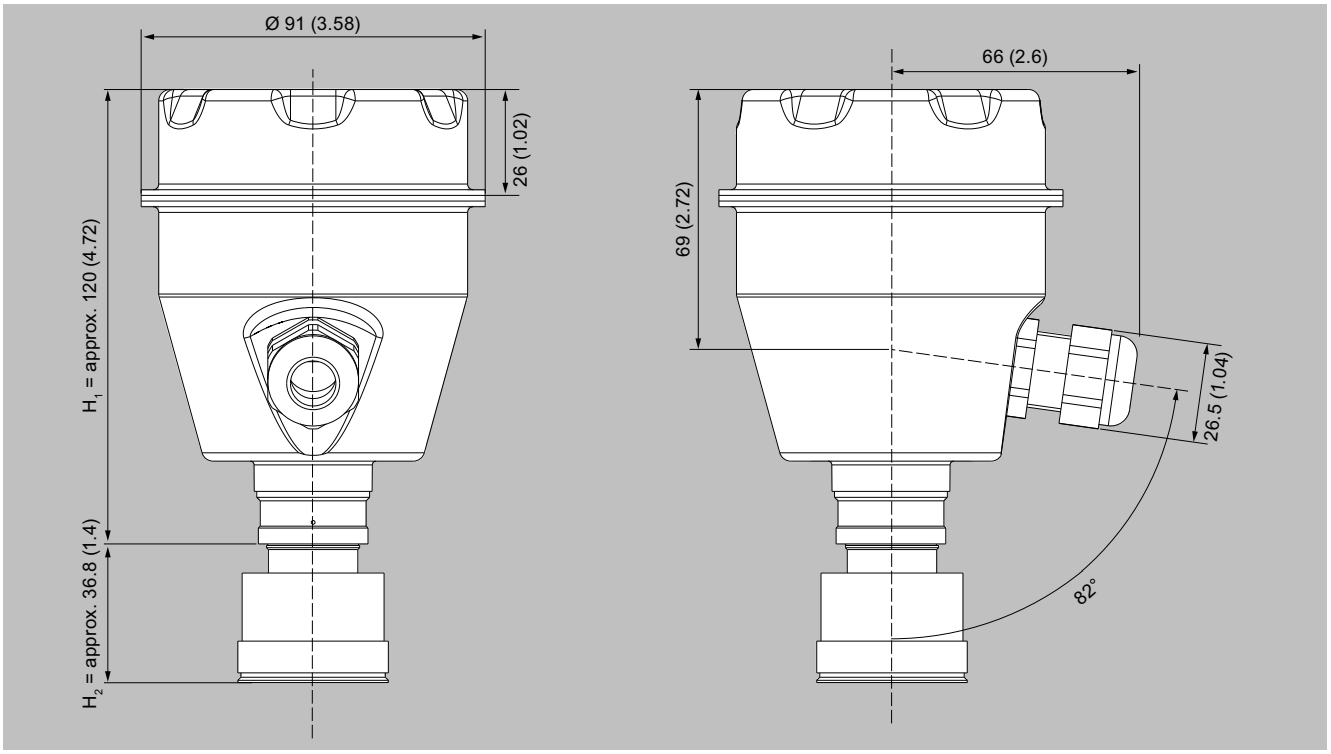
| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART version 5.x |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | 1 measured value: 5 bytes<br>2 measured values: 10 bytes |
| • Input byte | Register operation mode: 1 byte<br>Reset function due to dosing: 1 byte |
| Device profile | PROFIBUS PA Profile for Process Control Devices Version 3.0, Class B |
| Function blocks | 2 |
| • Analog input | |
| - Adaptation to user-specific process variable | Linearly rising or falling characteristic curve |
| - Electrical damping | 0 ... 100 s adjustable |
| - Simulation function | Output/input |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset and preset<br>Selectable direction of counting<br>Simulation function of the register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 2 |
| • Pressure transducer block | |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 31 nodes |
| - Characteristic curve | Linear |

| Communication | |
|---|---|
| - Simulation function | Available |
| • Transducer block "Electronics temperature" | |
| Simulation function | Available |
| **FOUNDATION Fieldbus** | |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings



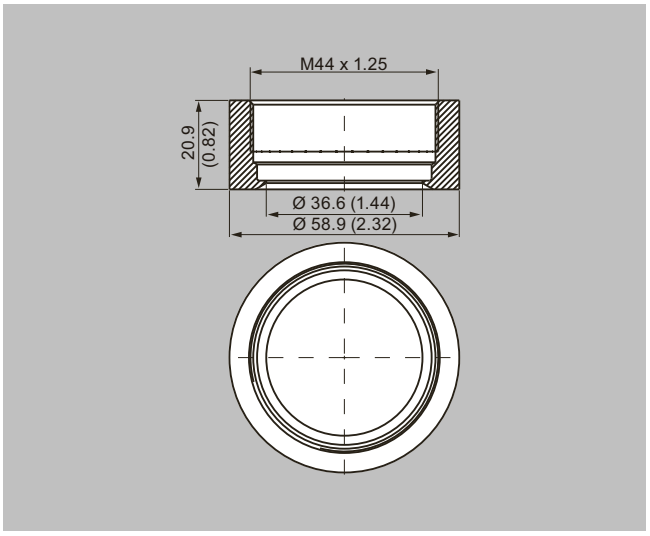

SITRANS P300 pressure transmitter for gauge pressure, with PMC connection, dimensions in mm (inch)

The figure shows a SITRANS P300 with an example flange. In this drawing, the height is subdivided into $H_1$ and $H_2$:

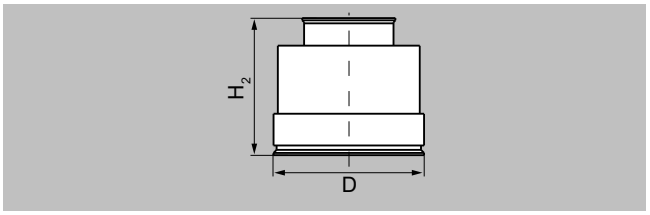
- $H_1$ = Height of the SITRANS P300 up to a defined cross-section
- $H_2$ = Height of the flange up to this defined cross-section

Only the height $H_2$ is indicated in the dimensions of the flanges.

***PMC Style standard weldable sockets***




PMC Style Standard weldable sockets, dimensions in mm (inch)



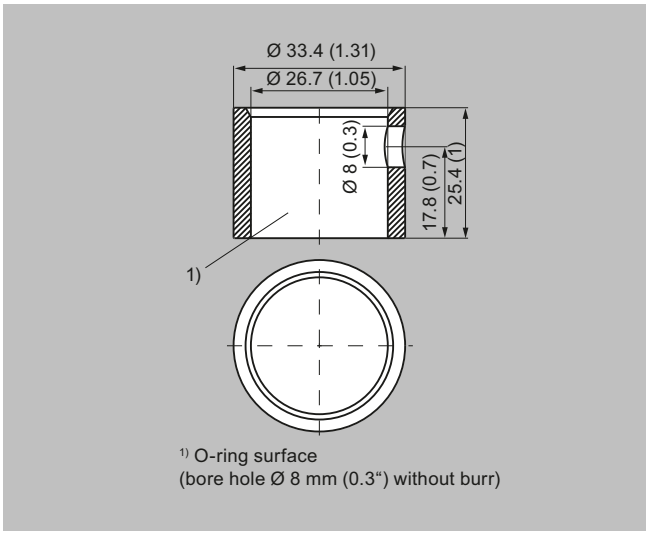

Material: Stainless steel, mat. no. 1.4404/316L
ØD = 40.9 mm (1.6")
$H_2$ = approx. 36.8 mm (1.4")

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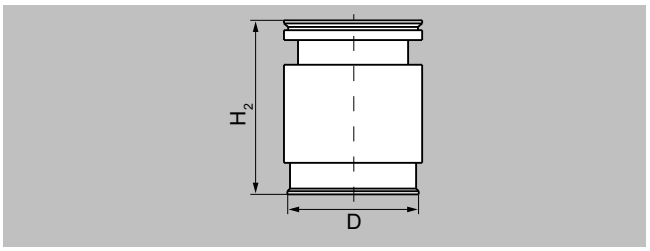


## Dimensional drawings (continued)

***PMC Style Minibolt weldable sockets***




PMC Style Minibolt weldable sockets, dimensions in mm (inch)




ØD = 26.3 mm (1.0")
$H_2$ = approx. 33.1 mm (1.3")

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## Overview

SITRANS P320/P420 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume flow
- Mass flow

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## Overview



SITRANS P320/P420 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameter assignment is performed using input buttons or the HART interface.

The comprehensive functionality makes for precise adjustment of the pressure transmitter to the requirements of the plant. Operation is very user-friendly in spite of the numerous setting options.

Due to their advanced diagnostic functionalities according to NAMUR NE107, the SITRANS P320/P420 pressure transmitters are very suitable for use in chemical plants. Thanks to the advanced diagnostic functions and the process value storage, the SITRANS P420 is "Ready for Digitalization".

The "Remote Safety Handling" function saves customers significant amounts of time and money, because the SIL function can be switched on and validated remotely via SIMATIC PDM. This eliminates travel times and on-site operation via the local display or keyboard.

Parameter assignment using the HART protocol is very easy and quick thanks to the innovative EDD with integrated Quick Start wizard.

The transmitters can be equipped with various types of remote seals for special applications such as the measurement of highly viscous substances.

SITRANS P320/P420 pressure transmitters are available in various versions for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume flow
- Mass flow

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## Benefits

- Diagnostic functions in accordance with NAMUR recommendation NE107
- SIL devices developed according to IEC 61508
- SIL validation on the device or remotely with SIMATIC PDM
- Reduction of internal inductance for Ex applications to LI = 0
- Step response time for pressure type T63 = 105 ms and for differential pressure type 135 ms.
- Minimal conformity error
- Very low temperature influence
- Very good long-term stability
- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For corrosive and non-corrosive gases, vapors and liquids
- Extensive diagnostics and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Wetted parts made of high-grade materials (e.g., stainless steel, alloy, gold, Monel, tantalum)
- Infinitely adjustable spans from 0.01 bar to 700 bar (0.15 psi to 10153 psi)
- Convenient parameterization over 4 input buttons and HART interface

## Application

SITRANS P320/P420 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads.

The pressure transmitters can be used in zone 1 or zone 0 with the corresponding Ex approval.

The pressure transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 4 input buttons or programmed externally over HART interface.

***Pressure transmitters for gauge pressure***

Measured variable:

- Gauge pressure of corrosive and non-corrosive gases, vapors and liquids.

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

There are two series:

- Gauge pressure series
- Differential pressure series

***Pressure transmitters for absolute pressure***

Measured variable:

- Absolute pressure of corrosive and non-corrosive gases, vapors and liquids.

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 8.3 mbar a to 160 bar a (0.12 to 2 321 psi a)

There are two series:

- Gauge pressure series
- Differential pressure series

***Pressure transmitters for differential pressure and flow***

Measured variables:

- Differential pressure
- Small positive or negative overpressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure transducer (see section "Flowmeters"))

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART: 1 mbar to 160 bar (0.0145 to 2 321 psi)

***Pressure transmitters for level***

Measured variable:

- Level of corrosive and non-corrosive liquids in open and closed vessels.

Measuring span (infinitely adjustable)

- For SITRANS P320/P420 with HART:
  25 mbar to 5 bar (0.363 to 72.5 psi)

Type of the mounting flange:

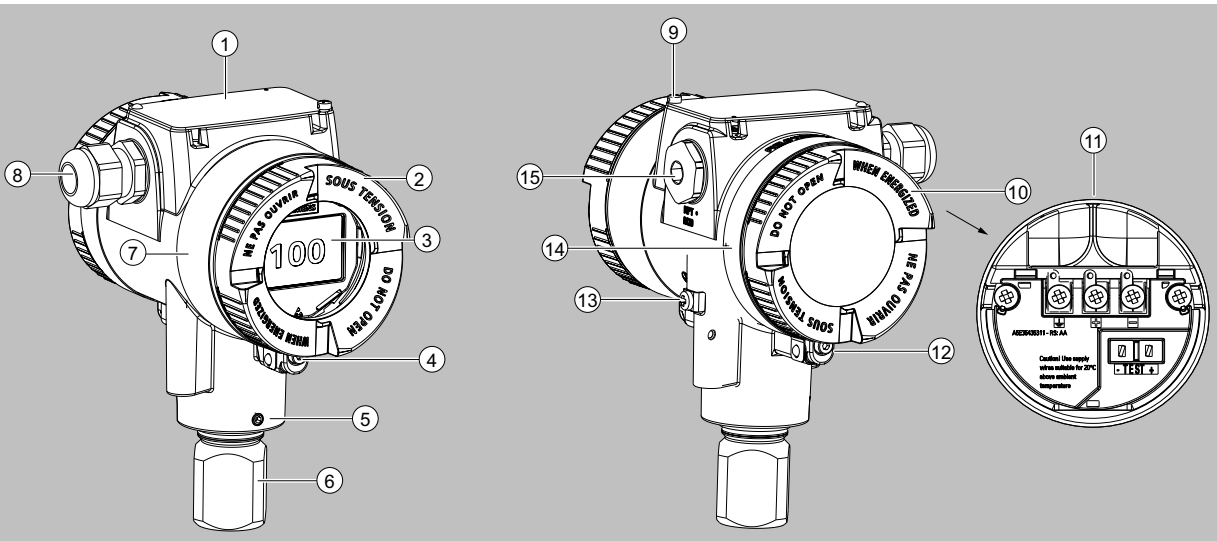
- EN 1092-1 flanges
- ASME B16.5 flanges
- J.I.S. flanges
- Diverse range of sealing surface forms available

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## Design

Depending on the customer-specific order, the device comprises different parts.




1. Cover over buttons and nameplate with general information
2. Cover (front) with glass pane (optional)
3. Display (optional)
4. Safety catch (front)
5. Locking screw for locking the enclosure
6. Process connection
7. Approval label with approval information
8. Cable inlet, optionally with cable gland
9. Locking screw for the cover over the buttons
10. Cover (rear) for electrical terminal compartment
11. Electrical terminal compartment
12. Safety catch (back)
13. Ground terminal
14. Nameplate with information on the remote seal
15. Blanking plug

Device front view

- The electronics enclosure is made of die cast aluminum or precision cast stainless steel.
- The enclosure has a removable cover at the front and the back.
- Depending on the device design, the front cover (2) may be designed with a glass pane.
- The cable inlet (8) to the electrical terminal compartment is at the side; either the left or right-hand one can be used. The unused opening is closed with a blanking plug (15).
- The ground terminal (13) is located on the side.
- The electrical terminal compartment (11) for the auxiliary power and shield is accessible when you remove the back cover (10).
- The measuring cell with process connection (6) is located in the bottom part of the enclosure.

  The measuring cell is prevented from rotating by a locking screw (5).
- Thanks to the modular design of the pressure transmitter, the measuring cell and application electronics or terminal compartment can be replaced if required.
- The button cover (1) is located on the upper face of the enclosure. The nameplate with general information is located on the cover over the buttons.

***Nameplates***

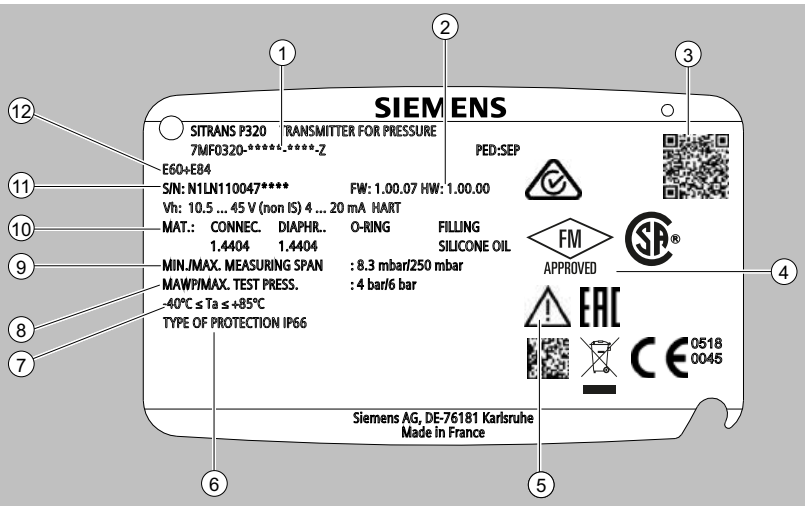
Nameplate

The nameplate with the article no. and other important information, such as design details and technical data, is located on the cover over the buttons.

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## **Design** (continued)




1. Article number
2. Firmware and hardware identification
3. QR code to the mobile website with device-specific information
4. Conformity with country-specific directives
5. Note operating instructions, certificates and approvals
6. Protection class
7. Permitted ambient temperature for the hazardous area of the corresponding temperature class
8. Maximum allowable operating pressure / maximum allowable test pressure
9. Minimum/maximum measuring span
10. Material: connection, diaphragm, O-ring, oil
11. Serial number
12. Order supplement (options, order code)

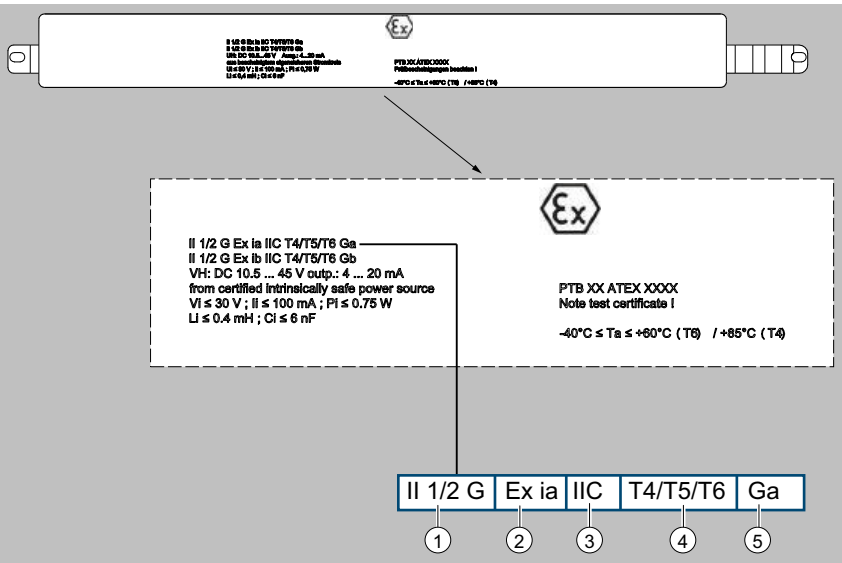
Certification label with approval information

The certification label with approval information is located on the front of the enclosure.

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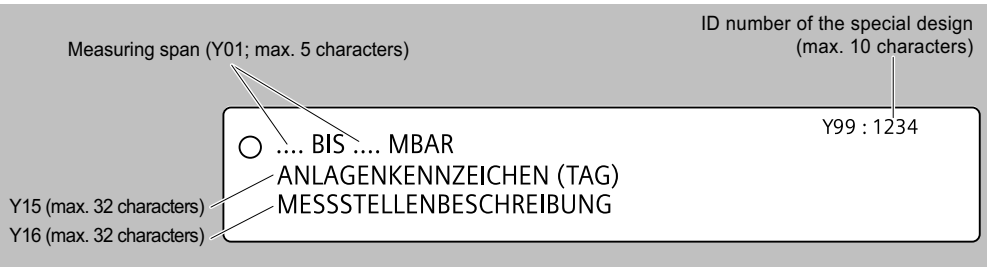
## Design (continued)




1. Characteristics of the hazardous area
2. Type of protection
3. Group (gas, dust)
4. Maximum surface temperature (temperature class)
5. Device protection level

Tag plate

The tag plate is fastened with a wire under the front cover.



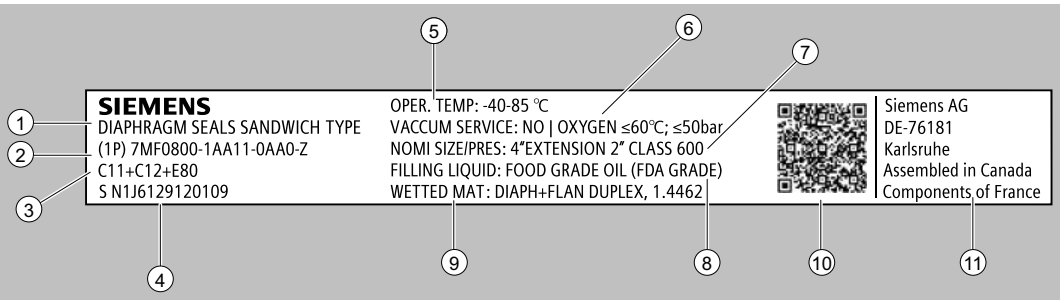

Nameplate with information on the remote seals

The nameplate with information on the remote seals is located on the back of the enclosure.

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## Design (continued)




1. Diaphragm seals of sandwich type
2. Article number
3. Order supplement (options, order code)
4. Serial number
5. Operating temperature
6. Vacuum pressure service: No, oxygen ≤ 60 °C; ≤ 50 bar
7. Nominal diameter/pressure: 4 inch, 50 mm tube length, CLASS 600
8. Filling liquid: Food grade oil (FDA-compliant)
9. Wetted materials: Diaphragm duplex, 1.4462
10. QR code to mobile website with device-specific information
11. Assembly and manufacturing location

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## Function

***Adjustable parameters and diagnostics***

SITRANS P320/P420 with HART communication

| Parameters | Input buttons | SITRANS P320 | SITRANS P420 |
|---|---|---|---|
| Application, measurement type | x | x | x |
| Adjusting lower range value/upper range value | x | x | x |
| Setting lower range value/upper range value | x | x | x |
| Electrical damping | x | x | x |
| Zero adjustment | x | x | x |
| Fault current | x | x | x |
| Saturation limits | x | x | x |
| Scaling of the display | x | x | x |
| Characteristic curve selection | x | x | x |
| Temperature unit | x | x | x |
| Button lock | x | x | x |
| Change user PIN | x | x | x |
| Functional safety | x | x | x |
| Loop test | x | x | x |
| Start view | x | x | x |
| Pressure reference | x | x | x |
| Reset | x | x | x |
| **Diagnostics and trend log** | | | |
| Min/max pointer | – | x | x |
| Limit monitoring | – | 2 | 2 |
| Event counter (overrun/undershoot) | – | 2 | 2 |
| Maintenance and service timer | – | x | x |
| Trend log | – | – | 2, max. 1 500 values |
| Diagnostic log | – | x | x |
| Parameters change log | – | – | x |

Available physical units of display for SITRANS P320/P420

| Physical variable | Physical units |
|---|---|
| Pressure (can also be preset in the factory) | Pa, MPa, kPa, hPa, bar, mbar, psi, g/cm², kg/cm², kgf/cm², $inH_2O$, $inH_2O$ (4 °C), $ftH_2O$, $mmH_2O$, $mmH_2O$ (4 °C), $mH_2O$ (4 °C), mmHg, inHg, atm, torr |
| Level (height data) | m, cm, mm, ft, in |
| Volumes (fill level) | m³, l, hl, in³, ft³, yd³, gal, gal (UK), bu, bbl, bbl (US), SCF, Nm³, Nl |
| Volume (flow) | m³/sec, m³/h, m³/d, l/sec, l/min, l/h, Ml/d, ft³/sec, ft³/h, ft³/d, SCF/min, SCF/h, Nl/h, Nm³/hgal/sec, gal/min, gal/h, gal/d, Mgal/d, gal (UK))/sec, gal (UK)/min, gal (UK)/h, gal (UK)/d, bbl/sec, bbl/min, bbl/h, bbl/d, |
| Mass (flow) | Kg/sec, kg/min, kg/h, kg/d, g/sec, g/min, g/h, t/min, t/h, t/d, lb/sec, lb/min, lb/h, lb/d, ton/min, ton/h, ton/d, ton (UK)/h, ton (UK)/d |
| Temperature | °C, °F |
| Other | %, mA, free text max. 12 characters |

For more device information and technical specifications, refer to the individual device versions.

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## Selection and ordering data

| Pressure transmitters for gauge pressure (pressure series) | Article No. | | |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate, 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Mounting bracket** | |
| Steel, zinc-plated | **H01** |
| Stainless steel 1.4301/304 | **H02** |
| Stainless steel 1.4404/316L | **H03** |
| **Flange connections with flange EN 1092-1** | |
| With flange adapter G½ Form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J80** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J81** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J82** |
| With water trap G½ form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J83** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J84** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J85** |
| • DN 25 PN 100, stainless steel 1.4571/316Ti | **J86** |
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| Gasket (EN 837-1) material Fe (soft iron) | **K60** |
| Gasket (EN 837-1) material 1.4571 | **K61** |
| Gasket (EN 837-1) material Cu | **K62** |
| **Process connection** | |
| Process connection external thread G½, bore hole 11 mm | **K80** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Shut-off valves, valve manifolds** | |
| With mounted valve manifold 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2) | **T02** |
| With mounted valve manifold 7MF9011-4FA, process connection at transmitter internal thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2) | **T03** |
| With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2) | **T05** |
| With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, stainless steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2) | **T06** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320/SITRANS P420 for gauge pressure (pressure series) | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Gauge pressure | | |
| Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. permissible test pressure (pursuant to DIN 16086)<br>(for oxygen measurement, max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 8.3 ... 250 mbar<br>0.83 ... 25 kPa<br>0.12 ... 3.6 psi | 4 bar<br>0.4 MPa<br>58 psi | 6 bar<br>0.6 MPa<br>87 psi |
| | 0.01 ... 1 bar<br>1 ... 100 kPa<br>0.15 ... 14.5 psi | 6 bar<br>0.6 MPa<br>87 psi | 9 bar<br>0.9 MPa<br>130 psi |
| | 0.04 ... 4 bar<br>4 ... 400 kPa<br>0.58 ... 58 psi | 20 bar<br>2 MPa<br>290 psi | 30 bar<br>3 MPa<br>435 psi |
| | 0.16 ... 16 bar<br>0.016 ... 1.6 MPa<br>2.3 ... 232 psi | 45 bar<br>4.5 MPa<br>652 psi | 70 bar<br>7 MPa<br>1015 psi |
| | 0.63 ... 63 bar<br>0.063 ... 6.3 MPa<br>9.1 ... 914 psi | 80 bar<br>8 MPa<br>1160 psi | 120 bar<br>12 MPa<br>1740 psi |
| | 1.6 ... 160 bar<br>0.16 ... 16 MPa<br>23 ... 2321 psi | 240 bar<br>24 MPa<br>3481 psi | 360 bar<br>36 MPa<br>5221 psi |
| | 4 ... 400 bar<br>0.4 ... 40 MPa<br>58 ... 5802 psi | 400 bar<br>40 MPa<br>5802 psi | 600 bar<br>60 MPa<br>8702 psi |
| | 7 ... 700 bar<br>0.7 ... 70 MPa<br>102 ... 10153 psi | 800 bar<br>80 MPa<br>11603 psi | 800 bar<br>80 MPa<br>11603 psi |
| Measuring limits | | | |
| • Lower measuring limit | For 250 mbar/25 kPa/3.6 psi measuring cells, the lower measuring limit is 750 mbar a/75 kPa a/10.8 psi a. The measuring cell is vacuum-resistant up to 30 mbar a/3 kPa a/0.44 psi a. | | |
| - Measuring cell with silicone oil filling | 30 mbar a/3 kPa a/0.44 psi a | | |
| - Measuring cell with inert oil | 30 mbar a/3 kPa a/0.44 psi a | | |
| - Measuring cell with FDA-compliant oil | 100 mbar a/10 kPa a/1.45 psi a | | |
| • Upper measuring limit | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | |
| • Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp} \leq 0.5\%$ of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA (factory set to 3.55 mA) | | |
| Load | Resistance R [Ω] | | |
| • Without HART communication | $R = (U_H - 10.5\ V) / 22.8\ mA$,<br>$U_H$: Auxiliary power in V | | |
| • With HART communication | R = 230 ... 1100 Ω | | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | | |
| Physical bus | - | | |
| Polarity-independent | - | | |

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## Technical specifications (continued)

| SITRANS P320/SITRANS P420 for gauge pressure (pressure series) | | |
|---|---|---|
| **Measuring accuracy** | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Conformity error at limit point setting, including hysteresis and repeatability | | |
| Measuring span ratio r (spread, Turn-Down) | r = max. measuring span/set measuring span and nominal measuring range | |
| • Linear characteristic curve | | |
| - 250 mbar/25 kPa/3.6 psi | r ≤ 1.25:<br>1.25 < r ≤ 30: | ≤ 0.075% (SITRANS P320)<br>≤ 0.065% (SITRANS P420)<br>≤ (0.008 · r +0.065)% |
| - 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi | r ≤ 5:<br>5 < r ≤ 100: | ≤ 0.065% (SITRANS P320)<br>≤ 0.04% (SITRANS P420)<br>≤ (0.004 · r +0.045)% |
| - 400 bar/40 MPa/5802 psi<br>700 bar/70 MPa/10152 psi | r ≤ 5:<br>5 < r ≤ 100:<br>r ≤ 5:<br>5 < r ≤ 100: | ≤ 0.075% (SITRANS P320)<br>≤ (0.005 · r + 0.05)% (SITRANS P320)<br>≤ 0.075% (SITRANS P420)<br>≤ (0.005 · r + 0.05)% (SITRANS P420) |
| Influence of ambient temperature in % per 28 °C (50 °F)) | | |
| • 250 mbar/25 kPa/3.6 psi | ≤ (0.16 · r +0.1)% | |
| • 1 bar/100 kPa/14.5 psi | ≤ (0.05 · r +0.1)% | |
| • 4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi<br>400 bar/40 MPa/5802 psi | ≤ (0.025 · r +0.125)% | |
| • 700 bar/70 MPa/10152 psi | ≤ (0.08 · r +0.16)% | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • 250 mbar/25 kPa/3.6 psi | ≤ (0.25 · r)% per year | |
| • 1 bar/100 kPa/14.5 psi | In 5 years ≤ (0.25 · r)%<br>In 10 years ≤ (0.35 · r)% | |
| • 4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi<br>160 bar/16 MPa/2321 psi<br>400 bar/40 MPa/5802 psi | In 5 years ≤ (0.125 · r)%<br>In 10 years ≤ (0.15 · r)% | |
| • 700 bar/70 MPa/10152 psi | In 5 years ≤ (0.25 · r)%<br>In 10 years ≤ (0.35 · r)% | |
| Step response time $T_{63}$ (without electrical damping) | ≤ 0.105 s | |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline<br>(zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |
| **Operating conditions** | | |
| Medium temperature | | |
| • Measuring cell with silicone oil filling | -40 ... +100 °C (-40 ... +212 °F) | |
| • Measuring cell with inert oil | | |
| - 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | -40 ... +100 °C (-40 ... +212 °F) | |
| - 160 bar/16 MPa/2321 psi<br>400 bar/40 MPa/5802 psi<br>700 bar/70 MPa/10152 psi | -20 ... +100 °C (-4 ... +212 °F) | |

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## Technical specifications (continued)

| SITRANS P320/SITRANS P420 for gauge pressure (pressure series) | |
|---|---|
| • Measuring cell with FDA-compliant oil | -10 ... +100 °C (14 ... +212 °F) |
| Ambient conditions | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with inert oil for gauge pressure measuring cells:<br>1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with inert oil | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with FDA-compliant oil | -10 ... +85 °C (14 ... +185 °F) |
| - Display | -20 ... +80 °C (-4 ... +176 °F) |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H |
| • Degree of protection | |
| - According to IEC 60529 | IP66, IP68 |
| - According to NEMA 250 | Type 4X |
| • Electromagnetic compatibility | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 |
| **Structural design** | |
| Weight | • Aluminum enclosure: Approx. 1.8 kg (3.9 lbs)<br>• Stainless steel enclosure: Approx. 3.8 kg (8.3 lbs) |
| Material | |
| • Material of wetted parts | |
| - Process connection | Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602 |
| - Oval flange | Stainless steel, mat. no. 1.4404/316L |
| - Seal diaphragm | Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819 |
| • Material of non-wetted parts | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Coating: The layer structure and thickness correspond to EN ISO 12944 Corrosion Class C3-M (for standard transmitter) and C5-H (for transmitter with double layer coating)<br>• Stainless steel nameplate (1.4404/316L) |
| - Mounting bracket | Zinc-plated steel or stainless steel |
| Process connection | • Connection shank G1/2A according to EN 837-1<br>• Female thread ½-14 NPT<br>• Oval flange (PN 160 (MWP 2320 psi g)) with fastening thread:<br>- 7/16-20 UNF according to EN 61518<br>- M10 according to DIN 19213<br>• Oval flange (PN 420 (MWP 2320 psi g)) with fastening thread:<br>- 7/16-20 UNF according to EN 61518<br>- M12 according to DIN 19213<br>• Male thread M20 × 1.5 and ½-14 NPT |
| Electrical connection | Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Display | • With or without integrated display (optional)<br>• Lid with inspection window (optional) |

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## Technical specifications (continued)

| SITRANS P320/SITRANS P420 for gauge pressure (pressure series) | |
|---|---|
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +55 °C (-40 ... +131 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW<br>$U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW |
| - Effective internal inductance/capacitance | $L_i = 0.24$ µH/$C_i = 3.29$ nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n = 10.5$ ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n = 10.5$ ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW<br>$U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW |
| - Effective internal inductance/capacitance | $L_i = 0.24$ µH/$C_i = 3.29$ nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |

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## Technical specifications (continued)

| SITRANS P320/SITRANS P420 for gauge pressure (pressure series) | |
|---|---|
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

1) Han 8D is identical to Han 8U.

| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |

| Communication | |
|---|---|
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |

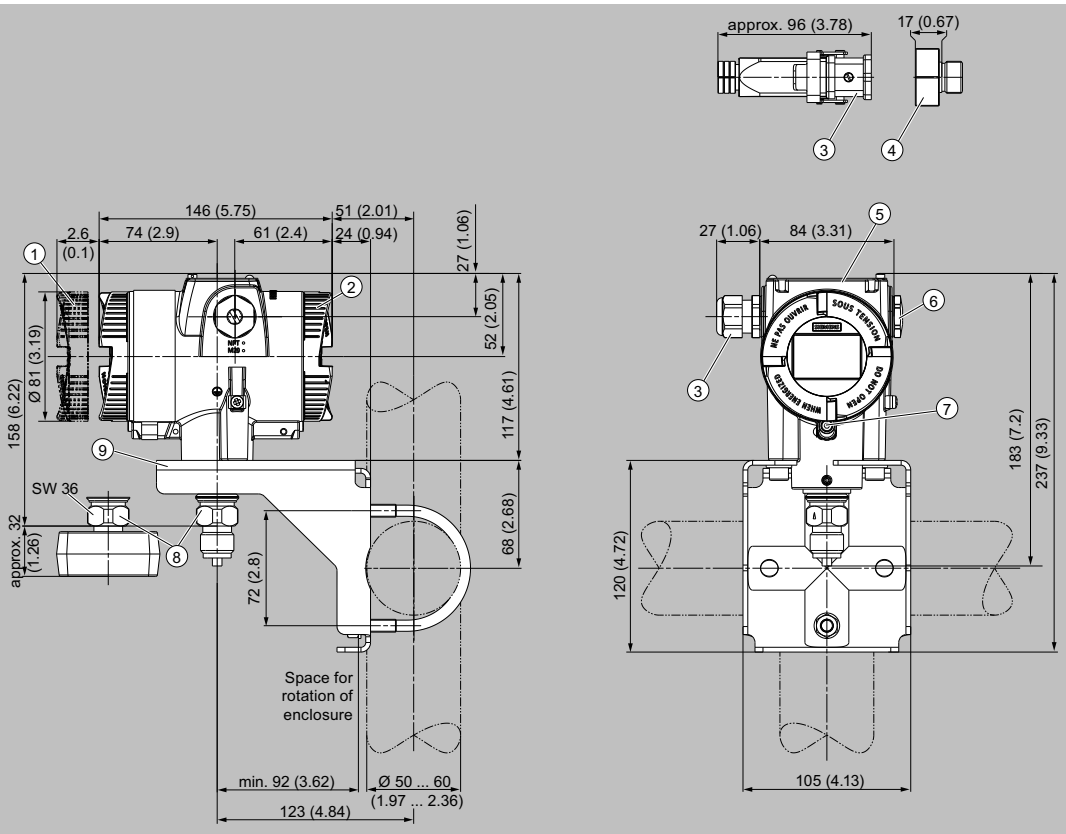
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## Technical specifications (continued)

| Communication | |
|---|---|
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1.5[3] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Process connection: G½B connection pin or oval flange
9. Mounting bracket (optional)

[1] In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
[2] Not with "flameproof enclosure" type of protection
[3] Not with type of protection "FM + CSA [is + XP]"

SITRANS P320/P420 pressure transmitter for gauge pressure (pressure series), dimensions in mm (inch)

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## Selection and ordering data

| Pressure transmitters for gauge pressure (differential pressure series) | Article No. | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 | 7MF031 | | | | | | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| SITRANS P420 | 7MF041 | | | | | | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | | | | | | | | |
| HART, 4 ... 20 mA | | | | | | | 0 | | | | | | | | | | | | | | |
| PROFIBUS PA | | | | | | | 1 | | | | | | | | | | | | | | |
| FOUNDATION Fieldbus (FF) | | | | | | | 2 | | | | | | | | | | | | | | |
| **Measuring cell filling** | | | | | | | | | | | | | | | | | | | | | |
| Silicone oil | | | | | | | | | 1 | | | | | | | | | | | | |
| Inert filling liquid | | | | | | | | | 3 | | | | | | | | | | | | |
| **Maximum measuring span** | | | | | | | | | | | | | | | | | | | | | |
| 20 mbar (8.037 in$H_2O$) | | | | | | | | | | B | | | | | | | | | | |
| 60 mbar (24.11 in$H_2O$) | | | | | | | | | | D | | | | | | | | | | |
| 250 mbar (1005 in$H_2O$) | | | | | | | | | | G | | | | | | | | | | |
| 600 mbar (241.1 in$H_2O$) | | | | | | | | | | H | | | | | | | | | | |
| 1 600 mbar (643 in$H_2O$) | | | | | | | | | | M | | | | | | | | | | |
| 5 000 mbar (2009 in$H_2O$) | | | | | | | | | | P | | | | | | | | | | |
| 30 bar (435 psi) | | | | | | | | | | R | | | | | | | | | | |
| 160 bar (2 320 psi) | | | | | | | | | | Y | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) | | | | | | | | | | | L | | | | | | | | | | |
| Oval flange, fastening thread: M10 (PN 160), (DIN 19213) | | | | | | | | | | | M | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) with lateral ventilation | | | | | | | | | | | N | | | | | | | | | | |
| Oval flange, fastening thread: M10 (PN 160) (DIN 19213) with lateral ventilation | | | | | | | | | | | P | | | | | | | | | | |
| **Material of wetted parts: Process connection, seal diaphragm** | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408 | | | | | | | | | | | | 0 | | | | | | | | | |
| Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | | | | | | 1 | | | | | | | | | |
| Alloy C22/2.4602, alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | | | | | | 2 | | | | | | | | | |
| Tantalum/tantalum, process flange stainless steel 316/1.4408<br>(not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi)) | | | | | | | | | | | | 4 | | | | | | | | | |
| Monel 400/2.4360, Monel 400/2.4360, process flange stainless steel 316/1.4408<br>(not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi)) | | | | | | | | | | | | 6 | | | | | | | | | |
| Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408<br>(not in combination with maximum measuring span 20 mbar (0.29 psi) and 60 mbar (0.87 psi)) | | | | | | | | | | | | 8 | | | | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | | | | | | | | | | | |
| Die-cast aluminum | | | | | | | | | | | | | 1 | | | | | | | | |
| Stainless steel precision casting CF3M/1.4409 similar to 316L | | | | | | | | | | | | | 2 | | | | | | | | |
| **Enclosure** | | | | | | | | | | | | | | | | | | | | | |
| Dual chamber device | | | | | | | | | | | | | | | 5 | | | | | | |
| **Type of protection** | | | | | | | | | | | | | | | | | | | | | |
| Without Ex | | | | | | | | | | | | | | | | A | | | | | |
| Intrinsic safety | | | | | | | | | | | | | | | | B | | | | | |
| Flameproof enclosure | | | | | | | | | | | | | | | | C | | | | | |
| Flameproof enclosure, intrinsic safety | | | | | | | | | | | | | | | | D | | | | | |
| Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | | | L | | | | | |
| Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | | | M | | | | | |
| Combination of options B, C and L (Zone model) | | | | | | | | | | | | | | | | S | | | | | |
| Combination of options B, C and L (Zone model, Class Division) | | | | | | | | | | | | | | | | T | | | | | |
| **Electrical connections/cable entries** | | | | | | | | | | | | | | | | | | | | | |
| Thread for cable gland: Cable gland must be ordered separately as option (Axx) | | | | | | | | | | | | | | | | | | | | | |
| • 2 × M20 × 1.5 | | | | | | | | | | | | | | | | | | F | | | |
| • 2 × ½-14 NPT | | | | | | | | | | | | | | | | | | M | | | |
| **Local operation/display** | | | | | | | | | | | | | | | | | | | | | |
| Without local display (lid closed) | | | | | | | | | | | | | | | | | | | | | 0 |
| With local display (lid closed) | | | | | | | | | | | | | | | | | | | | | 1 |
| With local display (lid with glass pane) | | | | | | | | | | | | | | | | | | | | | 2 |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate - 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Extension of the medium temperature to -40 °C for measuring cell filling with inert filling liquid<br>Please note step response time T63: 5.5 s (20 and 60 mbar); 1.4 s (250 and 600 mbar); 0.3 s (1.6 and 5 bar) | **D52** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Mounting bracket** | |
| Steel, zinc-plated | **H01** |
| Stainless steel 1.4301/304 | **H02** |
| Stainless steel 1.4404/316L | **H03** |
| **Process flanges; screw plug with vent valve** | |
| Welded in on right | **J08** |
| Welded in on left | **J09** |
| Glued in on right | **J10** |
| Glued in on left | **J11** |
| **Flange connections with flange EN 1092-1** | |
| Form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J70** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J71** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J72** |
| • DN 15 PN 40, stainless steel 1.4571/316Ti | **J78** |
| Form C | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J73** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J74** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J75** |
| **Flange connection options** | |
| Flange connection and temperature extension | **J76** |
| Flange connection with epoxy resin coating | **J77** |
| **Process flanges; special materials** | |
| Reserved for 7MF7: without process flanges, without screws, without gaskets | **K00** |
| Process flange material alloy C22/2.4602 | **K01** |
| Process flange material Monel 400/2.4360 | **K02** |
| Process connection material PVDF, on the side ½-14 NPT | **K05** |
| Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar | **K06** |
| Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar | **K07** |
| **Process flanges; process connection option** | |
| Process flange with process connection G½ welded on | **K20** |
| Process connection NAM (ASTAVA) | **K21** |
| **Process flanges chambered with gaskets** | |
| 1 × chambered, graphite | **K40** |
| 1 × chambered, PTFE (FDA-compliant), recommended for gas measurements | **K41** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| O-ring, process flanges, PTFE | **K50** |
| O-ring, process flanges, FEP (with silicone core, approved for food) | **K51** |
| O-ring, process flanges, FFKM (FFPM) | **K52** |
| O-ring, process flanges, NBR | **K53** |
| O-ring, process flanges, EPDM | **K54** |
| **Process flange options** | |
| Process flanges for vertical differential pressure lines (half process flange) | **K81** |
| Process flanges (+) - side front | **K82** |
| Process flange screws, process flange nuts, material Monel 400/2.4360 | **K83** |
| Valve ¼-18 NPT, material same as process flanges | **K84** |
| Valve mounted on the side, measured medium: Gas | **K85** |
| Oval flange attached, PTFE seal + fixing screws | **K86** |
| **Valve manifolds** | |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U01** |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U02** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U03** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U04** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

1) Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series) | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Gauge pressure | | |
| Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 1 ... 20 mbar<br>0.1 ... 2 kPa<br>0.4019 ... 8.037 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 1 ... 60 mbar<br>0.1 ... 6 kPa<br>0.4019 ... 24.11 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 2.5 ... 250 mbar<br>0.2 ... 25 kPa<br>1.005 ... 100.5 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 6 ... 600 mbar<br>0.6 ... 60 kPa<br>2.41 ... 241.1 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 16 ... 1 600 mbar<br>1.6 ... 160 kPa<br>6.43 ... 643 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 50 ... 5 000 mbar<br>5 ... 500 kPa<br>20.09 ... 2 009 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 0.3 ... 30 bar<br>0.03 ... 3 MPa<br>4.35 ... 435 psi | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 8 ... 160 bar<br>0.8 ... 16 MPa<br>116 ... 2 320 psi | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | 30 mbar a/3 kPa a/0.44 psi a | | |
| - Measuring cell with inert oil | 30 mbar a/3 kPa a/0.44 psi a | | |
| - Measuring cell with FDA-compliant oil | 100 mbar a/10 kPa a/1.45 psi a | | |
| • Upper measuring limit | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | |
| • Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp} \leq 0.5\%$ of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA | | |
| Load | Resistance R [Ω] | | |
| • Without HART communication | R = ($U_H$ - 10.5 V) /22.8 mA,<br>$U_H$: Auxiliary power in V | | |
| • With HART communication | R = 230 ... 1100 Ω | | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | | |
| Physical bus | - | | |
| Polarity-independent | - | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series) | | |
|---|---|---|
| **Measuring accuracy** | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Conformity error at limit point setting, including hysteresis and repeatability | | |
| Measuring span ratio r (spread, Turn-Down) | r = max. measuring span/set measuring span and nominal measuring range | |
| • Linear characteristic curve | | |
| - 20 mbar/2 kPa/8.031 in$H_2O$ | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 20: | ≤ (0.005 · r +0.05)% |
| - 60 mbar/6 kPa/24.09 in$H_2O$ | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 60: | ≤ (0.005 · r +0.05)% |
| - 250 mbar/25 kPa/3.6 psi<br>600 mbar/60 kPa/240.9 in$H_2O$<br>1 600 mbar/160 kPa/642.4 in$H_2O$<br>5 000 mbar/500 kPa/2008 in$H_2O$<br>30 bar/3 MPa/435 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320)<br>≤ 0.04% (SITRANS P420) |
| | 5 < r ≤ 100: | ≤ (0.004 · r +0.045)% |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320)<br>≤ 0.04% (SITRANS P420) |
| | 5 < r ≤ 20: | ≤ (0.004 · r +0.045)% |
| Influence of ambient temperature in % per 28 °C (50 °F) | | |
| • 20 mbar/2 kPa/8.031 in$H_2O$ | ≤ (0.15 · r +0.1)% | |
| • 60 mbar/6 kPa/24.09 in$H_2O$ | ≤ (0.075 · r +0.1)% | |
| • 250 mbar/25 kPa/3.6 psi<br>600 mbar/60 kPa/240.9 in$H_2O$<br>1 600 mbar/160 kPa/642.4 in$H_2O$<br>5 000 mbar/500 kPa/2008 in$H_2O$<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ (0.025 · r + 0.125)% (SITRANS P320) | |
| • 250 mbar/25 kPa/3.6 psi<br>5 000 mbar/500 kPa/2008 in$H_2O$ | ≤ (0.025 · r + 0.0625)% (SITRANS P420) | |
| • 600 mbar/60 kPa/240.9 in$H_2O$<br>1 600 mbar/160 kPa/642.4 in$H_2O$<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ (0.0125 · r + 0.0625)% (SITRANS P420) | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • 20 mbar/2 kPa/8.031 in$H_2O$ | ≤ (0.2 · r)% per year | |
| • 60 mbar/6 kPa/24.09 in$H_2O$ | In 5 years ≤ (0.25 · r)% | |
| • 250 mbar/25 kPa/3.6 psi<br>600 mbar/60 kPa/240.9 in$H_2O$<br>1 600 mbar/160 kPa/642.4 in$H_2O$<br>5 000 mbar/500 kPa/2008 in$H_2O$<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | In 5 years ≤ (0.125 · r)%<br>In 10 years ≤ (0.15 · r)% | |
| Step response time $T_{63}$ (without electrical damping) | | |
| • 20 mbar/2 kPa/8.031 in$H_2O$ | Approx. 0.160 s | |
| • 60 mbar/6 kPa/24.09 in$H_2O$ | Approx. 0.150 s | |
| • 250 mbar/25 kPa/3.6 psi<br>600 mbar/60 kPa/240.9 in$H_2O$<br>1 600 mbar/160 kPa/642.4 in$H_2O$<br>5 000 mbar/500 kPa/2008 in$H_2O$<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | Approx. 0.135 s | |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.7 mbar/0.07 kPa/0.010 psi per 10° incline<br>(zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series) | |
|---|---|
| **Operating conditions** | |
| Medium temperature | |
| • Measuring cell with silicone oil filling | -40 ... +100 °C (-40 ... +212 °F) |
| - Measuring cell 30 bar (435 psi) | -20 ... +100 °C (-4 ... +212 °F) |
| - Measuring cell 160 bar (2 320 psi) | -20 ... +100 °C (-4 ... +212 °F) |
| • Measuring cell with inert oil | -20 ... +100 °C (-4 ... +212 °F) |
| Ambient conditions | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with inert oil | -40 ... +85 °C (-40 ... +185 °F) |
| - Display | -20 ... +80 °C (-4 ... +176 °F) |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H |
| • Degree of protection | |
| - According to IEC 60529 | IP66, IP68 |
| - According to NEMA 250 | Type 4X |
| • Electromagnetic compatibility | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 |
| **Structural design** | |
| Weight | • Aluminum enclosure: Approx. 3.9 kg (8.5 lbs)<br>• Stainless steel enclosure: Approx. 5.9 kg (13 lbs) |
| Material | |
| • Material of wetted parts | |
| - Seal diaphragm | Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold |
| - Process flanges | Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360 |
| - Sealing plug | 1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360 |
| - O-ring | FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR |
| • Material of non-wetted parts | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) |
| - Process flange screws | Stainless steel ISO 3506-1 A4-70 |
| - Mounting bracket | Steel, zinc-plated steel, or stainless steel |
| Process connection | ¼-18 NPT female thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6092 psi)) |
| Electrical connection | Screw terminals<br>Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Display | • With or without integrated display (optional)<br>• Lid with inspection window (optional) |
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series) | |
|---|---|
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge pressure (differential pressure series) | |
|---|---|
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

[1] Han 8D is identical to Han 8U.

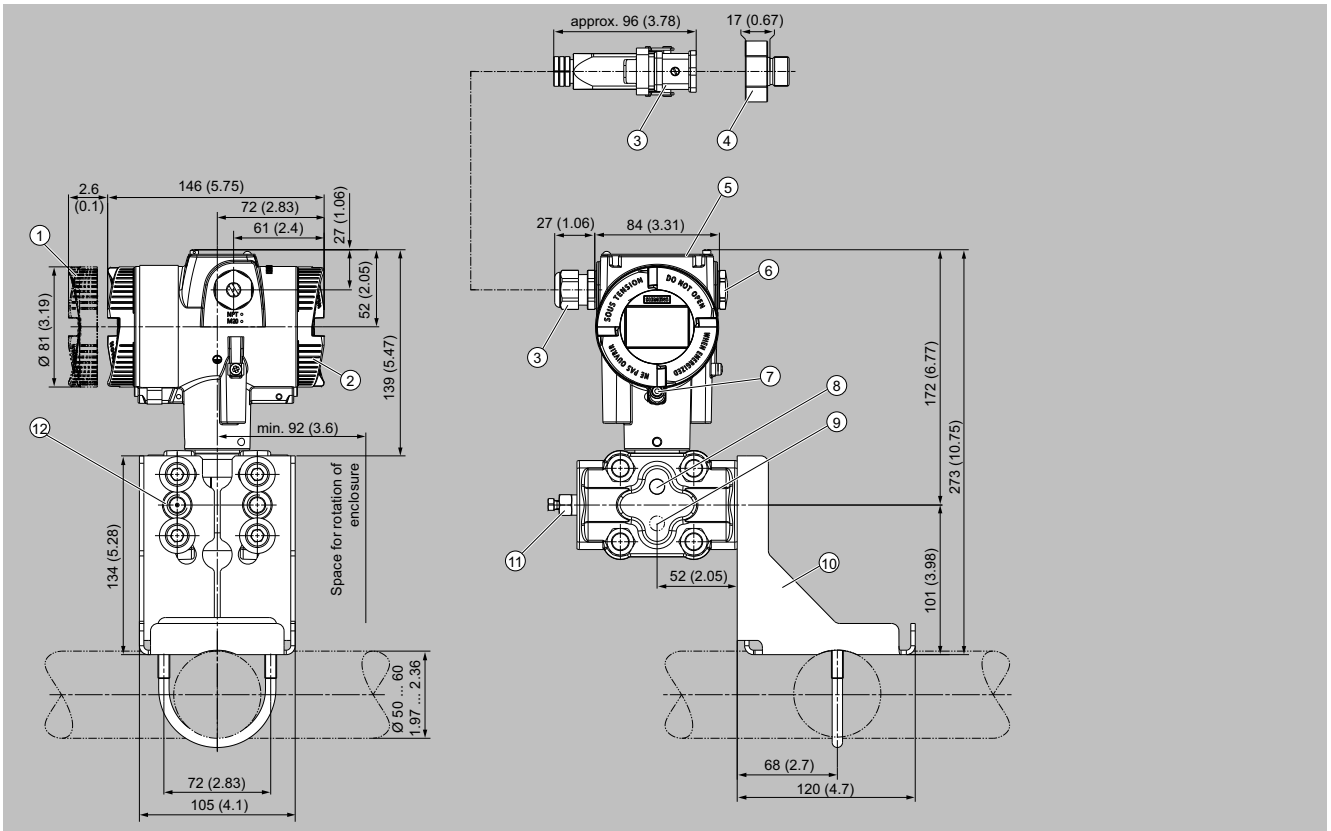
| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |

| Communication | |
|---|---|
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1,5[2] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Lateral ventilation for liquid measurement (Standard)
9. Lateral ventilation for gas measurement (order option K85)
10. Mounting bracket (optional)
11. Sealing plug with valve (optional)
12. Process connection: ¼-18 NPT (IEC 61518)

[1] In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
[2] Not with "flameproof enclosure" type of protection
[3] Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for gauge pressure (differential pressure series), dimensions in mm (inch)

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## Selection and ordering data

| Pressure transmitters for gauge and absolute pressure, with flush-mounted diaphragm | Article No. | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 for gauge pressure | 7MF030 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | |
| SITRANS P420 for gauge pressure | 7MF040 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | |
| SITRANS P320 for absolute pressure | 7MF032 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | |
| SITRANS P420 for absolute pressure | 7MF042 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | | | | | |
| HART, 4 ... 20 mA | | 0 | | | | | | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | | | | | | |
| FOUNDATION Fieldbus (FF) | | 2 | | | | | | | | | | | | | | | | |
| **Measuring cell filling** | | | | | | | | | | | | | | | | | | |
| Silicone oil | | | | 1 | | | | | | | | | | | | | | |
| Inert filling liquid | | | | 3 | | | | | | | | | | | | | | |
| Neobee oil | | | | 4 | | | | | | | | | | | | | | |
| **Maximum measuring span** | | | | | | | | | | | | | | | | | | |
| 1 000 mbar (14.5 psi) | | | | | J | | | | | | | | | | | | | |
| 4 000 mbar (58 psi) | | | | | N | | | | | | | | | | | | | |
| 16 bar (232 psi) | | | | | Q | | | | | | | | | | | | | |
| 63 bar (914 psi) | | | | | T | | | | | | | | | | | | | |
| 1 300 mbar a (18.9 psi a) | | | | | L | | | | | | | | | | | | | |
| 5 000 mbar a (72.5 psi a) | | | | | P | | | | | | | | | | | | | |
| 30 bar a (435 psi a) | | | | | R | | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | | | |
| Flush-mounted diaphragm | | | | | | K | | | | | | | | | | | | |
| **Material of wetted parts: Process connection, seal diaphragm** | | | | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, stainless steel 316L/1.4404 | | | | | | | 0 | | | | | | | | | | | |
| Stainless steel 316L/1.4404, alloy C276/2.4819 | | | | | | | 1 | | | | | | | | | | | |
| Alloy C22/2.4602, alloy C276/2.4819 | | | | | | | 2 | | | | | | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | | | | | | | | |
| Die-cast aluminum | | | | | | | | 1 | | | | | | | | | | |
| Stainless steel precision casting CF3M/1.4409 similar to 316L | | | | | | | | 2 | | | | | | | | | | |
| **Enclosure** | | | | | | | | | | | | | | | | | | |
| Dual chamber device | | | | | | | | | | | | 5 | | | | | | |
| **Type of protection** | | | | | | | | | | | | | | | | | | |
| Without Ex | | | | | | | | | | | | | A | | | | | |
| Intrinsic safety | | | | | | | | | | | | | B | | | | | |
| Flameproof enclosure | | | | | | | | | | | | | C | | | | | |
| Flameproof enclosure, intrinsic safety | | | | | | | | | | | | | D | | | | | |
| Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | L | | | | | |
| Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | M | | | | | |
| Combination of options B, C and L (Zone model) | | | | | | | | | | | | | S | | | | | |
| Combination of options B, C and L (Zone model, Class Division) | | | | | | | | | | | | | T | | | | | |
| **Electrical connections/cable entries** | | | | | | | | | | | | | | | | | | |
| Thread for cable gland: Cable gland must be ordered separately as option (Axx) | | | | | | | | | | | | | | | | | | |
| • 2 × M20 × 1.5 | | | | | | | | | | | | | | | | F | | |
| • 2 × ½-14 NPT | | | | | | | | | | | | | | | | M | | |
| **Local operation/display** | | | | | | | | | | | | | | | | | | |
| Without local display (lid closed) | | | | | | | | | | | | | | | | | 0 | |
| With local display (lid closed) | | | | | | | | | | | | | | | | | 1 | |
| With local display (lid with glass pane) | | | | | | | | | | | | | | | | | 2 | |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2× sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2× sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate, 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| 3A (hygiene) | **E86** |
| EHEDG (hygiene) | **E87** |
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| Gasket (EN 837-1) material Fe (soft iron) | **K60** |
| Gasket (EN 837-1) material 1.4571 | **K61** |
| Gasket (EN 837-1) material Cu | **K62** |
| **Process connection** | |
| Process connection external thread G½, bore hole 11 mm | **K80** |
| **Flanges according to EN 1092-1 Form B1 and ASME standard B16.5** | |
| EN 1092-1 Form B1 | |
| • DN 50 PN 16 | **M03** |
| • DN 80 PN 16 | **M05** |
| • DN 25 PN 40 | **M10** |
| • DN 40 PN 40 | **M12** |
| • DN 50 PN 40 | **M13** |
| • DN 80 PN 40 | **M15** |
| • DN 40 PN 100 | **M22** |
| ASME B16.5 | |
| • 1" Class 150 RF | **M30** |
| • 1 ½" Class 150 RF | **M31** |
| • 2" Class 150 RF | **M32** |
| • 3" Class 150 RF | **M33** |
| • 4" Class 150 RF | **M34** |
| • 1 ½" Class 300 RF | **M36** |
| • 2" Class 300 RF | **M37** |
| • 3" Class 300 RF | **M38** |
| • 4" Class 300 RF | **M39** |
| **Sanitary connections in accordance with the standard** | |
| Sanitary flange DIN 11851 | |
| • With slotted union nut DN 50 PN 25 | **N03** |
| • With slotted union nut DN 80 PN 25 | **N05** |
| Tri-Clamp | |
| • DIN 32676 DN 50 PN 16 | **N14** |
| • DIN 32676 DN 65 PN 10 | **N15** |
| • ISO 2852 2" PN 40 | **N22** |
| • ISO 2852 3" PN 40 | **N23** |
| Aseptic screwed connector | |
| • DIN 11864-1 Form A DN 50 PN 25 | **N33** |
| • DIN 11864-1 Form A DN 65 PN 25 | **N34** |
| • DIN 11864-1 Form A DN 80 PN 25 | **N35** |
| • DIN 11864-1 Form A DN100 PN 25 | **N36** |
| Aseptic flange with notch | |
| • DIN 11864-2 Form A DN 50 PN 16 | **N43** |
| • DIN 11864-2 Form A DN 65 PN 16 | **N44** |
| • DIN 11864-2 Form A DN 80 PN 16 | **N45** |
| • DIN 11864-2 Form A DN100 PN 16 | **N46** |
| Aseptic clamp with groove | |
| • DIN 11864-3 Form A DN 50 PN 25 | **N53** |
| • DIN 11864-3 Form A DN 65 PN 25 | **N54** |
| • DIN 11864-3 Form A DN 80 PN 16 | **N55** |
| • DIN 11864-3 Form A DN100 PN 16 | **N56** |
| **Sanitary connections manufacturer-specific** | |
| Varivent type N for pipes DN 40 ... DN 125 PN 40 | **P06** |
| **Sanitary connections special design** | |
| Tank connection | |
| • TG 52/50 PN 40 with gasket | **Q00** |
| • TG 52/150 PN 40 with gasket | **Q01** |
| DRD flange D = 65 mm DN 50 PN 40 | **Q15** |
| SMS socket | |
| • With thread 2" PN 25 | **Q28** |
| • With thread 2 ½" PN 25 | **Q29** |
| • With thread 3" PN 25 | **Q30** |
| **Weldable sockets for tank connection** | |
| Weldable piece for TG52/50 | **Q90** |
| Weldable piece for TG52/150 | **Q91** |
| **Connections for the paper industry** | |
| Process connection PMC Style Standard | **R00** |
| Process connection PMC Style Minibolt | **R01** |
| Weldable sockets for PMC Style Standard | **R02** |
| Weldable sockets for PMC Style Minibolt | **R03** |
| **Threaded connection** | |
| External thread G¾-A DIN 3852-2 Form A | **R11** |
| External thread G1-A DIN 3852-2 Form A | **R12** |
| External thread G2-A DIN 3852-2 Form A | **R14** |
| **Special options front-flush** | |
| Temperature decoupler (media temperature up to 200 °C) | **R85** |
| Mating connector including gasket | **R90** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm | | | |
|---|---|---|---|
| **Input of gauge pressure with front-flush diaphragm** | | | |
| Measured variable | Gauge pressure | | |
| Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure and max. permissible test pressure | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 0.01 ... 1 bar<br>1 ... 100 kPa<br>0.15 ... 14.5 psi | Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange[1)] | |
| | 0.04 ... 4 bar<br>4 ... 400 kPa<br>0.58 ... 58 psi | | |
| | 0.16 ... 16 bar<br>0.016 ... 1.6 MPa<br>2.3 ... 232 psi | | |
| | 0.6 ... 63 bar<br>0.063 ... 6.3 MPa<br>9.1 ... 914 psi | | |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | 100 mbar a/10 kPa a/1.45 psi a | | |
| - Measuring cell with inert oil | 100 mbar a/10 kPa a/1.45 psi a | | |
| - Measuring cell with FDA-compliant oil | 100 mbar a/10 kPa a/1.45 psi a | | |
| • Upper measuring limit | 100% of max. measuring span | | |
| **Input of absolute pressure, with flush-mounted diaphragm** | | | |
| Measured variable | Absolute pressure | | |
| Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure and max. permissible test pressure | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 43 ... 1300 mbar a<br>4.3 ... 130 kPa a<br>17 ... 525 in$H_2O$ a | Refer to the information on the nameplate of the pressure transmitter and the data on the mounting flange[1)] | |
| | 166 ... 5 000 mbar a<br>16.6 ... 500 kPa a<br>2.41 ... 72.5 psi a | | |
| | 1 ... 30 bar a<br>0.1 ... 3 MPa a<br>14.5 ... 435 psi a | | |
| | Depending on the process connection, the measuring span may differ from these values. | | |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | 0 bar a/0 kPa a/0 psi a | | |
| • Upper measuring limit | 100% of max. measuring span | | |
| Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp} \leq 0.5\%$ of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over local display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA | | |
| Load | Resistance R [Ω] | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm | | |
|---|---|---|
| • Without HART communication | $R = (U_H - 10.5\ V) / 22.8\ mA$, $U_H$: Auxiliary power in V | |
| • With HART communication | R = 230 ... 1100 Ω | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | |
| Physical bus | - | |
| Polarity-independent | - | |
| **Gauge pressure measuring accuracy, with front-flush diaphragm** | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Characteristic curve deviation at limit point setting, including hysteresis and repeatability | | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | |
| • Linear characteristic curve | | |
| - 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | r ≤ 5:<br>5 < r ≤ 100: | ≤ 0.075%<br>≤ (0.005 · r +0.05)% |
| Influence of ambient temperature in % per 28 °C (50 °F) | | |
| • 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | ≤ (0.08 · r +0.16)% | |
| Influence of the medium temperature (in pressure per temperature unit) | | |
| • Temperature difference between medium temperature and ambient temperature | 3 mbar/0.3 kPa/0.04 psi per 10 K | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi | In 5 years ≤ (0.25 · r)% | |
| • 16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | In 5 years ≤ (0.125 · r)% | |
| Step response time $T_{63}$ (without electrical damping) | ≤ 0.105 s | |
| Effect of mounting position (in pressure per change of angle) | 0.4 mbar/0.04 kPa/0.006 per 10° incline<br>(zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |
| **Absolute pressure measuring accuracy with flush diaphragm** | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Characteristic curve deviation at limit point setting, including hysteresis and repeatability | | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | |
| • Linear characteristic curve | | |
| | r ≤ 10: | ≤ 0.2% |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm | | |
|---|---|---|
| - All measuring cells | 10 < r ≤ 30: | ≤ 0.4% |
| Influence of ambient temperature in % per 28 °C (50 °F)) | | |
| • All measuring cells | ≤ (0.16 · r +0.24)% | |
| Influence of the medium temperature (in pressure per temperature unit) | | |
| • Temperature difference between medium temperature and ambient temperature | 3 mbar/0.3 kPa/0.04 psi per 10 K | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • All measuring cells | In 5 years ≤ (0.25 · r)% | |
| Step response time $T_{63}$ (without electrical damping) | ≤ 0.105 s | |
| Effect of mounting position (in pressure per change of angle) | 0.4 mbar/0.04 kPa/0.006 per 10° incline<br>(zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |
| **Operating conditions** | | |
| Medium temperature[2)] | | |
| • Measuring cell with silicone oil filling | -40 ... +150 °C (-40 ... +302 °F)<br>-40 ... +200 °C (-40 ... +392 °F) with temperature decoupler | |
| • Measuring cell with inert oil | -20 ... +100 °C (-4 ... +212 °F) | |
| • Measuring cell with FDA-compliant oil | -10 ... +150 °C (14 ... 302 °F) | |
| Ambient conditions | | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. | |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) | |
| - Measuring cell with inert fill oil (different pressure classes) | 1 bar/100 kPa/14.5 psi<br>4 bar/400 kPa/58 psi<br>16 bar/1.6 MPa/232 psi<br>63 bar/6.3 MPa/914 psi | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with FDA-compliant oil | -10 ... +85 °C (14 ... +185 °F) | |
| - Local display | -20 ... +80 °C (-4 ... +176 °F) | |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) | |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H | |
| • Type of protection | | |
| - According to IEC 60529 | IP66, IP68 | |
| - According to NEMA 250 | Type 4X | |
| • Electromagnetic compatibility | | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 | |
| **Structural design** | | |
| Weight | Pressure transmitter without mounting flange<br>• Aluminum enclosure: Approx. 1.8 kg (3.9 lb)<br>• Stainless steel enclosure: Approx. 3.8 kg (8.3 lb) | |
| Material | | |
| • Material of wetted parts | | |
| - Process connection | Stainless steel, mat. no. 1.4404/316L | |
| - Seal diaphragm | Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819 | |
| • Material of non-wetted parts | | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) | |
| - Mounting bracket | Steel, zinc-plated steel, or stainless steel | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm | |
|---|---|
| Process connection | • Flanges according to EN and ASME<br>• F&B and pharmaceutical flanges<br>• BioConnect/BioControl<br>• PMC style |
| Electrical connection | Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[3)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Local display | • With or without integrated local display (optional)<br>• Lid with inspection window (optional) |
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for gauge and absolute pressure, with flush-mounted diaphragm | |
|---|---|
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection (Ex) for zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters with analog output signal |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

1) The MAWP value of the pressure transmitter can be lower than the PN value of the mounting flange and vice versa.
To determine the maximum permissible operating pressure and the maximum permissible test pressure, use the lowest value as reference.
2) Observe the temperature limits in the process connection standards (e.g. DIN 32676 and DIN 11851) for the maximum medium temperature for flush-mounted process connections.
3) Han 8D is identical to Han 8U.

| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |

| Communication | |
|---|---|
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |

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## Technical specifications (continued)

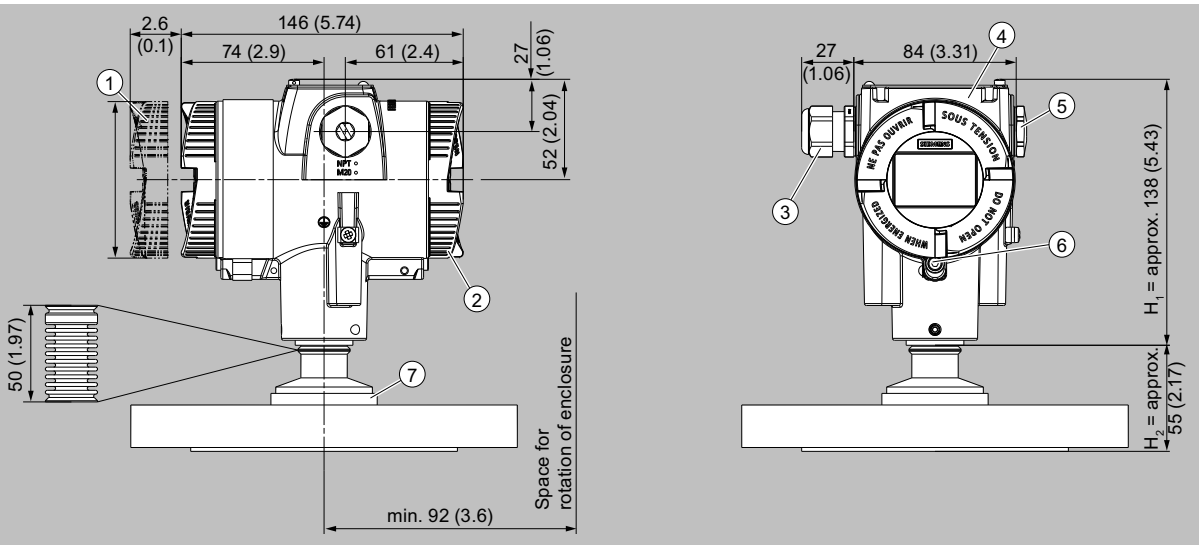
| Communication | |
|---|---|
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |

| Communication | |
|---|---|
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1,5[3] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Cover over buttons and nameplate with general information
5. Blanking plug
6. Safety catch (only for "flameproof enclosure" type of protection)
7. Process connection

1) In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
2) Not with "flameproof enclosure" type of protection
3) Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter, with flush-mounted diaphragm, dimensions in mm (inch)

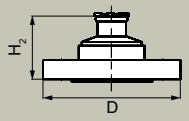
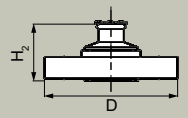
This figure consists of a SITRANS P320/P420 with an example flange. In this figure, the height is divided into $H_1$ and $H_2$.

$H_1$ = Height of the SITRANS P320/P420 up to a defined cross-section

$H_2$ = Height of the flange up to this defined cross-section

Only the height $H_2$ is indicated in the dimensions of the flanges.

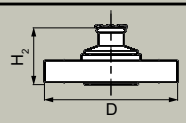
***Flanges according to EN and ASME***

| Flange | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **EN 1092-1** | | | | | |
|  | M03 | 50 | 16 | 165 mm (6.5 inches) | Approx. 52 mm (2 inches) |
| | M05 | 80 | 16 | 200 mm (7.9 inches) | |
| | M10 | 25 | 40 | 115 mm (4.5 inches) | |
| | M12 | 40 | 40 | 150 mm (5.9 inches) | |
| | M13 | 50 | 40 | 165 mm (6.5 inches) | |
| | M15 | 80 | 40 | 200 mm (7.9 inches) | |
| | M22 | 40 | 100 | 170 mm (6.7 inches) | |
| **ASME B16.5** | | | | | |
|  | M30 | 1 inch | 150 | 110 mm (4.3 inches) | Approx. 52 mm (2 inches) |
| | M31 | 1½ inches | 150 | 125 mm (4.9 inches) | |
| | M32 | 2 inches | 150 | 150 mm (5.9 inches) | |
| | M33 | 3 inches | 150 | 190 mm (7.5 inches) | |
| | M34 | 4 inches | 150 | 230 mm (9.1 inches) | |
| | M36 | 1½ inches | 300 | 155 mm (6.1 inches) | |
| | M37 | 2 inches | 300 | 165 mm (6.5 inches) | |

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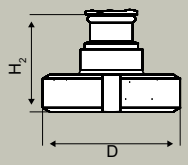
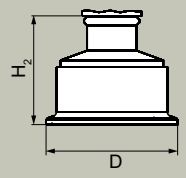


## Dimensional drawings (continued)

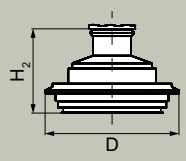
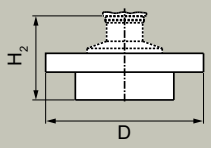
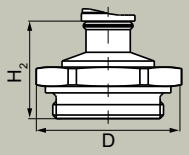
| Flange | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
|  | M38 | 3 inches | 300 | 210 mm (8.1 inches) | Approx. 52 mm (2 inches) |
| | M39 | 4 inches | 300 | 255 mm (10.0 inches) | |

***NuG and pharmaceutical connections***

Connections according to DIN

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **DIN 11851 (dairy connection with slotted union nut)** | | | | | |
|  | N03 | 50 | 25 | 92 mm (3.6 inches) | Approx. 52 mm (2 inches) |
| | N05 | 80 | 25 | 127 mm (5.0 inches) | |
| **Tri-Clamp acc. to DIN 32676** | | | | | |
|  | N14 | 50 | 16 | 64 mm (2.5 inches) | Approx. 52 mm (2 inches) |
| | N15 | 65 | 16 | 91 mm (3.6 inches) | |
| | N22 | 2 inches | 16 | 64 mm (2.5 inches) | |
| | N23 | 3 inches | 10 | 91 mm (3.6 inches) | |

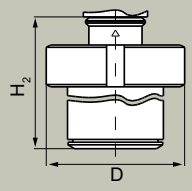
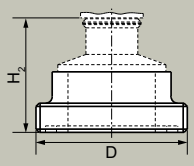
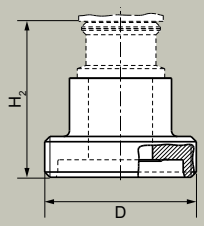
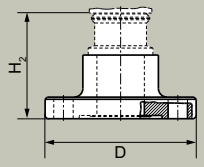
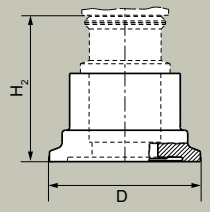
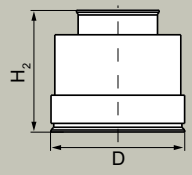
Other connections

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Varivent connection** | | | | | |
|  | P06 | 40 ... 125 | 40 | 84 mm (3.3 inches) | Approx. 52 mm (2 inches) |
| **Sanitary process connection according to DRD** | | | | | |
|  | Q15 | 65 | 40 | 105 mm (4.1 inches) | Approx. 52 mm (2 inches) |
| **Threaded connection G¾", G1" and G2" according to DIN 3852-2 form A** | | | | | |
|  | R11 | ¾ inch | 60 | 37 mm (1.5 inches) | Approx. 45 mm (1.8 inches) |
| | R12 | 1 inch | 60 | 48 mm (1.9 inches) | Approx. 47 mm (1.9 inches) |
| | R14 | 2 inches | 60 | 78 mm (3.1 inches) | Approx. 52 mm (2 inches) |

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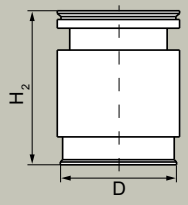
## Dimensional drawings (continued)

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Tank connection TG 52/50 and TG52/150**   | Q00 | 25 | 40 | 63 mm (2.5 inches) | Approx. 63 mm (2.5 inches) |
| | Q01 | 25 | 40 | 63 mm (2.5 inches) | Approx. 170 mm (6.7 inches) |
| **SMS screwed connector**   | Q28 | 2 inches | 25 | 70 x 1/6 mm | Approx. 52 mm (2.1 inches) |
| | Q29 | 2½ inches | 25 | 85 x 1/6 mm | |
| | Q30 | 3 inches | 25 | 98 x 1/6 mm | |
| **Aseptic screwed connector according to DIN 11864-1 Form A**   | N33 | 50 | 25 | 78 x 1/6 inch | Approx. 52 mm (2.1 inches) |
| | N34 | 65 | 25 | 95 x 1/6 inch | |
| | N35 | 80 | 25 | 110 x ¼ inch | |
| | N36 | 100 | 25 | 130 x ¼ inch | |
| **Aseptic flange with notch according to DIN 11864-2 Form A**   | N43 | 50 | 16 | 94 (3.7 inches) | Approx. 52 mm (2.1 inches) |
| | N44 | 65 | 16 | 113 (4.4 inches) | |
| | N45 | 80 | 16 | 133 (5.2 inches) | |
| | N46 | 100 | 16 | 159 (6.3 inches) | |
| **Aseptic clamp with groove according to DIN 11864-3 Form A**   | N53 | 50 | 25 | 77.5 (3.1 inch) | Approx. 52 mm (2.1 inches) |
| | N54 | 65 | 25 | 91 (3.6 inch) | |
| | N55 | 80 | 16 | 106 (4.2 inches) | |
| | N56 | 100 | 16 | 130 (5.1 inches) | |
| **Process connection PMC Style Standard**   | R00 | - | - | 40.9 mm (1.6 inches) | Approx. 36.8 mm (1.4 inches) |

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## Dimensional drawings (continued)

| Connection | Order code | DN | PN | ØD | $H_2$ |
|---|---|---|---|---|---|
| **Process connection PMC Style Minibolt**   | R01 | - | - | 26.3 mm (1.0 inch) | Approx. 33.1 mm (1.3 inches) |

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## Selection and ordering data

| Pressure transmitters for absolute pressure (pressure series) | Article No. | | |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2× sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2× sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate, 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Mounting bracket** | |
| Steel, zinc-plated | **H01** |
| Stainless steel 1.4301/304 | **H02** |
| Stainless steel 1.4404/316L | **H03** |
| **Flange connections with flange EN 1092-1** | |
| With flange adapter G½ Form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J80** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J81** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J82** |
| With water trap G½ form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J83** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J84** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J85** |
| • DN 25 PN 100, stainless steel 1.4571/316Ti | **J86** |
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| Gasket (EN 837-1) material Fe (soft iron) | **K60** |
| Gasket (EN 837-1) material 1.4571 | **K61** |
| Gasket (EN 837-1) material Cu | **K62** |
| **Process connection** | |
| Process connection external thread G½, bore hole 11 mm | **K80** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Shut-off valves, valve manifolds** | |
| With mounted valve manifold 7MF9011-4EA, process connection at transmitter G½ shank, PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2) | **T02** |
| With mounted valve manifold 7MF9011-4FA, process connection at transmitter internal thread ½-14 NPT, sealing tape. With PTFE sealing ring and pressure test certified in factory certificate (EN 10204-2.2) | **T03** |
| With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2) | **T05** |
| With mounted valve manifold 7MF9411-5AA, process connection at transmitter oval flange with PTFE sealing ring, stainless steel fixing screws, pressure test certified in factory certificate (EN 10204-2.2) | **T06** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for absolute pressure (pressure series) | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Absolute pressure | | |
| Measuring span (continuously adjustable) or measuring range, max. permissible operating pressure (in accordance with Pressure Equipment Directive 2014/68/EU) and max. test pressure (pursuant to DIN 16086) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 8.3 ... 250 mbar a<br>0.83 ... 25 kPa a<br>3.3 ... 100.5 in$H_2O$ a | 4 bar a<br>0.4 MPa a<br>58 psi a | 6 bar a<br>0.6 MPa a<br>87 psi a |
| | 43 ... 1300 mbar a<br>4.3 ... 130 kPa a<br>17.3 ... 522 in$H_2O$ a | 6.6 bar a<br>0.66 MPa a<br>95 psi a | 10 bar a<br>1 MPa a<br>145 psi a |
| | 166 ... 5 000 mbar a<br>16.6 ... 500 kPa a<br>2.41 ... 72.5 psi a | 20 bar a<br>2 MPa a<br>290 psi a | 30 bar a<br>3 MPa a<br>435 psi a |
| | 1 ... 30 bar a<br>0.1 ... 3 MPa a<br>14.5 ... 435 psi a | 65 bar a<br>6.5 MPa a<br>942 psi a | 100 bar a<br>10 MPa a<br>1450 psi a |
| | 5.3 ... 160 bar a<br>0.53 ... 16 MPa a<br>77 ... 2321 psi a | 240 bar<br>24 MPa<br>3481 psi | 380 bar a<br>38 MPa a<br>5511 psi a |
| | 13.3 ... 400 bar a<br>1.3 ... 40 MPa a<br>192 ... 5802 psi a | 400 bar a<br>40 MPa a<br>5802 psi a | 600 bar a<br>60 MPa a<br>8702 psi a |
| | 23.3 ... 700 bar a<br>2.3 ... 70 MPa a<br>337 ... 10153 psi a | 800 bar a<br>80 MPa a<br>11603 psi a | 800 bar a<br>80 MPa a<br>11603 psi a |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | 0 mbar a/kPa a/psi a | | |
| - Measuring cell with inert oil | For medium temperature -20-°C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F) | | 30 mbar a/3 kPa a/0.44 psi a |
| | For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi)) | | 30 mbar a +<br>20 mbar a · (ϑ -60 °C)/°C<br>3 kPa a +<br>2 kPa a · (ϑ -60 °C)/°C<br>0.44 psi a +<br>0.29 psi a · (ϑ - 140 °F)/°F |
| • Upper measuring limit | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | |
| • Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp}$ ≤ 0.5% of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA (factory set to 3.55 mA) | | |
| Load | Resistance R [Ω] | | |
| • Without HART communication | R = ($U_H$ - 10.5 V) /22.8 mA,<br>$U_H$: Auxiliary power in V | | |
| • With HART communication | R = 230 ... 1100 Ω | | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | | |
| Physical bus | - | | |
| Polarity-independent | - | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (pressure series) | |
|---|---|
| **Measuring accuracy** | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) |
| Conformity error at limit point setting, including hysteresis and repeatability | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range |
| • Linear characteristic curve (all measuring cells) | |
| - $r \leq 10$ | ≤ 0.1% |
| - $10 < r \leq 30$ | ≤ 0.2% |
| Influence of ambient temperature (in % per 28 °C (50 °F)) | |
| • 250 mbar a/25 kPa a/3.6 psi a | ≤ (0.15 · r +0.1)% |
| • 1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a<br>160 bar a/16 MPa a/2321 psi a<br>400 bar a/40 MPa a/5802 psi a<br>700 bar a/70 MPa a/10153 psi a | ≤ (0.08 · r +0.16)% |
| Long-term stability at ±30 °C (± 54 °F) | In 5 years ≤ (0.25 · r)% |
| Step response time $T_{63}$ (without electrical damping) | Approx. 0.105 s |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.05 mbar/0.005 kPa/0.000725 psi per 10° incline<br>(zero offset is possible with position error compensation) |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V |
| **Operating conditions** | |
| Medium temperature | |
| • Measuring cell with silicone oil filling | -40 ... +100 °C (-40 ... +212 °F) |
| • Measuring cell with inert filling liquid | -20 ... +100 °C (-4 ... +212 °F) |
| Ambient conditions | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with inert filling liquid | -40 ... +85 °C (-40 ... +185 °F) |
| - Display | -20 ... +80 °C (-4 ... +176 °F) |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H |
| • Degree of protection | |
| - According to IEC 60529 | IP66, IP68 |
| - According to NEMA 250 | Type 4X |
| • Electromagnetic compatibility | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 |
| **Structural design** | |
| Weight | • Aluminum enclosure: Approx. 1.8 kg (3.9 lbs)<br>• Stainless steel enclosure: Approx. 3.8 kg (8.3 lbs) |
| Material | |
| • Material of wetted parts | |
| - Process connection | Stainless steel, material no. 1.4404/316L or Alloy C22, material no. 2.4602 |
| - Oval flange | Stainless steel, mat. no. 1.4404/316L |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (pressure series) | |
|---|---|
| - Seal diaphragm | Stainless steel, material no. 1.4404/316L or Alloy C276, material no. 2.4819 |
| • Material of non-wetted parts | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) |
| - Mounting bracket | Zinc-plated steel or stainless steel |
| Process connection | • Connection shank G1/2A according to EN 837-1<br>• Female thread ½-14 NPT<br>• Oval flange (PN 160 (MWP 2320 psi g)) with fastening thread:<br>- 7/16-20 UNF according to EN 61518<br>- M10 according to DIN 19213<br>• Oval flange (PN 420 (MWP 2320 psi g)) with fastening thread:<br>- 7/16-20 UNF according to EN 61518<br>- M12 according to DIN 19213<br>• Male thread M20 × 1.5 and ½-14 NPT |
| Electrical connection | Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Display | • With or without integrated display (optional)<br>• Lid with inspection window (optional) |
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW<br>$U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW |
| - Effective internal inductance/capacitance | $L_i = 0.24$ µH/$C_i = 3.29$ nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (pressure series) | |
|---|---|
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To circuit with the operating values<br>$U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To circuit with the operating values<br>$U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To circuit with the operating values<br>$U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

1) Han 8D is identical to Han 8U.

| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |

| Communication | |
|---|---|
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |

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## Technical specifications (continued)

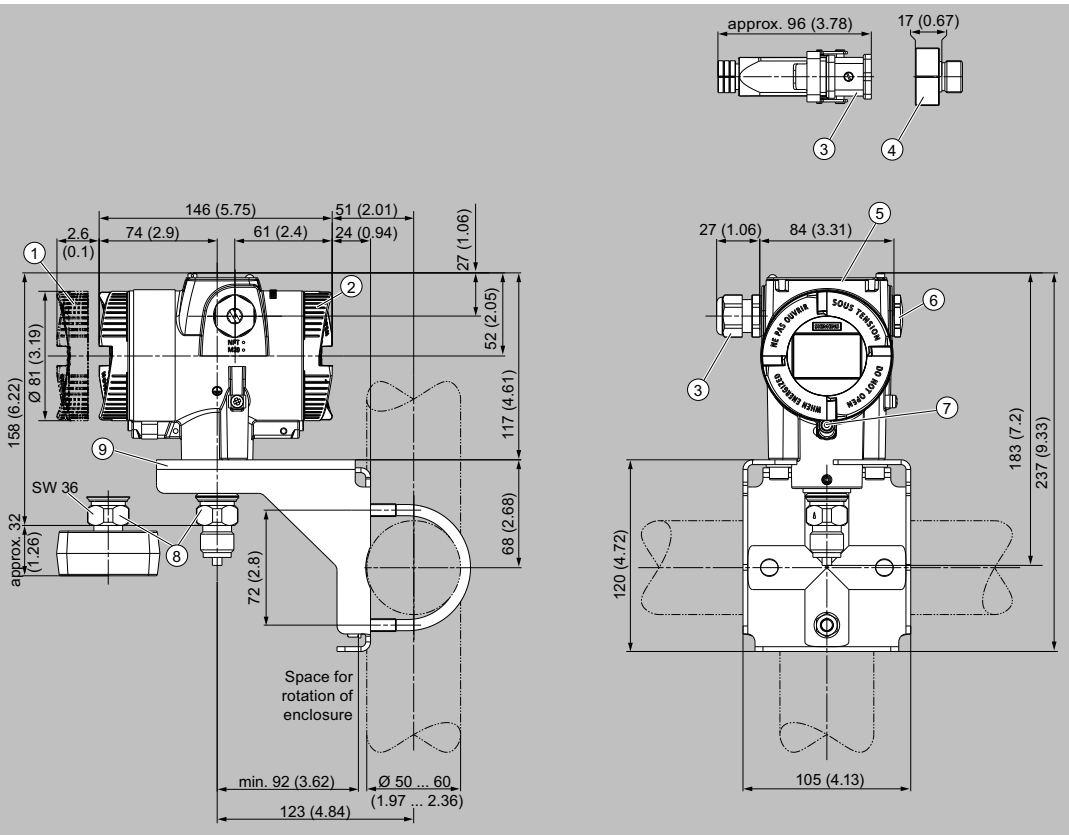
| Communication | |
|---|---|
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |

| Communication | |
|---|---|
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1.5[3] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Process connection: G½B connection pin or oval flange
9. Mounting bracket (optional)

[1] In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
[2] Not with "flameproof enclosure" type of protection
[3] Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for absolute pressure (pressure series), dimensions in mm (inch)

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## Selection and ordering data

| Pressure transmitters for absolute pressure (differential pressure series) | Article No. | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 | 7MF033 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | | | | | |
| SITRANS P420 | 7MF043 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | | | | | | | | | |
| HART, 4 ... 20 mA | | 0 | | | | | | | | | | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | | | | | | | | | | |
| FOUNDATION Fieldbus (FF) | | 2 | | | | | | | | | | | | | | | | | | | | |
| **Measuring cell filling** | | | | | | | | | | | | | | | | | | | | | | |
| Silicone oil | | | | 1 | | | | | | | | | | | | | | | | | | |
| Inert filling liquid | | | | 3 | | | | | | | | | | | | | | | | | | |
| **Maximum measuring span** | | | | | | | | | | | | | | | | | | | | | | |
| 250 mbar a (100.5 in$H_2O$ a) | | | | | G | | | | | | | | | | | | | | | | | |
| 1300 mbar a (522 in$H_2O$ a) | | | | | L | | | | | | | | | | | | | | | | | |
| 5000 mbar a (72.5 psi a) | | | | | P | | | | | | | | | | | | | | | | | |
| 30 bar a (435 psi a) | | | | | R | | | | | | | | | | | | | | | | | |
| 160 bar (2 320 psi) | | | | | Y | | | | | | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) | | | | | | Q | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: M10 (DIN 19213) | | | | | | R | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) with lateral ventilation | | | | | | S | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: M10 (DIN 19213) with lateral ventilation | | | | | | T | | | | | | | | | | | | | | | | |
| Version for diaphragm seal with fastening thread $^7/_{16}$-20 UNF (IEC 61518) | | | | | | V | | | | | | | | | | | | | | | | |
| Version for diaphragm seal with fastening thread M10 (DIN 19213) | | | | | | W | | | | | | | | | | | | | | | | |
| **Material of wetted parts: Process connection, seal diaphragm** | | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408 | | | | | | | 0 | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | 1 | | | | | | | | | | | | | | | |
| Alloy C22/2.4602, alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | 2 | | | | | | | | | | | | | | | |
| Tantalum/tantalum, process flange stainless steel 316/1.4408 | | | | | | | 4 | | | | | | | | | | | | | | | |
| Monel 400/2.4360, Monel 400/2.4360, process flange stainless steel 316/1.4408 | | | | | | | 6 | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408 | | | | | | | 8 | | | | | | | | | | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | | | | | | | | | | | | |
| Die-cast aluminum | | | | | | | | 1 | | | | | | | | | | | | | | |
| Stainless steel precision casting CF3M/1.4409 similar to 316L | | | | | | | | 2 | | | | | | | | | | | | | | |
| **Enclosure** | | | | | | | | | | | | | | | | | | | | | | |
| Dual chamber device | | | | | | | | | | | | | | 5 | | | | | | | | |
| **Type of protection** | | | | | | | | | | | | | | | | | | | | | | |
| Without Ex | | | | | | | | | | | | | | | A | | | | | | | |
| Intrinsic safety | | | | | | | | | | | | | | | B | | | | | | | |
| Flameproof enclosure | | | | | | | | | | | | | | | C | | | | | | | |
| Flameproof enclosure, intrinsic safety | | | | | | | | | | | | | | | D | | | | | | | |
| Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | | L | | | | | | | |
| Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | | M | | | | | | | |
| Combination of options B, C and L (Zone model) | | | | | | | | | | | | | | | S | | | | | | | |
| Combination of options B, C and L (Zone model, Class Division) | | | | | | | | | | | | | | | T | | | | | | | |
| **Electrical connections/cable entries** | | | | | | | | | | | | | | | | | | | | | | |
| Thread for cable gland: Cable gland must be ordered separately as option (Axx) | | | | | | | | | | | | | | | | | | | | | | |
| • 2 × M20 × 1.5 | | | | | | | | | | | | | | | | F | | | | | | |
| • 2 × ½-14 NPT | | | | | | | | | | | | | | | | M | | | | | | |
| **Local operation/display** | | | | | | | | | | | | | | | | | | | | | | |
| Without local display (lid closed) | | | | | | | | | | | | | | | | | 0 | | | | | |
| With local display (lid closed) | | | | | | | | | | | | | | | | | 1 | | | | | |
| With local display (lid with glass pane) | | | | | | | | | | | | | | | | | 2 | | | | | |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2× sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2× sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate - 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Mounting bracket** | |
| Steel, zinc-plated | **H01** |
| Stainless steel 1.4301/304 | **H02** |
| Stainless steel 1.4404/316L | **H03** |
| **Process flanges; screw plug with vent valve** | |
| Welded in on right | **J08** |
| Welded in on left | **J09** |
| Glued in on right | **J10** |
| Glued in on left | **J11** |
| **Flange connections with flange EN 1092-1** | |
| Form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J70** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J71** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J72** |
| • DN 15 PN 40, stainless steel 1.4571/316Ti | **J78** |
| Form C | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J73** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J74** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J75** |
| **Flange connection options** | |
| Flange connection and temperature extension | **J76** |
| Flange connection with epoxy resin coating | **J77** |
| **Process flanges; special materials** | |
| Reserved for 7MF7: without process flanges, without screws, without gaskets | **K00** |
| Process flange material alloy C22/2.4602 | **K01** |
| Process flange material Monel 400/2.4360 | **K02** |
| Process connection material PVDF, on the side ½-14 NPT | **K05** |
| Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 25 PN 40, MAWP 4 bar | **K06** |
| Process flanges/process connection material PVDF, flange on the side EN 1092-1 Form B1 DN 40 PN 40, MAWP 4 bar | **K07** |
| **Process flanges; process connection option** | |
| Process flange with process connection G½ welded on | **K20** |
| Process connection NAM (ASTAVA) | **K21** |
| **Process flanges chambered with gaskets** | |
| 1 × chambered, graphite | **K40** |
| 1 × chambered, PTFE (FDA-compliant), recommended for gas measurements | **K41** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| O-ring, process flanges, PTFE | **K50** |
| O-ring, process flanges, FEP (with silicone core, approved for food) | **K51** |
| O-ring, process flanges, FFKM (FFPM) | **K52** |
| O-ring, process flanges, NBR | **K53** |
| O-ring, process flanges, EPDM | **K54** |
| **Process flange options** | |
| Process flanges for vertical differential pressure lines (half process flange) | **K81** |
| Process flanges (+) - side front | **K82** |
| Process flange screws, process flange nuts, material Monel 400/2.4360 | **K83** |
| Valve ¼-18 NPT, material same as process flanges | **K84** |
| Valve mounted on the side, measured medium: Gas | **K85** |
| Oval flange attached, PTFE seal + fixing screws | **K86** |
| **Valve manifolds** | |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U01** |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U02** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U03** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U04** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series) | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Absolute pressure | | |
| Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 8.3 ... 250 mbar a<br>0.83 ... 25 kPa a<br>3.3 ... 100.5 in$H_2O$ a | 160 bar a<br>16 MPa a<br>2 320 psi a | 240 bar a<br>24 MPa a<br>3 481 psi a |
| | 43 ... 1300 mbar a<br>4.3 ... 130 kPa a<br>17.3 ... 522 in$H_2O$ a | 160 bar a<br>16 MPa a<br>2 320 psi a | 240 bar a<br>24 MPa a<br>3 481 psi a |
| | 166 ... 5 000 mbar a<br>16.6 ... 500 kPa a<br>2.41 ... 72.5 psi a | 160 bar a<br>16 MPa a<br>2 320 psi a | 240 bar a<br>24 MPa a<br>3 481 psi a |
| | 1 ... 30 bar a<br>0.1 ... 3 MPa a<br>14.5 ... 435 psi a | 160 bar a<br>16 MPa a<br>2 320 psi a | 240 bar a<br>24 MPa a<br>3 481 psi a |
| | 8 ... 160 bar<br>0.8 ... 16 MPa<br>116 ... 2 320 psi | 160 bar a<br>16 MPa a<br>2 320 psi a | 240 bar a<br>24 MPa a<br>3 481 psi a |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | 0 mbar a/kPa a/psi a | | |
| - Measuring cell with inert liquid | For medium temperature -20-°C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F) | | 30 mbar a/3 kPa a/0.44 psi a |
| | For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi)) | | 30 mbar a +<br>20 mbar a · (ϑ -60 °C)/°C<br>3 kPa a +<br>2 kPa a · (ϑ -60 °C)/°C<br>0.44 psi a +<br>0.29 psi a · (ϑ - 140 °F)/°F |
| • Upper measuring limit | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | |
| • Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp}$ ≤ 0.5% of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA | | |
| Load | Resistance R [Ω] | | |
| • Without HART communication | R = ($U_H$ - 10.5 V) /22.8 mA,<br>$U_H$: Auxiliary power in V | | |
| • With HART communication | R = 230 ... 1100 Ω | | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | | |
| Physical bus | - | | |
| Polarity-independent | - | | |
| **Measuring accuracy** | | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | | |
| Conformity error at limit point setting, including hysteresis and repeatability | | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series) | | |
|---|---|---|
| Measuring span ratio r (spread, Turn-Down) | r = max. measuring span/set measuring span and nominal measuring range | |
| • Linear characteristic curve | | |
| - 250 mbar/25 kPa/3.63 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 30: | ≤ (0.02 · r +0.05)% |
| - 1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 30: | ≤ (0.005 · r +0.05)% |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 20: | ≤ (0.005 · r +0.05)% |
| Influence of ambient temperature (in % per 28 °C (50 °F)) | | |
| • 250 mbar a/25 kPa a/3.6 psi a | ≤ (0.1 · r +0.1)% | |
| • 1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a<br>160 bar a/16 MPa a/2 320 psi a | ≤ (0.0025 · r +0.125)% | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • 250 mbar a/25 kPa a/3.6 psi a | In 5 years ≤ (0.2 · r)% | |
| • 1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a<br>160 bar a/16 MPa a/2 320 psi a | In 5 years ≤ (0.1 · r)%<br>In 10 years ≤ (0.15 · r)% | |
| Step response time $T_{63}$ (without electrical damping) | | |
| • 250 mbar a/25 kPa a/3.6 psi a<br>1300 mbar a/130 kPa a/18.8 psi a<br>5 bar a/500 kPa a/72.5 psi a<br>30 bar a/3000 kPa a/435 psi a<br>160 bar a/16 MPa a/2 320 psi a | Every 0.135 s | |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.7 mbar/0.07 kPa/0.010 psi per 10° incline<br>(zero offset is possible with position error compensation) | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |
| **Operating conditions** | | |
| Medium temperature | | |
| • Measuring cell with silicone oil filling | -40 ... +100 °C (-40 ... +212 °F) | |
| - Measuring cell 30 bar (435 psi) | -20 ... +100 °C (-4 ... +212 °F) | |
| - Measuring cell 160 bar (2 320 psi) | -20 ... +100 °C (-4 ... +212 °F) | |
| • Measuring cell with inert oil | -20 ... +100 °C (-4 ... +212 °F) | |
| Ambient conditions | | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. | |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) | |
| - Measuring cell with inert oil | -40 ... +85 °C (-40 ... +185 °F) | |
| - Display | -20 ... +80 °C (-4 ... +176 °F) | |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) | |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H | |
| • Degree of protection | | |
| - According to IEC 60529 | IP66, IP68 | |
| - According to NEMA 250 | Type 4X | |
| • Electromagnetic compatibility | | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 | |
| **Structural design** | | |
| Weight | • Aluminum enclosure: Approx. 3.9 kg (8.5 lbs)<br>• Stainless steel enclosure: Approx. 5.9 kg (13 lbs) | |
| Material | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series) | |
|---|---|
| • Material of wetted parts | |
| - Seal diaphragm | Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold |
| - Process flanges | Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360 |
| - Sealing plug | 1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360 |
| - O-ring | FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR |
| • Material of non-wetted parts | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) |
| - Process flange screws | Stainless steel ISO 3506-1 A4-70 |
| - Mounting bracket | Steel, zinc-plated steel, or stainless steel |
| Process connection | ¼-18 NPT female thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6092 psi)) |
| Electrical connection | Screw terminals<br>Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Display | • With or without integrated display (optional)<br>• Lid with inspection window (optional) |
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i = 30$ V, $I_i = 101$ mA, $P_i = 760$ mW<br>$U_i = 29$ V, $I_i = 110$ mA, $P_i = 800$ mW |
| - Effective internal inductance/capacitance | $L_i = 0.24$ µH/$C_i = 3.29$ nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for absolute pressure (differential pressure series) | |
|---|---|
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

1) Han 8D is identical to Han 8U.

| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |

| Communication | |
|---|---|
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |

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## Technical specifications (continued)

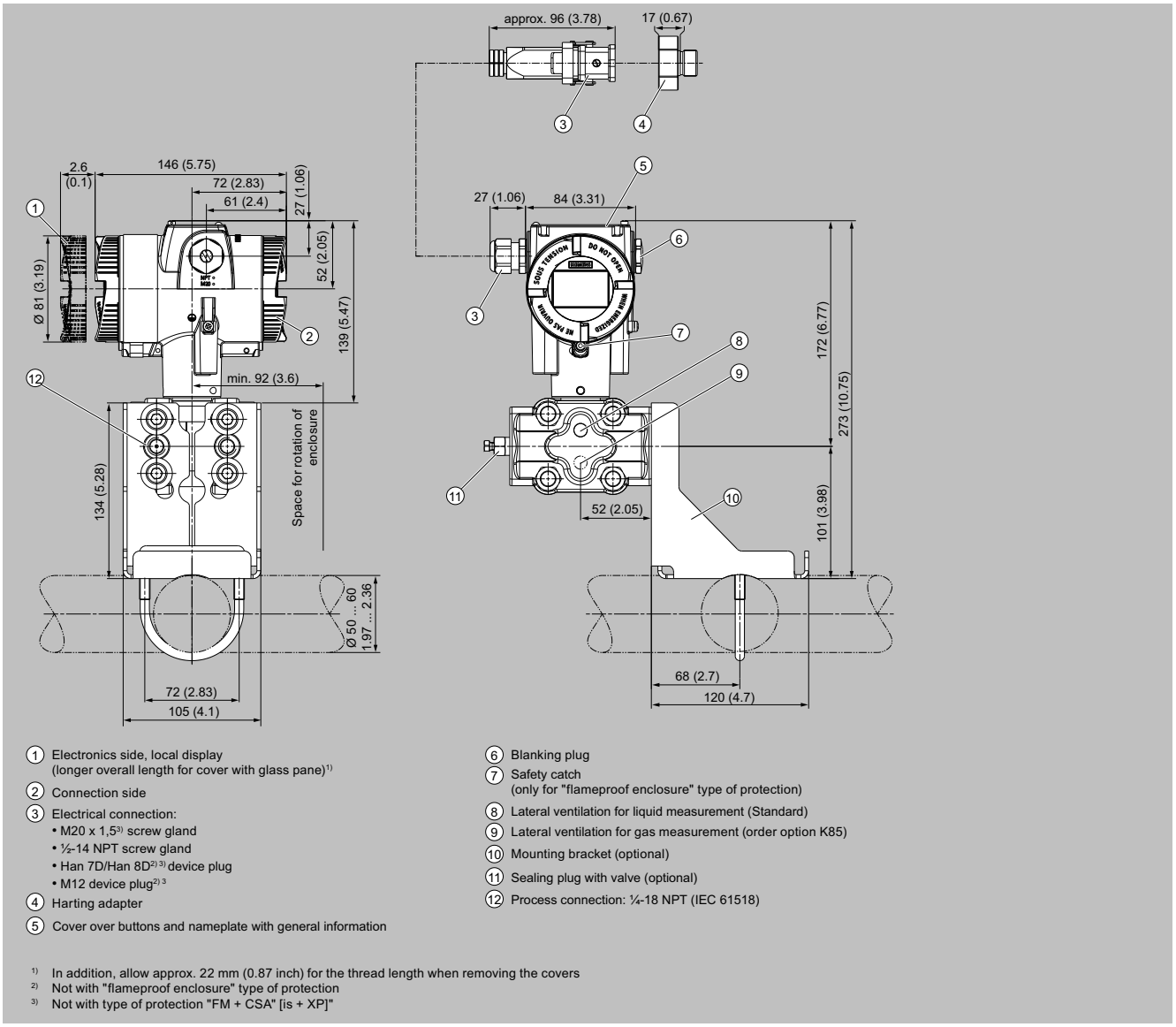
| Communication | |
|---|---|
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |

| Communication | |
|---|---|
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1,5[2] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Lateral ventilation for liquid measurement (Standard)
9. Lateral ventilation for gas measurement (order option K85)
10. Mounting bracket (optional)
11. Sealing plug with valve (optional)
12. Process connection: ¼-18 NPT (IEC 61518)

[1] In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
[2] Not with "flameproof enclosure" type of protection
[3] Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for absolute pressure (differential pressure series), dimensions in mm (inch)

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## Selection and ordering data

| Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi) | Article No. | | |

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## Selection and ordering data (continued)

| Pressure transmitters for differential pressure and flow, PN 160 (MAWP 2320 psi) | Article No. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 | 7MF034 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| SITRANS P420 | 7MF044 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| With local display (lid with glass pane) | | | | | | | | | | | | | | | | 2 |

| Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi) | Article No. | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 | 7MF035 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| SITRANS P420 | 7MF045 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | |
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | | | |
| HART, 4 ... 20 mA | | 0 | | | | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | | | | |
| FOUNDATION Fieldbus (FF) | | 2 | | | | | | | | | | | | | | |
| **Measuring cell filling** | | | | | | | | | | | | | | | | |
| Silicone oil | | | | 1 | | | | | | | | | | | | |
| Inert liquid | | | | 3 | | | | | | | | | | | | |
| Neobee oil | | | | 4 | | | | | | | | | | | | |
| **Maximum measuring span** | | | | | | | | | | | | | | | | |
| 250 mbar (100.5 in$H_2O$) | | | | | G | | | | | | | | | | | |
| 600 mbar (241.1 in$H_2O$) | | | | | H | | | | | | | | | | | |
| 1600 mbar (643 in$H_2O$) | | | | | M | | | | | | | | | | | |
| 5000 mbar (2009 in$H_2O$) | | | | | P | | | | | | | | | | | |
| 30 bar (435 psi) | | | | | R | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) | | | | | | L | | | | | | | | | | |
| Oval flange, fastening thread: M12 (PN 420) (DIN 19213) | | | | | | M | | | | | | | | | | |
| Oval flange, fastening thread: $^7/_{16}$-20 UNF (IEC 61518) with lateral ventilation | | | | | | N | | | | | | | | | | |
| Oval flange, fastening thread: M12 (PN 420) (DIN 19213) with lateral ventilation | | | | | | P | | | | | | | | | | |
| Version for diaphragm seal with fastening thread $^7/_{16}$-20 UNF (IEC 61518) | | | | | | V | | | | | | | | | | |
| Version for diaphragm seal with fastening thread M10 (DIN 19213) | | | | | | W | | | | | | | | | | |
| Version for diaphragm seal (one side mounted directly; other side with capillary line) with fastening thread $^7/_{16}$-20 UNF (IEC 61518) | | | | | | X | | | | | | | | | | |
| **Material of wetted parts: Process connection, seal diaphragm** | | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408 | | | | | | | 0 | | | | | | | | | |
| Stainless steel 316L/1.4404, alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | 1 | | | | | | | | | |
| Stainless steel 316L/1.4404 gold-plated, process flange stainless steel 316/1.4408 | | | | | | | 8 | | | | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | | | | | | |
| Die-cast aluminum | | | | | | | | 1 | | | | | | | | |
| Stainless steel precision casting CF3M/1.4409 similar to 316L | | | | | | | | 2 | | | | | | | | |
| **Enclosure** | | | | | | | | | | | | | | | | |
| Dual chamber device | | | | | | | | | | | 5 | | | | | |
| **Type of protection** | | | | | | | | | | | | | | | | |
| Without Ex | | | | | | | | | | | | A | | | | |
| Intrinsic safety | | | | | | | | | | | | B | | | | |
| Flameproof enclosure | | | | | | | | | | | | C | | | | |
| Flameproof enclosure, intrinsic safety | | | | | | | | | | | | D | | | | |
| Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | L | | | | |
| Dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | M | | | | |
| Combination of options B, C and L (Zone model) | | | | | | | | | | | | S | | | | |
| Combination of options B, C and L (Zone model, Class Division) | | | | | | | | | | | | T | | | | |
| **Electrical connections/cable entries** | | | | | | | | | | | | | | | | |
| Thread for cable gland: Cable gland must be ordered separately as option (Axx) | | | | | | | | | | | | | | | | |
| • 2 × M20 × 1.5 | | | | | | | | | | | | | | F | | |
| • 2 × ½-14 NPT | | | | | | | | | | | | | | M | | |
| **Local operation/display** | | | | | | | | | | | | | | | | |
| Without local display (lid closed) | | | | | | | | | | | | | | | | 0 |
| With local display (lid closed) | | | | | | | | | | | | | | | | 1 |

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## Selection and ordering data (continued)

| | Article No. | |
|---|---|---|
| **Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)** | | |
| **SITRANS P320** | **7MF035** | ● - ● ● ● ● ● - ● ● ● ● |
| **SITRANS P420** | **7MF045** | ● - ● ● ● ● ● - ● ● ● ● |
| With local display (lid with glass pane) | | 2 |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2 × sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2 × sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Certificates** | |
| Quality inspection certificate, 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Increase of pressure rating from PN 420 to PN 500 (Tested according to IEC 61010. Only permissible for process media of fluid group 2 acc. to DGRL. Not suitable for use with hazardous process media.) | **D50** |
| Extension of the medium temperature to -40 °C for measuring cell filling with inert filling liquid<br>Please note step response time T63: 5.5 s (20 and 60 mbar); 1.4 s (250 and 600 mbar); 0.3 s (1.6 and 5 bar) | **D52** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Mounting bracket** | |
| Steel, zinc-plated | **H01** |
| Stainless steel 1.4301/304 | **H02** |
| Stainless steel 1.4404/316L | **H03** |
| **Process flanges; screw plug with vent valve** | |
| Welded in on right | **J08** |
| Welded in on left | **J09** |
| Glued in on right | **J10** |
| Glued in on left | **J11** |
| **Flange connections with flange EN 1092-1** | |
| Form B1 | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J70** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J71** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J72** |
| • DN 15 PN 40, stainless steel 1.4571/316Ti | **J78** |
| Form C | |
| • DN 25 PN 40, stainless steel 1.4571/316Ti | **J73** |
| • DN 50 PN 40, stainless steel 1.4571/316Ti | **J74** |
| • DN 80 PN 40, stainless steel 1.4571/316Ti | **J75** |
| **Flange connection options** | |
| Flange connection and temperature extension | **J76** |
| Flange connection with epoxy resin coating | **J77** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Process flanges; special materials** | |
| Reserved for 7MF7: without process flanges, without screws, without gaskets | **K00** |
| Process flange material alloy C22/2.4602 | **K01** |
| Process flange material Monel 400/2.4360 | **K02** |
| Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. medium temperature 90 °C (194 °F) Process connection ½-14 NPT, on the side in the middle of the process flanges, no vent valves possible | **K05** |
| **Process flanges; process connection option** | |
| Process connection NAM (ASTAVA) | **K21** |
| **Process flanges chambered with gaskets** | |
| 1 × chambered, graphite | **K40** |
| 1 × chambered, PTFE (FDA-compliant), recommended for gas measurements | **K41** |
| **Process flanges, gaskets (instead of standard gaskets FKM (FPM))** | |
| O-ring, process flanges, PTFE | **K50** |
| O-ring, process flanges, FEP (with silicone core, approved for food) | **K51** |
| O-ring, process flanges, FFKM (FFPM) | **K52** |
| O-ring, process flanges, NBR | **K53** |
| O-ring, process flanges, EPDM | **K54** |
| **Process flange options** | |
| Process flanges for vertical differential pressure lines (half process flange) | **K81** |
| Process flanges (+) - side front | **K82** |
| Process flange screws, process flange nuts, material Monel 400/2.4360 | **K83** |
| Valve ¼-18 NPT, material same as process flanges | **K84** |
| Valve mounted on the side, measured medium: Gas | **K85** |
| Oval flange attached, PTFE seal + fixing screws | **K86** |
| **Valve manifolds** | |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U01** |
| With mounted valve manifold (3-way) 7MF9411-5BA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U02** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, chrome-plated steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U03** |
| With mounted valve manifold (5-way) 7MF9411-5CA, PTFE sealing rings, stainless steel screws and pressure test certified in factory certificate (EN 10204-2.2) | **U04** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| Square-rooted characteristic curve [VSLN2, MSLN2]; example: VSLN2 | **Y02** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3/s$, l/s, m, inch, ...], example 1 ... . 5 $m^3/s$ | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |

| Options<br>Add "-Z" to article no., add order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for differential pressure and flow | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Differential pressure and flow | | |
| Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 1 ... 20 mbar<br>0.1 ... 2 kPa<br>0.4019 ... 8.037 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 1 ... 60 mbar<br>0.1 ... 6 kPa<br>0.4019 ... 24.11 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 2.5 ... 250 mbar<br>0.2 ... 25 kPa<br>1.005 ... 100.5 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 6 ... 600 mbar<br>0.6 ... 60 kPa<br>2.41 ... 241.1 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 16 ... 1600 mbar<br>1.6 ... 160 kPa<br>6.43 ... 643 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 50 ... 5 000 mbar<br>5 ... 500 kPa<br>20.09 ... 2009 in$H_2O$ | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 8 ... 160 bar<br>0.8 ... 16 MPa<br>116 ... 2 320 psi | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 0.3 ... 30 bar<br>0.03 ... 3 MPa<br>4.35 ... 435 psi | 160 bar<br>16 MPa<br>2 320 psi | 240 bar<br>24 MPa<br>3 481 psi |
| | 2.5 ... 250 mbar<br>0.25 ... 25 kPa<br>1.005 ... 100.5 in$H_2O$ | 420 bar<br>42 MPa<br>6 092 psi | 630 bar<br>63 MPa<br>9 137 psi |
| | 6 ... 600 mbar<br>0.6 ... 60 kPa<br>2.41 ... 241.1 in$H_2O$ | 420 bar<br>42 MPa<br>6 092 psi | 630 bar<br>63 MPa<br>9 137 psi |
| | 16 ... 1600 mbar<br>1.6 ... 160 kPa<br>6.43 ... 643 in$H_2O$ | 420 bar<br>42 MPa<br>6 092 psi | 630 bar<br>63 MPa<br>9 137 psi |
| | 50 ... 5 000 mbar<br>5 ... 500 kPa<br>20.09 ... 2009 in$H_2O$ | 420 bar<br>42 MPa<br>6 092 psi | 630 bar<br>63 MPa<br>9 137 psi |
| | 0.3 ... 30 bar<br>0.03 ... 3 MPa<br>4.35 ... 435 psi | 420 bar<br>42 MPa<br>6 092 psi | 630 bar<br>63 MPa<br>9 137 psi |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | All measuring cells:<br>• -100% of max. measuring range or 30 mbar a /3 kPa a /0.44 psi a<br>Measuring cell 160 bar/16 MPa/2 320 psi:<br>• -25% of maximum measuring range or 30 mbar a /3 kPa a /0.44 psi a | | |
| - Measuring cell with inert liquid | For medium temperature -20 °C < ϑ ≤ +60 °C (-4 °F < ϑ ≤ +140 °F) | | -100% of maximum measuring range or<br>30 mbar a /3 kPa a /0.44 psi a |
| | For medium temperature 60 °C < ϑ ≤ +100 °C (max. 85 °C for measuring cell 30 bar with PN 420) (140 °F < ϑ ≤ +212 °F (max. 185 °F for measuring cell 435 psi)) | | -100% of maximum measuring range or<br>30 mbar a /3 kPa a /0.44 psi a<br>30 mbar a +<br>20 mbar a · (ϑ -60 °C)/°C 3 kPa a + 2 kPa a · (ϑ -60 °C)/°C0.44 psi a + 0.29 psi a · (ϑ - 140 °F)/°F |
| - Measuring cell with FDA-compliant oil | For medium temperature -10 °C < ϑ ≤ +100 °C (-14 °F < ϑ ≤ +212 °F) | | -100% of maximum measuring range or<br>100 mbar a /10 kPa a /14.5 psi a |
| • Upper measuring limit | 100% of the max. measuring span (for oxygen measurement max. 100 bar/10 MPa/1450 psi and 60 °C (140 °F) ambient temperature/medium temperature) | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for differential pressure and flow | | |
|---|---|---|
| • Lower range value | Between the measuring limits (continuously adjustable) | |
| **Output** | **HART** | |
| Output signal | 4 ... 20 mA | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | |
| • Ripple (without HART communication) | $I_{pp} \leq 0.5\%$ of max. output current | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over local display | |
| • Current simulator | 3.55 ... 22.8 mA | |
| • Failure signal | 3.55 ... 22.8 mA | |
| Load | Resistance R [Ω] | |
| • Without HART communication | $R = (U_H - 10.5\ V) / 22.8\ mA$,<br>$U_H$: Auxiliary power in V | |
| • With HART communication | R = 230 ... 1100 Ω | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | |
| Physical bus | - | |
| Polarity-independent | - | |
| **Measuring accuracy** | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | |
| Characteristic curve deviation at limit point setting, including hysteresis and repeatability | | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | |
| • Linear characteristic curve | | |
| - 20 mbar/2 kPa/0.29 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 20: | ≤ (0.005 · r +0.05)% |
| - 60 mbar/6 kPa/0.87 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 60: | ≤ (0.005 · r +0.05)% |
| - 250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320) |
| | 5 < r ≤ 100: | ≤ (0.004 · r + 0.045)% (SITRANS P320) |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320) |
| | 5 < r ≤ 20: | ≤ (0.004 · r + 0.045)% (SITRANS P320) |
| - 250 mbar/25 kPa/3.63 psi (PN 160)<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi | r ≤ 5: | ≤ 0.04% (SITRANS P420) |
| | 5 < r ≤ 100: | ≤ (0.004 · r + 0.045)% (SITRANS P420) |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.04% (SITRANS P420) |
| | 5 < r ≤ 20: | ≤ (0.004 · r + 0.045)% (SITRANS P420) |
| - 250 mbar/25 kPa/3.63 psi (PN 420) | r ≤ 5: | ≤ 0.065% (SITRANS P420) |
| • Square-rooted characteristic curve (flow > 50%) | | |
| - 20 mbar/2 kPa/0.29 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 20: | ≤ (0.005 · r +0.05)% |
| - 60 mbar/6 kPa/0.87 psi | r ≤ 5: | ≤ 0.075% |
| | 5 < r ≤ 60: | ≤ (0.005 · r +0.05)% |
| - 250 mbar/25 kPa/3.63 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320)<br>≤ 0.04% (SITRANS P420) |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for differential pressure and flow | | |
|---|---|---|
| 600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi | 5 < r ≤ 100: | ≤ (0.004 · r +0.045)% |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.065% (SITRANS P320)<br>≤ 0.04% (SITRANS P420) |
| | 5 < r ≤ 20: | ≤ (0.004 · r +0.045)% |
| • Square-rooted characteristic curve (flow 25 ... 50%) | | |
| - 20 mbar/2 kPa/0.29 psi | r ≤ 5: | ≤ 0.15% |
| | 5 < r ≤ 20: | ≤ (0.01 · r +0.1)% |
| - 60 mbar/6 kPa/0.87 psi | r ≤ 5: | ≤ 0.15% |
| | 5 < r ≤ 60: | ≤ (0.01 · r +0.1)% |
| - 250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi | r ≤ 5: | ≤ 0.13% (SITRANS P320)<br>≤ 0.08% (SITRANS P420) |
| | 5 < r ≤ 100: | ≤ (0.008 · r +0.09)% |
| - 160 bar/16 MPa/2 320 psi | r ≤ 5: | ≤ 0.13% (SITRANS P320)<br>≤ 0.08% (SITRANS P420) |
| | 5 < r ≤ 20: | ≤ (0.008 · r +0.09)% |
| Influence of ambient temperature (in % per 28 °C (50 °F)) | | |
| - 20 mbar/2 kPa/0.29 psi | ≤ (0.15 · r +0.1)% | |
| - 60 mbar/6 kPa/0.87 psi | ≤ (0.075 · r +0.1)% | |
| - 250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ (0.025 · r + 0.125)% (SITRANS P320) | |
| - 250 mbar/25 kPa/3.63 psi<br>5 bar/500 kPa/72.5 psi | ≤ (0.025 · r + 0.0625)% (SITRANS P420) | |
| - 600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ (0.0125 · r + 0.0625)% (SITRANS P420) | |
| Effect of static pressure | | |
| • At the lower range value | Zero offset is possible with position error compensation | |
| - 20 mbar/2 kPa/0.29 psi | ≤ (0.3 · r)% per 70 bar (SITRANS P320)<br>≤ (0.2 · r)% per 70 bar (SITRANS P420) | |
| - 60 mbar/6 kPa/0.87 psi<br>250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ (0.1 · r)% per 70 bar | |
| - 5 bar/500 kPa/72.5 psi | ≤ (0.15 · r)% per 70 bar | |
| • On the measuring span | | |
| - 20 mbar/2 kPa/0.29 psi | ≤ 0.2% per 70 bar | |
| - 60 mbar/6 kPa/0.87 psi<br>250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | ≤ 0.1% per 70 bar | |
| Long-term stability at ±30 °C (± 54 °F) | Static pressure max. 70 bar/7 MPa/1015 psi | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for differential pressure and flow | |
|---|---|
| • 20 mbar/2 kPa/0.29 psi | ≤ (0.2 · r)% per year |
| • 60 mbar/6 kPa/0.87 psi | In 5 years ≤ (0.25 · r)% |
| • 250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>160 bar/16 MPa/2 320 psi | In 5 years ≤ (0.125 · r)%<br>In 10 years ≤ (0.15 · r)% |
| • 30 bar/3 MPa/435 psi | In 5 years ≤ (0.25 · r)%<br>In 10 years ≤ (0.35 · r)% |
| Step response time $T_{63}$ (without electrical damping for pressure rating PN 160) | |
| • 20 mbar/2 kPa/0.29 psi | Approx. 0.160 s |
| • 60 mbar/6 kPa/0.87 psi | Approx. 0.150 s |
| • 250 mbar/25 kPa/3.63 psi<br>600 mbar/60 kPa/8.7 psi<br>1600 mbar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.5 psi<br>30 bar/3 MPa/435 psi<br>160 bar/16 MPa/2 320 psi | Approx. 0.135 s |
| Effect of mounting position (in pressure per change of angle) | ≤ 0.7 mbar/0.07 kPa/0.028 in$H_2O$ per 10° incline (zero offset is possible with position error compensation) |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V |
| **Operating conditions** | |
| Medium temperature | |
| • Measuring cell with silicone oil filling | -40 ... +100 °C (-40 ... +212 °F) |
| - Measuring cell 30 bar (435 psi) | -20 ... +100 °C (-4 ... +212 °F) |
| - Measuring cell 160 bar (2 320 psi) | -20 ... +100 °C (-4 ... +212 °F) |
| • Measuring cell with inert oil | -20 ... +100 °C (-4 ... +212 °F) |
| • Measuring cell with FDA-compliant oil | -10 ... +100 °C (14 ... +212 °F) |
| Ambient conditions | |
| • Ambient temperature/enclosure | Observe the temperature class in hazardous areas. |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with inert oil | -40 ... +85 °C (-40 ... +185 °F) |
| - Measuring cell with FDA-compliant oil | -10 ... +85 °C (14 ... +185 °F) |
| - Local display | -20 ... +80 °C (-4 ... +176 °F) |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) (with FDA-compliant oil: -20 ... +85 °C (-4 ... +185 °F)) |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H |
| • Degree of protection | |
| - According to IEC 60529 | IP66, IP68 |
| - According to NEMA 250 | Type 4X |
| • Electromagnetic compatibility | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 |
| **Structural design** | |
| Weight | • Aluminum enclosure: Approx. 3.9 kg (8.5 lbs)<br>• Stainless steel enclosure: Approx. 5.9 kg (13 lbs) |
| Material | |
| • Material of wetted parts | |
| - Seal diaphragm | Stainless steel, mat. no. 1.4404/316L, Alloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold |
| - Process flanges | Stainless steel, mat. no. 1.4408 to PN 160, mat. no. 1.4571/316Ti for PN 420, Alloy C22, 2.4602 or Monel, mat. no. 2.4360 |
| - Sealing plug | 1.4404 or as option alloy C22; 2.4602 or Monel mat. no. 2.4360 |
| - O-ring | FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR |
| • Material of non-wetted parts | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for differential pressure and flow | |
|---|---|
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) |
| - Process flange screws | Stainless steel ISO 3506-1 A4-70 |
| - Mounting bracket | Steel, zinc-plated steel, or stainless steel |
| Process connection | ¼-18 NPT internal thread and flange connection with 7/16-20 UNF fastening thread according to EN 61518 or M10 according to DIN 19213 (M12 for PN 420 (MWP 6 092 psi)) |
| Electrical connection | Screw terminals<br>Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 |
| **Displays and controls** | |
| Buttons | 4 buttons for operation directly on the device |
| Local display | • With or without integrated local display (optional)<br>• Lid with inspection window (optional) |
| **Auxiliary power $U_H$** | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) |
| Auxiliary power | – |
| Separate supply voltage | – |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice)<br>**For flow only**<br>For gases of fluid group 1 and liquids of fluid group 1; fulfills the basic safety requirements as per article 3, paragraph 1 (appendix 1); classified as category III, module H conformity evaluation by TÜV Nord |
| Drinking water | |
| • WRAS (England) | No.: 1903094 (option E83) |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) |
| CRN (Canada) | No.: 0F9863.5C (option E60) |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) |
| Explosion protection | |
| • Intrinsic safety "i" | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for differential pressure and flow | |
|---|---|
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex ia IIIC T120 °C Da<br>Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the signal level for the failure information of digital transmitters with analog output signal |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |

| Communication | |
|---|---|
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |

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## Technical specifications (continued)

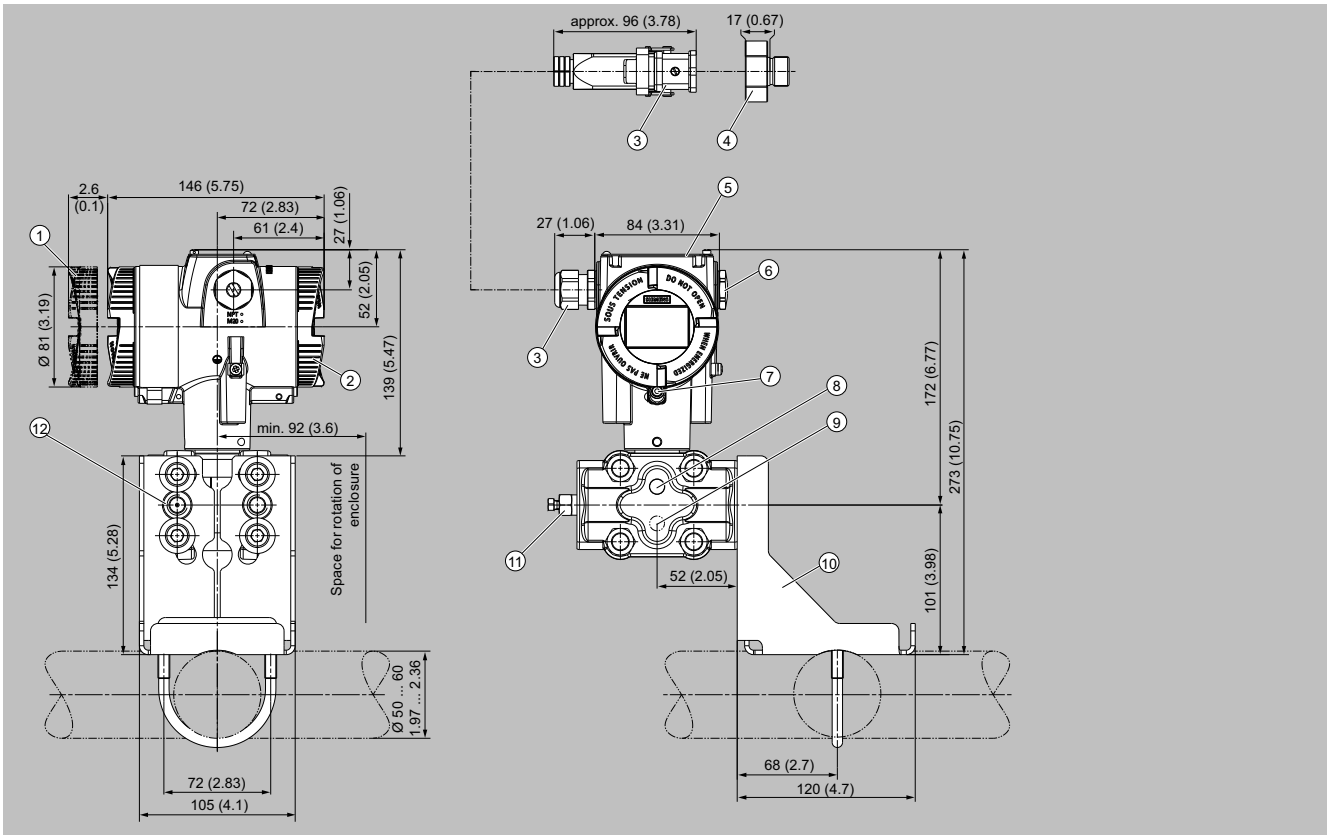
| Communication | |
|---|---|
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |

| Communication | |
|---|---|
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




1. Electronics side, local display (longer overall length for cover with glass pane)[1]
2. Connection side
3. Electrical connection:
   - M20 x 1,5[2] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2][3] device plug
   - M12 device plug[2][3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Lateral ventilation for liquid measurement (Standard)
9. Lateral ventilation for gas measurement (order option K85)
10. Mounting bracket (optional)
11. Sealing plug with valve (optional)
12. Process connection: ¼-18 NPT (IEC 61518)

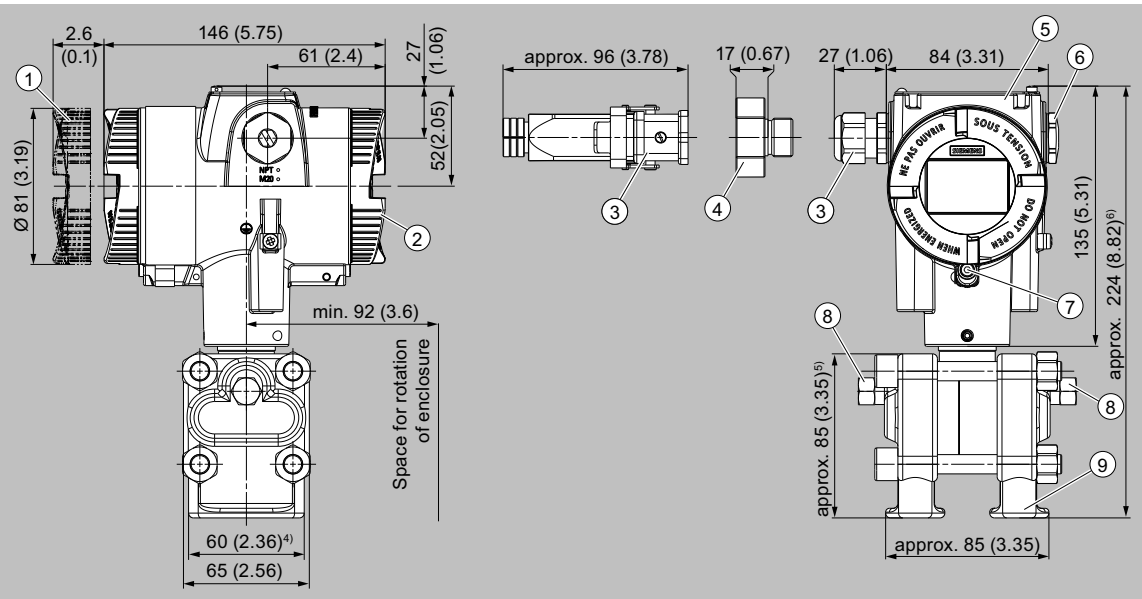
[1] In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
[2] Not with "flameproof enclosure" type of protection
[3] Not with type of protection "FM + CSA" [is + XP]"

SITRANS P320/P420 pressure transmitter for differential pressure and flow, dimensions in mm (inch)

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## Dimensional drawings (continued)




1. Electronics side, local display (longer overall length for cover with inspection window)[1)]
2. Connection side
3. Electrical connection:
   - M20 x 1.5[3)] screw gland
   - ½-14 NPT screw gland
   - Han 7D/Han 8D[2) 3)] device plug
   - M12 device plug[2) 3]
4. Harting adapter
5. Cover over buttons and nameplate with general information
6. Blanking plug
7. Safety catch (only for "flameproof enclosure" type of protection)
8. Sealing plug with valve (option)
9. Process connection: ¼-18 NPT (IEC 61518)

1) In addition, allow approx. 22 mm (0.87 inch) for the thread length when removing the covers
2) Not with "flameproof enclosure" type of protection
3) Not with type of protection "FM + CSA" [is + XP]"
4) 74 mm (2.9 inches) for PN ≥ 420 (MAWP ≥ 6092 psi)
5) 91 mm (3.6 inches) for PN ≥ 420 (MAWP ≥ 6092 psi)
6) 226 mm (8.9 inches) for PN ≥ 420 (MAWP ≥ 6092 psi)

SITRANS P320/P420 pressure transmitter for differential pressure and flow with process covers for vertical differential pressure lines (option "K81"), dimensions in mm (inch)

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## Selection and ordering data

| Pressure transmitters for level | Article No. | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITRANS P320 | 7MF036 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | | | | |
| SITRANS P420 | 7MF046 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | | | | | | | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | | | | | | | | |
| HART, 4 ... 20 mA | | 0 | | | | | | | | | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | | | | | | | | | |
| FOUNDATION Fieldbus (FF) | | 2 | | | | | | | | | | | | | | | | | | | |
| **Measuring cell filling** | | | | | | | | | | | | | | | | | | | | | |
| Silicone oil | | | | 1 | | | | | | | | | | | | | | | | | |
| **Maximum measuring span** | | | | | | | | | | | | | | | | | | | | | |
| 60 mbar (24.11 in$H_2O$) | | | | | D | | | | | | | | | | | | | | | | |
| 250 mbar (100.5 in$H_2O$) | | | | | G | | | | | | | | | | | | | | | | |
| 600 mbar (241 in$H_2O$) | | | | | H | | | | | | | | | | | | | | | | |
| 1600 mbar (643 in$H_2O$) | | | | | M | | | | | | | | | | | | | | | | |
| 5000 mbar (72.5 psi) | | | | | P | | | | | | | | | | | | | | | | |
| 30 bar (435 psi) | | | | | R | | | | | | | | | | | | | | | | |
| 160 bar (2321 psi) | | | | | Y | | | | | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | | | | | | | | |
| Version for diaphragm seal with fastening thread $^7/_{16}$-20 UNF (IEC 61518): Remote seal 7MF0814 must be ordered separately. | | | | | | V | | | | | | | | | | | | | | | |
| **Material of wetted parts: Process connection, seal diaphragm** | | | | | | | | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, stainless steel 316L/1.4404, process flange stainless steel 316/1.4408 | | | | | | | 0 | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404; alloy C276/2.4819, process flange stainless steel 316/1.4408 | | | | | | | 1 | | | | | | | | | | | | | | |
| Sensor pressure: Alloy C22/2.4602, alloy C276/2.4819 Sensor differential pressure: Alloy C276/2.4819, alloy C276/2.4819; process flange stainless steel 316/1.4408 | | | | | | | 2 | | | | | | | | | | | | | | |
| Tantalum, tantalum, process flange stainless steel 316/1.4408 | | | | | | | 4 | | | | | | | | | | | | | | |
| Monel 400/2.4360, Monel 400/2.4360; process flange: Stainless steel 316/1.4408 | | | | | | | 6 | | | | | | | | | | | | | | |
| Stainless steel 316L/1.4404, gold-plated; process flange stainless steel 316/1.4408 | | | | | | | 8 | | | | | | | | | | | | | | |
| **Material of non-wetted parts** | | | | | | | | | | | | | | | | | | | | | |
| Die-cast aluminum | | | | | | | | 1 | | | | | | | | | | | | | |
| Stainless steel precision casting CF3M/1.4409 similar to 316L | | | | | | | | 2 | | | | | | | | | | | | | |
| **Enclosure** | | | | | | | | | | | | | | | | | | | | | |
| Dual chamber device | | | | | | | | | | | | | 5 | | | | | | | | |
| **Type of protection** | | | | | | | | | | | | | | | | | | | | | |
| Without Ex | | | | | | | | | | | | | | A | | | | | | | |
| Intrinsic safety | | | | | | | | | | | | | | B | | | | | | | |
| Flameproof enclosure | | | | | | | | | | | | | | C | | | | | | | |
| Flameproof enclosure, intrinsic safety | | | | | | | | | | | | | | D | | | | | | | |
| Dust protection by enclosure Zone 21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | L | | | | | | | |
| Intrinsic safety, dust protection by enclosure Zone 20/21/22 (DIP), increased safety Zone 2 | | | | | | | | | | | | | | M | | | | | | | |
| Combination of options B, C and L (Zone model) | | | | | | | | | | | | | | S | | | | | | | |
| Combination of options B, C and L (Zone model, Class Division) | | | | | | | | | | | | | | T | | | | | | | |
| **Electrical connections/cable entries** | | | | | | | | | | | | | | | | | | | | | |
| Thread for cable gland: Cable gland must be ordered separately as option (Axx) | | | | | | | | | | | | | | | | | | | | | |
| • 2 × M20 × 1.5 | | | | | | | | | | | | | | | | | F | | | | |
| • 2 × ½-14 NPT | | | | | | | | | | | | | | | | | M | | | | |
| **Local operation/display** | | | | | | | | | | | | | | | | | | | | | |
| Without local display (lid closed) | | | | | | | | | | | | | | | | | | | | 0 | |
| With local display (lid closed) | | | | | | | | | | | | | | | | | | | | 1 | |
| With local display (lid with glass pane) | | | | | | | | | | | | | | | | | | | | 2 | |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Cable glands included** | |
| Plastic | **A00** |
| Metal | **A01** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A11** |
| CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm | **A12** |
| Sealing plug included, plastic | **A20** |
| Sealing plug included, metal | **A21** |
| Sealing plug included, stainless steel | **A22** |
| Sealing plug included, stainless steel 316L/1.4404 | **A23** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Cable entry/device plug mounting** | |
| 2× sealing plugs M20 × 1.5, IP66/68 installed on both sides | **A90** |
| 2× sealing plugs ½-14 NPT, IP66/68 installed on both sides | **A91** |
| Cable gland/device plug mounted left | **A97** |
| Cable gland/device plug mounted right | **A99** |
| **Nameplate labeling (standard labeling: English, unit bar)** | |
| German (bar) | **B11** |
| French (bar) | **B12** |
| Spanish (bar) | **B13** |
| Italian (bar) | **B14** |
| Chinese (bar) | **B15** |
| Russian (bar) | **B16** |
| English (psi) | **B20** |
| English (Pa) | **B30** |
| Chinese (Pa) | **B35** |
| **Certificates** | |
| Quality inspection certificate, 5-point factory calibration (IEC 62828-2) | **C11** |
| Inspection certificate (EN 10204-3.1) - Material of pressurized and wetted parts | **C12** |
| Factory certificate - NACE (MR 0103-2012 and MR 0175-2009) | **C13** |
| Factory certificate (EN 10204-2.2) - Wetted parts | **C14** |
| Inspection certificate (EN 10204-3.1) - PMI test of pressurized and wetted parts | **C15** |
| **Certificates for functional safety** | |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| FVMQ enclosure sealing | **D21** |
| Degree of protection IP66/IP68 (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 6 kV (internal) | **D70** |
| Overvoltage protection up to 6 kV (external) | **D71** |
| Labels on transport packaging (provided by customer) | **D90** |
| **General approval without Ex approval** | |
| Worldwide (CE, UKCA, RCM) except EAC, FM, CSA, KCC | **E00** |
| Worldwide (CE, UKCA, RCM, EAC, FM, CSA, KCC) | **E01** |
| CSA (USA and Canada) | **E06** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection approvals** | |
| ATEX (Europe) | **E20** |
| CSA (USA and Canada)[1)] | **E21** |
| FM (USA and Canada)[1)] | **E22** |
| IECEx (Worldwide) | **E23** |
| EACEx (GOST-R, -K, -B) | **E24** |
| INMETRO (Brazil) | **E25** |
| KCs (Korea) | **E26** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| CSA (Japan) | **E29** |
| UKR Sepro (Ukraine) | **E30** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe), IECEx (Worldwide) and UKEX (UK) | **E47** |
| CSA (Canada) and FM (USA)[1)] | **E48** |
| ATEX (Europe) and IECEx (Worldwide) + CSA (Canada) and FM (USA)[1)] | **E49** |
| **Marine approvals** | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |
| **Country-specific approvals** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **Special approvals** | |
| Oxygen application (with inert liquid, max. 160 bar (2 320 psi) at 100 °C (212 °F)) | **E80** |
| Dual Seal | **E81** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| WRC/WRAS (drinking water); only with process flange O-rings made of EPDM | **E83** |
| NSF61 (drinking water) | **E84** |
| ACS (drinking water) | **E85** |
| **Process flanges** | |
| Gasket process flange 1 × chambered, graphite | **K40** |
| Gasket process flange, 1 × chambered, PTFE | **K41** |
| Vent valve in the material of the process flange | **K84** |
| **Device settings** | |
| Measuring span: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit [mbar, bar, kPa, MPa, psi, ...], example: -0.5 ... 10.5 psi | **Y01** |
| TAG (on stainless steel plate and device parameters, max. 32 characters) | **Y15** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Measuring point description (on stainless steel plate and device parameters, max. 32 characters) | **Y16** |
| TAG short (device parameters, max. 8 characters) | **Y17** |
| Local display: [Pressure, Percent], reference [None, Absolute, Gauge], example: Pressure gauge | **Y21** |
| Local display: Scaling with standard units [$m^3$/s, l/s, m, inch, ...]; example 1 ... 5 m | **Y22** |
| Local display: Scaling with user-specific units (max. 12 characters), example 1 ... 5 m | **Y23** |
| Set PROFIBUS PA device address (1 ... 126) | **Y25** |
| Saturation limits instead of 3.8 ... 20.5 mA, example: 3.8 ... 22.0 mA | **Y30** |
| Fault current instead of 3.6 mA [22.5 mA, 22.8 mA] | **Y31** |
| Damping in seconds instead of 2 s (0.0 ... 100.0 s) | **Y32** |
| ID number of special design | **Y99** |

[1] Explosion protection acc. to FM/CSA: suitable for installation according to NEC 500/505.

| **Diaphragm seal**<br>**In flange design, directly installed on a pressure transmitter for level SITRANS P320/P420**<br>**7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit** | | **Article No.**<br>**7MF0814-** | | | **Order code** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | 0 | 3 | - | 0 | ● | ● | ● | | ● | ● | ● |
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | | |
| **Standard of process connection EN 1092-1** | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | |
| DN 25 | PN 10/16/25/40 | 0 | B | D | | | | | | | | | | | |
| | PN 63/100 | 0 | B | F | | | | | | | | | | | |
| | PN 160 | 0 | B | G | | | | | | | | | | | |
| | PN 250 | 0 | B | H | | | | | | | | | | | |
| DN 40 | PN 10/16/25/40 | 0 | D | D | | | | | | | | | | | |
| | PN 63/100 | 0 | D | F | | | | | | | | | | | |
| | PN 160 | 0 | D | G | | | | | | | | | | | |
| DN 50 | PN 10/16/25/40 | 0 | E | D | | | | | | | | | | | |
| | PN 63/100 | 0 | E | E | | | | | | | | | | | |
| | PN 160 | 0 | E | F | | | | | | | | | | | |
| DN 80 | PN 10/16/25/40 | 0 | G | D | | | | | | | | | | | |
| | PN 100 | 0 | G | F | | | | | | | | | | | |
| DN 100 | PN 10/16 | 0 | H | B | | | | | | | | | | | |
| | PN 25/40 | 0 | H | D | | | | | | | | | | | |
| DN 125 | PN 16 | 0 | J | B | | | | | | | | | | | |
| | PN 40 | 0 | J | D | | | | | | | | | | | |
| **Process connection standard ASME B16.5** | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | |
| 1 inch | Class 150 | 1 | K | L | | | | | | | | | | | |
| | Class 300 | 1 | K | M | | | | | | | | | | | |
| | Class 600 | 1 | K | N | | | | | | | | | | | |
| | Class 1500 | 1 | K | P | | | | | | | | | | | |
| 1½ inches | Class 150 | 1 | L | A | | | | | | | | | | | |
| | Class 300 | 1 | L | B | | | | | | | | | | | |
| | Class 400/600 | 1 | L | D | | | | | | | | | | | |
| | Class 900/1500 | 1 | L | F | | | | | | | | | | | |
| 2 inches | Class 150 | 1 | M | A | | | | | | | | | | | |
| | Class 300 | 1 | M | B | | | | | | | | | | | |
| | Class 400/600 | 1 | M | D | | | | | | | | | | | |
| | Class 900/1500 | 1 | M | F | | | | | | | | | | | |
| 3 inches | Class 150 | 1 | P | A | | | | | | | | | | | |

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## Selection and ordering data (continued)

| Diaphragm seal<br>In flange design, directly installed on a pressure transmitter for level SITRANS P320/P420<br>7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0814- | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | 0 | 3 | - | 0 | ● | ● | ● | ● | ● | ● |
| | Class 300 | 1 | P | B | | | | | | | | | | |
| | Class 600 | 1 | P | D | | | | | | | | | | |
| | Class 1500 | 1 | P | F | | | | | | | | | | |
| 4 inches | Class 150 | 1 | Q | A | | | | | | | | | | |
| | Class 300 | 1 | Q | B | | | | | | | | | | |
| | Class 400 | 1 | Q | D | | | | | | | | | | |
| | Class 1500 | 1 | Q | F | | | | | | | | | | |
| 5 inches | Class 150 | 1 | R | A | | | | | | | | | | |
| | Class 300 | 1 | R | B | | | | | | | | | | |
| | Class 400 | 1 | R | C | | | | | | | | | | |
| **Process connection standard J.I.S.** | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | |
| DN 50 | 10K | 2 | E | S | | | | | | | | | | |
| | 20k | 2 | E | T | | | | | | | | | | |
| | 40K | 2 | E | U | | | | | | | | | | |
| DN 80 | 10K | 2 | G | S | | | | | | | | | | |
| | 20k | 2 | G | T | | | | | | | | | | |
| | 40K | 2 | G | U | | | | | | | | | | |
| DN 100 | 10K | 2 | H | S | | | | | | | | | | |
| | 20k | 2 | H | T | | | | | | | | | | |
| | 40K | 2 | H | U | | | | | | | | | | |
| Other version, add order code and plain text | | 9 | Z | A | | | | | | | | | H | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | | B | | | | | |
| High-temperature oil | | | | | | | | | C | | | | | |
| Silicone oil M5 | | | | | | | | | A | | | | | |
| Food oil (FDA-listed) | | | | | | | | | E | | | | | |
| Neobee M20 (FDA-listed) | | | | | | | | | R | | | | | |
| Halocarbon oil | | | | | | | | | D | | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | | | | P | 1 | Y |
| **Material of wetted parts** | | | | | | | | | | | | | | |
| Stainless steel 316L | | | | | | | | | | | | | | |
| • Without coating | | | | | | | | | | A | | | | |
| • With PFA coating | | | | | | | | | | D | | | | |
| • With PTFE coating | | | | | | | | | | E | 0 | | | |
| • With ECTFE coating | | | | | | | | | | F | | | | |
| Monel 400, 2.4360 | | | | | | | | | | G | | | | |
| Hastelloy C276, 2.4819 | | | | | | | | | | J | | | | |
| Tantalum | | | | | | | | | | K | | | | |
| Titanium, 3.7035 | | | | | | | | | | L | 0 | | | |
| Nickel 201 | | | | | | | | | | M | 0 | | | |
| Diaphragm Duplex, 1.4462 | | | | | | | | | | Q | | | | |
| Diaphragm and flange Duplex, 1.4462 | | | | | | | | | | R | | | | |
| Stainless steel 316L, gold-plated | | | | | | | | | | S | 0 | | | |
| Hastelloy C4, 2.4610 | | | | | | | | | | U | 0 | | | |
| Hastelloy C22, 2.4602 | | | | | | | | | | V | 0 | | | |
| Other version, add order code and plain text | | | | | | | | | | Z | | | Q | 1 | Y |
| **Tube length** | | | | | | | | | | | | | | |
| None | | | | | | | | | | | 0 | | | |
| 50 mm (2 inches) | | | | | | | | | | | 1 | | | |
| 100 mm (4 inches) | | | | | | | | | | | 2 | | | |
| 150 mm (6 inches) | | | | | | | | | | | 3 | | | |
| 200 mm (8 inches) | | | | | | | | | | | 4 | | | |
| 250 mm (10 inches) | | | | | | | | | | | 5 | | | |
| Other version, add order code and plain text | | | | | | | | | | Z | 8 | | R | 1 | Y |

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## Selection and ordering data (continued)

| Diaphragm seal<br>In flange design, directly installed on a pressure transmitter for level SITRANS P320/P420<br>7MF03../7MF04.. to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0814- | Order code |
|---|---|---|---|
| | | ● ● ● 0 3 - 0 ● ● ● | ● ● ● |
| **Customer-specific tube length** | | | |
| • Wetted parts: Stainless steel without coating | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | A 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | A 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | A 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | A 4 |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | A 5 |
| • Wetted parts: Stainless steel with ECTFE coating | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | F 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | F 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | F 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | F 4 |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | F 5 |
| • Wetted parts: Stainless steel with PFA coating | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | D 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | D 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | D 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | D 4 |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | D 5 |
| • Wetted parts: Monel 400 | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | G 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | G 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | G 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | G 4 |
| • Wetted parts: Hastelloy C276 | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | J 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | J 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | J 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | J 4 |
| • Wetted parts: Tantalum | | | |
| Range | Standard length | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | K 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | K 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | K 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | K 4 |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2 | **C11** |
| Inspection certificate according to EN 10204-3.1 for main body and diaphragm | **C12** |

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| Manufacturer code according to NACE (MR 0103-2012 and MR 0175-2009) (only in combination with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Test report on the FDA listing of the oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3), suitability of devices for use according to IEC 61508 and IEC 61511 (contains SIL Declaration of Conformity) | **C20** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text or entry from drop-down list. | Order code |
|---|---|
| **Accessories** | |
| Epoxy resin coating<br>Color: Transparent<br>Scope: Front and rear of the remote seal, connecting pipe, process connection of the transmitter.<br>Maximum medium temperature with epoxy resin coating: 140 °C | **D15** |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| Volume deflagration flame arrester (VDEF) for differential pressure transmitter | **D62** |
| **Negative pressure service** | |
| Negative pressure service for differential pressure transmitters | **D83** |
| Extended negative pressure service for differential pressure transmitters | **D88** |
| **Approvals and certificates** | |
| Country-specific approval<br>CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| Oil-free and grease-free cleaned version for oxygen application including EN 10204-2.2 certificates (only with filling liquid halocarbon oil and at max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including EN 10204-2.2 certificates | **E87** |
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AA, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface internal face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |
| **Remote seal connection** | |
| Elongated pipe, 150 mm (5.9 inches) instead of 100 mm (3.9 inches) | **S05** |
| Elongated pipe, 200 mm (7.9 inches) instead of 100 mm (3.9 inches) | **S06** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1] | |
| Ambient temperature range | |
| • -10 ... +50 °C (14 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

[1] See also "Specification of process conditions for selection and ordering data" below the "More information" section.

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## Technical specifications

| SITRANS P320 / SITRANS P420 for level | | | |
|---|---|---|---|
| **Input** | | | |
| Measured variable | Level | | |
| Measuring span (continuously adjustable) or measuring range and max. permissible operating pressure (pursuant to Pressure Equipment Directive 2014/68/EU) | Measuring span | Max. permissible operating pressure MAWP (PS) | Maximum permissible test pressure |
| | 25 ... 250 mbar<br>2.5 ... 25 kPa<br>10 ... 100.5 in$H_2O$ | See "Mounting flange" | |
| | 25 ... 600 mbar<br>2.5 ... 60 kPa<br>10 ... 241 in$H_2O$ | | |
| | 53 ... 1 600 mbar<br>5.3 ... 160 kPa<br>21 ... 643 in$H_2O$ | | |
| | 166 ... 5 000 mbar<br>16.6 ... 500 kPa<br>2.41 ... 72.5 psi | | |
| Measuring limits | | | |
| • Lower measuring limit | | | |
| - Measuring cell with silicone oil filling | -100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange | | |
| - Measuring cell with inert oil | -100% of max. measuring range or 30 mbar a/3 kPa a/0.44 psi a depending on the mounting flange | | |
| - Measuring cell with FDA-compliant oil | -100% of max. measuring range or 100 mbar a/10 kPa a/1.45 psi a | | |
| • Upper measuring limit | 100% of max. measuring span | | |
| • Lower range value | Between the measuring limits (continuously adjustable) | | |
| **Output** | **HART** | | |
| Output signal | 4 ... 20 mA | | |
| • Lower saturation limit (continuously adjustable) | 3.55 mA, factory set to 3.8 mA | | |
| • Upper saturation limit (continuously adjustable) | 22.8 mA, factory-set to 20.5 mA or optionally 22.0 mA | | |
| • Ripple (without HART communication) | $I_{pp} \leq 0.5\%$ of max. output current | | |
| Adjustable damping | 0 ... 100 s, continuously adjustable over remote operation<br>0 ... 100 s, in increments of 0.1 s, adjustable over display | | |
| • Current simulator | 3.55 ... 22.8 mA | | |
| • Failure signal | 3.55 ... 22.8 mA | | |
| Load | Resistance R [Ω] | | |
| • Without HART communication | $R = (U_H - 10.5\ V) / 22.8\ mA$,<br>$U_H$: Auxiliary power in V | | |
| • With HART communication | R = 230 ... 1100 Ω | | |
| Characteristic curve | • Linearly increasing or linearly decreasing<br>• Linear increase or decrease or according to the square root (only for differential pressure and flow) | | |
| Physical bus | - | | |
| Polarity-independent | - | | |
| **Measuring accuracy** | | | |
| Reference conditions | • According to IEC 62828-1<br>• Rising characteristic curve<br>• Lower range value 0 bar/kPa/psi<br>• Seal diaphragm stainless steel<br>• Measuring cell with silicone oil filling<br>• Room temperature 25 °C (77 °F) | | |
| Conformity error at limit point setting, including hysteresis and repeatability | | | |
| Measuring span ratio r (spread, Turn-Down) | r = maximum measuring span/set measuring span or nominal measuring range | | |
| • Linear characteristic curve | | | |
| | r ≤ 5: | ≤ 0.125% | |

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## Technical specifications (continued)

| | | |
|---|---|---|
| **SITRANS P320 / SITRANS P420 for level** | | |
| - 250 mbar/25 kPa/3.6 psi<br>- 600 mbar/60 kPa/8.7 psi<br>- 1600 mbar/160 kPa/23.21 psi<br>- 5 bar/500 kPa/72.5 psi | 5 < r ≤ 10: | ≤ (0.007 · r +0.09)% |
| Influence of ambient temperature in % per 28 °C (50 °F) | | |
| • SITRANS P320 | ≤ (0.025 · r +0.125)% | |
| - 250 mbar/25 kPa/3.6 psi<br>- 600 mbar/60 kPa/8.7 psi<br>- 1600 mbar/160 kPa/23.21 psi<br>- 5 bar/500 kPa/72.5 psi | | |
| • SITRANS P420 | ≤ (0.025 · r +0.0625)% | |
| - 250 mbar/25 kPa/3.6 psi<br>- 5 bar/500 kPa/72.5 psi | | |
| - 600 mbar/60 kPa/8.7 psi<br>- 1600 mbar/160 kPa/23.21 psi | ≤ (0.125 · r +0.0625)% | |
| Effect of static pressure | | |
| • At the lower range value | | |
| - 250 mbar/25 kPa/3.63 psi | ≤ (0.3 · r)% per nominal pressure | |
| - 600 mbar/60 kPa/8.7 psi<br>1.6 bar/160 kPa/23.21 psi<br>5 bar/500 kPa/72.52 psi | ≤ (0.15 · r)% per nominal pressure | |
| • On the measuring span | ≤ (0.1 · r)% per nominal pressure | |
| Long-term stability at ±30 °C (± 54 °F) | | |
| • All measuring cells | In 5 years ≤ (0.25 · r)% static pressure max. 70 bar/7 MPa/1015 psi | |
| Step response time $T_{63}$ (without electrical damping) | Depends on the installed remote seal | |
| Influence of mounting position | Depends on the filling liquid in the mounting flange | |
| Effect of auxiliary power (in % per voltage change) | 0.005% per 1 V | |
| **Operating conditions** | | |
| Medium temperature | | |
| Measuring cell with silicone oil filling | • High side: See "Mounting flange"<br>• Low side: -40 ... +100 °C (-40 ... +212 °F) | |
| Ambient conditions | | |
| • Ambient temperature/enclosure | Always consider the assignment of max. permissible operating temperature to max. permissible operating pressure of the respective flange connection. | |
| - Measuring cell with silicone oil filling | -40 ... +85 °C (-40 ... +185 °F) | |
| - Display | -20 ... +80 °C (-4 ... +176 °F) | |
| • Storage temperature | -50 ... +85 °C (-58 ... +185 °F) | |
| • Climatic class in accordance with IEC 60721-3-4 | 4K4H | |
| • Degree of protection | | |
| - According to IEC 60529 | IP66, IP68 | |
| - According to NEMA 250 | Type 4X | |
| • Electromagnetic compatibility | | |
| - Emitted interference and interference immunity | According to IEC 61326 and NAMUR NE 21 | |
| **Structural design** | | |
| Weight | Pressure transmitter with mounting flange, without tube | |
| • According to EN | • Aluminum enclosure: Approx. 11 ... 13 kg (24.2 ... 28.7 lbs)<br>• Stainless steel enclosure: Approx. 13 ... 15 kg (28.7 ... 33 lbs) | |
| • According to ASME | • Aluminum enclosure: Approx. 11 ... 18 kg (24.2 ... 39.7 lbs)<br>• Stainless steel enclosure: Approx. 13 ... 20 kg (28.7 ... 44 lbs) | |
| Material | | |
| • Material of wetted parts | | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for level | | |
|---|---|---|
| - High side | Seal diaphragm of mounting flange | Stainless steel, mat. no. 1.4404/316L, Monel 400, mat. no. 2.4360, Alloy B2, mat. no. 2.4617, Alloy C276, mat. no. 2.4819, Alloy C22, mat. no. 2.4602, tantalum, PTFE, PFA, ECTFE |
| | Sealing surface | Smooth according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA for stainless steel 316L, EN 2092-1 form B2 or ASME B16.5 RFSF for the remaining materials |
| - Gasket material in the process flanges | For standard applications | Viton |
| | For negative pressure applications on the mounting flange | Copper |
| - Low side | Seal diaphragm | Stainless steel, mat. no. 1.4404/316L |
| | Process flanges | Stainless steel, mat. no. 1.4408/316 |
| | Process flange screw | Stainless steel ISO 3506-1 A4-70 |
| | O-ring | FPM (Viton) |
| • Material of non-wetted parts | | |
| - Electronics enclosure | • Low-copper die-cast aluminum GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4409/ CF-3M<br>• Standard: Powder coating with polyurethane<br>Option: 2 coats: Coat 1: Epoxy-based; coat 2: Polyurethane<br>• Stainless steel nameplate (1.4404/316L) | |
| Process flange screws | Stainless steel ISO 3506-1 A4-70 | |
| Measuring cell filling | Silicone oil | |
| • Mounting flange filling liquid | Silicone oil or other material | |
| Process connection | | |
| • High side | Flange according to EN and ASME | |
| • Low side | ¼-18 NPT female thread and flange connection with M10 fastening thread according to DIN 19213 (M12 for PN 420 (MWP 6092 psi)) or 7/16-20 UNF according to EN 61518 | |
| Electrical connection | Screw terminals<br>Cable entry via the following screw glands:<br>• M20 × 1.5<br>• ½-14 NPT<br>• Device plug Han 7D/Han 8D[1)]<br>• Device plug M12 | |
| **Displays and controls** | | |
| Buttons | 4 buttons for operation directly on the device | |
| Display | • With or without integrated display (optional)<br>• Lid with inspection window (optional) | |
| **Auxiliary power $U_H$** | | |
| Terminal voltage on pressure transmitter | 10.5 ... 45 V DC<br>10.5 ... 30 V DC in intrinsically safe mode | |
| Ripple | $U_{SS} \leq 0.2$ V (47 ... 125 Hz) | |
| Noise | $U_{eff} \leq 1.2$ mV (0.5 ... 10 kHz) | |
| Auxiliary power | – | |
| Separate supply voltage | – | |
| **Certificates and approvals** | | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) | |
| Drinking water | | |
| • WRAS (England) | No.: 1903094 (option E83) | |
| • ACS (France) | No.: 18 ACC LY 277 (option E85) | |
| • NSF (USA) | No.: 20180920-MH61350 (option E84) | |
| CRN (Canada) | No.: 0F9863.5C (option E60) | |
| Explosion protection acc. to NEPSI (China) | No.: GYJ19.1058X (option E27) | |
| Explosion protection acc. to INMETRO (Brazil) | No.: BRA-18-GE-0035X (option E25) | |
| Explosion protection | | |
| • Intrinsic safety "i" | | |
| - Marking | II 1/2 G Ex ia/ib IIC T4/T6 Ga/Gb | |

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## Technical specifications (continued)

| SITRANS P320 / SITRANS P420 for level | |
|---|---|
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Flameproof enclosure "d" | |
| - Marking | Ex II 1/2 G Ex ia/db IIC T4/T6 Ga/Gb |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 20, 21, 22 | |
| - Marking | Ex II 1D Ex tb IIIC T120 °C Da<br>Ex II 2D Ex tb IIIC T120 °C Db<br>Ex II 3D Ex tc IIIC T120 °C Dc |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Max. surface temperature | 120 °C (248 °F) |
| - Connection | To a circuit with the operating values: $U_n$ = 10.5 ... 45 V, 4 ... 20 mA |
| • Dust explosion protection for Zones 21, 22 | |
| - Marking | Ex II 2D Ex ib IIIC T120 °C Db |
| - Permissible ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) |
| - Connection | To certified intrinsically safe circuits with peak values:<br>$U_i$ = 30 V, $I_i$ = 101 mA, $P_i$ = 760 mW<br>$U_i$ = 29 V, $I_i$ = 110 mA, $P_i$ = 800 mW |
| - Effective internal inductance/capacitance | $L_i$ = 0.24 µH/$C_i$ = 3.29 nF |
| • Type of protection for Zone 2 | |
| - Marking | Ex II 3G Ex ec IIC T4/T6 Gc |
| - Permissible ambient temperature "ec" | -40 ... +80 °C (-40 ... +176 °F) temperature class T4<br>-40 ... +40 °C (-40 ... +104 °F) temperature class T6 |
| - Permissible medium temperature | -40 ... +100 °C (-40 ... +212 °F) temperature class T4<br>-40 ... +70 °C (-40 ... +158 °F) temperature class T6 |
| - "ec" connection | To a circuit with the operating values: $U_n$ = 10.5 ... 30 V, 4 ... 20 mA |
| • Explosion protection acc. to FM | Available soon |
| - Marking (XP/DIP) or IS; NI; S | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| • Explosion protection according to CSA | Available soon |
| - Marking (XP/DIP) or (IS) | CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4 ... T6: CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III |
| NAMUR recommendations | |
| • NE 06 | Standardized Electrical Signals and Questions Relating to Engineering Technology |
| • NE 21 | Electromagnetic Compatibility (EMC) of Industrial Process and Laboratory Control Equipment |
| • NE 23 | Extra Low Voltage Circuits with Safe Separation |
| • NE 43 | Standardization of the Signal Level for the Failure Information of Digital Transmitters |
| • NE 53 | Software and Hardware of Field Devices and Signal Processing Devices with Digital Electronics |
| • NE 80 | The Application of the Pressure Equipment Directive to Process Control Devices |
| • NE 105 | Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices |
| • NE 107 | Self-Monitoring and Diagnosis of Field Devices |
| • NE 131 | NAMUR Standard Device - Field Devices for Standard Applications |

1) Han 8D is identical to Han 8U.

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## Technical specifications (continued)

| Mounting flange | |
|---|---|
| Nominal diameter | Nominal pressure |
| • According to EN 1092-1 | |
| - DN 80 | PN 40 |
| - DN100 | PN 16, PN 40 |
| • According to ASME B16.5 | |
| - 3 inches | Class 150, Class 300 |
| - 4 inches | Class 150, Class 300 |

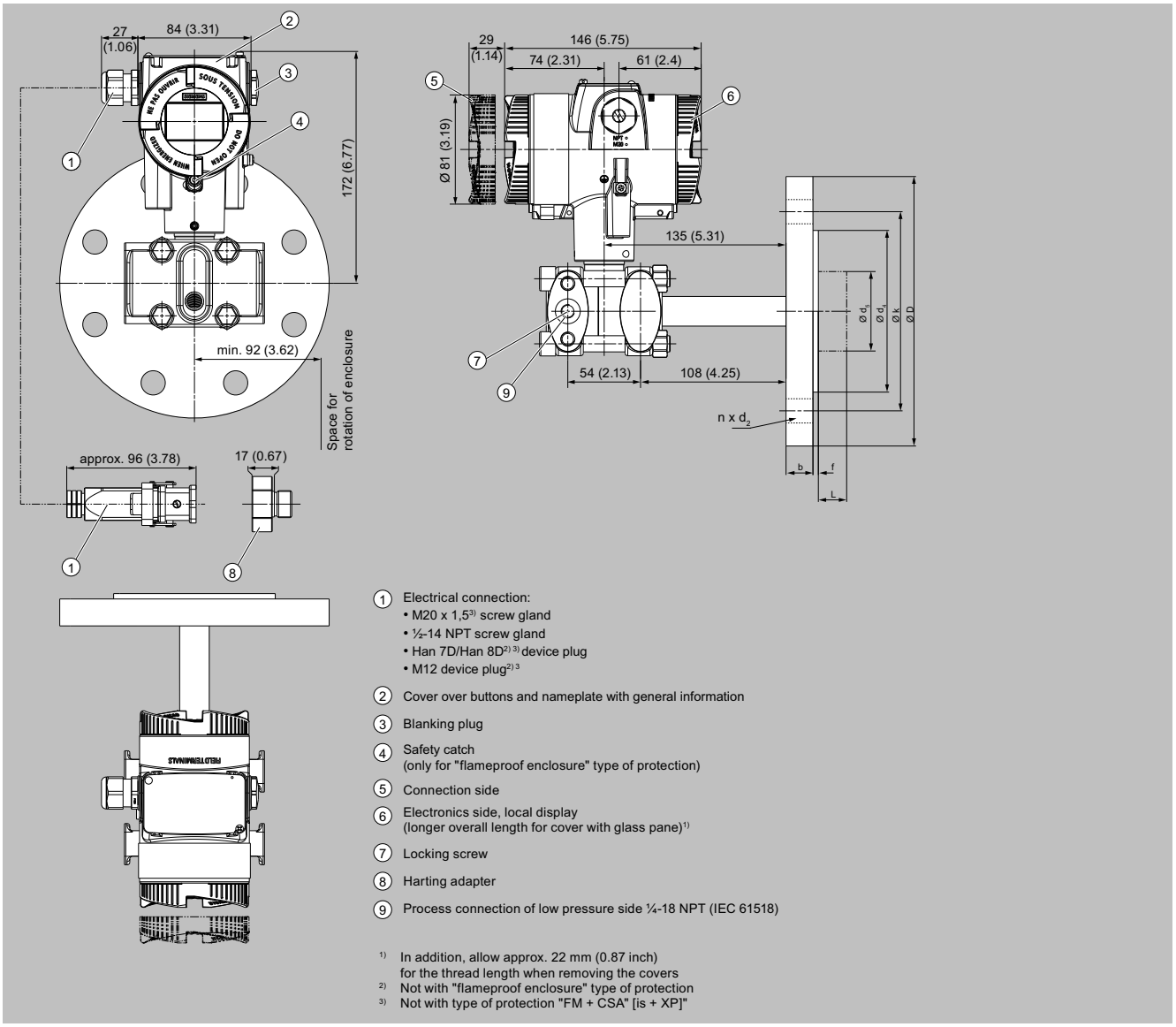
| Communication | |
|---|---|
| **HART** | |
| HART | 230 ... 1 100 Ω |
| Protocol | HART 7 |
| Software for computer | SIMATIC PDM |
| **PROFIBUS PA** | |
| Simultaneous communication with master class 2 (max.) | 4 |
| The address can be set using | Configuration tool or local operation (default setting address 126) |
| Cyclic data usage | |
| • Output byte | ≤ 35 (7 measured values) |
| • Input byte | 0, 1, or 2 (register operation mode and reset function for dosing) |
| Internal preprocessing | |
| Device profile | PROFIBUS PA Profile Version 4.01 Class B. Cyclic data usage compatible with version 3.XX |
| Number of function blocks | 7 |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| • Register (totalizer) | Can be reset, preset, optional direction of counting, simulation function of register output |
| - Limit monitoring | One upper and lower warning limit and one alarm limit respectively |
| • Physical block | 1 |
| Transducer blocks | 1 |

| Communication | |
|---|---|
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Specification of a vessel characteristic curve with | Max. 30 nodes |
| - Square-rooted characteristic curve for flow measurement | Yes |
| - Tank characteristic curve for volume measurement | Yes |
| - Low flow cut-off and implementation point of square-root extraction | Parameterizable |
| - Simulation function for measured pressure value and sensor temperature | Constant value or by means of parameterizable ramp function |
| **FOUNDATION Fieldbus** | |
| Device profile | FF ITK 6 |
| Function blocks | 3 function blocks analog input, 1 function block PID |
| • Analog input | |
| - Adaptation to user-specific process variable | Yes, linearly rising or falling characteristic curve |
| - Electrical damping adjustable | 0 ... 100 s |
| - Simulation function | Output/input (can be locked within the device with a bridge) |
| - Failure mode | Parameterizable (last good value, substitute value, incorrect value) |
| - Limit monitoring | Yes, one upper and lower warning limit and one alarm limit respectively |
| - Square-rooted characteristic curve for flow measurement | Yes |
| • PID | Standard FOUNDATION Fieldbus function block |
| • Physical block | 1 resource block |
| Transducer blocks | 1 transducer block Pressure with calibration, 1 transducer block LCD |
| • Pressure transducer block | |
| - Can be calibrated by applying two pressures | Yes |
| - Monitoring of sensor limits | Yes |
| - Simulation function: pressure measurement, sensor temperature and electronics temperature | Constant value or by means of parameterizable ramp function |

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## Dimensional drawings




SITRANS P320/P420 pressure transmitter for level, including mounting flange, dimensions in mm (inch)

Connection to EN 1092-1

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ Without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| **DN 40** | PN 10/16/ 25/40 | 16 | 150 | 18 | 88 | 38 | 30 | 42 | 2 | 110 | 4 | 0, 50, 100, 150 or 200 |
| | PN 63/100 | 24 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| | PN 160 | 26 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| **DN 50** | PN 10/16/ 25/40 | 18 | 165 | 18 | 102 | 48.3 | 40 | 51 | 2 | 125 | 4 | |
| | PN 63/100 | 26 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| | PN 160 | 28 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| **DN 80** | PN 10/16/ 25/40 | 22 | 200 | 18 | 138 | 76 | 65 | 85 | 2 | 160 | 8 | |
| | PN 100 | 30 | 230 | 26 | 138 | 76 | 65 | 85 | 2 | 180 | 8 | |

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## Dimensional drawings (continued)

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ Without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| DN 100 | PN 10/16 | 18 | 220 | 18 | 158 | 94 | 85 | 85 | 2 | 180 | 8 | 0, 50, 100, 150 or 200 |
| | PN 25/40 | 22 | 235 | 22 | 162 | 94 | 85 | 85 | 2 | 190 | 8 | |
| DN 125 | PN 16 | 20 | 250 | 18 | 188 | 127 | 85 | 116 | 2 | 210 | 8 | |
| | PN 40 | 24 | 270 | 26 | 188 | 127 | 85 | 116 | 2 | 220 | 8 | |

Connection according to ASME B16.5

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ Without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/sq.in. | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | | Inch (mm) |
| 1½ inches | 150 | 0.63 (15.9) | 4.92 (125) | 0.63 (15.9) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 3.87 (98.4) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | 300 | 0.75 (19.1) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 4.5 (114.3) | 4 | |
| | 400/600 | 0.88 (22.3) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.5 (114.3) | 4 | |
| | 900/1500 | 1.25 (31.8) | 7.09 (180) | 1.13 (28.6) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.87 (123.8) | 4 | |
| 2 inches | 150 | 0.69 (17.5) | 5.91 (150) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 4.75 (120.7) | 4 | |
| | 300 | 0.81 (20.7) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 5 (127) | 8 | |
| | 400/600 | 1.00 (25.4) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 5 (127) | 8 | |
| | 900/1500 | 1.5 (38.1) | 8.46 (215) | 1.00 (25.4) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 6.5 (165.1) | 8 | |
| 3 inches | 150 | 0.88 (22.3) | 7.48 (190) | 0.75 (19.1) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6 (152.4) | 4 | |
| | 300 | 1.06 (27) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6.63 (168.3) | 8 | |
| | 600 | 1.23 (31.8) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 6.63 (168.3) | 8 | |
| | 1500 | 1.88 (47.7) | 10.43 (265) | 1.25 (31.8) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 8 (203.2) | 8 | |
| 4 inches | 150 | 0.88 (22.3) | 9.06 (230) | 0.75 (19.1) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.5 (190.5) | 8 | |
| | 300 | 1.19 (30.2) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.87 (200) | 8 | |
| | 400 | 1.38 (35) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 7.87 (200) | 8 | |
| | 1500 | 2.13 (54) | 12.20 (310) | 1.37 (34.9) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 9.5 (241.3) | 8 | |
| 5 inches | 150 | 0.88 (22.3) | 10.04 (255) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 8.5 (215.9) | 8 | |
| | 300 | 1.31 (33.4) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 9.25 (235) | 8 | |
| | 400 | 1.50 (38.1) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.28 (7) | 9.25 (235) | 8 | |

Process connection according to J.I.S

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ Without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | | mm (inch) |
| DN 50 | 10 K | 14 (0.55) | 155 (6.10) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 4 | 0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87) |
| | 20 K | 16 (0.63) | 165 (6.50) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 8 | |
| | 40 K | 26 (1.02) | 165 (6.50) | 19 (0.75) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 130 (5.12) | 8 | |
| DN 80 | 10 K | 16 (0.63) | 185 (7.28) | 19 (0.75) | 126 (4.96) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 150 (5.91) | 8 | |
| | 20 K | 20 (0.79) | 200 (7.87) | 23 (0.91) | 132 (5.20) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 160 (6.30) | 8 | |
| | 40 K | 32 (1.26) | 210 (8.27) | 23 (0.91) | 140 (5.51) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 170 (6.30) | 8 | |
| DN 100 | 10 K | 16 (0.63) | 210 (8.27) | 19 (0.75) | 151 (5.94) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 175 (6.89) | 8 | |
| | 20 K | 22 (0.87) | 225 (8.86) | 23 (0.91) | 160 (6.30) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 185 (7.28) | 8 | |
| | 40 K | 36 (1.42) | 250 (9.84) | 25 (0.98) | 165 (6.50) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 205 (8.07) | 8 | |

d: Inside diameter of gasket according to DIN 2690
$d_M$: Effective diaphragm diameter

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## More information

***Specification of process conditions for selection and ordering data***

Ambient temperature range

The standard remote seal systems are optimized for an ambient temperature range of -10 to +50 °C (14 to +122 °F). Therefore, in the ordering options, the **order code "D66" is** preset.

If the range of the ambient temperature deviates from this, you have the possibility to choose other ambient temperature ranges:

- With the **order code D67**, a range from -40 to +50 °C (-40 to +122 °F)
- With the **order code D68**, a range from -10 to +85 °C (14 to +185 °F)

In the case of a **special design**, which you can select with the **order option Y99** in the device settings, it is possible to enter the ambient temperature as a numerical value.

Process temperature

The standard optimization for the process temperature depends on the filling liquid used:

| Filling liquid | Code | Optimized temperature range as standard |
|---|---|---|
| **Silicone M50** | B | -10 ... +200 °C (14 ... +392 °F) |
| **High-temperature oil** | C | -10 ... +300 °C (14 ... +572 °F) |
| **Silicone oil M5** | A | -40 ... +140 °C (-40 ... +284 °F) |
| **Food oil (FDA-listed)** | E | -10 ... +140 °C (14 ... +284 °F) |
| **Halocarbon oil** | D | -20 ... +60 °C (-4 ... +140 °F) |
| **Neobee M20 (FDA-listed)** | R | -10 ... +140 °C (14 ... +284 °F) |

- **If the process temperatures** deviate from the temperature ranges mentioned in the table above, we ask you to send the process temperature with the **order code Y50** along with the order.
- If the remote seal has a small diameter (< DN 50/2") or a long capillary (> 4 m), we also ask you to provide the process data with the **following order code** when ordering.

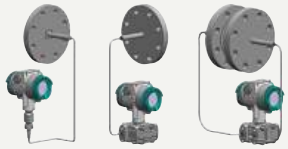
These entries are transmitted and ensure the correct functioning of the remote seal systems.

| | Order code |
|---|---|
| **Ambient temperature range** | |
| • -10 ... +50 °C (14 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (14 ... +185 °F) | **D68** |
| **Process temperature min. ... °C/(°F)/max. ... °C/(°F)** | **Y50** |

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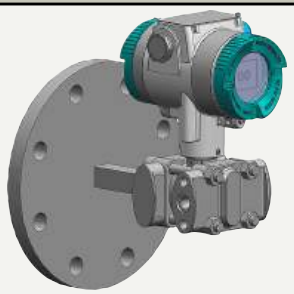
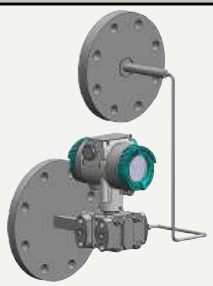
## Overview

| Type | 7MF0800, 7MF0801, 7MF0802 | | 7MF0810, 7MF0811, 7MF0812 | |
|---|---|---|---|---|
| |  | |  | |
| **Description** | Diaphragm seal | | Diaphragm seal | |
| **Application** | For the process industry | | For the process industry | |
| **Version** | Sandwich design | | Flange design | |
| **Type** | Flexible with flexible capillary | | Flexible with flexible capillary | |
| **Article No.** | 7MF0800*, 7MF0801*, 7MF0802* | | 7MF0810*/7MF0811*/7MF0812* | |
| **Process connection standard** | **Nominal diameter** | **Nominal pressure** | **Nominal diameter** | **Nominal pressure** |
| • EN 1092-1 | DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 | PN 16 ... 400 | DN 25 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250 |
| | | | DN 40 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160 |
| | | | DN 50 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100 |
| | | | DN 80 | PN 10, PN 16, PN 25, PN 40, PN 100 |
| | | | DN 100 | PN 10, PN 16, PN 25, PN 40 |
| | | | DN 125 | PN 16, PN 40 |
| • SME B16.5 | 1", 1½", 2", 2½", 3", 4", 5" | Class 150 ... 2500 | 1″ | Class 150/300/600/1500 |
| | | | 1½″ | Class 150/300/400/600/900/1500 |
| | | | 2″ | Class 150/300/400/600/900/1500 |
| | | | 3″ | Class 150/300/600/1500 |
| | | | 4″ | Class 150/300/400/1500 |
| | | | 5″ | Class 150/300/400 |
| • J.I.S. | DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 | 10 ... 63K | DN 50, DN 80, DN 100 | 10K/20K/40K |
| **Sealing surface** | For **stainless steel** mat. no. 1.4404/316L<br>According to EN 1092-1, form B1 or ASME B16.5<br>RF 125 ... 250 AA<br>For the **other materials** according to EN 1092-1, form B2 or ASME B16.5 RFSF | | For **stainless steel** mat. no. 1.4404/316L<br>According to EN 1092-1, form B1 or ASME B16.5<br>RF 125 ... 250 AA<br>For the **other materials** according to EN 1092-1, form B2 or ASME B16.5 RFSF | |
| **Materials** | • Basic body stainless steel mat. no. 1.4404/316L<br>• Wetted parts<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>- ECTFE coating<br>- PFA coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Duplex 2205, mat. no. 1.4462<br>• Stainless steel 316L, gold plated, layer thickness approx. 25 µm | | • Basic body stainless steel mat. no. 1.4404/316L<br>• Wetted parts<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>- ECTFE coating<br>- PFA coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Duplex 2205, mat. no. 1.4462<br>• Stainless steel 316L, gold plated, layer thickness approx. 25 µm | |
| **Capillary length** | ≤ 10 m (32.8 ft), longer lengths on request | | ≤ 10 m (32.8 ft), longer lengths on request | |
| **Filling liquid** | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | |
| **Tube length** | Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84") | | Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84") | |

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## Overview (continued)

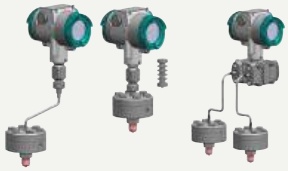
| Type | 7MF0810 | | 7MF0814 | | 7MF0813 | |
|---|---|---|---|---|---|---|
| |  | |  | |  | |
| **Description** | Diaphragm seal | | Diaphragm seal | | Diaphragm seal | |
| **Application** | For the process industry | | For the process industry | | For the process industry | |
| **Version** | Flange design | | Flange design | | Flange design | |
| **Type** | Mounted directly | | Mounted directly | | Mounting flange (with optional tube) Direct mounting at high side and with flexible capillary connected at low side | |
| **Article No.** | 7MF0810* | | 7MF0814* | | 7MF0813* | |
| **Process connection standard** | **Nominal diameter** | **Nominal pressure** | **Nominal diameter** | **Nominal pressure** | **Nominal diameter** | **Nominal pressure** |
| • EN 1092-1 | DN 25 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250 | - | - | - | - |
| | DN 40 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160 | DN 40 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160 | DN 40 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160 |
| | DN 50 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100 | DN 50 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100 | DN 50 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100 |
| | DN 80 | PN 10, PN 16, PN 25, PN 40, PN 100 | DN 80 | PN 10, PN 16, PN 25, PN 40, PN 100 | DN 80 | PN 10, PN 16, PN 25, PN 40, PN 100 |
| | DN 100 | PN 10, PN 16, PN 25, PN 40 | DN 100 | PN 10, PN 16, PN 25, PN 40 | DN 100 | PN 10, PN 16, PN 25, PN 40 |
| | DN 125 | PN 16, PN 40 | DN 125 | PN 16, PN 40 | DN 125 | PN 16, PN 40 |
| • SME B16.5 | 1″ | Class 150/300/600/-1500 | - | - | - | - |
| | 1½″ | Class 150/300/400/-600/900/1500 | 1½″ | Class 150/300/400/-600/900/1500 | 1½″ | Class 150/300/400/-600/900/1500 |
| | 2″ | Class 150/300/400/-600/900/1500 | 2″ | Class 150/300/400/-600/900/1500 | 2″ | Class 150/300/400/-600/900/1500 |
| | 3″ | Class 150/300/600/-1500 | 3″ | Class 150/300/600/-1500 | 3″ | Class 150/300/600/-1500 |
| | 4″ | Class 150/300/400/-1500 | 4″ | Class 150/300/400/-1500 | 4″ | Class 150/300/400/-1500 |
| | 5″ | Class 150/300/400 | 5″ | Class 150/300/400 | 5″ | Class 150/300/400 |
| • J.I.S. | DN 50, DN 80, DN 100 | 10K/20K/40K | DN 50, DN 80, DN 100 | 10K/20K/40K | DN 50, DN 80, DN 100 | 10K/20K/40K |
| **Sealing surface** | For **stainless steel** mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the **other materials** according to EN 1092-1, form B2 or ASME B16.5 RFSF | | For **stainless steel** mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the **other materials** according to EN 1092-1, form B2 or ASME B16.5 RFSF | | For **stainless steel** mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA For the **other materials** according to EN 1092-1, form B2 or ASME B16.5 RFSF | |

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## Overview (continued)

| Type | 7MF0810 | 7MF0814 | 7MF0813 |
|---|---|---|---|
| **Materials** | • Basic body stainless steel mat. no. 1.4404/316L<br>• Wetted parts<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>- ECTFE coating<br>- PFA coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Duplex 2205, mat. no. 1.4462<br>• Stainless steel 316L, gold plated, layer thickness approx. 25 µm | • Basic body stainless steel mat. no. 1.4404/316L<br>• Wetted parts<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>- ECTFE coating<br>- PFA coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Duplex 2205, mat. no. 1.4462<br>• Stainless steel 316L, gold plated, layer thickness approx. 25 µm | • Basic body stainless steel mat. no. 1.4404/316L<br>• Wetted parts<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>- ECTFE coating<br>- PFA coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Duplex 2205, mat. no. 1.4462<br>• Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| **Capillary length** | | | ≤ 10 m (32.8 ft), longer lengths on request |
| **Filling liquid** | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) |
| **Tube length** | Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84") | Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84") | Without tube, 50 mm (1.97"), 100 mm (3.94"), 150 mm (5.91"), 200 mm (7.87"), 250 mm (9.84") |

| Type | 7MF0840, 7MF0842 | | 7MF0850 | | 7MF0830, 7MF0832 | |
|---|---|---|---|---|---|---|
| |  | |  | |  | |
| **Description** | Diaphragm seal | | Diaphragm seal | | Diaphragm seal | |
| **Application** | For the process industry | | For the process industry | | For the process industry | |
| **Version** | With inner membrane (nominal diameter 50/2"), process connection: open | | Mounted directly | | Flange design | |
| **Type** | Direct mounting or connected via flexible capillary | | Remote seal, miniature type | | With quick release, with flexible capillary or direct mounting | |
| **Article No.** | 7MF0840*, 7MF0842* | | 7MF0850* | | 7MF0830*, 7MF0832* | |
| **Process connection standard, nominal diameter and rated pressure** | **Nominal diameter** | **Nominal pressure** | **Nominal diameter** | **Nominal pressure** | **Nominal diameter** | **Nominal pressure** |
| | ***Open flange according to EN 1092-1*** | | ***DIN 3852, form A*** | | ***DIN 11851 with groove nut*** | |
| | DN 15 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250 | G 1" | PN 400 | DN 25, DN 32, DN 40 | PN 40 |

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## Overview (continued)

| Type | 7MF0840, 7MF0842 | | 7MF0850 | | 7MF0830, 7MF0832 | |
|---|---|---|---|---|---|---|
| **Process connection standard, nominal diameter and rated pressure** | DN 20 | PN 10, PN 16, PN 25, PN 40 | G 1½" | PN 250 | DN 50, DN 65, DN 80 | PN 25 |
| | DN 25 | PN 10, PN 16, PN 25, PN 40, PN 63, PN 100, PN 160, PN 250 | G 2" | PN 250 | ***DIN 11851 with thread*** | |
| | ***Open flange per ASME B16.5*** | | ***ASME B1.20.1*** | | DN 25, DN 32, DN 40 | PN 40 |
| | ½", ¾", 1" | Class 150/300/600/-1500 | 1" NPT-M | Class 3625 | DN 50, DN 65, DN 80 | PN 25 |
| | ***Thread according to EN 837-1*** | | 1½" NPT-M | Class 1450 | ***Clamp ISO 2852*** | |
| | G¼"B, G½"B, G¾"B, G1"B | PN 100, PN 250 | 2" NPT-M | Class 1450 | DN 25, DN 38, DN 51 | PN 16 |
| | ***Thread per ASME B1.20.1*** | | | | DN 63.5, DN 76.1 | PN 10 |
| | ¼" NPT-M, ¼" NPT-F | Class 1500/3675 | | | ***Clamp DIN 32676, series C*** | |
| | ½" NPT-M, ½" NPT-F | Class 1500/3675 | | | 1", 1½" | PN 25 |
| | ¾" NPT-M, ¾" NPT-F | Class 1500/3675 | | | 2", 2½" | PN 16 |
| | 1" NPT-M, 1" NPT-F | Class 1500/3675 | | | 3" | PN 10 |
| | | | | | ***Clamp DIN 32676, series A metric*** | |
| | | | | | DN 25, DN 32, DN 40 | PN 25 |
| | | | | | DN 50 | PN 16 |
| | | | | | DN 65 | PN 10 |
| | | | | | ***Varivent*** | |
| | | | | | DN 25, DN 32, DN 40, DN 50 | PN 25 |
| | | | | | ***DRD flange*** | |
| | | | | | DN 50 | PN 40 |
| **Sealing surface** | For **stainless steel** mat. no. 1.4404/316L According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA | | | | | |
| **Materials** | **Base**:<br>• Stainless steel, mat. no. 1.4404/316L<br>**Membrane**:<br>• Stainless steel, mat. no. 1.4404/316L<br>- No coating<br>- PTFE coating<br>• Monel 400, mat. no. 2.4360<br>• Hastelloy C276, mat. no. 2.4819<br>• Hastelloy C4, mat. no. 2.4610<br>• Hastelloy C22, mat. no. 2.4602<br>• Tantalum<br>• Titanium, mat. no. 3.7035<br>• Nickel 201<br>• Stainless steel 316L, gold-plated, layer thickness approx. 25 µm | | **Basic body**:<br>• Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819<br>**Membrane**:<br>• Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 | | **Basic body**:<br>• Stainless steel, mat. no. 1.4404/316L<br>**Wetted parts**:<br>• Stainless steel, mat. no. 1.4404/316L<br>**Capillary**:<br>• Stainless steel | |
| **Capillary length** | ≤ 10 m (32.8 ft), longer lengths on request | | | | ≤ 10 m (32.8 ft), longer lengths on request | |
| **Filling liquid** | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | | Silicone oil M5, food oil (FDA listed), Neobee M20 (FDA listed) | | Food oil (FDA-listed), Neobee M20 (FDA-listed) | |

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## Overview (continued)

| Type | 7MF0900, 7MF0902 | 7MF0930 | 7MF4925 |
|---|---|---|---|
| |  |  |  |
| **Description** | Diaphragm seal | Diaphragm seal | Flushing ring |
| **Application** | For the process industry | For the process industry | For the process industry |
| **Version** | Inline seal | Inline seal | |
| **Type** | In sandwich design, direct mounting or with a flexible capillary | With quick release, flange type design, with flexible capillary or direct mounting | Flushing ring for diaphragm seals 7MF0800 to 7MF0814 |
| **Article No.** | 7MF0900*, 7MF0902* | 7MF0930* | 7MF4925* |
| **Process connection standard, nominal diameter and rated pressure** | ***EN 1092-1***<br>DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 — PN 6 ... 100<br>***ASME B16.5***<br>1", 1½", 2", 2½", 3", 4", 5" — Class 150 ... 2500 | ***DIN 11851 with thread***<br>DN 25, DN 32, DN 40 — PN 40<br>DN 50, DN 65, DN 80 — PN 25<br>***Clamp ISO 2852***<br>DN 25, DN 38, DN 51 — PN 16<br>DN 63.5, DN 76.1, DN 51 — PN 10<br>***Clamp DIN 32676, series C***<br>1", 1½" — PN 25<br>2", 2½" — PN 16<br>3" — PN 10<br>***Clamp DIN 32676, series A metric***<br>DN 25, DN 32, DN 40 — PN 25<br>DN 50 — PN 16<br>DN 65 — PN 10 | ***EN 1092-1 1***<br>DN 50, DN 80, DN 100, DN 125 — PN 16 ... 100<br>***ASME B 16.5***<br>2", 3", 4", 5" — Class 150 ... 600 |
| **Sealing surface** | For **stainless steel** mat. no. 1.4404/316L<br>According to EN 1092-1, form B1 or<br>ASME B16.5 RF 125 ... 250 AA<br>For the **other materials** Smooth according to EN 1092-1, form B2 or<br>ASME B16.5 RFSF | | ***EN 1092-1***<br>Form B1<br>Form B2<br>Form D/Form D<br>Form C/Form C<br>Form D/Form C<br>Form E<br>Form F<br>***ASME B16.5***<br>RF 125 ... 250 AA<br>RFSF<br>RJF ring groove |
| **Materials** | ***Main body***<br>Stainless steel, mat. no. 1.4404/316L<br>***Diaphragm***<br>Stainless steel, mat. no. 1.4404/316L<br>***Wetted parts***<br>Stainless steel, mat. no. 1.4404/316L, no coating<br>***Capillary***<br>Stainless steel | ***Main body***<br>Stainless steel, mat. no. 1.4404/316L<br>***Diaphragm***<br>Stainless steel, mat. no. 1.4404/316L<br>***Capillary***<br>Stainless steel | Stainless steel 1.4404/316L |

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## Overview (continued)

| Type | 7MF0900, 7MF0902 | 7MF0930 | 7MF4925 |
|---|---|---|---|
| Capillary length | ≤ 10 m (32.8 ft), longer lengths on request | ≤ 10 m (32.8 ft), longer lengths on request | |
| Filling liquid | Silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil (for O2 measurements), food oil (FDA listed), Neobee M20 (FDA listed) | Silicone oil M5, food oil (FDA listed), Neobee M20 (FDA listed) | Food oil (FDA-listed), Neobee M20 (FDA-listed)<br><br>Flushing holes (2 units), female thread: G¼, G½, ¼-18 NPT, ½-14 NPT |

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## Overview

In many cases, the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the following SITRANS P320/420 pressure transmitter series:

- Gauge pressure
- Absolute pressure
- Differential pressure and flow

***Note***

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical specification". Only then will the remote seal work to optimum effect.

## Benefits

- No direct contact between pressure transmitter and medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- Available in many versions
- Specially designed for difficult operating conditions
- Quick-release versions available for the food industry

## Application

Remote seal systems should be used when it is necessary or expedient to separate the medium and measuring instrument.

Some examples of such cases:

- The medium temperature is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials that are not available for the pressure transmitter.
- The medium is highly viscous or has a high solids content and would block the sample chambers of the pressure transmitter.
- The medium could freeze in the sample chambers or the pulse cable.
- The medium is heterogeneous or fibrous.
- The medium has a tendency towards polymerization or crystallization.
- The process requires quick-release remote seals, as required in the food & beverages industry for fast cleaning, for example.
- The process requires cleaning of the measuring point, like in a batch process, for example.

## Design

A remote seal system consists of the following components.

- Pressure transmitter
- One or two remote seals
- Filling liquid
- Connection between the pressure transmitter and remote seal (direct mounting or via a capillary)

The space for the medium is sealed off with a flat embedded elastic diaphragm. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary must be connected between the remote seal and the pressure transmitter in order, for example, to reduce the temperature effects on the pressure transmitter when the measured medium is hot.

However, the capillary influences the response time and the temperature response of the overall remote seal system. When capillaries are used to connect a remote seal to a pressure transmitter for differential pressure, two capillaries of equal length must always be used.

Optionally, the remote seal with diaphragm extension (tube) can be ordered.

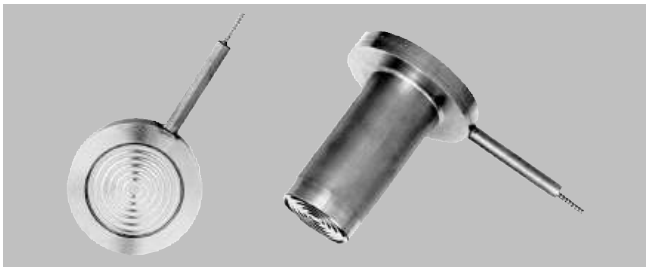
The remote seals in sandwich design are secured with a blank flange.

***Designs***

Diaphragm seal

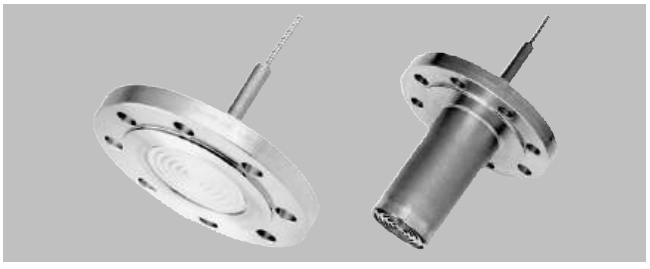
With diaphragm seals, the pressure is sensed by a flat embedded diaphragm.

Diaphragm seals are differentiated as follows:



Diaphragm seal in sandwich design without (left) and with diaphragm extension (tube)

- Sandwich design
- Sandwich design with diaphragm extension (tube) according to EN or ASME and secured with a blank flange



Diaphragm seal in flange design without (left) and with diaphragm extension (tube)

- Flange design

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## Design (continued)

- Flange design with diaphragm extension (tube) according to EN or ASME and secured using holes on the flange



Quick-release diaphragm seal

- Remote seal with quick release, e.g., according to DIN 11851, SMS Standard, IDF Standard, APV-RJF Standard, clamp connection, etc.
- Miniature remote seal with male thread for screwing into threaded holes
- Remote seal with customer-specific process connections

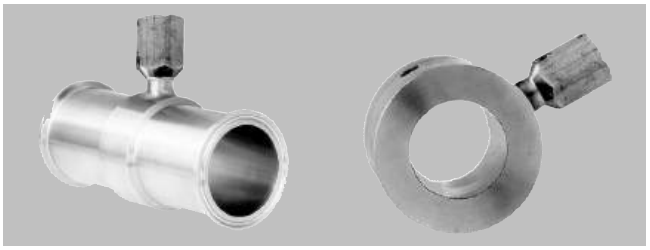


Miniature diaphragm seal with flush-mounted diaphragm

- Miniature diaphragm seal

Remote seals with quick release are used mainly in the food industry. Their design means that the medium cannot accumulate in dead volumes. The remote seal's quick release mechanism enables fast disassembly for cleaning.

Inline seal



Quick-release inline seal (left) and for flange mounting

With inline seals, the pressure is sensed using a cylindrical diaphragm inside the pipe and then transmitted with the filling liquid to the pressure transmitter.

## Design (continued)

The inline seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Because it is completely integrated in the process line, there are no turbulences, dead spaces or other obstacles in the flow direction. The inline seal is also piggable.

Inline seals are differentiated as follows:

- Quick-release inline seal, e.g., according to DIN 11851, SMS Standard, IDF Standard, APV/RJF Standard, clamp connection, etc. The remote seal's quick release mechanism enables fast disassembly for cleaning.
- Inline seal for flange mounting according to EN or ASME
- Inline seal with customer-specific process connections

***Note:***

The pressure information on the transmitter and the remote seal must be observed in accordance with the pressure-temperature relationship.

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## Function

The measured pressure is transferred to the filling liquid by the diaphragm and enters the measuring chamber of the pressure transmitter through the capillary. The filling liquid completely fills the inside of the diaphragm seal, the capillary and the measuring chamber of the pressure transmitter so that it is free of gas.

***Transmission response***

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

Temperature error

Temperature errors are caused by changes in the volume of the filling liquid as a result of temperature fluctuations. To select the right remote seal, you must calculate the temperature error.

Below is an overview of the factors which affect the extent of the temperature error, and information on how to calculate the temperature error.

The temperature error depends on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Effect of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Inside diameter of the capillary: The greater the inside diameter, the greater the temperature error
- Capillary length: The longer the capillary, the greater the temperature error

Diaphragm rigidity

The rigidity of the diaphragm is extremely important. The greater the diameter of the diaphragm, the softer the diaphragm and the more sensitive it is to temperature-induced changes in the volume of the filling liquid.

Large-diameter diaphragms are therefore always required for small measuring ranges.

Apart from diaphragm rigidity, the following factors are also important:

- Diaphragm thickness
- Diaphragm material
- Any coatings

Filling liquid

Temperature fluctuations cause volume changes in all filling liquids. Choosing the right filling liquid can minimize the temperature error; however, the filling liquid must be appropriate for the temperature limits and operating pressure. The filling liquid must also be harmless to health.

There is filling liquid underneath the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank). The temperature error must therefore be calculated separately for each combination.

**Note**:

A vacuum-resistant remote seal is recommended for continuous negative pressure operation at 500 mbar a or below, including during commissioning (see ordering data).

You can find an example of how to calculate the temperature error in "Technical specifications".

Adjustment time

The adjustment time depends on the following factors:

- Inside diameter of the capillary: The greater the inside diameter, the shorter the adjustment time.
- Filling liquid viscosity: The greater the viscosity, the longer the adjustment time.
- Capillary length: The longer the capillary, the longer the adjustment time.
- Pressure in the pressure measurement system: The higher the pressure, the shorter the adjustment time.

***Recommendations***

For the best possible pressure transmitter and remote seal combination, please note the following:

- Use a diameter as large as possible for the remote seal. This makes the effective diameter of the remote seal diaphragms larger and reduces the temperature error.
- Use a capillary as short as possible. This reduces the adjustment time and the temperature error.
- Use the filling liquid with the lowest viscosity and smallest coefficients of expansion. Make sure, however, that the filling liquid meets the high-pressure, low-pressure and temperature process requirements. The filling liquid and the medium must also be compatible.
- Please note the following points for operation in the negative pressure range:
  - The pressure transmitter must always be positioned below the lowest shank.
  - The operating range of some filling liquids may be extremely limited in terms of the permissible temperature of the medium.
  - A vacuum-resistant remote seal is required for continuous operation in the low-pressure range.
- You can find recommendations for the minimum measuring span in "Technical specifications".

***Note***

The remote seals listed here are merely a selection of the most common remote seals. As there is a wide range of process connections, this list may not include all remote seals available.

Other versions may include:

- Different process connections and standards
- Aseptic or sterile screw glands
- Different dimensions
- Different nominal pressures
- Special diaphragm materials and coatings
- Different sealing surfaces
- Different filling liquids
- Different capillary lengths
- Capillary sheathed in protective tubing
- Calibration at higher/lower temperatures, etc.

***Please contact your local Siemens office for further information.***

***Negative pressure service***

Filling liquids, such as silicone oils, inert or those suitable for food, are used in remote seal systems for transmission of the process pressure to the pressure transmitter.

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## Function (continued)

In each liquid, particles have the tendency to leave the liquid compound with increasing temperature (transition from liquid to gaseous aggregate state). This means the vapor pressure increases with increasing temperature and is dependent on the substance or mixture present.

The higher the temperature and the lower the associated process pressure in the liquid, the more difficult it is to guarantee the desired transmission properties of the remote seal's filling liquid and therefore the measuring arrangement.

In addition, the sealing elements at the transmitter must be designed so that a diffusion of molecules from the atmosphere into the remote seal system is prevented due to the constantly occurring negative pressure.

In addition to the influencing variables process pressure and process temperature, the vapor pressure curve of the filling liquid at the remote seal end and the stiffness of the remote seal membrane impact the functionality of the remote seal in the negative pressure range.

This means you have to pay special attention to the physical properties of filling liquids with applications in the negative pressure range.

There are three stages for the negative pressure resistance:

- **Standard version** of the remote seal without additional protective measures, suitable for the overpressure range and low negative pressure range. This design is identified with (1) in the diagrams below.
- **Negative pressure service** with suitable seals and treated filling liquid, identified with (2) in the diagrams below. Here you select the order codes D81 or D83, depending on the mounting type.
- **Extended negative pressure service** with more extended treatment of the filling liquid and the remote seals, identified in the diagrams below with (3). Here you select the order codes D85 or D88, depending on the mounting type.

There are two more areas in the charts. The area (4) identifies an area that has to be clarified with Technical Support prior to placing the order. The area (5) describes the area in which the remote seal filling liquid is permanently destroyed and the entire remote seal is therefore without function.

Technical specifications of the remote seal filling liquids

| Filling liquid | Reference in the article no. | Density at 20 °C (68 °F) [kg/dm³] | Viscosity at 20 °C (68 °F) [mm²/s] | Suitable for negative pressure service | Suitable for extended negative pressure service |
|---|---|---|---|---|---|
| Silicone oil M5 | A | 0.914 | 4 | x | - |
| Silicone oil M50 | B | 0.966 | 50 | x | x |
| High-temperature oil | C | 1.079 | 57 | x | x |
| Halocarbon oil | D | 1.968 | 14 | x | - |
| Food oil (FDA-listed) | E | 0.920 | 10 | x | x |
| Neobee M20 | R | 0.921 | 10 | x | x |

The suitable negative pressure service is specified with the pressure/temperature curves of the respective liquids described below.

**Note:** For reasons of operational safety, the transmitter must not exceed the height of the remote seal - with differential pressure applications, the height of the bottom remote seal - for measurements in the negative pressure range. The associated mounting types B, C1, C2 or H are described at the end of this section under the topic "Measuring arrangements".

***Selection of the required negative pressure service***

The procedure for determining the required negative pressure service is described below using the silicone oil M5 as filling liquid. The minimum existing process pressure of a fictitious process is 200 $mbar_{abs}$ (2.9 psi) (at a maximum process temperature of 150 °C (302 °F). This intersection is identified by an "X" in the chart below. This means the negative pressure service D81 or D83 (depending on the application) is sufficient in this example.

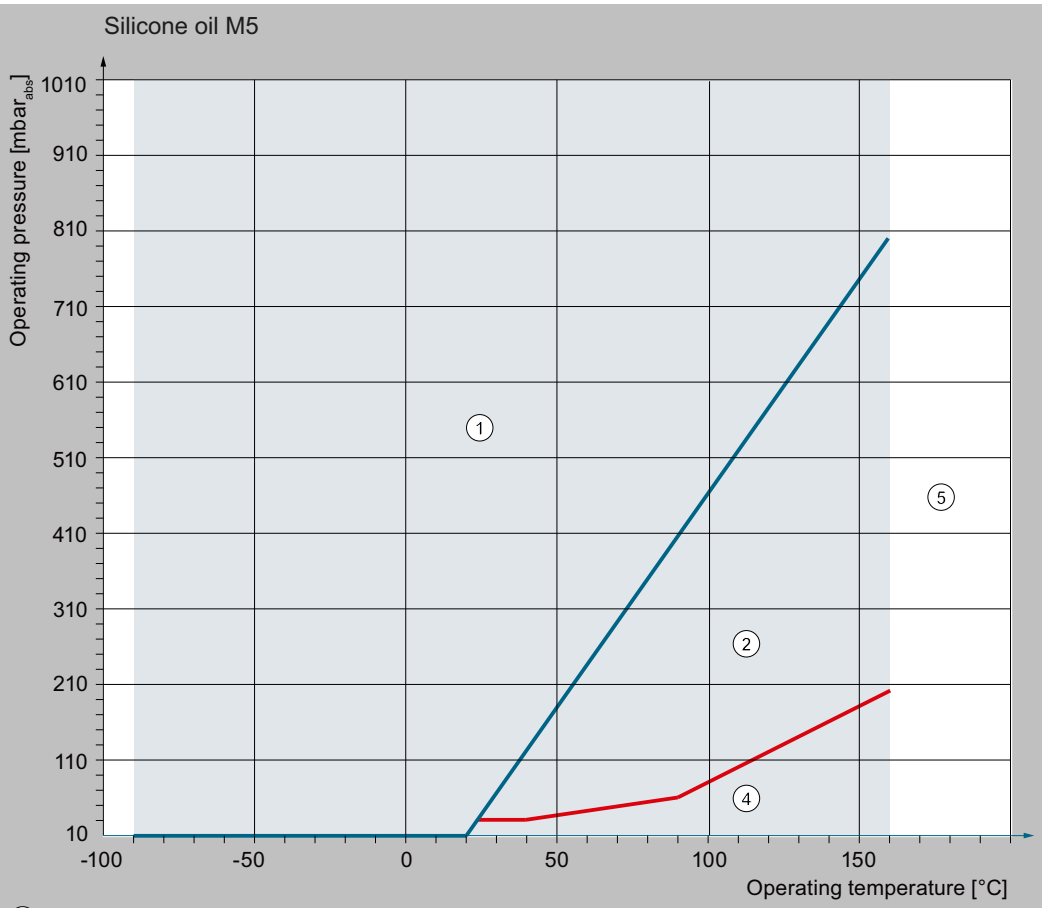
The suitable negative pressure resistance is determined this way for all other filling liquids also.

***Note:***
***Note the response times according to the table "Response times" (see Technical specifications).***

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## Function (continued)




(1) Operating range of the standard remote seal design without special measures.

(2) Operating range for which the **negative pressure service D81 or D83** is required.
Note: An extended negative pressure service is **not** possible for this fill fluid.

(4) Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.

(5) Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

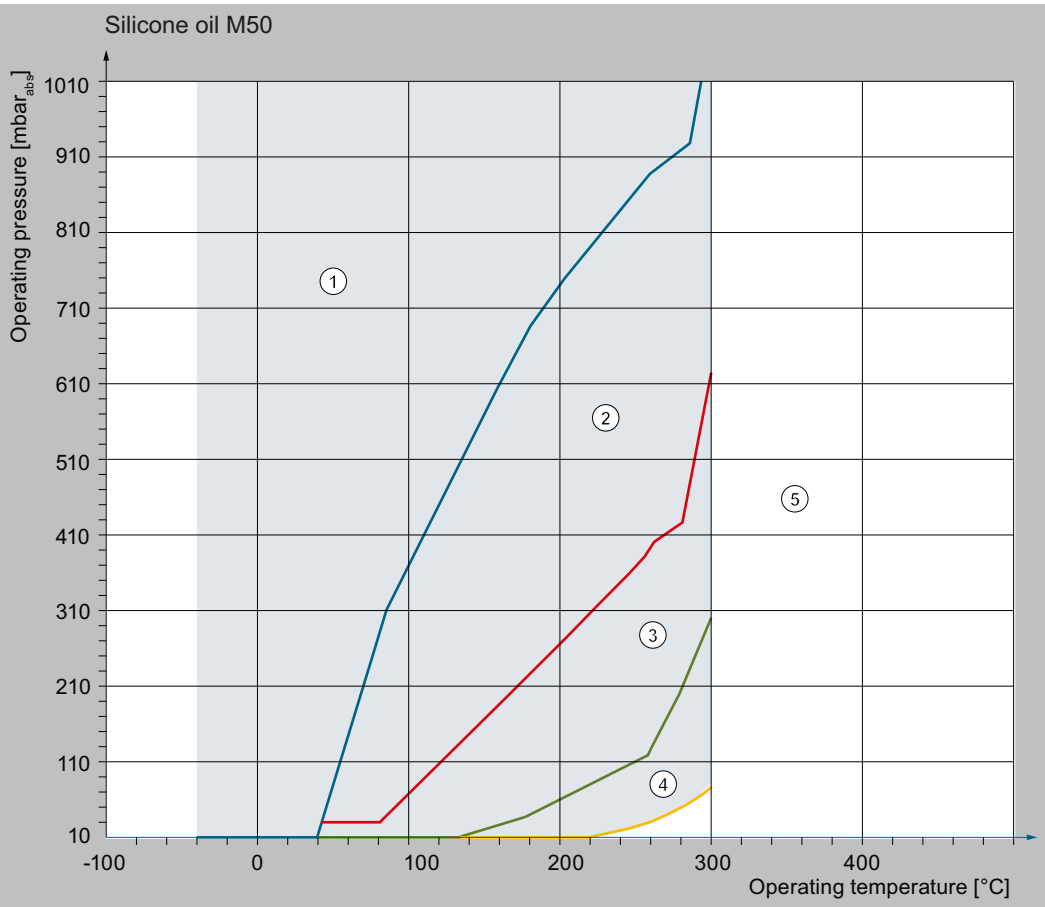
Permissible operating range:
Max. temperature limit: 160 °C
Min. temperature limit: -90 °C

Negative pressure applications with silicone oil M5

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## Function (continued)




(1) Operating range of the standard remote seal design without special measures.

(2) Operating range for which the **negative pressure service D81 or D83** is required.

(3) Operating range for which the **extended negative pressure service D85 or D88** is required

(4) Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.

(5) Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

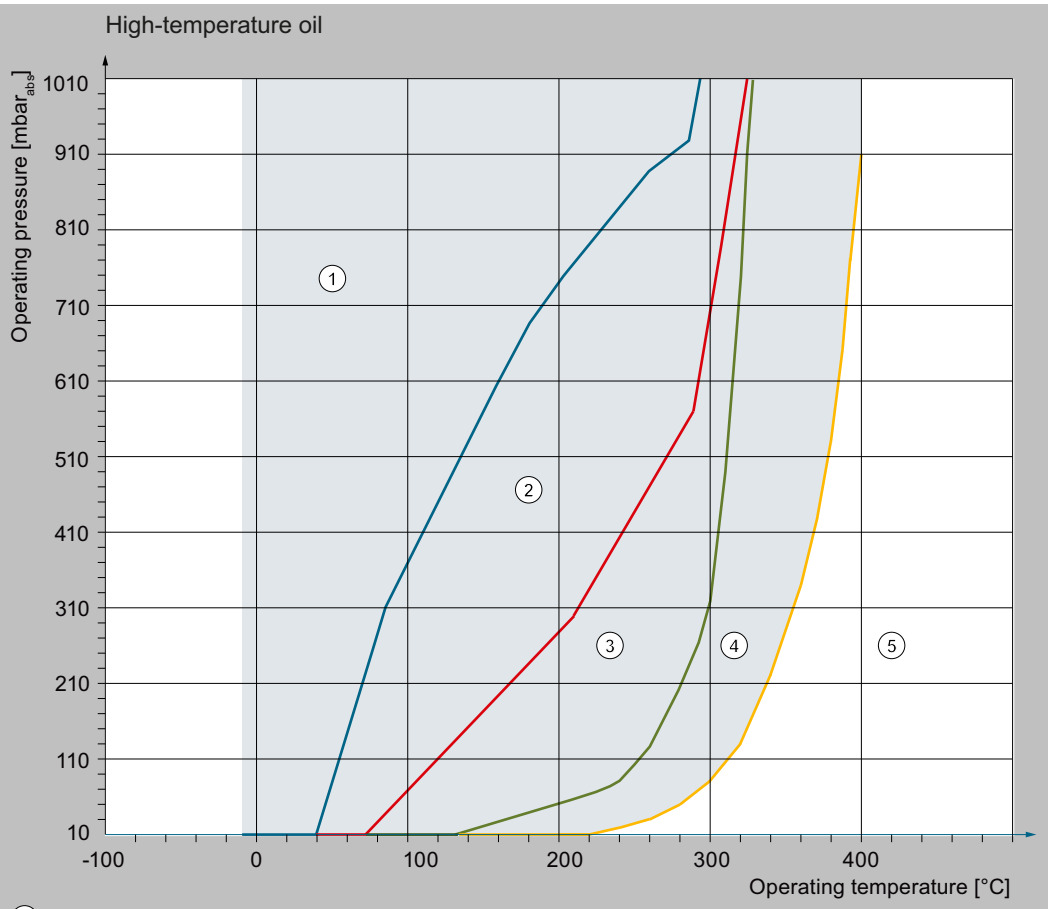
Permissible operating range:
Max. temperature limit: 300 °C
Min. temperature limit: -40 °C

Negative pressure applications with silicone oil M50

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## Function (continued)




1. Operating range of the standard remote seal design without special measures.
2. Operating range for which the **negative pressure service D81 or D83** is required.
3. Operating range for which the **extended negative pressure service D85 or D88** is required
4. Please contact Technical Support for applications in this area.
   Detailed information regarding application, process and ambient data are necessary.
5. Area in which you have to expect the destruction of the fill fluid.
   A function of the remote seal is not specified here.

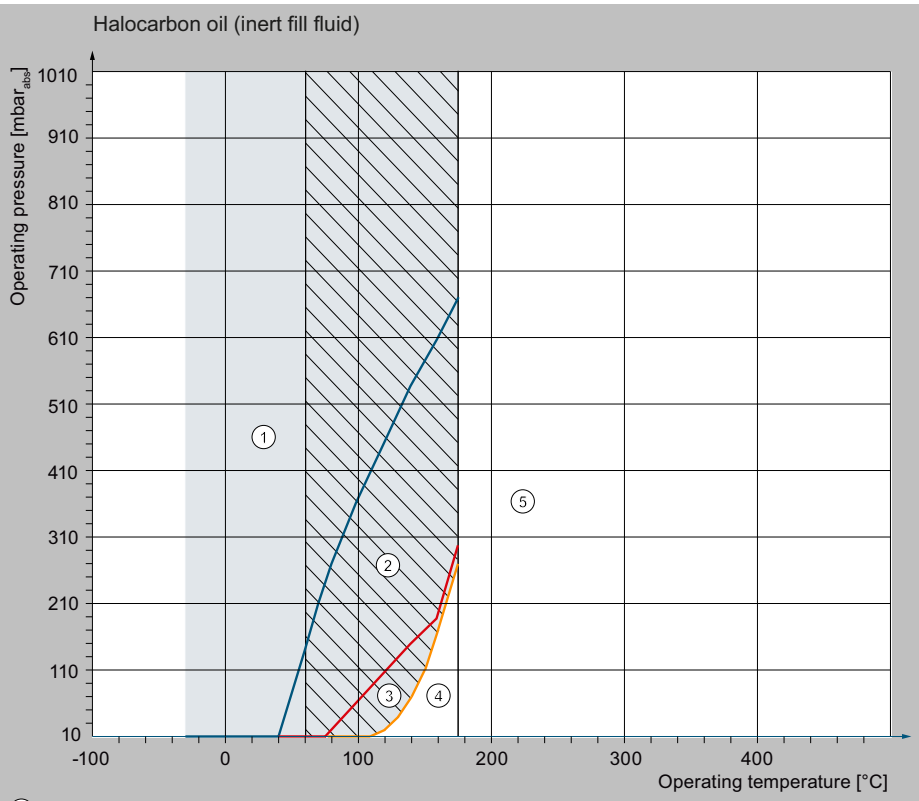
Permissible operating range:
Max. temperature limit: 400 °C
Min. temperature limit: -10 °C

Negative pressure applications with high-temperature oil

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## Function (continued)




1. Operating range of the standard remote seal design without special measures.
2. Operating range for which the **negative pressure service D81 or D83** is required.
3. Operating range for which the extended **negative pressure service D85 or D88** is required.
4. Please contact Technical Support for applications in this area.
   Detailed information regarding application, process and ambient data are necessary.
5. Area in which you have to expect the destruction of the fill fluid.
   A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 175 °C
Min. temperature limit: -30 °C

Oxygen application for operating temperature between 60 and 175 °C
and also for operating pressure > 50 bar not permissible.

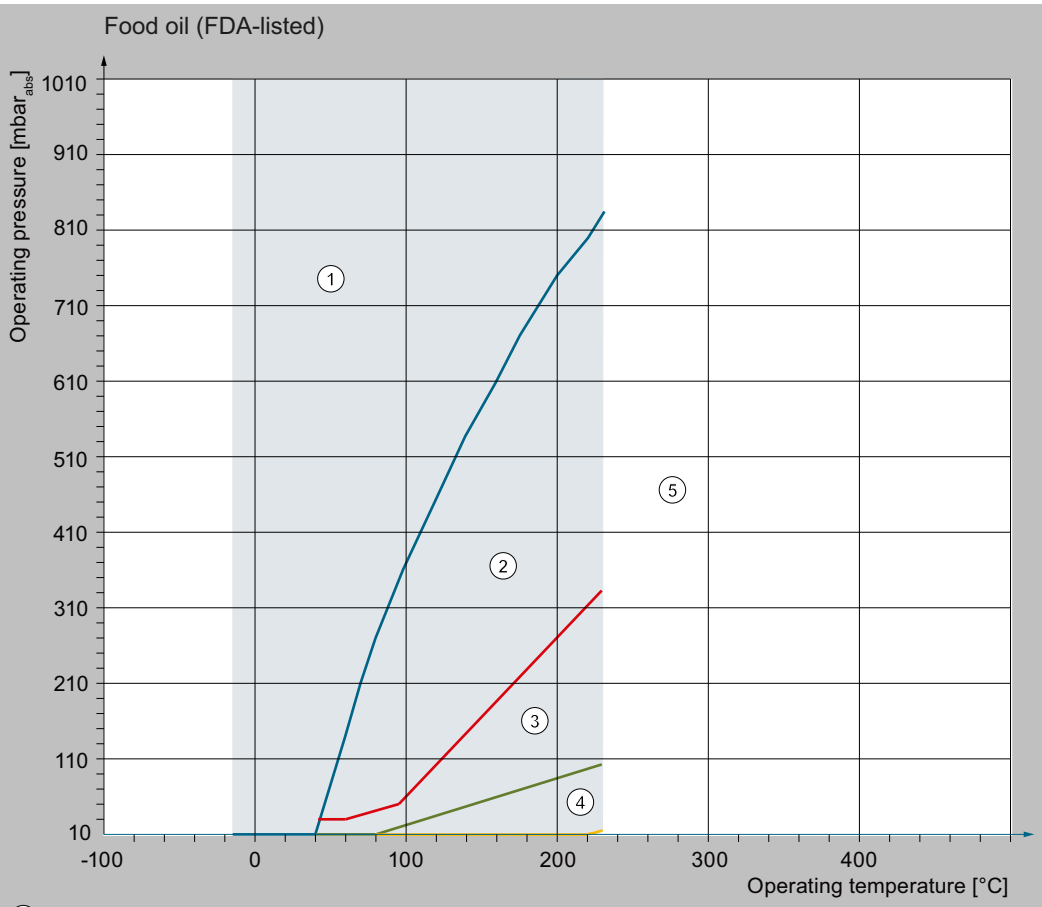
Negative pressure applications with halocarbon oil (inert filling liquid)

A BAM approval for process temperatures up to 60 °C (140 °F) and system pressures up to 50 bar (725 psi) is available for the oxygen application.

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## Function (continued)




(1) Operating range of the standard remote seal design without special measures.

(2) Operating range for which the **negative pressure service D81 or D83** is required.

(3) Operating range for which the **extended negative pressure service D85 or D88** is required

(4) Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.

(5) Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

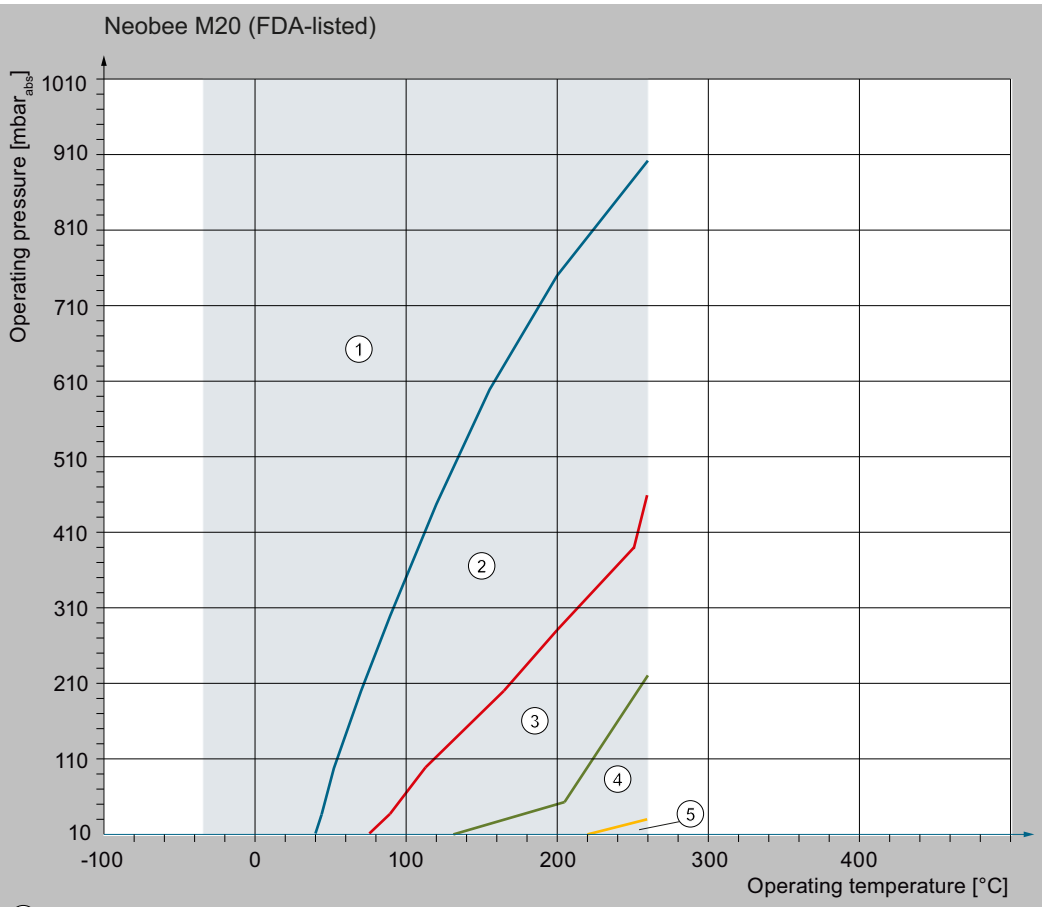
Permissible operating range:
Max. temperature limit: 230 °C
Min. temperature limit: -15 °C

Negative pressure applications with food oil (FDA-listed)

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## Function (continued)




(1) Operating range of the standard remote seal design without special measures.

(2) Operating range for which the **negative pressure service D81 or D83** is required.

(3) Operating range for which the **extended negative pressure service D85 or D88** is required

(4) Please contact Technical Support for applications in this area.
Detailed information regarding application, process and ambient data are necessary.

(5) Area in which you have to expect the destruction of the fill fluid.
A function of the remote seal is not specified here.

Permissible operating range:
Max. temperature limit: 260 °C
Min. temperature limit: -35 °C

Negative pressure applications with Neobee M20 (FDA-listed)

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## Technical specifications

***Diaphragm seal temperature error***

Temperature errors of diaphragm seals when connected to pressure transmitters for gauge pressure, absolute pressure, differential pressure (single-sided) and level

Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel

With selected order code W01:

- The values listed in the table for "High-temperature oil" filling liquid and for the wetted parts made of stainless steel 316L, mat no. 1.4404/1.4435, apply.
- For the other filling liquids, the following supplements must be applied to the determined table values for the temperature errors[1]:
  - For "FDA oil": 5%
  - For "Silicone oil M5": 35%
  - For "Silicone oil M50": 35%
  - For "Halocarbon oil": 20%
  - For "Neobee M20": 20%

[1] The specified surcharges for the various wetted parts are unaffected. They still need to be included in the calculation.

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of remote seal $f_{RS}$ | | Temperature error of capillary $f_{Cap}$ | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar/(10 K · $m_{Cap}$) | (psi/(10 K · $m_{Cap}$)) |
| **Sandwich design or with flange according to EN 1092-1** | DN 25 without tube | 27 | (1.06) | 5 | (0.073) | 16 | (0.232) |
| | DN 40 without tube | 40 | (1.57) | 1.6 | (0.023) | 2.9 | (0.042) |
| | DN 50 without tube | 59 | (2.32) | 1.5 | (0.022) | 2 | (0.029) |
| | DN 50 with tube | 45 | (1.89) | 5 | (0.073) | 10 | (0.145) |
| | DN 80 without tube | 89 | (3.50) | 0.2 | (0.003) | 0.2 | (0.003) |
| | DN 80 with tube | 72 | (2.83) | 1 | (0.015) | 1 | (1.015) |
| | DN 100 without tube | 89 | (3.50) | 0.2 | (0.003) | 0.4 | (0.006) |
| | DN 100 with tube | 89 | (3.50) | 0.4 | (0.006) | 0.4 | (0.006) |
| | DN 125 without tube | 124 | (4.88) | 0.2 | (0.003) | 0.1 | (0.002) |
| | DN 125 with tube | 124 | (4.88) | 0.2 | (0.003) | 0.1 | (0.002) |
| **Sandwich design or with flange according to ASME B16.5** | 1 inch without tube | 27 | (1.06) | 5 | (0.073) | 16 | (0.232) |
| | 1½ without tube | 40 | (1.57) | 1.6 | (0.023) | 2.9 | (0.042) |
| | 2 inches without tube | 59 | (2.32) | 1.5 | (0.022) | 2 | (0.029) |
| | 2 inches with tube | 45 | (1.89) | 5 | (0.073) | 10 | (0.145) |
| | 3 inches without tube | 89 | (3.50) | 0.2 | (0.003) | 0.2 | (0.003) |
| | 3 inches with tube | 72 | (2.83) | 1 | (0.015) | 1 | (1.015) |
| | 4 inches without tube | 89 | (3.50) | 0.2 | (0.003) | 0.4 | (0.006) |
| | 4 inches with tube | 89 | (3.50) | 0.4 | (0.006) | 0.4 | (0.006) |
| | 5 inches without tube | 124 | (4.88) | 0.2 | (0.003) | 0.1 | (0.002) |
| | 5 inches with tube | 124 | (4.88) | 0.2 | (0.003) | 0.1 | (0.002) |
| **Remote seal with union nut according to DIN 11851** | DN 25 | 25 | (0.98) | 20 | (0.290) | 60 | (0.870) |
| | DN 32 | 32 | (1.26) | 8 | (0.116) | 25 | (0.363) |
| | DN 40 | 40 | (1.57) | 4 | (0.058) | 10 | (0.145) |
| | DN 50 | 52 | (2.05) | 4 | (0.058) | 5 | (0.073) |
| | DN 65 | 59 | (2.32) | 3 | (0.044) | 4 | (0.058) |
| | DN 80 | 72 | (2.83) | 1 | (0.015) | 1 | (0.015) |
| **Remote seal, screw gland design** | DN 50 | 52 | (2.05) | 4 | (0.058) | 5 | (0.073) |
| **Remote seal with screwed connector according to DIN 11851** | DN 25 | 25 | (0.98) | 20 | (0.290) | 60 | (0.870) |
| | DN 32 | 32 | (1.26) | 8 | (0.116) | 25 | (0.363) |
| | DN 40 | 40 | (1.57) | 4 | (0.058) | 10 | (0.145) |
| | DN 50 | 52 | (2.05) | 4 | (0.058) | 5 | (0.073) |
| | DN 65 | 59 | (2.32) | 3 | (0.044) | 4 | (0.058) |
| | DN 80 | 72 | (2.83) | 1 | (0.015) | 1 | (0.015) |
| **Clamp connection** | 1½ inches | 32 | (1.26) | 8 | (0.116) | 25 | (0.363) |
| | 2 inches | 40 | (1.57) | 4 | (0.058) | 10 | (0.145) |
| | 2½ inches | 59 | (2.32) | 3 | (0.044) | 5 | (0.073) |

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## Technical specifications (continued)

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of remote seal $f_{RS}$ | | Temperature error of capillary $f_{Cap}$ | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar/(10 K · $m_{Cap}$) | (psi/(10 K · $m_{Cap}$)) |
| | 3 inches | 72 | (2.83) | 1 | (0.015) | 1 | (0.015) |
| **Miniature diaphragm seal** | G1B | 25 | (0.98) | 20 | (0.290) | 60 | (0.870) |
| | G1½B | 40 | (1.57) | 4 | (0.058) | 10 | (0.145) |
| | G2B | 52 | (2.05) | 4 | (0.058) | 5 | (0.073) |

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of process flange/connection shank $f_{PF}$ | | Recommended min. measuring spans (guidance values, note temperature error) | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| **Sandwich design or with flange according to EN 1092-1** | DN 25 without tube | 27 | (1.06) | 23.6 | (0.342) | 4000 | (58) |
| | DN 40 without tube | 40 | (1.57) | 4.3 | (0.062) | 1000 | (14.5) |
| | DN 50 without tube | 59 | (2.32) | 2 | (0.029) | 200 | (2.90) |
| | DN 50 with tube | 45 | (1.89) | 10 | (0.145) | 500 | (7.25) |
| | DN 80 without tube | 89 | (3.50) | 0.2 | (0.003) | 100 | (1.45) |
| | DN 80 with tube | 72 | (2.83) | 1 | (1.015) | 250 | (3.63) |
| | DN 100 without tube | 89 | (3.50) | 0.4 | (0.006) | 100 | (1.45) |
| | DN 100 with tube | 89 | (3.50) | 0.4 | (0.006) | 100 | (1.45) |
| | DN 125 without tube | 124 | (4.88) | 0.1 | (0.002) | 20 | (0.29) |
| | DN 125 with tube | 124 | (4.88) | 0.1 | (0.002) | 20 | (0.29) |
| **Sandwich design or with flange according to ASME B16.5** | 1 inch without tube | 27 | (1.06) | 23.6 | (0.342) | 4000 | (58) |
| | 1½ without tube | 40 | (1.57) | 4.3 | (0.062) | 1000 | (14.5) |
| | 2 inches without tube | 59 | (2.32) | 2 | (0.029) | 200 | (2.90) |
| | 2 inches with tube | 45 | (1.89) | 10 | (0.145) | 500 | (7.25) |
| | 3 inches without tube | 89 | (3.50) | 0.2 | (0.003) | 100 | (1.45) |
| | 3 inches with tube | 72 | (2.83) | 1 | (1.015) | 250 | (3.63) |
| | 4 inches without tube | 89 | (3.50) | 0.4 | (0.006) | 100 | (1.45) |
| | 4 inches with tube | 89 | (3.50) | 0.4 | (0.006) | 100 | (1.45) |
| | 5 inches without tube | 124 | (4.88) | 0.1 | (0.002) | 20 | (0.29) |
| | 5 inches with tube | 124 | (4.88) | 0.1 | (0.002) | 20 | (0.29) |
| **Remote seal with union nut according to DIN 11851** | DN 25 | 25 | (0.98) | 60 | (0.870) | 6000 | (87) |
| | DN 32 | 32 | (1.26) | 25 | (0.363) | 4000 | (58) |
| | DN 40 | 40 | (1.57) | 10 | (0.145) | 2000 | (29) |
| | DN 50 | 52 | (2.05) | 5 | (0.073) | 500 | (7.25) |
| | DN 65 | 59 | (2.32) | 4 | (0.058) | 500 | (7.25) |
| | DN 80 | 72 | (2.83) | 1 | (0.015) | 250 | (3.63) |
| **Remote seal, screw gland design** | DN 50 | 52 | (2.05) | 5 | (0.073) | 500 | (7.25) |
| **Remote seal with screwed connector according to DIN 11851** | DN 25 | 25 | (0.98) | 60 | (0.870) | 6000 | (87) |
| | DN 32 | 32 | (1.26) | 25 | (0.363) | 4000 | (58) |
| | DN 40 | 40 | (1.57) | 10 | (0.145) | 2000 | (29) |
| | DN 50 | 52 | (2.05) | 5 | (0.073) | 500 | (7.25) |
| | DN 65 | 59 | (2.32) | 4 | (0.058) | 500 | (7.25) |
| | DN 80 | 72 | (2.83) | 1 | (0.015) | 250 | (3.63) |
| **Clamp connection** | 1½ inches | 32 | (1.26) | 25 | (0.363) | 4000 | (58) |
| | 2 inches | 40 | (1.57) | 10 | (0.145) | 2000 | (29) |
| | 2½ inches | 59 | (2.32) | 5 | (0.073) | 500 | (7.25) |
| | 3 inches | 72 | (2.83) | 1 | (0.015) | 250 | (3.63) |
| **Miniature diaphragm seal** | G1B | 25 | (0.98) | 60 | (0.870) | 6000 | (87) |
| | G1½B | 40 | (1.57) | 10 | (0.145) | 2000 | (29) |
| | G2B | 52 | (2.05) | 5 | (0.073) | 500 | (7.25) |

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## Technical specifications (continued)

***Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)***

Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel

With selected order code W01:

- The values listed in the table for "High-temperature oil" filling liquid and for the wetted parts made of stainless steel 316L, mat no. 1.4404/1.4435, apply.
- For the other filling liquids, the following supplements must be applied to the determined table values for the temperature errors[1]:
  - For "FDA oil": 5%
  - For "Silicone oil M5": 35%
  - For "Silicone oil M50": 35%
  - For "Halocarbon oil": 20%
  - For "Neobee M20": 20%

1) The specified surcharges for the various wetted parts are unaffected. They still need to be included in the calculation.

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of remote seal $f_{RS}$ | | Temperature error of capillary $f_{Cap}$ | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar/(10 K · $m_{Cap}$) | (psi/(10 K · $m_{Cap}$)) |
| **Sandwich design or with flange according to EN 1092-1** | DN 40 without tube | 40 | (1.57) | 0.2 | (0.003) | 0.4 | (0.006) |
| | DN 50 without tube | 59 | (2.32) | 0.3 | (0.0043) | 0.3 | (0.0045) |
| | DN 50 with tube | 45 | (1.89) | 1.26 | (0.018) | 1.7 | (0.025) |
| | DN 80 without tube | 89 | (3.50) | 0.05 | (0.001) | 0.05 | (0.001) |
| | DN 80 with tube | 72 | (2.83) | 0.24 | (0.004) | 0.17 | (0.003) |
| | DN 100 without tube | 89 | (3.50) | 0.05 | (0.001) | 0.07 | (0.001) |
| | DN 100 with tube | 89 | (3.50) | 0.1 | (0.002) | 0.07 | (0.001) |
| | DN 125 without tube | 124 | (4.88) | 0.05 | (0.001) | 0.03 | (0.0004) |
| | DN 125 with tube | 124 | (4.88) | 0.05 | (0.001) | 0.03 | (0.0004) |
| **Sandwich design with flange according to ASME B16.5** | 1½ without tube | 40 | (1.57) | 0.2 | (0.003) | 0.4 | (0.006) |
| | 2 inches without tube | 59 | (2.32) | 0.3 | (0.0043) | 0.3 | (0.0043) |
| | 2 inches with tube | 45 | (1.89) | 1.26 | (0.018) | 1.7 | (0.025) |
| | 3 inches without tube | 89 | (3.50) | 0.05 | (0.001) | 0.05 | (0.0007) |
| | 3 inches with tube | 72 | (2.83) | 0.24 | (0.004) | 0.17 | (0.003) |
| | 4 inches without tube | 89 | (3.50) | 0.05 | (0.001) | 0.07 | (0.001) |
| | 4 inches with tube | 89 | (3.50) | 0.1 | (0.002) | 0.07 | (0.001) |
| | 5 inches without tube | 124 | (4.88) | 0.05 | (0.001) | 0.03 | (0.0004) |
| | 5 inches with tube | 124 | (4.88) | 0.05 | (0.001) | 0.03 | (0.0004) |
| **Remote seal, screw gland design** | DN 50 | 52 | (2.05) | 1 | (0.015) | 0.83 | (0.012) |
| **Remote seal with union nut according to DIN 11851** | DN 50 | 52 | (2.05) | 1 | (0.015) | 0.83 | (0.012) |
| | DN 65 | 59 | (2.32) | 0.7 | (0.010) | 0.67 | (0.010) |
| | DN 80 | 72 | (2.83) | 0.24 | (0.004) | 0.17 | (0.003) |
| **Remote seal with screwed connector according to DIN 11851** | DN 50 | 52 | (2.05) | 1 | (0.015) | 0.83 | (0.012) |
| | DN 65 | 59 | (2.32) | 0.7 | (0.010) | 0.67 | (0.010) |
| | DN 80 | 72 | (2.83) | 0.24 | (0.004) | 0.17 | (0.003) |
| **Clamp connection** | 2 inches | 40 | (1.57) | 1 | (0.015) | 2.5 | (0.036) |
| | 2½ inches | 59 | (2.32) | 0.7 | (0.010) | 0.67 | (0.010) |
| | 3 inches | 72 | (2.83) | 0.24 | (0.004) | 0.17 | (0.003) |

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of process flange/connection shank $f_{PF}$ | | Recommended min. measuring spans (guidance values, note temperature error) | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| **Sandwich design or with flange according to EN 1092-1** | DN 40 without tube | 40 | (1.57) | 0.4 | (0.006) | 1600 | (23.2) |
| | DN 50 without tube | 59 | (2.32) | 0.3 | (0.0045) | 250 | (3.626) |
| | DN 50 with tube | 45 | (1.89) | 1.7 | (0.025) | 250 | (3.626) |
| | DN 80 without tube | 89 | (3.50) | 0.05 | (0.0007) | 50 | (0.725) |
| | DN 80 with tube | 72 | (2.83) | 0.17 | (0.003) | 100 | (1.45) |
| | DN 100 without tube | 89 | (3.50) | 0.07 | (0.001) | 50 | (0.725) |
| | DN 100 with tube | 89 | (3.50) | 0.07 | (0.001) | 50 | (0.725) |
| | DN 125 without tube | 124 | (4.88) | 0.03 | (0.0004) | 20 | (0.29) |
| | DN 125 with tube | 124 | (4.88) | 0.03 | (0.0004) | 20 | (0.29) |

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## Technical specifications (continued)

| | Nominal diameter/design | Diaphragm diameter | | Temperature error of process flange/connection shank $f_{PF}$ | | Recommended min. measuring spans (guidance values, note temperature error) | |
|---|---|---|---|---|---|---|---|
| | | mm | (inch) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| **Sandwich design with flange according to ASME B16.5** | 1½ without tube | 40 | (1.57) | 0.4 | (0.006) | 1600 | (23.2) |
| | 2 inches without tube | 59 | (2.32) | 0.3 | (0.0045) | 250 | (3.626) |
| | 2 inches with tube | 45 | (1.89) | 1.7 | (0.025) | 250 | (3.626) |
| | 3 inches without tube | 89 | (3.50) | 0.05 | (0.0007) | 50 | (0.725) |
| | 3 inches with tube | 72 | (2.83) | 0.17 | (0.003) | 100 | (1.45) |
| | 4 inches without tube | 89 | (3.50) | 0.07 | (0.001) | 50 | (0.725) |
| | 4 inches with tube | 89 | (3.50) | 0.07 | (0.001) | 50 | (0.725) |
| | 5 inches without tube | 124 | (4.88) | 0.03 | (0.0004) | 20 | (0.29) |
| | 5 inches with tube | 124 | (4.88) | 0.03 | (0.0004) | 20 | (0.29) |
| **Remote seal, screw gland design** | DN 50 | 52 | (2.05) | 0.83 | (0.012) | 250 | (3.626) |
| **Remote seal with union nut according to DIN 11851** | DN 50 | 52 | (2.05) | 0.83 | (0.012) | 250 | (3.626) |
| | DN 65 | 59 | (2.32) | 0.67 | (0.010) | 250 | (3.626) |
| | DN 80 | 72 | (2.83) | 0.17 | (0.003) | 100 | (1.450) |
| **Remote seal with screwed connector according to DIN 11851** | DN 50 | 52 | (2.05) | 0.83 | (0.012) | 250 | (3.626) |
| | DN 65 | 59 | (2.32) | 0.67 | (0.010) | 250 | (3.626) |
| | DN 80 | 72 | (2.83) | 0.17 | (0.003) | 100 | (1.450) |
| **Clamp connection** | 2 inches | 40 | (1.57) | 2.5 | (0.036) | 2000 | (29.01) |
| | 2½ inches | 59 | (2.32) | 0.67 | (0.010) | 250 | (3.626) |
| | 3 inches | 72 | (2.83) | 0.17 | (0.003) | 100 | (1.450) |

***Inline seal temperature errors***

Notes

Table values apply to:

- The filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed), Neobee M20
- Diaphragm material stainless steel
- Half the values apply to glycerin/water mixture as filling liquid

Diaphragm thickness:

- 0.05 mm (0.002 inches) for DN 25/DN 40/DN 50
- 0.1 mm (0.004 inches) for DN 80/DN 100

Temperature errors of inline seals for flange-mounting 7MF0900 for one-sided mounting

| Nominal diameter/design | Process error | | Transmitter error | | Remote line error | | Minimum measuring span | |
|---|---|---|---|---|---|---|---|---|
| | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| DN 25 (1 inch) | 8.0 | (0.116) | 12.0 | (0.174) | Not possible | Not possible | 3000 | (43.5) |
| DN 40 (1½ inches) | 10.0 | (0.145) | 9.5 | (0.138) | 8.0 | (0.116) | 3000 | (43.5) |
| DN 50 (2 inches) | 12.0 | (0.174) | 9.0 | (0.131) | 19.0 | (0.276) | 3000 | (43.5) |
| DN 80 (3 inches) | 9.5 | (0.138) | 5.0 | (0.073) | 10.5 | (0.152) | 2000 | (29) |
| DN 100 (4 inches) | 16.0 | (0.232) | 7.0 | (0.102) | 16.0 | (0.232) | 3000 | (43.5) |

Temperature errors of inline seals for flange-mounting 7MF0902 for two-sided mounting

| Nominal diameter/design | Process error | | Transmitter error | | Remote line error | | Minimum measuring span | |
|---|---|---|---|---|---|---|---|---|
| | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| DN 25 (1 inch) | Not possible | Not possible | Not possible | Not possible | Not possible | Not possible | Not possible | Not possible |
| DN 40 (1½ inches) | 10.0 | (0.145) | 9.5 | (0.138) | 7.5 | (0.109) | 600 | (8.7) |
| DN 50 (2 inches) | 13.5 | (0.196) | 12.5 | (0.181) | 19.0 | (0.276) | 600 | (8.7) |
| DN 80 (3 inches) | 11.0 | (0.160) | 12.5 | (0.181) | 10.5 | (0.152) | 600 | (8.7) |
| DN 100 (4 inches) | 14.0 | (0.203) | 9.0 | (0.131) | 14.0 | (0.203) | 3000 | (43.5) |

Temperature errors of quick-release inline seals 7MF0930 for one-sided mounting

| Nominal diameter/design | Process error | | Transmitter error | | Remote line error | | Minimum measuring span | |
|---|---|---|---|---|---|---|---|---|
| | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar/10 K | (psi/10 K) | mbar | (psi) |
| DN 25 (1 inch) | 30.0 | (0.435) | 23.0 | (0.334) | 13.0 | (0.189) | 6000 | (87) |
| DN 32 (1¼ inches) | 9.0 | (0.131) | 5.0 | (0.073) | 16.5 | (0.239) | 3000 | (43.5) |
| DN 40 (1½ inches) | 3.0 | (0.044) | 1.5 | (0.022) | 4.0 | (0.058) | 2000 | (29) |
| DN 50 (2 inches) | 4.0 | (0.058) | 1.0 | (0.015) | 3.0 | (0.044) | 2000 | (29) |
| DN 65 (2½ inches) | 5.5 | (0.080) | 2.0 | (0.029) | 6.0 | (0.087) | 2000 | (29) |

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## Technical specifications (continued)

### *Calculation of the temperature error*

The following equation is used to calculate the temperature error:

$dp = (\vartheta_{RS} - \vartheta_{Cal}) \cdot f_{RS} + (\vartheta_{Cap} - \vartheta_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (\vartheta_{MU} - \vartheta_{Cal}) \cdot f_{PF}$

| Legend: | |
|---|---|
| dp | Additional temperature error (mbar) |
| $\vartheta_{RS}$ | Temperature on remote seal diaphragm (generally corresponds to temperature of medium) |
| $\vartheta_{Cal}$ | Calibration/reference temperature (20 °C (68 °F)) |
| $f_{DM}$ | Temperature error of remote seal |
| $\vartheta_{Cap}$ | Ambient temperature on the capillaries |
| $l_{Cap}$ | Capillary length |
| $f_{Cap}$ | Temperature error of capillaries |
| $\vartheta_{TR}$ | Ambient temperature on pressure transmitter |
| $f_{PF}$ | Temperature error of the oil filling in the process flanges of the pressure transmitter |

### *Example of temperature error calculation*

What are you looking for?

We are looking for an additional temperature error of the remote seals (**dp**).

Prevailing values:

| | |
|---|---|
| SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 ... 100 mbar, with DN 100 diaphragm seals without tube, diaphragm made of stainless steel, mat. no. 1.4404/316L | $f_{DM}$ = 0.05 mbar/10 K (0.039 $inH_2O$/10 K) |
| Capillary length | $l_{Cap}$ = 6 m (19.7 ft) |
| Capillaries fitted on both sides | $f_{Cap}$ = 0.07 mbar/(10 K · $m_{Cap}$) 0.028 $inH_2O$/(10 K · $m_{Cap}$) |
| Filling liquid silicone oil M5 | $f_{PF}$ = 0.07 mbar/10 K (0.028 $inH_2O$/10 K) |
| Medium temperature | ***$\vartheta_{DM}$ = 100 °C (212 °F)*** |
| Temperature on the capillaries | ***$\vartheta_{Cap}$ = 50 °C (122 °F)*** |
| Temperature on pressure transmitter | ***$\vartheta_{MU}$ = 50 °C (122 °F)*** |
| Calibration temperature | ***$\vartheta_{Cal}$ = 20 °C (68 °F)*** |

Calculation in mbar:

dp = (100 °C – 20 °C) · 0.05 mbar/10 K + (50 °C – 20 °C) · 6 m · 0.07 mbar/(10 K · m) + (50 °C – 20 °C) · 0.07 mbar/10 K

Calculation in $inH_2O$:

dp = (212 °F – 68 °F) · 0.039 $inH_2O$/10 K + (112 °F – 68 °F) · 19.7 ft · 0.028 $inH_2O$/(10 K · 3.28 ft) + (112 °F – 68 °F) · (0.028 $inH_2O$/10 K)

dp = 0.16 $inH_2O$ + 0.51 $inH_2O$ + 0.08 $inH_2O$

Result:

***dp = 1.87 mbar (0.75 $inH_2O$)***

(corresponds to 2.27% of set measuring span)

Note:

The determined temperature error only applies to the error resulting from connection of the remote seal.

The transmission response of the respective pressure transmitter is not taken into account here!
The transmission response must be calculated separately, and the resulting measuring error added to the temperature error determined above from connection of the remote seal.

### *Dependence of temperature error on diaphragm material*

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

| Diaphragm material | Change in temperature error of remote seal |
|---|---|
| | ***Increase in values by:*** |
| Stainless steel, duplex, ... | See previous tables |
| Hastelloy C4, mat. no. 2.4610 | 50% |
| Hastelloy C276, mat. no. 2.4819 | 50% |
| Monel 400, mat. no. 2.4360 | 60% |
| Tantalum | 50% |
| Titanium | 50% |
| PTFE coating on stainless steel diaphragm | 80% |
| ECTFE coating or PFA coating on stainless steel diaphragm | 100% |
| Gold coating on stainless steel diaphragm | 40% |
| Inconel | 50% |
| Incoloy | 50% |

### *Maximum medium temperature*

Note

When taking into account the maximum medium temperature, the application limits of the filling liquids and gaskets used as well as the pressure/temperature limits of the respective process connections must also be taken into consideration.

The following maximum medium temperatures apply depending on the material of wetted parts.

| Material | Max. medium temperature | Min./max. Pressure |
|---|---|---|
| **Stainless steel, mat. no. 1.4404/316L** | 400 °C (752 °F) | No restrictions |
| **PTFE coating** | 200 °C (392 °F) | < 0 bar (0 psi); gauge pressure |
| | 260 °C (500 °F) | 0 bar (0 psi) ... 25 bar (363 psi); gauge pressure |
| | 150 °C (302 °F) | 25 bar (363 psi) ... 40 bar (580 psi); gauge pressure |
| | 50 °C (302 °F) | 40 bar (580 psi) ... 60 bar (870 psi); gauge pressure |
| **ECTFE coating** | 150 °C (302 °F) | For pressures < 1 bar (14.5 psi) on request |
| **PFA coating** | 200 °C (392 °F) | < 0 bar (0 psi); gauge pressure |
| | 260 °C (500 °F) | 0 bar (0 psi) ... 25 bar (363 psi); gauge pressure |
| | 150 °C (302 °F) | 25 bar (363 psi) ... 40 bar (580 psi); gauge pressure |
| | 50 °C (302 °F) | 40 bar (580 psi) ... 100 bar (1450 psi); gauge pressure |

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## Technical specifications (continued)

| Material | Max. medium temperature | Min./max. Pressure |
|---|---|---|
| Hastelloy C4, mat. no. 2.4610 | 400 °C (752 °F) | No restrictions |
| Hastelloy C276, mat. no. 2.4819 | 400 °C (752 °F) | No restrictions |
| Hastelloy C22, mat. no. 2.4602 | 400 °C (752 °F) | No restrictions |
| Monel 400, mat. no. 2.4360 | 400 °C (752 °F) | No restrictions |
| Tantalum | 300 °C (572 °F) | No restrictions |
| | 150 °C (302 °F) | No restrictions |
| Duplex, mat. no. 1.4462 | 250 °C (482 °F) | No restrictions |
| Titanium | 150 °C (302 °F) | No restrictions |
| Inconel | 400 °C (752 °F) | No restrictions |
| Incoloy | 400 °C (752 °F) | No restrictions |
| Gold coating | 400 °C (752 °F) | No restrictions |

***Maximum length of the capillary for diaphragm seals (guidance values)***

| Nominal diameter DN | | Max. length of the capillary Diaphragm seal | | Inline seal 7MF0900* | | 7MF0902* | | 7MF0930* | |
|---|---|---|---|---|---|---|---|---|---|
| | | m | (ft) | m | (ft) | m | (ft) | m | (ft) |
| DN 25 | (1") | 2.5 | (8.2) | Only direct mounting possible | Only direct mounting possible | Not possible | Not possible | 1 | (3.2) |
| DN 32 | (1¼") | 2.5 | (8.2) | - | - | - | - | 6 | (19.7) |
| DN 40 | (1½") | 4 | (13.1) | 1.66 | (5.5) | 1 | (3.2) | 6 | (19.7) |
| DN 50 | (2") | 6 | (19.7) | 4 | (13.1) | 4 | (13.1) | 6 | (19.7) |
| DN 65 | (2½") | 8 | (26.2) | - | - | - | - | 6 | (19.7) |
| DN 80 | (3") | 15 | (49.1) | 4 | (13.1) | 6 | (19.7) | - | - |
| DN 100 | (4") | 15 | (49.1) | 4 | (13.1) | 4 | (13.1) | - | - |
| DN 125 | (5") | 15 | (49.1) | - | - | - | - | - | - |

***Response times***

The response times specified in the following table (in seconds per meter length of the capillary) apply to a change in pressure which corresponds to the set measuring span.

The listed values must be multiplied by the respective length of the capillary, or with pressure transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set measuring span within the range of the respective pressure transmitter. The response times are of insignificant importance for measuring spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

| Filling liquid | Density | | Temperature on capillary | | Response time in s/m (s/ft) with max. measuring span of pressure transmitter | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | kg/dm³ | (lb/in³) | °C | (°F) | 250 mbar | (101 in$H_2O$) | 600 mbar | (241 in$H_2O$) | 1600 mbar | (643 in$H_2O$) |
| Silicone oil M5 | 0.914 | (0.033) | +60 | (140) | 0.06 | (0.018) | 0.02 | (0.006) | 0.01 | (0.003) |
| | | | +20 | (68) | 0.11 | (0.034) | 0.02 | (0.006) | 0.02 | (0.006) |
| | | | -20 | (-4) | 0.3 | (0.091) | 0.12 | (0.037) | 0.05 | (0.015) |
| Silicone oil M50 | 0.966 | (0.035) | +60 | (140) | 0.6 | (0.183) | 0.25 | (0.076) | 0.09 | (0.027) |
| | | | +20 | (68) | 0.61 | (0.186) | 0.26 | (0.079) | 0.1 | (0.030) |
| | | | -20 | (-4) | 1.69 | (0.515) | 0.71 | (0.216) | 0.27 | (0.082) |
| High-temperature oil | 1.070 | (0.039) | +60 | (140) | 0.14 | (0.043) | 0.06 | (0.018) | 0.02 | (0.006) |
| | | | +20 | (68) | 0.65 | (0.198) | 0.27 | (0.082) | 0.1 | (0.030) |
| | | | -10 | (14) | 3.96 | (1.207) | 1.65 | (0.503) | 0.62 | (0.189) |
| Halocarbon oil | 1.968 | (0.071) | +60 | (140) | 0.07 | (0.021) | 0.03 | (0.009) | 0.01 | (0.003) |
| | | | +20 | (68) | 0.29 | (0.088) | 0.12 | (0.037) | 0.05 | (0.015) |
| | | | -20 | (-4) | 2.88 | (0.878) | 1.2 | (0.366) | 0.45 | (0.137) |
| Food oil (FDA-listed) | 0.920 | (0.033) | +60 | (140) | 0.75 | (0.229) | 0.33 | (0.101) | 0.17 | (0.052) |
| | | | +20 | (68) | 4 | (1.220) | 1.75 | (0.534) | 0.67 | (0.204) |
| | | | -20 | (-4) | 20 | (6 100) | 8.5 | (2.593) | 3.25 | (0.991) |
| Neobee M20 | 0.920 | (0.033) | +60 | (140) | 0.69 | (0.210) | 0.29 | (0.884) | 0.11 | (0.034) |
| | | | +20 | (68) | 1.81 | (0.552) | 0.76 | (0.232) | 0.29 | (0.088) |
| | | | -20 | (-4) | 6.46 | (1.969) | 2.71 | (0.826) | 1.04 | (0.317) |

See charts under "Function" for permissible data of filling liquid for pressure and temperatures.

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## More information

***Specification of process conditions for selection and ordering data***

Ambient temperature range

The standard remote seal systems are optimized for an ambient temperature range of -10 to +50 °C (14 to +122 °F). Therefore, in the ordering options, the **order code "D66" is** preset.

If the range of the ambient temperature deviates from this, you have the possibility to choose other ambient temperature ranges:

- With the **order code D67**, a range from -40 to +50 °C (-40 to +122 °F)
- With the **order code D68**, a range from -10 to +85 °C (14 to +185 °F)

In the case of a **special design**, which you can select with the **order option Y99** in the device settings, it is possible to enter the ambient temperature as a numerical value.

Process temperature

The standard optimization for the process temperature depends on the filling liquid used:

| Filling liquid | Code | Optimized temperature range as standard |
|---|---|---|
| **Silicone M50** | B | -10 ... +200 °C (14 ... +392 °F) |
| **High-temperature oil** | C | -10 ... +300 °C (14 ... +572 °F) |
| **Silicone oil M5** | A | -40 ... +140 °C (-40 ... +284 °F) |
| **Food oil (FDA-listed)** | E | -10 ... +140 °C (14 ... +284 °F) |
| **Halocarbon oil** | D | -20 ... +60 °C (-4 ... +140 °F) |
| **Neobee M20 (FDA-listed)** | R | -10 ... +140 °C (14 ... +284 °F) |

- **If the process temperatures** deviate from the temperature ranges mentioned in the table above, we ask you to send the process temperature with the **order code Y50** along with the order.
- If the remote seal has a small diameter (< DN 50/2") or a long capillary (> 4 m), we also ask you to provide the process data with the **following order code** when ordering.

These entries are transmitted and ensure the correct functioning of the remote seal systems.

| | Order code |
|---|---|
| **Ambient temperature range** | |
| • -10 ... +50 °C (14 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (14 ... +185 °F) | **D68** |
| **Process temperature min. ... °C/(°F)/max. ... °C/(°F)** | **Y50** |

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## Overview



Diaphragm seals in sandwich design

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## Selection and ordering data

| | | Article No. | | | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal**<br>**In sandwich design, connected with flexible capillary tube to a transmitter** | | | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit** | | **7MF0800-** | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 for absolute pressure from differential pressure**<br>**7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0801-** | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 transmitter for differential pressure and flow**<br>**7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0802-** | | | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | | ● | ● | ● | |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | | |
| ***Process connection standard EN 1092-1*** | | | | | | | | | | | | | | | | | |
| (DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | | |
| DN 25 | PN 16 ... 400 | **0** | **B** | **Q** | | | | | | | | | | | | | |
| DN 40 | PN 16 ... 400 | **0** | **D** | **Q** | | | | | | | | | | | | | |
| DN 50 | PN 16 ... 400 | **0** | **E** | **Q** | | | | | | | | | | | | | |
| DN 65 | PN 16 ... 400 | **0** | **F** | **Q** | | | | | | | | | | | | | |
| DN 80 | PN 16 ... 400 | **0** | **G** | **Q** | | | | | | | | | | | | | |
| DN 100 | PN 16 ... 400 | **0** | **H** | **Q** | | | | | | | | | | | | | |
| DN 125 | PN 16 ... 400 | **0** | **J** | **Q** | | | | | | | | | | | | | |
| ***Process connection standard ASME B16.5*** | | | | | | | | | | | | | | | | | |
| (1 inch, 1½ inches and 2 inches only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | | |
| 1 inch | Class 150 ... 2500 | **1** | **K** | **X** | | | | | | | | | | | | | |
| 1½ inches | Class 150 ... 2500 | **1** | **L** | **X** | | | | | | | | | | | | | |
| 2 inches | Class 150 ... 2500 | **1** | **M** | **X** | | | | | | | | | | | | | |
| 2½ inches | Class 150 ... 2500 | **1** | **N** | **X** | | | | | | | | | | | | | |
| 3 inches | Class 150 ... 2500 | **1** | **P** | **X** | | | | | | | | | | | | | |
| 4 inches | Class 150 ... 2500 | **1** | **Q** | **X** | | | | | | | | | | | | | |
| 5 inches | Class 150 ... 2500 | **1** | **R** | **X** | | | | | | | | | | | | | |
| ***Process connection standard J.I.S.*** | | | | | | | | | | | | | | | | | |
| (DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | | |
| DN 25 | 10K ... 63K | **2** | **B** | **W** | | | | | | | | | | | | | |
| DN 40 | 10K ... 63K | **2** | **D** | **W** | | | | | | | | | | | | | |
| DN 50 | 10K ... 63K | **2** | **E** | **W** | | | | | | | | | | | | | |
| DN 65 | 10K ... 63K | **2** | **F** | **W** | | | | | | | | | | | | | |
| DN 80 | 10K ... 63K | **2** | **G** | **W** | | | | | | | | | | | | | |
| DN 100 | 10K ... 63K | **2** | **H** | **W** | | | | | | | | | | | | | |
| DN 125 | 10K ... 63K | **2** | **J** | **W** | | | | | | | | | | | | | |
| Other version, add order code and plain text | | **9** | **A** | **A** | | | | | | | | | | **H** | **1** | **Y** | |
| **Capillary length** | | | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | **1** | **0** | | | | | | | | | | | |
| 1.6 m (63 inches) | | | | | **1** | **1** | | | | | | | | | | | |
| 2 m (78.7 inches) | | | | | **1** | **2** | | | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | **1** | **3** | | | | | | | | | | | |
| 3 m (118.1 inches) | | | | | **1** | **4** | | | | | | | | | | | |
| 4 m (157.5 inches) | | | | | **1** | **5** | | | | | | | | | | | |
| 5 m (196.9 inches) | | | | | **1** | **6** | | | | | | | | | | | |
| 6 m (236.2 inches) | | | | | **1** | **7** | | | | | | | | | | | |
| 7 m (275.6 inches) | | | | | **1** | **8** | | | | | | | | | | | |
| 8 m (315 inches) | | | | | **2** | **0** | | | | | | | | | | | |
| 9 m (354.3 inches) | | | | | **2** | **1** | | | | | | | | | | | |
| 10 m (393.7 inches) | | | | | **2** | **2** | | | | | | | | | | | |
| 11 m (433.1 inches); only for 7MF0802 | | | | | **2** | **3** | | | | | | | | | | | |
| 12 m (472.4 inches); only for 7MF0802 | | | | | **2** | **4** | | | | | | | | | | | |
| 13 m (511.811 inches); only for 7MF0802 | | | | | **2** | **5** | | | | | | | | | | | |
| 14 m (551.2 inches); only for 7MF0802 | | | | | **2** | **6** | | | | | | | | | | | |
| 15 m (590.6 inches); only for 7MF0802 | | | | | **2** | **7** | | | | | | | | | | | |
| Other version, add order code and plain text | | | | | **9** | **8** | | | | | | | | **L** | **1** | **Y** | |
| **Filling liquid** | | | | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | | **B** | | | | | | | | |
| High-temperature oil | | | | | | | | | **C** | | | | | | | | |

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## Selection and ordering data (continued)

| | Article No. | Order code |
|---|---|---|
| **Diaphragm seal**<br>**In sandwich design, connected with flexible capillary tube to a transmitter** | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit** | **7MF0800-** | |
| **SITRANS P320/P420 for absolute pressure from differential pressure**<br>**7MF03../7MF04.. order separately, scope of delivery: 1 unit** | **7MF0801-** | |
| **SITRANS P320/P420 transmitter for differential pressure and flow**<br>**7MF03../7MF04.. order separately, scope of delivery: 2 units** | **7MF0802-** | |
| | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| Silicone oil M5 | A | |
| Food oil (FDA-listed) | E | |
| Halocarbon oil | D | |
| Neobee M20 (FDA listed) | R | |
| Other version, add order code and plain text | Z | P 1 Y |
| **Material of wetted parts** | | |
| Stainless steel 316L | | |
| • Without coating | A | |
| • With PFA coating | D | |
| • With PTFE coating | E 0 | |
| • With ECTFE coating | F | |
| Monel 400, 2.4360 | G | |
| Hastelloy C276, 2.4819 | J | |
| Tantalum | K | |
| Titanium, 3.7035 | L 0 | |
| Nickel 201 | M 0 | |
| Diaphragm Duplex, 1.4462 | Q | |
| Diaphragm and flange Duplex, 1.4462 | R | |
| Stainless steel 316L, gold-plated | S 0 | |
| Hastelloy C4, 2.4610 | U 0 | |
| Hastelloy C22, 2.4602 | V 0 | |
| Other version, add order code and plain text | Z 8 | Q 1 Y |
| **Tube length** | | |
| None | 0 | |
| 50 mm (2 inches) | 1 | |
| 100 mm (4 inches) | 2 | |
| 150 mm (6 inches) | 3 | |
| 200 mm (8 inches) | 4 | |
| 250 mm (10 inches) | 5 | |
| Other version, add order code and plain text | Z 8 | Q 1 Y |
| **Customer-specific tube length** | | |
| ***Wetted parts: Stainless steel without coating*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | A 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | A 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | A 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | A 4 | |
| 201 ... 250 mm (7.91 ... 9.84 inches) / 250 mm (9.84 inches) | A 5 | |
| ***Wetted parts: Stainless steel with ECTFE coating*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | F 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | F 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | F 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | F 4 | |
| 201 ... 250 mm (7.91 ... 9.84 inches) / 250 mm (9.84 inches) | F 5 | |
| ***Wetted parts: Stainless steel with PFA coating*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | D 1 | |

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## Selection and ordering data (continued)

| | | Article No. | Order code |
|---|---|---|---|
| **Diaphragm seal**<br>**In sandwich design, connected with flexible capillary tube to a transmitter** | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit** | | **7MF0800-** | |
| **SITRANS P320/P420 for absolute pressure from differential pressure**<br>**7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0801-** | |
| **SITRANS P320/P420 transmitter for differential pressure and flow**<br>**7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0802-** | |
| | | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **D 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **D 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **D 4** |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | **D 5** |
| ***Wetted parts: Monel 400*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **G 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **G 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **G 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **G 4** |
| ***Wetted parts: Hastelloy C276*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **J 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **J 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **J 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **J 4** |
| ***Wetted parts: Tantalum*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **K 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **K 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **K 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **K 4** |

| **Options**<br>**Add "-Z" to article number and specify order code.** | **Order code** |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| Volume deflagration flame arrester (VDEF) | |
| • For gauge pressure and absolute pressure transmitters | **D61** |
| • For differential pressure and level transmitters | **D62** |

| **Options**<br>**Add "-Z" to article number and specify order code.** | **Order code** |
|---|---|
| **Negative pressure service** | |
| Negative pressure service | |
| • For gauge pressure and absolute pressure transmitters | **D81** |
| • For differential pressure transmitters | **D83** |
| Extended negative pressure service | |
| • For gauge pressure and absolute pressure transmitters (only 7MF0800) | **D85** |
| • For differential pressure transmitters | **D88** |
| **Marine approvals** | |
| ***Note:*** | |
| If one of the order codes E50 to E60 is selected, the corresponding option must also be selected for the transmitter! | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN 1092-1 resp. RFSF/ANSI 16.5 (for wetted parts made of stainless steel 316L only) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M70** |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M76** |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 25 | **M82** |
| • DN 40 | **M83** |
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |
| **Capillary connection**<br>(Only for 7MF0800) | |
| Single-side mounted at differential pressure transmitter at high side | **S03** |
| Single-side mounted at differential pressure transmitter at low side | **S04** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| • 11 m (433.1 inches); only for 7MF0802 | **S22** |
| • 12 m (472.4 inches); only for 7MF0802 | **S23** |
| • 13 m (511.811 inches); only for 7MF0802 | **S24** |
| • 14 m (551.2 inches); only for 7MF0802 | **S25** |
| • 15 m (590.6 inches); only for 7MF0802 | **S26** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| • 11 m (433.1 inches); only for 7MF0802 | **S52** |
| • 12 m (472.4 inches); only for 7MF0802 | **S53** |
| • 13 m (511.811 inches); only for 7MF0802 | **S54** |
| • 14 m (551.2 inches); only for 7MF0802 | **S55** |
| • 15 m (590.6 inches); only for 7MF0802 | **S56** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| • 11 m (433.1 inches); only for 7MF0802 | **S82** |
| • 12 m (472.4 inches); only for 7MF0802 | **S83** |
| • 13 m (511.811 inches); only for 7MF0802 | **S84** |
| • 14 m (551.2 inches); only for 7MF0802 | **S85** |
| • 15 m (590.6 inches); only for 7MF0802 | **S86** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

[1] See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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## Technical specifications

| SITRANS P320/P420 diaphragm seals in sandwich design with flexible capillary | |
|---|---|
| **Nominal diameter** | **Nominal pressure** |
| Standard of process connection EN 1092-1 | |
| • DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 | PN 16 ... PN 400 |
| Standard of process connection ASME B16.5 | |
| • 1 inch, 1½ inch, 2 inch, 2½ inch, 3 inch, 4 inch, 5 inch | Class 150 ... Class 2500 |
| Process connection standard J.I.S. | |
| • DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 | 10K ... 63K |
| **Sealing surface** | |
| • For stainless steel mat. no. 1.4404/316L | According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA |
| • For the other materials | According to EN 1092-1, form B2 or ASME B16.5 RFSF |
| **Materials** | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L<br>• Without coating<br>• PTFE coating<br>• ECTFE coating (for negative pressure on request)<br>• PFA coating<br>Monel 400, mat. no. 2.4360<br>Hastelloy C276, mat. no. 2.4819<br>Hastelloy C4, mat. no. 2.4610<br>Hastelloy C22, mat. no. 2.4602<br>Tantalum<br>Titanium, mat. no. 3.7035<br>Nickel 201<br>Duplex 2205, mat. no. 1.4462<br>Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with options W01 and E50 ... E58) or mat. no. 1.4301/304 |
| • Sheath | Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L |
| **Gasket material in the process flanges** | |
| • For gauge pressure transmitters, absolute pressure transmitters and negative pressure applications | Copper |
| • For other applications | Viton |
| **Permissible pressure load** | See above and the technical specifications of the pressure transmitters |
| **Tube length** | Without tube as standard.<br>A custom tube length can be selected as an order code. |
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft), longer lengths on request |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| **Filling liquid** | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil (for measuring $O_2$)<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |

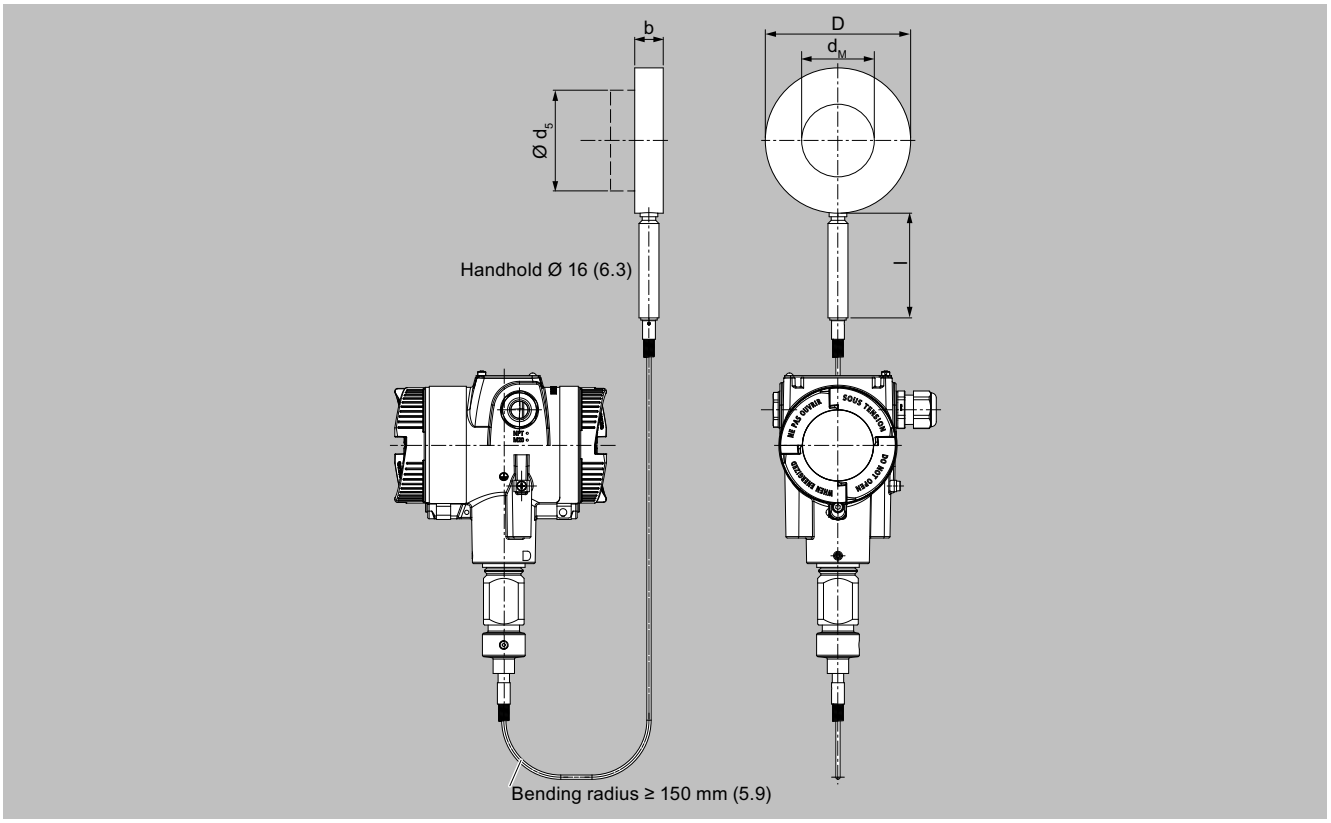
## Technical specifications (continued)

| SITRANS P320/P420 diaphragm seals in sandwich design with flexible capillary | |
|---|---|
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 4 kg (8.82 lbs) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings

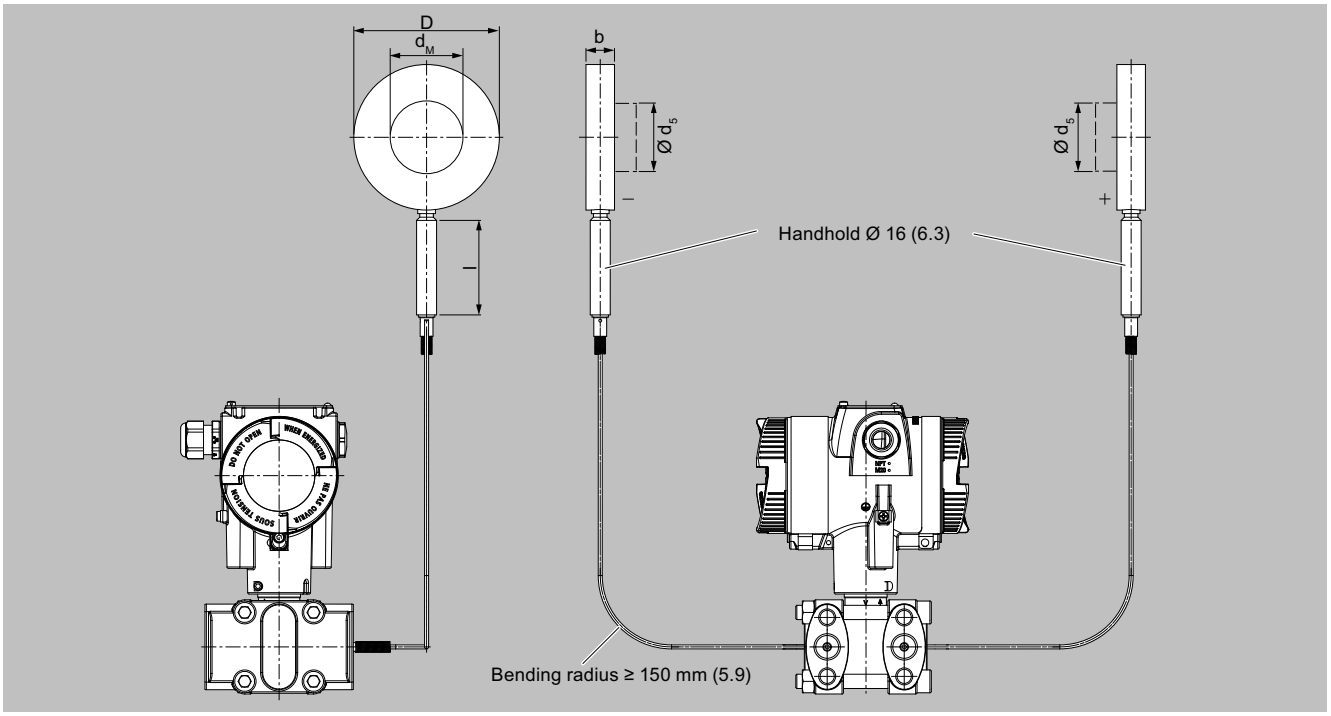



Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for gauge pressure, dimensions in mm (inch)

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## Dimensional drawings (continued)




Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P320/420 pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

***Connection according to EN 1092-1***

| Nominal diameter | Nominal pressure | b | D | $d_5$ | $d_M$ with tube | $d_M$ without tube | l |
|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm |
| DN 25 | PN 16 ... PN 400 | 20 | 68 | 24.5 | 22.6 | 27 | 100 |
| DN 40 | | 20 | 88 | 38 | 30 | 40 | 100 |
| DN 50 | | 20 | 102 | 48.3 | 40 | 51 | 100 |
| DN 65 | | 20 | 122 | 48.3 | 40 | 65 | 100 |
| DN 80 | | 20 | 138 | 76 | 65 | 85 | 100 |
| DN 100 | | 20 | 158 | 94 | 85 | 85 | 100 |
| DN 125 | | 22 | 188 | 125 | 16 | 116 | 100 |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

***Connection according to ASME B16.5***

| Nominal diameter | Nominal pressure | b | D | $d_5$ | $d_M$ with tube | $d_M$ without tube | l |
|---|---|---|---|---|---|---|---|
| | lb/sq.in. | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) |
| 1" | 150 ... 2500 | 20 (0.79) | 51 (2.01) | 24.5 (0.96) | 22.6 (0.89) | 30 (1.18) | 100 (3.94) |
| 1½" | | 20 (0.79) | 73 (2.9) | 38 (1.5) | 30 (1.18) | 40 (1.57) | 100 (3.94) |
| 2" | | 20 (0.79) | 100 (3.94) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 100 (3.94) |
| 2½" | | 20 (0.79) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 65 (2.56) | 100 (3.94) |
| 3" | | 20 (0.79) | 134 (5.28) | 72 (2.8) | 65 (2.56) | 85 (3.35) | 100 (3.94) |
| 4" | | 20 (0.79) | 158 (6.22) | 94 (3.69) | 85 (3.35) | 85 (3.35) | 100 (3.94) |
| 5" | | 22 (0.87) | 186 (7.32) | 125 (4.92) | 116 (4.57) | 116 (4.57) | 100 (3.94) |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Dimensional drawings (continued)

***Connection according to J.I.S.***

| Nominal diameter | Nominal pressure | b<br>mm (inch) | D<br>10K, 20K<br>mm (inch) | D<br>30K ... 63K<br>mm (inch) | $d_5$<br>mm (inch) | $d_M$<br>with tube<br>mm (inch) | $d_M$<br>without tube<br>mm (inch) | l<br>mm (inch) |
|---|---|---|---|---|---|---|---|---|
| **DN 25** | 10K ... 63K | 20 (0.79) | 67 (2.64) | 70 (2.76) | 24.5 (0.96) | 22.6 (0.89) | 30 (1.18) | 100 (3.94) |
| **DN 40** | | 20 (0.79) | 81 (3.19) | 90 (3.54) | 38 (1.5) | 30 (1.18) | 36 (1.42) | 100 (3.94) |
| **DN 50** | | 20 (0.79) | 96 (3.78) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 100 (3.94) |
| **DN 65** | | 20 (0.79) | 116 (4.57) | 130 (5.12) | 48.3 (1.9) | 40 (1.57) | 65 (2.56) | 100 (3.94) |
| **DN 80** | | 20 (0.79) | 132 (5.2) | 140 (5.51) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 100 (3.94) |
| **DN 100** | | 20 (0.79) | 160 (6.3) | 160 (6.3) | 94 (3.69) | 85 (3.35) | 85 (3.35) | 100 (3.94) |
| **DN 125** | | 20 (0.79) | 195 (7.68) | 195 (7.68) | 125 (4.92) | 116 (4.57) | 116 (4.57) | 100 (3.94) |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Overview



Diaphragm seals of flange design

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## Selection and ordering data

| | | Article No. | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal<br>Flange type design, connected to a transmitter with flexible capillary** | | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure<br>(only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit** | | **7MF0810-** | | | | | | | | | | | | | | |
| **SITRANS P320/P420 for absolute pressure from differential pressure<br>7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0811-** | | | | | | | | | | | | | | |
| **SITRANS P320/P420 transmitter for differential pressure and flow<br>7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0812-** | | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | |
| ***Process connection standard EN 1092-1*** | | | | | | | | | | | | | | | | |
| (DN 25, DN 40 and DN 50 only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | |
| DN 25 | PN 10/16/25/40 | **0** | **B** | **D** | | | | | | | | | | | | |
| | PN 63/100 | **0** | **B** | **F** | | | | | | | | | | | | |
| | PN 160 | **0** | **B** | **G** | | | | | | | | | | | | |
| | PN 250 | **0** | **B** | **H** | | | | | | | | | | | | |
| DN 40 | PN 10/16/25/40 | **0** | **D** | **D** | | | | | | | | | | | | |
| | PN 63/100 | **0** | **D** | **F** | | | | | | | | | | | | |
| | PN 160 | **0** | **D** | **G** | | | | | | | | | | | | |
| DN 50 | PN 10/16/25/40 | **0** | **E** | **D** | | | | | | | | | | | | |
| | PN 63 | **0** | **E** | **E** | | | | | | | | | | | | |
| | PN 100 | **0** | **E** | **F** | | | | | | | | | | | | |
| DN 80 | PN 10/16/25/40 | **0** | **G** | **D** | | | | | | | | | | | | |
| | PN 100 | **0** | **G** | **F** | | | | | | | | | | | | |
| DN 100 | PN 10/16 | **0** | **H** | **B** | | | | | | | | | | | | |
| | PN 25/40 | **0** | **H** | **D** | | | | | | | | | | | | |
| DN 125 | PN 16 | **0** | **J** | **B** | | | | | | | | | | | | |
| | PN 40 | **0** | **J** | **D** | | | | | | | | | | | | |
| ***Process connection standard ASME B16.5*** | | | | | | | | | | | | | | | | |
| (1 inch, 1½ inches and 2 inches only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | |
| 1 inch | Class 150 | **1** | **K** | **L** | | | | | | | | | | | | |
| | Class 300 | **1** | **K** | **M** | | | | | | | | | | | | |
| | Class 600 | **1** | **K** | **N** | | | | | | | | | | | | |
| | Class 1500 | **1** | **K** | **P** | | | | | | | | | | | | |
| 1½ inches | Class 150 | **1** | **L** | **A** | | | | | | | | | | | | |
| | Class 300 | **1** | **L** | **B** | | | | | | | | | | | | |
| | Class 400/600 | **1** | **L** | **D** | | | | | | | | | | | | |
| | Class 900/1500 | **1** | **L** | **F** | | | | | | | | | | | | |
| 2 inches | Class 150 | **1** | **M** | **A** | | | | | | | | | | | | |
| | Class 300 | **1** | **M** | **B** | | | | | | | | | | | | |
| | Class 400/600 | **1** | **M** | **D** | | | | | | | | | | | | |
| | Class 900/1500 | **1** | **M** | **F** | | | | | | | | | | | | |
| 3 inches | Class 150 | **1** | **P** | **A** | | | | | | | | | | | | |
| | Class 300 | **1** | **P** | **B** | | | | | | | | | | | | |
| | Class 600 | **1** | **P** | **D** | | | | | | | | | | | | |
| | Class 1500 | **1** | **P** | **F** | | | | | | | | | | | | |
| 4 inches | Class 150 | **1** | **Q** | **A** | | | | | | | | | | | | |
| | Class 300 | **1** | **Q** | **B** | | | | | | | | | | | | |
| | Class 400 | **1** | **Q** | **C** | | | | | | | | | | | | |
| | Class 1500 | **1** | **Q** | **F** | | | | | | | | | | | | |
| 5 inches | Class 150 | **1** | **R** | **A** | | | | | | | | | | | | |
| | Class 300 | **1** | **R** | **B** | | | | | | | | | | | | |
| | Class 400 | **1** | **R** | **C** | | | | | | | | | | | | |
| ***Process connection standard J.I.S.*** | | | | | | | | | | | | | | | | |
| (DN 50 only recommended for pressure transmitters for gauge pressure) | | | | | | | | | | | | | | | | |
| DN 50 | 10 K | **2** | **E** | **S** | | | | | | | | | | | | |
| | 20 K | **2** | **E** | **T** | | | | | | | | | | | | |
| | 40 K | **2** | **E** | **U** | | | | | | | | | | | | |
| DN 80 | 10 K | **2** | **G** | **S** | | | | | | | | | | | | |
| | 20 K | **2** | **G** | **T** | | | | | | | | | | | | |

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## Selection and ordering data (continued)

| | | Article No. | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal**<br>**Flange type design, connected to a transmitter with flexible capillary** | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit** | | **7MF0810-** | | | | | | | | | | | | | |
| **SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0811-** | | | | | | | | | | | | | |
| **SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0812-** | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | ● | ● | ● |
| | 40 K | 2 | G | U | | | | | | | | | | | |
| DN 100 | 10 K | 2 | H | S | | | | | | | | | | | |
| | 20 K | 2 | H | T | | | | | | | | | | | |
| | 40 K | 2 | H | U | | | | | | | | | | | |
| Other version, add order code and plain text | | 9 | A | A | | | | | | | | | H | 1 | Y |
| **Transmitter connection** | | | | | | | | | | | | | | | |
| Connection via capillary<br>Capillary length | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | 1 | 0 | | | | | | | | | |
| 1.6 m (63 inches) | | | | | 1 | 1 | | | | | | | | | |
| 2 m (78.7 inches) | | | | | 1 | 2 | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | 1 | 3 | | | | | | | | | |
| 3 m (118.1 inches) | | | | | 1 | 4 | | | | | | | | | |
| 4 m (157.5 inches) | | | | | 1 | 5 | | | | | | | | | |
| 5 m (196.9 inches) | | | | | 1 | 6 | | | | | | | | | |
| 6 m (236.2 inches) | | | | | 1 | 7 | | | | | | | | | |
| 7 m (275.6 inches) | | | | | 1 | 8 | | | | | | | | | |
| 8 m (315 inches) | | | | | 2 | 0 | | | | | | | | | |
| 9 m (354.3 inches) | | | | | 2 | 1 | | | | | | | | | |
| 10 m (393.7 inches) | | | | | 2 | 2 | | | | | | | | | |
| 11 m (433.1 inches); only for 7MF0812 | | | | | 2 | 3 | | | | | | | | | |
| 12 m (472.4 inches); only for 7MF0812 | | | | | 2 | 4 | | | | | | | | | |
| 13 m (511.811 inches); only for 7MF0812 | | | | | 2 | 5 | | | | | | | | | |
| 14 m (551.2 inches); only for 7MF0812 | | | | | 2 | 6 | | | | | | | | | |
| 15 m (590.6 inches); only for 7MF0812 | | | | | 2 | 7 | | | | | | | | | |
| Other version, add order code and plain text | | | | | 9 | 8 | | | | | | | L | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | B | | | | | | | |
| High-temperature oil | | | | | | | | C | | | | | | | |
| Silicone oil M5 | | | | | | | | A | | | | | | | |
| Food oil (FDA-listed) | | | | | | | | E | | | | | | | |
| Halocarbon oil | | | | | | | | D | | | | | | | |
| Neobee M20 (FDA listed) | | | | | | | | R | | | | | | | |
| Other version, add order code and plain text | | | | | | | | Z | | | | | P | 1 | Y |
| **Material of wetted parts** | | | | | | | | | | | | | | | |
| Stainless steel 316L | | | | | | | | | | | | | | | |
| • Without coating | | | | | | | | | A | | | | | | |
| • With PFA coating | | | | | | | | | D | | | | | | |
| • With PTFE coating | | | | | | | | | E | 0 | | | | | |
| • With ECTFE coating | | | | | | | | | F | | | | | | |
| Monel 400, 2.4360 | | | | | | | | | G | | | | | | |
| Hastelloy C276, 2.4819 | | | | | | | | | J | | | | | | |
| Tantalum | | | | | | | | | K | | | | | | |
| Titanium, 3.7035 | | | | | | | | | L | 0 | | | | | |
| Nickel 201 | | | | | | | | | M | 0 | | | | | |
| Diaphragm Duplex, 1.4462 | | | | | | | | | Q | | | | | | |
| Diaphragm and flange Duplex, 1.4462 | | | | | | | | | R | | | | | | |
| Stainless steel 316L, gold-plated | | | | | | | | | S | 0 | | | | | |
| Hastelloy C4, 2.4610 | | | | | | | | | U | 0 | | | | | |
| Hastelloy C22, 2.4602 | | | | | | | | | V | 0 | | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | 8 | | | Q | 1 | Y |

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## Selection and ordering data (continued)

| | | Article No. | Order code |
|---|---|---|---|
| **Diaphragm seal**<br>**Flange type design, connected to a transmitter with flexible capillary** | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit** | | **7MF0810-** | |
| **SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0811-** | |
| **SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0812-** | |
| | | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| **Tube length** | | | |
| Without tube | | | **0** |
| 50 mm (2 inches) | | | **1** |
| 100 mm (4 inches) | | | **2** |
| 150 mm (6 inches) | | | **3** |
| 200 mm (8 inches) | | | **4** |
| 250 mm (10 inches) | | | **5** |
| Other version, add order code and plain text | | | **Z 8** **Q 1 Y** |
| **Customer-specific tube length** | | | |
| ***Wetted parts: Stainless steel without coating*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **A 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **A 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **A 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **A 4** |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | **A 5** |
| ***Wetted parts: Stainless steel with ECTFE coating*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **F 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **F 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **F 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **F 4** |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | **F 5** |
| ***Wetted parts: Stainless steel with PFA coating*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **D 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **D 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **D 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **D 4** |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | **D 5** |
| ***Wetted parts: Monel 400*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **G 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **G 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **G 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **G 4** |
| ***Wetted parts: Hastelloy C276*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **J 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **J 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **J 3** |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **J 4** |
| ***Wetted parts: Tantalum*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | **K 1** |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | **K 2** |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | **K 3** |

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## Selection and ordering data (continued)

| | | Article No. | Order code |
|---|---|---|---|
| **Diaphragm seal**<br>**Flange type design, connected to a transmitter with flexible capillary** | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit** | | **7MF0810-** | |
| **SITRANS P320/P420 for absolute pressure from differential pressure 7MF03../7MF04.. order separately, scope of delivery: 1 unit** | | **7MF0811-** | |
| **SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0812-** | |
| | | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | **K 4** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Representation of the epoxy resin coating<br>Color: Transparent<br>coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter.<br>Maximum process medium temperature for epoxy lacquering: 140 °C | **D15** |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| Volume deflagration flame arrester (VDEF) | |
| • For gauge pressure and absolute pressure transmitters | **D61** |
| • For differential pressure and level transmitters | **D62** |
| **Negative pressure service** | |
| Negative pressure service | |
| • For gauge pressure and absolute pressure transmitters (only 7MF0810) | **D81** |
| • For differential pressure transmitters | **D83** |
| Extended negative pressure service | |
| • For gauge pressure and absolute pressure transmitters (only 7MF0810) | **D85** |
| • For differential pressure transmitters | **D88** |
| **Marine approvals** | |
| ***Note:*** | |
| If one of the order codes E50 to E60 is selected, the corresponding option must also be selected for the transmitter! | |
| DNV-GL (Det Norske Veritas/Germanischer Lloyd) | **E50** |
| LR (Lloyds Register) | **E51** |
| BV (Bureau Veritas) | **E52** |
| ABS (American Bureau of Shipping) | **E53** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| RMR (Russian Maritime Register) | **E55** |
| KR (Korean Register of Shipping) | **E56** |
| RINA (Registro Italiano Navale) | **E57** |
| CCS (China Classification Society) | **E58** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M70** |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M76** |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 25 | **M82** |
| • DN 40 | **M83** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |
| **Capillary connection** | |
| For 7MF0810 | |
| • Radial capillary outlet (for single-side mounting) | **S01** |
| • Single-side mounted at differential pressure transmitter at high side | **S03** |
| • Single-side mounted at differential pressure transmitter at low side | **S04** |
| For 7MF0811 | |
| • Radial capillary outlet (for single-side mounting) | **S01** |
| For 7MF0812 | |
| • Radial capillary pipe outlet (for double-side mounting) | **S02** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| • 11 m (433.1 inches); only for 7MF0812 | **S22** |
| • 12 m (472.4 inches); only for 7MF0812 | **S23** |
| • 13 m (511.811 inches); only for 7MF0812 | **S24** |
| • 14 m (551.2 inches); only for 7MF0812 | **S25** |
| • 15 m (590.6 inches); only for 7MF0812 | **S26** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| • 11 m (433.1 inches); only for 7MF0812 | **S52** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 12 m (472.4 inches); only for 7MF0812 | **S53** |
| • 13 m (511.811 inches); only for 7MF0812 | **S54** |
| • 14 m (551.2 inches); only for 7MF0812 | **S55** |
| • 15 m (590.6 inches); only for 7MF0812 | **S56** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| • 11 m (433.1 inches); only for 7MF0812 | **S82** |
| • 12 m (472.4 inches); only for 7MF0812 | **S83** |
| • 13 m (511.811 inches); only for 7MF0812 | **S84** |
| • 14 m (551.2 inches); only for 7MF0812 | **S85** |
| • 15 m (590.6 inches); only for 7MF0812 | **S86** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1)] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

1) See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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## Technical specifications

| SITRANS P320/P420 diaphragm seals in flange design with flexible capillary | |
|---|---|
| **Nominal diameter** | **Nominal pressure** |
| Standard of process connection EN 1092-1 | |
| • DN 25 | PN 10/16/25/40/63/100/160/250 |
| • DN 40 | PN 10/16/25/40/63/100/160 |
| • DN 50 | PN 10/16/25/40/63/100 |
| • DN 80 | PN 10/16/25/40/100 |
| • DN 100 | PN 10/16/25/40 |
| • DN 125 | PN 16/40 |
| Process connection standard ASME B16.5 | |
| • 1 inch | Class 150/300/600/1500 |
| • 1½ inches | Class 150/300/400/600/900/1500 |
| • 2 inches | Class 150/300/400/600/900/1500 |
| • 3 inches | Class 150/300/600/1500 |
| • 4 inches | Class 150/300/400/1500 |
| • 5 inches | Class 150/300/400 |
| Process connection standard J.I.S. | |
| • DN 50 | 10K |
| • DN 80 | 20K |
| • DN 100 | 40K |
| **Sealing surface** | |
| • For stainless steel mat. no. 1.4404/316L | According to EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AO |
| • For other materials | According to EN 1092-1, form B2 or ASME B16.5 RFSF |
| **Materials** | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L<br>• Without coating<br>• PTFE coating<br>• ECTFE coating (for negative pressure on request)<br>• PFA coating<br>Monel 400, mat. no. 2.4360<br>Hastelloy C276, mat. no. 2.4819<br>Hastelloy C4, mat. no. 2.4610<br>Hastelloy C22, mat. no. 2.4602<br>Tantalum<br>Titanium, mat. no. 3.7035<br>Nickel 201<br>Duplex 2205, mat. no. 1.4462<br>Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with options W01 and E50 to E58) or mat. no. 1.4301/304 |
| • Sheath | Flexible spiral coiled tube made of stainless steel mat. no. 1.4404/316L |
| **Gasket material in the process flanges** | |
| • For pressure transmitters, absolute pressure transmitters and negative pressure applications | Copper |
| • For other applications | Viton |
| **Permissible pressure load** | See above and the technical specifications of the pressure transmitter |
| **Tube length** | Without tube as standard.<br>A custom tube length can be selected as an order code. |

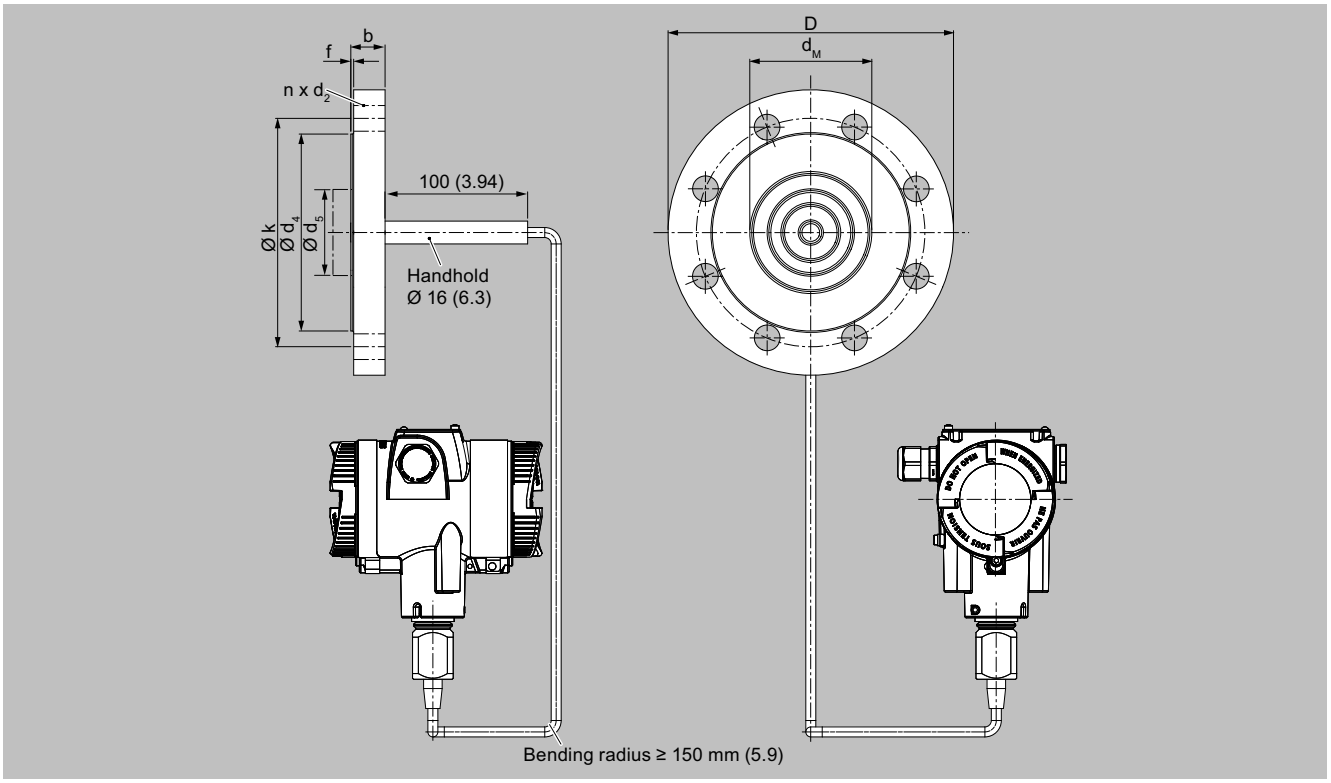
## Technical specifications (continued)

| SITRANS P320/P420 diaphragm seals in flange design with flexible capillary | |
|---|---|
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft), longer lengths on request |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| **Filling liquid**<br>(for remote seals of sandwich and flange type) | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil (for measuring $O_2$)<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 4 kg (8.82 lb) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings

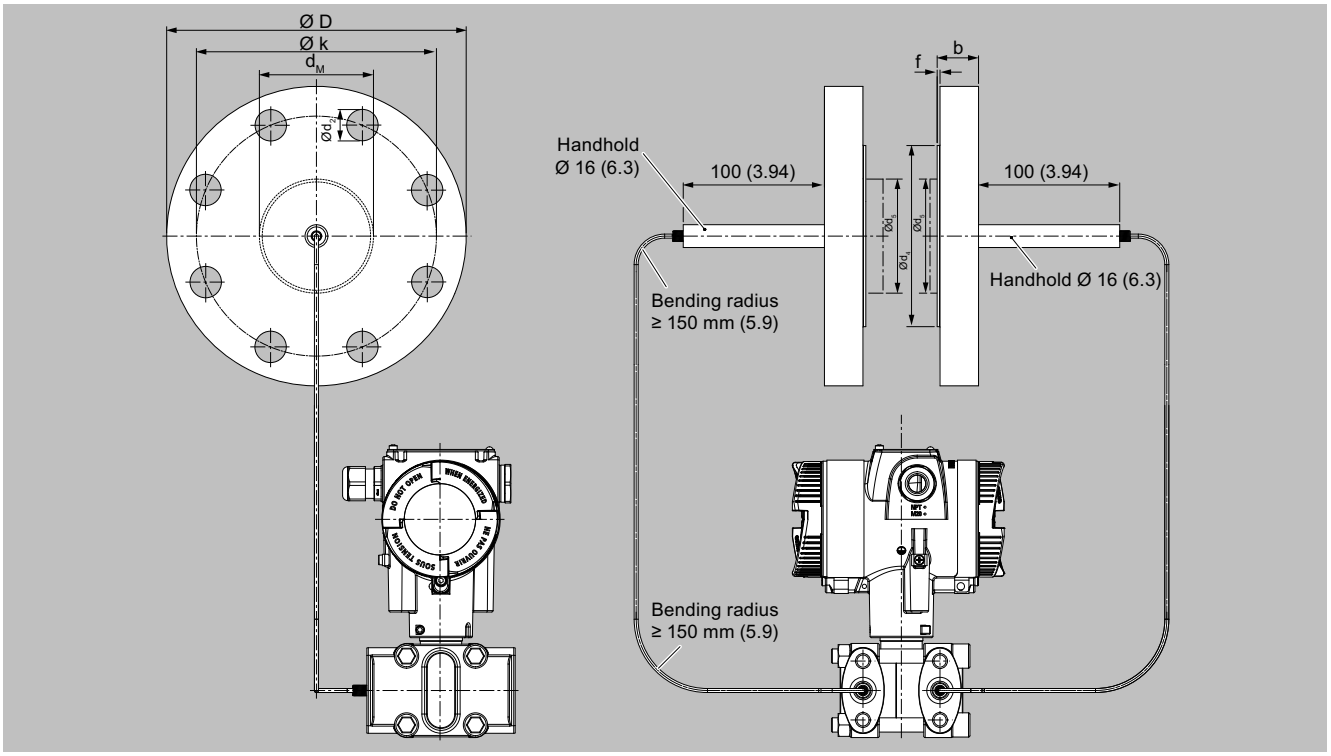



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for gauge pressure, dimensions in mm (inch)

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## Dimensional drawings (continued)




Diaphragm seals of flange design with flexible capillary for connection to SITRANS P320/420 pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

***Connection according to EN 1092-1***

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| **DN 25** | PN 10/16/25/40 | 18 | 115 | 14 | 68 | 24.5 | 22.6 | 27 | 2 | 85 | 4 | 0, 50, 100, 150 or 200 |
| | PN 63/100 | 24 | 140 | 18 | 68 | 24.5 | 22.6 | 27 | 2 | 100 | 4 | |
| | PN 160 | 24 | 140 | 18 | 68 | 24.5 | 22.6 | 27 | 2 | 100 | 4 | |
| | PN 250 | 28 | 150 | 22 | 68 | 24.5 | 22.6 | 27 | 2 | 105 | 4 | |
| **DN 40** | PN 10/16/25/40 | 16 | 150 | 18 | 88 | 38 | 30 | 42 | 2 | 110 | 4 | |
| | PN 63/100 | 24 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| | PN 160 | 26 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| **DN 50** | PN 10/16/25/40 | 18 | 165 | 18 | 102 | 48.3 | 40 | 51 | 2 | 125 | 4 | |
| | PN 63/100 | 26 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| | PN 160 | 28 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| **DN 80** | PN 10/16/25/40 | 22 | 200 | 18 | 138 | 76 | 65 | 85 | 2 | 160 | 8 | |
| | PN 100 | 30 | 230 | 26 | 138 | 76 | 65 | 85 | 2 | 180 | 8 | |
| **DN 100** | PN 10/16 | 18 | 220 | 18 | 158 | 94 | 85 | 85 | 2 | 180 | 8 | |
| | PN 25/40 | 22 | 235 | 22 | 162 | 94 | 85 | 85 | 2 | 190 | 8 | |
| **DN 125** | PN 16 | 20 | 250 | 18 | 188 | 127 | 85 | 116 | 2 | 210 | 8 | |
| | PN 40 | 24 | 270 | 26 | 188 | 127 | 85 | 116 | 2 | 220 | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Dimensional drawings (continued)

### *Connection according to ASME B16.5*

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/sq.in. | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | | Inch (mm) |
| 1" | 150 | 0.71 (18) | 4.33 (110) | 0.61 (15.6) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.08 (2) | 3.13 (79.4) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | 300 | 0.77 (19.5) | 4.92 (125) | 0.75 (19.1) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.08 (2) | 3.5 (88.9) | 4 | |
| | 600 | 0.96 (24.5) | 4.92 (125) | 0.75 (19.1) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.28 (7) | 3.5 (88.9) | 4 | |
| | 1500 | 1.4 (35.6) | 5.91 (150) | 1 (25.4) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.28 (7) | 4 (101.6) | 4 | |
| 1½" | 150 | 0.63 (15.9) | 4.92 (125) | 0.63 (15.9) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 3.87 (98.4) | 4 | |
| | 300 | 0.75 (19.1) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 4.5 (114.3) | 4 | |
| | 400/600 | 0.88 (22.3) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.5 (114.3) | 4 | |
| | 900/1500 | 1.25 (31.8) | 7.09 (180) | 1.13 (28.6) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.87 (123.8) | 4 | |
| 2" | 150 | 0.69 (17.5) | 5.91 (150) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 4.75 (120.7) | 4 | |
| | 300 | 0.81 (20.7) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 5 (127) | 8 | |
| | 400/600 | 1.00 (25.4) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 5 (127) | 8 | |
| | 900/1500 | 1.5 (38.1) | 8.46 (215) | 1.00 (25.4) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 6.5 (165.1) | 8 | |
| 3" | 150 | 0.88 (22.3) | 7.48 (190) | 0.75 (19.1) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6 (152.4) | 4 | |
| | 300 | 1.06 (27) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6.63 (168.3) | 8 | |
| | 600 | 1.23 (31.8) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 6.63 (168.3) | 8 | |
| | 1500 | 1.88 (47.7) | 10.43 (265) | 1.25 (31.8) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 8 (203.2) | 8 | |
| 4" | 150 | 0.88 (22.3) | 9.06 (230) | 0.75 (19.1) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.5 (190.5) | 8 | |
| | 300 | 1.19 (30.2) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.87 (200) | 8 | |
| | 400 | 1.38 (35) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 7.87 (200) | 8 | |
| | 1500 | 2.13 (54) | 12.20 (310) | 1.37 (34.9) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 9.5 (241.3) | 8 | |
| 5" | 150 | 0.88 (22.3) | 10.04 (255) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 8.5 (215.9) | 8 | |
| | 300 | 1.31 (33.4) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 9.25 (235) | 8 | |
| | 400 | 1.50 (38.1) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.28 (7) | 9.25 (235) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

### *Connection according to J.I.S.*

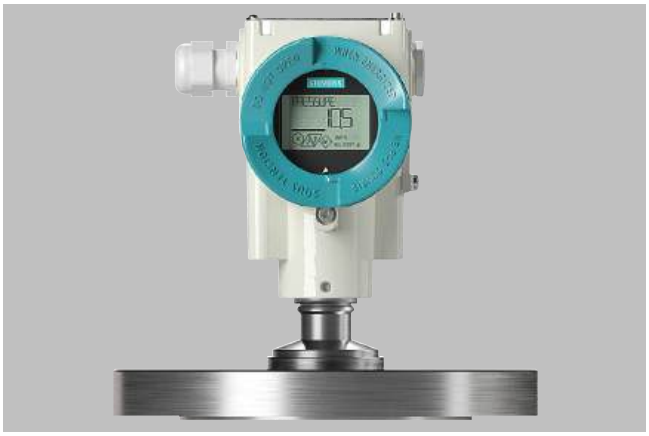
| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | | mm (inch) |
| DN 50 | 10K | 14 (0.55) | 155 (6.10) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 4 | 0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87) |
| | 20K | 16 (0.63) | 165 (6.50) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 8 | |
| | 40K | 26 (1.02) | 165 (6.50) | 19 (0.75) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 130 (5.12) | 8 | |
| DN 80 | 10K | 16 (0.63) | 185 (7.28) | 19 (0.75) | 126 (4.96) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 150 (5.91) | 8 | |
| | 20K | 20 (0.79) | 200 (7.87) | 23 (0.91) | 132 (5.20) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 160 (6.30) | 8 | |
| | 40K | 32 (1.26) | 210 (8.27) | 23 (0.91) | 140 (5.51) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 170 (6.30) | 8 | |
| DN 100 | 10K | 16 (0.63) | 210 (8.27) | 19 (0.75) | 151 (5.94) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 175 (6.89) | 8 | |
| | 20K | 22 (0.87) | 225 (8.86) | 23 (0.91) | 160 (6.30) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 185 (7.28) | 8 | |
| | 40K | 36 (1.42) | 250 (9.84) | 25 (0.98) | 165 (6.50) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 205 (8.07) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for gauge pressure

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## Selection and ordering data

| Diaphragm seal<br>Flange type design, mounted directly onto the transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0810- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | |
| ***Process connection standard EN 1092-1*** | | | | | | | | | | | | | | | |
| DN 25 | PN 10/16/25/40 | 0 | B | D | | | | | | | | | | | |
| | PN 63/100 | 0 | B | F | | | | | | | | | | | |
| | PN 160 | 0 | B | G | | | | | | | | | | | |
| | PN 250 | 0 | B | H | | | | | | | | | | | |
| DN 40 | PN 10/16/25/40 | 0 | D | D | | | | | | | | | | | |
| | PN 63/100 | 0 | D | F | | | | | | | | | | | |
| | PN 160 | 0 | D | G | | | | | | | | | | | |
| DN 50 | PN 10/16/25/40 | 0 | E | D | | | | | | | | | | | |
| | PN 63 | 0 | E | E | | | | | | | | | | | |
| | PN 100 | 0 | E | F | | | | | | | | | | | |
| DN 80 | PN 10/16/25/40 | 0 | G | D | | | | | | | | | | | |
| | PN 100 | 0 | G | F | | | | | | | | | | | |
| DN 100 | PN 10/16 | 0 | H | B | | | | | | | | | | | |
| | PN 25/40 | 0 | H | D | | | | | | | | | | | |
| DN 125 | PN 16 | 0 | J | B | | | | | | | | | | | |
| | PN 40 | 0 | J | D | | | | | | | | | | | |
| ***Process connection standard ASME B16.5*** | | | | | | | | | | | | | | | |
| 1 inch | Class 150 | 1 | K | L | | | | | | | | | | | |
| | Class 300 | 1 | K | M | | | | | | | | | | | |
| | Class 600 | 1 | K | N | | | | | | | | | | | |
| | Class 1500 | 1 | K | P | | | | | | | | | | | |
| 1½ inches | Class 150 | 1 | L | A | | | | | | | | | | | |
| | Class 300 | 1 | L | B | | | | | | | | | | | |
| | Class 400/600 | 1 | L | D | | | | | | | | | | | |
| | Class 900/1500 | 1 | L | F | | | | | | | | | | | |
| 2 inches | Class 150 | 1 | M | A | | | | | | | | | | | |
| | Class 300 | 1 | M | B | | | | | | | | | | | |
| | Class 400/600 | 1 | M | D | | | | | | | | | | | |
| | Class 900/1500 | 1 | M | F | | | | | | | | | | | |
| 3 inches | Class 150 | 1 | P | A | | | | | | | | | | | |
| | Class 300 | 1 | P | B | | | | | | | | | | | |
| | Class 600 | 1 | P | D | | | | | | | | | | | |
| | Class 1500 | 1 | P | F | | | | | | | | | | | |
| 4 inches | Class 150 | 1 | Q | A | | | | | | | | | | | |
| | Class 300 | 1 | Q | B | | | | | | | | | | | |
| | Class 400 | 1 | Q | C | | | | | | | | | | | |
| | Class 1500 | 1 | Q | F | | | | | | | | | | | |
| 5 inches | Class 150 | 1 | R | A | | | | | | | | | | | |
| | Class 300 | 1 | R | B | | | | | | | | | | | |
| | Class 400 | 1 | R | C | | | | | | | | | | | |
| ***Process connection standard J.I.S.*** | | | | | | | | | | | | | | | |
| DN 50 | 10 K | 2 | E | S | | | | | | | | | | | |
| | 20 K | 2 | E | T | | | | | | | | | | | |
| | 40 K | 2 | E | U | | | | | | | | | | | |
| DN 80 | 10 K | 2 | G | S | | | | | | | | | | | |
| | 20 K | 2 | G | T | | | | | | | | | | | |
| | 40 K | 2 | G | U | | | | | | | | | | | |
| DN 100 | 10 K | 2 | H | S | | | | | | | | | | | |
| | 20 K | 2 | H | T | | | | | | | | | | | |
| | 40 K | 2 | H | U | | | | | | | | | | | |
| Other version, add order code and plain text | | 9 | A | A | | | | | | | | | H | 1 | Y |

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## Selection and ordering data (continued)

| Diaphragm seal<br>Flange type design, mounted directly onto the transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure<br>(only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit | Article No.<br>7MF0810- | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | ● | ● | ● | |
| **Transmitter connection** | | | | | | | | | | | | | | |
| Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters) | | | | 0 | 0 | | | | | | | | | |
| Without capillary pipe, direct mount, connection with 90° elbow (for gauge pressure transmitters) | | | | 0 | 1 | | | | | | | | | |
| **Filling liquid** | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | B | | | | | | |
| High-temperature oil | | | | | | | | C | | | | | | |
| Silicone oil M5 | | | | | | | | A | | | | | | |
| Food oil (FDA-listed) | | | | | | | | E | | | | | | |
| Halocarbon oil | | | | | | | | D | | | | | | |
| Neobee M20 (FDA listed) | | | | | | | | R | | | | | | |
| Other version, add order code and plain text | | | | | | | | Z | | | P | 1 | Y | |
| **Material of wetted parts** | | | | | | | | | | | | | | |
| Stainless steel 316L | | | | | | | | | | | | | | |
| • Without coating | | | | | | | | | A | | | | | |
| • With PFA coating | | | | | | | | | D | | | | | |
| • With PTFE coating | | | | | | | | | E | 0 | | | | |
| • With ECTFE coating | | | | | | | | | F | | | | | |
| Monel 400, 2.4360 | | | | | | | | | G | | | | | |
| Hastelloy C276, 2.4819 | | | | | | | | | J | | | | | |
| Tantalum | | | | | | | | | K | | | | | |
| Titanium, 3.7035 | | | | | | | | | L | 0 | | | | |
| Nickel 201 | | | | | | | | | M | 0 | | | | |
| Diaphragm Duplex, 1.4462 | | | | | | | | | Q | | | | | |
| Diaphragm and flange Duplex, 1.4462 | | | | | | | | | R | | | | | |
| Stainless steel 316L, gold-plated | | | | | | | | | S | 0 | | | | |
| Hastelloy C4, 2.4610 | | | | | | | | | U | 0 | | | | |
| Hastelloy C22, 2.4602 | | | | | | | | | V | 0 | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | 8 | | Q | 1 | Y |
| **Tube length** | | | | | | | | | | | | | | |
| Without tube | | | | | | | | | | 0 | | | | |
| 50 mm (2 inches) | | | | | | | | | | 1 | | | | |
| 100 mm (4 inches) | | | | | | | | | | 2 | | | | |
| 150 mm (6 inches) | | | | | | | | | | 3 | | | | |
| 200 mm (8 inches) | | | | | | | | | | 4 | | | | |
| 250 mm (10 inches) | | | | | | | | | | 5 | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | 8 | | Q | 1 | Y |
| **Customer-specific tube length** | | | | | | | | | | | | | | |
| ***Wetted parts: Stainless steel without coating*** | | | | | | | | | | | | | | |
| ***Range*** | ***Standard length*** | | | | | | | | | | | | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | | | | | | | A | 1 | | | | |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | | | | | | | A | 2 | | | | |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | | | | | | | A | 3 | | | | |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | | | | | | | A | 4 | | | | |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | | | | | | | A | 5 | | | | |
| ***Wetted parts: Stainless steel with ECTFE coating*** | | | | | | | | | | | | | | |
| ***Range*** | ***Standard length*** | | | | | | | | | | | | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | | | | | | | | F | 1 | | | | |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | | | | | | | | F | 2 | | | | |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | | | | | | | | F | 3 | | | | |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | | | | | | | | F | 4 | | | | |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | | | | | | | | F | 5 | | | | |

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## Selection and ordering data (continued)

| Diaphragm seal<br>Flange type design, mounted directly onto the transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0810- | Order code |
|---|---|---|---|
| | | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| ***Wetted parts: Stainless steel with PFA coating*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | D | 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | D | 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | D | 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | D | 4 |
| 201 ... 250 mm (7.91 ... 9.84 inches) | 250 mm (9.84 inches) | D | 5 |
| ***Wetted parts: Monel 400*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | G | 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | G | 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | G | 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | G | 4 |
| ***Wetted parts: Hastelloy C276*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | J | 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | J | 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | J | 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | J | 4 |
| ***Wetted parts: Tantalum*** | | | |
| ***Range*** | ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) | 50 mm (1.97 inches) | K | 1 |
| 51 ... 100 mm (2.01 ... 3.94 inches) | 100 mm (3.94 inches) | K | 2 |
| 101 ... 150 mm (3.98 ... 5.91 inches) | 150 mm (5.91 inches) | K | 3 |
| 151 ... 200 mm (5.94 ... 7.87 inches) | 200 mm (7.87 inches) | K | 4 |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Representation of the epoxy resin coating<br>Color: Transparent<br>coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter.<br>Maximum process medium temperature for epoxy lacquering: 140 °C | **D15** |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| Volume deflagration flame arrester (VDEF) for gauge pressure and absolute pressure transmitters | **D61** |
| **Negative pressure service** | |
| Negative pressure service for gauge pressure and absolute pressure transmitters | **D81** |
| Extended negative pressure service for gauge pressure and absolute pressure transmitters (only for 7MF0810) | **D85** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:***<br>If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M70** |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M76** |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 25 | **M82** |
| • DN 40 | **M83** |
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Capillary connection** | |
| Elongated pipe elbow, 150 mm instead of 100 mm, max. media temperature 250 °C (482 °F), observe the max. permissible media temperature of the filling liquid. | **S05** |
| Elongated pipe elbow, 200 mm instead of 100 mm, max. media temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid. | **S06** |
| Elongated pipe elbow, 200 mm instead of 130 mm, max. media temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid. | **S07** |
| Cooling element, max. medium temperature 300 °C (572 °F), observe the max. permissible media temperature of the filling liquid. | **S08** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

[1] See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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## Technical specifications

| SITRANS P320/P420 diaphragm seals in flange design, mounted directly on the transmitter | |
|---|---|
| **Nominal diameter** | **Nominal pressure** |
| Standard of process connection EN 1092-1 | |
| • DN 25 | PN 10/16/25/40/63/100/160/250 |
| • DN 40 | PN 10/16/25/40/63/100/160 |
| • DN 50 | PN 10/16/25/40/63/100 |
| • DN 80 | PN 10/16/25/40/100 |
| • DN 100 | PN 10/16/25/40 |
| • DN 125 | PN 16/40 |
| Process connection standard ASME B16.5 | |
| • 1 inch | Class 150/300/600/1500 |
| • 1½ inches | Class 150/300/400/600/900/1500 |
| • 2 inches | Class 150/300/400/600/900/1500 |
| • 3 inches | Class 150/300/600/1500 |
| • 4 inches | Class 150/300/400/1500 |
| • 5 inches | Class 150/300/400 |
| Process connection standard J.I.S. | |
| • DN 50 | 10K |
| • DN 80 | 20K |
| • DN 100 | 40K |
| **Sealing surface** | |
| • For stainless steel mat. no. 1.4404/316L | According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA |
| • For the other materials | Smooth according to EN 1092-1, form B2 or ASME B16.5 RFSF |
| **Materials** | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L<br>• No coating<br>• PTFE coating<br>• ECTFE coating (for negative pressure on request)<br>• PFA coating<br>Monel 400, mat. no. 2.4360<br>Hastelloy C276, mat. no. 2.4819<br>Hastelloy C4, mat. no. 2.4610<br>Hastelloy C22, mat. no. 2.4602<br>Tantalum<br>Titanium, mat. no. 3.7035<br>Nickel 201<br>Duplex 2205, mat. no. 1.4462<br>Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| • Capillary | Stainless steel, mat. no. 1.4404/316L |
| • Gasket material at the transmitter connection | Copper |
| **Permissible pressure load** | See above and the technical specifications of the transmitter |
| **Tube length** | • Without tube<br>• 50 mm (1.97 inches)<br>• 100 mm (3.94 inches)<br>• 150 mm (5.91 inches)<br>• 200 mm (7.87 inches) |
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft), longer lengths on request |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |

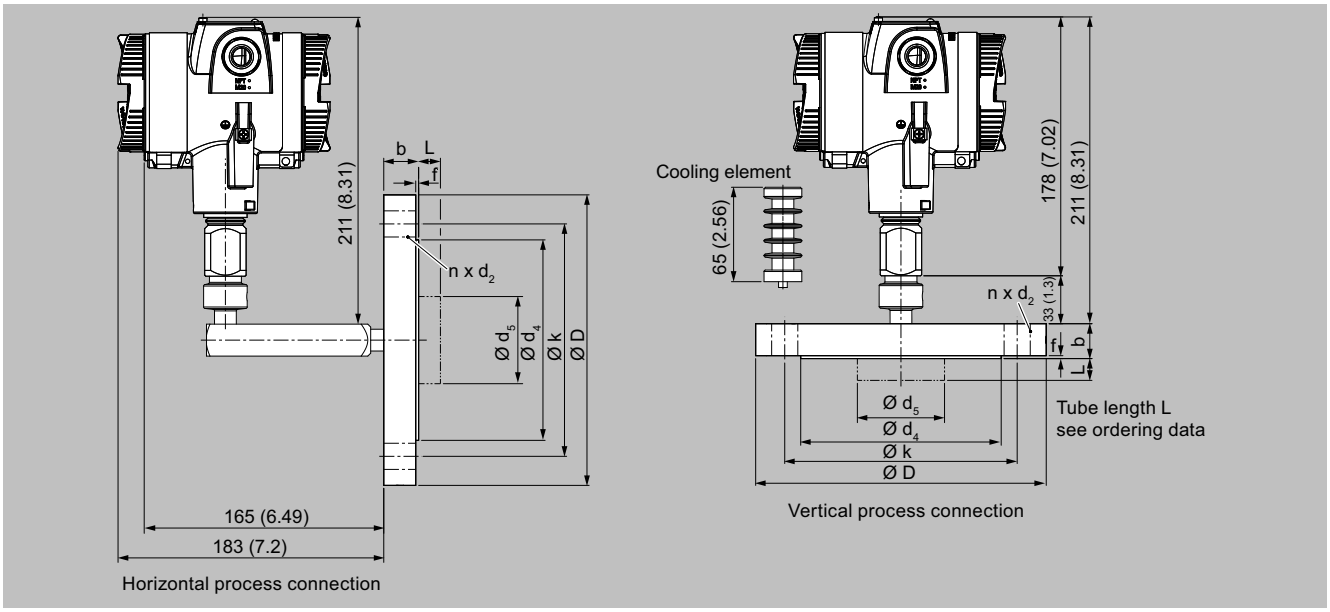
## Technical specifications (continued)

| SITRANS P320/P420 diaphragm seals in flange design, mounted directly on the transmitter | |
|---|---|
| • Minimum bending radius | 150 mm (5.9 inches) |
| **Filling liquid** | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil (for measuring $O_2$)<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| **Max. recommended medium temperature** | 170 °C (338 °F) |
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 4 kg (8.82 lbs) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings




Diaphragm seals of flange design, direct connection to a SITRANS P320/420 pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

***Connection according to EN 1092-1***

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| **DN 25** | PN 10/16/25/40 | 18 | 115 | 14 | 68 | 24.5 | 22.6 | 27 | 2 | 85 | 4 | 0, 50, 100, 150 or 200 |
| | PN 63/100 | 24 | 140 | 18 | 68 | 24.5 | 22.6 | 27 | 2 | 100 | 4 | |
| | PN 160 | 24 | 140 | 18 | 68 | 24.5 | 22.6 | 27 | 2 | 100 | 4 | |
| | PN 250 | 28 | 150 | 22 | 68 | 24.5 | 22.6 | 27 | 2 | 105 | 4 | |
| **DN 40** | PN 10/16/25/40 | 16 | 150 | 18 | 88 | 38 | 30 | 42 | 2 | 110 | 4 | |
| | PN 63/100 | 24 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| | PN 160 | 26 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| **DN 50** | PN 10/16/25/40 | 18 | 165 | 18 | 102 | 48.3 | 40 | 51 | 2 | 125 | 4 | |
| | PN 63/100 | 26 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| | PN 160 | 28 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| **DN 80** | PN 10/16/25/40 | 22 | 200 | 18 | 138 | 76 | 65 | 85 | 2 | 160 | 8 | |
| | PN 100 | 30 | 230 | 26 | 138 | 76 | 65 | 85 | 2 | 180 | 8 | |
| **DN 100** | PN 10/16 | 18 | 220 | 18 | 158 | 94 | 85 | 85 | 2 | 180 | 8 | |
| | PN 25/40 | 22 | 235 | 22 | 162 | 94 | 85 | 85 | 2 | 190 | 8 | |
| **DN 125** | PN 16 | 20 | 250 | 18 | 188 | 127 | 85 | 116 | 2 | 210 | 8 | |
| | PN 40 | 24 | 270 | 26 | 188 | 127 | 85 | 116 | 2 | 220 | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

***Connection according to ASME B16.5***

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/sq.in. | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | | Inch (mm) |
| **1"** | 150 | 0.71 (18) | 4.33 (110) | 0.61 (15.6) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.08 (2) | 3.13 (79.4) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | 300 | 0.77 (19.5) | 4.92 (125) | 0.75 (19.1) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.08 (2) | 3.5 (88.9) | 4 | |
| | 600 | 0.96 (24.5) | 4.92 (125) | 0.75 (19.1) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.28 (7) | 3.5 (88.9) | 4 | |
| | 1500 | 1.4 (35.6) | 5.91 (150) | 1 (25.4) | 2 (50.8) | 0.96 (24.5) | 0.89 (22.6) | 1,18 (30) | 0.28 (7) | 4 (101.6) | 4 | |

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## Dimensional drawings (continued)

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/sq.in. | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | | Inch (mm) |
| 1½" | 150 | 0.63 (15.9) | 4.92 (125) | 0.63 (15.9) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 3.87 (98.4) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | 300 | 0.75 (19.1) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.08 (2) | 4.5 (114.3) | 4 | |
| | 400/600 | 0.88 (22.3) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.5 (114.3) | 4 | |
| | 900/1500 | 1.25 (31.8) | 7.09 (180) | 1.13 (28.6) | 2.87 (73) | 1.5 (38) | 1,18 (30) | 1.42 (36) | 0.28 (7) | 4.87 (123.8) | 4 | |
| 2" | 150 | 0.69 (17.5) | 5.91 (150) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 4.75 (120.7) | 4 | |
| | 300 | 0.81 (20.7) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 5 (127) | 8 | |
| | 400/600 | 1.00 (25.4) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 5 (127) | 8 | |
| | 900/1500 | 1.5 (38.1) | 8.46 (215) | 1.00 (25.4) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 6.5 (165.1) | 8 | |
| 3" | 150 | 0.88 (22.3) | 7.48 (190) | 0.75 (19.1) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6 (152.4) | 4 | |
| | 300 | 1.06 (27) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6.63 (168.3) | 8 | |
| | 600 | 1.23 (31.8) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 6.63 (168.3) | 8 | |
| | 1500 | 1.88 (47.7) | 10.43 (265) | 1.25 (31.8) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 8 (203.2) | 8 | |
| 4" | 150 | 0.88 (22.3) | 9.06 (230) | 0.75 (19.1) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.5 (190.5) | 8 | |
| | 300 | 1.19 (30.2) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.87 (200) | 8 | |
| | 400 | 1.38 (35) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 7.87 (200) | 8 | |
| | 1500 | 2.13 (54) | 12.20 (310) | 1.37 (34.9) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 9.5 (241.3) | 8 | |
| 5" | 150 | 0.88 (22.3) | 10.04 (255) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 8.5 (215.9) | 8 | |
| | 300 | 1.31 (33.4) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 9.25 (235) | 8 | |
| | 400 | 1.50 (38.1) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.28 (7) | 9.25 (235) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

***Connection according to J.I.S.***

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | | Inch (mm) |
| DN 50 | 10K | 14 (0.55) | 155 (6.10) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 4 | 0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87) |
| | 20K | 16 (0.63) | 165 (6.50) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 8 | |
| | 40K | 26 (1.02) | 165 (6.50) | 19 (0.75) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 130 (5.12) | 8 | |
| DN 80 | 10K | 16 (0.63) | 185 (7.28) | 19 (0.75) | 126 (4.96) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 150 (5.91) | 8 | |
| | 20K | 20 (0.79) | 200 (7.87) | 23 (0.91) | 132 (5.20) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 160 (6.30) | 8 | |
| | 40K | 32 (1.26) | 210 (8.27) | 23 (0.91) | 140 (5.51) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 170 (6.30) | 8 | |
| DN 100 | 10K | 16 (0.63) | 210 (8.27) | 19 (0.75) | 151 (5.94) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 175 (6.89) | 8 | |
| | 20K | 22 (0.87) | 225 (8.86) | 23 (0.91) | 160 (6.30) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 185 (7.28) | 8 | |
| | 40K | 36 (1.42) | 250 (9.84) | 25 (0.98) | 165 (6.50) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 205 (8.07) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Overview



Diaphragm seal of flange design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

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## Selection and ordering data

| | | Article No. | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal<br>Flange design, mounted directly and with capillary<br>Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420<br>SITRANS P320/P420 transmitter for differential pressure and flow<br>7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0813-** | | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | |
| ***Process connection standard EN 1092-1*** | | | | | | | | | | | | | | | | |
| DN 40 | PN 10/16/25/40 | 0 | D | D | | | | | | | | | | | | |
| | PN 63/100 | 0 | D | F | | | | | | | | | | | | |
| | PN 160 | 0 | D | G | | | | | | | | | | | | |
| DN 50 | PN 10/16/25/40 | 0 | E | D | | | | | | | | | | | | |
| | PN 63 | 0 | E | E | | | | | | | | | | | | |
| | PN 100 | 0 | E | F | | | | | | | | | | | | |
| DN 80 | PN 10/16/25/40 | 0 | G | D | | | | | | | | | | | | |
| | PN 100 | 0 | G | F | | | | | | | | | | | | |
| DN 100 | PN 10/16 | 0 | H | B | | | | | | | | | | | | |
| | PN 25/40 | 0 | H | D | | | | | | | | | | | | |
| DN 125 | PN 16 | 0 | J | B | | | | | | | | | | | | |
| | PN 40 | 0 | J | D | | | | | | | | | | | | |
| ***Process connection standard ASME B16.5*** | | | | | | | | | | | | | | | | |
| 1½ inches | Class 150 | 1 | L | A | | | | | | | | | | | | |
| | Class 300 | 1 | L | B | | | | | | | | | | | | |
| | Class 400/600 | 1 | L | D | | | | | | | | | | | | |
| | Class 900/1500 | 1 | L | F | | | | | | | | | | | | |
| 2 inches | Class 150 | 1 | M | A | | | | | | | | | | | | |
| | Class 300 | 1 | M | B | | | | | | | | | | | | |
| | Class 400/600 | 1 | M | D | | | | | | | | | | | | |
| | Class 900/1500 | 1 | M | F | | | | | | | | | | | | |
| 3 inches | Class 150 | 1 | P | A | | | | | | | | | | | | |
| | Class 300 | 1 | P | B | | | | | | | | | | | | |
| | Class 600 | 1 | P | D | | | | | | | | | | | | |
| | Class 1500 | 1 | P | F | | | | | | | | | | | | |
| 4 inches | Class 150 | 1 | Q | A | | | | | | | | | | | | |
| | Class 300 | 1 | Q | B | | | | | | | | | | | | |
| | Class 400 | 1 | Q | C | | | | | | | | | | | | |
| | Class 1500 | 1 | Q | F | | | | | | | | | | | | |
| 5 inches | Class 150 | 1 | R | A | | | | | | | | | | | | |
| | Class 300 | 1 | R | B | | | | | | | | | | | | |
| | Class 400 | 1 | R | C | | | | | | | | | | | | |
| ***Process connection standard J.I.S.*** | | | | | | | | | | | | | | | | |
| DN 50 | 10K | 2 | E | S | | | | | | | | | | | | |
| | 20K | 2 | E | T | | | | | | | | | | | | |
| | 40K | 2 | E | U | | | | | | | | | | | | |
| DN 80 | 10K | 2 | G | S | | | | | | | | | | | | |
| | 20K | 2 | G | T | | | | | | | | | | | | |
| | 40K | 2 | G | U | | | | | | | | | | | | |
| DN 100 | 10K | 2 | H | S | | | | | | | | | | | | |
| | 20K | 2 | H | T | | | | | | | | | | | | |
| | 40K | 2 | H | U | | | | | | | | | | | | |
| Other version, add order code and plain text | | 9 | A | A | | | | | | | | | | H | 1 | Y |
| **Capillary length at low side** | | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | 1 | 0 | | | | | | | | | | |
| 1.6 m (63 inches) | | | | | 1 | 1 | | | | | | | | | | |
| 2 m (78.7 inches) | | | | | 1 | 2 | | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | 1 | 3 | | | | | | | | | | |
| 3 m (118.1 inches) | | | | | 1 | 4 | | | | | | | | | | |

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## Selection and ordering data (continued)

| | Article No. | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal<br>Flange design, mounted directly and with capillary<br>Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420<br>SITRANS P320/P420 transmitter for differential pressure and flow<br>7MF03../7MF04.. order separately, scope of delivery: 2 units** | **7MF0813-** | | | | | | | | | | | | | |
| | ● | ● | ● | ● | ● | - | 0 | ● | ● | ● | | ● | ● | ● |
| 4 m (157.5 inches) | | | | 1 | 5 | | | | | | | | | |
| 5 m (196.9 inches) | | | | 1 | 6 | | | | | | | | | |
| 6 m (236.2 inches) | | | | 1 | 7 | | | | | | | | | |
| 7 m (275.6 inches) | | | | 1 | 8 | | | | | | | | | |
| 8 m (315 inches) | | | | 2 | 0 | | | | | | | | | |
| 9 m (354.3 inches) | | | | 2 | 1 | | | | | | | | | |
| 10 m (393.7 inches) | | | | 2 | 2 | | | | | | | | | |
| Other version, add order code and plain text | | | | 9 | 8 | | | | | | | L | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | B | | | | | | | |
| High-temperature oil | | | | | | | C | | | | | | | |
| Silicone oil M5 | | | | | | | A | | | | | | | |
| Food oil (FDA-listed) | | | | | | | E | | | | | | | |
| Halocarbon oil | | | | | | | D | | | | | | | |
| Neobee M20 (FDA listed) | | | | | | | R | | | | | | | |
| Other version, add order code and plain text | | | | | | | Z | | | | | P | 1 | Y |
| **Material of wetted parts** | | | | | | | | | | | | | | |
| Stainless steel 316L | | | | | | | | | | | | | | |
| • Without coating | | | | | | | | A | | | | | | |
| • With PFA coating | | | | | | | | D | | | | | | |
| • With PTFE coating | | | | | | | | E | 0 | | | | | |
| • With ECTFE coating | | | | | | | | F | | | | | | |
| Monel 400, 2.4360 | | | | | | | | G | | | | | | |
| Hastelloy C276, 2.4819 | | | | | | | | J | | | | | | |
| Tantalum | | | | | | | | K | | | | | | |
| Titanium, 3.7035 | | | | | | | | L | 0 | | | | | |
| Nickel 201 | | | | | | | | M | 0 | | | | | |
| Diaphragm Duplex, 1.4462 | | | | | | | | Q | | | | | | |
| Diaphragm and flange Duplex, 1.4462 | | | | | | | | R | | | | | | |
| Stainless steel 316L, gold-plated | | | | | | | | S | 0 | | | | | |
| Hastelloy C4, 2.4610 | | | | | | | | U | 0 | | | | | |
| Hastelloy C22, 2.4602 | | | | | | | | V | 0 | | | | | |
| Other version, add order code and plain text | | | | | | | | Z | 8 | | | Q | 1 | Y |
| **Tube length** | | | | | | | | | | | | | | |
| Note:<br>If a tube is ordered, only the directly mounted remote seal is equipped with a tube. | | | | | | | | | | | | | | |
| None | | | | | | | | | 0 | | | | | |
| 50 mm (2 inches) | | | | | | | | | 1 | | | | | |
| 100 mm (4 inches) | | | | | | | | | 2 | | | | | |
| 150 mm (6 inches) | | | | | | | | | 3 | | | | | |
| 200 mm (8 inches) | | | | | | | | | 4 | | | | | |
| 250 mm (10 inches) | | | | | | | | | 5 | | | | | |
| Other version, add order code and plain text | | | | | | | | Z | 8 | | | Q | 1 | Y |
| **Customer-specific tube length** | | | | | | | | | | | | | | |
| ***Wetted parts: Stainless steel without coating*** | | | | | | | | | | | | | | |
| ***Range*** / ***Standard length*** | | | | | | | | | | | | | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | | | | | | | | A | 1 | | | | | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | | | | | | | | A | 2 | | | | | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | | | | | | | | A | 3 | | | | | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | | | | | | | | A | 4 | | | | | |
| 201 ... 250 mm (7.91 ... 9.84 inches) / 250 mm (9.84 inches) | | | | | | | | A | 5 | | | | | |
| ***Wetted parts: Stainless steel with ECTFE coating*** | | | | | | | | | | | | | | |

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## Selection and ordering data (continued)

| | Article No. | Order code |
|---|---|---|
| **Diaphragm seal**<br>**Flange design, mounted directly and with capillary**<br>**Mounting flange (optionally with tube) for direct mounting on high side and flange remote seal without tube, mounted via capillary on low side of SITRANS P for differential pressure; SITRANS P320/420**<br>**SITRANS P320/P420 transmitter for differential pressure and flow 7MF03../7MF04.. order separately, scope of delivery: 2 units** | **7MF0813-** | |
| | ● ● ● ● ● - 0 ● ● ● | ● ● ● |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | F 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | F 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | F 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | F 4 | |
| 201 ... 250 mm (7.91 ... 9.84 inches) / 250 mm (9.84 inches) | F 5 | |
| ***Wetted parts: Stainless steel with PFA coating*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | D 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | D 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | D 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | D 4 | |
| 201 ... 250 mm (7.91 ... 9.84 inches) / 250 mm (9.84 inches) | D 5 | |
| ***Wetted parts: Monel 400*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | G 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | G 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | G 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | G 4 | |
| ***Wetted parts: Hastelloy C276*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | J 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | J 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | J 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | J 4 | |
| ***Wetted parts: Tantalum*** | | |
| ***Range*** / ***Standard length*** | | |
| 20 ... 50 mm (0.79 ... 1.97 inches) / 50 mm (1.97 inches) | K 1 | |
| 51 ... 100 mm (2.01 ... 3.94 inches) / 100 mm (3.94 inches) | K 2 | |
| 101 ... 150 mm (3.98 ... 5.91 inches) / 150 mm (5.91 inches) | K 3 | |
| 151 ... 200 mm (5.94 ... 7.87 inches) / 200 mm (7.87 inches) | K 4 | |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Accessories** | |
| Representation of the epoxy resin coating<br>Color: Transparent<br>coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter.<br>Maximum process medium temperature for epoxy lacquering: 140 °C | **D15** |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| Volume deflagration flame arrester (VDEF) for differential pressure and level transmitters | **D62** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Negative pressure service** | |
| Negative pressure service for differential pressure transmitters | **D83** |
| Extended negative pressure service for differential pressure transmitters | **D88** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M70** |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M76** |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 25 | **M82** |
| • DN 40 | **M83** |
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Specification of process conditions**[1] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

[1] See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

## Technical specifications

| SITRANS P320/P420 diaphragm seals in flange design, mounted directly and with capillary | |
|---|---|
| **Nominal diameter** | **Nominal pressure** |
| Standard of process connection EN 1092-1 | |
| • DN 40 | PN 10/16/25/40/63/100/160 |
| • DN 50 | PN 10/16/25/40/63/100 |
| • DN 80 | PN 10/16/25/40/100 |
| • DN 100 | PN 10/16/25/40 |
| • DN 125 | PN 16/40 |
| Process connection standard ASME B16.5 | |
| • 1½ inches | Class 150/300/400/600/900/1500 |
| • 2 inches | Class 150/300/400/600/900/1500 |
| • 3 inches | Class 150/300/600/1500 |
| • 4 inches | Class 150/300/400/1500 |
| • 5 inches | Class 150/300/400 |
| Process connection standard J.I.S. | |
| • DN 50 | 10K |
| • DN 80 | 20K |
| • DN 100 | 40K |
| Sealing surface | |
| • For stainless steel mat. no. 1.4404/316L | According to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AO |
| • For the other materials | According to EN 1092-1, form B2 or ASME B16.5 RFSF |
| **Materials** | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L<br>• Without coating<br>• PTFE coating<br>• ECTFE coating (for negative pressure on request)<br>• PFA coating<br>Monel 400, mat. no. 2.4360<br>Hastelloy C276, mat. no. 2.4819<br>Hastelloy C4, mat. no. 2.4610<br>Hastelloy C22, mat. no. 2.4602<br>Tantalum<br>Titanium, mat. no. 3.7035<br>Nickel 201<br>Duplex 2205, mat. no. 1.4462 |

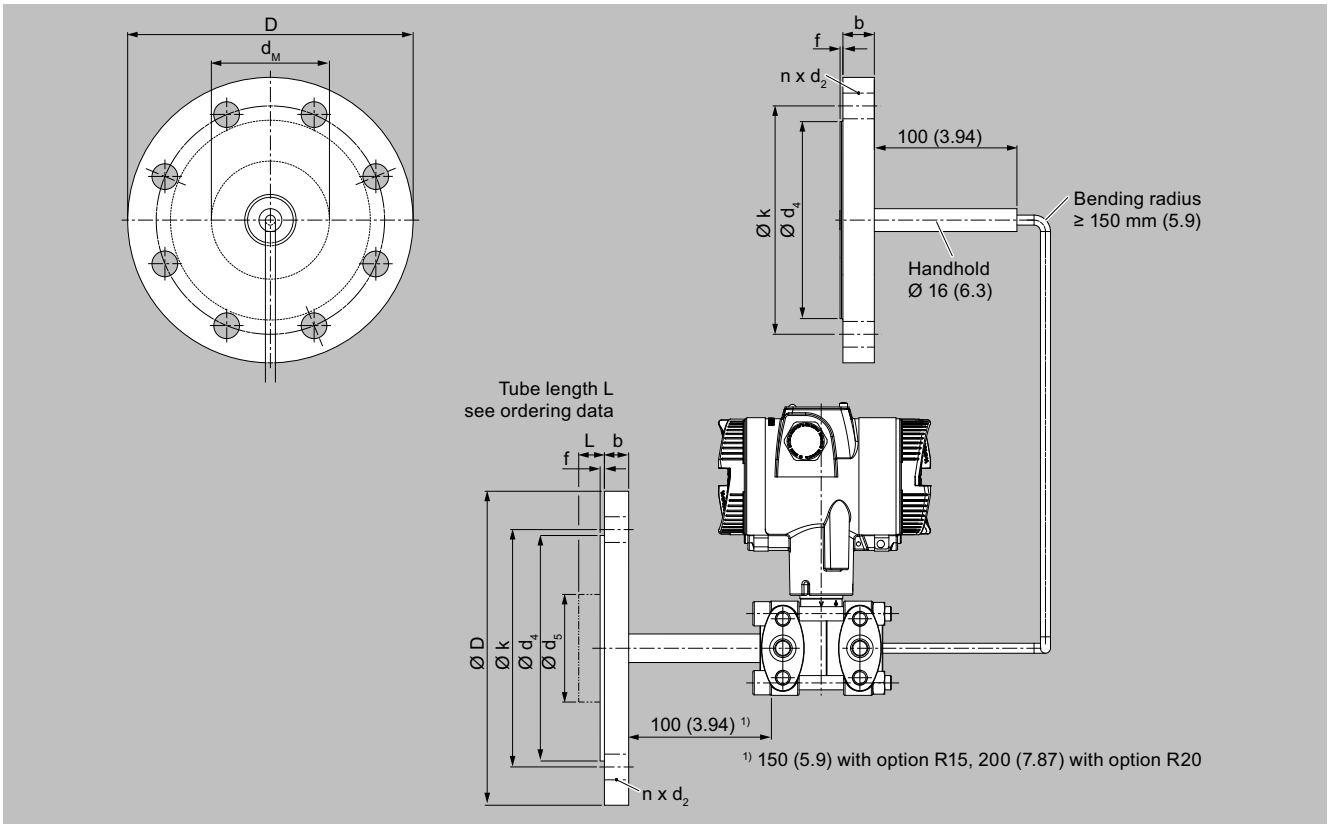
## Technical specifications (continued)

| SITRANS P320/P420 diaphragm seals in flange design, mounted directly and with capillary | |
|---|---|
| • Wetted parts | Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304 |
| • Sheath | Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L |
| **Gasket material in the process flanges** | |
| • For gauge pressure transmitters, absolute pressure transmitters and negative pressure applications | Copper |
| • For other applications | Viton |
| **Permissible pressure load** | See above and the technical specifications of the pressure transmitter |
| Tube length | • Without tube<br>• 50 mm (1.97 inch)<br>• 100 mm (3.94 inches)<br>• 150 mm (5.91 inches)<br>• 200 mm (7.87 inches)<br>Note:<br>If a tube is ordered, only the directly mounted remote seal is equipped with a tube. |
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft), longer lengths on request |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| **Filling liquid** | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil (for measuring $O_2$)<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| **Max. recommended medium temperature** | 170 °C (338 °F) |
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 4 kg (8.82 lb) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings




Diaphragm seals of flange design with flexible capillary, rigid mounting, for connection to a SITRANS P320/420 pressure transmitter for differential pressure, dimensions in mm (inch)

***Connection according to EN 1092-1***

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm | mm |
| **DN 40** | PN 10/16/25/40 | 16 | 150 | 18 | 88 | 38 | 30 | 42 | 2 | 110 | 4 | 0, 50, 100, 150 or 200 |
| | PN 63/100 | 24 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| | PN 160 | 26 | 170 | 22 | 88 | 38 | 30 | 42 | 2 | 125 | 4 | |
| **DN 50** | PN 10/16/25/40 | 18 | 165 | 18 | 102 | 48.3 | 40 | 51 | 2 | 125 | 4 | |
| | PN 63/100 | 26 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| | PN 160 | 28 | 195 | 26 | 102 | 48.3 | 40 | 51 | 2 | 145 | 4 | |
| **DN 80** | PN 10/16/25/40 | 22 | 200 | 18 | 138 | 76 | 65 | 85 | 2 | 160 | 8 | |
| | PN 100 | 30 | 230 | 26 | 138 | 76 | 65 | 85 | 2 | 180 | 8 | |
| **DN 100** | PN 10/16 | 18 | 220 | 18 | 158 | 94 | 85 | 85 | 2 | 180 | 8 | |
| | PN 25/40 | 22 | 235 | 22 | 162 | 94 | 85 | 85 | 2 | 190 | 8 | |
| **DN 125** | PN 16 | 20 | 250 | 18 | 188 | 127 | 85 | 116 | 2 | 210 | 8 | |
| | PN 40 | 24 | 270 | 26 | 188 | 127 | 85 | 116 | 2 | 220 | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Dimensional drawings (continued)

### *Connection according to ASME B16.5*

| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/sq.in. | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | Inch (mm) | | Inch (mm) |
| 1½" | 150 | 0.63 (15.9) | 4.92 (125) | 0.63 (15.9) | 2.87 (73) | 1.5 (38) | 1.18 (30) | 1.42 (36) | 0.08 (2) | 3.87 (98.4) | 4 | 0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200) |
| | 300 | 0.75 (19.1) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1.18 (30) | 1.42 (36) | 0.08 (2) | 4.5 (114.3) | 4 | |
| | 400/600 | 0.88 (22.3) | 6.10 (155) | 0.87 (22.2) | 2.87 (73) | 1.5 (38) | 1.18 (30) | 1.42 (36) | 0.28 (7) | 4.5 (114.3) | 4 | |
| | 900/1500 | 1.25 (31.8) | 7.09 (180) | 1.13 (28.6) | 2.87 (73) | 1.5 (38) | 1.18 (30) | 1.42 (36) | 0.28 (7) | 4.87 (123.8) | 4 | |
| 2" | 150 | 0.69 (17.5) | 5.91 (150) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 4.75 (120.7) | 4 | |
| | 300 | 0.81 (20.7) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.08 (2) | 5 (127) | 8 | |
| | 400/600 | 1.00 (25.4) | 6.5 (165) | 0.75 (19.1) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 5 (127) | 8 | |
| | 900/1500 | 1.5 (38.1) | 8.46 (215) | 1.00 (25.4) | 3.63 (92.1) | 1.9 (48.3) | 1.57 (40) | 2.01 (51) | 0.28 (7) | 6.5 (165.1) | 8 | |
| 3" | 150 | 0.88 (22.3) | 7.48 (190) | 0.75 (19.1) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6 (152.4) | 4 | |
| | 300 | 1.06 (27) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.08 (2) | 6.63 (168.3) | 8 | |
| | 600 | 1.23 (31.8) | 8.27 (210) | 0.87 (22.2) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 6.63 (168.3) | 8 | |
| | 1500 | 1.88 (47.7) | 10.43 (265) | 1.25 (31.8) | 5 (127) | 3 (76) | 2.65 (65) | 3.35 (85) | 0.28 (7) | 8 (203.2) | 8 | |
| 4" | 150 | 0.88 (22.3) | 9.06 (230) | 0.75 (19.1) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.5 (190.5) | 8 | |
| | 300 | 1.19 (30.2) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.08 (2) | 7.87 (200) | 8 | |
| | 400 | 1.38 (35) | 10.04 (255) | 0.87 (22.2) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 7.87 (200) | 8 | |
| | 1500 | 2.13 (54) | 12.20 (310) | 1.37 (34.9) | 6.19 (157.2) | 3.69 (94) | 3.35 (85) | 3.35 (85) | 0.28 (7) | 9.5 (241.3) | 8 | |
| 5" | 150 | 0.88 (22.3) | 10.04 (255) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 8.5 (215.9) | 8 | |
| | 300 | 1.31 (33.4) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.08 (2) | 9.25 (235) | 8 | |
| | 400 | 1.50 (38.1) | 11.02 (280) | 0.87 (22.2) | 7.31 (185.7) | 5 (127) | 4.57 (116) | 4.57 (116) | 0.28 (7) | 9.25 (235) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

### *Connection according to J.I.S.*

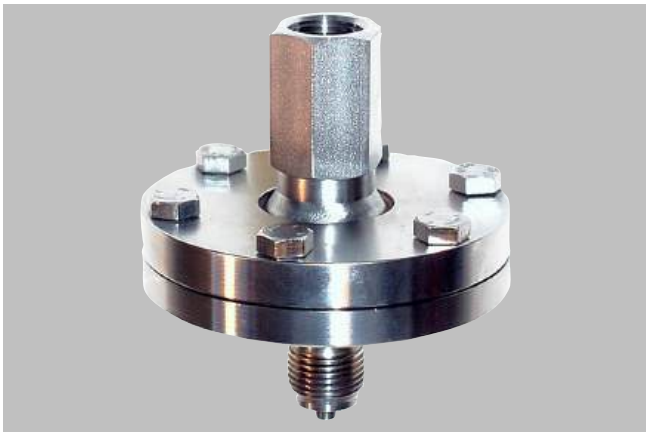
| Nominal diameter | Nominal pressure | b | D | $d_2$ | $d_4$ | $d_5$ | $d_M$ with tube | $d_M$ without tube | f | k | n | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | mm (inch) | | mm (inch) |
| DN 50 | 10K | 14 (0.55) | 155 (6.10) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 4 | 0, 50, 100, 150 or 200 (0, 2, 3.94, 5.94 or 7.87) |
| | 20K | 16 (0.63) | 165 (6.50) | 19 (0.75) | 96 (3.78) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 120 (4.72) | 8 | |
| | 40K | 26 (1.02) | 165 (6.50) | 19 (0.75) | 105 (4.13) | 48.3 (1.9) | 40 (1.57) | 51 (2.01) | 2 | 130 (5.12) | 8 | |
| DN 80 | 10K | 16 (0.63) | 185 (7.28) | 19 (0.75) | 126 (4.96) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 150 (5.91) | 8 | |
| | 20K | 20 (0.79) | 200 (7.87) | 23 (0.91) | 132 (5.20) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 160 (6.30) | 8 | |
| | 40K | 32 (1.26) | 210 (8.27) | 23 (0.91) | 140 (5.51) | 76 (2.99) | 65 (2.56) | 85 (3.35) | 2 | 170 (6.30) | 8 | |
| DN 100 | 10K | 16 (0.63) | 210 (8.27) | 19 (0.75) | 151 (5.94) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 175 (6.89) | 8 | |
| | 20K | 22 (0.87) | 225 (8.86) | 23 (0.91) | 160 (6.30) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 185 (7.28) | 8 | |
| | 40K | 36 (1.42) | 250 (9.84) | 25 (0.98) | 165 (6.50) | 94 (3.7) | 85 (3.35) | 85 (3.35) | 2 | 205 (8.07) | 8 | |

d: Inside diameter of gasket according to EN 1092-1/ASME B16.5
$d_M$: Effective diaphragm diameter

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## Overview



Diaphragm seal, screwed design with inside diaphragm for gauge, absolute and differential pressure for direct mounting



Process connection: open measurement flange

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## Selection and ordering data

| | | Article No. | Order code |
|---|---|---|---|
| **Diaphragm seals, screwed**<br>**With inside diaphragm, direct mounting or connected via flexible capillary pipe to a transmitter** | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit** | | **7MF0840-** | |
| **SITRANS P320/P420 for differential pressure and flow**<br>**7MF03../7MF04.. to be ordered separately; scope of delivery: 2 units** | | **7MF0842-** | |
| | | ● ● ● ● ● - 0 ● ● 0 | ● ● ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | |
| **Nominal diameter** | **Nominal pressure** | | |
| ***Open flange, process connection standard EN 1092-1*** | | | |
| DN 15 | PN 10/16/25/40 | 0 A D | |
| | PN 63/100 | 0 A F | |
| | PN 160 | 0 A G | |
| | PN 250 | 0 A H | |
| DN 20 | PN 10/16/25/40 | 0 A M | |
| DN 25 | PN 10/16/25/40 | 0 B D | |
| | PN 63/100 | 0 B F | |
| | PN 160 | 0 B G | |
| | PN 250 | 0 B H | |
| ***Open flange, process connection standard ASME B16.5*** | | | |
| ½ inch | Class 150 | 1 K A | |
| | Class 300 | 1 K B | |
| | Class 600 | 1 K C | |
| | Class 1500 | 1 K D | |
| ¾ inch | Class 150 | 1 K F | |
| | Class 300 | 1 K G | |
| | Class 600 | 1 K H | |
| | Class 1500 | 1 K J | |
| 1 inch | Class 150 | 1 K L | |
| | Class 300 | 1 K M | |
| | Class 600 | 1 K N | |
| | Class 1500 | 1 K P | |
| ***Process connection: Thread according to EN 837-1*** | | | |
| G¼"B | PN 100 | 3 S B | |
| G¼"B | PN 250 | 3 S C | |
| G½"B | PN 100 | 3 S F | |
| G½"B | PN 250 | 3 S G | |
| G¾"B | PN 100 | 3 S K | |
| G¾"B | PN 250 | 3 S L | |
| G1"B | PN 100 | 3 S P | |
| G1"B | PN 250 | 3 S Q | |
| ***Process connection: thread according to ASME B1.20.1*** | | | |
| ¼" NPTM | Class 1500 | 5 T A | |
| ¼" NPTM | Class 3675 | 5 T B | |
| ¼" NPTF | Class 1500 | 5 T C | |
| ¼" NPTF | Class 3675 | 5 T D | |
| ½" NPTM | Class 1500 | 5 T E | |
| ½" NPTM | Class 3675 | 5 T F | |
| ½" NPTF | Class 1500 | 5 T G | |
| ½" NPTF | Class 3675 | 5 T H | |
| ¾" NPTM | Class 1500 | 5 T J | |
| ¾" NPTM | Class 3675 | 5 T K | |
| ¾" NPTF | Class 1500 | 5 T L | |
| ¾" NPTF | Class 3675 | 5 T M | |
| 1" NPTM | Class 1500 | 5 T N | |
| 1" NPTM | Class 3675 | 5 T P | |

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## Selection and ordering data (continued)

| Diaphragm seals, screwed<br>With inside diaphragm, direct mounting or connected via flexible capillary pipe to a transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)<br>7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit<br>SITRANS P320/P420 for differential pressure and flow<br>7MF03../7MF04.. to be ordered separately; scope of delivery: 2 units | | Article No. | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7MF0840-<br>7MF0842- | ● | ● | ● | ● | ● | - | 0 | ● | ● | 0 | ● | ● | ● |
| 1" NPTF | Class 1500 | | 5 | T | Q | | | | | | | | | | |
| 1" NPTF | Class 3675 | | 5 | T | R | | | | | | | | | | |
| Other version, add order code and plain text | | | 9 | A | A | | | | | | | | H | 1 | Y |
| **Transmitter connection** | | | | | | | | | | | | | | | |
| Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters) | | | | | | 0 | 0 | | | | | | | | |
| Other version, add order code and plain text | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | | 1 | 0 | | | | | | | | |
| 1.6 m (63 inches) | | | | | | 1 | 1 | | | | | | | | |
| 2 m (78.7 inches) | | | | | | 1 | 2 | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | | 1 | 3 | | | | | | | | |
| 3 m (118.1 inches) | | | | | | 1 | 4 | | | | | | | | |
| 4 m (157.5 inches) | | | | | | 1 | 5 | | | | | | | | |
| 5 m (196.9 inches) | | | | | | 1 | 6 | | | | | | | | |
| 6 m (236.2 inches) | | | | | | 1 | 7 | | | | | | | | |
| 7 m (275.6 inches) | | | | | | 1 | 8 | | | | | | | | |
| 8 m (315 inches) | | | | | | 2 | 0 | | | | | | | | |
| 9 m (354.3 inches) | | | | | | 2 | 1 | | | | | | | | |
| 10 m (393.7 inches) | | | | | | 2 | 2 | | | | | | | | |
| Other version, add order code and plain text | | | | | | 9 | 8 | | | | | | L | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | | B | | | | | | |
| High-temperature oil | | | | | | | | | C | | | | | | |
| Silicone oil M5 | | | | | | | | | A | | | | | | |
| Food oil (FDA-listed) | | | | | | | | | E | | | | | | |
| Neobee M20 (FDA-listed) | | | | | | | | | R | | | | | | |
| Halocarbon oil | | | | | | | | | D | | | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | | | | P | 1 | Y |
| **Material of wetted parts** | | | | | | | | | | | | | | | |
| Stainless steel 316L without coating | | | | | | | | | | A | | | | | |
| Stainless steel 316L with PTFE coating | | | | | | | | | | E | | | | | |
| Monel 400, 2.4360 | | | | | | | | | | G | | | | | |
| Hastelloy C276, 2.4819 | | | | | | | | | | J | | | | | |
| Tantalum | | | | | | | | | | K | | | | | |
| Stainless steel 316L, gold-plated | | | | | | | | | | S | | | | | |
| Neobee M20 (FDA listed) | | | | | | | | | | R | | | | | |
| Hastelloy C4, 2.4610 | | | | | | | | | | U | | | | | |
| Other version, add order code and plain text | | | | | | | | | | Z | | | Q | 1 | Y |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Representation of the epoxy resin coating<br>Color: Transparent<br>coverage: Front and rear of the remote seal, connecting pipe, process connection of the transmitter.<br>Maximum process medium temperature for epoxy lacquering: 140 °C | **D15** |
| Flushing port ¼" 18 NPT unsealed | **D70** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| Flushing port ¼" 18 NPT sealed with stainless steel plug | **D71** |
| Gasket material between upper and lower enclosure PTFE (instead of FKM viton) | **D75** |
| Gasket material between upper and lower enclosure metal C spring lock washer (instead of FKM viton) | **D76** |
| PTFE coating of lower section (only for G½B PN 100, DN 25 PN 10 ... 40, 1 inch Class 150/300) | **D77** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **Negative pressure service** | |
| Negative pressure service (for gauge pressure and absolute pressure transmitters) | **D81** |
| Negative pressure service (for differential pressure transmitters) | **D83** |
| Extended negative pressure service (for gauge pressure and absolute pressure transmitters) (only 7MF0800) | **D85** |
| Extended negative pressure service (for differential pressure transmitters) | **D88** |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2 (only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |
| **Capillary connection**<br>(Only for 7MF0840) | |
| Single-side mounted at differential pressure transmitter at high side | **S03** |
| Single-side mounted at differential pressure transmitter at low side | **S04** |
| Cooling element | **S08** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling holes | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text) | **Y44** |
| **Specification of process conditions**[1)] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

1) See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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## Technical specifications

| SITRANS P320/P420 diaphragm seals, screwed design | |
|---|---|
| **Process connection** | **Nominal pressure** |
| - Open flange EN 1092-1 | |
| • DN 15 | PN 10/16/25/40/63/100/160/250 |
| • DN 20 | PN 10/16/25/40 |
| • DN 25 | PN 10/16/25/40/63/100/160/250 |
| Open flange ASME B16.5 | |
| • ½ inch, ¾ inch, 1 inch | Class 150/300/600/1500 |
| Thread EN 837-1 | |
| • G¼"B, G½"B, G¾"B, G1"B | PN 100/250 |
| Thread ASME B1.20.1 | |
| • ¼" NPT-M, ¼" NPT-F | Class 1500/3675 |
| • ½" NPT-M, ½" NPT-F | Class 1500/3675 |
| • ¾" NPT-M, ¾" NPT-F | Class 1500/3675 |
| • 1" NPT-M, 1" NPT-F | Class 1500/3675 |
| **Sealing surface for open measurement flange** | |
| • For stainless steel mat. no. 1.4404/316L | According to EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AA |
| **Materials** | |
| • Lower section (in the case of process connection thread) | Stainless steel, mat. no. 1.4404/316L |
| • Diaphragm | Stainless steel, mat. no. 1.4404/316L<br>• Without coating<br>• With PTFE coating<br>Monel 400, mat. no. 2.4360<br>Hastelloy C276, mat. no. 2.4819<br>Hastelloy C4, mat. no. 2.4610<br>Hastelloy C22, mat. no. 2.4602<br>Tantalum<br>Titanium, mat. no. 3.7035<br>Nickel 201<br>Stainless steel 316L, gold plated, layer thickness approx. 25 µm |
| • Top section (process connection in the case of an open measurement flange) | Stainless steel, mat. no. 1.4404/316L |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304 |
| • Gasket material on the process connection | Viton or copper (in the case of vacuum-free version) |
| • Gasket material between top and bottom section | Viton (FKM) (standard:)<br>Teflon (PTFE)<br>metal spring ring (silver-coated) |
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft) |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| • Sheath | Flexible spiral coiled tube made of stainless steel, mat. no. 14301/304 |
| **Filling liquid**<br>(for remote seals of sandwich and flange type) | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil (for measuring $O_2$)<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| **Max. recommended medium temperature** | 170 °C (338 °F) |

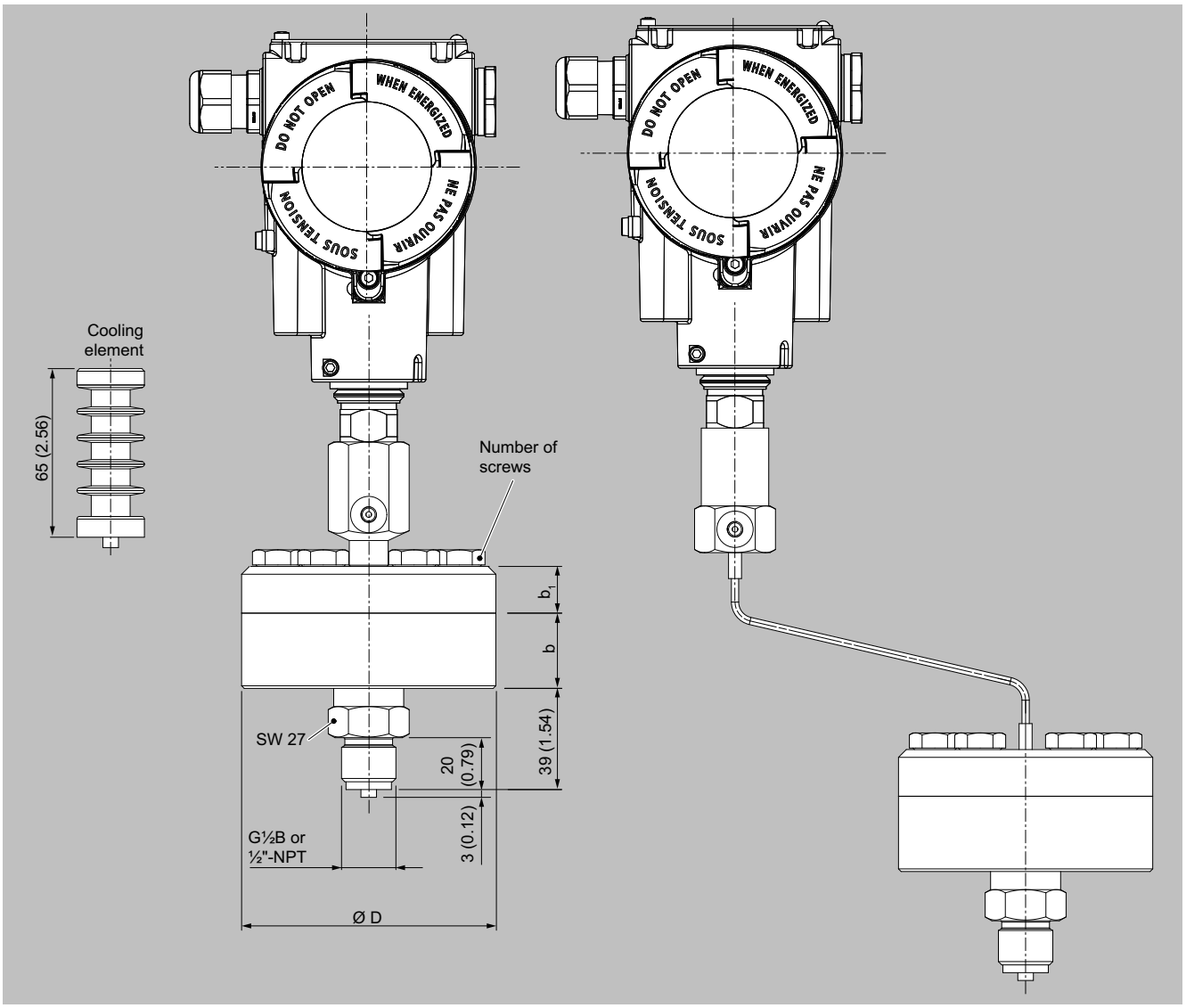
## Technical specifications (continued)

| SITRANS P320/P420 diaphragm seals, screwed design | |
|---|---|
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 1.5 kg (3.3 lbs) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings



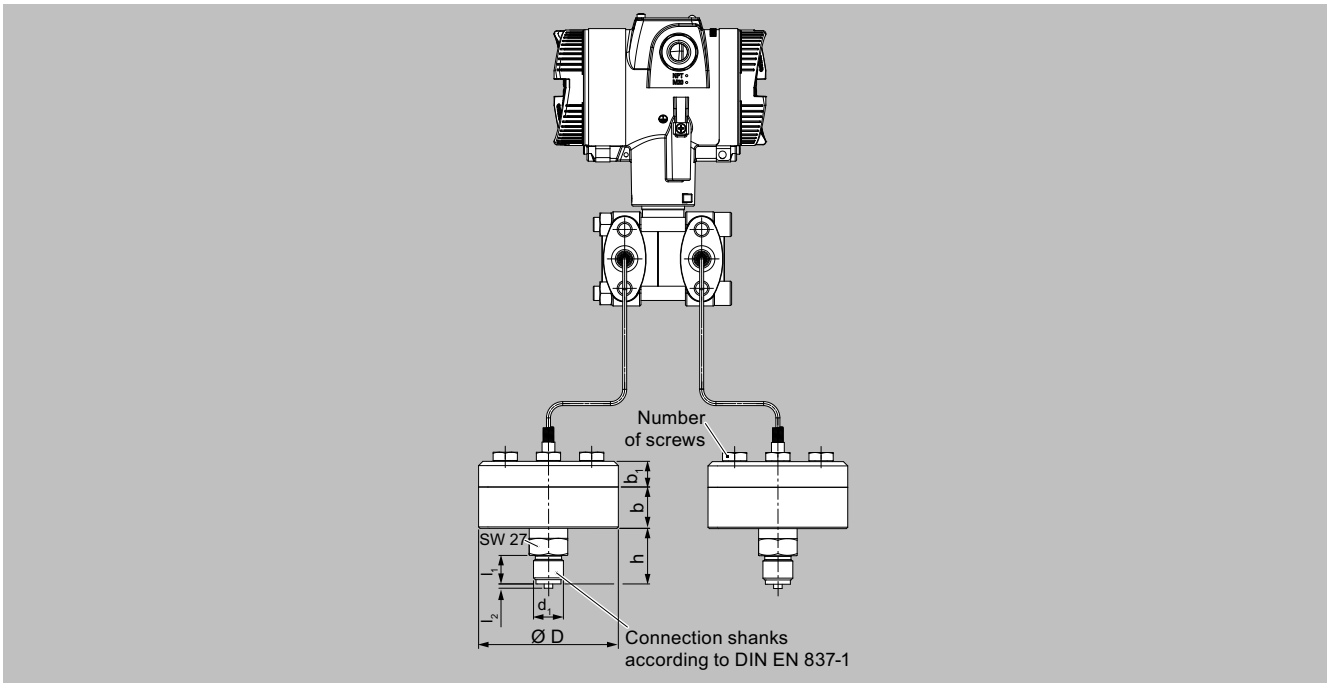

Diaphragm seal, screwed design with interior diaphragm, for gauge and absolute pressure, attached to the transmitter directly and with capillaries, dimensions in mm (inch)

| Range | D<br>mm (inch) | b<br>mm (inch) | $b_1$<br>mm (inch) | Number of screws |
|---|---|---|---|---|
| **Up to 100 bar** | 98 (3.86) | 14 (0.55) | 16 (0.63) | 6 |
| **Up to 250 bar** | 98 (3.86) | 14 (0.55) | 20 (0.79) | 12 |

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## Dimensional drawings (continued)



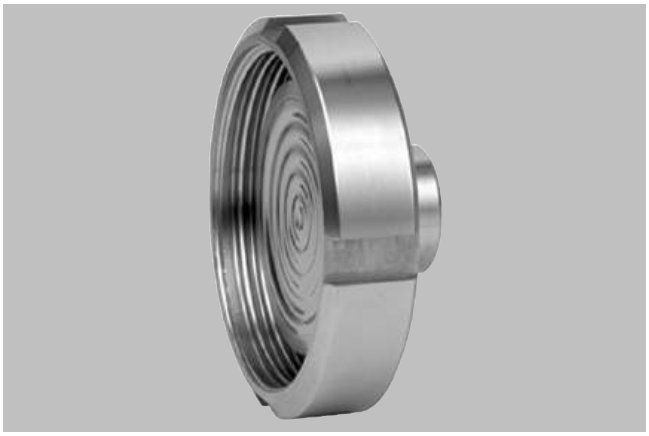

Diaphragm seal, screwed design with interior diaphragm, for differential pressure, attached to the transmitter directly and with capillaries, dimensions in mm (inch)

| Nominal diameter | Nominal pressure | D mm (inch) | d4 | k | M | Number of holes | b mm (inch) | b1 | f |
|---|---|---|---|---|---|---|---|---|---|
| **DN 25** | PN 10/16/25/40 | 115 (4.53) | 68 (2.68) | 85 (3.35) | M12 | 4 | 26 (1.02) | 12 (0.47) | 21 (0.83) |
| **1"** | 150 lb/sq.in | 110 (4.33) | 50.8 (2) | 79.4 (3.13) | M12 | 4 | 32 (1.26) | 12 (0.47) | 1.6 (0.063) |
| **1"** | 300 lb/sq.in | 125 (4.92) | 50.8 (2) | 88.9 (3.5) | M16 | 4 | 32 (1.26) | 12 (0.47) | 1.6 (0.063) |

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## Overview



Quick-release diaphragm seals, acc. to DIN 11851 with slotted union nut



Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals can be supplied for the pressure transmitters of the SITRANS P320/420 series.

The quick-release remote seals are common designs in the food industry. Their design means that the medium cannot accumulate in dead volumes. The remote seal's quick release mechanism enables fast disassembly for cleaning.

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## Selection and ordering data

| | | Article No. | | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Diaphragm seal with quick-release**<br>**Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter**<br>**SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit** | | **7MF0830-** | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 for absolute pressure from differential pressure**<br>**7MF03../7MF04.. order separately, scope of delivery: 2 units** | | **7MF0832-** | | | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | A | 0 | | | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | | |
| ***Process connection standard DIN 11851 with groove nut*** | | | | | | | | | | | | | | | | | |
| DN 25 | PN 40 | 0 | B | M | | | | | | | | | | | | | |
| DN 32 | PN 40 | 0 | C | D | | | | | | | | | | | | | |
| DN 40 | PN 40 | 0 | D | M | | | | | | | | | | | | | |
| DN 50 | PN 25 | 0 | E | K | | | | | | | | | | | | | |
| DN 65 | PN 25 | 0 | F | L | | | | | | | | | | | | | |
| DN 80 | PN 25 | 0 | G | K | | | | | | | | | | | | | |
| ***Process connection standard DIN 11851 with thread*** | | | | | | | | | | | | | | | | | |
| DN 25 | PN 40 | 1 | B | M | | | | | | | | | | | | | |
| DN 32 | PN 40 | 1 | C | D | | | | | | | | | | | | | |
| DN 40 | PN 40 | 1 | D | M | | | | | | | | | | | | | |
| DN 50 | PN 25 | 1 | E | K | | | | | | | | | | | | | |
| DN 65 | PN 25 | 1 | F | L | | | | | | | | | | | | | |
| DN 80 | PN 25 | 1 | G | K | | | | | | | | | | | | | |
| ***Process connection standard clamp ISO 2852*** | | | | | | | | | | | | | | | | | |
| DN 25 | PN 16 | 2 | B | K | | | | | | | | | | | | | |
| DN 38 | PN 16 | 2 | C | Q | | | | | | | | | | | | | |
| DN 51 | PN 16 | 2 | F | H | | | | | | | | | | | | | |
| DN 63.5 | PN 10 | 2 | F | J | | | | | | | | | | | | | |
| DN 76.1 | PN 10 | 2 | G | J | | | | | | | | | | | | | |
| ***Process connection standard clamp DIN 32676, schedule C*** | | | | | | | | | | | | | | | | | |
| DN 1 inch | PN 25 | 3 | K | V | | | | | | | | | | | | | |
| DN 1½ inch | PN 25 | 3 | L | V | | | | | | | | | | | | | |
| DN 2 inch | PN 16 | 3 | M | V | | | | | | | | | | | | | |
| DN 2½ inch | PN 16 | 3 | N | V | | | | | | | | | | | | | |
| DN 3 inch | PN 10 | 3 | P | V | | | | | | | | | | | | | |
| ***Process connection standard clamp DIN 32676, schedule A metric*** | | | | | | | | | | | | | | | | | |
| DN 25 | PN 25 | 4 | B | L | | | | | | | | | | | | | |
| DN 32 | PN 25 | 4 | C | C | | | | | | | | | | | | | |
| DN 40 | PN 25 | 4 | D | L | | | | | | | | | | | | | |
| DN 50 | PN 16 | 4 | E | J | | | | | | | | | | | | | |
| DN 65 | PN 10 | 4 | F | K | | | | | | | | | | | | | |
| ***Varivent*** | | | | | | | | | | | | | | | | | |
| DN 25/32 | PN 25 | 5 | C | L | | | | | | | | | | | | | |
| DN 40/50 | PN 25 | 5 | D | K | | | | | | | | | | | | | |
| ***DRD flange*** | | | | | | | | | | | | | | | | | |
| DN 50 | PN 40 | 6 | E | M | | | | | | | | | | | | | |
| Other version, add order code and plain text | | 9 | A | A | | | | | | | | | | | H | 1 | Y |
| **Transmitter connection** | | | | | | | | | | | | | | | | | |
| Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters) | | | | | 0 | 0 | | | | | | | | | | | |
| Connection via capillary<br>Capillary length: | | | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | 1 | 0 | | | | | | | | | | | |
| 1.6 m (63 inches) | | | | | 1 | 1 | | | | | | | | | | | |
| 2 m (78.7 inches) | | | | | 1 | 2 | | | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | 1 | 3 | | | | | | | | | | | |
| 3 m (118.1 inches) | | | | | 1 | 4 | | | | | | | | | | | |
| 4 m (157.5 inches) | | | | | 1 | 5 | | | | | | | | | | | |

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## Selection and ordering data (continued)

| | Article No. | Order code |
|---|---|---|
| **Diaphragm seal with quick-release**<br>**Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter**<br>**SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only in conjunction with underpressure service)**<br>**7MF03../7MF04../7MF802. to be ordered separately; scope of delivery: 1 unit**<br>**SITRANS P320/P420 for absolute pressure from differential pressure**<br>**7MF03../7MF04.. order separately, scope of delivery: 2 units** | **7MF0830-**<br>**7MF0832-** | |
| | ● ● ● ● ● - 0 ● A 0 ● ● ● | |
| 5 m (196.9 inches) | 1 6 | |
| 6 m (236.2 inches) | 1 7 | |
| 7 m (275.6 inches) | 1 8 | |
| 8 m (315 inches) | 2 0 | |
| 9 m (354.3 inches) | 2 1 | |
| 10 m (393.7 inches) | 2 2 | |
| Other version, add order code and plain text | 9 8 | L 1 Y |
| **Filling liquid** | | |
| Food oil (FDA-listed) | E | |
| Neobee M20 (FDA listed) | R | |
| Other version, add order code and plain text | Z | P 1 Y |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| **Negative pressure service** | |
| Negative pressure service | |
| • For gauge pressure and absolute pressure transmitters | **D81** |
| • For differential pressure transmitters | **D83** |
| Extended negative pressure service | |
| • For gauge pressure and absolute pressure transmitters | **D85** |
| • For differential pressure transmitters | **D88** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **Capillary connection**<br>(Only for 7MF0830) | |
| Single-side mounted at differential pressure transmitter at high side | **S03** |
| Single-side mounted at differential pressure transmitter at low side | **S04** |
| Cooling element | **S08** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling holes | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1)] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

1) See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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## Technical specifications

| SITRANS P320/P420 quick-release diaphragm seals | |
|---|---|
| **Connection, nominal diameter** | **Nominal pressure** |
| Process connection standard DIN 11851 with groove nut | |
| • DN 25/32/40 | PN 40 |
| • DN 50/65/80 | PN 25 |
| Process connection standard DIN 11851 with thread | |
| • DN 25/32/40 | PN 40 |
| • DN 50/65/80 | PN 25 |
| Standard of process connection clamp ISO 2852 | |
| • DN 25/38/51 | PN 16 |
| • DN 63.5/76.1 | PN 10 |
| Standard of process connection clamp DIN 32676, schedule C Tri-Clamp | |
| • 1 inch, 1½ inches | PN 25 |
| • 2 inches, 2½ inch | PN 16 |
| • 3 inches | PN 10 |
| Standard of process connection clamp DIN 32676, schedule A metric | |
| • DN 25/32/40 | PN 25 |
| • DN 50 | PN 16 |
| • DN 65 | PN 10 |
| Varivent | |
| • DN 25/32/40/50 | PN 25 |
| DRD flange | |
| • DN 50 | PN 40 |
| **Materials** | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304 |
| • Sheath | Spiral coiled tube made of stainless steel, mat. no. 1.4404/316L |
| **Permissible pressure load** | See above and the technical specifications of the pressure transmitter |
| **Tube length** | Without tube |
| **Capillary** | |
| • Length | ≤ 10 m (32.8 ft), longer lengths on request |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| • Sheath | Flexible spiral coiled tube made of stainless steel mat. no. 1.4404/316L |
| **Filling liquid** | • Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| **Permissible ambient temperature** | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| **Weight** | Approx. 4 kg (8.82 lbs) |

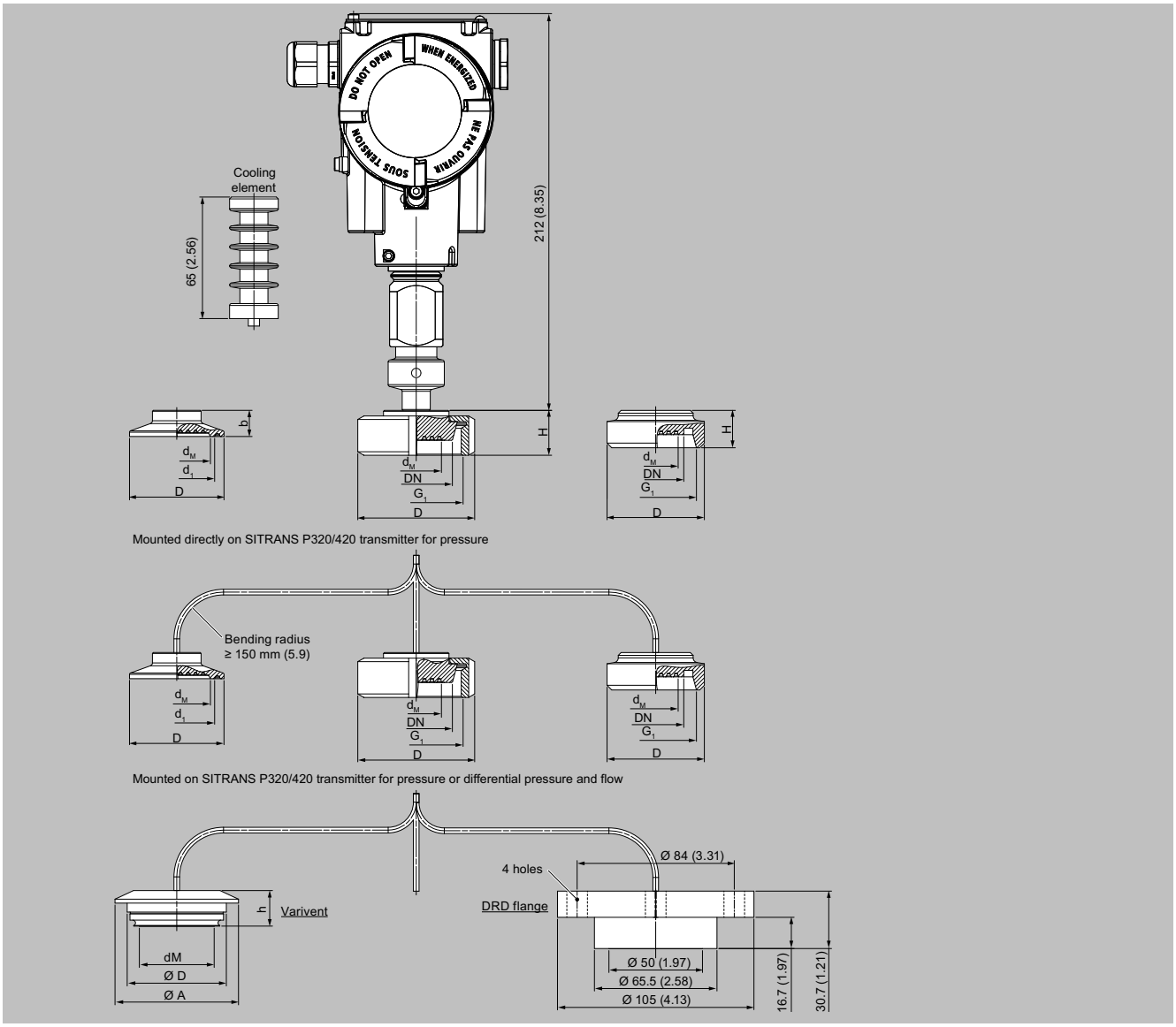
## Technical specifications (continued)

| SITRANS P320/P420 quick-release diaphragm seals | |
|---|---|
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |
| EHEDG | Complies with EHEDG recommendations |

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## Dimensional drawings




Quick-release diaphragm seals

***Connection according to DIN 11851 with groove nut***

| Nominal diameter | Ø $d_M$ mm | Ø D mm | H mm | $G_1$ mm |
|---|---|---|---|---|
| **DN 25** | 25 | 63 | 36 | Radius 52x1/6 |
| **DN 32** | 32 | 70 | 36 | Radius 52x1/6 |
| **DN 40** | 40 | 78 | 36 | Radius 65x1/6 |
| **DN 50** | 52 | 112 | 36 | Radius 78x1/6 |
| **DN 65** | 65 | 112 | 36 | Radius 95x1/6 |
| **DN 80** | 72 | 127 | 36 | Radius 110x1/6 |

$d_M$ effective diaphragm diameter

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## Dimensional drawings (continued)

### *Connection according to DIN 11851 with thread*

| Nominal diameter | Ø $d_M$ mm | H mm | $G_1$ mm |
|---|---|---|---|
| **DN 25** | 25 | 36 | Radius 52x1/6 |
| **DN 32** | 32 | 36 | Radius 52x1/6 |
| **DN 40** | 40 | 36 | Radius 65x1/6 |
| **DN 50** | 52 | 36 | Radius 78x1/6 |
| **DN 65** | 65 | 36 | Radius 95x1/6 |
| **DN 80** | 72 | 36 | Radius 110x1/6 |

$d_M$ effective diaphragm diameter

### *Clamp connection according to ISO 2852 for pipes according to ISO 2037*

| Nominal diameter | Nominal pressure | $d_M$ mm | $d_1$ mm | b mm | D mm |
|---|---|---|---|---|---|
| **DN 25** | PN 16 | 22.6 | 43.5 | 14 | 50.5 |
| **DN 38** | PN 16 | 34 | 43.5 | 12 | 50.5 |
| **DN 51** | PN 16 | 46 | 56.5 | 14 | 64 |
| **DN 63.5** | PN 10 | 51 | 70.5 | 14 | 77.5 |
| **DN 76.1** | PN 10 | 65 | 83.5 | 14 | 91 |

$d_M$ effective diaphragm diameter

### *Clamp connection according to DIN 32676 row C for pipes according to ASME BPE*

| Nominal diameter | Nominal pressure | $d_M$ mm (inch) | $d_1$ mm (inch) | b mm (inch) | D mm (inch) |
|---|---|---|---|---|---|
| **1"** | PN 25 | 22.6 (0.89) | 43.5 (1.71) | 14 (0.55) | 50.5 (1.99) |
| **1½"** | PN 25 | 34 (1.34) | 43.5 (1.71) | 12 (0.47) | 50.5 (1.99) |
| **2"** | PN 16 | 46 (1.81) | 56.5 (2.22) | 14 (0.55) | 64 (2.52) |
| **2½"** | PN 16 | 51 (2.01) | 70.5 (2.78) | 14 (0.55) | 77.5 (3.05) |
| **3"** | PN 16 | 65 (2.56) | 83.5 (3.29) | 14 (0.55) | 91 (3.58) |

$d_M$ effective diaphragm diameter

### *Clamp connection according to DIN 32676 row A (metric) for pipes according to EN 10357 (DIN 11850)*

| Nominal diameter | Nominal pressure | Ø $d_M$ mm | $d_1$ mm | b mm | D mm |
|---|---|---|---|---|---|
| **DN 25** | PN 25 | 22.6 | 43.5 | 14 | 50.5 |
| **DN 32** | PN 25 | 27 | 43.5 | 12 | 50.5 |
| **DN 40** | PN 25 | 34 | 43.5 | 12 | 50.5 |
| **DN 50** | PN 16 | 46 | 56.5 | 14 | 64 |
| **DN 65** | PN 16 | 65 | 83.5 | 14 | 91 |

$d_M$ effective diaphragm diameter

### *Varivent*

| Nominal diameter | $d_M$ mm (inch) | A mm (inch) | D mm (inch) | h mm (inch) |
|---|---|---|---|---|
| **DN 25, DN 32, 1", 1¼"** | 40 (1.57) | 66 (2.6) | 50 (1.97) | 19 (0.75) |
| **DN 40 ... 125, 1 ½" ... 6"** | 58 (2.28) | 84 (3.3) | 68 (2.68) | 19 (0.75) |

$d_M$ effective diaphragm diameter

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## Overview



The miniature diaphragm seals are available for the pressure transmitters of the SITRANS P320/420 series.

For high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

## Design

The miniature diaphragm seals consist of a flush diaphragm, a fixed threaded pin and are free of dead space.

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## Selection and ordering data

| Diaphragm seals, miniature type<br>Installed directly on pressure transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service),<br>7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0850- | Order code |
|---|---|---|---|
| | | ● ● ● 0 0 - 0 ● ● 0 | ● ● ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | |
| **Process connection** | | | |
| ***Process connection standard DIN 3852-2 form A*** | | | |
| G 1" | PN 400 | 4 S V | |
| G 1½" | PN 250 | 4 S W | |
| G 2" | PN 250 | 4 S X | |
| ***Process connection standard ASME B1.20.1*** | | | |
| 1" NPTM | PN 250 | 5 T U | |
| 1½" NPT-M | PN 100 | 5 T V | |
| 2" NPTM | PN 100 | 5 T W | |
| Other version, add order code and plain text | | 9 A A | H 1 Y |
| **Filling liquid** | | | |
| Silicone oil M5 | | A | |
| Food oil (FDA-listed) | | E | |
| Neobee M20 (FDA listed) | | R | |
| Other version, add order code and plain text | | Z | P 1 Y |
| **Material of wetted parts** | | | |
| Stainless steel 316L without coating | | A | |
| Hastelloy C276, 2.4819 | | J | |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| **Negative pressure service** | |
| Negative pressure service for gauge pressure and absolute pressure transmitters | **D81** |
| Extended negative pressure service for gauge pressure and absolute pressure transmitters | **D85** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Capillary connection** | |
| Cooling element between transmitter and remote seal | **S08** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling hole | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

[1] See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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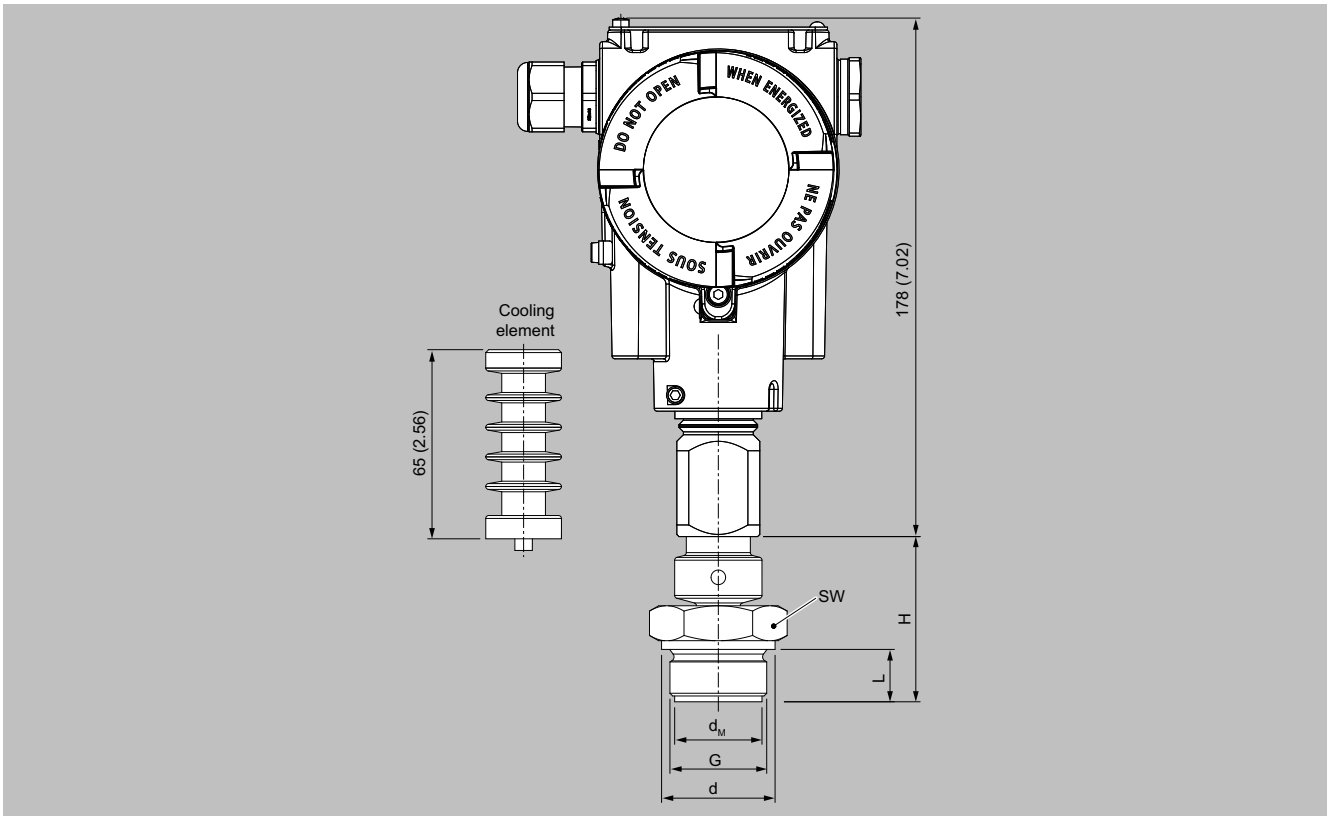
## Technical specifications

| SITRANS P320/P420 miniature diaphragm seals | |
|---|---|
| Measuring span when | |
| • G1B and 1" NPT | > 6 bar (> 87 psi) |
| • G1½B and 1½" NPT | > 2 bar (> 29 psi) |
| • G2B and 2" NPT | > 600 mbar (> 8.7 psi) |
| Filling liquid | • Silicone oil M5<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| Material | |
| • Main body | Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 |
| • Diaphragm | Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819 |
| Maximum pressure | 100% of the nominal pressure of the pressure transmitter, but a maximum of PN 400 (5802 psi) (depending on the seal used) |
| Temperature of use | As for pressure transmitter |
| Medium temperature range | As for pressure transmitter |
| Max. recommended medium temperature | 150 °C (302 °F) |
| Weight | |
| • G1B and 1" NPT | Approx. 0.3 kg (approx. 0.66 lb) |
| • G1½B and 1½" NPT | Approx. 0.5 kg (approx. 1.10 lb) |
| • G2B and 2" NPT | Approx. 0.8 kg (approx. 1.76 lb) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 4, paragraph 3 (sound engineering practice) |

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## Dimensional drawings




Diaphragm seal, miniature type, dimensions in mm (inch)

| G | Ø $d_M$ mm (inch) | Width across flats mm (inch) | Ø d mm (inch) | L mm (inch) | H mm (inch) |
|---|---|---|---|---|---|
| **G1B** | 25 (0.98) | 41 (1.61) | 39 (1.53) | 28 (1.1) | 56 (2.21) |
| **G1½B** | 40 (1.57) | 55 (2.17) | 60 (2.36) | 30 (1.18) | 50 (1.97) |
| **G2B** | 50 (1.97) | 60 (2.36) | 70 (2.76) | 30 (1.18) | 63 (2.48) |

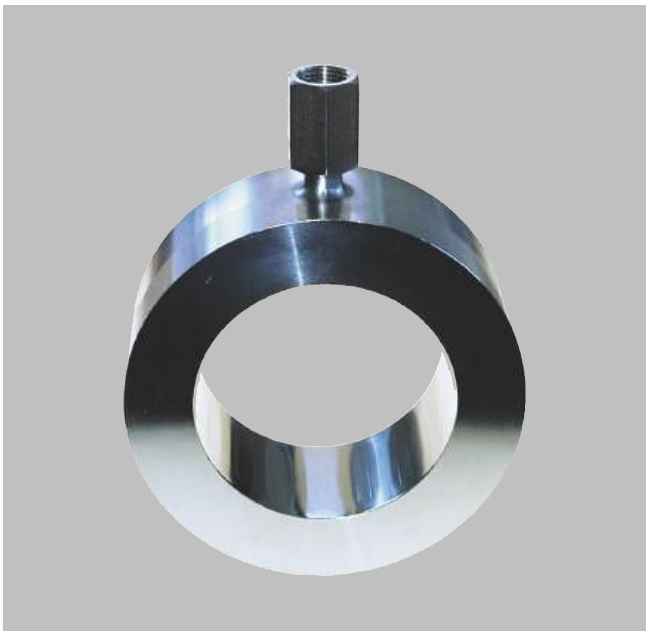
| G | Ø $d_M$ mm (inch) | Width across flats mm (inch) | L mm (inch) | H mm (inch) |
|---|---|---|---|---|
| **1" NPT** | 27 (1.06) | 41 (1.61) | 25 (0.98) | 40 (1.57) |
| **1½" NPT** | 34 (1.34) | 55 (2.17) | 26 (1.02) | 45 (1.77) |
| **2" NPT** | 46 (1.81) | 60 (2.56) | 26 (1.02) | 45 (1.77) |

$d_M$: Effective diaphragm diameter

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## Overview



Inline seals for flange-mounting

The inline seal is fully integrated into the process control. It is especially suitable for flowing and high-viscosity media.

The inline seal consists of a cylindrical jacket into which a thin-walled tube is welded. It is clamped directly between two flanges in the pipeline.

## Design

- Inline seals for flange-mounting (flange design) according to EN/ASME for SITRANS P320/420 pressure transmitters
  - For gauge and absolute pressure (only in connection with negative pressure service)
  - For differential pressure and flow
- Sealing surface according to EN 1092-1 or ASME B16.5
- Connection to the pressure transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical specifications for details of materials used for the wetted parts
- Material used for the capillary, the protective jacket, the remote seal's main body and the measuring cell: Stainless steel, mat. no. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, food oil (FDA-listed) vegetable oil or glycerin/water (not suitable for applications in negative pressure range).

## Function

The measured pressure is transferred to the filling liquid by the diaphragm and enters the sample chamber of the pressure transmitter either directly or through the capillary. The filling fluid completely fills the inside of the diaphragm seal, the capillary and the sample chamber of the pressure transmitter so that it is free of gas.

**Note**:

A vacuum-resistant remote seal is recommended for low-pressure operation, including during commissioning (see ordering data).

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## Selection and ordering data

| | | Article No. | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inline seals in sandwich design, direct mounting or with a flexible capillary connected with pressure transmitter** | | | | | | | | | | | | | | | | |
| **SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service), 7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit** | | **7MF0900-** | | | | | | | | | | | | | | |
| **SITRANS P320/P420 for differential pressure and flow 7FM03../7MF04.. to be ordered separately, scope of delivery: 2 units** | | **7MF0902-** | | | | | | | | | | | | | | |
| | | ● | ● | ● | ● | ● | - | 0 | ● | ● | 0 | | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | |
| ***Process connection standard EN 1092-1*** | | | | | | | | | | | | | | | | |
| DN 25 | PN 6 ... 100 | **0** | **B** | **P** | | | | | | | | | | | | |
| DN 40 | PN 6 ... 100 | **0** | **D** | **P** | | | | | | | | | | | | |
| DN 50 | PN 6 ... 100 | **0** | **E** | **P** | | | | | | | | | | | | |
| DN 65 | PN 6 ... 100 | **0** | **F** | **P** | | | | | | | | | | | | |
| DN 80 | PN 6 ... 100 | **0** | **G** | **P** | | | | | | | | | | | | |
| DN 100 | PN 6 ... 100 | **0** | **H** | **P** | | | | | | | | | | | | |
| DN 125 | PN 6 ... 100 | **0** | **J** | **P** | | | | | | | | | | | | |
| ***Process connection standard ASME B16.5*** | | | | | | | | | | | | | | | | |
| 1 inch | Class 150 ... 2500 | **1** | **K** | **X** | | | | | | | | | | | | |
| 1½ inches | Class 150 ... 2500 | **1** | **L** | **X** | | | | | | | | | | | | |
| 2 inches | Class 150 ... 2500 | **1** | **M** | **X** | | | | | | | | | | | | |
| 2½ inches | Class 150 ... 2500 | **1** | **N** | **X** | | | | | | | | | | | | |
| 3 inches | Class 150 ... 2500 | **1** | **P** | **X** | | | | | | | | | | | | |
| 4 inches | Class 150 ... 2500 | **1** | **Q** | **X** | | | | | | | | | | | | |
| 5 inches | Class 150 ... 2500 | **1** | **R** | **X** | | | | | | | | | | | | |
| Different version, add order code and plain text. | | **9** | **A** | **A** | | | | | | | | | | **H** | **1** | **Y** |
| **Transmitter connection** | | | | | | | | | | | | | | | | |
| Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters) | | | | | **0** | **0** | | | | | | | | | | |
| Without capillary pipe, direct mount, connection with 90° elbow (for gauge pressure transmitters) | | | | | **0** | **1** | | | | | | | | | | |
| Connection via capillary<br>Capillary length: | | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | **1** | **0** | | | | | | | | | | |
| 1.6 m (63 inches) | | | | | **1** | **1** | | | | | | | | | | |
| 2 m (78.7 inches) | | | | | **1** | **2** | | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | **1** | **3** | | | | | | | | | | |
| 3 m (118.1 inches) | | | | | **1** | **4** | | | | | | | | | | |
| 4 m (157.5 inches) | | | | | **1** | **5** | | | | | | | | | | |
| 5 m (196.9 inches) | | | | | **1** | **6** | | | | | | | | | | |
| 6 m (236.2 inches) | | | | | **1** | **7** | | | | | | | | | | |
| 7 m (275.6 inches) | | | | | **1** | **8** | | | | | | | | | | |
| 8 m (315 inches) | | | | | **2** | **0** | | | | | | | | | | |
| 9 m (354.3 inches) | | | | | **2** | **1** | | | | | | | | | | |
| 10 m (393.7 inches) | | | | | **2** | **2** | | | | | | | | | | |
| 11 m (433.1 inches); only for 7MF0902 | | | | | **2** | **3** | | | | | | | | | | |
| 12 m (472.4 inches); only for 7MF0902 | | | | | **2** | **4** | | | | | | | | | | |
| 13 m (511.811 inches); only for 7MF0902 | | | | | **2** | **5** | | | | | | | | | | |
| 14 m (551.2 inches); only for 7MF0902 | | | | | **2** | **6** | | | | | | | | | | |
| 15 m (590.6 inches); only for 7MF0902 | | | | | **2** | **7** | | | | | | | | | | |
| Other version, add order code and plain text | | | | | **9** | **8** | | | | | | | | **L** | **1** | **Y** |
| **Filling liquid** | | | | | | | | | | | | | | | | |
| Silicone oil M50 | | | | | | | | | **B** | | | | | | | |
| High-temperature oil | | | | | | | | | **C** | | | | | | | |
| Silicone oil M5 | | | | | | | | | **A** | | | | | | | |
| Food oil (FDA-listed) | | | | | | | | | **E** | | | | | | | |
| Halocarbon oil | | | | | | | | | **D** | | | | | | | |
| Neobee M20 (FDA listed) | | | | | | | | | **R** | | | | | | | |
| Other version, add order code and plain text | | | | | | | | | **Z** | | | | | **P** | **1** | **Y** |
| **Material of wetted parts** | | | | | | | | | | | | | | | | |
| Stainless steel 316L | | | | | | | | | | **A** | | | | | | |
| Other version, add order code and plain text | | | | | | | | | | **Z** | | | | **Q** | **1** | **Y** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with wetted parts made of stainless steel 316 L and Hastelloy) | **C13** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| Volume deflagration flame arrester (VDEF) | |
| • For gauge pressure and absolute pressure transmitters | **D61** |
| • For differential pressure and level transmitters | **D62** |
| **Negative pressure service** | |
| Negative pressure service | |
| • For gauge pressure and absolute pressure transmitters | **D81** |
| • For differential pressure transmitters | **D83** |
| Extended negative pressure service | |
| • For gauge pressure and absolute pressure transmitters | **D85** |
| • For differential pressure transmitters | **D88** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **General product approvals without explosion proof approvals** | |
| Oil-free and grease-free cleaned version for oxygen application including certificate EN 10204-2.2<br>(only with filling liquid halocarbon oil max. temperature 60 °C and max. pressure 50 bar) | **E80** |
| Oil-free and grease-free cleaned version not for oxygen application, including certificate EN 10204-2.2 | **E87** |
| **Sealing surface** | |
| Sealing surface smooth, form B2/EN 1092-1 or RFSF/ANSI 16.5 (only for wetted parts made of stainless steel 316L) | **M50** |
| Sealing surface groove according to EN 1092-1, form D (instead of sealing surface B1, only for wetted parts made of stainless steel 316L) | **M54** |
| Sealing surface RJF (groove) according to ASME B16.5 (instead of sealing surface RF 125 ... 250AO, only for wetted parts made of stainless steel 316L) | **M64** |
| Sealing surface with tongue to EN 1092-1, form C (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M70** |
| • DN 40 | **M71** |
| • DN 50 | **M72** |
| • DN 80 | **M73** |
| • DN 100 | **M74** |
| • DN 125 | **M75** |
| Sealing surface with spigot according to EN 1092-1, form E (for wetted parts made of stainless steel 316L only) | |
| • DN 25 | **M76** |
| • DN 40 | **M77** |
| • DN 50 | **M78** |
| • DN 80 | **M79** |
| • DN 100 | **M80** |
| • DN 125 | **M81** |
| Sealing surface female face according to EN 1092-1, form F (only for wetted parts made of stainless steel 316L) | |
| • DN 25 | **M82** |
| • DN 40 | **M83** |
| • DN 50 | **M84** |
| • DN 80 | **M85** |
| • DN 100 | **M86** |
| • DN 125 | **M87** |
| **Capillary connection** | |
| For 7MF0900 | |
| • Single-side mounted at differential pressure transmitter at high side | **S03** |
| • Single-side mounted at differential pressure transmitter at low side | **S04** |
| • Cooling element | **S08** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| • 11 m (433.1 inches); only for 7MF0902 | **S22** |
| • 12 m (472.4 inches); only for 7MF0902 | **S23** |
| • 13 m (511.811 inches); only for 7MF0902 | **S24** |
| • 14 m (551.2 inches); only for 7MF0902 | **S25** |
| • 15 m (590.6 inches); only for 7MF0902 | **S26** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |
| • 2.5 m (98.4 inches) | **S43** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| • 11 m (433.1 inches); only for 7MF0902 | **S52** |
| • 12 m (472.4 inches); only for 7MF0902 | **S53** |
| • 13 m (511.811 inches); only for 7MF0902 | **S54** |
| • 14 m (551.2 inches); only for 7MF0902 | **S55** |
| • 15 m (590.6 inches); only for 7MF0902 | **S56** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| • 11 m (433.1 inches); only for 7MF0902 | **S82** |
| • 12 m (472.4 inches); only for 7MF0902 | **S83** |
| • 13 m (511.811 inches); only for 7MF0902 | **S84** |
| • 14 m (551.2 inches); only for 7MF0902 | **S85** |
| • 15 m (590.6 inches); only for 7MF0902 | **S86** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling holes | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1)] | |
| Ambient temperature range | |
| • +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| • -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| • -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

1) See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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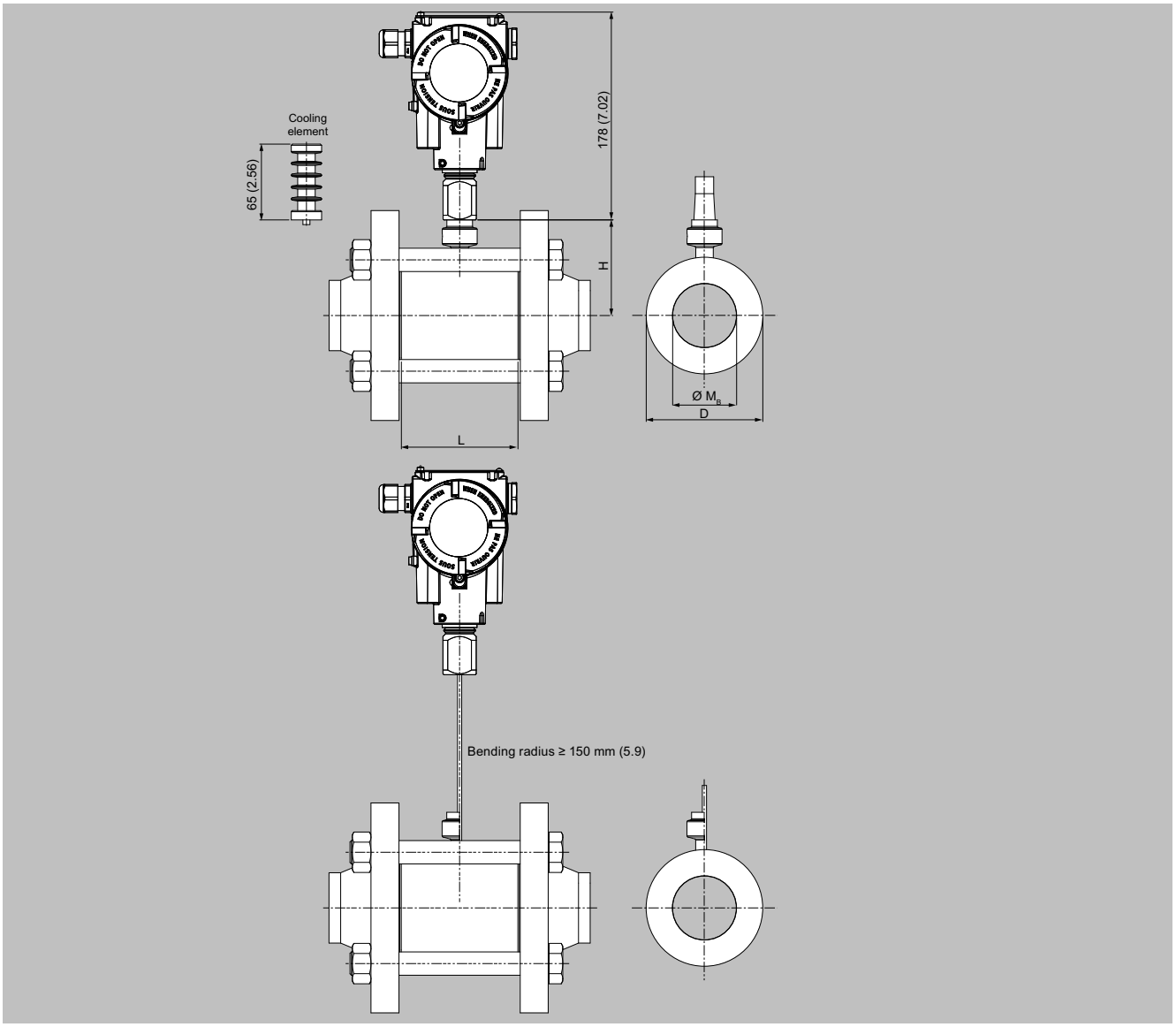
## Technical specifications

| SITRANS P320/P420 inline seals in sandwich design | |
|---|---|
| Nominal diameter | Nominal pressure |
| Standard of process connection EN 1092-1 | |
| • DN 25/40/50/65/80/100/125 | PN 6 ... PN 100 |
| Standard of process connection ASME B16.5 | |
| • 1, 1½, 2, 2½, 3, 4, 5 inch | Class 150 ... Class 2500 |
| Process connection | Flange according to EN 1092-1 or ASME B 16.5 |
| Sealing surface | • For stainless steel mat. no. 1.4404/316L according to EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA<br>• For the other materials according to EN 1092-1, form B2 or ASME B16.5 RFSF |
| Materials | |
| • Main body | Stainless steel, mat. no. 1.4404/316L |
| • Diaphragm | Stainless steel, mat. no. 1.4404/316L |
| • Wetted parts | Stainless steel, mat. no. 1.4404/316L |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304 |
| • Sheath | Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L |
| Capillary | |
| • Length | ≤ 10 m (32.8 ft) |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) |
| • Minimum bending radius | 150 mm (5.9 inches) |
| Filling liquid | • Silicone oil M5<br>• Silicone oil M50<br>• High-temperature oil<br>• Halocarbon oil<br>• Food oil (FDA-listed)<br>• Neobee M20 (FDA-listed) |
| Permissible ambient temperature | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" |
| Weight | Approx. 4 kg (8.82 lbs) |
| **Certificates and approvals** | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of Article 4, Paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord |

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## Dimensional drawings




Inline seal for flange-mounting, installed on SITRANS P320/420 pressure transmitter, dimensions in mm (inch)

***Connection according to EN 1092-1***

| Nominal diameter | PN | D | Mb | L | H |
|---|---|---|---|---|---|
| | bar | mm | mm | mm | mm |
| DN 25 | 6 ... 100 | 68 | 28.5 | 60 | 81 |
| DN 40 | | 88 | 43.1 | 60 | 91 |
| DN 50 | | 100 | 54.5 | 60 | 93 |
| DN 65 | | 120 | 70.3 | 60 | 107 |
| DN 80 | | 138 | 82.5 | 60 | 116 |
| DN 100 | | 160 | 107.1 | 60 | 127 |
| DN 125 | | 188 | 127 | 60 | 141 |

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## Dimensional drawings (continued)

***Connection according to ASME B16.5***

| Nominal diameter | Class | D<br>mm (inch) | Mb<br>mm (inch) | L<br>mm (inch) | H<br>mm (inch) |
|---|---|---|---|---|---|
| 1" | 150 ... 2500 | 50 (1.97) | 28.5 (1.12) | 60 (2.36) | 72 (2.83) |
| 1½" | | 73.5 (2.89) | 43.1 (1.70) | 60 (2.36) | 84 (3.31) |
| 2" | | 91.9 (3.62) | 54.5 (2.15) | 60 (2.36) | 93 (3.66) |
| 2½" | | 104.6 (4.12) | 70.3 (2.77) | 60 (2.36) | 99 (3.9) |
| 3" | | 127 (5) | 82.5 (3.25) | 60 (2.36) | 110 (4.33) |
| 4" | | 157.2 (6.19) | 107.1 (4.22) | 60 (2.36) | 125 (4.92) |
| 5" | | 188 (7.4) | 127 (5) | 60 (2.36) | 141 (5.55) |

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## Overview



Quick-release inline seal, according to DIN 11851 with screwed connector



Quick-release inline seal, with clamp connection

Quick-release inline seals are available for pressure transmitters of the SITRANS P320/420 series.

## Application

The quick-release inline seal is a special design for flowing and high-viscosity media. Because it is completely integrated in the process line, there are no turbulences, dead spaces or other obstacles in the flow direction. The medium flows almost unhindered through the inline seal and causes self-cleaning of the sample chamber. The inline seal is also piggable.

## Design

The quick-release lock is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The inline seal is connected to the pressure transmitter either directly or via a capillary tube.

## Function

The measured pressure is transferred to the filling liquid by the measuring diaphragm located around the circumference inside the inline seal and enters the sample chamber of the pressure transmitter through the capillary. The filling fluid completely fills the inside of the inline seal, the capillary and the sample chamber of the pressure transmitter so that it is free of gas.

**Note**:

A vacuum-resistant remote seal is recommended for low-pressure operation, including during commissioning (see ordering data).

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## Selection and ordering data

| Inline seal with quick-release<br>Flange type design, with flexible capillary pipe or direct mounting on pressure transmitter<br>SITRANS P320/P420 or SITRANS P300 for gauge and absolute pressure (only together with negative pressure service),<br>7MF03../7MF04../7MF802 is to be ordered separately, scope of delivery: 1 unit | | Article No.<br>7MF0930- | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | - | 0 | ● | A | 0 | | | ● | ● | ● |
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | | |
| **Nominal diameter** | **Nominal pressure** | | | | | | | | | | | | | | | |
| ***Process connection standard DIN 11851 with thread*** | | | | | | | | | | | | | | | | |
| DN 25 | PN 40 | 1 | B | M | | | | | | | | | | | | |
| DN 32 | PN 40 | 1 | C | D | | | | | | | | | | | | |
| DN 40 | PN 40 | 1 | D | M | | | | | | | | | | | | |
| DN 50 | PN 25 | 1 | E | K | | | | | | | | | | | | |
| DN 65 | PN 25 | 1 | F | L | | | | | | | | | | | | |
| DN 80 | PN 25 | 1 | G | K | | | | | | | | | | | | |
| ***Process connection standard Clamp ISO 2852*** | | | | | | | | | | | | | | | | |
| DN 25 | PN 16 | 2 | B | K | | | | | | | | | | | | |
| DN 38 | PN 16 | 2 | C | Q | | | | | | | | | | | | |
| DN 51 | PN 16 | 2 | F | H | | | | | | | | | | | | |
| DN 63.5 | PN 10 | 2 | F | J | | | | | | | | | | | | |
| DN 76.1 | PN 10 | 2 | G | J | | | | | | | | | | | | |
| ***Process connection standard Clamp DIN 32676, schedule C*** | | | | | | | | | | | | | | | | |
| DN 1 inch | PN 25 | 3 | K | V | | | | | | | | | | | | |
| DN 1½ inch | PN 25 | 3 | L | V | | | | | | | | | | | | |
| DN 2 inch | PN 16 | 3 | M | V | | | | | | | | | | | | |
| DN 2½ inch | PN 16 | 3 | N | V | | | | | | | | | | | | |
| DN 3 inch | PN 10 | 3 | P | V | | | | | | | | | | | | |
| ***Process connection standard Clamp DIN 32676, schedule A metric*** | | | | | | | | | | | | | | | | |
| DN 25 | PN 25 | 4 | B | L | | | | | | | | | | | | |
| DN 32 | PN 25 | 4 | C | C | | | | | | | | | | | | |
| DN 40 | PN 25 | 4 | D | L | | | | | | | | | | | | |
| DN 50 | PN 16 | 4 | E | J | | | | | | | | | | | | |
| DN 65 | PN 10 | 4 | F | K | | | | | | | | | | | | |
| Other version<br>Add order code and plain text. | | 9 | A | A | | | | | | | | | | H | 1 | Y |
| **Transmitter connection** | | | | | | | | | | | | | | | | |
| Without capillary pipe, direct mount, straight connection (for gauge pressure transmitters) | | | | | 0 | 0 | | | | | | | | | | |
| Connection via capillary<br>Capillary length: | | | | | | | | | | | | | | | | |
| 1 m (38.37 inches) | | | | | 1 | 0 | | | | | | | | | | |
| 1.6 m (63 inches) | | | | | 1 | 1 | | | | | | | | | | |
| 2 m (78.7 inches) | | | | | 1 | 2 | | | | | | | | | | |
| 2.5 m (98.4 inches) | | | | | 1 | 3 | | | | | | | | | | |
| 3 m (118.1 inches) | | | | | 1 | 4 | | | | | | | | | | |
| 4 m (157.5 inches) | | | | | 1 | 5 | | | | | | | | | | |
| 5 m (196.9 inches) | | | | | 1 | 6 | | | | | | | | | | |
| 6 m (236.2 inches) | | | | | 1 | 7 | | | | | | | | | | |
| 7 m (275.6 inches) | | | | | 1 | 8 | | | | | | | | | | |
| 8 m (315 inches) | | | | | 2 | 0 | | | | | | | | | | |
| 9 m (354.3 inches) | | | | | 2 | 1 | | | | | | | | | | |
| 10 m (393.7 inches) | | | | | 2 | 2 | | | | | | | | | | |
| Other version, add order code and plain text | | | | | 9 | 8 | | | | | | | | L | 1 | Y |
| **Filling liquid** | | | | | | | | | | | | | | | | |
| Food oil (FDA-listed) | | | | | | | | | E | | | | | | | |
| Neobee M20 (FDA listed) | | | | | | | | | R | | | | | | | |
| Other version, add order code and plain text | | | | | | | | | Z | | | | | P | 1 | Y |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| **Factory certificates** | |
| Quality inspection certificate (5-point characteristic curve test) acc. to IEC 62828-2 | **C11** |
| Inspection certificate to EN 10204-3.1 for material of body and diaphragm | **C12** |
| Inspection certificate according to EN 10204-3.1, PMI test of pressure containing and wetted parts | **C15** |
| Certificate of FDA-approved fill oil according to EN 10204-2.2 | **C17** |
| Factory certificate functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511 (includes SIL Declaration of Conformity) | **C20** |
| **Accessories** | |
| Remote seal nameplate<br>Attached, made of stainless steel, contains Article No. and order number of the remote seal | **D42** |
| **Negative pressure service** | |
| Negative pressure service for gauge pressure and absolute pressure transmitters | **D81** |
| Extended negative pressure service for gauge pressure and absolute pressure transmitters | **D85** |
| **Country-specific approval** | |
| CRN approval Canada (Canadian Registration Number) | **E60** |
| ***Note:*** | |
| If the order code E60 is selected, the option E60 must also be selected for the transmitter! | |
| **Capillary connection** | |
| Single-side mounted at differential pressure transmitter at high side | **S03** |
| Single-side mounted at differential pressure transmitter at low side | **S04** |
| Cooling element | **S08** |
| **Capillary coating** | |
| PE protective tube | |
| • 1 m (38.37 inches) | **S10** |
| • 1.6 m (63 inches) | **S11** |
| • 2 m (78.7 inches) | **S12** |
| • 2.5 m (98.4 inches) | **S13** |
| • 3 m (118.1 inches) | **S14** |
| • 4 m (157.5 inches) | **S15** |
| • 5 m (196.9 inches) | **S16** |
| • 6 m (236.2 inches) | **S17** |
| • 7 m (275.6 inches) | **S18** |
| • 8 m (315 inches) | **S19** |
| • 9 m (354.3 inches) | **S20** |
| • 10 m (393.7 inches) | **S21** |
| PTFE protective tube | |
| • 1 m (38.37 inches) | **S40** |
| • 1.6 m (63 inches) | **S41** |
| • 2 m (78.7 inches) | **S42** |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| • 2.5 m (98.4 inches) | **S43** |
| • 3 m (118.1 inches) | **S44** |
| • 4 m (157.5 inches) | **S45** |
| • 5 m (196.9 inches) | **S46** |
| • 6 m (236.2 inches) | **S47** |
| • 7 m (275.6 inches) | **S48** |
| • 8 m (315 inches) | **S49** |
| • 9 m (354.3 inches) | **S50** |
| • 10 m (393.7 inches) | **S51** |
| PVC protective tube | |
| • 1 m (38.37 inches) | **S70** |
| • 1.6 m (63 inches) | **S71** |
| • 2 m (78.7 inches) | **S72** |
| • 2.5 m (98.4 inches) | **S73** |
| • 3 m (118.1 inches) | **S74** |
| • 4 m (157.5 inches) | **S75** |
| • 5 m (196.9 inches) | **S76** |
| • 6 m (236.2 inches) | **S77** |
| • 7 m (275.6 inches) | **S78** |
| • 8 m (315 inches) | **S79** |
| • 9 m (354.3 inches) | **S80** |
| • 10 m (393.7 inches) | **S81** |
| **Desired remote seal supplier** | |
| ***Note:*** | |
| If the remote seal is to be supplied only by one of the suppliers specified below, this option needs to be selected. For orders without this option, the remote seal supplier is selected through the dispatch center. | |
| Company WIKA, Klingenberg | **W01** |
| Company Labom, Hude | **W02** |
| **Special design** | |
| Welded filling holes | **X01** |
| **Customer-specific tube length** | |
| Customer-specific tube length (specify in plain text in mm) | **Y44** |
| **Specification of process conditions**[1)] | |
| Ambient temperature range | |
| +10 ... +50 °C (+50 ... +122 °F) preset | **D66** |
| -40 ... +50 °C (-40 ... +122 °F) | **D67** |
| -10 ... +85 °C (+14 ... +185 °F) | **D68** |
| Process temperature min. ... °C/(°F)/max. ... °C/(°F) | **Y50** |

1) See also "Specification of process conditions for selection and ordering data" in the section "More information" under "Technical reference" for SITRANS P320/P420.

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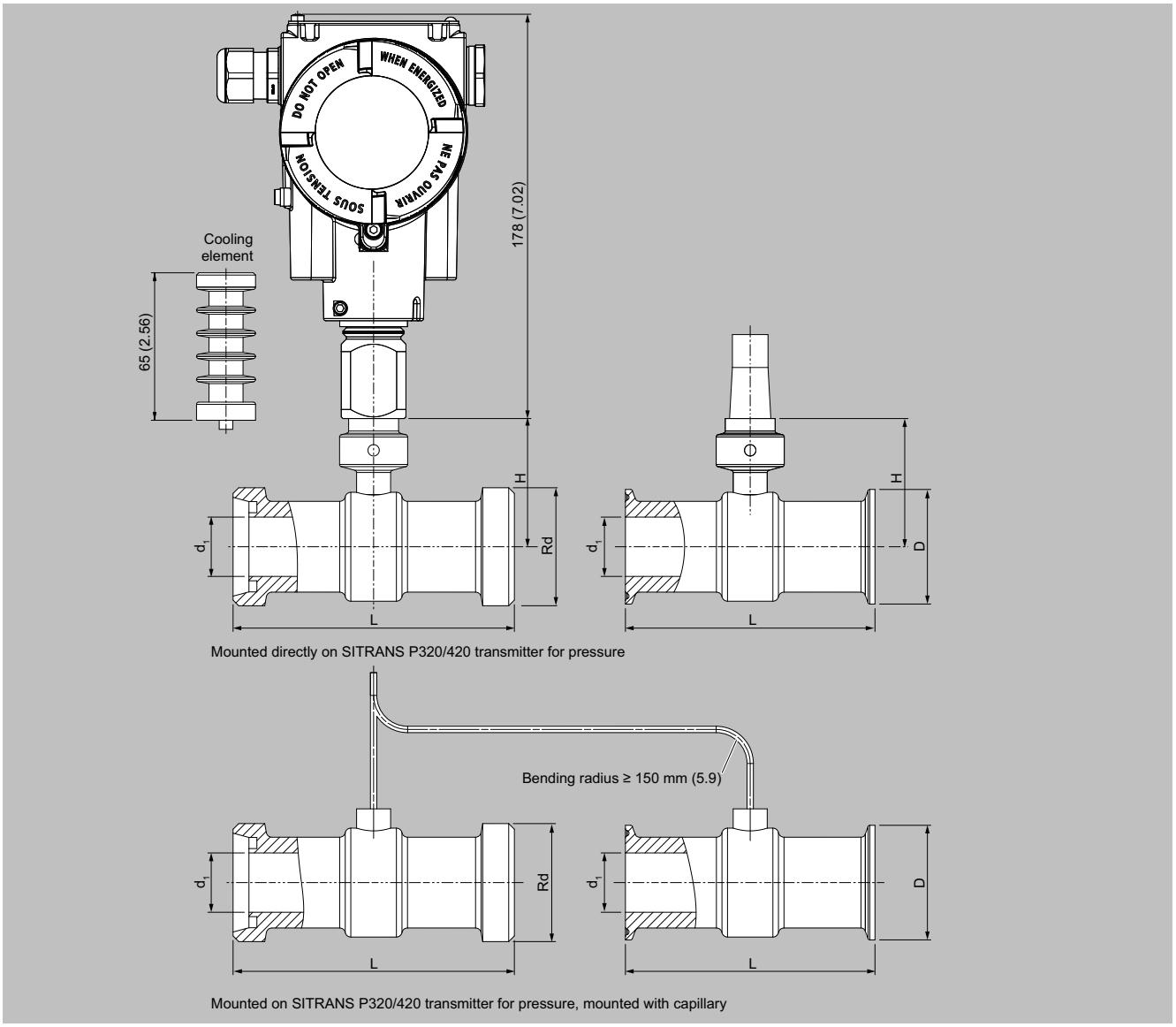
## Technical specifications

| SITRANS P320/P420 quick-release inline seals | | |
|---|---|---|
| Connection | ***Nominal diameter*** | ***Nominal pressure*** |
| • Process connection standard DIN 11851 with thread | DN 25/32/40 | PN 40 |
| | DN 50/65/80 | PN 25 |
| • Standard of process connection clamp ISO 2852 | DN 25/38/51 | PN 16 |
| | DN 63.5/76.1 | PN 10 |
| • Standard of process connection clamp DIN 32676, schedule C Tri-Clamp | 1, 1½ inch | PN 25 |
| | 2, 2½ inch | PN 16 |
| | 3 inches | PN 10 |
| • Process connection standard clamp DIN 32676, schedule A metric | DN 25/32/40 | PN 25 |
| | DN 50 | PN 16 |
| | DN 65 | PN 10 |
| Material | | |
| • Main body | Stainless steel, mat. no. 1.4404/316L | |
| • Capillary | Stainless steel, mat. no. 1.4571/316Ti (with option W01) or mat. no. 1.4301/304 | |
| • Diaphragm | Stainless steel, mat. no. 1.4404/316L | |
| Capillary | | |
| • Length | ≤ 10 m (32.8 ft) | |
| • Inside diameter | ≤ 1.3 mm (0.051 inch) | |
| • Minimum bending radius | 150 mm (5.9 inches) | |
| • Sheath | Flexible spiral coiled tube made of stainless steel, mat. no. 1.4404/316L | |
| Filling liquid | • Food oil (FDA-listed) | |
| | • Neobee M20 (FDA-listed) | |
| Permissible ambient temperature | Dependent on the pressure transmitter and the filling liquid of the remote seal.<br>**More information**<br>In the technical specifications of the pressure transmitters and in the sections in the technical reference of the remote seals:<br>• "Function" - "Technical specifications of the remote seal filling liquids"<br>• "More information" - "Specification of process conditions for selection and ordering data" | |
| Weight | Approx. 4 kg (approx. 8.82 lbs) | |
| **Certificates and approvals** | | |
| Classification according to pressure equipment directive (PED 2014/68/EU) | For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of Article 4, Paragraph 1 (annex 1); assigned to category III, conformity evaluation module H by the TÜV Nord | |
| EHEDG | Complies with EHEDG recommendations | |

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## Dimensional drawings




Quick-release inline seal, dimensions in mm (inch)

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## Dimensional drawings (continued)

*Inline seals for pipes according to EN 10357 (DIN 11851)*

| | | | | Food connections DIN 11851 | | DIN 32676 | |
|---|---|---|---|---|---|---|---|
| | Length | Inside diameter | Connection height | Nominal pressure | Round thread connection according to DIN 11851 | Nominal pressure | Clamp connection according to DIN 32676 |
| Nominal diameter | L [mm] | di (mm) | h (mm) | | Thread radius | | D (mm) |
| DN 10 | 96 | 10 | 27.5 | PN 40 | 28 × 1/8" | PN 16 | 34 |
| DN 15 | 150 | 16 | 12 | PN 40 | 34 × 1/8" | PN 16 | 34 |
| DN 25 | 110 | 26 | 21 | PN 40 | 52 × 1/6" | PN 16 | 50.5 |
| DN 32 | 110 | 32 | 26 | PN 40 | 58 × 1/6" | PN 16 | 50.5 |
| DN 40 | 110 | 38 | 28.5 | PN 40 | 65 × 1/6" | PN 16 | 50.5 |
| DN 50 | 110 | 50 | 34 | PN 25 | 78 × 1/6" | PN 16 | 64 |
| DN 65 | 110 | 66 | 42 | PN 25 | 95 × 1/6" | PN 10 | 91 |
| DN 80 | 60 | 81 | 47.5 | PN 25 | 110 × 1/4" | PN 10 | 106 |
| DN 100 | 60 | 100 | 60 | PN 25 | 130 × 1/4" | PN 10 | 119 |

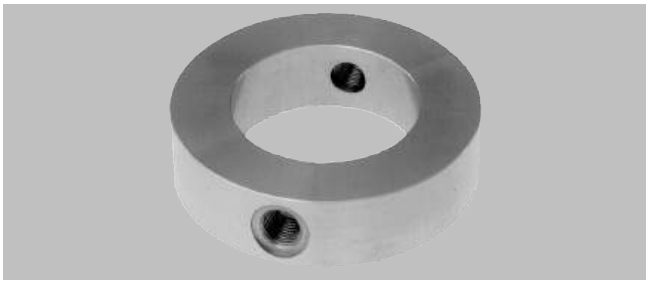
*Inline seals for pipes according to BS 4825 Part 3 and pipe outer diameter (suitable for pipes according to ASME-BPE)*

| Nominal diameter | | | | | Food connections IDF according to ISO 2853 | | Clamp connection according to ISO 2852 | |
|---|---|---|---|---|---|---|---|---|
| | | Length | Inside diameter | Connection height | Nominal pressure | IDF thread according to ISO 2853 | Nominal pressure | Clamp connection according to ISO 2852 |
| Inch | mm | L [mm] | di (mm) | h (mm) | | IDF thread (Tr) | | D (mm) |
| 1 | 25.4 | 110 | 22.2 | 21 | PN 40 | 37 × 3.175 | PN 16 | 50.5 |
| 1½ | 38 | 110 | 34.8 | 28.5 | PN 40 | 50 × 3.175 | PN 16 | 50.5 |
| 2 | 51 | 110 | 47.8 | 34 | PN 25 | 64 × 3.175 | PN 16 | 64 |
| 1½ | 63.5 | 110 | 60.3 | 38 | PN 25 | 77.5 × 3.175 | PN 16 | 77.5 |
| 3 | 76.1 | 60 | 72.9 | 44.5 | PN 25 | 91 × 3.175 | PN 10 | 91 |
| 4 | 101.6 | 60 | 97.6 | 59.5 | PN 25 | 118 × 3.175 | PN 10 | 119 |

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## Overview



Flushing rings are required for remote seals in flange and sandwich design (article numbers 7MF0800 ... 7MF0814) when the medium has a tendency to form deposits or blockages due to the process conditions and the geometry of the connection.

The ferrule is clamped in between the process flange and the remote seal.

Due to the lateral flushing holes, particles accumulated in front of the membrane can be washed away and the pressure space can be vented. Different nominal diameters and forms enable adaption to the relevant process flange.

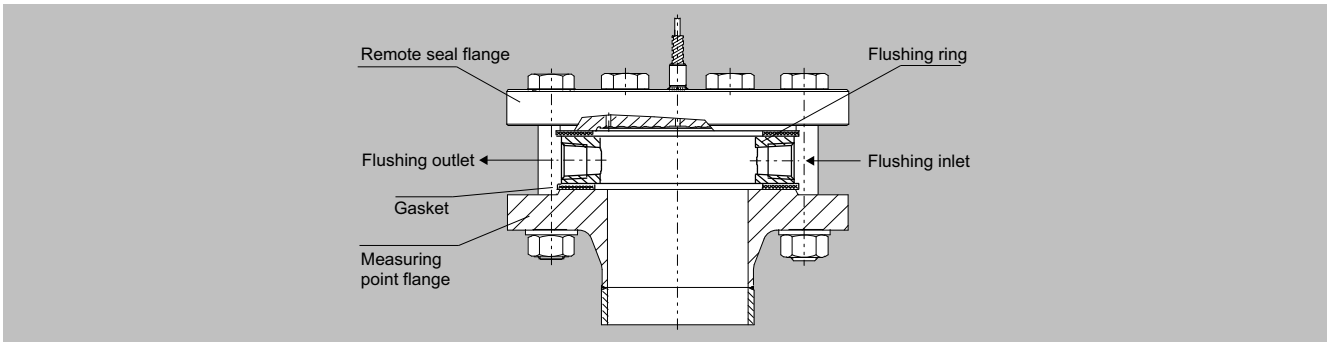
***Process connection***

For flanges according to EN and ASME:
DN 50, 80, 100, 125; PN 16 ... 100 or
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

***Standard version***

Material: CrNi steel, mat. no. 1.4404/316L
Sealing surfaces and flushing holes: See ordering data

## Design




Example of installation

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## Selection and ordering data

| Flushing ring<br>For remote seals 7MF0800 to 7MF0814 | | Article No.<br>7MF4925-<br>1 ● ● ● ● | Order code<br>● ● ● |
|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | |
| **Nominal diameter** | **Nominal pressure** | | |
| DN 50 | PN 16 ... PN 100 | A | |
| DN 80 | PN 16 ... PN 100 | B | |
| DN 100 | PN 16 ... PN 100 | C | |
| DN 125 | PN 16 ... PN 100 | D | |
| 2 inches | Class 150 ... 600 | G | |
| 3 inches | Class 150 ... 600 | H | |
| 4 inches | Class 150 ... 600 | J | |
| 5 inches | Class 150 ... 600 | K | |
| ***Only for RJF ring groove, 7MF4925-1*R....:*** | | | |
| 2 inches | Class 150 | N R | |
| 3 inches | Class 150 | P R | |
| 4 inches | Class 150 | Q R | |
| 5 inches | Class 150 | R R | |
| 2 inches | Class 300 ... 600 | U R | |
| 3 inches | Class 300 ... 600 | V R | |
| 4 inches | Class 300 ... 600 | W R | |
| 5 inches | Class 300 ... 600 | X R | |
| Other version, add Order Code and plain text: Nominal diameter ...; Nominal pressure ... | | Z | J 1 Y |
| **Sealing surface** | | | |
| EN 1092-1 | | | |
| • Form B1 | | A | |
| • Form B2 | | C | |
| • Form C / Form C | | D | |
| • Form D / Form C | | E | |
| • Form D / Form D | | F | |
| • Form E | | G | |
| • Form F | | H | |
| ASME B16.5 | | | |
| • RF 125 ... 250 AA | | M | |
| • RFSF | | Q | |
| • RJF ring groove | | R | |
| Other version, add Order Code and plain text: Sealing surface ... | | Z | K 1 Y |
| **Flushing holes (2 units)** | | | |
| Female thread G¼ | | 1 | |
| Female thread G½ | | 2 | |
| Female thread ¼-18 NPT | | 3 | |
| Female thread ½-14 NPT | | 4 | |
| **Material** | | | |
| Stainless steel mat. no. 1.4404/316L | | 0 | |
| Other version, add Order Code and plain text: Material ... | | 9 | M 1 Y |

| Options<br>Add "-Z" to article number and specify order code. | Order code |
|---|---|
| Inspection certificate according to EN 10204-3.1 | **C12** |

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## Technical specifications

| SITRANS P320/P420 flushing ring for diaphragm seals | |
|---|---|
| Nominal diameter | Nominal pressure |
| • DN 50 | PN 16 ... PN 100 |
| • DN 80 | PN 16 ... PN 100 |
| • DN 100 | PN 16 ... PN 100 |
| • DN 125 | PN 16 ... PN 100 |
| • 2 inches | Class 150 ... Class 600 |
| • 3 inches | Class 150 ... Class 600 |
| • 4 inches | Class 150 ... Class 600 |
| • 5 inches | Class 150 ... Class 600 |
| Sealing surface | |
| • According to EN 1092-1 | • Form B1<br>• Form B2<br>• Form D/Form D<br>• Form C/Form C<br>• Form D/Form C<br>• Form E<br>• Form F |
| • According to ASME B16.5 | • RF 125 ... 250 AA<br>• RFSF<br>• RJF ring groove |
| Flushing holes (2 units), female thread: | • G¼<br>• G½<br>• ¼-18 NPT<br>• ½-14 NPT |
| Material | Stainless steel 1.4404/316L |

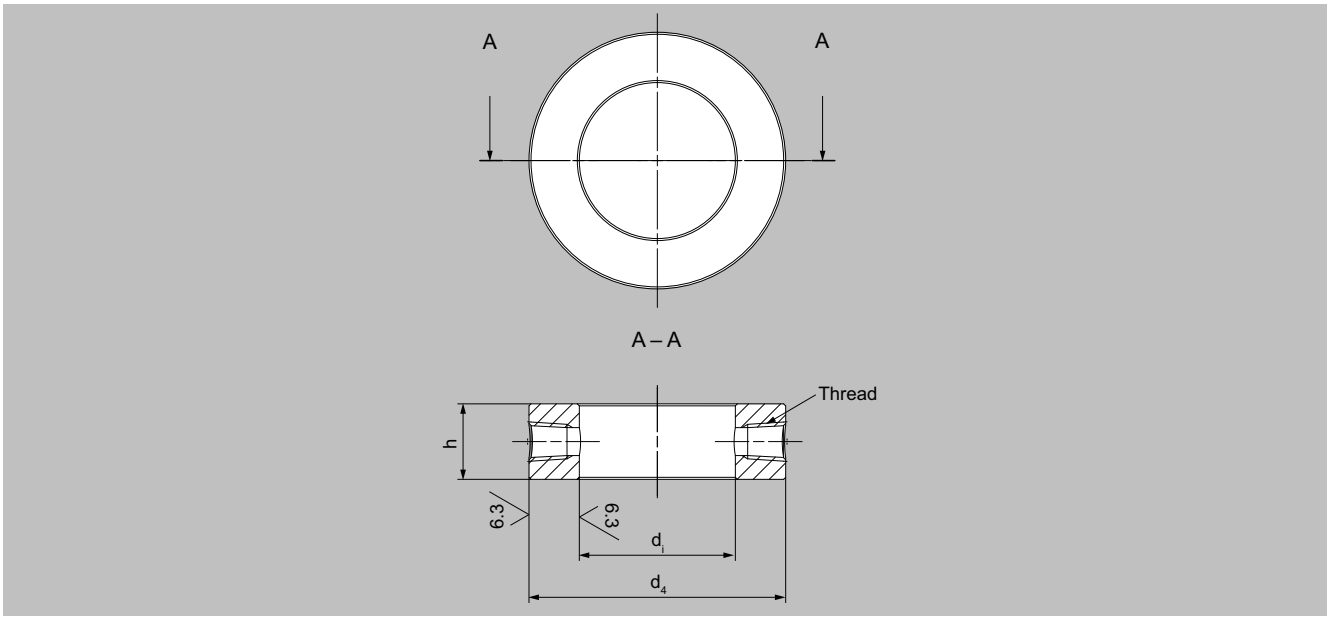
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## Dimensional drawings

***Connection according to EN 1092-1***

Form B1 and form B2




Flushing ring; sealing surface (EN 1092-1), form B1 and form B2

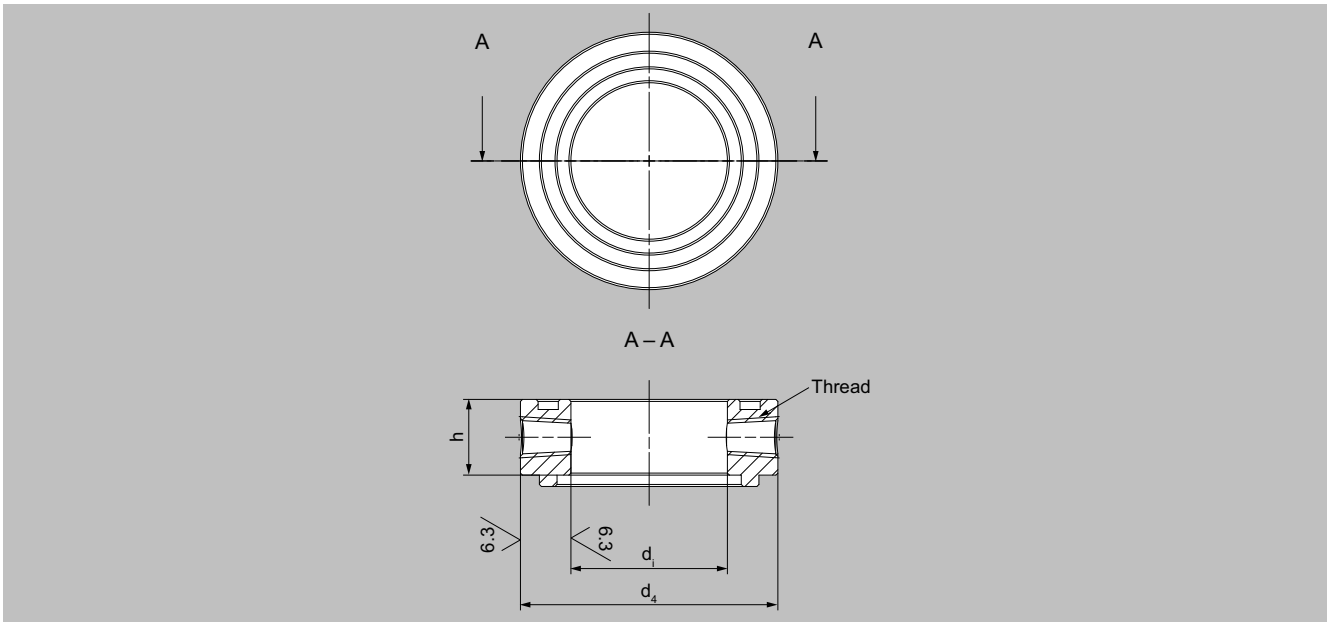
| Nominal diameter | PN bar | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|
| **DN 50** | 16 ... 100 | ¼ NPT | 102 (4.02) | 62 (2.44) | 30 (1.18) | 1.24 (2.73) |
| **DN 80** | 16 ... 100 | ¼ NPT | 138 (5.43) | 92 (3.62) | 30 (1.18) | 1.99 (4.39) |
| **DN 100** | 16 ... 100 | ¼ NPT | 162 (6.38) | 92 (3.62) | 30 (1.18) | 3.35 (7.39) |
| **DN 125** | 16 ... 100 | ¼ NPT | 188 (7.40) | 132 (5.2) | 30 (1.18) | 3.38 (7.45) |
| **DN 50** | 16 ... 100 | ½ NPT | 102 (4.02) | 62 (2.44) | 30 (1.18) | 1.24 (2.73) |
| **DN 80** | 16 ... 100 | ½ NPT | 138 (5.43) | 92 (3.62) | 30 (1.18) | 1.99 (4.39) |
| **DN 100** | 16 ... 100 | ½ NPT | 162 (6.38) | 92 (3.62) | 30 (1.18) | 3.35 (7.39) |
| **DN 125** | 16 ... 100 | ½ NPT | 188 (7.40) | 132 (5.2) | 30 (1.18) | 3.38 (7.45) |

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## Dimensional drawings (continued)

Form D / Form C




Flushing ring; sealing surface (EN 1092-1), form D / form C

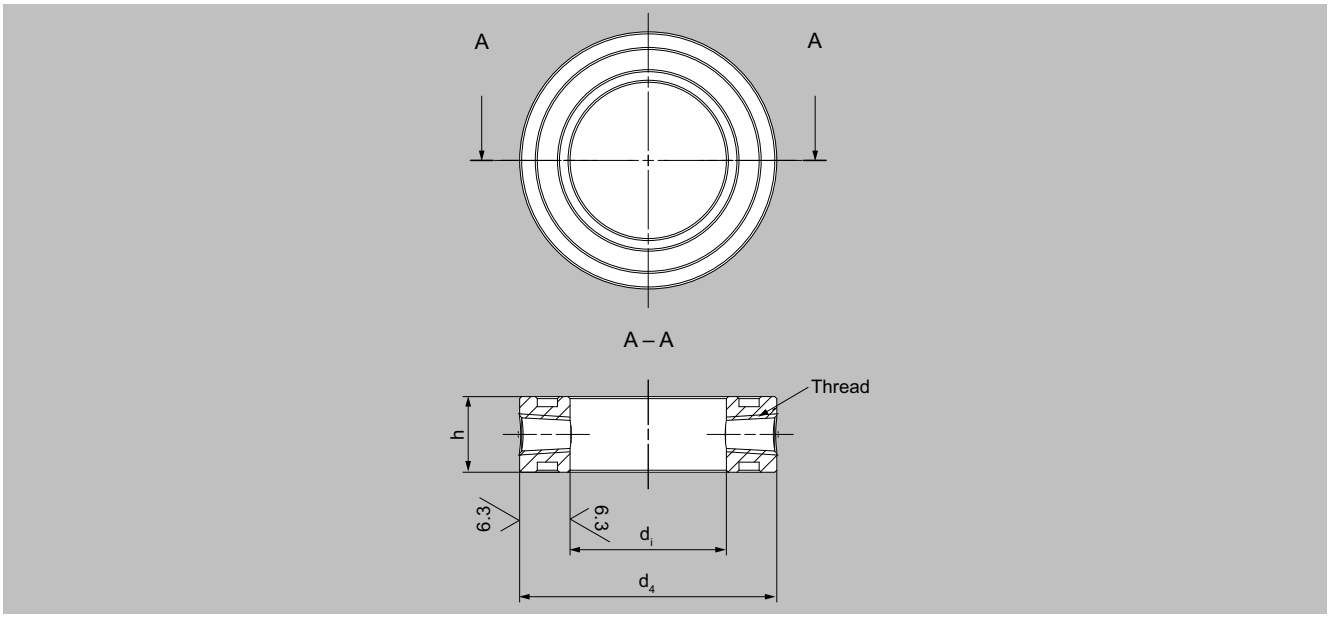
| Nominal diameter | PN bar | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|
| **DN 50** | 16 ... 100 | ¼ NPT | 102 (4.02) | 62 (2.44) | 35.5 (1.40) | 1.46 (3.22) |
| **DN 80** | 16 ... 100 | ¼ NPT | 138 (5.43) | 92 (3.62) | 35.5 (1.40) | 2.36 (5.2) |
| **DN 100** | 16 ... 100 | ¼ NPT | 162 (6.38) | 92 (3.62) | 35.5 (1.40) | 3.96 (8.73) |
| **DN 125** | 16 ... 100 | ¼ NPT | 188 (7.40) | 132 (5.2) | 35.5 (1.40) | 4.00 (8.82) |
| **DN 50** | 16 ... 100 | ½ NPT | 102 (4.02) | 62 (2.44) | 40.5 (1.595) | 1.67 (3.68) |
| **DN 80** | 16 ... 100 | ½ NPT | 138 (5.43) | 92 (3.62) | 40.5 (1.595) | 2.69 (5.93) |
| **DN 100** | 16 ... 100 | ½ NPT | 162 (6.38) | 92 (3.62) | 40.5 (1.595) | 4.52 (9.97) |
| **DN 125** | 16 ... 100 | ½ NPT | 188 (7.40) | 132 (5.2) | 40.5 (1.595) | 4.56 (10.05) |

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## Dimensional drawings (continued)

Form D / Form D




Flushing ring; sealing surface (EN 1092-1), form D/form D

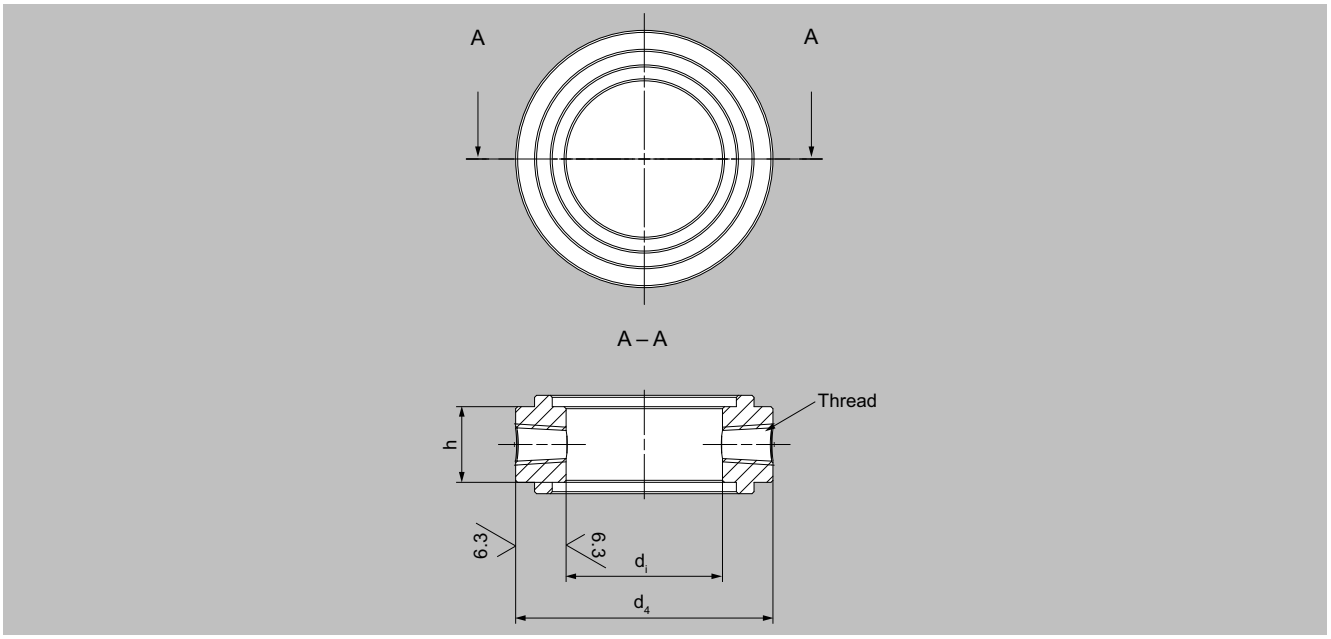
| Nominal diameter | PN bar | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|
| **DN 50** | 16 ... 100 | ¼ NPT | 102 (4.02) | 62 (2.44) | 40 (1.58) | 1.65 (3.64) |
| **DN 80** | 16 ... 100 | ¼ NPT | 138 (5.43) | 92 (3.62) | 40 (1.58) | 2.66 (5.86) |
| **DN 100** | 16 ... 100 | ¼ NPT | 162 (6.38) | 92 (3.62) | 40 (1.58) | 4.47 (9.86) |
| **DN 125** | 16 ... 100 | ¼ NPT | 188 (7.40) | 132 (5.2) | 40 (1.58) | 4.50 (9.92) |
| **DN 50** | 16 ... 100 | ½ NPT | 102 (4.02) | 62 (2.44) | 40 (1.58) | 1.65 (3.64) |
| **DN 80** | 16 ... 100 | ½ NPT | 138 (5.43) | 92 (3.62) | 40 (1.58) | 2.66 (5.86) |
| **DN 100** | 16 ... 100 | ½ NPT | 162 (6.38) | 92 (3.62) | 40 (1.58) | 4.47 (9.86) |
| **DN 125** | 16 ... 100 | ½ NPT | 188 (7.40) | 132 (5.2) | 40 (1.58) | 4.50 (9.92) |

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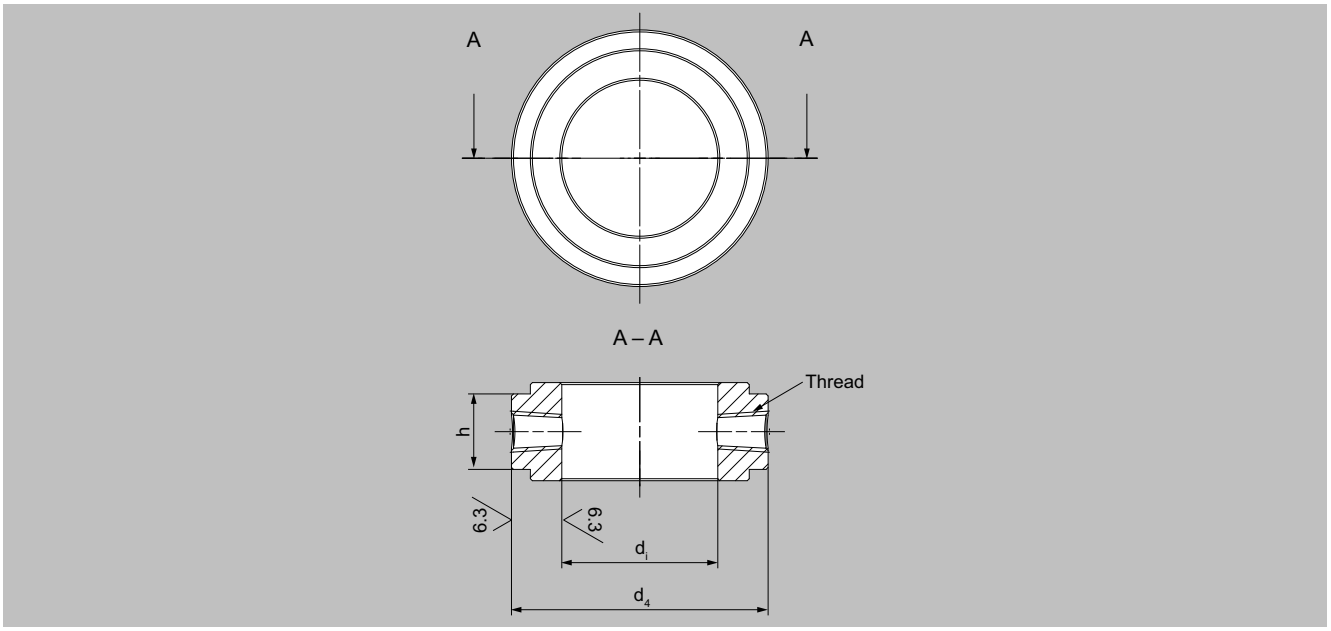


## Dimensional drawings (continued)

Form C / form C and form E




Flushing ring; sealing surface (EN 1092-1), form C / form C




Flushing ring; sealing surface (EN 1092-1), form E

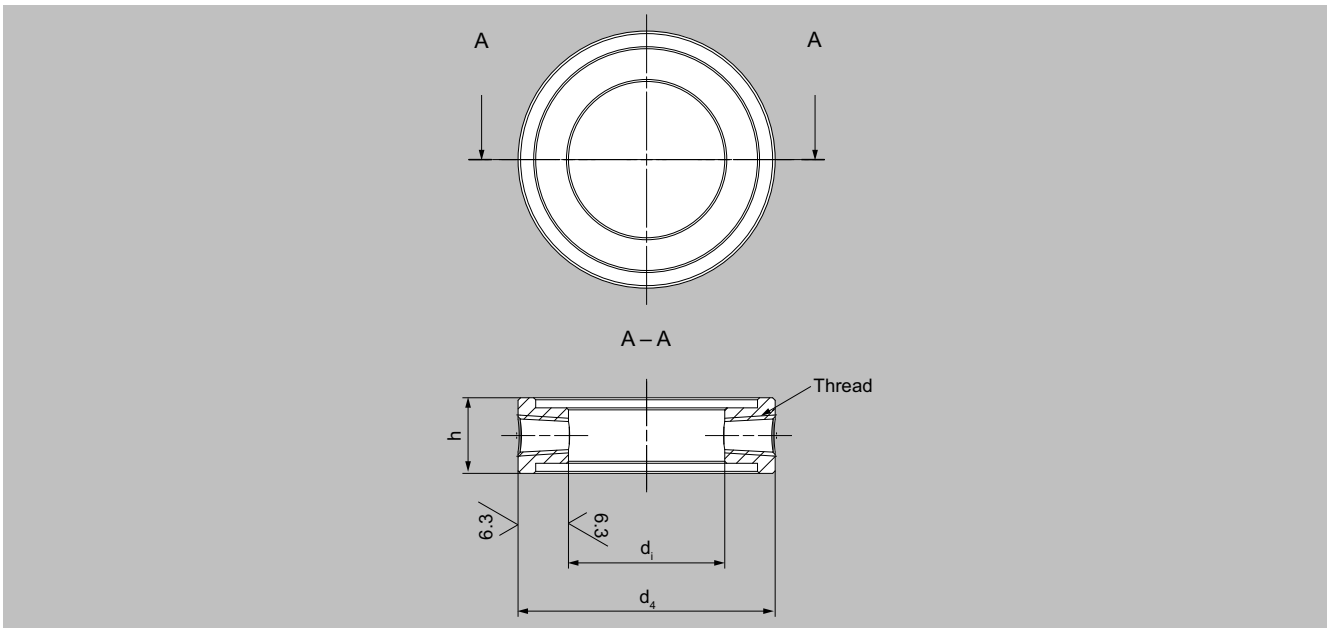
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## Dimensional drawings (continued)

| Nominal diameter | PN bar | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | x Ø in mm (inch) | f3 Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|---|---|
| DN 50 | 16 ... 100 | ¼ NPT | 102 (4.02) | 62 (2.44) | 31 (1.22) | 87 (3.43) | 4.5 (0.18) | 1.49 (3.28) |
| DN 80 | 16 ... 100 | ¼ NPT | 138 (5.43) | 92 (3.62) | 31 (1.22) | 120 (4.72) | 4.5 (0.18) | 2.40 (5.29) |
| DN 100 | 16 ... 100 | ¼ NPT | 162 (6.38) | 92 (3.62) | 30 (1.18) | 149 (5.87) | 5 (0.2) | 4.21 (9.28) |
| DN 125 | 16 ... 100 | ¼ NPT | 188 (7.40) | 132 (5.2) | 30 (1.18) | 175 (6.89) | 5 (0.2) | 4.21 (9.28) |
| DN 50 | 16 ... 100 | ½ NPT | 102 (4.02) | 62 (2.44) | 31 (1.22) | 87 (3.43) | 4.5 (0.18) | 1.49 (3.28) |
| DN 80 | 16 ... 100 | ½ NPT | 138 (5.43) | 92 (3.62) | 31 (1.22) | 120 (4.72) | 4.5 (0.18) | 2.40 (5.29) |
| DN 100 | 16 ... 100 | ½ NPT | 162 (6.38) | 92 (3.62) | 30 (1.18) | 149 (5.87) | 5 (0.2) | 4.21 (9.28) |
| DN 125 | 16 ... 100 | ½ NPT | 188 (7.40) | 132 (5.2) | 30 (1.18) | 175 (6.89) | 5 (0.2) | 3.38 (7.45) |

Form F




Flushing ring; sealing surface (EN 1092-1), form F

| Nominal diameter | PN bar | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | x Ø in mm (inch) | f3 Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|---|---|
| DN 50 | 16 ... 100 | ¼ NPT | 102 (4.02) | 62 (2.44) | 35 (1.38) | 88 (3.46) | 4 (0.16) | 1.25 (2.76) |
| DN 80 | 16 ... 100 | ¼ NPT | 138 (5.43) | 92 (3.62) | 35 (1.38) | 121 (4.76) | 4 (0.16) | 2.02 (4.45) |
| DN 100 | 16 ... 100 | ¼ NPT | 162 (6.38) | 92 (3.62) | 35 (1.38) | 150 (5.91) | 4.5 (0.18) | 3.11 (6.86) |
| DN 125 | 16 ... 100 | ¼ NPT | 188 (7.40) | 132 (5.2) | 35 (1.38) | 175 (6.89) | 4.5 (0.18) | 3.19 (7.03) |
| DN 50 | 16 ... 100 | ½ NPT | 102 (4.02) | 62 (2.44) | 40 (1.58) | 88 (3.46) | 4 (0.16) | 1.45 (3.2) |
| DN 80 | 16 ... 100 | ½ NPT | 138 (5.43) | 92 (3.62) | 40 (1.58) | 121 (4.76) | 4 (0.16) | 2.35 (5.18) |
| DN 100 | 16 ... 100 | ½ NPT | 162 (6.38) | 92 (3.62) | 40 (1.58) | 150 (5.91) | 4.5 (0.18) | 3.67 (8.09) |
| DN 125 | 16 ... 100 | ½ NPT | 188 (7.40) | 132 (5.2) | 40 (1.58) | 175 (6.89) | 4.5 (0.18) | 3.76 (8.29) |

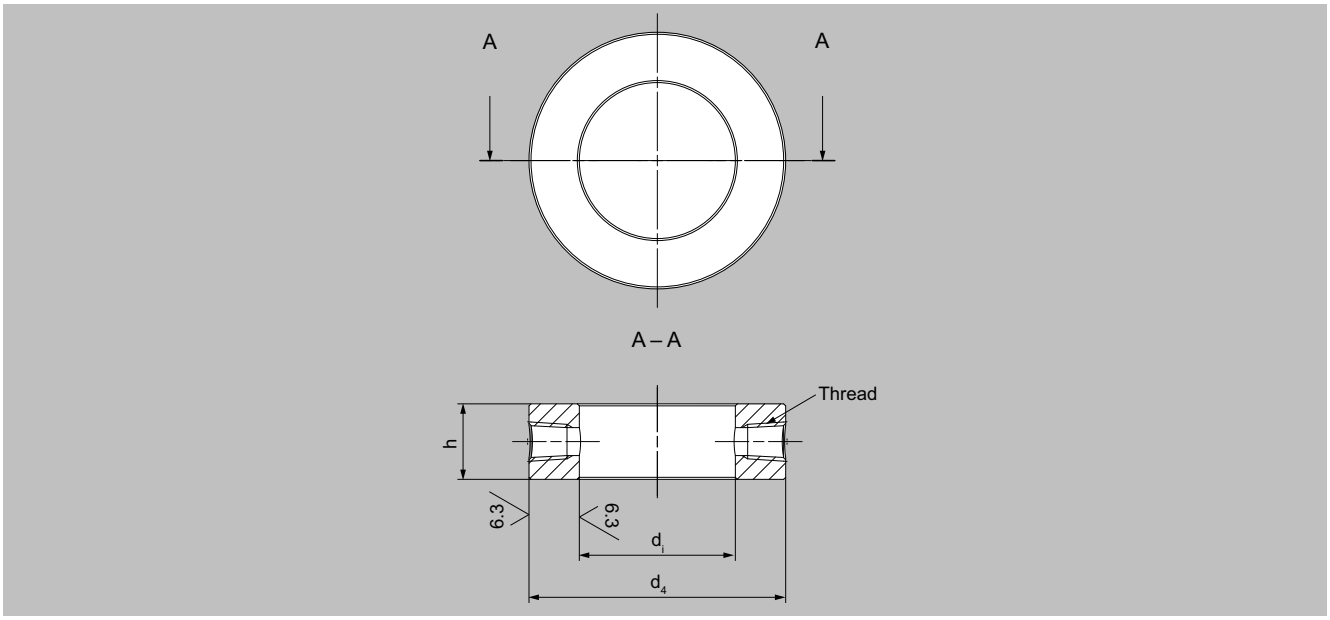
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## Dimensional drawings (continued)

***Connection according to ASME B 16.5***

RFSF and RF 125 ... 250 AO




Flushing ring; sealing surface (ASME B 16.5), RFSF and RF 125 to 250 AO

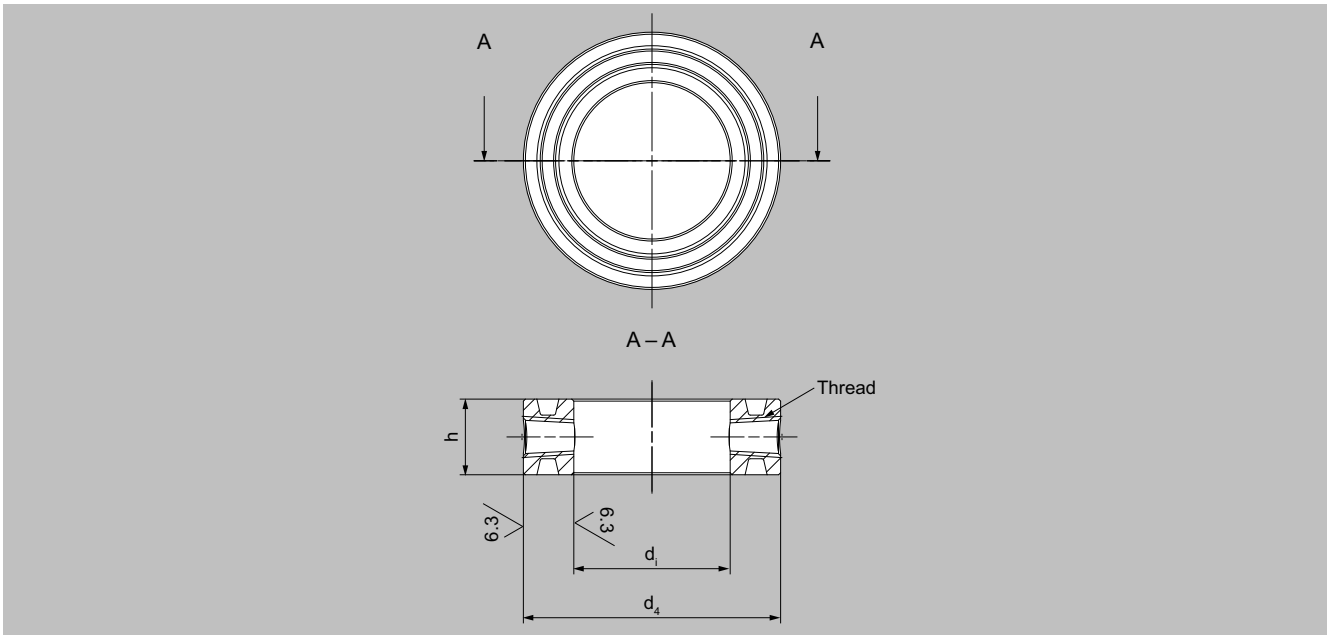
| Nominal diameter | Class | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|
| **2"** | 150 ... 600 | ¼ NPT | 92 (3.62) | 62 (2.44) | 30 (1.18) | 0.87 (1.92) |
| **3"** | 150 ... 600 | ¼ NPT | 127 (5) | 92 (3.62) | 30 (1.18) | 1.44 (3.17) |
| **4"** | 150 ... 600 | ¼ NPT | 157 (6.18) | 92 (3.62) | 30 (1.18) | 3.05 (6.72) |
| **5"** | 150 ... 600 | ¼ NPT | 186 (7.32) | 141 (5.55) | 30 (1.18) | 2.77 (6.11) |
| **2"** | 150 ... 600 | ½ NPT | 92 (3.62) | 62 (2.44) | 30 (1.18) | 0.87 (1.92) |
| **3"** | 150 ... 600 | ½ NPT | 127 (5) | 92 (3.62) | 30 (1.18) | 1.44 (3.17) |
| **4"** | 150 ... 600 | ½ NPT | 157 (6.18) | 92 (3.62) | 30 (1.18) | 3.05 (6.72) |
| **5"** | 150 ... 600 | ½ NPT | 186 (7.32) | 141 (5.55) | 30 (1.18) | 2.77 (6.11) |

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## Dimensional drawings (continued)

RJF ring groove




Flushing ring; sealing surface (ASME B 16.5), RJF ring groove

| Nominal diameter | Class | Thread | $d_4$ Ø in mm (inch) | $d_i$ Ø in mm (inch) | h Ø in mm (inch) | Weight kg (lb) |
|---|---|---|---|---|---|---|
| 2" | 150 | ¼ NPT | 102 (4.02) | 62 (2.44) | 40 (1.58) | 1.65 (3.64) |
| 3" | 150 | ¼ NPT | 133 (5.24) | 92 (3.62) | 40 (1.58) | 2.32 (5.12) |
| 4" | 150 | ¼ NPT | 171 (6.73) | 92 (3.62) | 40 (1.58) | 5.22 (11.51) |
| 5" | 150 | ¼ NPT | 194 (7.64) | 141 (5.55) | 40 (1.58) | 4.46 (9.83) |
| 2" | 150 | ½ NPT | 102 (4.02) | 62 (2.44) | 46 (1.81) | 1.90 (4.19) |
| 3" | 150 | ½ NPT | 133 (5.24) | 92 (3.62) | 46 (1.81) | 2.66 (5.86) |
| 4" | 150 | ½ NPT | 171 (6.73) | 92 (3.62) | 46 (1.81) | 6.00 (13.23) |
| 5" | 150 | ½ NPT | 194 (7.64) | 141 (5.55) | 46 (1.81) | 5.13 (11.31) |
| 2" | 300 ... 600 | ¼ NPT | 108 (4.25) | 62 (2.44) | 40 (1.58) | 1.96 (4.32) |
| 3" | 300 ... 600 | ¼ NPT | 146 (5.75) | 92 (3.62) | 40 (1.58) | 3.23 (7.12) |
| 4" | 300 ... 600 | ¼ NPT | 175 (6.89) | 92 (3.62) | 40 (1.58) | 5.57 (12.28) |
| 5" | 300 ... 600 | ¼ NPT | 210 (8.27) | 141 (5.55) | 40 (1.58) | 6.08 (13.4) |
| 2" | 300 ... 600 | ½ NPT | 108 (4.25) | 62 (2.44) | 46 (1.81) | 2.26 (4.98) |
| 3" | 300 ... 600 | ½ NPT | 146 (5.75) | 92 (3.62) | 46 (1.81) | 3.71 (8.18) |
| 4" | 300 ... 600 | ½ NPT | 175 (6.89) | 92 (3.62) | 46 (1.81) | 6.4 (14.11) |
| 5" | 300 ... 600 | ½ NPT | 210 (8.27) | 141 (5.55) | 46 (1.81) | 7 (15.43) |

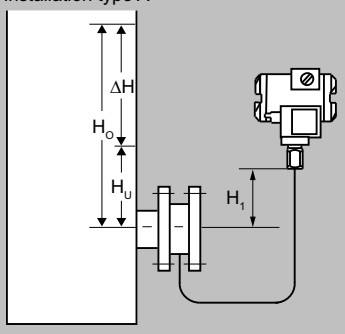
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## Dimensional drawings

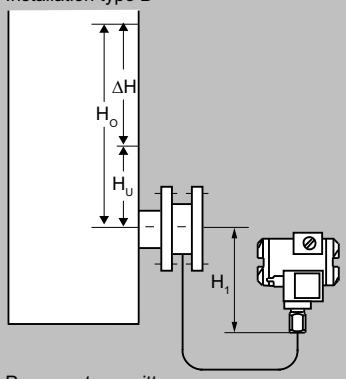
### *Mounting types for gauge pressure and level measurements (open vessels)*

Installation type A




Pressure transmitter
above the measuring point

Installation type B




Pressure transmitter
below the measuring point

$H_1 \leq 7$ m (23 ft), with halocarbon oil as filling liquid only $H_1 \leq 4$ m (13.1 ft)

Installation type A

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1$

Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1$

Installation type B

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1$

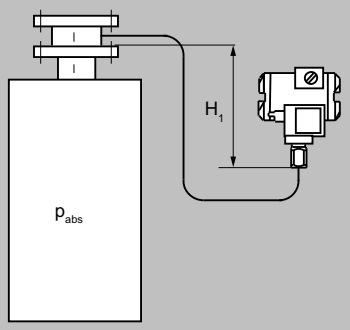
Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1$

Legend

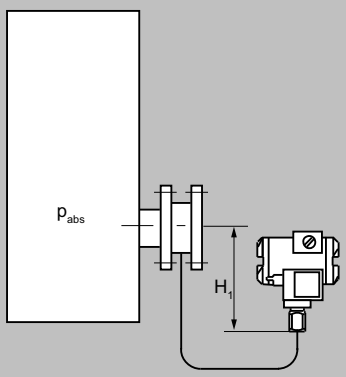
| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $\rho_{FL}$ | Density of medium in vessel |
| $\rho_{Oil}$ | Density of filling oil in the capillary to the remote seal |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |
| $H_1$ | Distance between vessel flange and pressure trans. |

### *Mounting type for absolute pressure measurements (closed vessels)*

Installation type $C_1$




Installation type $C_2$




Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200$ mm (7.9 inch)

Installation type $C_1$ and $C_2$

Lower range value: $p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1$

Upper range value: $p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1$

Legend

| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $p_{START}$ | Lower range value |
| $p_{END}$ | Upper range value |
| $\rho_{Oil}$ | Density of filling oil in the capillary to the remote seal |
| g | Local acceleration due to gravity |
| $H_1$ | Distance between vessel flange and pressure trans. |

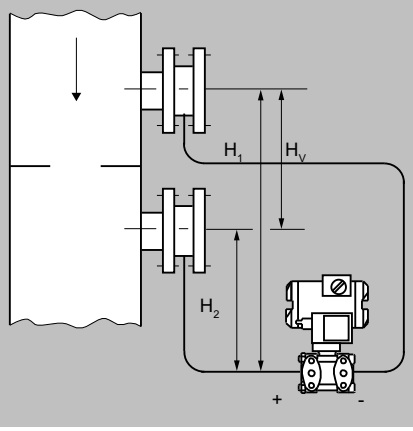
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## Dimensional drawings (continued)

### *Mounting types for differential pressure and flow measurements*

Installation type D Filter monitoring




Installation type D

Lower range value: $p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V$

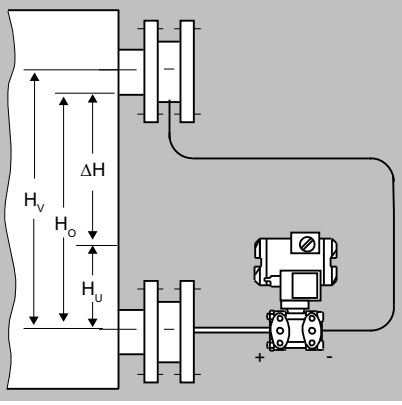
Upper range value: $p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V$

Legend

| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $p_{START}$ | Lower range value |
| $p_{END}$ | Upper range value |
| $\rho_{Oil}$ | Density of filling oil in the capillary to the remote seal |
| g | Local acceleration due to gravity |
| $H_V$ | Distance between the measuring points (spigots) |

### *Mounting type for level measurements (closed vessels)*

Installation type E




Installation type E

Lower range value: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Upper range value: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

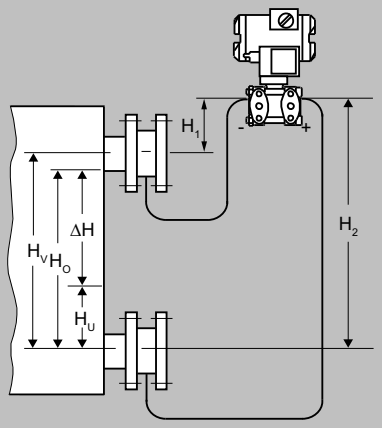
| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $\rho_{FL}$ | Density of medium in vessel |
| $\rho_{Oil}$ | Density of filling oil in the capillary to the remote seal |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |
| $H_V$ | Distance between the measuring points (spigots) |

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## Dimensional drawings (continued)

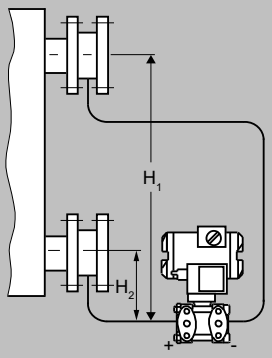
Installation type G




Pressure transmitter for differential pressure above the upper measuring point, no vacuum

$H_2$ ≤ 7 m (23 ft), with halocarbon oil as filling liquid only $H_1$ ≤ 4 m (13.1 ft)

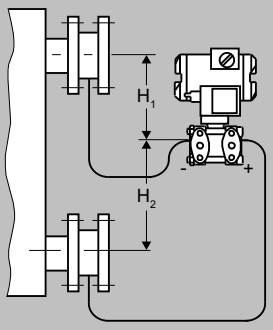
Installation type H




below the lower measuring point

Installation type for vacuum applications

Installation type J




between the measuring points, no vacuum

$H_2$ ≤ 7 m (23 ft), with halocarbon oil as filling liquid only $H_2$ ≤ 4 m (13.1 ft)

Installation type G, H and J

Lower range value:
$p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Upper range value:
$p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

| | | | |
|---|---|---|---|
| $p_{MA}$ | Lower range value to be set | g | Local acceleration due to gravity |
| $p_{ME}$ | Upper range value to be set | $H_U$ | Lower range value |
| $\rho_{FL}$ | Density of medium in vessel | $H_O$ | Upper range value |
| $\rho_{Oil}$ | Density of filling oil in the capillary to the remote seal | $H_V$ | Distance between the measuring points (spigots) |

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## Overview

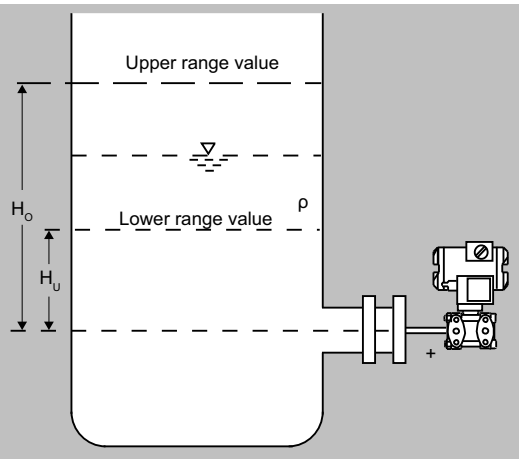
***Notes***

- For interface measurements, the interface must be located between the two nozzles. In addition, the fill level of the container must always be above the top nozzle.
- A constant level of the process medium is required for density measurement. The level should be above the top nozzle.

## Dimensional drawings

***Pressure transmitters for differential pressure for flanging***

Measuring arrangements for open containers



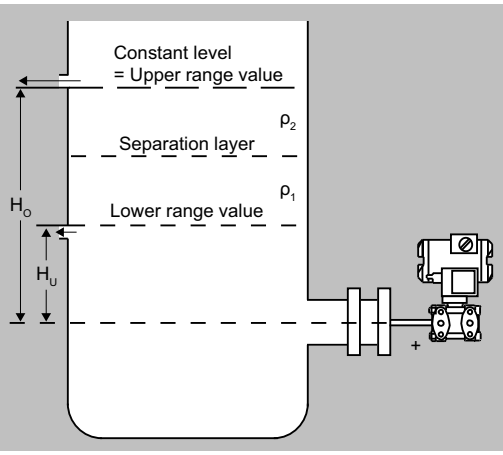

Level measurement

Lower range value: $p_{MA} = \rho \cdot g \cdot H_U$

Upper range value: $p_{ME} = \rho \cdot g \cdot H_O$

Legend

| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| ρ | Density of medium in vessel |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |




Separation layer measurement

Lower range value: $p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$

Upper range value: $p_{ME} = \rho_1 \cdot g \cdot H_O$

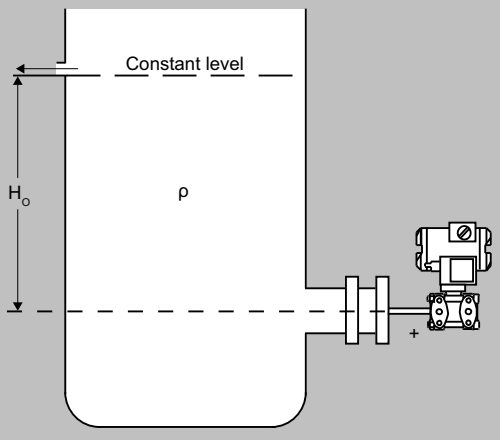
Legend

| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $\rho_1$ | Density of heavier liquid |
| $\rho_2$ | Density of lighter liquid |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |

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## Dimensional drawings (continued)




Density measurement

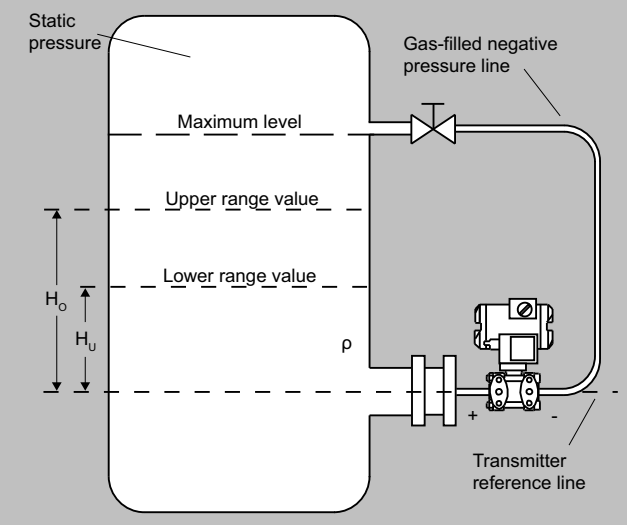
Lower range value: $p_{MA} = \rho_{MIN} \cdot g \cdot H_O$

Upper range value: $p_{ME} = \rho_{MAX} \cdot g \cdot H_O$

Legend

| | |
|---|---|
| $p_{MA}$ | Lower range value to be set |
| $p_{ME}$ | Upper range value to be set |
| $\rho_{MIN}$ | Minimum density of medium in vessel |
| $\rho_{MAX}$ | Maximum density of medium in vessel |
| g | Local acceleration due to gravity |
| $H_O$ | Upper range value in m |

Measuring arrangements for closed containers



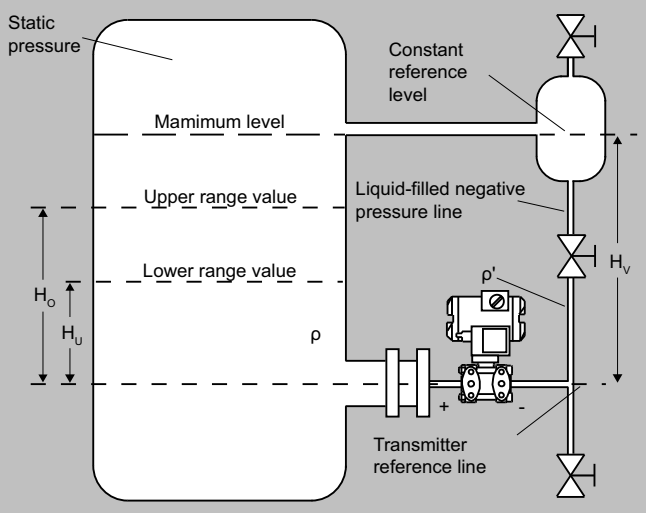

Level measurement, Version 1

Lower range value: $\Delta p_{MA} = \rho \cdot g \cdot H_U$

Upper range value: $\Delta pME = \rho \cdot g \cdot H_O$

Legend

| | |
|---|---|
| $\Delta p_{MA}$ | Lower range value to be set |
| $\Delta p_{ME}$ | Upper range value to be set |
| ρ | Density of medium in vessel |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |




Level measurement, Version 2

Lower range value: $\Delta p_{MA} = g \cdot (H_U \cdot \rho - H_V \cdot \rho')$

Upper range value: $\Delta p_{ME} = g \cdot (H_O \cdot \rho - H_V \cdot \rho')$

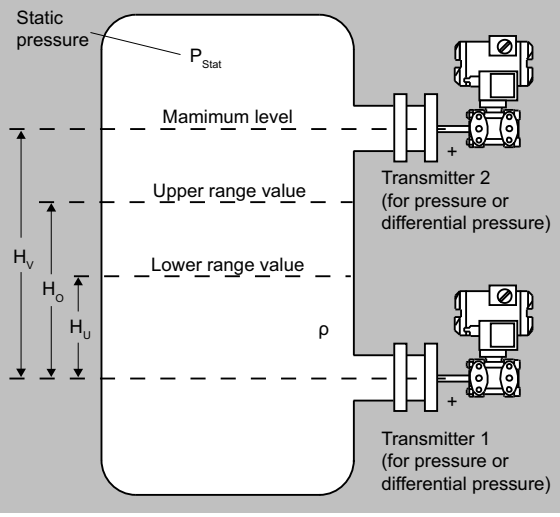
Legend

| | |
|---|---|
| $\Delta p_{MA}$ | Lower range value to be set |
| $\Delta p_{ME}$ | Upper range value to be set |
| ρ | Density of medium in vessel |
| ρ' | Density of liquid in the negative pressure line (corresponding to the temperature existing there) |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |
| $H_V$ | Distance between the measuring points (spigots) |

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## Dimensional drawings (continued)




Level measurement, Version 3

Lower range value: $\Delta p_{MA} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_U}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$

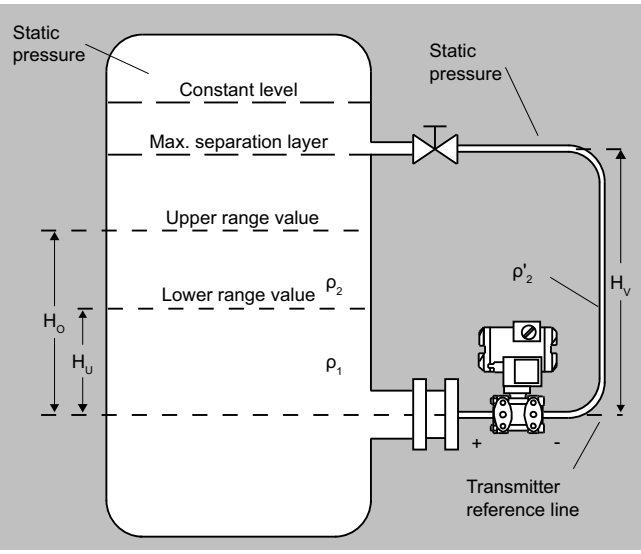
Upper range value: $\Delta p_{ME} = \underbrace{P_{Stat} + \rho \cdot g \cdot H_O}_{\text{Transmitter 1}} - \underbrace{P_{Stat}}_{\text{Transmitter 2}}$

Legend

| | |
|---|---|
| $\Delta p_{MA}$ | Lower range value to be set |
| $\Delta p_{ME}$ | Upper range value to be set |
| ρ | Density of medium in vessel |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |
| $H_V$ | Distance between the measuring points (spigots) |

The pressure measuring range (≙ level) will be calculated by subtraction of measuring range of transmitter 1 minus measuring range of transmitter 2 in the process control system.

Pressure transmitters for differential pressure for flanging, measuring arrangement for closed containers, level measurement




Separation layer measurement

Lower range value: $\Delta p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho'_2)$

Upper range value: $\Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho'_2)$

Legend

| | |
|---|---|
| $\Delta p_{MA}$ | Lower range value to be set |
| $\Delta p_{ME}$ | Upper range value to be set |
| $\rho_1$ | Density of heavier liquid with separation layer in vessel |
| $\rho_2$ | Density of lighter liquid with separation layer |
| $\rho'_2$ | Density of liquid in the negative pressure line (corresponding to the temperature existing there) |
| g | Local acceleration due to gravity |
| $H_U$ | Lower range value |
| $H_O$ | Upper range value |
| $H_V$ | Distance between the measuring points (spigots) |

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## Overview

All shut-off fittings can be secured onto walls, racks (72 mm grid size) and vertical and horizontal pipes.

This offers the advantage when assembling a plant that the shut-off fittings can be secured first and the lines for the medium and differential pressure lines connected to them. It is then possible to check all connections for leaks and to blow out or flush the pipes in order to remove dirt (welding residues, shavings etc.).

Finally, when all piping is completed, the measuring instruments are screwed onto the shut-off fittings.

If a measuring instrument has to be removed for maintenance, the fittings and pipes remain intact. Only the valves have to be closed. The measuring instrument can then be detached and re-installed after maintenance.

***Classification according to pressure equipment directive (PED 2014/68/EU):***

For gasses of fluid group 1 and liquids of fluid group 1; compliance with requirements of article 4, paragraph 3 (sound engineering practice).

***Norm IEC 61518/EN 61518***

The flange connection between pressure transmitter and valve manifold was modified in the standard IEC 61518/EN 61518. The only connection thread approved for use in the process flanges of the pressure transmitter is $^{7}/_{16}$-20 UNF.

The valve manifolds for M12 screws, including the accessory sets, have therefore been deleted.

***Material inspection certificate to EN 10204-3.1***

If a material inspection certificate according to EN 10204-3.1 is required for ordering valve manifolds or shut-off fittings, be aware that one certificate is sufficient for each valve type ordered. This means that you will only be charged for one certificate in the cost calculations.

***Minimum/maximum operating temperatures***

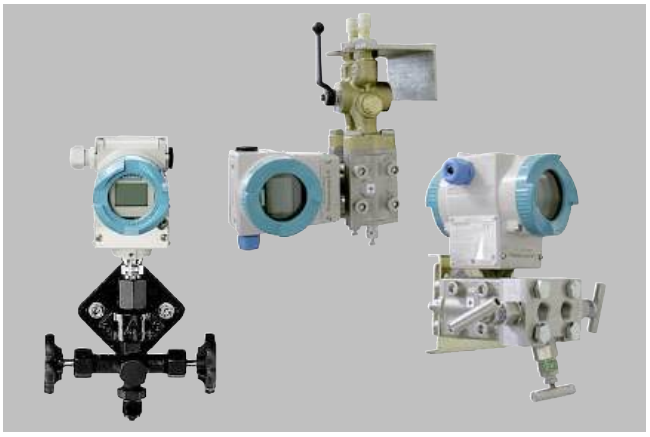
The maximum operating temperatures are given for each value or valve manifold.

The minimum operating temperatures depend on the material used for the valves or valve manifold. They are:

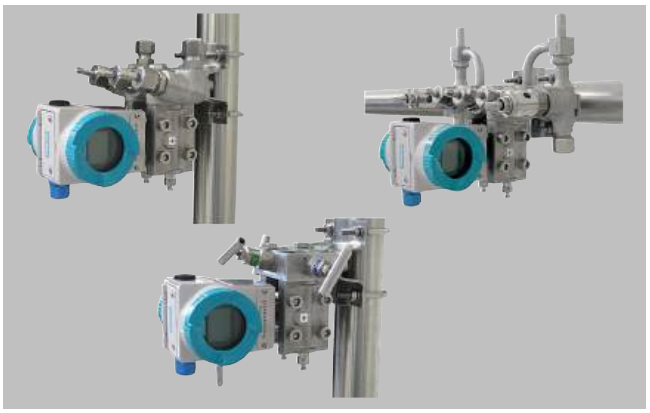
| Material | Minimum operating temperature |
|---|---|
| Brass | -10 °C (+14 °F) according to EN 12516-4 |
| Steel | -10 °C (+14 °F) according to AD200-W10 |
| Stainless steel | -40 °C (-40 °F) |

## Overview (continued)

***Pressure transmitters with shut-off fittings – mounting examples***



SITRANS P transmitter for gauge pressure with double shut-off valve, SITRANS P differential pressure transmitter with multiway cock or 3-spindle valve manifold



SITRANS P transmitter for differential pressure with 3-way valve manifold, 3-spindle valve manifold or valve manifold combination DN 5/DN 8



SITRANS P pressure transmitter for differential pressure, mounted in protective box (available on request)

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## Overview (continued)



SITRANS P pressure transmitter mounted on "Monoflange" valve combination for direct connection to flanges (available on request)

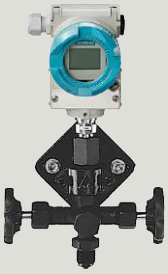
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## Configuration

***Selection aid***

Selection of possible shut-off valves

| Transmitters | Shut-off valves for general applications | | Shut-off valves for special applications | |
|---|---|---|---|---|
| **Gauge and absolute pressure transmitters with process connection G½" external thread**<br>e.g.<br>• SITRANS P200<br>7MF1565-...<br>• SITRANS P210<br>7MF1566-...<br>• SITRANS P220<br>7MF1567-...<br>• SITRANS P300<br>7MF802.-...0.-....<br>• SITRANS P 320/420<br>7MF030.-..D..-....<br>7MF032.-..D..-....<br>7MF040.-..D..-....<br>7MF042.-..D..-.... | Shut-off valves / double shut-off valves according to DIN 16270, DIN 16271, and DIN 16272 |  | Double shut-off valve DN 5 for cross-over ½ NPT-F to nipple connection G½<br>7MF9011-4EA<br><br>2-spindle valve manifold DN 5 for installation in protective boxes<br>7MF9412-1B |  <br>  |
| **Gauge and absolute pressure transmitters with process connection ½"-14 NPT external or external thread**<br>e.g.<br>• SITRANS P200<br>7MF1565-...<br>• SITRANS P210<br>7MF1566-...<br>• SITRANS P220<br>7MF1567-<br>• SITRANS P300<br>7MF802.-...1.-....<br>• SITRANS P 320/420<br>7MF030.-..E..-....<br>7MF030.-..F..-....<br>7MF032.-..E..-....<br>7MF032.-..F..-....<br>7MF040.-..E..-....<br>7MF040.-..F..-....<br>7MF042.-..E..-....<br>7MF042.-..F..-.... | Double shut-off valve DN 5<br>7MF9011-4EA, -4FA, -4GA and -4KA |  <br>7MF9011-4FA<br>7MF9011-4KA | Double shut-off valve DN 5 for process connection ½-NPT<br>7MF9011-4DA |  |
| **Absolute pressure transmitter with process connection according to IEC 61518/EN 61518**<br>e.g.<br>• SITRANS P 320/420<br>7MF033.-.....-....<br>7MF043.-.....-.... | 2-spindle valve manifold DN 5<br>7MF9411-5A. |  | 2-spindle valve manifold DN 5 for installation in protective boxes<br>7MF9412-1C. |  |

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## Configuration (continued)

| Transmitters | Shut-off valves for general applications | | Shut-off valves for special applications | |
|---|---|---|---|---|
| **Differential pressure transmitter with process connection according to IEC 61518/EN 61518**<br>e.g.<br>• SITRANS P 320/420<br>7MF034.-.....-....<br>7MF044.-.....-.... | 3/5-spindle valve manifold DN 5<br>7MF9411-5B. and<br>7MF9411-5C. |  | 3-way valve manifold DN 5 forged version<br>7MF9410-1.. |  |
| | | | 5-way valve manifold DN 5 forged version<br>7MF9410-3.. |  |
| | PN 100 multiway cock<br>7MF9004-... |  | 3-way valve manifold DN 8 forged version<br>7MF9416-1.. and 7MF9416-2.. |  |
| | |  | Valve manifold combination DN 5/DN 8 for vapor measurement<br>7MF9416-6.. |  |
| | | | Valve manifold combination DN 8 for vapor measurement<br>7MF9416-4.. |  |

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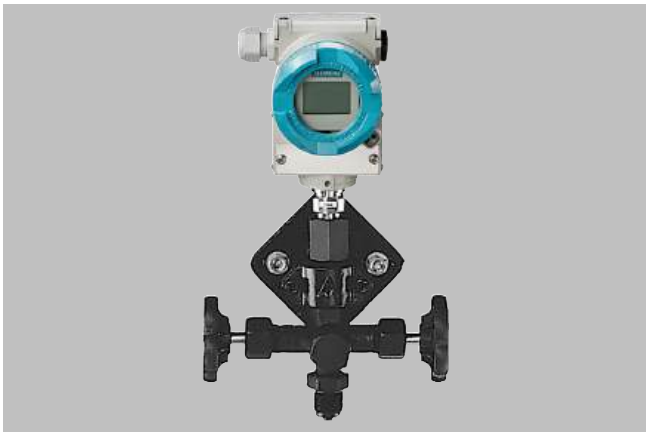
## Configuration (continued)

| Transmitters | Shut-off valves for general applications | | Shut-off valves for special applications | |
|---|---|---|---|---|
| **Differential pressure transmitter with process connection according to IEC 61518/EN 61518**<br>e.g.<br>• SITRANS P 320/420<br>7MF034.-.....-....<br>7MF044.-.....-.... | PN 100 multiway cock<br>7MF9004-... |  <br>  | Valve manifold for DN 5 for installation in protective boxes<br>7MF9412-1D. and<br>7MF9412-1E.<br><br>Valve manifold for vertical differential pressure line<br>7MF9413-1..<br><br>Low-pressure multiway cock<br><br>7MF9004-4.. |  <br>  <br>  <br>  |

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## Overview



Pressure transmitters with double shut-off valve 7MF9401-...

The shut-off valves for pressure gauges are used to shut off the measured medium line for corrosive and non-corrosive gases, vapors and liquids.

## Design

A siphon is installed in front of the shutoff value for measured materials with temperatures above 120 °C. The form B shut-off valves have a shaft with which a measuring instrument holder can be attached. No adapter is therefore required for fastening these valves. With double shut-off valves DN 5, the air-release/test connection can be shut off. This enables a zero point check on the pressure gauge. In addition, a characteristic curve test can be conducted on the pressure gauge using an external pressure sensor. The valve packing material is PTFE.

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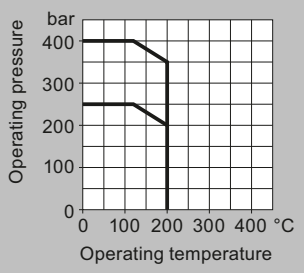


## Selection and ordering data

| Shut-off valves, form B, DIN 16270 | | Article No. |
|---|---|---|
| Without test collar, connection shank, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| CW614N (CuZn39Pb3) (mat. no. 2.0402) | 250 bar (3626 psi) | **7MF9401-7AA** |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-7AB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-7AC** |
| **Shut-off valves, form B, DIN 16271** | | |
| With test collar, connection shank, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| CW614N (CuZn39Pb3) (mat. no. 2.0402) | 250 bar (3626 psi) | **7MF9401-7BA** |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-7BB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-7BC** |
| **Shut-off valves, form B, DIN 16270** | | |
| Without test collar, cutting ring 12 S EN ISO 8434-1, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-8AB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-8AC** |
| **Shut-off valves, form B, DIN 16271** | | |
| With test collar, cutting ring 12 S EN ISO 8434-1, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-8BB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-8BC** |
| **Double shut-off valves, form B, DIN 16272** | | |
| With test collar, connection shank, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| CW614N (CuZn39Pb3) (mat. no. 2.0402) | 250 bar (3626 psi) | **7MF9401-7DA** |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-7DB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-7DC** |
| **Double shut-off valves, form B, DIN 16272** | | |
| With test collar, cutting ring 12 S EN ISO 8434-1, without certificate | | |
| ***Material valve enclosure*** | ***Max. permissible operating overpressure*** | |
| P250GH (mat. no. 1.0460) | 400 bar (5800 psi) | **7MF9401-8DB** |
| X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | 400 bar (5800 psi) | **7MF9401-8DC** |
| **Accessories** | | |
| Factory certificate according to EN 10204-2.2 | | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | | **7MF9000-8AD** |

Measuring instrument holders, see under "Accessories for shut-off valves and double shut-off valves".

## Characteristic curves




Steel or stainless steel version
400 bar (5800 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

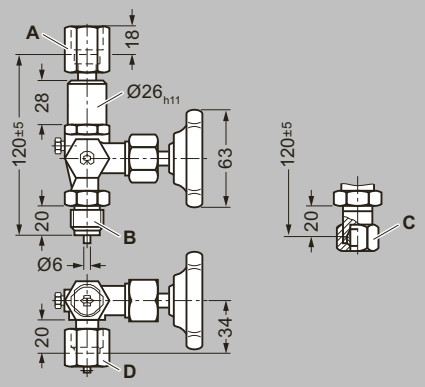
Brass version
250 bar (3626 psi) at 120 °C (248 °F)
200 bar (2901 psi) at 200 °C (392 °F)

Permissible operating overpressure depends on the permissible operating temperature

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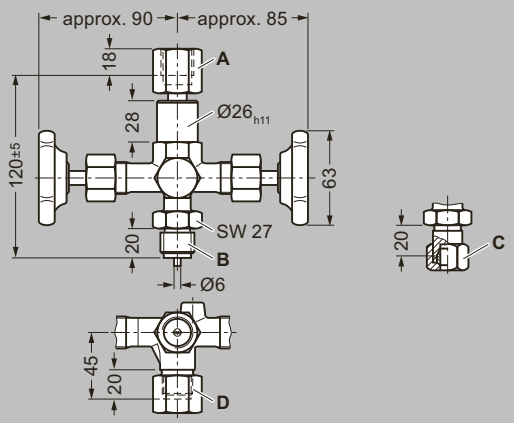


## Dimensional drawings




A Connection on device side: to DIN 16284, G½, SW 27
B Connection on measurement side: connection shank to DIN EN 837-1, G½
C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
D Connection on test collar (with sealing cap): thread M20 x 1.5

Shut-off valve, Form B, dimension drawing, dimensions in mm




A Connection on device side: to DIN 16284, G½, SW 27
B Connection on measurement side: connection shank to DIN EN 837-1, G½
C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
D Connection on test collar (with sealing cap): thread M20 x 1.5

Double shut-off valve, Form B, dimension drawing, dimensions in mm

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## Overview



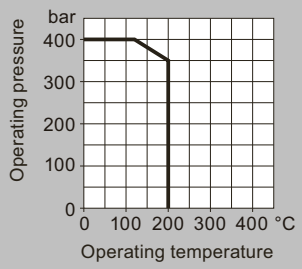
P300 pressure transmitters with shut-off valve and angled adapter

The angled adapter serves to allow transmitters with display on top to be read from the front.

## Selection and ordering data

| | Article No. |
|---|---|
| **Angled adapter**<br>Material: X 12 CrNiMoTi 17 12 2 (mat. no. 1.45714/316Ti), max. permissible operating overpressure 400 bar (5800 psi) | **7MF9401-7WA** |
| **Accessories** | |
| Factory certificate according to EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

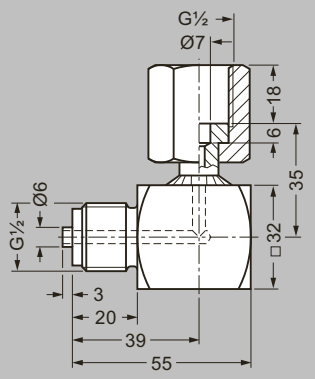
## Characteristic curves




Stainless steel version
400 bar (5800 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating overpressure depends on the permissible operating temperature

## Dimensional drawings




Angled adapter, dimensions in mm

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## Overview

The double shut-off valves DN 5 are suitable for pressure measuring devices and pressure transmitters and available in 5 versions:

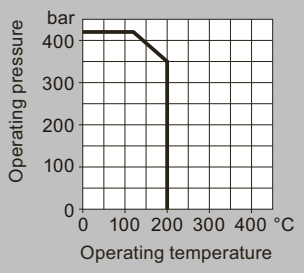
- Sleeve-nipple
- Sleeve-sleeve
- Sleeve-collar
- Collar-collar
- Collar-sleeve

The valve packing material is PTFE.

## Selection and ordering data

| Shut-off valves DN 5 | Article No. |
|---|---|
| Material: X 6 CrNiMoTi 17 13 2 (mat. no. 1.4404/316L), max. permissible operating overpressure 420 bar (6092 psi) | |
| • Sleeve-sleeve | **7MF9011-3HA** |
| **Double shut-off valves DN 5** | |
| Material: X 6 CrNiMoTi 17 13 2 (mat. no. 1.4404/316L), max. permissible operating overpressure 420 bar (6092 psi) | |
| • Sleeve-nipple | **7MF9011-4EA** |
| • Sleeve-sleeve | **7MF9011-4HA** |
| • Sleeve-collar | **7MF9011-4FA** |
| • Collar-collar | **7MF9011-4GA** |
| • Collar-sleeve | **7MF9011-4KA** |
| **Accessories** | |
| Factory certificate according to EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |
| **Options** | **Order code** |
| Add "**-Z**" to article number and specify order code. | |
| Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) | **S12** |
| Suitable for hydrogen applications in ventilated environment | **S22** |
| **Certification according to NACE MR-0175** | **D07** |
| Including inspection certificate 3.1 according to EN 10204 | |

## Characteristic curves



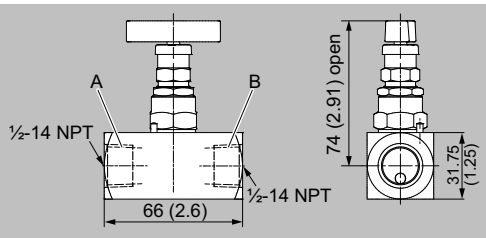

420 bar (6092 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating overpressure depends on the permissible operating temperature

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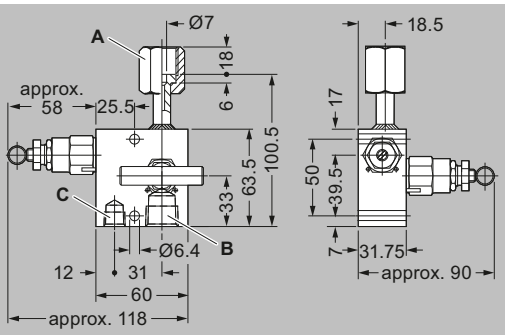


## Dimensional drawings



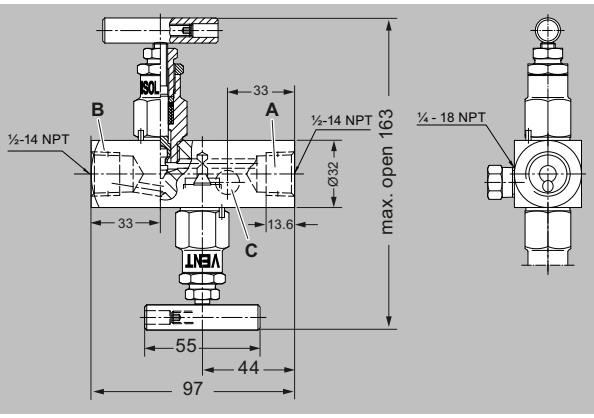

A Connection on device side: ½-14 NPT
B Connection on measurement side: ½-14 NPT

Shut-off valve DN 5 (sleeve-sleeve) 7MF9011-3HA, dimensions in mm (inch)




A Connection on device side: nipple to DIN 16284, G½, SW 27
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (sleeve-nipple connection) 7MF9011-4EA, dimensions in mm (inch)

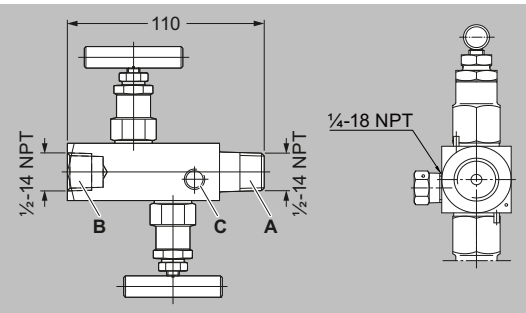



Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4HA, dimensions in mm (inch)

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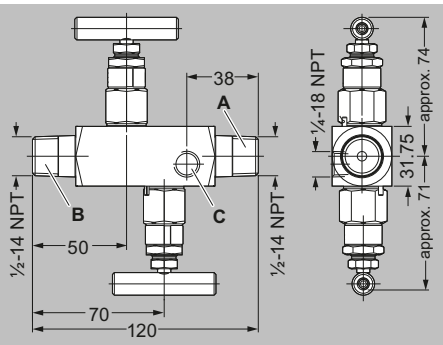


## Dimensional drawings (continued)

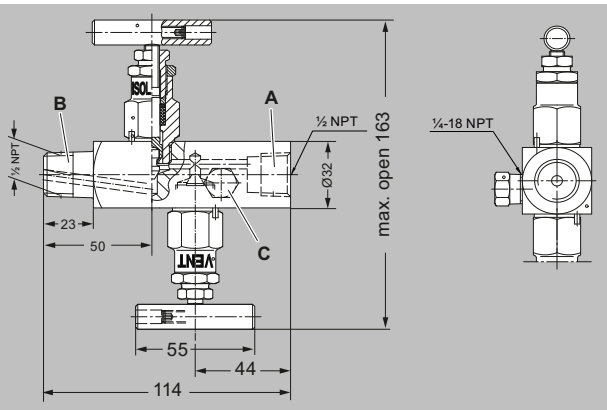



A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (sleeve-collar) 7MF9011-4FA, dimensions in mm (inch)




Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA, dimensions in mm (inch)




A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (collar-sleeve) 7MF9011-4KA, dimensions in mm (inch)

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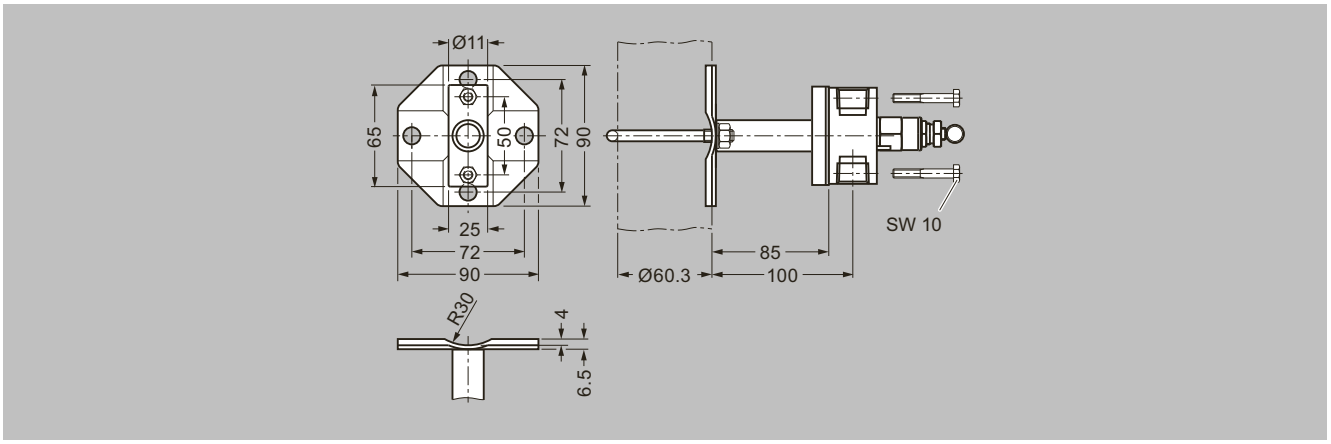
## Overview

The mounting kit is suitable for the double shut-off valves 7MF9011-4.A and for wall, rack and tube mounting.

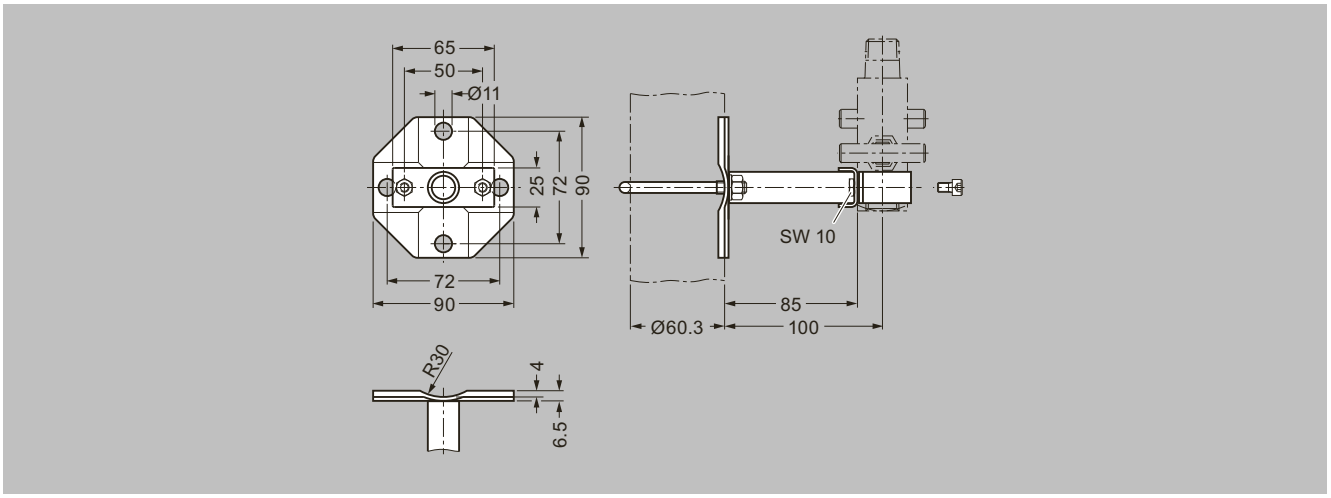
## Selection and ordering data

| Mounting set for shut-off valves | Article No. |
|---|---|
| **7MF9011-4DA and -4EA**<br>Made of stainless steel, scope of delivery:<br>1 × mounting brackets<br>2 × hexagon head screws M6x40<br>1 × mounting bracket<br>2 × washers 8.4 according to DIN 125<br>2 × hexagon nut M8 according to EN 24032 | **7MF9011-8AB** |
| **7MF9011-4FA, -4GA, 4HA, -4KA and -3HA**<br>Made of stainless steel, scope of delivery:<br>1 × mounting brackets<br>2 × hexagon head screws M6x10<br>1 × mounting bracket<br>2 × washers 8.4 according to DIN 125<br>2 × hexagon nut M8 according to EN 24032 | **7MF9011-8AC** |

## Dimensional drawings




Mounting bracket (7MF9011-8AB) for shut-off valves 7MF9011-4DA and 7MF9011-4EA for wall, rack or pipe mounting, dimensions in mm




Mounting bracket (7MF9011-8AC) for shut-off valves 7MF9011-4FA and 7MF9011-4GA for wall, rack or pipe mounting, dimensions in mm

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## Overview

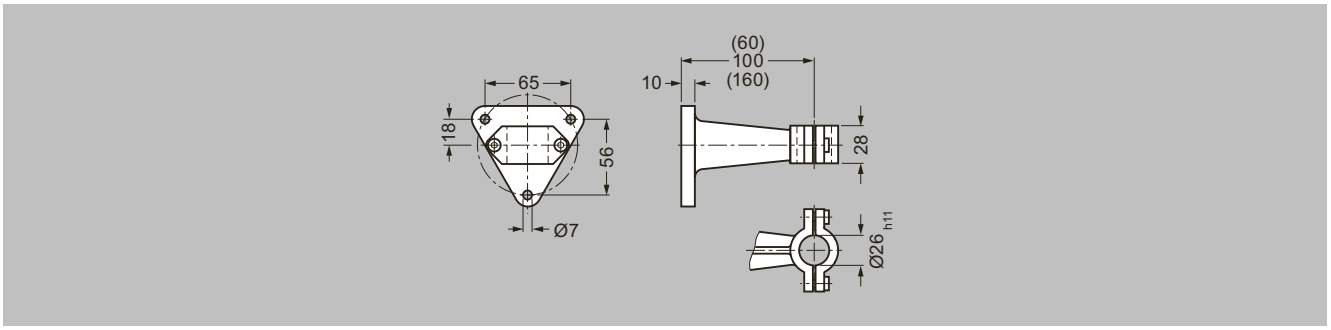
The measuring instrument holders are required to mount the following devices:

- Pressure gauges with threaded connection underneath
- Shut-off valves according to DIN 16270, DIN 16271 and DIN 16272 (7MF9401-7.. and 7MF9401-8..)

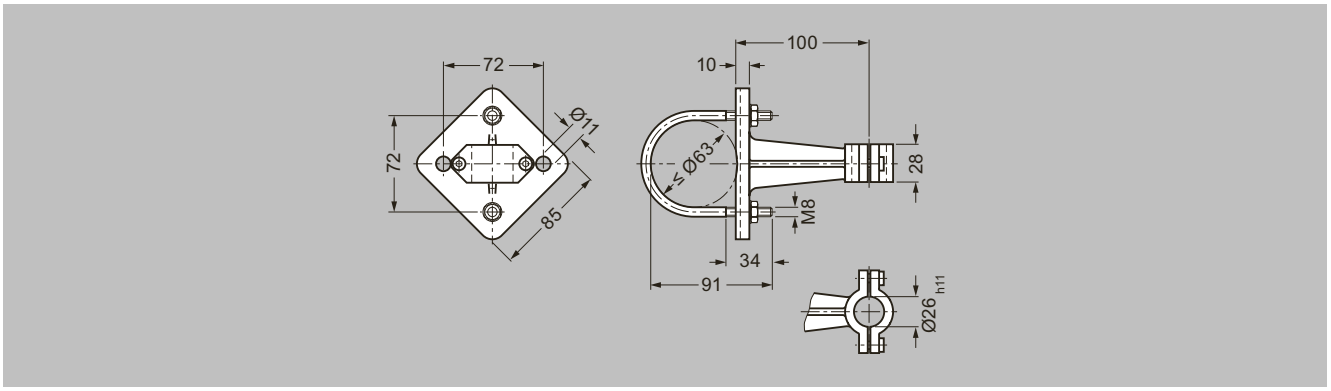
## Selection and ordering data

| | Article No. |
|---|---|
| **Measuring instrument holder, form H, DIN 16281**<br>(E.g. for pressure gauge)<br>Out of aluminum alloy, painted black, for **wall mounting**, removable holder lid | |
| • Projection length 60 mm | **M56340-A0046** |
| • Projection length 100 mm | **M56340-A0047** |
| **Measuring instrument holder, form A, DIN 16281**<br>(E.g. for integrator)<br>Out of malleable cast iron, zinc-plated and primed;<br>for **wall mounting**, fastened to a rack or mounting rail (horizontal/vertical);<br>removable holder lid | **M56340-A0053** |
| **Measuring instrument holder, form A, DIN 16281**<br>(E.g. for transmitter)<br>Out of malleable cast iron, zinc-plated and primed;<br>with pipe collar for **wall and pipe mounting** (horizontal/vertical)<br>removable holder lid | **M56340-A0079** |

## Dimensional drawings




Measuring instrument holder form H for wall mounting M56340-A0046/-A0047, dimensions in mm




Measuring instrument holder form A for wall and pipe mounting M56340-A0053/-A0079, dimensions in mm

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## Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds 7MF9411-5.. are for pressure transmitters for absolute pressure or gauge pressure.

The valve manifolds are used to shut off the differential pressure lines and to check the transmitter zero point.

The 2-spindle and the 5-spindle valve manifolds also enable venting on the transmitter side and checking of the pressure transmitter characteristic.

## Benefits

- Max. operating overpressure 420 bar (6092 psi)
- Each available in version for oxygen

## Application

The spindle valve manifolds DN 5 are designed for liquids and gases.

A version for oxygen is also available on request.

## Design

All versions of the valve manifolds have a process connection ½-14 NPT. The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A. The 2-spindle and the 5-spindle valve manifold have a vent and test connection ¼-18 NPT in addition.

The valves have an external spindle thread.

***Materials used***

| Component | Material | Mat. no. |
|---|---|---|
| Enclosure | X 2 CrNiMo 17 13 2 | 1.4404/316L |
| Cones | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti |
| Spindles | X 2 CrNiMo 18 10 | 1.4404/316L |
| Head parts | X 5 CrNiMo 18 10 | 1.4401/316 |
| Packings | PTFE | - |

## Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

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## Selection and ordering data

| Valve manifolds DN 5 | Article No. 7MF9411- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | |
| For liquids and gases, for flanging to pressure transmitter for absolute and differential pressure, max. operating overpressure 420 bar, (order accessory kit using order code), without certificate | | | | | | | | | | | |
| • 2-spindle valve manifold | | | | | | | | | 5 | A | |
| • 3-spindle valve manifold | | | | | | | | | 5 | B | |
| • 5-spindle valve manifold | | | | | | | | | 5 | C | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** (Connection valve manifold – pressure transmitter) | | |
| ***For valve manifold 7MF9411-5A.*** | | |
| 2 × screws $^{7}/_{16}$-20 UNF × 1¾ inches according to ASME B18.2.1; chromated steel<br>1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K35** | **7MF9411-7DB** |
| 2 × screws $^{7}/_{16}$-20 UNF × 1¾ inches according to ASME B18.2.1; **stainless steel**<br>1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K45** | **7MF9411-7DC** |
| ***For valve manifold 7MF9411-5B. and -5C.*** | | |
| 4 × screws $^{7}/_{16}$-20 UNF × 1¾ inches according to ASME B18.2.1; chromated steel<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K36** | **7MF9411-5DB** |
| 4 × screws $^{7}/_{16}$-20 UNF × 1¾ inches according to ASME B18.2.1; **stainless steel**<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K46** | **7MF9411-5DC** |
| **Accessory kit according to DIN[2]** (Connection valve manifold – pressure transmitter) | | |
| ***For valve manifold 7MF9411-5A.*** | | |
| 2 × screws M10×45 according to EN 24014; chromated steel<br>2 × washers Ø 10.5 mm according to DIN 125;<br>1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K15** | **7MF9411-7BB** |
| 2 × screws M10×45 according to EN 24014; **stainless steel**<br>2 × washers Ø 10.5 mm according to DIN 125, **stainless steel**;<br>1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K25** | **7MF9411-7BC** |
| ***For valve manifold 7MF9411-5B. and -5C.*** | | |
| 4 × screws M10×45 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160. | **K16** | **7MF9411-6BB** |
| 4 × screws M10×45 according to EN 24014; **stainless steel**<br>4 × washers Ø 10.5 mm according to DIN 125, **stainless steel**;<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160 | **K26** | **7MF9411-6BC** |
| **Mounting plate** | | |
| • For valve manifold, made of electrogalvanized sheet steel | | |
| • For **wall mounting** or fastening on rack (72 mm grid), weight 0.5 kg<br>Scope of delivery:<br>1 × mounting plate with fixing screws for mounting on valve manifold | **M11** | **7MF9006-6EA** |
| • For **pipe mounting**, weight 0.7 kg<br>Scope of delivery:<br>1 × mounting plate M11, 2 × pipe collar with nuts and washers (for pipe with max. Ø 60.3 mm) and fixing screws for mounting on valve manifold | **M12** | **7MF9006-6GA** |
| • For valve manifold, made of **stainless steel 316L** | | |
| • For **wall mounting** or fastening on rack (72 mm grid), weight 0.5 kg<br>Scope of delivery:<br>1 × mounting plate with fixing screws for mounting on valve manifold | **M21** | **7MF9006-6EC** |
| • For **pipe mounting**, weight 0.7 kg<br>Scope of delivery:<br>1 × mounting plate M21, 2 × pipe collar with nuts and washers (for pipe with max. Ø 60.3 mm) | **M22** | **7MF9006-6GC** |
| **Valve manifold 100 bar** Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) | | |
| • For 7MF9411-5A. | **S12** | |
| • For 7MF9411-5B. | **S13** | |
| • For 7MF9411-5C. | **S14** | |
| Suitable for hydrogen applications in ventilated environment | **S22** | |
| **Certification according to NACE MR-0175** Including inspection certificate 3.1 according to EN 10204 | **D07** | |

[1] If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.
[2] Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

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## Accessories

***Accessory set for 2-, 3- and 5-spindle valve manifolds***

***2-spindle valve manifold DN 5***

- K35: 2 screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1, 1 flat gasket
- K15: 2 screws M10x45 according to EN 24 014, 2 washers, 1 flat gasket

***3-spindle and 5-way valve manifold DN 5***

- K36: 4 screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 according to EN 24 014, 4 washers, 2 flat gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

**Note**: Flange connection with M10 screws only permissible up to PN 160!

***Mounting plate***

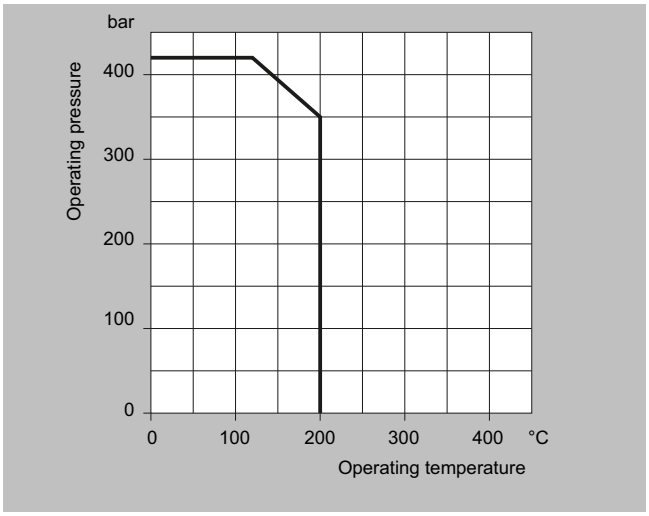
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
  Scope of delivery:
  - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
  Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

***Valve manifold 100 bar, suitable for oxygen***

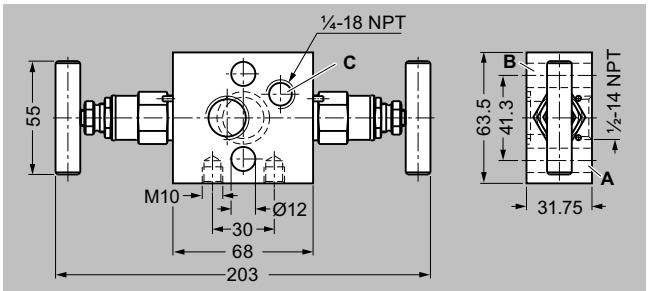
- S12: For 2-way valve manifold
- S13: For 3-way valve manifold
- S14: For 5-way valve manifold

## Characteristic curves



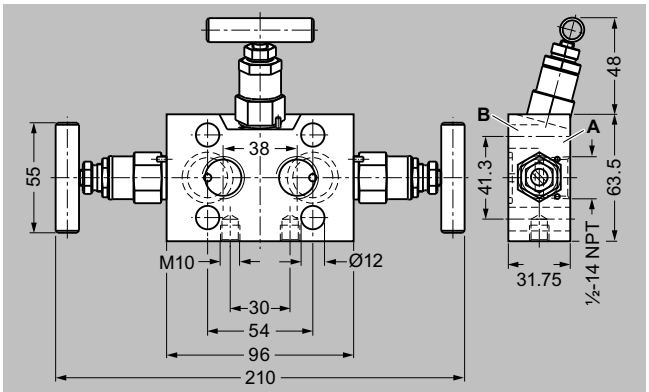

Valve manifolds DN 5 (7MF9411-5..), permissible operating overpressure depends on the permissible operating temperature

## Dimensional drawings



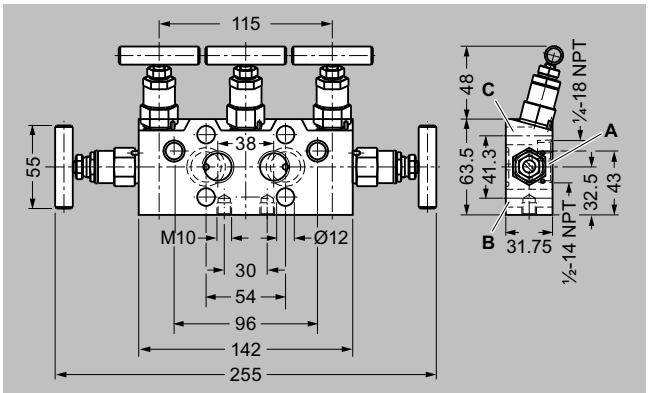

A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to IEC 61518, form B
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm




A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to IEC 61518, form B
Valve design: external spindle thread

3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm



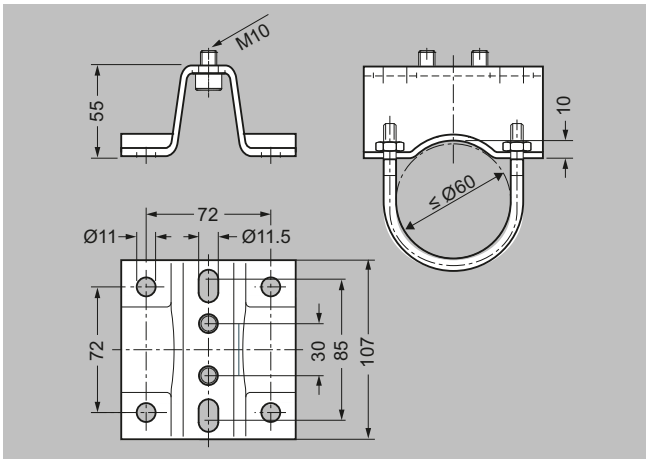

A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to IEC 61518, form B
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

5-spindle valve manifold DN 5 (7MF9411-5C.), dimensions in mm

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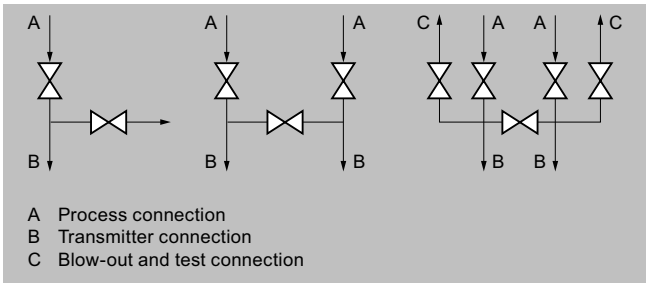


## Dimensional drawings (continued)




Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

## Circuit diagrams




2-spindle, 3-spindle and 5-spindle valve manifold DN 5, connections

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## Overview



The multiway cock PN 100 (1450 psi) can be flanged to pressure transmitters for differential pressure.

## Benefits

- Version for corrosive liquids, gases and vapors available
- Robust design
- Oil- and grease-free variant possible
- One-hand operation

## Application

The PN 100 (1450 psi) multiway cock is available in versions for corrosive and non-corrosive liquids, gases and vapors.

## Design

The multiway cock can be flanged with four screws to pressure transmitters for differential pressure.

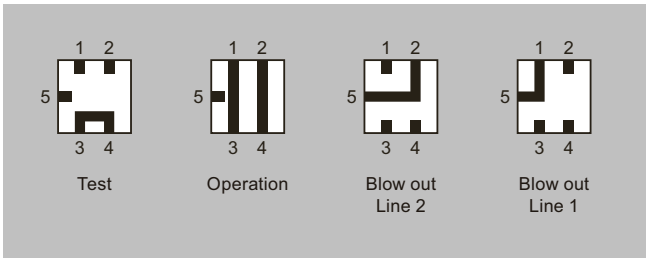
The PN 100 (1450 psi) has 2 process connections and one blow-out connection. A steel version of the multiway cock is available for non-corrosive media, and a stainless steel version for corrosive media. The enclosure is forged in one piece. The switching lever is removable.

Sealing can be improved during operation.

**Note**: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter:

## Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Checking the zero point of the pressure transmitter.




Cock settings, the symbols are on the cock

## Selection and ordering data

| PN 100 multiway cocks (1450 psi) | Article No. 7MF9004- | ● | ● | A |
|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | |
| For flanging to pressure transmitter, weight 2.5 kg (without accessory kit), without certificate | | | | |
| For water and non-corrosive liquids, gases and vapors | | 1 | P | |
| For corrosive liquids, gases and vapors | | 1 | Q | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN**<br>(Required for flanging, weight 0.2 kg)<br>4 × screws $^{7}/_{16}$-20 UNF × 1 inch according to ASME B18.2.1; chromated<br>2 × flat gaskets made of PTFE, max. permissible 80 °C (176 °F) | **L31** | **7MF9004-5CC** |
| **Accessory kit according to DIN**<br>(Required for flanging, weight 0.2 kg)<br>4 × screws M10×25 according to EN 24017; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;2 × flat gaskets made of PTFE, max. permissible 80 °C (176 °F) | | |
| • Standard design | **L11** | **7MF9004-6AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| • Version for oxygen (in connection with order code S11) | **L15** | **7MF9004-6AE** |
| **Multiway cock in oil-free and grease-free design**<br>Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F), BAM-tested lubricant, sealing socket suitable for oxygen (only for article no. 7MF9004-1Q. -Z) | **S11** | |
| **Mounting brackets**<br>Required **forwall mounting** or for fastening on rack (72 mm grid); made of electrogalvanized sheet steel, weight 0.85 kg | **M13** | **7MF9004-6AA** |
| **Certification according to NACE MR-0175**<br>Including inspection certificate 3.1 according to EN 10204 (only for version 7MF9004-1QA) | **D07** | |

[1] If accessory kit or mounting brackets are ordered together with the multiway cock, please use order code; otherwise, use the article number.

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## Accessories

***Accessory set for multiway cock PN 100***

- L31: 4 screws $^{7}/_{16}$-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

***Multiway cock in oil-free and grease-free design***

- S11 (only for corrosive liquids, gases and vapors (7MF9004-1Q.)): Max. PN 63 (914 psi) (instead of PN 100 (1450 psi)), BAM-tested lubricant, gasket suitable for oxygen

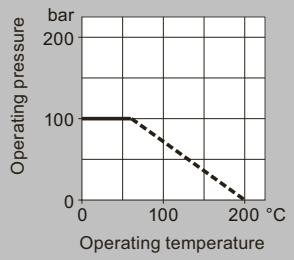
***Mounting brackets***

- M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

## Technical specifications

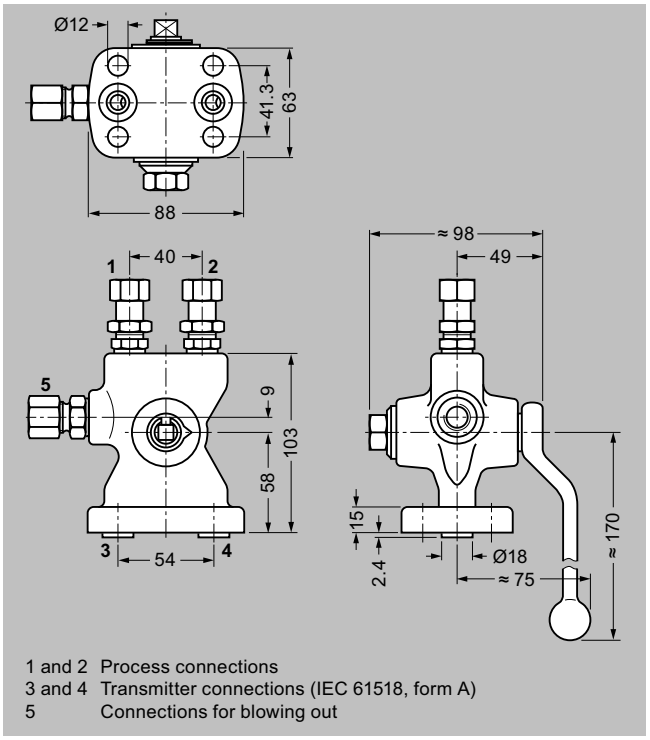
| PN 100 multiway cocks | | |
|---|---|---|
| **Measured medium** | **Water, non-corrosive liquids and gases** | **Corrosive liquids, gases and vapors** |
| Material | P250GH, mat. no.: 1.0460 | X 6 CrNiMoTi 17 12 2, mat. no. 1.4571/316Ti |
| Connections | Steel, for pipe Ø 12 mm, schedule L | Stainless steel, for pipe Ø 12 mm, schedule L |
| • Process connection | 2 bulkhead glands | |
| • Connection for blowing out | Cutting ring fitting | |
| Max. permissible working temperature | 200 °C (392 °F) | |
| Max. permissible operating overpressure | 100 bar (1450 psi) (up to max. 60 °C (140 °F)) | |
| Weight | 2.5 kg | |

## Characteristic curves

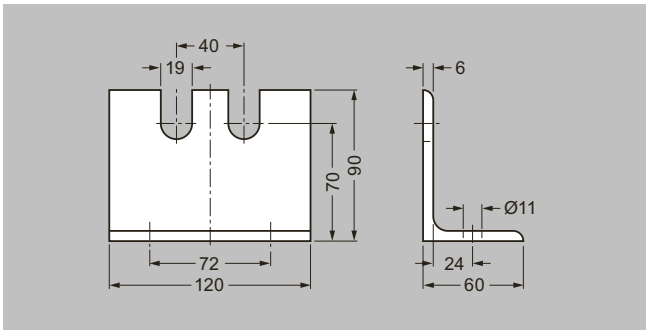



Multiway cock PN 100 (1450 psi), permissible operating pressure as a function of the permissible operating temperature

## Dimensional drawings




Multiway cock 7MF9004-1P. for flanging to pressure transmitter for differential pressure, dimensions in mm




Mounting bracket 7MF9004-6AA (M13), dimensions in mm

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## Overview



The 3-way and 5-way valve manifolds DN 5 (7MF9410-1../-3..) are used to shut off the differential pressure lines and to check the transmitter zero point.

The 5-way valve manifold also enables blowing out of differential pressure lines.

## Benefits

- Available for corrosive and non-corrosive liquids and gases
- Max. working pressure 420 bar (6092 psi), with version for oxygen max. 100 bar (1450 psi)

## Application

The 3-way and 5-way valve manifolds are available in versions for corrosive and non-corrosive liquids and gases.

Wall mounting, securing on rack and tube mounting are possible with the appropriate mounting plate.

## Design

The process connection of the 3-way and 5-way valve manifolds is a pipe union with cutting ring.

Both valve manifolds have 2 flange connections for connecting a pressure transmitter.

The 5-way valve manifold also has 2 blowout connections.

Depending on the version, the valve manifold has 3 or 5 valves, each with an internal spindle thread.

***Materials used***

| | For non-corrosive liquids and gases | | For corrosive liquids and gases | |
|---|---|---|---|---|
| **Component** | Material | Mat. no. | Material | Mat. no. |
| **Enclosure** | P250GH | 1.0460 | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti |
| **Head parts** | C 35 | 1.0501 | | |
| **Spindles** | X 12 CrMoS 17 | 1.4104 | | |
| **Cones** | X 35 CrMo 17 hardened and tempered | 1.4122 | | |
| **Valve seats** | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | | |
| **Packings** | PTFE | - | PTFE | - |

## Function

- Shutting off the differential pressure lines
- Monitoring of transmitter zero point
- The 5-way valve manifold also enables blowing out of differential pressure lines.

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## Selection and ordering data

| DN 5 3-way valve manifold | Article No. 7MF9410- | | | | | | | | | | | ● | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | |
| For flanging to pressure transmitter for differential pressure, process connection: Pipe union with cutting ring, max. operating overpressure 420 bar (6092 psi), weight 2.9 kg (order accessory kit and mounting plate using order code) | | | | | | | | | | | | | | |
| • For non-corrosive liquids and gases | | | | | | | | | | | | 1 | E | |
| • For corrosive liquids and gases | | | | | | | | | | | | 1 | F | |
| **DN 5 5-way valve manifold** | | | | | | | | | | | | | | |
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| For flanging to pressure transmitter for differential pressure, process connection: Pipe union with cutting ring, max. operating overpressure 420 bar (6092 psi), weight 4.4 kg (order accessory kit and mounting plate using order code) | | | | | | | | | | | | | | |
| • For non-corrosive liquids and gases | | | | | | | | | | | | 3 | E | |
| • For corrosive liquids and gases | | | | | | | | | | | | 3 | F | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **B31** | **7MF9010-5CC** |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B34** | **7MF9410-5CA** |
| **Accessory kit according to DIN[2]** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws M10×55 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | | |
| • Standard design | **B11** | **7MF9010-6AD** |
| • Version for oxygen | **B15** | **7MF9010-6AE** |
| 4 × screws M10×55 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B16** | **7MF9010-6CC** |

| Options[1] | Order code | Article No. |
|---|---|---|
| **Mounting plate** | | |
| For valve manifold, made of electrogalvanized sheet steel | | |
| For **wall mounting** or for fastening on rack (72 mm grid), weight 0.5 kg<br>Scope of delivery:<br>1 × mounting plate with bolts for mounting on valve manifold | **M11** | **7MF9006-6EA** |
| For **pipe mounting**, weight 0.7 kg<br>Scope of delivery:<br>1 × mounting plate M11, 2 × pipe collars with nuts and washers (for pipes with max. Ø 60.3 mm) | **M12** | **7MF9006-6GA** |
| **Valve manifold 100 bar** | | |
| Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) | | |
| For 7MF9410-1F. | **S13** | |
| For 7MF9410-3F. | **S14** | |
| **Certification according to NACE MR-0175** | **D07** | |
| Including inspection certificate 3.1 according to EN 10204 (only for version 7MF9410-1FA and -3FA) | | |

[1] If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.
[2] Flange connections according to DIN 9213 only permissible up to PN 160 (2321 psi)!

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## Accessories

***Accessory set for 3-way and 5-way valve manifold DN 5 for flanging***

- B31: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 flat gaskets
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B15 (suitable for oxygen): 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (176 °F)

**Note**: M10 screws only permissible up to PN 160 (2320 psi)!

***Mounting plate***

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)

  Scope of delivery:

  - 1 mounting plate 7MF9006-6EA with bolts for mounting on valve manifold

- M12: For pipe mounting

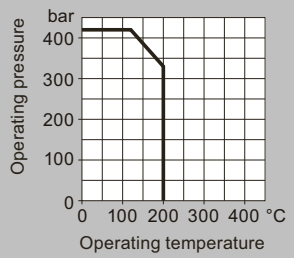
  scope of delivery:

  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

***Valve manifold 100 bar, suitable for oxygen***

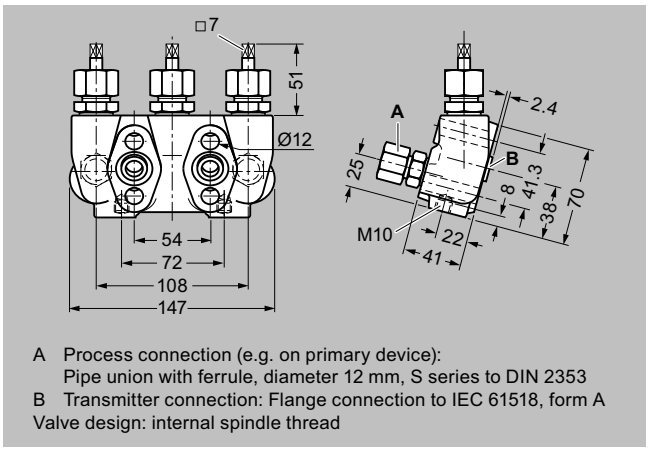
S12: Only in combination with versions for corrosive liquids and gases

## Characteristic curves



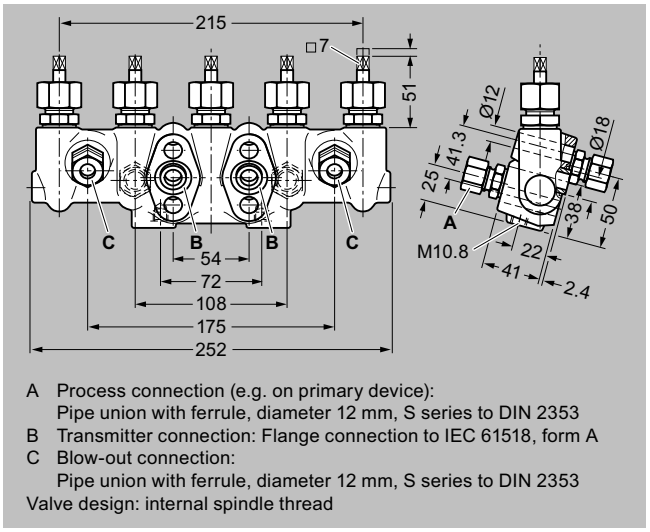

Permissible operating overpressure depends on the permissible operating temperature

## Dimensional drawings



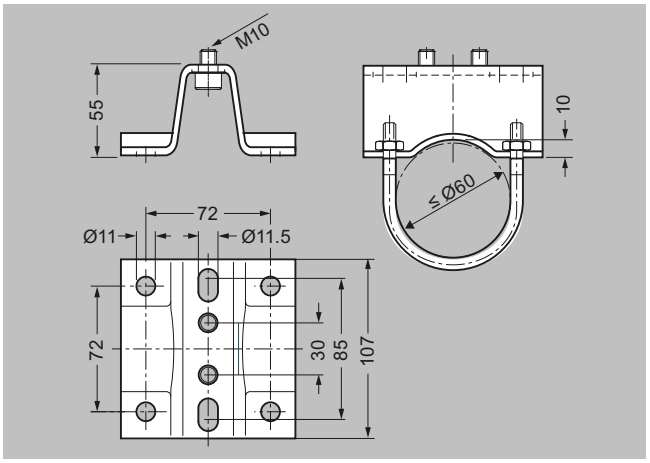

A Process connection (e.g. on primary device):
Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to IEC 61518, form A
Valve design: internal spindle thread

3-way valve manifold DN 5 (7MF9410-1..), dimensions in mm




A Process connection (e.g. on primary device):
Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to IEC 61518, form A
C Blow-out connection:
Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
Valve design: internal spindle thread

5-way valve manifold DN 5 (7MF9410-3..), dimensions in mm

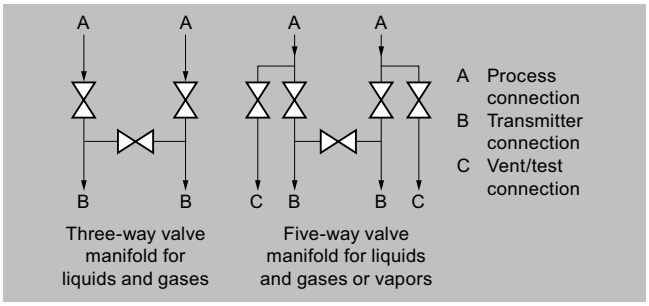



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

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## Circuit diagrams




3-way and 5-way valve manifolds, schematic diagram

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## Overview



The 3-way valve manifold DN 8 (7MF9416-1../-2..) is for pressure transmitters for differential pressure. It is used to shut off the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

## Benefits

- For corrosive and non-corrosive liquids and gases
- The maximum working pressure is 420 bar (6092 psi).

## Application

The 3-way valve manifold is available in versions for corrosive and non-corrosive liquids and gases.

Wall mounting, securing on rack and tube mounting are possible with the appropriate mounting plate.

## Design

In the version for non-corrosive measured mediums, you can choose between a pipe union with cutting ring and welding pins for the process connection.

The version for corrosive measuring media always has a pipe union with cutting ring.

The two versions are optionally available with a test connection M20x1.5.

The valves have an internal spindle thread.

***Materials used***

| | For non-corrosive liquids and gases | | For corrosive liquids and gases | |
|---|---|---|---|---|
| **Component** | **Material** | **Mat. no.** | **Material** | **Mat. no.** |
| Enclosure | P250GH | 1.0460 | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti |
| Head parts | C 35 | 1.0501 | | |
| Spindles | X 12 CrMoS 17 | 1.4104 | | |
| Cones | X 35 CrMo 17 hardened and tempered | 1.4122 | | |
| Valve seats | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | | |
| Packings | PTFE | - | PTFE | - |

## Function

The 3-way valve manifold DN 8 fulfills two functions as standard:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

All versions are also available with test connection to which the test device can be connected to check the characteristic of the transmitter.

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## Selection and ordering data

| DN 8 3-way valve manifold | Article No. 7MF9416- | | | | | | | | | | ● | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | |
| For flanging to the pressure transmitter for differential pressure, max. operating overpressure 420 bar (6092 psi), (order accessory kit and mounting plate using order code), without certificate | | | | | | | | | | | | | |
| For non-corrosive liquids and gases, process connection: Pipe union with cutting ring Æ 12 mm | | | | | | | | | | | | | |
| • Without test connection | | | | | | | | | | | 1 | B | |
| • With test connection | | | | | | | | | | | 1 | C | |
| For non-corrosive liquids and gases, process connection: Welding pins Ø 14 × 2.5 | | | | | | | | | | | | | |
| • Without test connection | | | | | | | | | | | 2 | C | |
| • With test connection | | | | | | | | | | | 2 | D | |
| For corrosive liquids and gases, process connection: Pipe union with cutting ring Æ 12 mm | | | | | | | | | | | | | |
| • Without test connection | | | | | | | | | | | 1 | D | |
| • With test connection | | | | | | | | | | | 1 | E | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **B31** | **7MF9010-5CC** |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B34** | **7MF9410-5CA** |
| **Accessory kit according to DIN[2]** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws M10×55 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **B11** | **7MF9010-6AD** |
| 4 × screws M10×55 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B16** | **7MF9010-6CC** |
| **Mounting plate** | | |
| For valve manifold, made of electrogalvanized sheet steel | | |
| Forwall mounting or for fastening on rack (72 mm grid), weight 0.5 kg<br>Scope of delivery:<br>1 × mounting plate with bolts for mounting on valve manifold | **M11** | **7MF9006-6EA** |
| For pipe mounting, weight 0.7 kg<br>Scope of delivery:<br>1 × mounting plate M11, 2 × pipe collars with nuts and washers (for pipes with max. Ø 60.3 mm) | **M12** | **7MF9006-6GA** |
| **Certification according to NACE MR-0175** | **D07** | |
| Including inspection certificate 3.1 according to EN 10204 (only for version 7MF9416-1DA and -1EA) | | |

[1] If accessory kit or mounting brackets are ordered together with the valve manifold, please use order code; otherwise, use the article number.
[2] Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

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## Accessories

***Accessory set for 3-way valve manifold DN 8 for flanging***

- B31: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 flat gaskets
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 according to EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

**Note**: M10 screws only permissible up to PN 160 (2320 psi)!

***Mounting plate***

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)

  Scope of delivery:

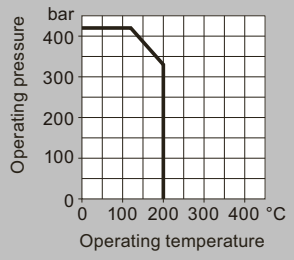
  - 1 mounting plate with bolts for mounting on valve manifold

- M12: For pipe mounting

  scope of delivery:

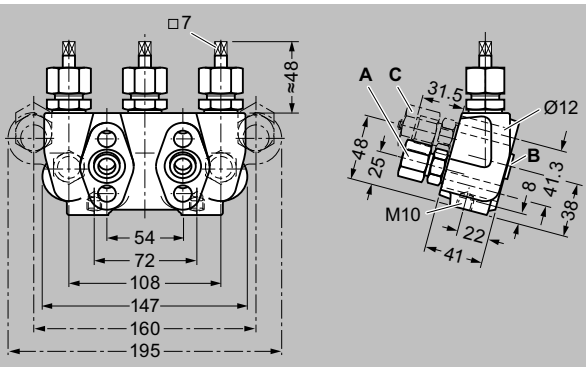
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

## Characteristic curves



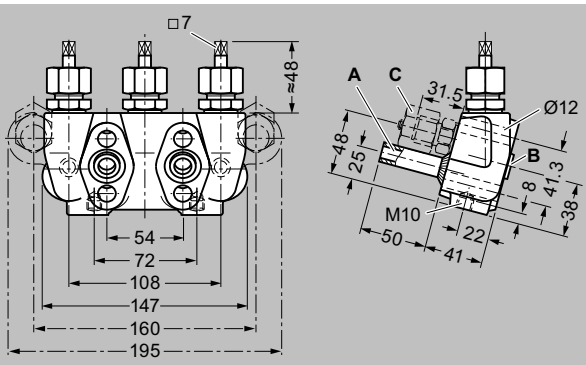

3-way valve manifold DN 8, permissible operating overpressure depends on the permitted operating temperature

## Dimensional drawings




A Process connection (e.g. on primary device):
Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to IEC 61518, form A
C Test connection: M20 x 1.5
Valve design: internal spindle thread

3-way valve manifold DN 8 (7MF9416-1..) with pipe union, dimensions in mm



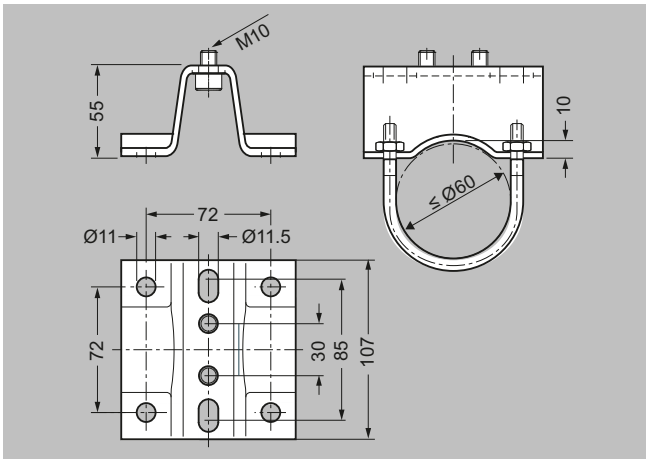

A Process connection (e.g. on primary device):
Welding pin, diameter 14 x 2.5
B Transmitter connection: Flange connection to IEC 61518, form A
C Test connection: M20 x 1.5
Valve design: internal spindle thread

3-way valve manifold DN 8 (7MF9416-2..) with welding pins, dimensions in mm

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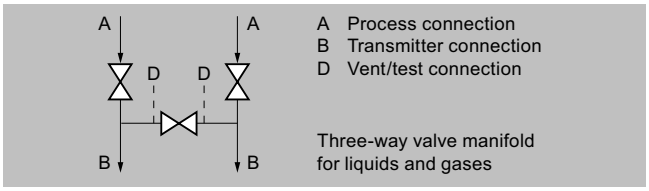


## Dimensional drawings (continued)




Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

## Circuit diagrams




3-way valve manifold DN 8, schematic diagram

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## Overview



The valve manifold combination DN 5/DN 8 (7MF9416-6..) is for pressure transmitters for differential pressure.

The combination is used to shut off and blow out the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

## Benefits

Max. operating overpressure 420 bar (6092 psi)

## Application

The valve manifold combination DN 5/DN 8 is designed for vapors.

## Design

The valve manifold combination DN 5/DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as a flange connection, the blowout connection as a pipe union with cutting ring.

The block valves have an internal spindle thread, the blowout valves have an external spindle thread.

The optional test connections are M20x1.5.

***Materials used***

| | Valve manifold DN 5 | | Blowout valves DN 8 | |
|---|---|---|---|---|
| Component | Material | Mat. No. | Material | Mat. No. |
| Enclosure | P250GH | 1.0460 | 16 Mo 3 | 1.5415 |
| Head parts | C 35 | 1.0501 | 21 CrMo V 57 | 1.7709 |
| Spindles | X 12 CrMoS 17 | 1.4104 | X 20 Cr 13 | 1.4021 |
| Cones | X 35 CrMo 17 | 1.4122 | X 35 CrMo 17 hardened and tempered | 1.4122 |
| Valve seats | X 6 CrNiMoTi | 1.4571/316Ti | X 20 Cr 13 | 1.4021 |
| Packings | PTFE | - | Pure graphite | - |
| Welding pins | - | - | 16 Mo 3 | 1.5415 |

## Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Monitoring of pressure transmitter zero point

A version with test connection to which a test device to check the characteristic of the pressure transmitter can be connected can be ordered optionally.

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## Selection and ordering data

| DN 5/DN 8 valve manifold combination for vapors | Article No. 7MF9416- | | | | | | | | | 6 | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | |
| For flanging to the pressure transmitter for differential pressure, max. operating overpressure 420 bar (6092 psi), available in stainless steel on request (order accessory kit using order code), without certificate | | | | | | | | | | | | |
| • Without test connection | | | | | | | | | | | C | |
| • With test connection M20 × 1.5 | | | | | | | | | | | D | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B34** | **7MF9410-5CA** |

| Options[1] | Order code | Article No. |
|---|---|---|
| **Accessory kit according to DIN[2]** | | |
| (Required for flanging, weight 0.2 kg) | | |
| 4 × screws M10×55 according to DIN EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **B16** | **7MF9010-6CC** |

1) If accessory kit is ordered together with the valve manifold combination, please use order code; otherwise, use the article number.
2) Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

## Accessories

***Accessory set for valve manifold combination DN 5/DN 8 for flanging***

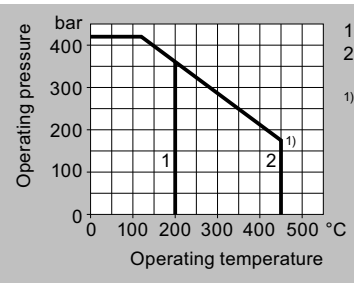
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 according to EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

**Note**: M10 screws only permissible up to PN 160 (2321 psi)!

## Characteristic curves




1 Valve manifold
2 Blow-out connection

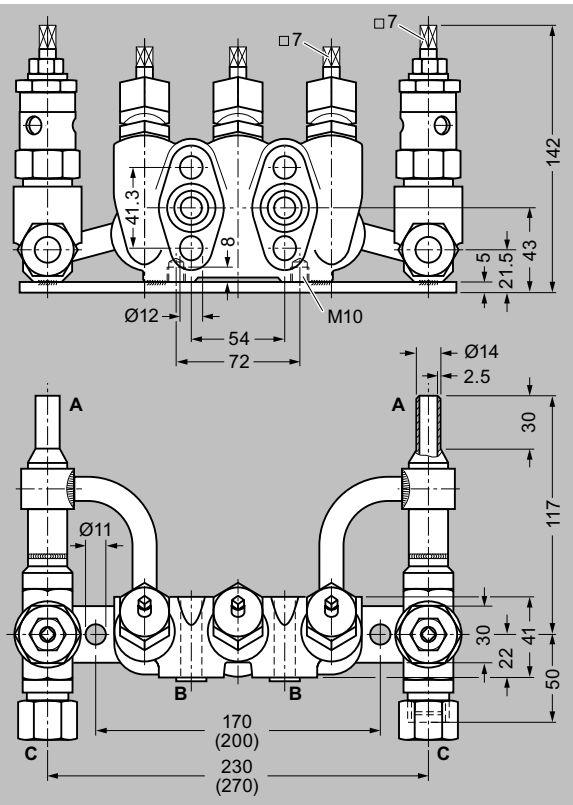
1) According to DIN 19210 the design can be such that the temperatures for the differential pressure line can be set approx. 100 °C (212 °F) lower than the media temperature.

Permissible operating overpressure depends on the permissible operating temperature

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## Dimensional drawings

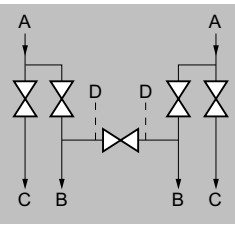



A Process connection (e.g. on primary device): Welding pin
B Transmitter connection: Flange connection to IEC 61518, form A
C Blow-out connection: Pipe union with ferrule, diameter 14 mm, S series to DIN 2353

Valve design:
- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 5/DN 8 (7MF9416-6C.), dimensions in mm (deviating dimensions for 7MF9416-6D. in brackets)

## Circuit diagrams




A Process connection
B Transmitter connection
C Blow-out connection
D Test connection

Valve manifold combination for vapors

DN 5/DN 8 valve manifold combination, connections

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## Shut-off valves for differential pressure / DN 8 valve manifold combination

### Overview



The valve manifold combination DN 8 (7MF9416-4..) is for pressure transmitters for differential pressure.

They are used to shut off and blow out the differential pressure lines and to check the transmitter zero point.

In the versions with test connection, a test device can be connected to check the characteristic of the pressure transmitter.

### Benefits

Max. operating overpressure 420 bar (6092 psi)

### Application

The valve manifold combination DN 8 is designed for vapors.

### Design

The valve manifold combination DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as a flange connection, the blowout connection as a pipe union with cutting ring.

The block valves have an internal spindle thread, the blowout valves have an external spindle thread.

The optional test connection is M20x1.5.

The valve manifold combination DN 8 is supplied with a mounting plate.

***Materials used***

| | Valve manifold | | Blowout valves | |
|---|---|---|---|---|
| Component | Material | Mat. No. | Material | Mat. No. |
| Enclosure | P250GH | 1.0460 | 16 Mo 3 | 1.5415 |
| Head parts | C 35 | 1.0501 | 21 CrMo V 57 | 1.7709 |
| Spindles | X 12 CrMoS 17 | 1.4104 | X 20 Cr 13 | 1.4021 |
| Cones | X 35 CrMo 17 | 1.4122 | X 35 CrMo 17 hardened and tempered | 1.4122 |
| Valve seats | X 6 CrNiMoTi | 1.4571/316Ti | X 20 Cr 13 | 1.4021 |
| Packings | PTFE | - | Pure graphite | - |
| Welding pins | - | - | 16 Mo 3 | 1.5415 |

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## Function

- Shutting off the differential pressure lines
- Blowing out differential pressure lines
- Monitoring of pressure transmitter zero point

A version with test connection to which a test device to check the characteristic of the pressure transmitter can be connected can be ordered optionally.

## Selection and ordering data

| DN 8 valve manifold combination for vapors | Article No. 7MF9416- | ● | ● | A |
|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | |
| For flanging to the pressure transmitter for differential pressure, with mounting plate, max. operating overpressure 420 bar (6092 psi), available in stainless steel on request (order accessory kit using order code), without certificate | | | | |
| • Without test connection | | 4 | C | |
| • With test connection M20 × 1.5 | | 4 | D | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** (Required for flanging, weight 0.2 kg) | | |
| 4 × screws $^{7}/_{16}$-20 UNF × $2^{1}/_{8}$ inches according to ASME B18.2.1; chromated steel<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar, 120 °C (248 °F) | **B34** | **7MF9410-5CA** |

| Options[1] | Order code | Article No. |
|---|---|---|
| **Accessory kit according to DIN[2]** (Required for flanging, weight 0.2 kg) | | |
| 4 × screws M10×55 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar, 120 °C (248 °F) | **B16** | **7MF9010-6CC** |

1) If accessory kit is ordered together with the valve manifold combination, please use order code; otherwise, use the article number.
2) Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

## Accessories

***Accessory set for valve manifold combination DN 8 for flanging***

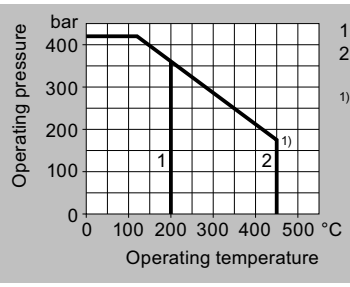
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inches to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 according to EN 24 014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 according to DIN 125

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

**Note:** M10 screws only permissible up to PN 160 (2321 psi)!

## Characteristic curves




1 Valve manifold
2 Blow-out connection

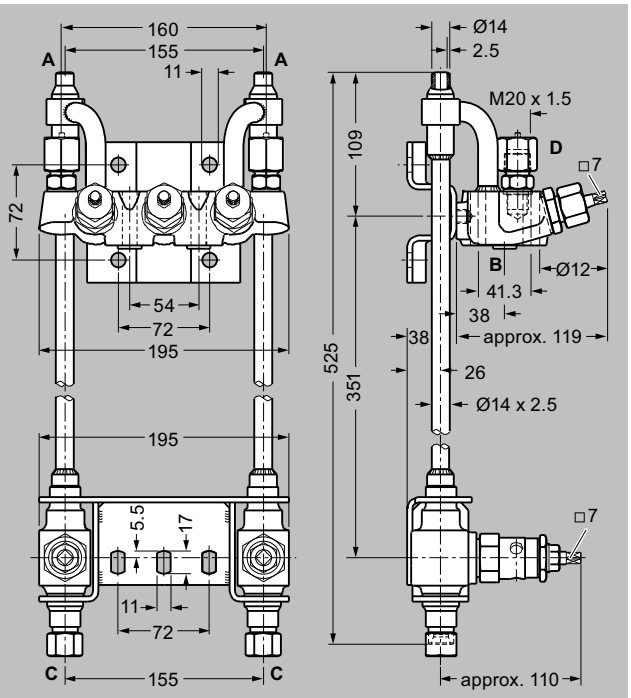
1) According to DIN 19210 the design can be such that the temperatures for the differential pressure line can be set approx. 100 °C (212 °F) lower than the media temperature.

Permissible operating overpressure depends on the permissible operating temperature

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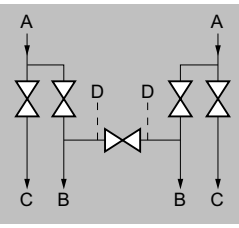
## Dimensional drawings




A Process connection (e.g. on primary device): Welding pin
B Transmitter connection: Flange connection to IEC 61518, form A
C Blow-out connection:
Pipe union with ferrule, diameter 14 mm, S series to DIN 2353
D Test connection (only with Article No. 7MF9416-4D.): M20 x 1.5
Valve design:
- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 8 (7MF9416-4..), dimensions in mm

## Circuit diagrams




A Process connection
B Transmitter connection
C Blow-out connection
D Test connection

Valve manifold combination for vapors

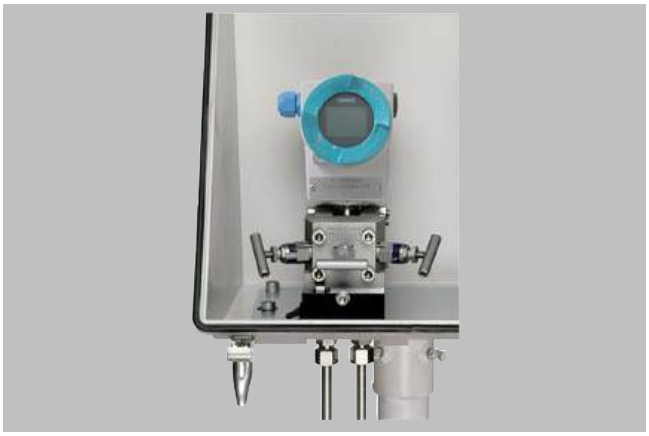
DN 8 valve manifold combination, connections

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# Shut-off valves for differential pressure / 2-, 3- and 5-spindle valve manifold for protective casing

## Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds (7MF9412-1..) are used to shut off the differential pressure lines and to check the pressure transmitter zero point.

The 2-spindle and the 5-spindle valve manifolds also enable venting on the transmitter side and checking of the pressure transmitter characteristic.

These valve manifolds are designed for installation in protective boxes. However, using a mounting bracket, they can also be used for wall, frame or pipe mounting.

## Application

The DN 5 valve manifolds are designed for liquids and gases and for installation in protective boxes.

A version for oxygen is also available on request.

## Design

All versions of the spindle valve manifolds have a process connection ½-14 NPT.

The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have a vent and test connection ¼-18 NPT in addition.

The valves have an external spindle thread.

Materials used:

| Component | Material | Mat. no. |
|---|---|---|
| Enclosure | X 2 CrNiMo 17 13 2 | 1.4404/316L |
| Cones | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti |
| Spindles | X 2 CrNiMo 18 10 | 1.4404/316L |
| Head parts | X 5 CrNiMo 18 10 | 1.4401/316 |
| Packings | PTFE | - |

## Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

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## Selection and ordering data

| Valve manifolds DN 5 for installing in protective boxes | Article No. 7MF9412- | | | | | | | | | | | ● | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | |
| For liquids and gases, for flanging to pressure transmitter for absolute and differential pressure; material: Stainless steel, mat. no.: 1.4404/316L; max. operating overpressure 420 bar (6092 psi) (Order accessory kit using order code), without certificate | | | | | | | | | | | | | | |
| • 2-spindle valve manifold with rotatable coupling sleeve G½ | | | | | | | | | | | | 1 | B | |
| • 2-spindle valve manifold with flange connection | | | | | | | | | | | | 1 | C | |
| • 3-spindle valve manifold | | | | | | | | | | | | 1 | D | |
| • 5-spindle valve manifold | | | | | | | | | | | | 1 | E | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| (Connection valve manifold – pressure transmitter) | | |
| ***For valve manifold 7MF9412-1C.*** | | |
| 2 × screws $^{7}/_{16}$-20 UNF × 2 inches according to ASME B18.2.1; chromated steel, 1 × O-ring according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar, (6092 psi), 120 °C (248 °F) | **F32** | **7MF9412-6CA** |
| 2 × screws $^{7}/_{16}$-20 UNF × 2 inches according to ASME B18.2.1; chromated steel, 1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2] | **F35** | **7MF9412-6DA** |
| ***For valve manifold 7MF9412-1D. and -1E.*** | | |
| 4 × screws $^{7}/_{16}$-20 UNF × 2 inches according to ASME B18.2.1; chromated steel, 2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)[2] | **F34** | **7MF9412-6GA** |
| 4 × screws $^{7}/_{16}$-20 UNF × 2 inches according to ASME B18.2.1; chromated steel, 2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2] | **F36** | **7MF9412-6HA** |
| **Accessory kit according to DIN[2]** | | |
| (Connection valve manifold – pressure transmitter) | | |
| ***For valve manifold 7MF9412-1C.*** | | |
| 2 × screws M10×50 according to DIN EN 24014; chromated steel<br>2 × washers Ø 10.5 mm according to DIN 125;<br>1 × O-ring according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **F12** | **7MF9412-6AA** |
| 2 × screws M10×50 according to DIN EN 24014; chromated steel<br>2 × washers Ø 10.5 mm according to DIN 125;<br>1 × flat sealing made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **F15** | **7MF9412-6BA** |
| ***For valve manifold 7MF9412-1D. and -1E.*** | | |
| 4 × screws M10×50 according to DIN EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × O-rings according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **F14** | **7MF9412-6EA** |
| 4 × screws M10×50 according to DIN EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **F16** | **7MF9412-6FA** |
| **Mounting bracket** | | |
| Required for **wall mounting** for fastening to rack, with fixing screws for mounting on valve manifold | | |
| • For valve manifold 7MF9412-1B. and -1C. | **M14** | **7MF9006-6LA** |
| • For valve manifold 7MF9412-1D. | **M17** | **7MF9006-6NA** |
| • For valve manifold 7MF9412-1E. | **M18** | **7MF9006-6PA** |
| **Mounting bracket** | | |
| 2 units, for fastening the mounting bracket to the pipe | **M16** | **7MF9006-6KA** |
| **Valve manifold 100 bar** | | |
| Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) | | |
| • For valve manifold 7MF9412-1B. and -1C. | **S12** | |
| • For valve manifold 7MF9412-1D. | **S13** | |
| • For valve manifold 7MF9412-1E. | **S14** | |
| Suitable for hydrogen applications in ventilated environment | **S22** | |
| **Certification according to NACE MR-0175** | **D07** | |
| Including inspection certificate 3.1 according to EN 10204 | | |

[1] If accessory kit or mounting brackets are ordered together with the valve manifolds, please use order code; otherwise, use the article number.
[2] Flange connections with screws M10 only permissible up to PN 160 (2321 psi)!

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## Accessories

***Accessory set for 2, 3 and 5-spindle valve manifolds (connection: valve manifold-pressure transmitter)***

***For 2-spindle valve manifold DN 5 with flange connection***

- F32: 2 screws $^{7}/_{16}$-20 UNF x 2 inches to ASME B 18.2.1, 1 O-ring (FPM 90)
- F35: 2 screws $^{7}/_{16}$-20 UNF x 2 inches to ASME B 18.2.1, 1 flat gasket
- F12: 2 screws M10x50 according to EN 24 014, 2 washers, 1 O-ring (FPM90)
- F15: 2 screws M10x50 according to EN 24 014, 2 washers, 1 flat gasket

***For 3-spindle and 5-spindle valve manifold DN 5***

- F34: 4 screws $^{7}/_{16}$-20 UNF x 2 inches to ASME B 18.2.1, 2 O-rings (FPM90)
- F36: 4 screws $^{7}/_{16}$-20 UNF x 2 inches to ASME B 18.2.1, 2 flat gaskets
- F14: 4 screws M10x50 according to EN 24 014, 4 washers, 2 O-rings (FPM 90)
- F16: 4 screws M10x50 according to EN 24 014, 4 washers, 2 flat-gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

**Note:** Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

***Mounting bracket for wall mounting or for securing to mounting rack***

With bolts for mounting on valve manifold

- M14: For 2-spindle valve manifold DN 5
- M17: For 3-spindle valve manifold DN 5
- M18: For 5-spindle valve manifold DN 5

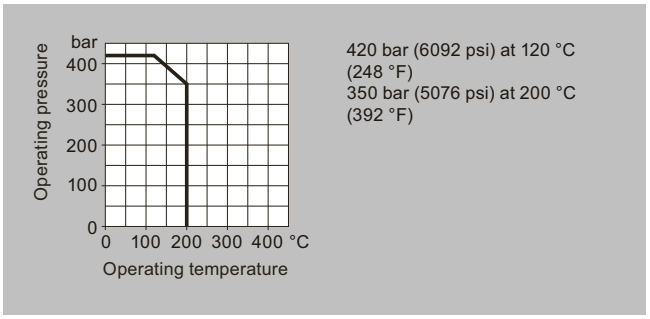
***Mounting clip (2 units)***

- M16: For securing the mounting brackets M14, M17 and M18 to pipe

***Valve manifold 100 bar, suitable for oxygen***

- S12: For 2-spindle valve manifold DN 5
- S13: For 3-spindle valve manifold DN 5
- S14: For 5-spindle valve manifold DN 5

## Characteristic curves

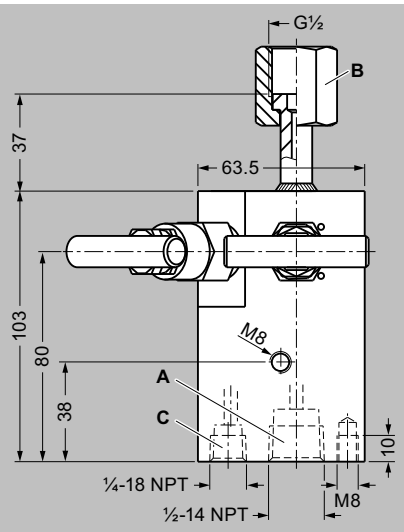



Permissible operating overpressure depends on the permissible operating temperature

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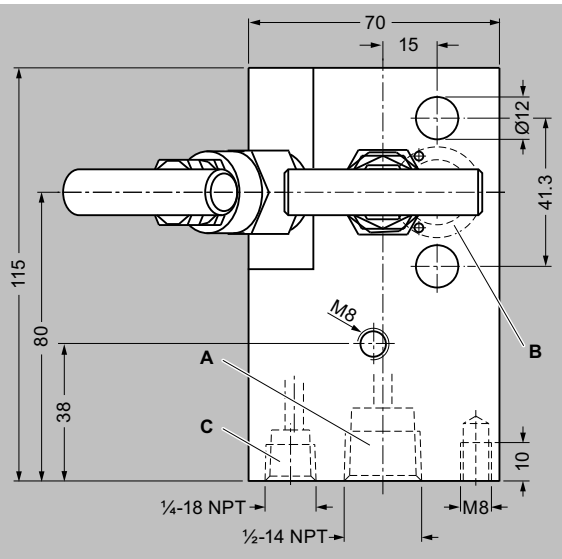


## Dimensional drawings




A Process connection: ½-14 NPT
B Transmitter connection: Nipple to DIN 16284, G½, SW 27
C Vent / test connection: ¼-18 NPT

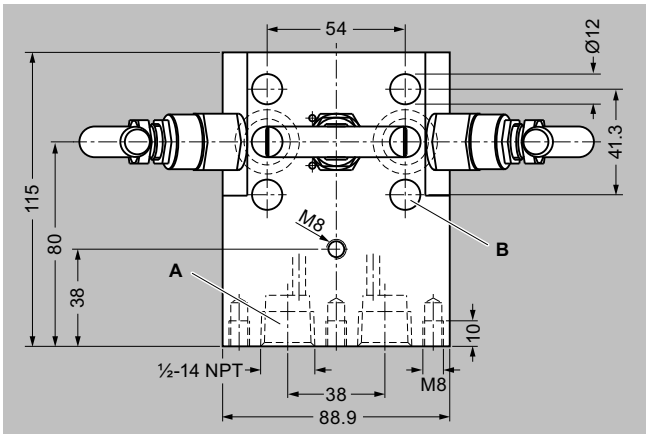
2-spindle valve manifold DN 5 (7MF9412-1B..) with rotatable sleeve, dimensions in mm




A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to IEC 61518, form A
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

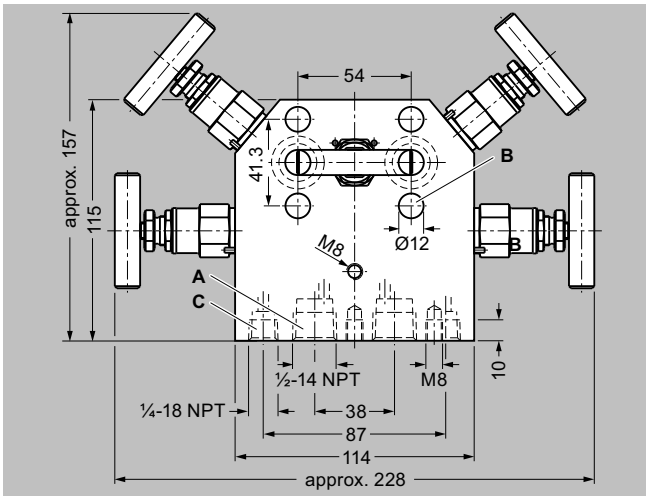
2-spindle valve manifold DN 5 (7MF9412-1C..), dimensions in mm

## Dimensional drawings (continued)




A Process connection: ½-14 NPT
B Transmitter connection: Flange connection IEC 61518, form A
Valve design: external spindle thread

3-spindle valve manifold DN 5 (7MF9412-1D..), dimensions in mm



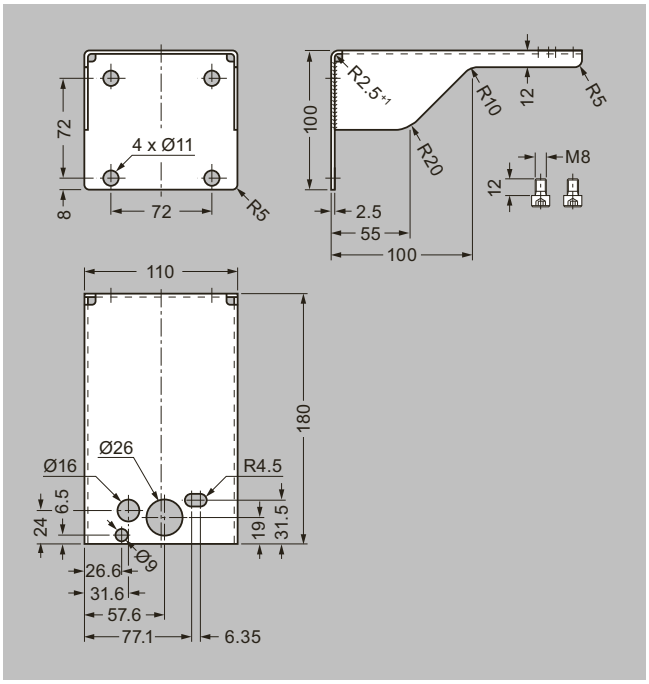

A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to IEC 61518, form A
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

5-spindle valve manifold DN 5 (7MF9412-1E..), dimensions in mm

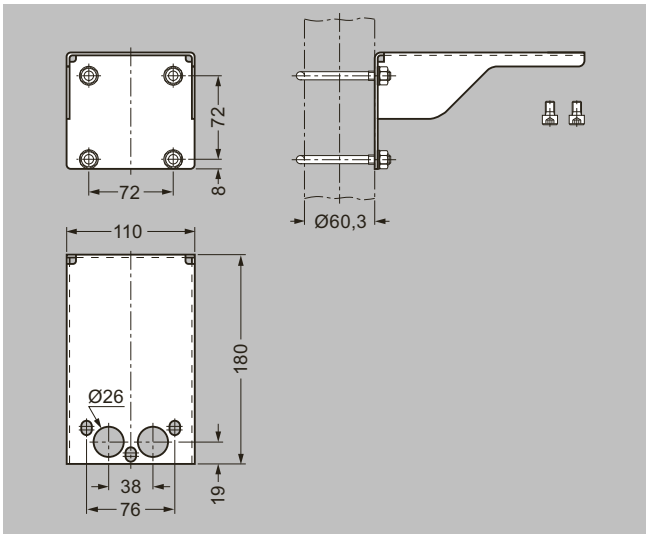
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## Dimensional drawings (continued)

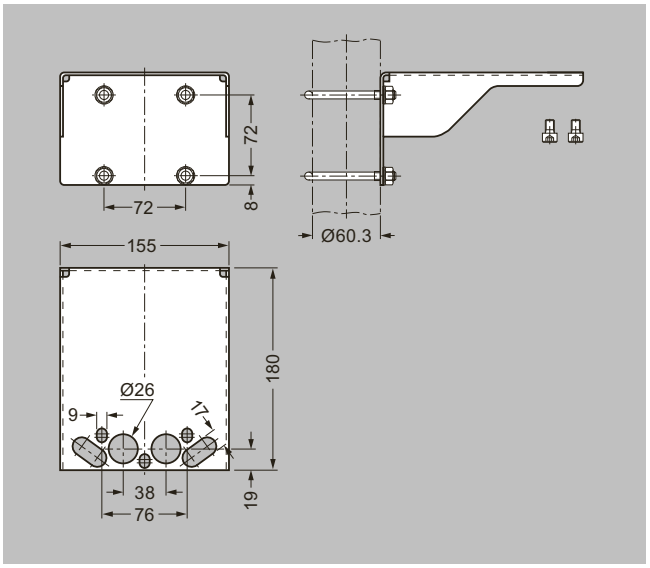



Mounting bracket (7MF9006-6LA)/(M14) for 2-spindle valve manifold, dimensions in mm



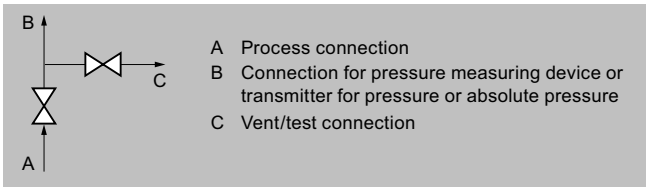

Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifold, dimensions in mm

## Dimensional drawings (continued)

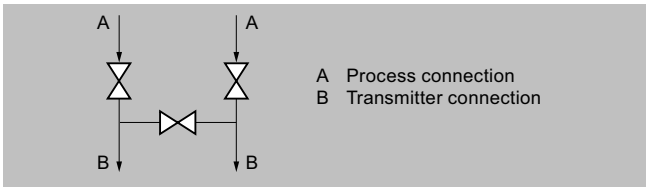



Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifold, dimensions in mm

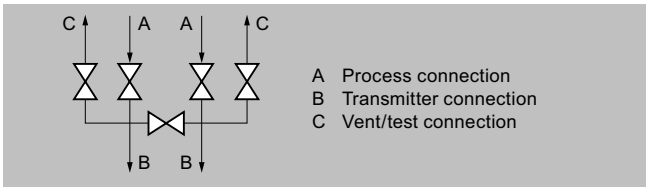
## Circuit diagrams




2-spindle valve manifold DN 5 (with rotating sleeve G½ or flange connection), connections




3-spindle valve manifold DN 5, connections



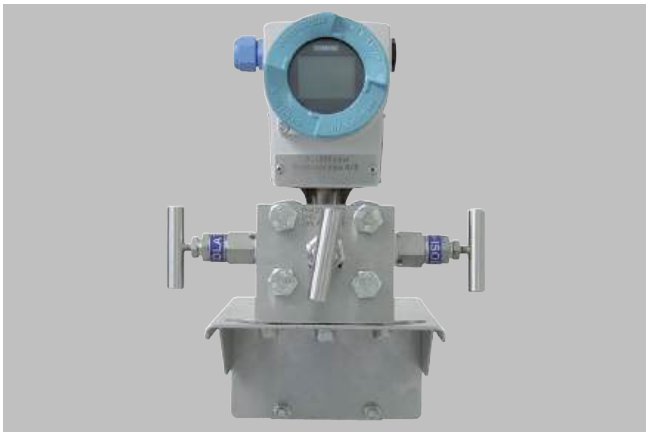

5-spindle valve manifold DN 5, connections

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# Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

## Overview



These 3-spindle and 5-spindle valve manifolds 7MF9413-1.. were developed specifically for vertical differential pressure lines.

The valve manifolds are used to shut off the differential pressure lines and to check the transmitter zero point.

The 5-spindle valve manifold also enables venting on the transmitter side and checking of the pressure transmitter characteristic.

## Benefits

- For vertical differential pressure lines
- Max. operating overpressure 420 bar (6092 psi)

## Application

The 3-spindle and 5-spindle valve manifolds for vertical differential pressure lines are for liquids and gases. The valve manifolds are flanged to the pressure transmitter.

## Design

All versions of the spindle valve manifolds have a process connection ½-14 NPT.

The connection for the pressure transmitter is always designed as a flange connection according to IEC 61518/EN 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have a vent and test connection ¼-18 NPT in addition.

Materials used:

| Component | Material | Mat. no. |
|---|---|---|
| Enclosure | X 2 CrNiMo 17 13 2 | 1.4404/316L |
| Cones | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti |
| Spindles | X 2 CrNiMo 18 10 | 1.4404/316L |
| Head parts | X 5 CrNiMo 18 10 | 1.4401/316 |
| Packings | PTFE | - |

## Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Monitoring of pressure transmitter zero point

Additional functions of the 2-spindle or 5-spindle valve manifolds via the venting and test connection:

- Venting on transmitter side
- Monitoring of the pressure transmitter characteristic

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## Selection and ordering data

| Valve manifolds for vertically arranged differential pressure lines | Article No. 7MF9413- | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | | | | | |
| For liquids and gases, for flanging to pressure transmitter for absolute and differential pressure; material: Stainless steel, mat. no.: 1.4404/316L; max. operating overpressure 420 bar (6092 psi) (order accessory kit using order code), without certificate | | | | | | | | | | | | | | | |
| • 3-spindle valve manifold | | | | | | | | | | | | 1 | D | | |
| • 5-spindle valve manifold | | | | | | | | | | | | 1 | E | | |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| (Connection valve manifold – pressure transmitter) | | |
| 4 × screws $^{7}/_{16}$-20 UNF × 1¾ inches according to ASME B18.2.1; chromated steel, 2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **K36** | **7MF9411-5DB** |
| **Accessory kit according to DIN[2]** | | |
| (Connection valve manifold – pressure transmitter) | | |
| 4 × screws M10×45 according to EN 24014; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125;<br>2 × flat sealings made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); flange connection with screws M10 only permissible up to PN 160 (2321 psi). | **K16** | **7MF9411-6BB** |
| **Mounting bracket** | | |
| Required for **wall mounting** for fastening to rack, with fixing screws for mounting on valve manifold | | |
| • For valve manifold 7MF9413-1D. | **M17** | **7MF9006-6NA** |

| Options[1] | Order code | Article No. |
|---|---|---|
| • For valve manifold 7MF9413-1E. | **M18** | **7MF9006-6PA** |
| Required for **mounting on 2" standpipe**, with fixing screws for mounting on valve manifold | | |
| • For valve manifold 7MF9413-1D. | **M19** | **7MF9006-6QA** |
| **Mounting bracket** | | |
| 2 units, for fastening the mounting bracket to the pipe | **M16** | **7MF9006-6KA** |
| **Valve manifold 100 bar (1450 psi)** | | |
| Oil-free and grease-free cleaned version for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F) | | |
| • For valve manifold 7MF9413-1D. | **S13** | |
| • For valve manifold 7MF9413-1E. | **S14** | |
| Suitable for hydrogen applications in ventilated environment | **S22** | |
| **Certification according to NACE MR-0175** | **D07** | |
| Including inspection certificate 3.1 according to EN 10204 | | |

1) If accessory kit or mounting brackets are ordered together with the multi-way cock, please use order code; otherwise, use the article number.
2) Flange connections according to DIN 19213 only permissible up to PN 160 (2321 psi).

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## Shut-off valves for differential pressure / 3- and 5-spindle valve manifold for vertical differential pressure lines

### Accessories

***Accessory set (connection between valve manifold and pressure transmitter)***

- K36: 4 screws $^{7}/_{16}$-20 UNF x 1¾ inches to ASME B 18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 according to EN 24 014, 4 washers, 2 flat gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

**Note**: Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

***Mounting bracket for wall mounting or for securing to mounting rack***

With bolts for mounting on valve manifold

- M17: For 3-spindle valve manifold
- M18: For 5-spindle valve manifold

***Mounting bracket for mounting on 2" standpipe***

With bolts for mounting on valve manifold

- M19: For 3-spindle valve manifold

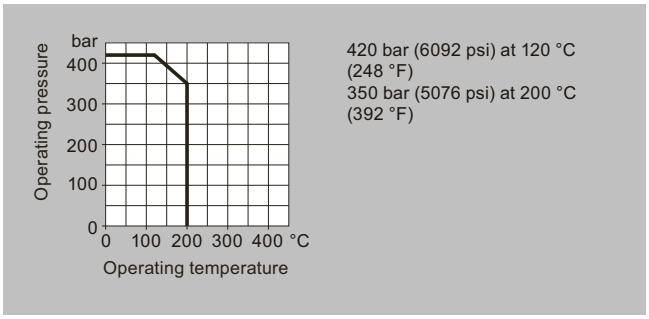
***Mounting clip (2 units)***

For securing the mounting brackets M17, M18 and M19 to pipe

***Valve manifold 100 bar, suitable for oxygen***

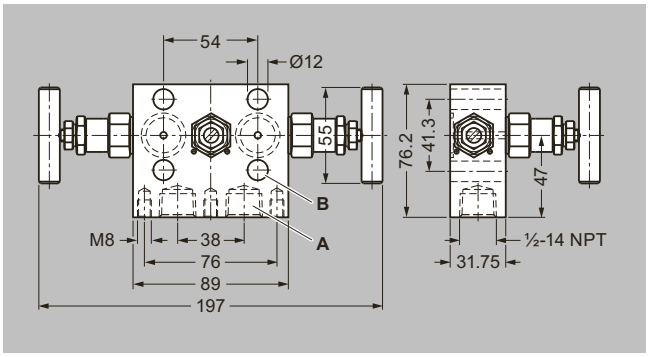
- For 3-spindle valve manifold
- For 5-spindle valve manifold

### Characteristic curves

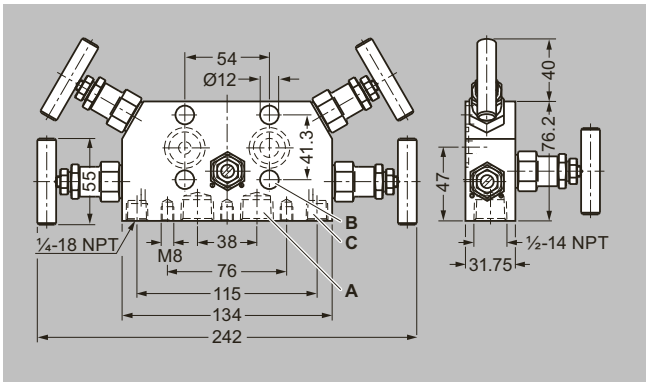



Permissible operating overpressure depends on the permissible operating temperature

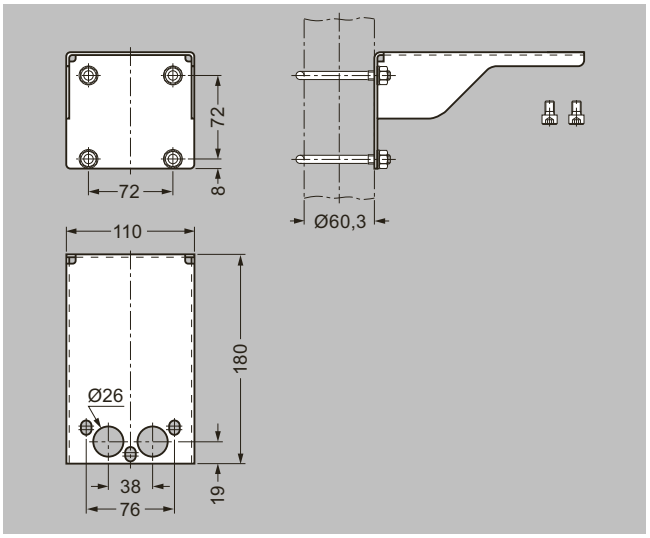
### Dimensional drawings




3-spindle valve manifold 7MF9413-1D. for vertical differential pressure lines, dimensions in mm




5-spindle valve manifold 7MF9413-1E. for vertical differential pressure lines, dimensions in mm

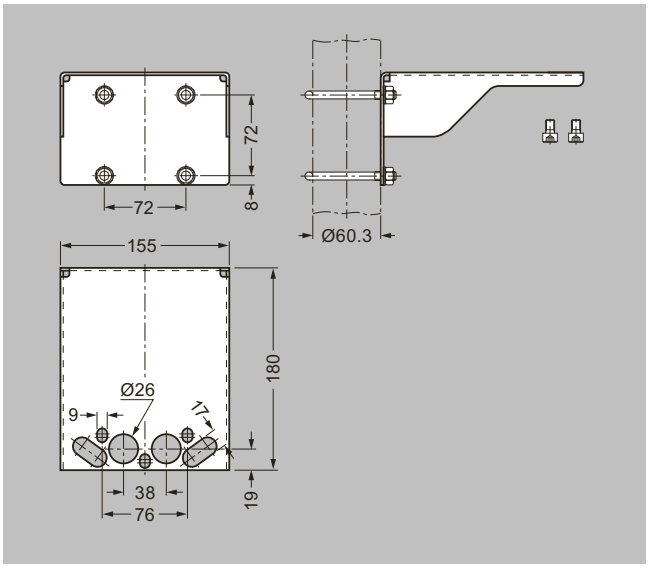



Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifold, dimensions in mm

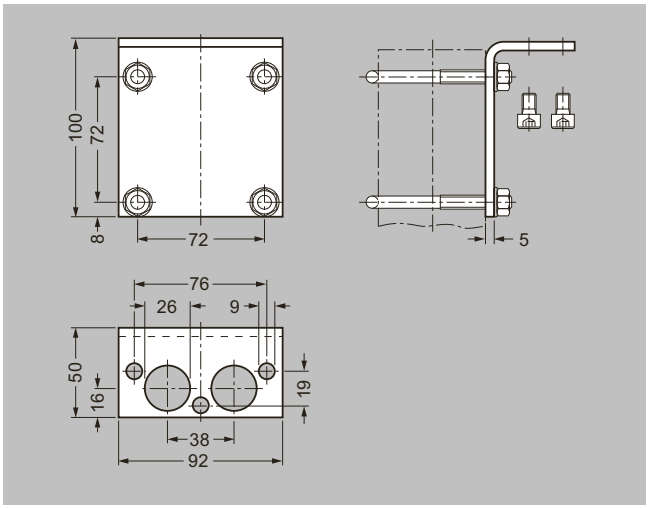
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## Dimensional drawings (continued)

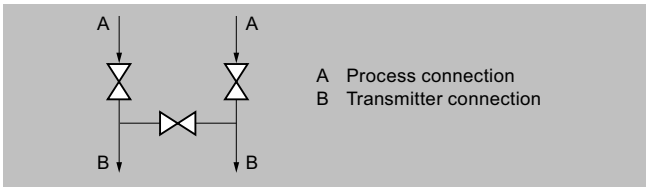



Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifold, dimensions in mm

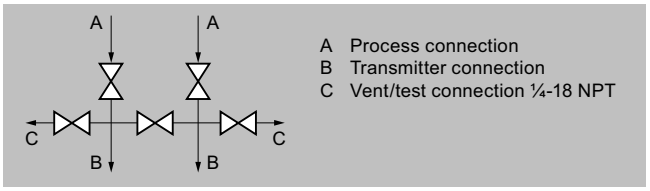



Mounting bracket (7MF9006-6QA)/(M19) for 3-spindle valve manifold, dimensions in mm

## Circuit diagrams




3-spindle valve manifold for vertical differential pressure lines, connections




5-spindle valve manifold for vertical differential pressure lines, connections

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## Overview



The low-pressure multiway cock can be flanged to pressure transmitters for differential pressure.

## Benefits

- Robust design
- For liquids and gases
- One-hand operation

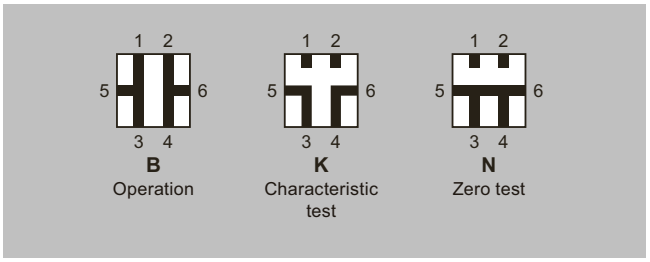
## Design

The multiway cock has two process connections and two test connections which are available in two versions ($G^3/_8$ sealing screws or quick-release couplings). The enclosure is made of pressed brass CuZn39Pb3, CW 614N. Test connections with screw plugs or with self-sealing quick-release couplings.

**Note:** An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

## Function

- Shutting off the differential pressure lines
- Checking the zero point of the pressure transmitter.
- Checking the characteristic of the pressure transmitter.




Cock settings, the symbols are on the cock

## Selection and ordering data

| Low-pressure multiway cock | Article No. |
|---|---|
| For liquids and gases, for flanging to pressure transmitter, max. operating overpressure 25 bar (363 psi), max. operating temperature 60 °C (140 °F) (briefly up to 80 °C (176 °F)), weight 1.75 kg (without accessory kit) | |
| **Test connections** | |
| • 2 × screw plugs $G^3/_8$ | **7MF9004-4CA** |
| • 2 × quick-action couplings | **7MF9004-4DA** |

| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN**<br>(Required for flanging, weight 0.2 kg)<br>4 × screws $^7/_{16}$-20 UNF × 1 inch according to ASME B18.2.1; chromated steel<br>2 × flat gaskets made of PTFE, max. permissible 80 °C (176 °F) | **L31** | **7MF9004-5CC** |

| Options[1] | Order code | Article No. |
|---|---|---|
| ***Accessory kit according to DIN***<br>(Required for flanging, weight 0.2 kg)<br>4 × screws M10×25 according to EN 24017; chromated steel<br>4 × washers Ø 10.5 mm according to DIN 125,<br>2 × flat sealings made of PTFE, max. permissible 80 °C (176 °F) | | |
| • Standard design | **L11** | **7MF9004-6AD** |
| • Version for oxygen | **L15** | **7MF9004-6AE** |
| **Multiway cock in oil-free and grease-free design**<br>BAM-tested lubricant, sealing socket suitable for oxygen | **S11** | |
| **Mounting brackets**<br>Required for **wall mounting** or for fastening on rack (72 mm grid); made of electrogalvanized sheet steel, weight 0.85 kg | **M13** | **7MF9004-6AA** |

[1] If accessory kit or mounting brackets are ordered together with the multiway cock, please use order code; otherwise, use the article number.

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## Accessories

***Accessory set for low-pressure multiway cock***

- L31: 4 screws $^{7}/_{16}$-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 according to EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

***Multiway cock in oil-free and grease-free design***

- S11: BAM-tested lubricant, sealing socket suitable for oxygen

***Mounting brackets***

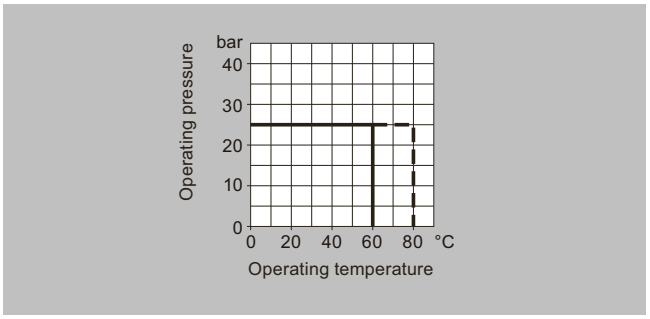
- M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

## Options

Test connections

- 2 screw plugs $G^{3}/_{8}$
- 2 quick-action couplings

## Characteristic curves

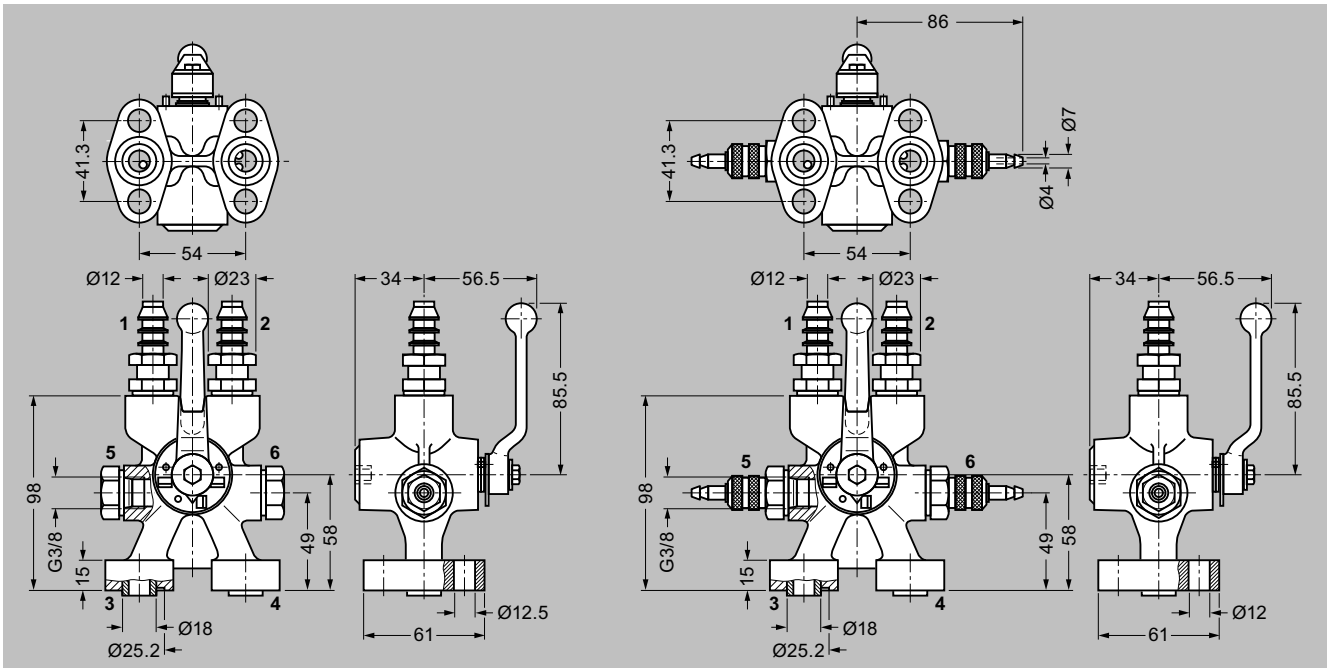



Low-pressure multiway cock, permissible operating overpressure depends on the permissible operating temperature

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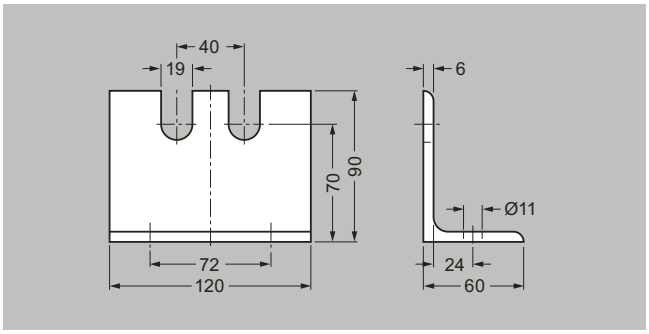


## Dimensional drawings




1 and 2 Process connections (hose sleeve, diameter 12 mm)
3 and 4 Transmitter connections (IEC 61518, form A)
5 and 6 Test connections (with sealing screws G3/8 or with quick-release couplings

Low-pressure multiway cock 7MF9004-4CA/-4DA for direct flanging to pressure transmitter for differential pressure, dimensions in mm




Mounting bracket 7MF9004-6AA (M13), dimensions in mm

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## Overview



The 7MF9408-2C oval flange for pressure transmitters for absolute pressure and differential pressure has a ½-14 NPT internal thread and is designed for a max. operating pressure of 420 bar (6092 psi).

## Selection and ordering data

| | Article No. |
|---|---|
| **Oval flange** | |
| With internal thread ½-14 NPT, max. operating overpressure 420 bar (6092 psi), flange connection according to IEC 61518/EN 61518, form A | |
| **Material** | |
| P250GH, mat. no. 1.0460 | **7MF9408-2CE** |
| X 2 CrNiMo 17 13 2, mat. no. 1.4404/316L | **7MF9408-2CL** |

| Options[1] | Order code | Article No. |
|---|---|---|
| Add "**-Z**" to article number and specify order code. | | |
| **Accessory kit according to EN** | | |
| 2 × screws $^{7}/_{16}$-20 UNF × 1½ inches according to ASME B 18.2.3; chromated steel<br>1 × flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) | **E36** | **7MF9408-5DA** |
| 2 × screws $^{7}/_{16}$-20 UNF × 1½ inches according to ASME B 18.2.3; chromated steel<br>1 × O-ring according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F) | **E34** | **7MF9408-5CA** |

| Options[1] | Order code | Article No. |
|---|---|---|
| **Accessory kit according to DIN** | | |
| 2 × screws M10×40 according to EN 4762; chromated steel<br>2 × washers Ø 10.5 mm according to DIN 125;<br>1 × O-ring according to DIN 3771, 20 × 2.65 - S - FPM90, max. permissible 160 bar (2321 psi), 120 °C (248 °F) | **E13** | **7MF9408-6AA** |
| 2 × screws M10×40 according to EN 4762; chromated steel<br>2 × washers Ø 10.5 mm according to DIN 125;<br>1 × flat gasket made of PTFE, max. permissible 160 bar (2321 psi), 80 °C (176 °F)[2] | **E16** | **7MF9408-6BA** |
| **Certification according to NACE MR-0175** | **D07** | |
| Including inspection certificate 3.1 according to EN 10204 | | |

[1] If accessory kit is ordered together with the oval flange, please use order code; otherwise, use the article number.
[2] Flange connections with screws M10 only permissible up to PN 160 (2321 psi).

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## Accessories

- E36: 2 screws $^{7}/_{16}$-20 UNF × 1½ inch according to ASME B18.2.1, 1 flat gasket
- E34: 2 screws $^{7}/_{16}$-20 UNF × 1½ inch according to ASME B18.3, 1 O-ring (FPM 90)
- E13: 2 screws M10x40 according to EN 4762, 2 washers, 1 O-ring (FPM 90)
- E16: 2 screws M10x40 according to EN ISO 4762, 2 washers, 1 flat gasket

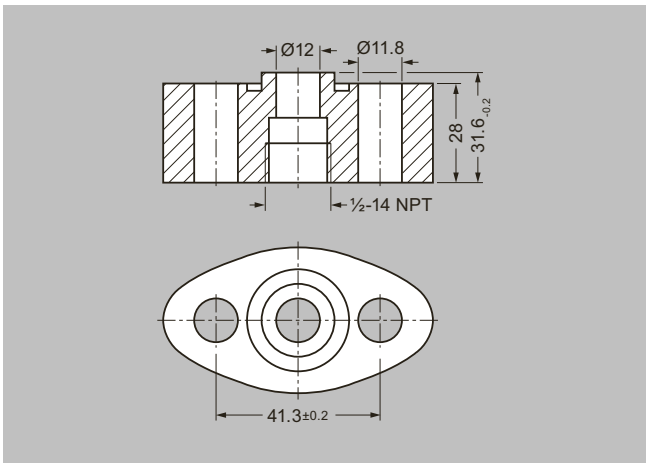
Washers Ø 10.5 according to DIN 125

Flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)

O-ring acc. to DIN 3771, 20 × 2.65 – S – FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)

**Note**: M10 screws only permissible up to PN 160 (2321 psi)!

## Dimensional drawings




Oval flange 7MF9408-2C., dimensions in mm

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## Overview

Adapters enable, for example, a transition from measured medium connections with NPT thread to shut-off valves according to DIN 16270 ... 16272 or to tubes in connection with a connection gland (e.g. 7MF9008).

## Design

The adapters are made of X 6 CrNiMoTi 17 12 2, mat. no. 1.4571 and are available in 3 versions:

- Thread ¼-18 NPT and connection shank G½ according to EN 837-1
- Thread ½-14 NPT and connection shank G½ according to EN 837-1
- Thread ½-14 NPT and thread ½-14 NPT

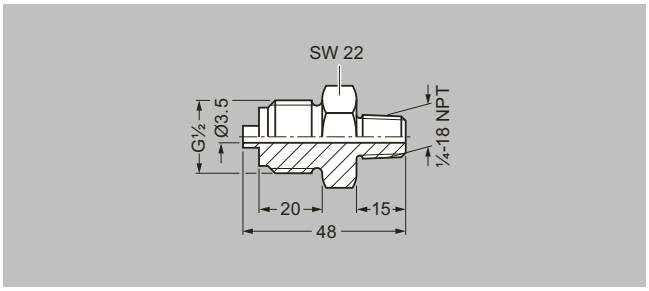
## Selection and ordering data

| | Article No. |
|---|---|
| **Connection piece**<br>Max. operating pressure: 689 bar (10 000 psi), weight: 0.2 kg | |
| With thread ¼-18 NPT – G½ | **7MF9001-1AA** |
| With thread ½-14 NPT – G½ | **7MF9001-1CA** |
| With thread ½-14 NPT – ½-14 NPT | **7MF9001-1DA** |
| With thread ½-14 NPT – M20 × 1.5 | **7MF9001-1EA** |
| With cutting ring 12 S, max. operating pressure 630 bar (9 100 psi), ∅ 12 mm – ½-14 NPT | |
| • 9 SMnPb 28, mat. No. .0718 | **7MF9008-1CA** |
| • X 6 CrNiMoTi 17 122, mat. No. 1.4571 | **7MF9008-1CB** |
| With cutting ring 14 S, max. operating pressure 630 bar (9 100 psi), ∅ 14 mm – ½-14 NPT | |
| • 9 SMnPb 28, mat. No. 1.0718 | **7MF9008-1CC** |
| • X 6 CrNiMoTi 17 122, mat. No. 1.4571 | **7MF9008-1CD** |

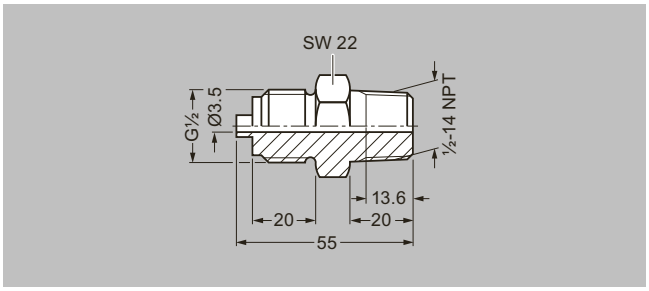
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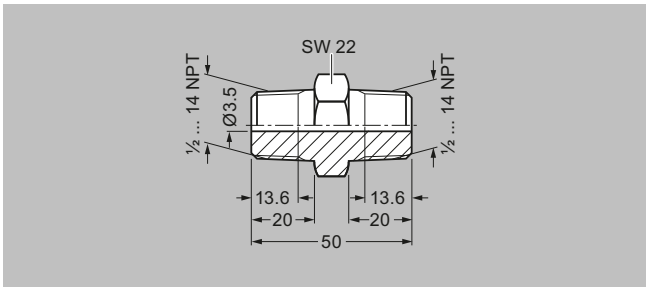
## Dimensional drawings



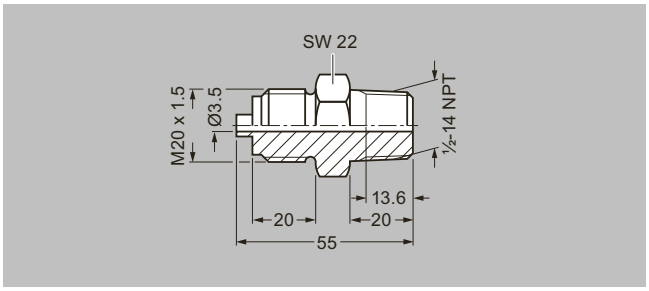

Mounting collar with thread ¼-18 NPT and connection shank G½ (7MF9001-1AA), dimensions in mm




Mounting collar with thread ½-14 NPT and connection shank G½ (7MF9001-1CA), dimensions in mm

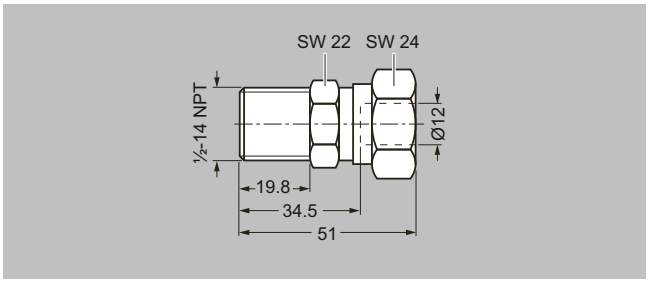



Mounting collar with ½-14 NPT thread and ½-14 NPT thread (7MF9001-1DA), dimensions in mm

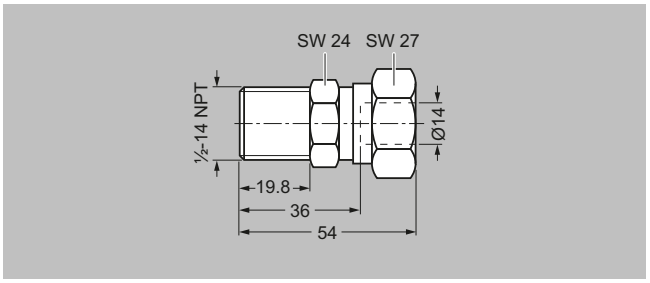



Mounting collar with thread ½-14 NPT and connection shank M20 x 1.5 (7MF9001-1EA), dimensions in mm

## Dimensional drawings (continued)




Mounting collar with cutting ring fitting 12 S, Ø12 mm and thread ½-14 NPT (7MF9008-1CA and -1CB), dimensions in mm




Mounting collar with cutting ring fitting 14 S, Ø14 mm and thread ½-14 NPT (7MF9008-1CC and -1CD), dimensions in mm

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## Overview

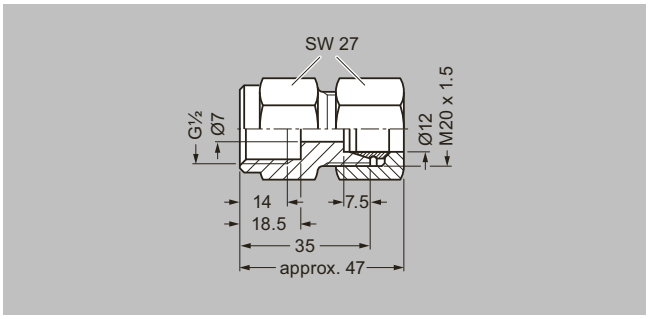
Connection glands for connecting measured-medium or differential pressure lines to connection shank G½ according to EN 837-1

- For rated pressures up to PN 630 (9137 psi)
- For oxygen only up to PN 250 (3626 psi)

## Selection and ordering data

| | | Article No. |
|---|---|---|
| **Connection glands for pipes** | | |
| (weight 0.2 kg) | | |
| ***Material*** | ***Version*** | |
| 11SMn30 (mat. No. 1.0715) | Normal | **7MF9008-1GA** |
| X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti) | Normal | **7MF9008-1GB** |
| X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti) | Grease-free | **7MF9008-1GC** |

## Dimensional drawings




Connection gland 7MF9008-1G., dimensions in mm

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## Overview

Connection parts G½ for pressure gauges and shut-off valves are available in 3 versions:

- Nipple connection
- Clamping sleeve
- Shank mounting collar

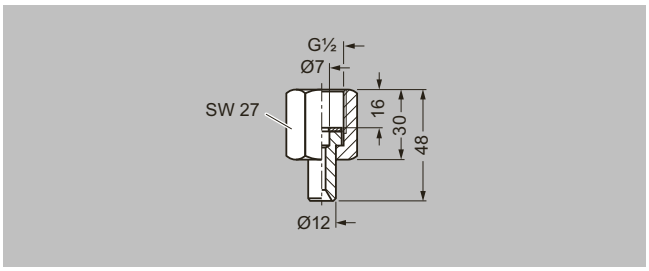
## Selection and ordering data

| Connection parts G½ | | Article No. |
|---|---|---|
| For pressure measuring devices and shut-off valves | | |
| **Nipple connection** | | |
| G½ according to DIN 16284 (union nut with nipple and gasket); Max. Operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connection: G½ according to EN 837-1; female thread G½ | | |
| ***Material*** | ***Mat. no.*** | |
| CuZn39Pb3 | CW 614N | **M56340-A0001** |
| Union nut: 9 SMn 28 k | 1.0715 | **M56340-A0002** |
| Nipple: RSt 37-2 | 1.0037 | |
| Union nut: X 8 CrNiS 18 9 | 1.4305 | **M56340-A0003** |
| Nipple: X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | |
| **Nipple connection** | | |
| M20 × 1.5 according to DIN 16284 (union nut with nipple and gasket); Max. Operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connection: M20 × 1.5 according to EN 837-1; female thread M20 × 1.5 | | |
| ***Material*** | ***Mat. no.*** | |
| Union nut: X 8 CrNiS 18 9 | 1.4305 | **M56340-A0008** |
| Nipple: X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | |
| **Clamping sleeve** | | |
| G½ according to DIN 16283; max. operating overpressure 400 bar (5802 psi); weight 0.1 kg; Connections: G½ according to EN 837-1; Female thread: G½ right, G½ left | | |
| ***Material*** | ***Mat. no.*** | |
| CuZn39Pb3 | CW614N | **M56340-A0004** |
| 9 SMn 28 k | 1.0715 | **M56340-A0005** |
| **Collar connection piece** | | |
| Max. operating pressure; weight 0.1 kg; Connections: G½ according to EN 837-1; Male thread: G½, G½ | | |
| ***Material*** | ***Mat. no.*** | |
| CuZn39Pb3 | CW614N | **M56340-A0006** |
| 9 SMn 28 k | 1.0715 | **M56340-A0007** |

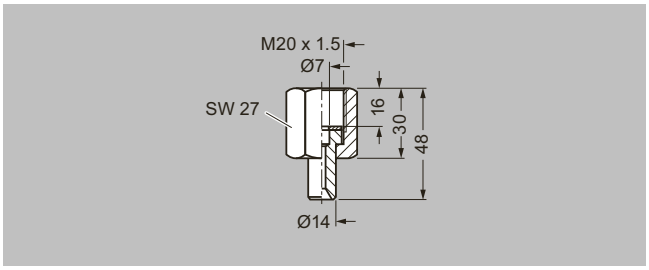
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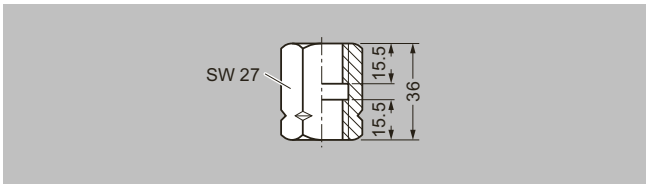
## Dimensional drawings



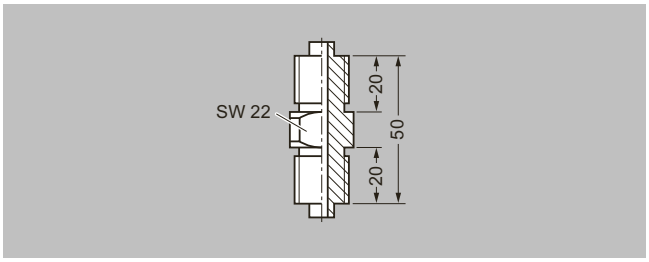

G½ (M56340-A0001 to -A0003) nipple connection, dimensions in mm




M20 x 1.5 nipple connection (M56340-A0008), dimensions in mm




Clamping sleeve (M56340-A0004/-A0005), dimensions in mm




Collar connection piece (M56340-A0006/-A0007), dimensions in mm

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## Overview

Water traps protect pressure measuring devices and shut-off fittings from heating up (e.g. by steam) by the water column produced by the water trap.

The max. operating temperature is 120 °C (248 °F) at 100 bar (1450 psi), 300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi). If the temperature of the measured medium is higher, a sufficiently long line has to be connected upstream of the trap to enable heat dissipation.

## Design

The water traps are available in U form (type B) or in circular form (type D) according to DIN 16282. On the measuring cell side, they consist of a weld-in end Ø 20 mm × 2.6 mm. The connection on the device side is a clamping sleeve G½ to DIN 16283.

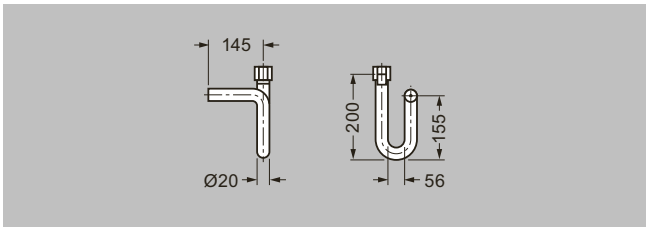
The water traps are made of steel (P250GH) or stainless steel (X 6 CrNiMoTi 17 12 2)

Water traps are designed as standard for max. operating temperature 120 °C (248 °F) at a max. operating pressure of 100 bar (1450 psi) (300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi)). Water traps for higher operating pressures and temperatures are available on request.

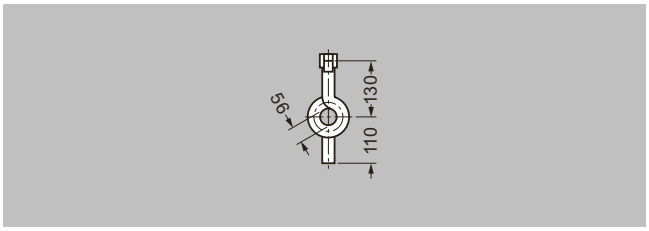
## Selection and ordering data

| Water traps | | Article No. |
|---|---|---|
| For pressure measuring devices and pressure transmitters; max. operating temperature 120 °C (248 °F), max. operating pressure 100 bar (1450 psi) (or 300 °C (572 °F) at 80 bar (1160 psi), or 400 °C (752 °F) at 63 bar (914 psi)), weight 0.7 kg | | |
| **Water trap B according to DIN 16282** | | |
| ***Material*** | ***Mat. no.*** | |
| P235GH | 1.0345 | **M56340-A0043** |
| X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | **M56340-A0061** |
| **Water trap D according to DIN 16282** | | |
| ***Material*** | ***Mat. no.*** | |
| P235GH | 1.0345 | **M56340-A0045** |
| X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | **M56340-A0063** |

## Dimensional drawings




Water traps, type B, M56340-A0043/-A0061, measurements in mm




Water traps, type D, M56340-A0045/-A0063, measurements in mm

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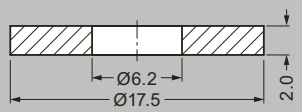
## Overview

The sealing rings according to EN 837-1 are required to seal the pressure measuring devices with process connection G½B.

## Selection and ordering data

| | Article No. |
|---|---|
| **Sealing ring according to EN 837-1 for G½ thread** (Packing unit 100 units) | |
| • made of copper | **7MF9007-7AA** |
| • made of soft iron | **7MF9007-7AB** |
| • made of stainless steel, mat. no. 1.4571 | **7MF9007-7AC** |
| • made of PTFE | **7MF9007-7AD** |

## Dimensional drawings




Sealing ring 7MF9007-7A according to EN 837-1, measurements in mm

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## Overview

The pressure surge reducer protects the pressure gauge from damage, premature wear-and-tear, and an imprecise or vibrating display.

## Application

The pressure reducer is used when pulsations of the measured medium occur (e.g. in slow-running steam engines, piston pumps and compressors) or when sudden pressure increases and drops of the measured medium can be expected (e.g. in hydraulic presses and tensile testing machines).

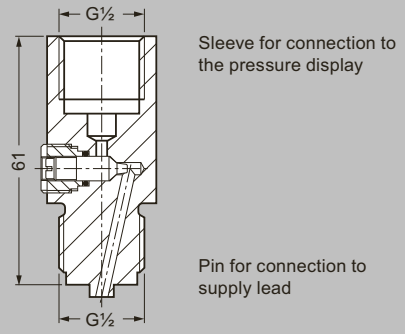
## Design

- Brass or stainless steel enclosure (mat. no. 1.4571)
- Adjustable nozzle
- Sleeve for connection to the pressure gauge
- Shank for connection to the supply line

## Selection and ordering data

| | | | Article No. |
|---|---|---|---|
| **Pressure surge reducers**<br>Weight approx. 0.21 kg | | | |
| **Material** | **Full-scale value** | **Weight approx. in kg** | |
| Brass | 250 bar (3626 psi) | 0.21 | **M56340-A0054** |
| Stainless steel | 600 bar (8702 psi) | 0.21 | **M56340-A0059** |

## Dimensional drawings




Pressure surge reducer, dimensions in mm

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## Overview

The primary shut-off valves are available in the following versions:

- For non-corrosive liquids, gases and vapors
- For corrosive liquids and gases
- Grease-free for oxygen

The shut-off valves are available in different materials and with different connections (see ordering data).

## Selection and ordering data

| Primary shut-off valves<br>Without certificate | | | | | | | Article No.<br>7MF9017- | ● | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | |
| *Max. operating overpressure* | *Characteristic curve* [1] | *Material* | *Mat. no.* | *Spindle thread* | *Connections* | Weight in kg | | | | |
| **Shut-off valve for non-corrosive liquids, gases and vapors** | | | | | | | | | | |
| 160 bar (2321 psi) | A | P250GH | 1.0460 | Female | Screwed connectors G½, form R, DIN 19207 | 0.8 | | 1 | A | |
| 160 bar (2321 psi) | A | P250GH | 1.0460 | Female | Screwed connectors G½ form R, DIN 19207 and pipe union with cutting ring for pipe Ø 12 mm, schedule S | 0.8 | | 1 | B | |
| 400 bar (5800 psi) | C | P250GH | 1.0460 | Female | Pipe union with cutting ring for pipe Ø 12 mm, schedule S | 1 | | 1 | C | |
| 400 bar (5800 psi) | C | P250GH | 1.0460 | Female | Pipe union with cutting ring for pipe Ø 14 mm, schedule S | 1 | | 1 | D | |
| 500 bar (7252 psi) | D | 16 Mo 3 | 1.5415 | Male | Welding sleeve Ø 14 mm × 2.5 mm | 1.6 | | 1 | F | |
| 500 bar (7252 psi) | E | 11 CrMo 9 10 | 1.7383 | Male | Welding sleeve Ø 14 mm × 2.5 mm | 1.6 | | 1 | G | |
| 500 bar (7252 psi) | D | 16 Mo 3 | 1.5415 | Male | Welding sleeve Ø 21.3 mm × 6.3 mm and Ø 14 mm × 2.5 mm | 1.6 | | 1 | H | |
| 500 bar (7252 psi) | D | 16 Mo 3 | 1.5415 | Male | Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm | 1.6 | | 1 | J | |
| 500 bar (7252 psi) | E | 11 CrMo 9 10 | 1.7383 | Male | Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm | 1.6 | | 1 | K | |
| **Shut-off valve for corrosive liquids and gases** | | | | | | | | | | |
| 160 bar (2321 psi) | F | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | Female | Screwed connectors G½ form R, DIN 19207 and pipe union with cutting ring for pipe Ø 12 mm, schedule S | 0.8 | | 2 | B | |
| 400 bar (5800 psi) | G | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | Female | Pipe union with cutting ring for pipe Ø 12 mm, schedule S | 1 | | 2 | C | |
| 400 bar (5800 psi) | H | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | Male | Welding sleeve Ø 21.3 mm × 6.3 mm and Ø 14 mm × 2.5 mm | 1.6 | | 2 | H | |
| 400 bar (5800 psi) | H | X 6 CrNiMoTi 17 12 2 | 1.4571/316Ti | Male | Welding sleeve Ø 24 mm × 7.1 mm and Ø 14 mm × 2.5 mm | 1.6 | | 2 | J | |

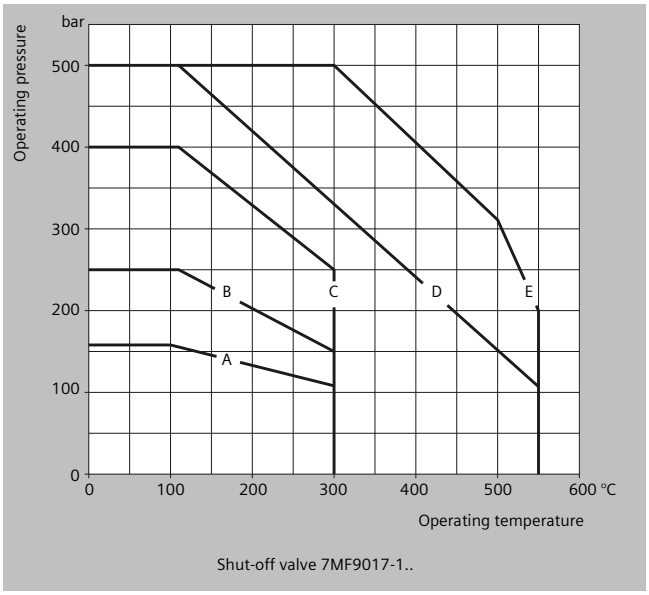
| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

[1] See characteristic curve "Permissible operating overpressure depends on the permissible operating temperature"

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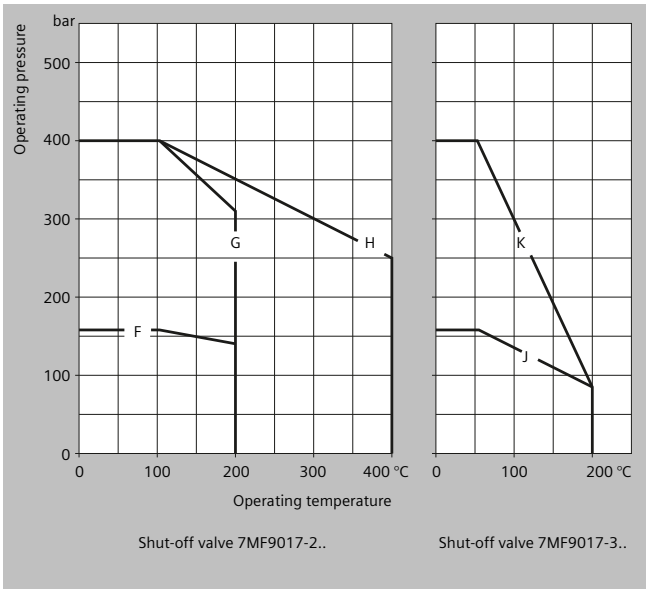


## Characteristic curves




Shut-off valve 7MF9017-1..

Shut-off valve 7MF9017-1.., permissible operating overpressure depends on permissible operating temperature

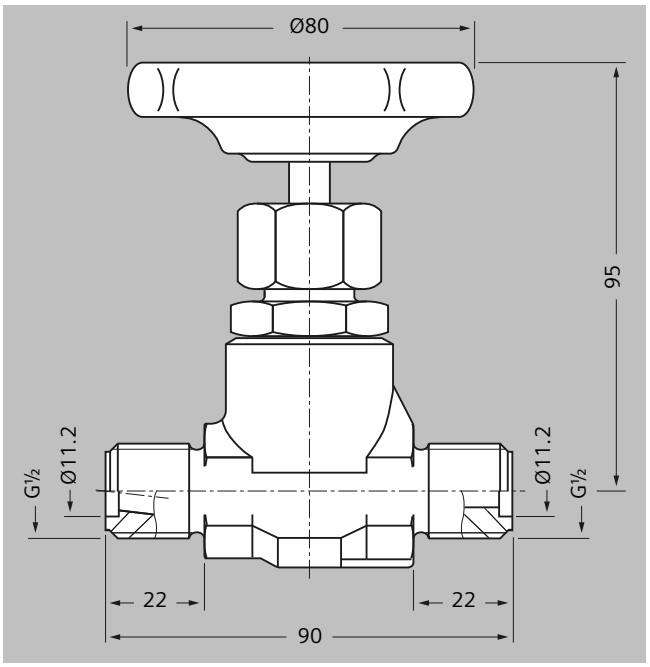



Shut-off valve 7MF9017-2..

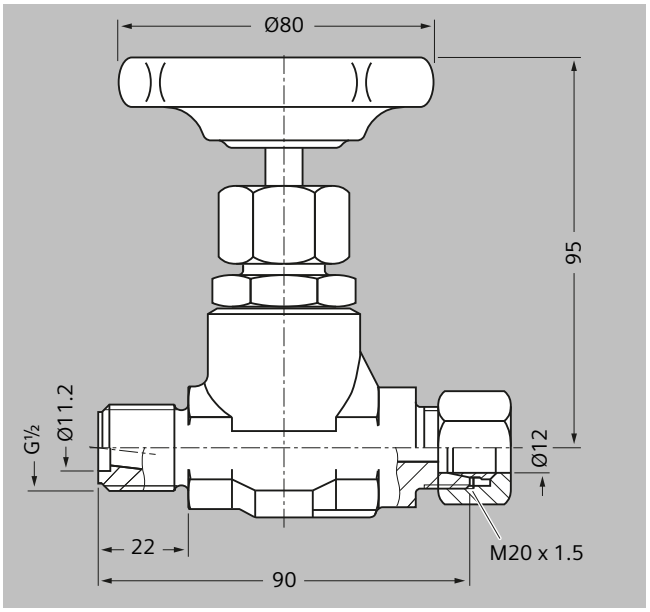
Shut-off valve 7MF9017-3..

Shut-off valves 7MF9017-2.. and –3.., permissible operating overpressure depends on permissible operating temperature

## Dimensional drawings




Shut-off valves 7MF9017-1A., dimensions in mm

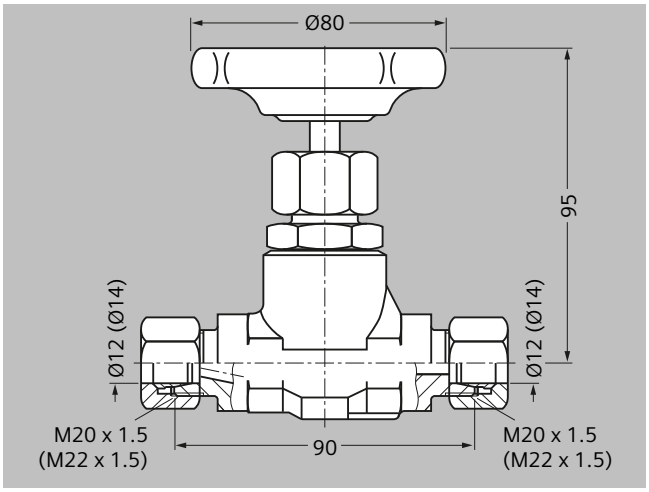



Shut-off valves 7MF9017-1B. and -2B., dimensions in mm

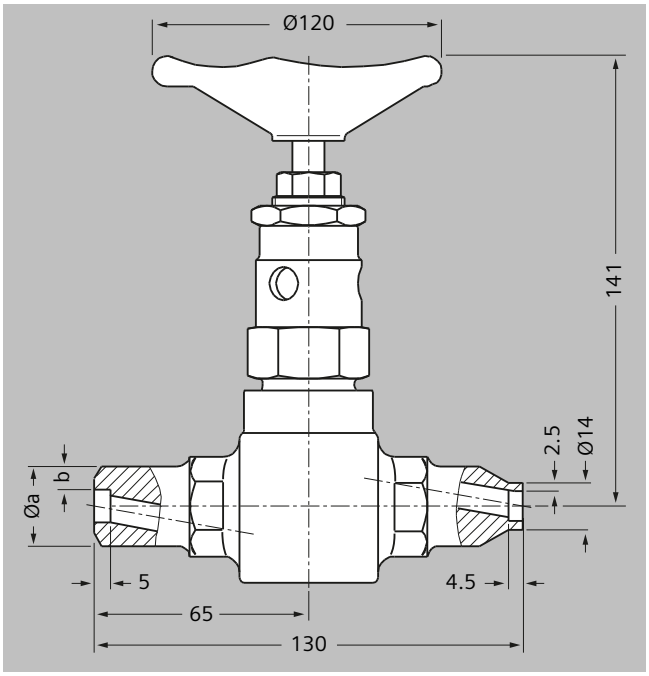
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## Dimensional drawings (continued)




Shut-off valves 7MF9017-1C., -1D. and -2C., dimensions in mm




Shut-off valves 7MF9017-..., dimensions in mm

| Ø A x b | 7MF9017- |
|---|---|
| 14 mm x 2.5 mm | 1F. and 1G. |
| 21.3 mm x 6.3 mm | 1H. and 2H. |
| 24 mm x 7.1 mm | 1J., 1K. and 2J. |

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## Overview

The compensation vessels prevent the level difference in the differential pressure lines on a change in pressure, which corrupts the measurement result.

According to DIN 19211, for calculating the wall thickness, the prevailing temperature in the compensation vessel should be assumed to be 50 K lower than the steam temperature in the pipeline. The reason is that the temperature in the condensate vessels during operation can rise no higher than the saturated steam temperature.

There is a material inspection certificate A according to EN 10204-3.1 for materials from which the compensation vessels are manufactured.

## Selection and ordering data

| Condensate vessel<br>Without certificate | | | | | | | | Article No.<br>7MF9015- | ● | ● | A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Click the article number for online configuration in the PIA Life Cycle Portal.** | | | | | | | | | | | |
| ***Max. operating overpressure*** | ***Characteristic curve*** [1] | ***Material*** | ***Mat. no.*** | ***Connections:*** | | Content approx. $cm^3$ | Weight approx. kg | | | | |
| | | | | ***Input*** | ***Output*** | | | | | | |
| 160 bar (2321 psi) | A | 16 Mo 3 | 1.5415 | Screwed connectors G½, form R, DIN 19207 | Screwed connectors G½, form V, DIN 19207 | 250 | 0.8 | | 1 | A | |
| 250 bar (3626 psi) | B | 16 Mo 3 | 1.5415 | Welding sleeve Ø 21.3 mm × 6.3-mm | Welding sleeve Ø 21.3 mm × 6.3-mm | 250 | 0.8 | | 1 | B | |
| 250 bar (3626 psi) | B | 16 Mo 3 | 1.5415 | Welding sleeve Ø 24 mm × 7.1 -mm | Welding sleeve Ø 24 mm × 7.1 -mm | 250 | 1 | | 1 | C | |
| 500 bar (7252 psi) | E | 11 CrMo 9 10 | 1.7383 | Welding sleeve Ø 24 mm × 7.1 -mm | Welding sleeve Ø 24 mm × 7.1 -mm | 170 | 1 | | 1 | D | |
| 250 bar (3626 psi) | B | 16 Mo 3 | 1.5415 | Welding sleeve Ø 33.7 mm × 4.5-mm | Welding sleeve Ø 24 mm × 7.1 -mm | 700 | 0.7 | | 1 | E | |
| 160 bar (2321 psi) | A | 16 Mo 3 | 1.5415 | Screwed connectors G½, form R, DIN 19207 | Screwed connectors G½, form V, DIN 19207 | 20 | 1.6 | | 5 | A | |
| 500 bar (7252 psi) | D | 16 Mo 3 | 1.5415 | Welding sleeve Ø 21.3 mm × 6.3-mm | Welding sleeve Ø 21.3 mm × 6.3-mm | 20 | 1.6 | | 5 | B | |
| 500 bar (7252 psi) | D | 16 Mo 3 | 1.5415 | Welding sleeve Ø 24 mm × 7.1 -mm | Welding sleeve Ø 24 mm × 7.1 -mm | 20 | 1.6 | | 5 | C | |
| 500 bar (7252 psi) | E | 11 CrMo 9 10 | 1.7383 | Welding sleeve Ø 24 mm × 7.1 -mm | Welding sleeve Ø 24 mm × 7.1 -mm | 20 | 1.6 | | 5 | D | |

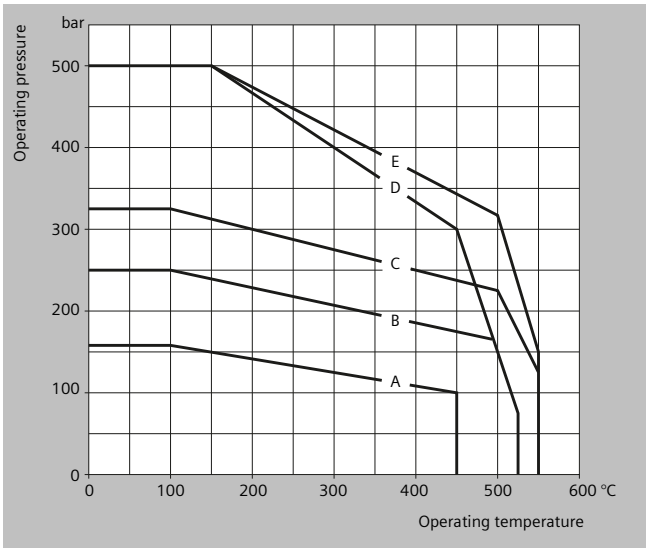
| Accessories | |
|---|---|
| Factory certificate EN 10204-2.2 | **7MF9000-8AB** |
| Material inspection certificate to EN 10204-3.1 | **7MF9000-8AD** |

[1] See characteristic curve "Permissible operating overpressure depends on the permissible operating temperature"

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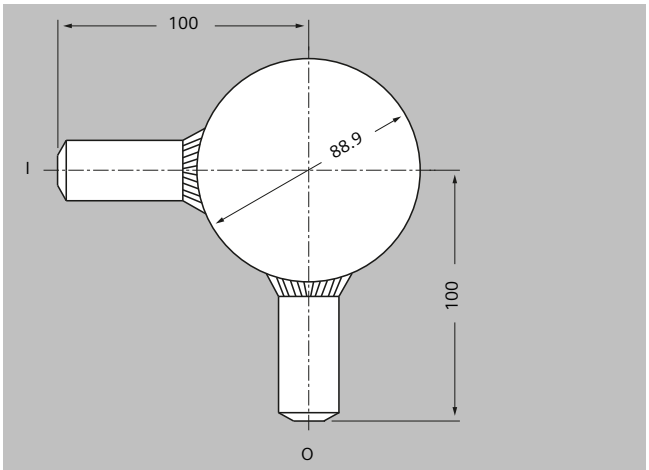


## Characteristic curves



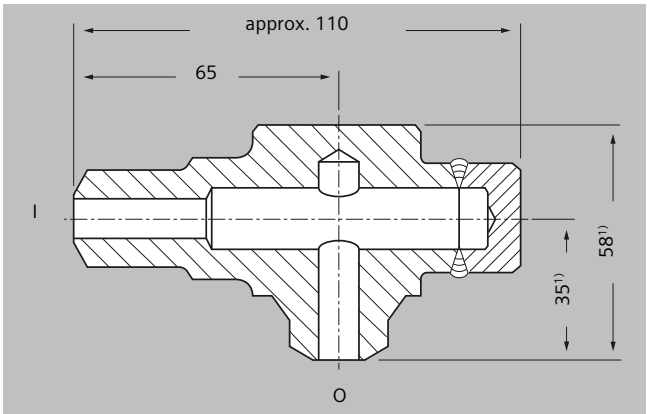

Permissible operating overpressure depends on the permissible operating temperature

## Dimensional drawings




I Input (see Ordering data for dimensions)
O Output (see Ordering data for dimensions)

Compensation vessel 7MF9015-1.., dimensions in mm




I Input (see Ordering data for dimensions)
O Output (see Ordering data for dimensions)
1) 30 mm longer with 7MF9015-5A.

Compensation vessel 7MF9015-5.., dimensions in mm

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## Overview

Connection parts are available in the following versions:

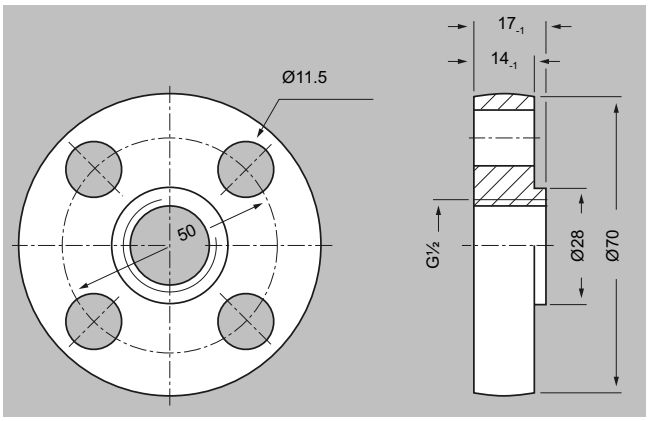
- G½ threaded flange pair with stainless steel gasket
- G½ nipple connection, form V to DIN 19207
- G½ C 35 union nut to DIN 16284
- B½ sealing ring (grooved) to DIN 19207

All connection parts are also available grease-free for oxygen.

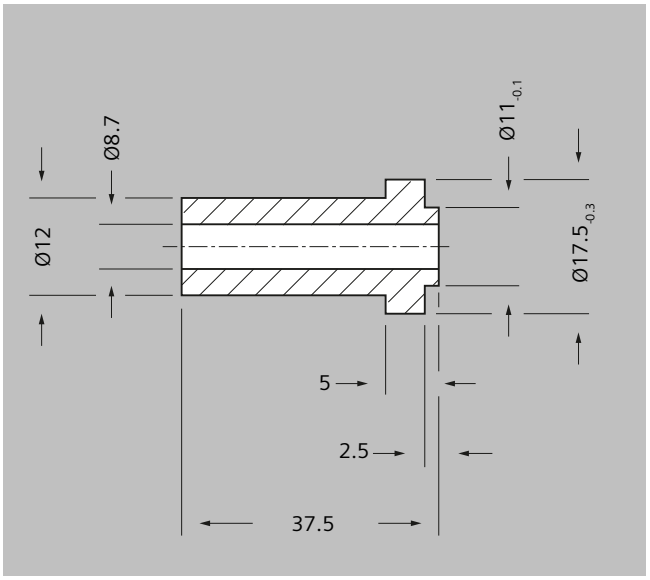
## Selection and ordering data

| | Article No. |
|---|---|
| **Threaded flange pair G½** | |
| • With stainless steel gasket | **7MF9007-4CA** |
| • Grease-free for oxygen, with stainless steel gasket | **7MF9007-4DA** |
| Scope of delivery:<br>2 × threaded flange G½ according to DIN 19207; material: P250GH (mat. no. 1.0460)<br>4 × hexagonal screws M10×45 According to EN 24014; material: C35E (mat. no. 1.1181)<br>4 × hexagon nut M10 according to EN 24032<br>1 × sealing ring G½ (7MF9007-6BA) grooved, according to DIN 19207; material: X 6 CrNiMoTi 17 12 2 (mat. no. 14571/316Ti); only for 7MF9007-4CA!<br>1 × sealing ring G½ (7MF9007-6CA), grease-free for oxygen, grooved, according to DIN 19207; material: X 6 CrNiMoTi 17 12 2 (mat. no. 14571/316Ti); only for 7MF9007-4DA! | |
| **Nipple G½** | |
| According to DIN 19207 | |
| • Material: 16 Mo 3 (mat. no. 1.5415) | **7MF9007-4KA** |
| • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | **7MF9007-4LA** |
| **Union nut G½** | |
| According to DIN 16284 | |
| • Material: C35E (mat. no. 1.1181) | **7MF9007-4MA** |
| • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | **7MF9007-4NA** |
| **Sealing ring G½** | |
| According to DIN 19207, grooved | |
| • Material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | **7MF9007-6BA** |
| • Grease-free for oxygen; material: X 6 CrNiMoTi 17 12 2 (mat. no. 1.4571/316Ti) | **7MF9007-6CA** |

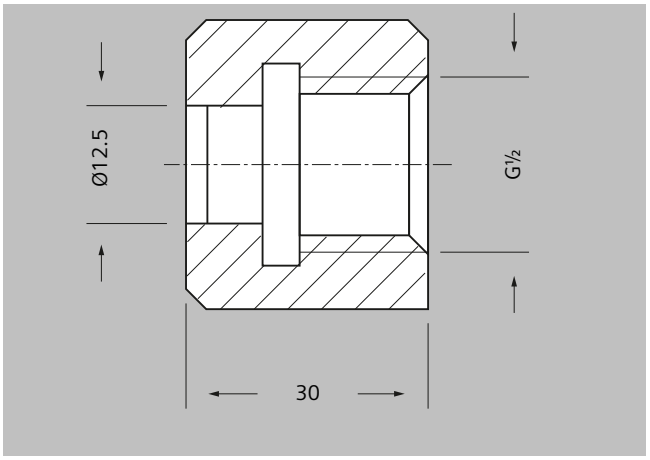
## Dimensional drawings




Threaded flange 7MF9007-4CA/-4DA, dimensions in mm




G½ nipple connection, 7MF9007-4KA/-4LA, dimensions in mm

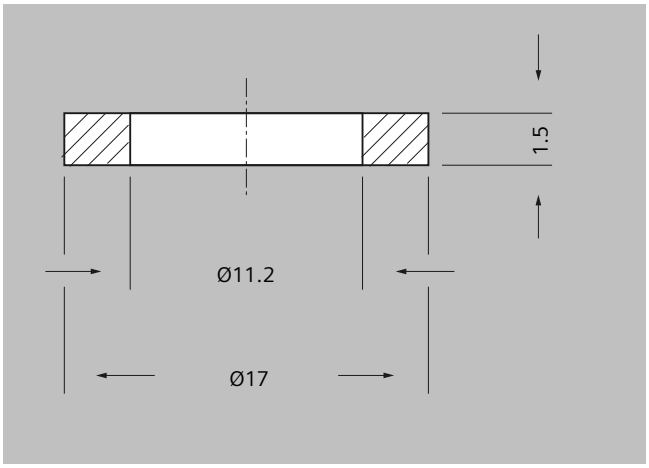



G½ union nut 7MF9007-4MA/-4N, dimensions in mm

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## Dimensional drawings (continued)




Sealing ring 7MF9007-6BA/-6CA, dimensions in mm

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| | |
|---|---|
| **2/2** | **Product overview** |
| **2/5** | **Temperature sensors** |
| 2/5 | SITRANS TS500 |
| 2/5 | Technical description |
| **2/24** | **Temperature transmitters** |
| 2/24 | Compact and head transmitters |
| 2/24 | SITRANS TH100 (4 to 20 mA, Pt100) |
| 2/28 | SITRANS TH320 (HART, universal) |
| 2/39 | SITRANS TH420 (HART, universal) |
| 2/51 | SITRANS TH100 Slim (Pt100) |
| 2/54 | Rail transmitters |
| 2/54 | SITRANS TR320 (HART, universal) |
| 2/64 | SITRANS TR420 (HART, universal) |
| 2/77 | Field transmitter and field indicator |
| 2/77 | SITRANS TF320 (HART, universal) |
| 2/94 | SITRANS TF420 (HART, universal) |
| **2/114** | **Accessories** |
| 2/114 | Further accessories for assembly, connection and transmitter configuration |

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## Overview

| Compact and head transmitters | | | | |
|---|---|---|---|---|
| **Type** | **Description** | **Mounting of transmitter with Ex protection** | | **Software for parameterization** |
| | | ***Transmitters*** | ***Sensor*** | |
| **SITRANS TH100**  | • 4 to 20 mA<br>• Transmitters for Pt100 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• DIV 1<br>• DIV 2 | SIPROM T |
| **SITRANS TH320**  | 2-wire head transmitter with and without HART communication interface.<br>With 1 input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V<br>• 4 to 20 mA<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | SIMATIC PDM or SIPROM T (depending on SITRANS TH320 type used) |
| **SITRANS TH420**  | Transmitters with 2 inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V<br>• Drift detection function<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508<br>• High input availability | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | SIMATIC PDM |
| **SITRANS TH100 Slim**  | For temperature measurement in combination with Pt100 compact resistance thermometers | - | - | SIPROM T |

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## Overview (continued)

| Rail transmitter | | | | |
|---|---|---|---|---|
| **Type** | **Description** | **Mounting of transmitter with Ex protection** | | **Software for parameterization** |
| | | ***Transmitters*** | ***Sensor*** | |
| **SITRANS TR200**  | • 4 to 20 mA<br>• Universal | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20 | SIPROM T |
| **SITRANS TR300**  | • 4 to 20 mA<br>• HART<br>• Universal | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20 | SIMATIC PDM |
| **SITRANS TR320**  | 2-wire rail transmitter with and without HART communication interface<br>With 1 input for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V<br>• 4 to 20 mA<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | SIMATIC PDM (depending on SITRANS TR320 type used) |
| **SITRANS TR420**  | Transmitters with 2 inputs for connection to resistance thermometers, linear resistors, potentiometers, thermocouples, and DC voltages up to 1.7 V<br>• Drift detection function<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508<br>• High input availability | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 21<br>• Zone 20<br>• M1<br>• DIV 1<br>• DIV 2 | SIMATIC PDM |

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## Overview (continued)

| Field transmitter | | | | |
|---|---|---|---|---|
| **Type** | **Description** | **Mounting of transmitter with Ex protection** | | **Software for parameterization** |
| | | ***Transmitters*** | ***Sensor*** | |
| **SITRANS TF320**  | Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.7 V<br>• In field enclosure for heavy industrial use<br>• 4 to 20 mA<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508 | • Zone 2<br>• Zone 1<br>• Zone 21<br>• Zone 22<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 20<br>• Zone 21<br>• Zone 22<br>• DIV 1<br>• DIV 2 | Local operation with buttons.<br>SIMATIC PDM local with HART modem or SIPROM T (depending on SITRANS TH320 type used) |
| **SITRANS TF420**  | Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.7 V<br>• In field enclosure for heavy industrial use<br>• HART 7<br>• Universal<br>• SIL2/3 according to IEC 61508<br>• High input availability | • Zone 2<br>• Zone 1<br>• Zone 21<br>• Zone 22<br>• DIV 1<br>• DIV 2 | • Zone 2<br>• Zone 1<br>• Zone 0<br>• Zone 20<br>• Zone 21<br>• Zone 22<br>• DIV 1<br>• DIV 2 | Local operation with buttons.<br>SIMATIC PDM locally with HART modem. |

***Supplied product documentation on DVD and safety notes***



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weighing technology portfolio. The delivery may also contain product-specific or order-specific printed materials.

For more information, refer to section 10 "Appendix".

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## Overview



Temperature sensors of the SITRANS TS500 product family are used to measure temperatures in industrial equipment.

## Benefits

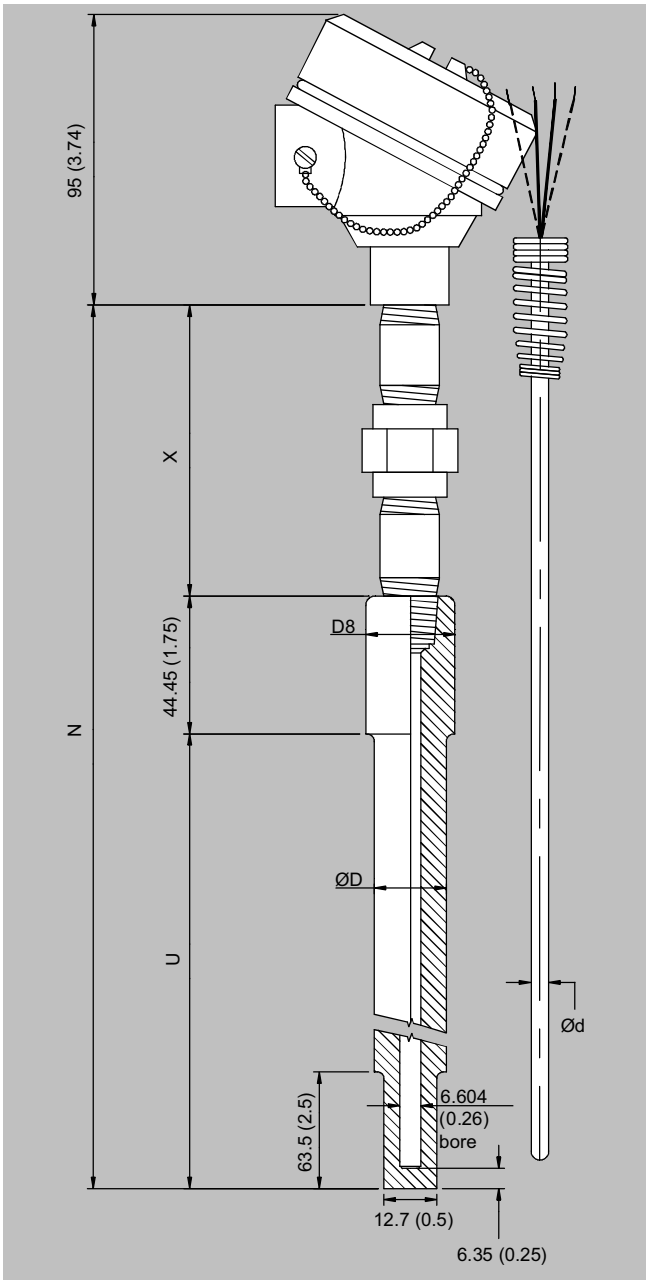
The modular design makes it possible to customize the temperature sensor for most applications, while still being able to use many standardized individual components.

***SITRANS TS500 Temperature sensors as a modular system***

Due to their modular design, temperature sensors of the SITRANS TS500 series are well suited to a large number of applications. The replaceable measuring insert makes it possible to conduct maintenance work even during ongoing operations. These devices are used particularly frequently in vessels and pipelines of the following industries:

- Power plants
- Chemical industry
- Petrochemical industry
- General process engineering
- Water, waste water

## Design




SITRANS TS500, type SWR, socket reduced well, dimensions in mm (inch)

The temperature sensors of the SITRANS TS500 series are available in four different designs:

- General Purpose without Thermowell
- Threaded Thermowell
- Flanged Thermowell
- Socket Thermowell

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## Design (continued)

***Configuration components***

***Process connections***

Flanges

The different properties of the flanges are as follows:

- Standard series EN 1092, ASME 16.5,..
- Nominal pressure
- Nominal diameter
- Sealing face

This information is stamped into the flange, as well as the material code and batch number for "3.1 Material".

***Thermowell***

Thermowells fulfill two basic functions:

- They protect the measuring insert from aggressive media
- They make it possible to replace units during ongoing operations

This catalog is limited to the standard versions. Special versions are available on request.

- Barstock thermowells
  - Where process loads are too high, or where thermowells with welded seams are not allowed, deep hole drilled barstock thermowells are used.

***Extension (neck tube)***

The extension is the section from the lower edge of the connection head to the fixed point of the process connection or thermowell. There is a variety of terms for this components, e.g. neck tube. For this reason the term extension has been selected as a standardized term for the different designs. Function is the deciding factor:

- Thermal decoupling of connection head from process temperature
- Installation of connection head over existing insulation
- Simple standardization of measuring inserts: In general, the length of the extension may be freely selected. However, when using standardized insertion lengths ensures that measuring inserts are quickly available can be used.
- The extension takes the spring load of the sensor.
- Depending on the design, the extension can also be used to achieve an alignment of the connection head.

***Connection head***

The connection head protects the wiring connections. The connection head features sufficient room for mounting a terminal block or transmitter.

Different connection heads are used depending on the application and preference.

***Measuring insert***

Measuring inserts feature a large spring range. These measuring inserts are ideal for use with NPT threads with the typical loose tolerances. In this configuration, the extension function is partially or fully integrated (nipple-union-nipple). Moreover it is also possible to directly attach field devices, e.g. SITRANS TF.

***Transmitters***

SITRANS TH head transmitters process the weak non-linear sensor signals and transmit a stable and temperature-linear standard signal, thereby minimizing sensor signal disruptions.

The transmitters constantly monitor the temperature sensors and transmit diagnostic data to superordinate systems.

## Design (continued)

Because of the low energy feed of the SITRANS TH head transmitters, self-heating of the temperature sensors can be maintained at minimal levels.

The electrical isolation and integrated cold junction ensure that temperature sensors with thermocouples provide reliable measurements at a low cost.

SITRANS TH product family

For detailed technical data on the SITRANS TH transmitters, please refer to the catalog FI 01.

- TH100 - the basic device
  - Output 4 to 20mA
  - for Pt100
  - can be configured using simple software
- TH320 - the universal device
  - Output 4 ... 20 mA or:
  - Output 4 ... 20 mA/HART
  - 1 x input resistance thermometer, thermocouples
  - Can be configured using simple software
- TH420 - Twice as safe
  - Output 4 ... 20 mA/HART
  - 2 x input resistance thermometer, thermocouples, hot backup, drift detection, etc. can be achieved as a result
  - Extended diagnostics functions

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## Function

A complete measuring point consists of a measuring insert which contains the basic sensors, the protective fitting and an optional transmitter.

The basic sensors are:

- Resistance thermometers:
  - Temperature measurement is based on the temperature dependency of the installed measuring resistor.
- Thermocouples:
  - Temperature measurement is based on the Seebeck effect. A thermocouple which subjected to a temperature drop produces thermoelectric voltage that can be measured.

Transmitters:

The optional Siemens transmitters assume the following functions:

- Optimum measurement processing
- Strengthening of weak sensor signals directly on site
- Transmits standardized signals
- Protects against electromagnetic interferences
- Support enhanced diagnosis options

The resistance thermometer is intended for installation in containers and pipelines.

- Modular design consisting of thermowell, measuring insert, connection head and optional transmitter.
- Transmitter can be integrated (4 to 20 mA, PROFIBUS PA or FOUNDATION Fieldbus)

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## Selection and ordering data

| SITRANS TS500 Threaded Sensor Assembly (no thermowell) | Article No. 7MC650 | ● - | ● | ● | ● | ● | - | 0 | ● | ● | ● | - | Order code ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | | |
| **Sheath material** | | | | | | | | | | | | | | | |
| 316L Stainless Steel | | **2** | | | | | | | | | | | | | |
| 310 Stainless Steel | | **4** | | | | | | | | | | | | | |
| Alloy 600 | | **7** | | | | | | | | | | | | | |
| **Form** | | | | | | | | | | | | | | | |
| Adjustable Compression Fitting | | | **2** | | | | | | | | | | | | |
| Fixed Welded | | | **3** | | | | | | | | | | | | |
| Spring-Loaded | | | **4** | | | | | | | | | | | | |
| **Process connection size** | | | | | | | | | | | | | | | |
| ½" NPT | | | | **J** | | | | | | | | | | | |
| **Insertion length (U-Length)** | | | | | | | | | | | | | | | |
| 1" | | | | | **P** | **0** | | | | | | | | | |
| 1.5" | | | | | **P** | **1** | | | | | | | | | |
| 2" | | | | | **P** | **2** | | | | | | | | | |
| 2.5" | | | | | **P** | **3** | | | | | | | | | |
| 3" | | | | | **P** | **4** | | | | | | | | | |
| 3.5" | | | | | **P** | **5** | | | | | | | | | |
| 4" | | | | | **P** | **6** | | | | | | | | | |
| 4.5" | | | | | **P** | **7** | | | | | | | | | |
| 5" | | | | | **P** | **8** | | | | | | | | | |
| 5.5" | | | | | **Q** | **0** | | | | | | | | | |
| 6" | | | | | **Q** | **1** | | | | | | | | | |
| 6.5" | | | | | **Q** | **2** | | | | | | | | | |
| 7" | | | | | **Q** | **3** | | | | | | | | | |
| 7.5" | | | | | **Q** | **4** | | | | | | | | | |
| 8" | | | | | **Q** | **5** | | | | | | | | | |
| 8.5" | | | | | **Q** | **6** | | | | | | | | | |
| 9" | | | | | **Q** | **7** | | | | | | | | | |
| 9.5" | | | | | **Q** | **8** | | | | | | | | | |
| 10" | | | | | **R** | **0** | | | | | | | | | |
| 10.5" | | | | | **R** | **1** | | | | | | | | | |
| 11" | | | | | **R** | **2** | | | | | | | | | |
| 11.5" | | | | | **R** | **3** | | | | | | | | | |
| 12" | | | | | **R** | **4** | | | | | | | | | |
| 12.5" | | | | | **R** | **5** | | | | | | | | | |
| 13" | | | | | **R** | **6** | | | | | | | | | |
| 13.5" | | | | | **R** | **7** | | | | | | | | | |
| 14" | | | | | **R** | **8** | | | | | | | | | |
| 14.5" | | | | | **S** | **0** | | | | | | | | | |
| 15" | | | | | **S** | **1** | | | | | | | | | |
| 15.5" | | | | | **S** | **2** | | | | | | | | | |
| 16" | | | | | **S** | **3** | | | | | | | | | |
| 16.5" | | | | | **S** | **4** | | | | | | | | | |
| 17" | | | | | **S** | **5** | | | | | | | | | |
| 17.5" | | | | | **S** | **6** | | | | | | | | | |
| 18" | | | | | **S** | **7** | | | | | | | | | |
| 18.5" | | | | | **S** | **8** | | | | | | | | | |
| 19" | | | | | **T** | **0** | | | | | | | | | |
| 19.5" | | | | | **T** | **1** | | | | | | | | | |
| 20" | | | | | **T** | **2** | | | | | | | | | |
| 20.5" | | | | | **T** | **3** | | | | | | | | | |
| 21" | | | | | **T** | **4** | | | | | | | | | |
| 21.5" | | | | | **T** | **5** | | | | | | | | | |
| 22" | | | | | **T** | **6** | | | | | | | | | |
| 22.5" | | | | | **T** | **7** | | | | | | | | | |
| 23" | | | | | **T** | **8** | | | | | | | | | |
| 23.5" | | | | | **U** | **0** | | | | | | | | | |
| 24" | | | | | **U** | **1** | | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS TS500 Threaded Sensor Assembly (no thermowell) | Article No. 7MC650 | ● - ● ● ● ● ● - 0 ● ● ● - | Order code ● ● ● |
|---|---|---|---|
| Other, specify U length | | Z 0 | K 1 Y |
| **Sensor diameter** | | | |
| ¼" | | 7 | |
| **Connection head** | | | |
| Cast Aluminum | | J | |
| Cast Stainless Steel | | S | |
| Flip-Top Aluminum | | B | |
| Explosion Proof Aluminum | | G | |
| Explosion Proof Aluminum with window and display | | H | |
| Explosion Proof SS | | U | |
| Without Head (for TF/display, use option A80-A86) | | N | |
| Other | | Z | P 1 Y |
| **Sensor type** | | | |
| **RTD**<br>Standard RTDs are 3-wire, 100 Ohm Platinum, 500 F | | | |
| Class B | | A 1 | |
| Class A | | A 2 | |
| Class AA (4-wire) | | A 3 | |
| Class B Dual | | A 5 | |
| Class A Dual | | A 6 | |
| High Vibration RTD (900 F) - Class B | | B 1 | |
| RTD high temp (900 F) - Class B | | C 1 | |
| **Thermocouple**<br>Standard thermocouples are ungrounded | | | |
| Type J | | J 1 | |
| Type J dual | | J 5 | |
| Type K | | K 1 | |
| Type K dual | | K 5 | |
| Type T | | T 1 | |
| Type T dual | | T 5 | |
| Type E | | E 1 | |
| Type E dual | | E 5 | |
| Other | | Z 0 | Q 1 Y |

| | Order code |
|---|---|
| **Options**<br>Please add "**-Z**" to Article No. and and add options, separate extensions with "+" | |
| **Hazardous area classification** | |
| FM non-Ex, general purpose | **E10** |
| FM flameproof NPT-thr. (incl. flame-path fitting) | **E13** |
| FM non incendive | **E16** |
| **Transmitter mounted in head**<br>Measuring range to be set must be specified with plain text data "Y01". | |
| SITRANS TH100, Input: 1 x Pt100, Output: 4-20 mA | **T12** |
| SITRANS TH320, Input: 1 x universal, Output: 4-20 mA | **T24** |
| SITRANS TH320, Input: 1 x universal, Output: 4-20 mA; HART | **T34** |
| SITRANS TH420, Input: 2 x universal, Output: 4-20 mA; HART | **T35** |
| **Transmitter with display** | |
| Dual chamber housing, Aluminum General purpose, with local operation and indicator (select internal transmitter via T**-option) | **A85** |
| Dual chamber housing, Aluminum XP, with local operation and indicator (select internal transmitter via T**-option) | **A86** |

| | Order code |
|---|---|
| **Other temperature transmitter (Metric housing, SST housing, etc)** | |
| Mounting of transmitter - ordered separately | **A80** |
| **Transmitter configuration** | |
| Specify measuring range in plain text | **Y01** |
| Specify HART-address (max. 8 characters) in plain text | **Y17** |
| Fail-safe value 3.6 mA (instead of 22.8 mA) | **U36** |
| **Certificates** | |
| Material certificate for wetted parts | **C12** |
| Cert SIL 2/3 | **C20** |
| Factory cal - matched pair | **C15** |
| 3-point factory calibration: sensor without transmitter. Default calibration = 32-212F (0-100C). Specify other range with option Y01 | **C60** |
| 3-point factory calibration: sensor with transmitter. Default calibration = 32-212F (0-100C). Specify other range with option Y01 | **C61** |
| CRN-marking (Specify which province via text) | **Y60** |
| **Sensor options** | |
| Grounded T/C (std = ungrounded) | **G31** |
| 4-wire RTD (std = 3-wire) | **R04** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further options** | |
| SS tag plate - wired to sensor assembly (connection head only) | **Y15** |
| Special option (define in plain text: "Y99:...") | **Y99** |

| SITRANS TS500 Barstock Thermowell Assembly | Article No. 7MC652 | ● - | ● ● | ● | ● | - | ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | |
| **Well material** | | | | | | | | |
| 316 SS | | 2 | | | | | | |
| Special Version (Y99 required) | | 8 | | | | | | |
| **Thermowell process connection type and size** | | | | | | | | |
| **Threaded thermowell** | | | | | | | | |
| ½" NPT | | | 1 | J | | | | |
| ½" NPT | | | 1 | K | | | | |
| 1" NPT | | | 1 | L | | | | |
| **Flanged thermowell** | | | | | | | | |
| 1.0" 150# RF | | | 2 | E | | | | |
| 1.0" 300# RF | | | 2 | F | | | | |
| 1.5" 150# RF | | | 2 | G | | | | |
| 1.5" 300# RF | | | 2 | H | | | | |
| 2.0" 150# RF | | | 2 | J | | | | |
| 2.0" 300# RF | | | 2 | K | | | | |
| 2.0" 300# RF | | | 2 | P | | | | |
| 3.0" 300# RF | | | 2 | Q | | | | |
| **Socket weld thermowell** | | | | | | | | |
| ¾" Socket Weld | | | 0 | K | | | | |
| 1" Socket Weld | | | 0 | L | | | | |
| **Other design** | | | | | | | | |
| Customer-specified connection (Specify in plain text) | | | 9 | X | | | | H 1 Y |
| **Thermowell form** | | | | | | | | |
| Straight | | | | | S | | | |
| Tapered | | | | | T | | | |
| Step-Down (Reduced) | | | | | U | | | |
| Other, specify thermowell form, U-length and T-length | | | | | Z | 8 | 8 | |
| **Insertion length (U-Length), with standard T-length (1.75")** | | | | | | | | |
| 2" | | | | | | 1 | 2 | |
| 2.5" | | | | | | 1 | 3 | |
| 3" | | | | | | 1 | 4 | |
| 3.5" | | | | | | 1 | 5 | |
| 4" | | | | | | 1 | 6 | |
| 4.5" | | | | | | 1 | 7 | |
| 5" | | | | | | 2 | 0 | |
| 5.5" | | | | | | 2 | 1 | |
| 6" | | | | | | 2 | 2 | |
| 6.5" | | | | | | 2 | 3 | |
| 7" | | | | | | 2 | 4 | |
| 7.5" | | | | | | 2 | 5 | |
| 8" | | | | | | 2 | 6 | |
| 8.5" | | | | | | 2 | 7 | |
| 9" | | | | | | 3 | 0 | |
| 9.5" | | | | | | 3 | 1 | |
| 10" | | | | | | 3 | 2 | |
| 10.5" | | | | | | 3 | 3 | |
| 11" | | | | | | 3 | 4 | |
| 11.5" | | | | | | 3 | 5 | |
| 12" | | | | | | 3 | 6 | |
| 12.5" | | | | | | 3 | 7 | |
| 13" | | | | | | 4 | 0 | |

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## Selection and ordering data (continued)

| SITRANS TS500 Barstock Thermowell Assembly | Article No. 7MC652 | ● - ● ● ● ● ● - ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|
| 13.5" | | 4 1 | |
| 14" | | 4 2 | |
| 14.5" | | 4 3 | |
| 15" | | 4 4 | |
| 15.5" | | 4 5 | |
| 16" | | 4 6 | |
| 16.5" | | 4 7 | |
| 17" | | 5 0 | |
| 17.5" | | 5 1 | |
| 18" | | 5 2 | |
| 18.5" | | 5 3 | |
| 19" | | 5 4 | |
| 19.5" | | 5 5 | |
| 20" | | 5 6 | |
| 20.5" | | 5 7 | |
| 21" | | 6 0 | |
| 21.5" | | 6 1 | |
| 22" | | 6 2 | |
| 22.5" | | 6 3 | |
| 23" | | 6 4 | |
| 23.5" | | 6 5 | |
| 24" | | 6 6 | |
| 24.5" | | 6 7 | |
| Other, specify U length | | Z 8 8 | K 1 Y |
| **Extension (A-length)** | | | |
| None | | 0 | |
| 3" Hex nipple-union-nipple, SS (HUNS) | | 7 | |
| 3" Nipple, SS (NS) | | 9 | N 0 G |
| 3" Nipple-union-nipple, galv. steel (NUN) | | 9 | N 0 M |
| 3" Nipple-union-nipple, SS (NUNS) | | 9 | N 0 N |
| 6" Nipple-union-nipple, galv. steel (NUN) | | 9 | N 9 M |
| 6" Nipple-union-nipple, SS (NUNS) | | 9 | N 9 N |
| 6" Hex nipple-union-nipple, SS (HUNS) | | 9 | N 9 H |
| Other | | 9 | N 8 Y |
| **Connection head** | | | |
| Cast Aluminum | | J | |
| Cast Stainless Steel | | S | |
| Flip-Top Aluminum | | B | |
| Explosion Proof Aluminum | | G | |
| Explosion Proof Aluminum with window and display | | H | |
| Explosion Proof SS | | U | |
| Without Head (for TF/display, use option A80-A86) | | N | |
| Other | | Z | P 1 Y |
| **Sensor type** | | | |
| **RTD**<br>Standard RTDs are 3-wire, 100 Ohm Platinum, 500 F | | | |
| Class B | | A 1 | |
| Class A | | A 2 | |
| Class AA (4-wire) | | A 3 | |
| Class B Dual | | A 5 | |
| Class A Dual | | A 6 | |
| High Vibration RTD (900 F) - Class B | | B 1 | |
| RTD high temp (900 F) - Class B | | C 1 | |
| **Thermocouple**<br>Standard thermocouples are ungrounded | | | |
| Type J | | J 1 | |
| Type J dual | | J 5 | |
| Type K | | K 1 | |
| Type K dual | | K 5 | |
| Type T | | T 1 | |

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## Selection and ordering data (continued)

| SITRANS TS500 Barstock Thermowell Assembly | Article No. 7MC652 | Order code |
|---|---|---|
| Type T dual | | T 5 |
| Type E | | E 1 |
| Type E dual | | E 5 |
| **Other sensor**<br>Other, specify type (Q1Y = ...) | | Z 0 Q 1 Y |
| **No sensor**<br>For well-only configurations | | N 0 |

| | Order code |
|---|---|
| **Options**<br>Please add "**-Z**" to Article No. and and add options, separate extensions with "+" | |
| **Hazardous area classification** | |
| FM non-Ex, general purpose | **E10** |
| FM flameproof NPT-thr. (incl. flame-path fitting) | **E13** |
| FM non incendive | **E16** |
| **Transmitter mounted in head**<br>Measuring range to be set must be specified with plain text data "Y01". | |
| SITRANS TH100, Input: 1 x Pt100, Output: 4-20 mA | **T12** |
| SITRANS TH320, Input: 1 x universal, Output: 4-20 mA | **T24** |
| SITRANS TH320, Input: 1 x universal, Output: 4-20 mA; HART | **T34** |
| SITRANS TH420, Input: 2 x universal, Output: 4-20 mA; HART | **T35** |
| **Transmitter with display** | |
| Dual chamber housing, Aluminum General purpose, with local operation and indicator (select internal transmitter via T**-option) | **A85** |
| Dual chamber housing, Aluminum XP, with local operation and indicator (select internal transmitter via T**-option) | **A86** |
| **Other temperature transmitter (Metric housing, SST housing, etc)** | |
| Mounting of transmitter - ordered separately | **A80** |
| **Transmitter configuration** | |
| Specify measuring range in plain text | **Y01** |
| Specify HART-address (max. 8 characters) in plain text | **Y17** |
| Fail-safe value 3.6 mA (instead of 22.8 mA) | **U36** |
| **Certificates** | |
| Material certificate for wetted parts | **C12** |
| Cert SIL 2/3 | **C20** |

| | Order code |
|---|---|
| Hydrostatic pressure test | **C31** |
| Thermowell NACE cert. | **C50** |
| Oxygen-cleaned (ISO 9001 grease-free for oxygen service) | **C51** |
| Inspection certificate Thermowell calculation according ASME PTC 19.3 (Murdock) | **C37** |
| Factory cal - matched pair | **C15** |
| 3-point factory calibration: sensor without transmitter. Default calibration = 32-212F (0-100C). Specify other range with option Y01 | **C60** |
| 3-point factory calibration: sensor with transmitter. Default calibration = 32-212F (0-100C). Specify other range with option Y01 | **C61** |
| CRN-marking (Specify which province via text) | **Y60** |
| **Thermowell options** | |
| Thermowell lag-length (T-length): 2 .. 3.5 inch: please specify in 1/2" steps | **Y40** |
| Thermowell lag-length (T-length): 4 .. 6 inch: please specify in 1/2" steps | **Y41** |
| Thermowell lag-length (T-length): longer than 6 inch: please specify in 1/2" steps | **Y42** |
| **Full penetration welding for flanged process connections** | |
| Full penetration weld | **G02** |
| X-ray test certificate for full penetration weld | **C41** |
| Ultrasonic test certificate for full penetration weld | **C44** |
| **Sensor options** | |
| Grounded T/C (std = ungrounded) | **G31** |
| 4-wire RTD (std = 3-wire) | **R04** |
| **Further options** | |
| SS tag plate - wired to sensor assembly (connection head only) | **Y15** |
| Special option (define in plain text: "Y99:...") | **Y99** |

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## Technical specifications

***Measuring technology: Sensor elements***

The diverse application spectrum for industrial temperature measuring technology requires different sensor technologies.

Resistance thermometer

Sensor elements made of other basic materials with different nominal resistances or different underlying standards are available on request. Resistance thermometers can be classified as follows:

- Basic design:
  - The sensor element is built with thin layer technology. The resistance material is applied in the form of a thin layer on a ceramic carrier material.
- Versions featuring increased vibration-resistance:
  - In addition to the basic design, the vibration resistance is improved through extra measures.
- Versions with expanded measuring range:
  - Elements in wire-wound design. The wire winding is embedded in a ceramic body.

Thermocouples

Other thermocouples based on other thermo couples or underlying standards are available upon request.

The most common base metal thermocouples include:

- Type K (NiCr-Ni) more stable than type J, but drifts in upper range.
- Type J (Fe-CuNi) narrow application band

***Measuring technology: Measuring range***

The measuring range describes the temperature limits within which the thermometer can be used in a way that is meaningful for measurement purposes. Depending on the loads present, the thermowell materials and the desired accuracy levels, the actual application range for the thermometer may be smaller.

| Resistance thermometer [°C (°F)] | |
|---|---|
| Basic version and increased vibration resistance | -50 ... +400 (-58 ... +752) |
| Expanded measuring range | -196 ... +600 (-320.8 ... +1112) |

| Thermocouple [°C (°F)] | |
|---|---|
| Type K | -40 ... +1000 (-40 ... +1132) |
| Type J | -40 ... +750 (-40 ... +1382) |

***Measuring technology: Measuring accuracy***

Resistance thermometer

The tolerance classes of the resistance thermometers correspond with IEC 751/EN 60751:

| Tolerance | Δt |
|---|---|
| Basic accuracy, Class B | ±(0.30 °C +0.0050\|t[°C]\|)<br>±(0.54 °F +0.0050\|t [°F]-32\|) |
| Increased accuracy, Class A | ±(0.15 °C +0.0020\|t[°C]\|)<br>(±(0.27 °F +0.0020\|t [°F]-32\|)) |
| High degree of accuracy, Class A+ (1/3 B) | ±(0.10 °C +0.0017\|t[°C]\|)<br>(±(0.18 °F +0.0017\|t [°F]-32\|)) |

The following tables provide an overview of the scope of these tolerances. If you exceed the specified limits with a resistance thermometer, the values of the next lower accuracy class apply:

| Resistance thermometer<br>Basic version [°C (°F)] | |
|---|---|
| **Tolerance** | **Range** |
| Basic accuracy, Class B | -50 ... +400 (-58 ... +752) |
| Increased accuracy, Class A | -30 ... +300 (-22 ... +572) |
| High degree of accuracy, Class A+ (1/3 B) | 0 ... 150 (32 ... 302) |

| Resistance thermometer<br>Increased vibration-resistance [°C (°F)] | |
|---|---|
| **Tolerance** | **Range** |
| Basic accuracy, Class B | -50 ... +400 (-58 ... +752) |
| Increased accuracy, Class A | -30 ... +300 (-22 ... +572) |
| High degree of accuracy, Class A+ (1/3 B) | 0 ... 150 (32 ... 302) |

| Resistance thermometer<br>Expanded measuring range [°C (°F)] | |
|---|---|
| **Tolerance** | **Range** |
| Basic accuracy, Class B | -196 ... +600 (-321 ... +1112) |
| Increased accuracy, Class A | -100 ... +450 (-148 ... +842) |

Thermocouples

The tolerance classes of the thermocouples correspond with IEC 584/EN 60584.

Catalog versions

| Type | Basic accuracy, Class 2 | Increased accuracy, Class 1 |
|---|---|---|
| K | -40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F)<br>333 °C ... 1000 °C ±0.0075x\|t[°C]\| (631 °F ... 1832 °F ±0.0075x\|t[°F]-32\|) | -40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F)<br>375 °C ... 1000 °C ±0.004x\|t[°C]\| (707 °F ... 1832 °F ±0.004x\|t[°F]-32\|) |
| J | -40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F)<br>333 °C ... 750 °C ±0.0075x\|t[°C]\| (631 °F ... 1382 °F ±0.0075x\|t[°F]-32\|) | -40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F)<br>375 °C ... 750 °C ±0.004x\|t[°C]\| (707 °F ... 1382 °F ±0.004x\|t[°F]-32\|) |

Other thermocouples, ignoble

| Type | Basic accuracy, Class 2 | Increased accuracy, Class 1 |
|---|---|---|
| T | -40 °C ... 133 °C ±1 °C (-40 °F ... +271 °F ±1.8 °F)<br>133 °C ... 350 °C ±0.0075x\|t[°C]\| (271 °F ... 662 °F ±0.0075x\|t[°F]-32\|) | -40 °C ... +125 °C ±0.5 °C (-40 °F ... +257 °F ±0.9 °F)<br>125 °C ... 350 °C ±0.004x\|t[°C]\| (257 °F ... 662 °F ±0.004x\|t[°F]-32\|) |
| E | -40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F)<br>333 °C ... 900 °C ±0.0075x\|t[°C]\| (631 °F ... 1652 °F ±0.0075x\|t[°F]-32\|) | -40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F)<br>375 °C ... 800 °C ±0.004x\|t[°C]\| (707 °F ... 1472 °F ±0.004x\|t[°F]-32\|) |

Other thermocouples, noble

| Type | Basic accuracy, Class 2 | Increased accuracy, Class 1 |
|---|---|---|
| R and S | 0 °C ... 600 °C±1.5 °C (32 °F ... 1112 °F±2.7 °F)<br>600 °C ... 1600 °C±0.0025 x \|t\| (1112 °F ... 2912 °F±0.0025 x \|t\|) | 0 °C ... 1100 °C±1 °C (32 °F ... 2012 °F±1.8 °F)<br>1100 °C ... 1600 °C±[1 + 0.003 (t - 1100)] °C<br>(2112 °F ... 2912 °F±[1.8 + 0.003 (t - 212)] °F) |
| B | 600 °C ... 1700 °C±0.0025 x \|t\|<br>(1112 °F ... 3092 °F±0.0025 x \|t\|) | |

***Measuring technology: Connection types***

In the case of resistance thermometers, the type of sensor connection directly affects the level of accuracy:

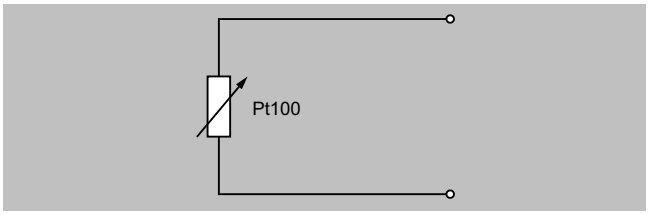
Two-wire system

The resistance of sensor lines are included in the measurement result as an error. Adjustments are recommended in this case.

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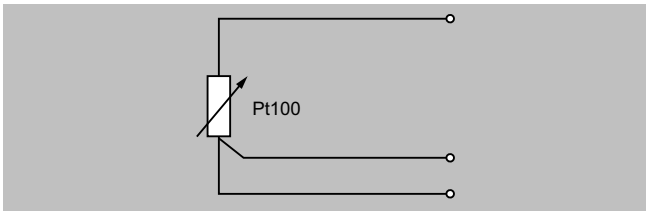
## Technical specifications (continued)




Pt100 Two-wire system

Three-wire system

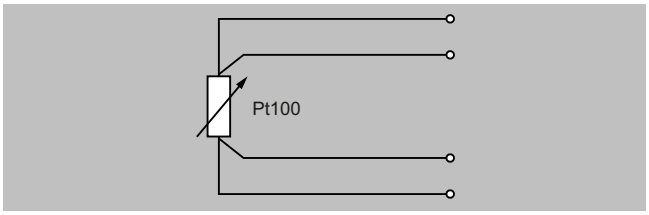
Line resistance is not included in the measurement result. Requirements: all terminal and line resistances (corrosion) are at the same level, and terminals are at the same temperature level.




Pt100 Three-wire system

Four-wire system

Line resistance is not included in the measurement result. This type of connection is the most secure and most accurate.




Pt100 Four-wire system

Siemens measuring inserts can be used to implement all types of connections for 1 x Pt100 devices. In the case of 2 x Pt100 versions, two- and three-wire systems are also possible. For measurement-related reasons, we always recommend a 1 x four-wire or 2 x 3-wire connection.

Thermowell calculation

Properly applied load diagrams will provide a sufficient degree of safety for the most common thermowell configurations.

However, there are cases in which operating conditions deviate too greatly from standard parameters. In this case, a customized thermowell calculation may be required.

Another reason for doing this calculation is the fact that flowing media can create turbulence at the tip of the thermowell under certain conditions. The thermowell will then vibrate and may even be destroyed if not configured correctly. This is the most frequent cause of thermowell bailure.

SIEMENS offers the two recognized methods for calculating the thermowell:

- DIN/Dittrich method
- ASME/Murdock method
  - This method also takes into account turbulence formation on a mathematical level.

Both methods provide a high degree of safety with regard to thermowell configuration, however, they do not provide a guarantee against breakdowns.

Materials

| Material descriptions/Standards comparison | | | | Max. temperature [°C (°F)] (unloaded) | Properties | Applications |
|---|---|---|---|---|---|---|
| **Mat. No.:** | **AISI/Trade name:** | **EN 10028-2:** | **Description** | | | |
| 1.4404 or 1.4435 | AISI 316 L | X2CrN-iMo17-12-2 | Austenitic stainless steel | 600 (1112) | Good acid resistance, resistant against grain boundary corrosion | Chemical industry, waste treatment, paper and cellulose industry, food industry |
| 2.4816 | Inconel 600 | NiCr15Fe | Nickel-Chrome alloy | 1150 (2102) | Resistant at high temperatures, resistant against chlorine-induced cold crack corrosion | Chemical industry, petrochemical industry, food industry |

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## Technical specifications (continued)

| Material descriptions/Standards comparison | | | | Max. temperature [°C (°F)] (unloaded) | Properties | Applications |
|---|---|---|---|---|---|---|
| 1.4876 | Incoloy 800 | X10NiCrAlTi32--21 | Austenitic heatresistant stainless steel | 1100 (2012) | Excellent resistance against oxidation and carbonization at high temperatures, good corrosion resistance | O&G industry, waste gas treatment, power plants (steam boiler, heat exchanger), applications using aggressive fluids |
| 2.4819 | Hastelloy C 276 | NiMo16Cr15W | Nickel-Chrome-Molybdenum alloy | 1100 (2012) | Resistant at high temperatures, in oxidizing and reducing atmosphere, resistant against pitting and crevice corrosion, good corrosion resistance after welding | Chemicals industry, paper and cellulose industry, waste treatment, waste incinerators, emissions controls, shipbuilding and offshore industry |
| 2.4360 | Monel 400 | NiCu30Fe | Nickel-Copper alloy | 500 (932) | Excellent corrosion resistance, particularly against chlorineinduced cold crack corrosion | Chemical industry, offshore industry, nuclear technology, petrochemical industry |

Where cost-intensive materials are used with flange thermowells, cost savings can be achieved by using a so-called flanged wheel. A thin disc of the material which comes into contact with media is applied prior to the flange (ordinary stainless steel).

Vibration resistance of measuring insert, cable sensor

Similar to the thermowell, inner (Karman vortices) and outer (plant) vibrations also affect the measuring insert. For this reason, a special assembly of measurement elements is required. Other than a few exceptions for cable and compact thermometers, Siemens only produces sensors based on a mineral-insulated cable. Together with precautions taken when installing the measuring element, the Siemens basic version already exceeds EN 60751 by more than a factor of 3. Pursuant to the measurement methods of this standard, the following values are obtained (tip-tip):

- 10 g: Basic version and expanded measuring range
- 60 g: Increased vibration-resistance and thermocouple

***Electrical stability***

Insulation resistance

The insulation resistance between each measuring circuit and the fitting is tested at a voltage of 500 V DC at room temperature.

Riso ≥ 100 MΩ

Due to the property of the mineral-insulated cable, the insulation resistance decreases as temperature increases. Because of the special production method, it is, however, possible to achieve very good values even at high temperatures.

Line resistance

When connected to two-wire systems, the line resistance is included in the measurement result. The following rule of thumb can be used:

- Ø Measuring insert 6 mm (0.24 in) 2.8 Ω/m or 44.78 (44.78 ).

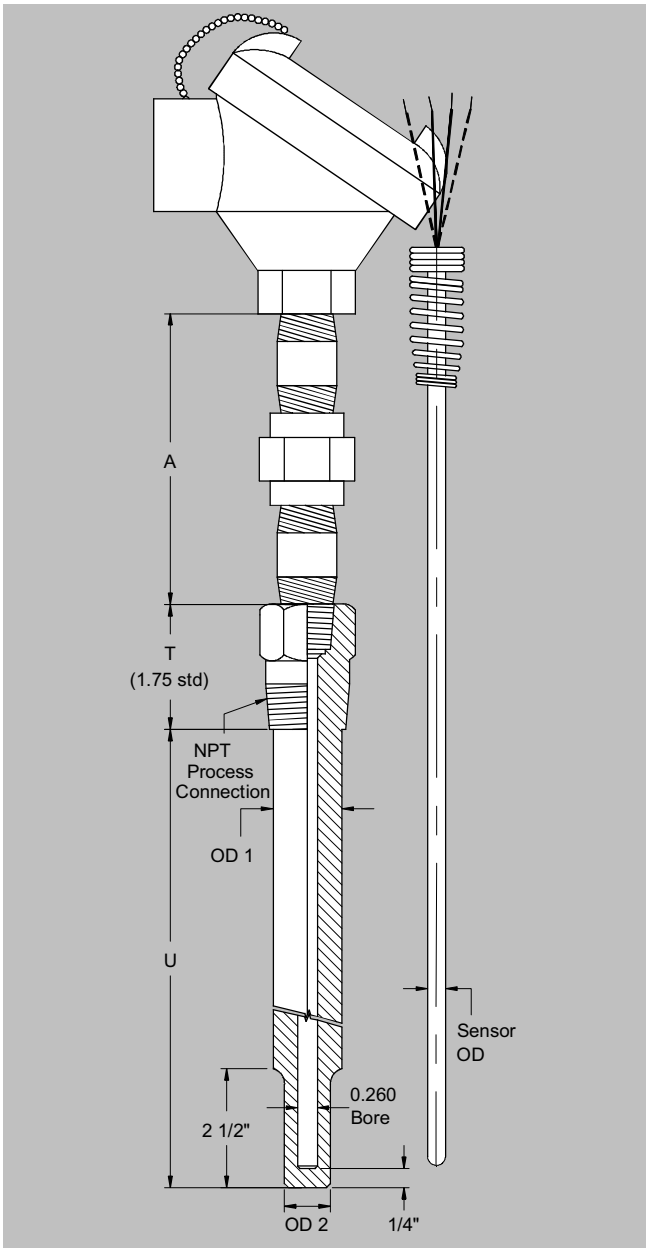
For this reason a connection to three- or four-wire systems is highly recommended.

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## Dimensional drawings

***Step down threaded well assemblies***

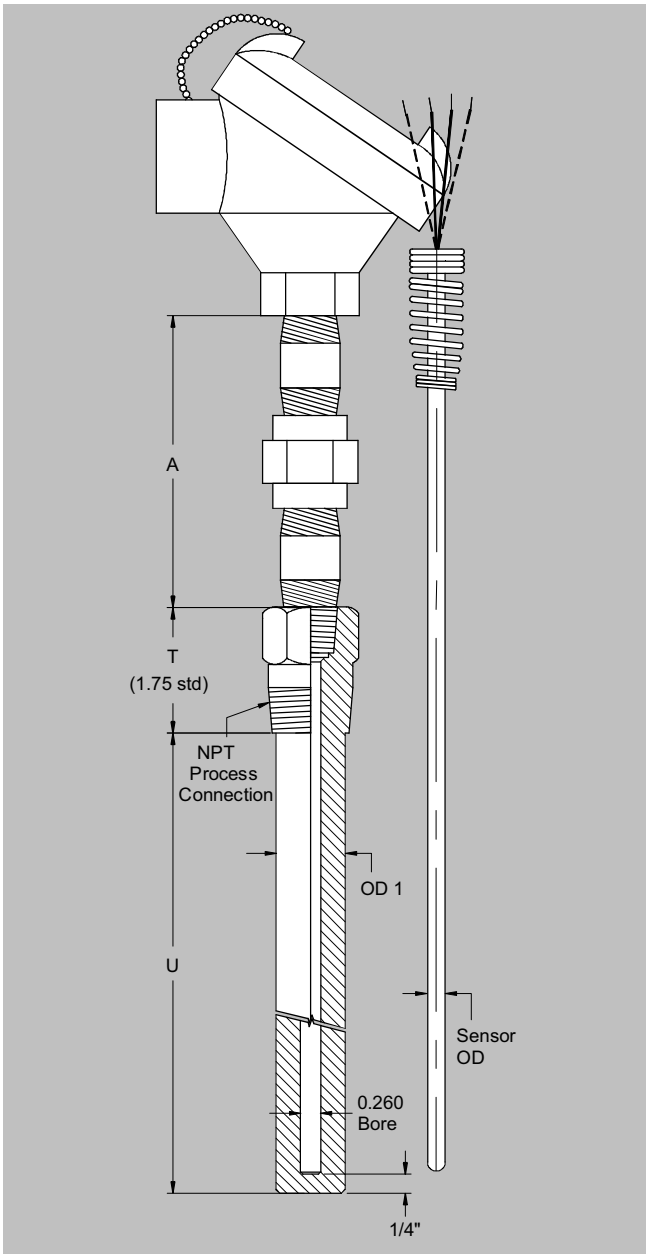



Dimensions in inch

| Process NPT | OD1 | OD2 |
|---|---|---|
| ½" | 0.68" | 5/8" |
| ¾" | 7/8" | 5/8" |
| 1" | 1 1/16" | 5/8" |
| 1 ¼" | 1 1/8" | ¾" |
| 1 ½" | 1 1/8" | ¾" |

## Dimensional drawings (continued)

***Straight threaded well assemblies***




Dimensions in inch

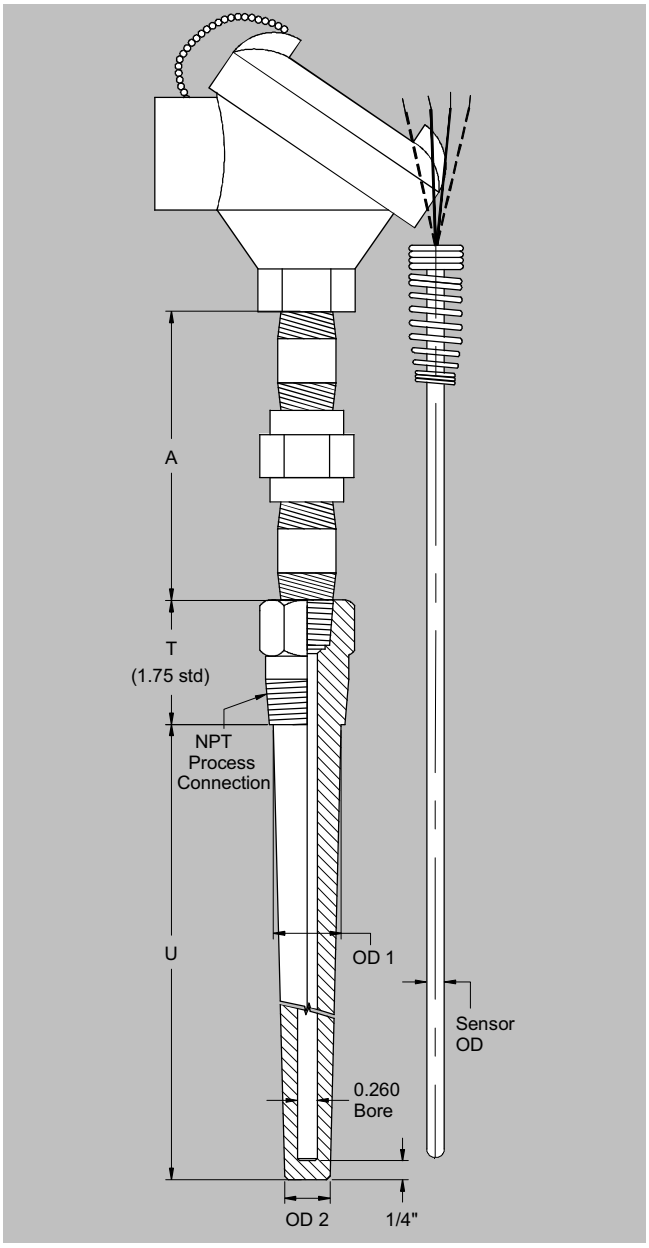
| Process NPT | OD1 |
|---|---|
| ½" | 0.68" |
| ¾" | ¾" |
| 1" | 7/8" |
| 1 ¼" | 1 1/8" |
| 1 ½" | 1 1/8" |

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## Dimensional drawings (continued)

***Tapered threaded well assemblies***

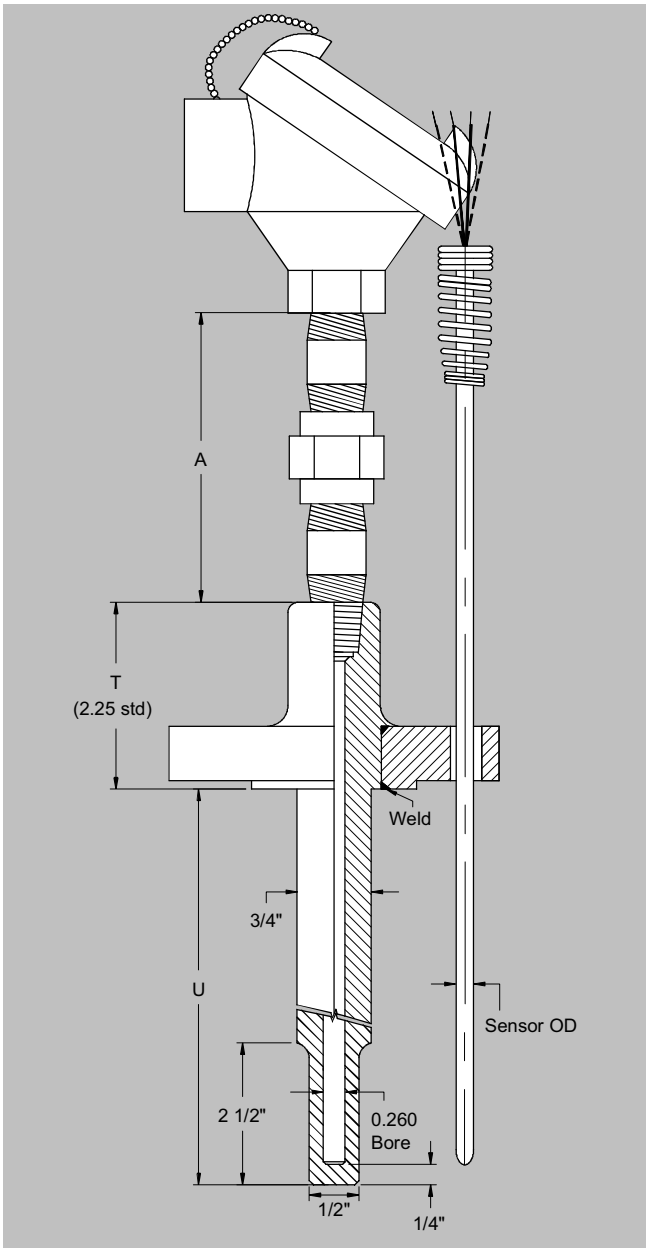



Dimensions in inch

| Process NPT | OD1 | OD2 |
|---|---|---|
| ½" | 0.68" | 5/8" |
| ¾" | 7/8" | 5/8" |
| 1" | 1 1/16" | 5/8" |
| 1 ¼" | 1 1/8" | ¾" |
| 1 ½" | 1 1/8" | ¾" |

## Dimensional drawings (continued)

***Step down flanged well assemblies***



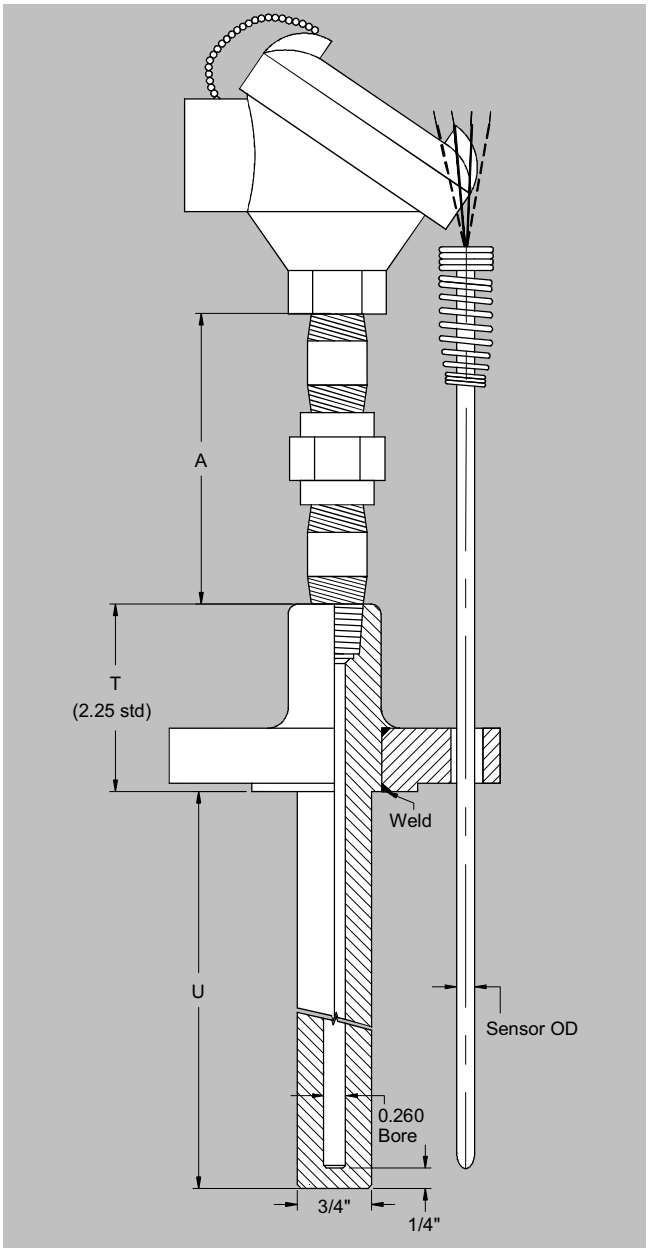

Dimensions in inch

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## Dimensional drawings (continued)

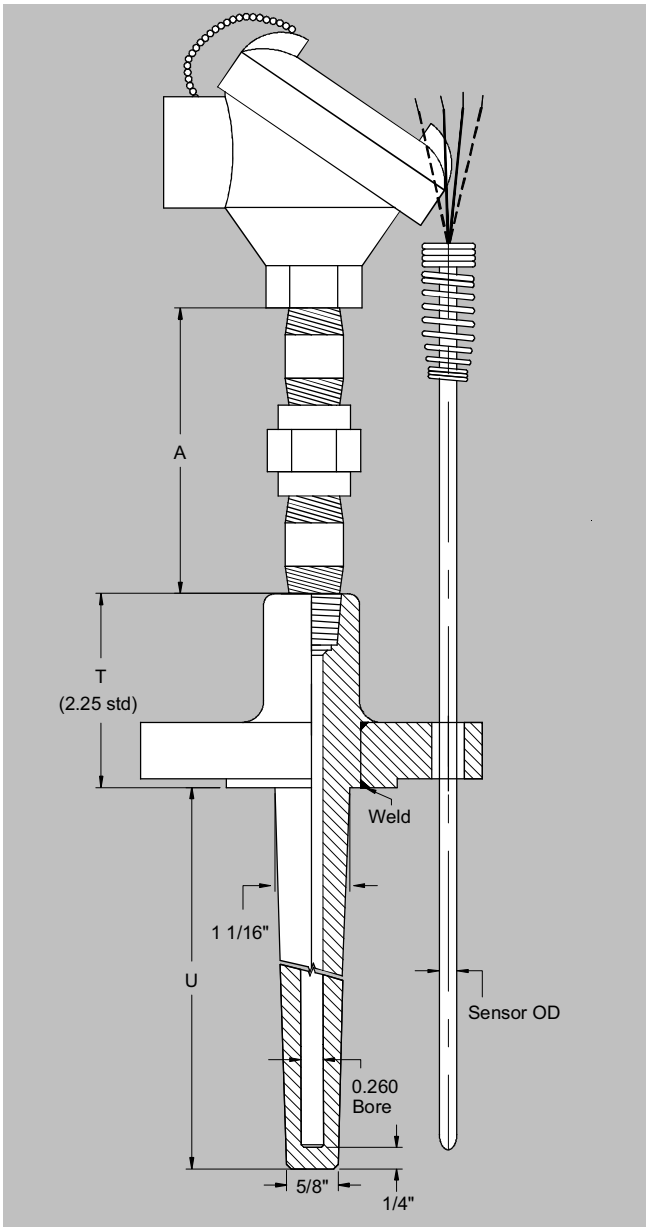
***Straight flanged well assemblies***




Dimensions in inch

## Dimensional drawings (continued)

***Tapered flanged well assemblies***



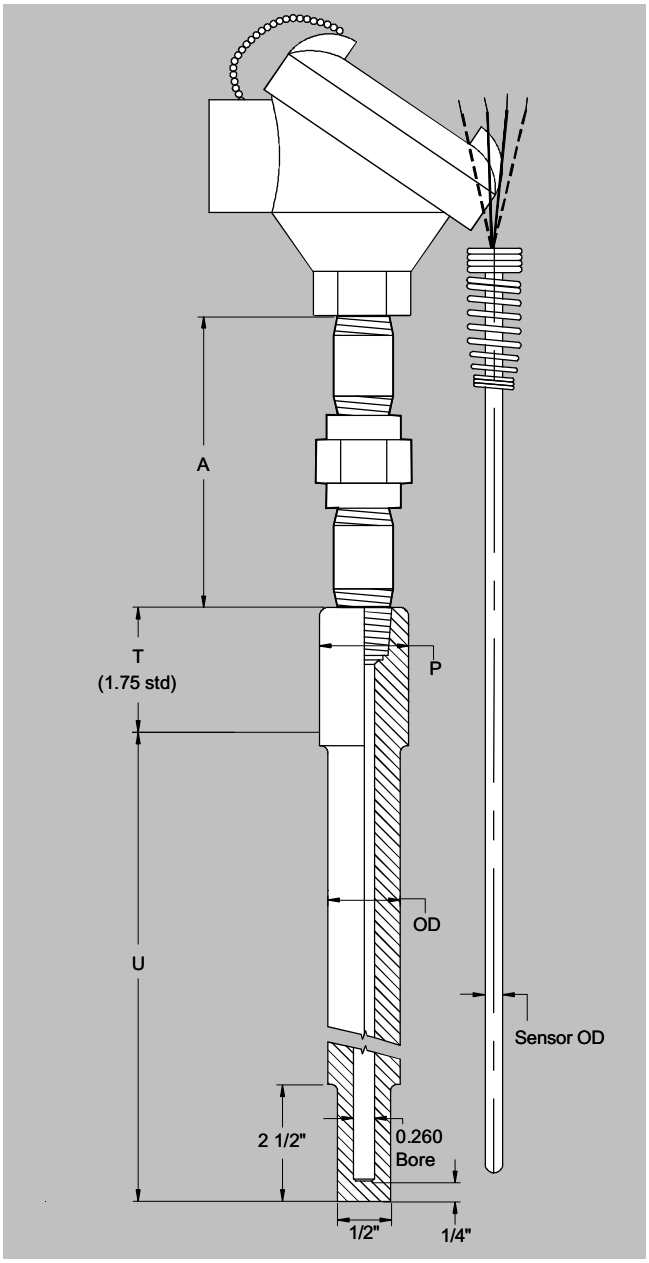

Dimensions in inch

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## Dimensional drawings (continued)

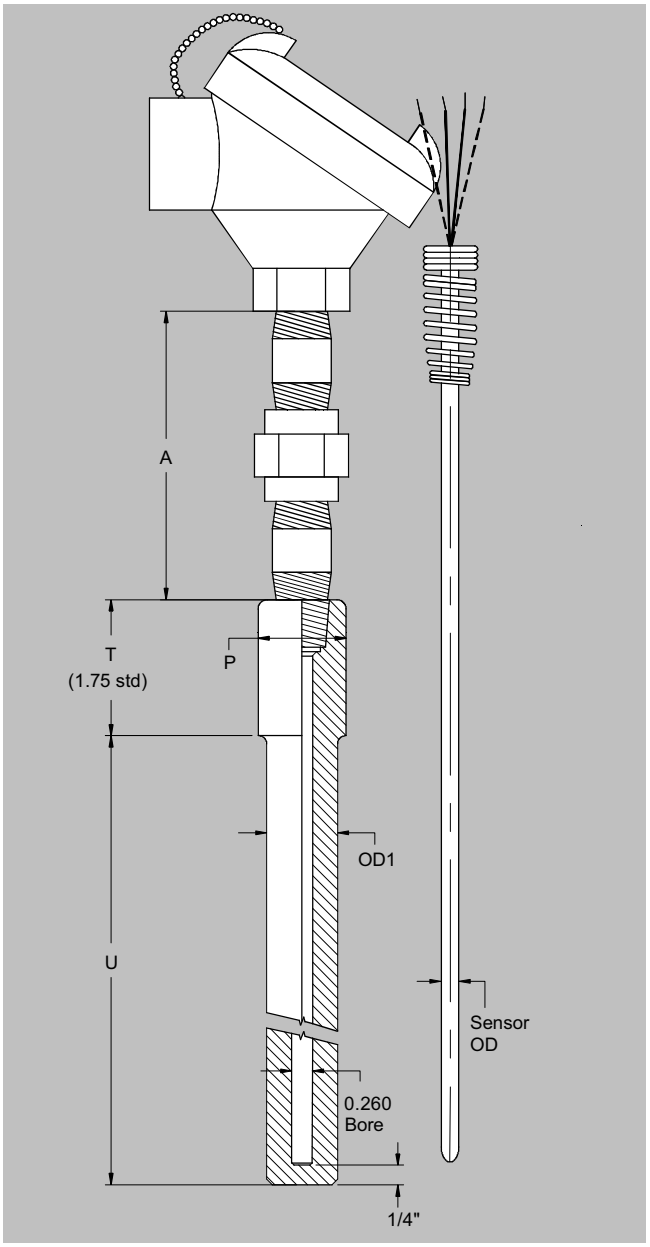
***Step down socket well assemblies***




Dimensions in inch

## Dimensional drawings (continued)

***Straight socket well assemblies***




Dimensions in inch

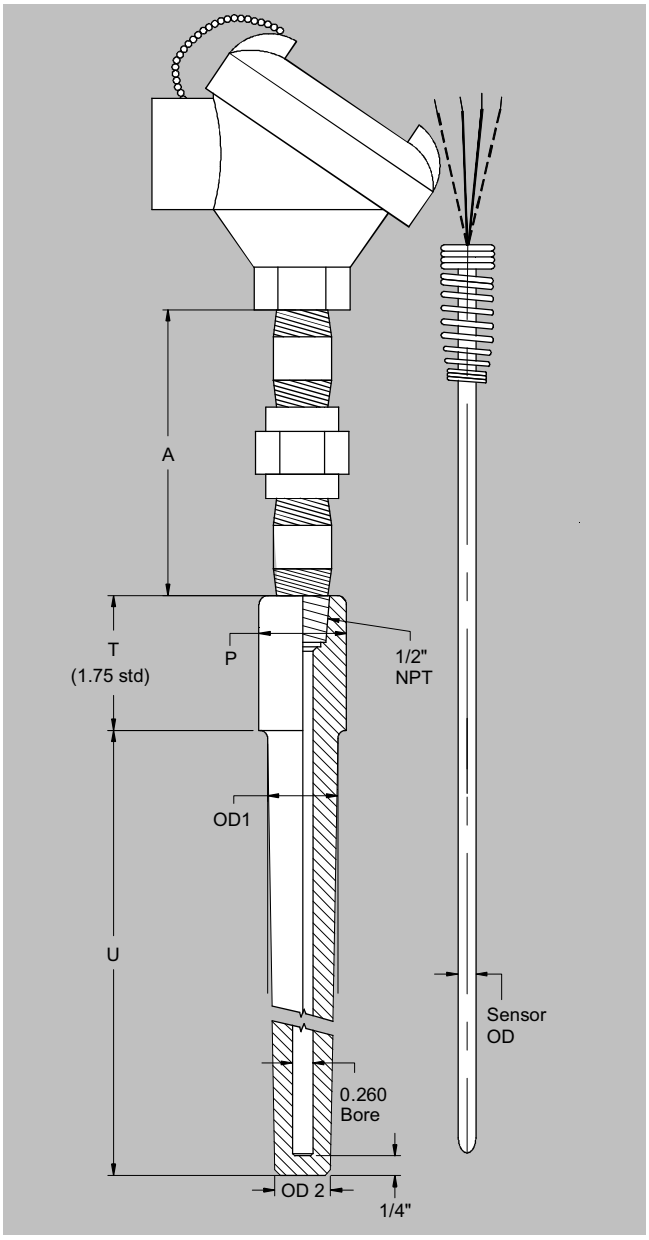
| Process NPT | OD1 |
|---|---|
| ½" | 0.68" |
| ¾" | ¾" |
| 1" | 7/8" |
| 1 ¼" | 1 1/8" |
| 1 ½" | 1 1/8" |

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## Dimensional drawings (continued)

### *Tapered socket well assemblies*

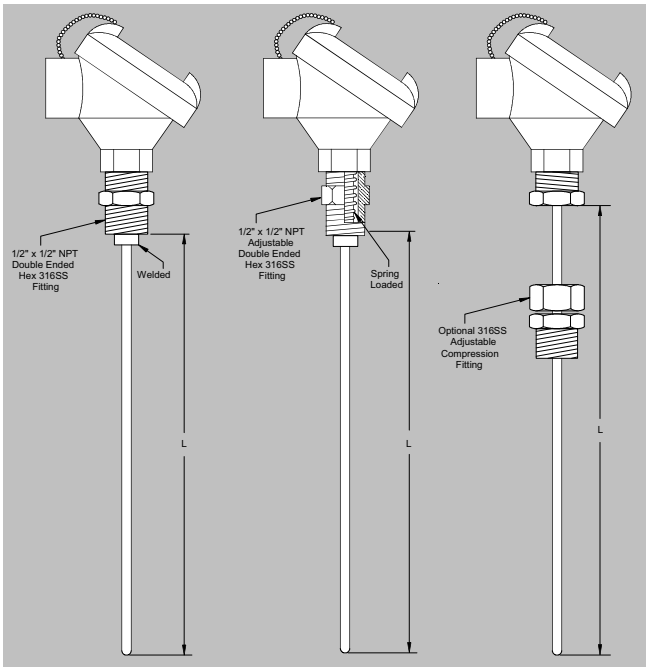



Dimensions in inch

| Process NPT | OD1 | OD2 |
|---|---|---|
| ½" | 0.68" | 5/8" |
| ¾" | 7/8" | 5/8" |
| 1" | 1 1/16" | 5/8" |
| 1 ¼" | 1 1/8" | ¾" |
| 1 ½" | 1 1/8" | ¾" |

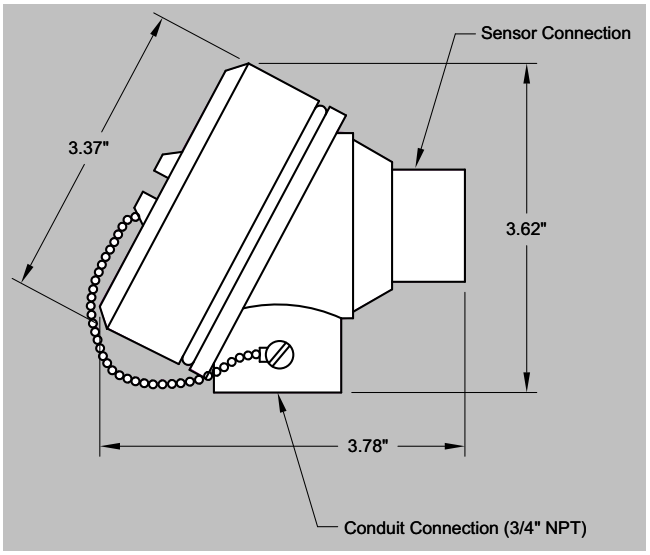
## Dimensional drawings (continued)

### *General purpose sensors*




Dimensions in inch

### *Connection heads*

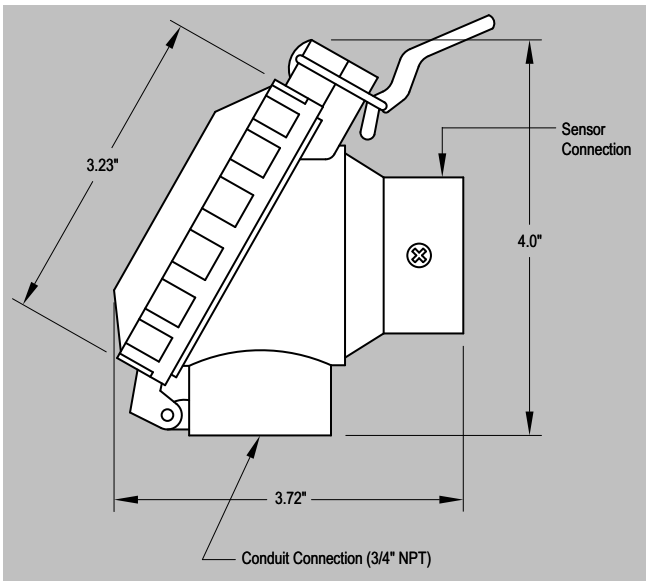



Connection head, aluminum (types G and J), stainless steel (types S and U)

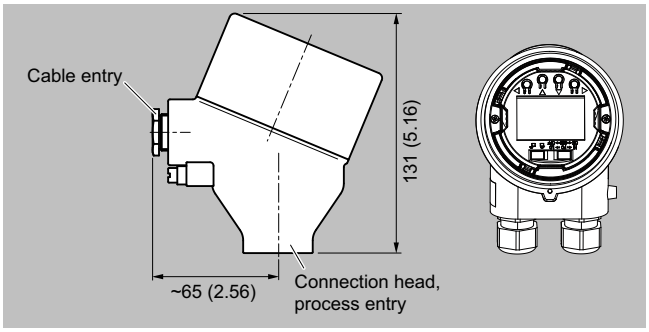
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## Dimensional drawings (continued)



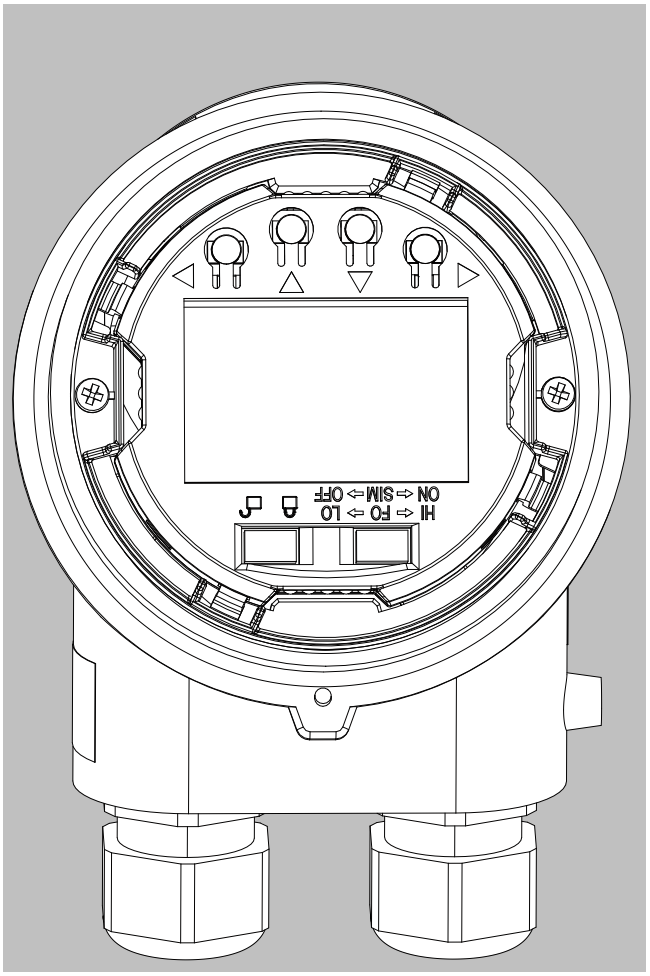

Connection head, flip-top aluminum (type B)




Connection head with 4-20 mA display, aluminum, type AH0, stainless steel, type AV0, dimensions in mm (inch)

## Dimensional drawings (continued)

SITRANS TS500 – Connection head with display

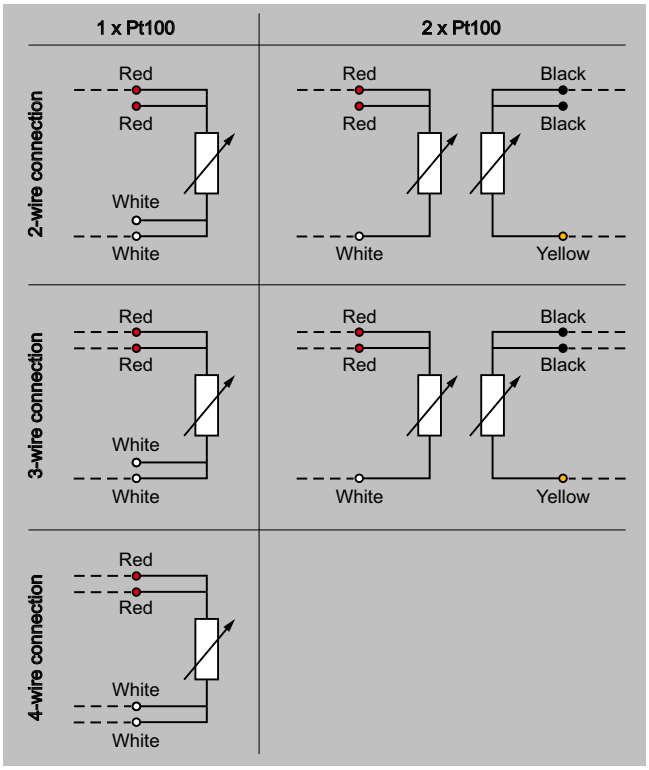


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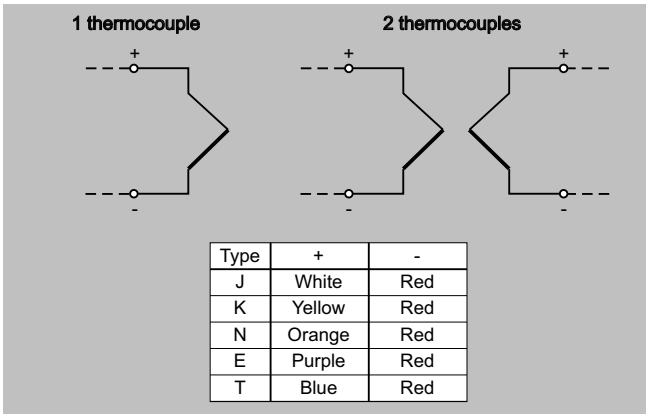
## Circuit diagrams

### *Resistance thermometer*




Schematics 1 x Pt100-2W up to 2 x Pt100-4W

### *Thermocouples*




| Type | + | - |
|---|---|---|
| J | White | Red |
| K | Yellow | Red |
| N | Orange | Red |
| E | Purple | Red |
| T | Blue | Red |

Circuit diagram for thermocouple

Where thermocouples are used, the use of head transmitters offers particular advantages: The cold junction is already integrated into the universal transmitter. There is no need for expensive thermo or extension cable. This also removes a number of possible error sources. The weak millivolt signal of the thermocouple is already converted into a stable and temperature-linear DC or bus signal on site. This drastically reduces the effects of electromagnetic factors on the measurement result.

If a head transmitter is not installed, the sensor feed line consists either of the appropriate thermo or extension leads. The thermo line is made from the thermo material of the relevant thermo-couple, while the extension lead uses a cost-effective substitute material. The extension cable behaves similar to a thermo line at an electrical level, within a limited temperature range of up to 200°C. A wide spectrum of color coding is available for thermocouples on an international level. This must be taken into account during the electrical connecting.

| Country | International/Germany | | | North America | | | UK/Czech Republic | | |
|---|---|---|---|---|---|---|---|---|---|
| **Standard** | Not intrinsically safe[1] | | | Extension lead[2] | | | BS 1843 | | |
| | Jacket | + | - | Jacket | + | - | Jacket | + | - |
| N | PN | PN | WH | OG | OG | RD | OG | OG | BU |
| K | GN | GN | WH | YE | YE | RD | RD | BR | BU |
| J | BK | BK | WH | BK | WH | RD | BK | YE | BU |
| T | BR | BR | WH | BU | BU | RD | BU | WH | BU |
| E | VT | VT | WH | VT | VT | RD | BR | BR | BU |
| R+S | OG | OG | WH | | BK | RD | GN | WH | BU |
| B | GY | GY | WH | GY | GY | RD | - | - | - |

[1] With an intrinsically safe line as per IEC 584-3, the sheath is always blue.
[2] For thermo lines as per ANSI MC96, the sheath is always blue.

| Country | Netherlands | | | Japan | | | France | | |
|---|---|---|---|---|---|---|---|---|---|
| **Standard** | DIN 43714 | | | ISC 1610-198 | | | NF C42-323 | | |
| | Jacket | + | - | Jacket | + | - | Jacket | + | - |
| N | GN | RD | GN | BU | RD | WH | VT | VT | YE |
| K | BU | RD | BU | YE | RD | WH | BK | BK | YE |
| J | BR | RD | BR | BR | RD | WH | BU | BU | YE |
| T | BK | RD | BK | VT | RD | WH | OG | OG | YE |
| E | WH | RD | WH | BK | RD | WH | GN | GN | YE |
| R+S | GY | RD | GY | GY | RD | WH | - | - | - |
| B | GN | RD | GN | BU | RD | WH | VT | VT | YE |

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## Circuit diagrams (continued)

| Abbreviation for colors | | | | |
|---|---|---|---|---|
| BK: black | BR: brown | BU: blue | GD: gold | GN: green |
| GY: gray | OG: orange | PN: pink | RD: red | SR: silver |
| TQ: turquoise | VT: violet | WH: white | YE: yellow | |

***Transmitters***

In addition, our transmitters also allow for a large number of other possible connections (e.g. difference, average, two sensors). More information can be obtained at: http://www.usa.siemens.com/temperature

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## Overview




The SITRANS TH100, which represents an economical alternative by dispensing with galvanic isolation and universal sensor connection, is ideally suited for Pt100 measurements.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Its compact design makes the SITRANS TH100 suitable for retrofitting measuring points or replacing analog transmitters.

The transmitter is available in a non-Ex version and in a version suitable for use in hazardous areas.

## Benefits

- Transmitter with 2-wire system
- Mounting in connection head, type B or larger or on DIN rail
- Programmable; as a result, the sensor connection, measuring range and much more are programmable
- Intrinsically safe version for use in hazardous areas

## Application

The SITRANS TH100 transmitter can be used for temperature measurement with Pt100 resistance thermometers in all industries. Its compact size means that it can be installed in connection heads of type B or larger.

The output signal is a load-independent direct current of 4 to 20 mA which is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "Modem for SITRANS TK" (article number 7NG3190-6KB), you can continue to use this for parameterization of the SITRANS TH100.

Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices meet the directive 2014/34/EU (ATEX) as well as the FM and CSA requirements.

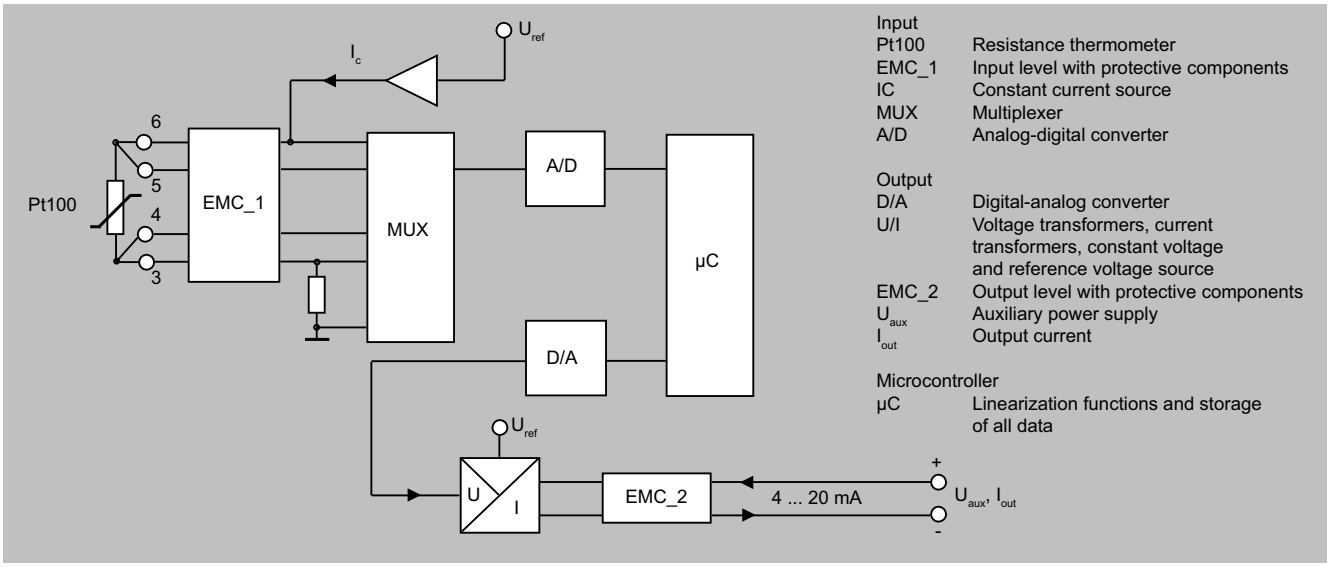
## Function

***Mode of operation***

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire connection) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog-to-digital converter. They are converted in the microcontroller in accordance with the sensor characteristic and further parameters (measuring range, damping, ambient temperature, etc.).

The signal prepared in this way is converted in an analog-to-digital converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.




SITRANS TH100, function block diagram

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## Selection and ordering data

| | Article No. |
|---|---|
| **SITRANS TH100 head transmitter for Pt100**<br>For installation in connection head type B, 2-wire system 4 ... 20 mA, programmable, without galvanic isolation | |
| Without explosion protection | **7NG3211-0NN00** |
| With explosion protection "Intrinsic safety" type of protection and for zone 2 | |
| • According to ATEX | **7NG3211-0AN00** |
| • According to FM ($_cFM_{US}$) | **7NG3211-0BN00** |

| **Options**<br>**Add "-Z" to article number, specify order code and, if applicable, plain text** | **Order code** |
|---|---|
| Test report (5 measuring points) | **C11** |
| **Customer-specific programming** | |
| Specify measuring range to be set in plain text (max. 5 digits):<br>Y01: ... to ... °C, °F | **Y01**[1] |
| Measuring point number (TAG) max. 8 characters | **Y17**[2] |
| Measuring point description, max. 16 characters | **Y23**[2] |
| Pt100 (IEC) 2-wire, $R_L$ = 0 Ω | **U02**[3] |
| Pt100 (IEC) 3-wire | **U03**[3] |
| Pt100 (IEC) 4-wire | **U04**[3] |
| Enter special deviating customer-specific setting in plain text | **Y09**[4] |
| Fault current 3.6 mA (instead of 22.8 mA) | **U36**[2] |

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
2) For this selection, Y01 or Y09 must also be selected.
3) For this selection, Y01 must also be selected.
4) For customer-specific programming for mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

### *Accessories*

| | Article No. |
|---|---|
| Other accessories for assembly, connection and transmitter configuration, see page 2/198. | |
| **Modem** | |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |
| **Mounting rail adapter for head transmitter**<br>(Quantity delivered: 5 units) | **7NG3092-8KA** |
| **Connecting cable**<br>4-wire, 200 mm (7.87 inches), for sensor connections when using head transmitters in the high spring flap (set with 5 units) | **7NG3092-8KC** |

For supply units, see Catalog FI01 section "Supplementary components"

***Ordering example:***

7NG3211-0NN00-Z Y01+Y23+U03

Y01: -10 ... +100 °C
Y23: TICA1234HEAT

***Factory setting:***

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °C)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

## Technical specifications

| **SITRANS TH100 (4 ... 20 mA, Pt100)** | |
|---|---|
| **Input** | |
| ***Resistance thermometer*** | |
| Measured variable | Temperature |
| Input type | Pt100 according to IEC 60751 |
| Characteristic curve | Temperature-linear |
| Connection type | 2, 3, 4-wire connection |
| Resolution | 14 bit |
| Measuring accuracy | |
| • Measuring span <250 °C (450 °F) | < 0.25 °C (0.45 °F) |
| • Measuring span >250 °C (450 °F) | < 0.1% of measuring span |
| Repeatability | < 0.1 °C (0.18 °F) |
| Measuring current | Approx. 0.4 mA |
| Measuring cycle | < 0.7 s |
| Measuring range | -200 ... +850 °C (-328 ... +1562 °F) |
| Measuring span | 25 ... 1050 °C (77 ... 1922 °F) |
| Unit | °C or °F |
| Offset | Programmable:<br>-100 ... +100 °C (-180 ... +180 °F) |
| Wire resistance | Max. 20 Ω (total from feeder and return conductor) |
| Noise suppression | 50 and 60 Hz |
| **Output** | |
| Output signal | 4 ... 20 mA, 2-wire |
| Auxiliary power | 8.5 ... 36 V DC (30 V with Ex ia and ib; 32 V with Ex nL/ic; 35 V with Ex nA) |
| Max. load | ($U_{aux}$ – 8.5 V)/0.023 A |
| Overrange | 3.6 ... 23 mA, continuously adjustable (default range: 3.84 ... 20.5 mA) |
| Error signal (following sensor breakage) (conforming to NE43) | 3.6 ... 23 mA, continuously adjustable (default range: 3.6 mA or 22.8 mA) |
| Damping time | 0...30 s (default value: 0 s) |
| Protection | Against reverse polarity |
| Resolution | 12 bit |
| Accuracy at 23 °C (73.4 °F) | < 0.1% of measuring span |
| Temperature influence | < 0.1%/10 °C (0.1%/18 °F) |
| Effect of auxiliary power | < 0.01% of measuring span/V |
| Effect of load impedance | < 0.025% of the max. measuring span/100 Ω |
| Long-term drift | • < 0.025% of the max. measuring span in the first month<br>• < 0.035% of the max. measuring span after one year<br>• < 0.05% of the max. measuring span according to 5 years |
| **Ambient conditions** | |
| Ambient temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Relative humidity | < 98%, with condensation |
| Electromagnetic compatibility | According to EN 61326 and NAMUR NE21 |
| **Structural design** | |
| Weight | 50 g (0.11 lb) |
| Dimensions | See dimensional drawing |
| Material | Molded plastic |
| Cross-section of cables | Max. 2.5 mm² (AWG 13) |
| Degree of protection according to IEC 60529 | |
| • Enclosure | IP40 |
| • Terminals | IP00 |
| **Certificates and approvals** | |
| ATEX explosion protection | |
| EC type-examination certificate | DEKRA 21ATEX0033X /<br>DEKRA 21ATEX0034X |

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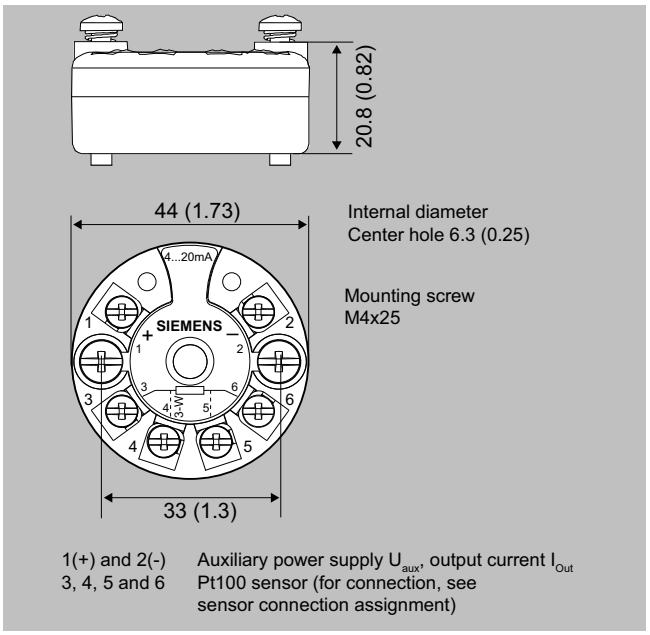
## Technical specifications (continued)

| SITRANS TH100 (4 ... 20 mA, Pt100) | |
|---|---|
| • "Intrinsic gas safety" type of protection | • II 1 G Ex ia IIC T6...T4<br>• II 2 (1) G Ex ib [ia Ga] IIC T6...T4 Gb<br>• II 3 (1) G Ex ic [ia Ga] IIC T6...T4 Gc<br>• II 3 G Ex ic IIC T6...T4 Gc |
| • "Increased safety" type of protection | • II 3 G Ex ec IIC T6...T4 Gc<br>• II 3 G Ex ec [ic] IIC T6...T4 Gc |
| • "Intrinsic dust safety" type of protection | II 2 D Ex ia IIIC Db |
| Explosion protection: FM for USA | |
| • FM approval | FM 3024169 |
| • Degrees of protection | • IS / Cl I, II, III / Div 1 / GP ABCDEFG T6, T5, T4<br>• Cl I / ZN 0 / AEx ia IIC T6, T5, T4<br>• NI / Cl I / Div 2 / GP ABCDFG T6, T5, T4<br>• NI / Cl I / ZN 2 / IIC T6, T5, T4 |
| Explosion protection to FM for Canada ($_{c}$FM$_{U.S}$) | |
| • FM approval | FM 3024169C |
| • Degrees of protection | • IS / Cl I, II, III / Div 1/ GP ABCDEFG T6, T5, T4<br>• NI / Cl I / DIV 2 / GP ABCD T6, T5, T4<br>• NIFW / Cl I, II, III / DIV 2 / GP ABCDFG T6, T5, T4<br>• DIP / Cl II, III / Div 2 / GP FG T6, T5, T4<br>• Cl I / ZN 0 / Ex ia IIC T6, T5, T4<br>• Cl I / ZN 2 / Ex nA nL IIC T6, T5, T4 |
| Other certificates | EAC Ex, NEPSI |
| **Software requirements for SIPROM T** | |
| PC operating system | Windows ME, 2000, XP, Win 7, 8 and 10; in connection with RS 232 modem, also Windows 95, 98 and 98 SE |

***Factory setting:***

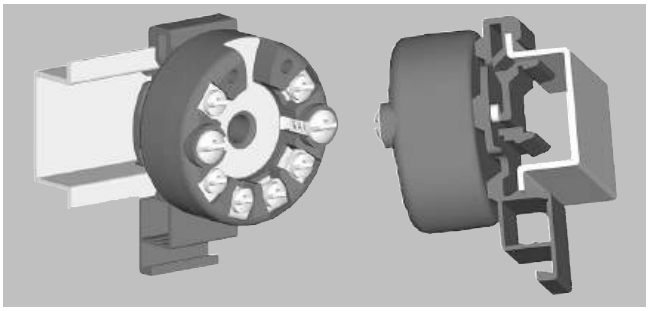
- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (32 °F)
- Damping 0.0 s

## Dimensional drawings

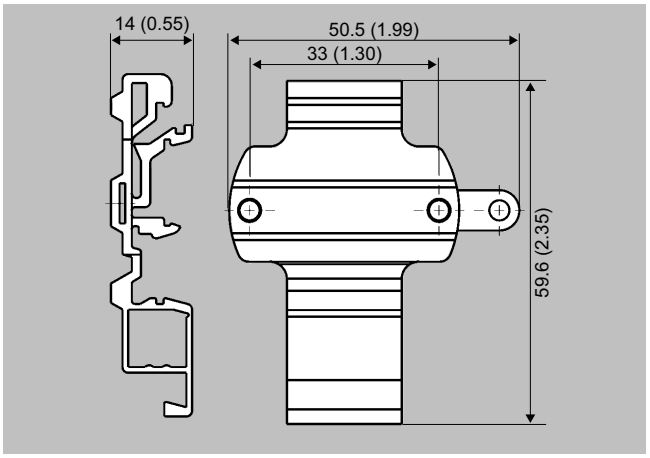



SITRANS TH100, dimensions in mm (inch)

***Mounting on DIN rail***



SITRANS TH100, mounting of transmitter on DIN rail

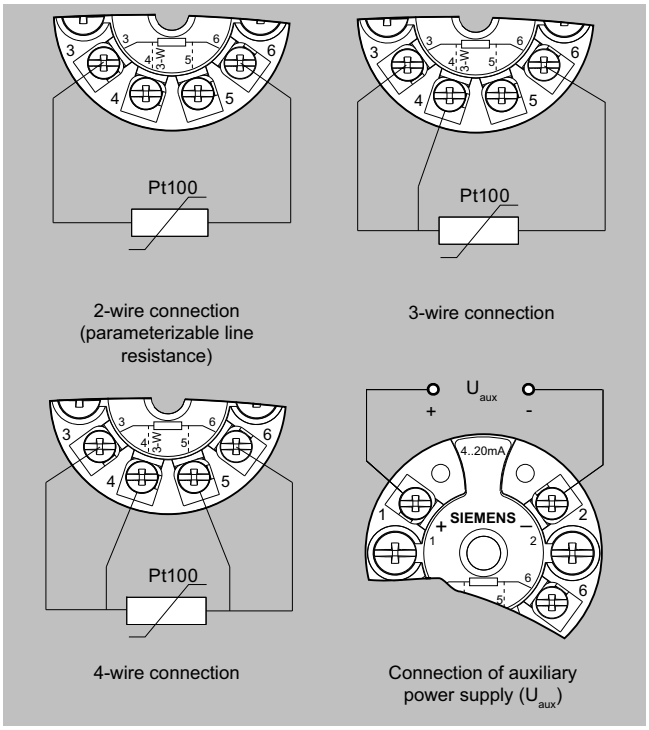



Mounting rail adapter, dimensions in mm (inch)

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## Circuit diagrams




SITRANS TH100, sensor connection assignment

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## Overview




- 2-wire head transmitter with and without HART communications interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7 or optional local operation

## Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21

## Application

SITRANS TH320 transmitters can be used in all sectors. Its compact size means that it can be installed in connection heads of type B or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples
- Linear resistance, potentiometer and DC voltage sources

With HART communications interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

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## Function

***Without HART communications interface***

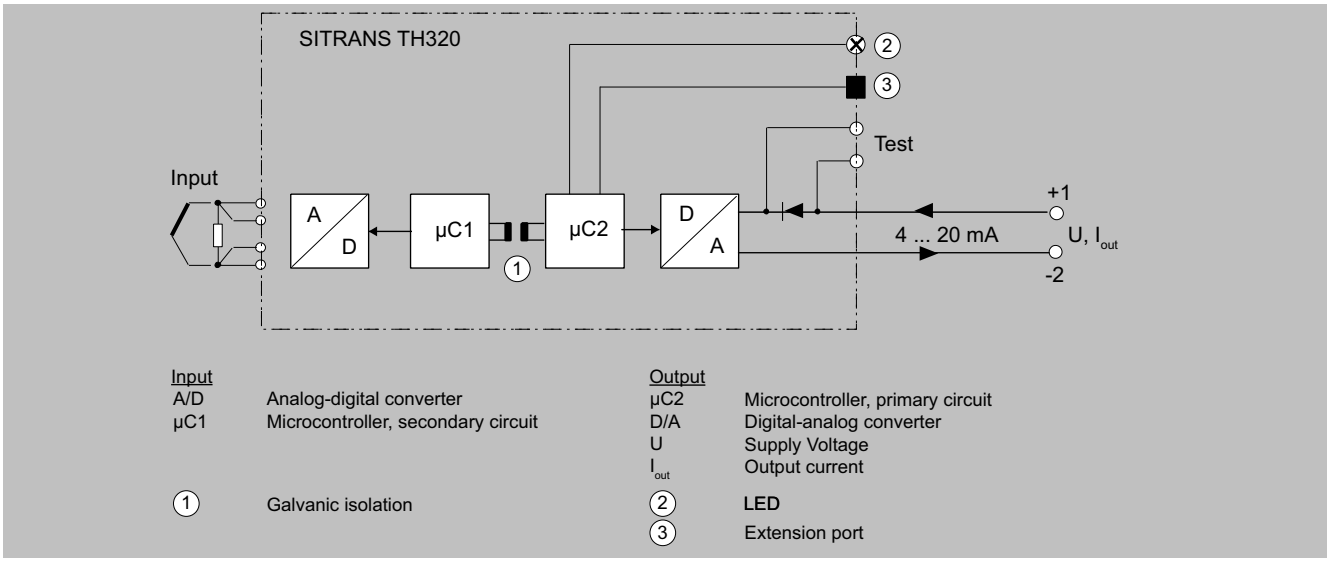
For the SITRANS TH320 without HART functionality, parameters are assigned with the PC. A special modem and the software tool SIPROM T are available for this purpose.

***With HART communications interface:***

The SITRANS TH320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM parameterization software. The configuration data is then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal device error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.




| Input | | Output | |
|---|---|---|---|
| A/D | Analog-digital converter | µC2 | Microcontroller, primary circuit |
| µC1 | Microcontroller, secondary circuit | D/A | Digital-analog converter |
| | | U | Supply Voltage |
| | | $I_{out}$ | Output current |
| ① | Galvanic isolation | ② | LED |
| | | ③ | Extension port |

SITRANS TH320 function block diagram

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## Selection and ordering data

| SITRANS TH320 head transmitter with 1 input | Article No. 7NG031 ● - ● ● ● ● ● - 0 ● ● ● |
|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | |
| **Communication** | |
| With HART | 0 |
| 2-wire, 4 ... 20 mA | 7 |
| **Primary value output** | |
| Input 1 | 0 |
| **Input 1, type** | |
| RTD | |
| • Pt100 (IEC), 3-wire | B |
| • Pt100 (IEC), 4-wire | C |
| • Pt1000 (IEC), 3-wire | D |
| • Pt1000 (IEC), 4-wire | E |
| TC | |
| • Type B | F |
| • Type E | G |
| • Type J | H |
| • Type K | J |
| • Type L | K |
| • Type N | L |
| • Type R | N |
| • Type S | P |
| • Type T | Q |
| Potentiometer, 4-wire | R |
| **Input 1, type customer-specific** | |
| Define customer-specific input configurations in V options | Y |
| **Input 2, type** | |
| Without input 2 | A |
| **CJC configuration for TC** | |
| Without CJC | 0 |
| Internal CJC | 1 |
| External CJC Pt100 (IEC), 3-wire | 3 |
| External CJC Ni100 (DIN), 3-wire | 6 |
| Define fixed CJC value with option Y60 | 8 |
| **Materials not in contact with media** | |
| None | 0 |
| **Type of protection** | |
| General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK | A |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx) | N |
| **Electrical connection/cable entries** | |
| None | A |
| **Local HMI** | |
| Without display | 0 |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety SIL2/3 (IEC 61508) | **C20** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Device options** | |
| PDF file with device settings | **D10** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Input 1: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire | **D73** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL) | **D82** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt x (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V60** |
| Pt x (IEC 60721), 3-wire, define RTD factor x in option Y21 | **V61** |
| Pt x (IEC 60721), 4-wire, define RTD factor x in option Y21 | **V62** |
| Pt x (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V63** |
| Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21 | **V64** |
| Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21 | **V67** |
| Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21 | **V68** |
| Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V69** |
| Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21 | **V70** |
| Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21 | **V71** |
| Ni x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V72** |
| Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21 | **V73** |
| Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu x (ECW-15), 3-wire, define RTD factor x in option Y21 | **V76** |
| Cu x (ECW-15), 4-wire, define RTD factor x in option Y21 | **V77** |
| Cu x (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V78** |
| Cu x (GOST 6651-94), define 3-wire, define RTD factor x in option Y21 | **V79** |
| Cu x (GOST 6651-94), define 4-wire, define RTD factor x in option Y21 | **V80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V81** |
| Cu x (GOST 6651-2009), define 3-wire, define RTD factor x in option Y21 | **V82** |
| Cu x (GOST 6651-2009), define 4-wire, define RTD factor x in option Y21 | **V83** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description (device parameters, max. 32 characters), adhesive label | **Y16** |
| Tag (device parameters, max. 8 characters), adhesive label | **Y17** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| ID number of special design | **Y99** |

### *Accessories*

| | Article No. |
|---|---|
| Other accessories for assembly, connection and transmitter configuration, see page 2/198. | |
| **Modems** | |
| HART modem with USB interface | **7MF4997-1DB** |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |
| **SIMATIC PDM parameterization software** | See Catalog FI 01 section 8 |
| **Mounting rail adapter for head transmitter**<br>(Quantity delivered: 5 units) | **7NG3092-8KA** |
| **Connecting cable**<br>4-wire, 200 mm (7.97 inches), for input connections when using head transmitters in the high spring flap (set with 5 units) | **7NG3092-8KC** |

### *Ordering example*

7NG0310-0BA00-0AA0-Z Y01

Y01: -10 ... +100 °C

### *Factory setting*

- Pt100 (IEC 60751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)

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## Selection and ordering data (continued)

- Fault current
  - Device fault: < 3.6 mA
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

## Technical specifications

| SITRANS TH320 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 7.5 ... 48 V DC |
| • With explosion protection (Ex i) | 7.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumpers or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | 4 ... 20 mA: ≤ 55 ms<br>HART: ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire or 3-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | -50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |

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## Technical specifications (continued)

| SITRANS TH320 (HART, universal) | |
|---|---|
| ***Linear resistance*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 10 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Voltage input*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 7.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |

| SITRANS TH320 (HART, universal) | |
|---|---|
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Ambient temperature for devices with functional safety | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Transmitter enclosure | IP68 |
| • Terminals | IP00 |
| **Structural design** | |
| Weight | 50 g (0.11 lb) |
| Maximum core cross-section | 1 × 1.5 mm² (stranded wire) |
| Tightening torque for clamping screws | 0.4 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3)] | • DEKRA 17ATEX0116 X<br>• IECEx DEK 17.0054X<br>• A5E43700604A-2018X |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 20, 21, 22 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 D Ex ia IIIC Db<br>• I M1 Ex ia I Ma |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ia IIIC Db<br>• Ex ia I Ma |
| "Intrinsic safety ic" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC Dc |
| "Non-sparking/increased safety nA/ec" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex nA IIC T6...T4 Gc<br>• II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | • Ex nA IIC T6 ... T4 Gc<br>• Ex ec IIC T6 ... T4 Gc |

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## Technical specifications (continued)

| SITRANS TH320 (HART, universal) | |
|---|---|
| ***Explosion protection CSA/FM for Canada and USA*** | |
| Certificates | • CSA 1861385<br>• FM18CA0024<br>• FM18US0046 |
| "Intrinsic safety ia" type of protection | • IS, CL I, Div 1, GP ABCD, T6 ... T4<br>• Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb |

| SITRANS TH320 (HART, universal) | |
|---|---|
| "Non incendive field wiring NIFW" type of protection | NIFW, CL I, Div 2, GP ABCD T6 ... T4 |
| "Non incendive NI" type of protection | • NI, CL I, Div 2, GP ABCD T6...T4<br>• Ex nA IIC T6 ... T4 Gc<br>• AEx nA IIC T6 ... T4 Gc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH320. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

### *Measuring ranges/Minimum measuring span*

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in $°C^{-1}$ ($°F^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML R84:2-003 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

### *Input accuracy*

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Voltage input** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

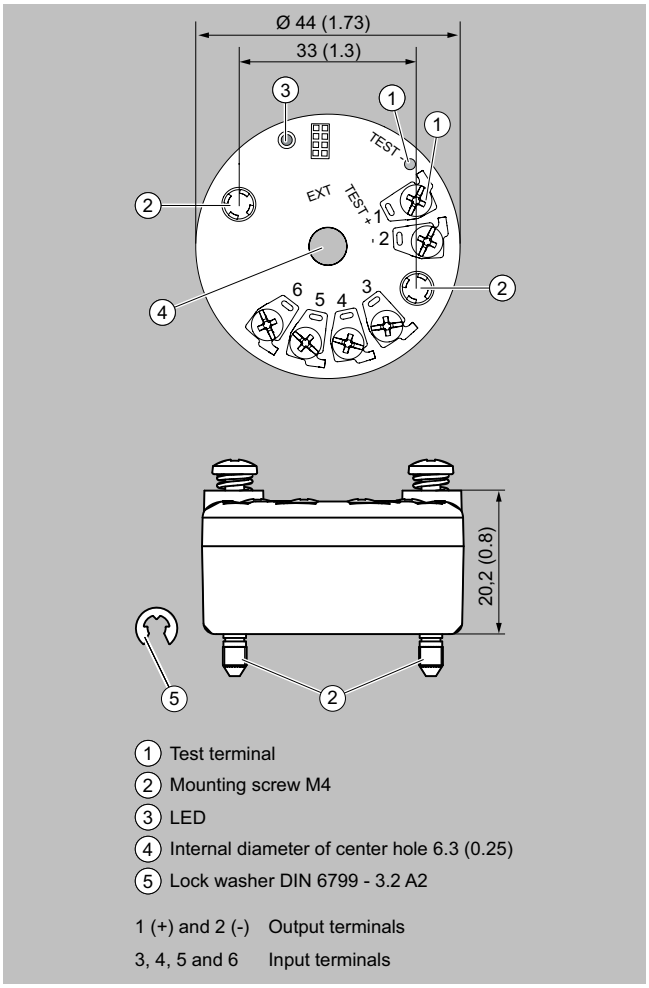
***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

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## Dimensional drawings




SITRANS TH320, dimensions and pin assignment, dimensions in mm (inch)

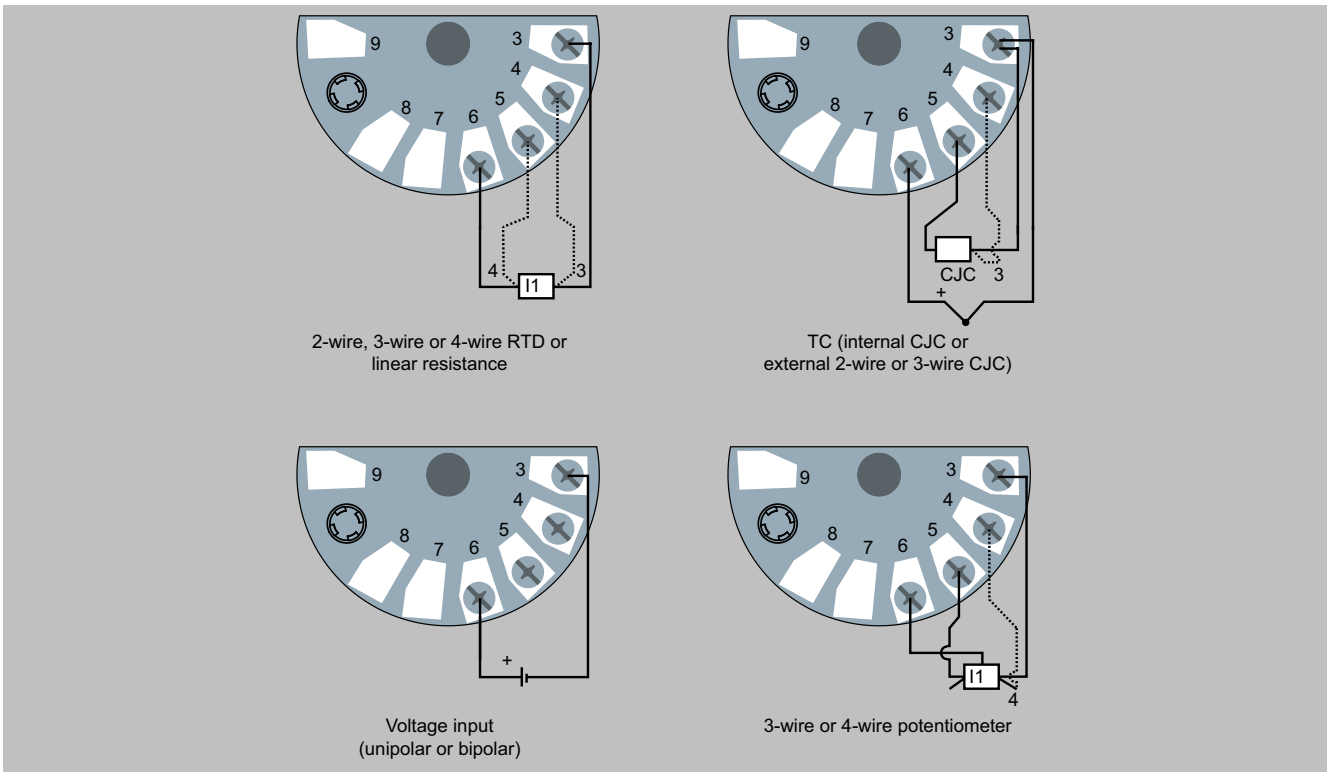
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## Circuit diagrams

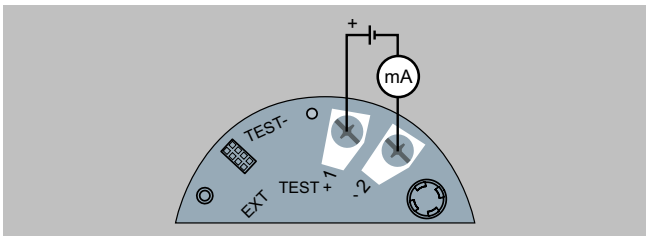
***Connections***

Input connection




SITRANS TH320, input connection assignment

Output connection




SITRANS TH320, output connection assignment

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## Overview




- 2-wire head transmitter with HART communications interface
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable via HART 7

## Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Flexible mounting and center hole allow you to select your preferred mounting type
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break, short-circuit and drift
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2/3 (with order note C20)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21

## Application

The SITRANS TH420 transmitter with two inputs can be used in all sectors. Its compact size means that it can be installed in connection heads of type B or larger. Due to its universal input module, the following sensors and signal sources can be connected in redundant operation (high input availability):

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

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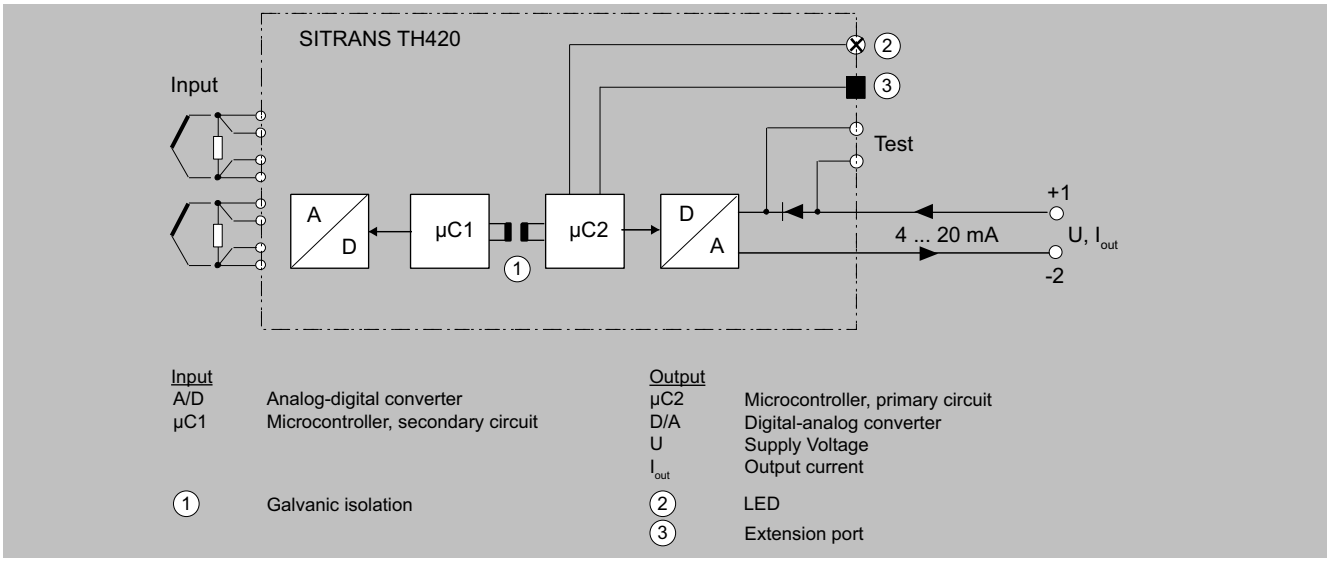


## Function

The SITRANS TH420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.




SITRANS TH420, function block diagram

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## Selection and ordering data

| SITRANS TH420<br>head transmitter with 2 inputs | Article No.<br>7NG041<br>● - ● ● ● ● ● - 0 ● ● ● | Order code<br>● ● ● |
|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Communication** | | |
| With HART | 0 | |
| **Primary value output** | | |
| Input 1 | 0 | |
| Input 1, input 2 as redundancy | 1 | |
| Input 2, input 1 as redundancy | 2 | |
| Mean value input 1 and input 2, both as redundancy | 3 | |
| Minimum input 1 and input 2, both as redundancy | 4 | |
| Maximum input 1 and input 2, both as redundancy | 5 | |
| Difference input 1 - input 2 | 6 | |
| Difference input 2 - input 1 | 7 | |
| Absolute difference | 8 | |
| **Primary value output, customer-specific** | | |
| Minimum input 1 and input 2, without redundancy | 9 | H 1 A |
| Maximum input 1 and input 2, without redundancy | 9 | H 1 B |
| Mean value input 1 and input 2, without redundancy | 9 | H 1 C |
| Input 2 | 9 | H 1 D |
| **Input 1, type** | | |
| RTD | | |
| • Pt100 (IEC), 3-wire | B | |
| • Pt100 (IEC), 4-wire | C | |
| • Pt1000 (IEC), 3-wire | D | |
| • Pt1000 (IEC), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| **Input 1, type customer-specific** | | |
| Define customer-specific input configurations in V options | Y | |
| **Input 2, type** | | |
| Without input 2 | A | |
| RTD | | |
| • Pt100 (IEC), 3-wire | B | |
| • Pt100 (IEC), 4-wire | C | |
| • Pt1000 (IEC), 3-wire | D | |
| • Pt1000 (IEC), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |

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## Selection and ordering data (continued)

| SITRANS TH420<br>head transmitter with 2 inputs | Article No.<br>7NG041 ● - ● ● ● ● ● - 0 ● ● ● ● ● ● | Order code |
|---|---|---|
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| **Input 2, type customer-specific** | | |
| Define customer-specific input configurations in W options | Y | |
| **CJC configuration for TC** | | |
| Input 1: no CJC; input 2: No CJC | 0 | |
| Input 1: internal CJC; input 2: internal CJC | 1 | |
| Input 1: external CJC; input 2: external CJC; define type in option Jxx | 2 | |
| Input 1: external CJC; define type in option Jxx; input 2: internal CJC | 3 | |
| Input 1: internal CJC; input 2: external CJC; define type in option Jxx | 4 | |
| Input 1: Internal CJC; Input 2: No CJC | 5 | |
| Input 1: External CJC (define type in option Jxx); input 2: No CJC | 6 | |
| **Materials not in contact with media** | | |
| None | 0 | |
| **Type of protection** | | |
| General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK | A | |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx) | N | |
| **Electrical connection/cable entries** | | |
| None | A | |
| **Local HMI** | | |
| Without display | 0 | |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety SIL2/3 (IEC 61508) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Input 1: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire | **D73** |
| Input 2: Cable extension 200 mm fixed, for RTD Pt100 (0 ... 100 °C) 4-wire | **D74** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL) | **D82** |
| **External CJC types** | |
| Pt100, IEC 60751, 3-wire | **J02** |
| Pt100, IEC 60751, 4-wire | **J03** |
| Ni100, DIN 43760-87, 3-wire | **J05** |
| Ni100, DIN 43760-87, 4-wire | **J06** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt x (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V60** |
| Pt x (IEC 60751), 3-wire, define RTD factor x in option Y21 | **V61** |
| Pt x (IEC 60751), 4-wire, define RTD factor x in option Y21 | **V62** |
| Pt x (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V63** |
| Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21 | **V64** |
| Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21 | **V67** |
| Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21 | **V68** |
| Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V69** |
| Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21 | **V70** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V81** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |
| **Input 2: TC** | |
| Type C W5 | **W01** |
| Type D W3 | **W02** |
| Type U | **W03** |
| Type Lr | **W04** |
| **Input 2: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36) | **W50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y36) | **W51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y36) | **W52** |
| **Input 2: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W60** |
| Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22 | **W61** |
| Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22 | **W62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22 | **W64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22 | **W65** |
| Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22 | **W70** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22 | **W71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y22 | **W76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y22 | **W77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W78** |
| Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22 | **W79** |
| Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22 | **W80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W81** |
| Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W82** |
| Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W83** |
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag<br>(device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description<br>(device parameters, max. 32 characters), adhesive label | **Y16** |
| Tag (device parameters, max. 8 characters), adhesive label | **Y17** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Input 2: RTD factor (e.g. factor "200" => RTD Pt200), adhesive label | **Y22** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y36** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Wire resistance value input 2 in ohms (0 ... 100 ohms) | **Y52** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| Input 2: CJC sensor, fixed value (see measuring range for unit) | **Y61** |

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## Selection and ordering data (continued)

### *Accessories*

| | Article No. |
|---|---|
| Other accessories for assembly, connection and transmitter configuration, see page 2/198. | |
| **Modems** | |
| HART modem with USB interface | **7MF4997-1DB** |
| **SIMATIC PDM parameterization software** | See Catalog FI 01 section 8 |
| **Mounting rail adapter for head transmitter** (Quantity delivered: 5 units) | **7NG3092-8KA** |
| **Connecting cable** 4-wire, 200 mm (7.87 inches), for input connections when using head transmitters in the high spring flap (set with 5 units) | **7NG3092-8KC** |

### *Ordering example*

7NG0410-0BA00-0AA0-Z Y01
Y01: -10 ... +100 °C

### *Factory setting*

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
  - Device fault: < 3.6 mA
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input circuit drift: 22 mA (active when input 2 is active)
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

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## Technical specifications

| SITRANS TH420 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 7.5 ... 48 V DC |
| • With explosion protection (Ex i) | 7.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumpers or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |

| SITRANS TH420 (HART, universal) | |
|---|---|
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire, 3-wire or 4-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | -50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Linear resistance*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 10 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 3-wire, 4-wire or 5-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |

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## Technical specifications (continued)

| SITRANS TH420 (HART, universal) | |
|---|---|
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Voltage input*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 7.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Ambient temperature for devices with functional safety | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Transmitter enclosure | IP68 |
| • Terminals | IP00 |
| **Structural design** | |
| Weight | 50 g (0.11 lb) |
| Maximum core cross-section | 1 × 1.5 mm² (stranded wire) |

| SITRANS TH420 (HART, universal) | |
|---|---|
| Tightening torque for clamping screws | 0.4 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3] | • DEKRA 17ATEX0116 X<br>• IECEx DEK 17.0054X<br>• A5E43700604A-2018X |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 20, 21, 22 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 D Ex ia IIIC Db<br>• I M1 Ex ia I Ma |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ia IIIC Db<br>• Ex ia I Ma |
| "Intrinsic safety ic" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC Dc |
| "Non-sparking/increased safety nA/ec" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex nA IIC T6...T4 Gc<br>• II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | • Ex nA IIC T6 ... T4 Gc<br>• Ex ec IIC T6 ... T4 Gc |
| ***Explosion protection CSA/FM for Canada and USA*** | |
| Certificates | • CSA 1861385<br>• FM18CA0024<br>• FM18US0046 |
| "Intrinsic safety ia" type of protection | • IS, CL I, Div 1, GP ABCD, T6 ... T4<br>• Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb |
| "Non incendive field wiring NIFW" type of protection | NIFW, CL I, Div 2, GP ABCD T6 ... T4 |
| "Non incendive NI" type of protection | • NI, CL I, Div 2, GP ABCD T6...T4<br>• Ex nA IIC T6 ... T4 Gc<br>• AEx nA IIC T6 ... T4 Gc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TH420. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

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## Technical specifications (continued)

***Measuring ranges/Minimum measuring span***

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in °C$^{-1}$ (°F$^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2-003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML - R84:2003 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

***Input accuracy***

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Voltage input** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

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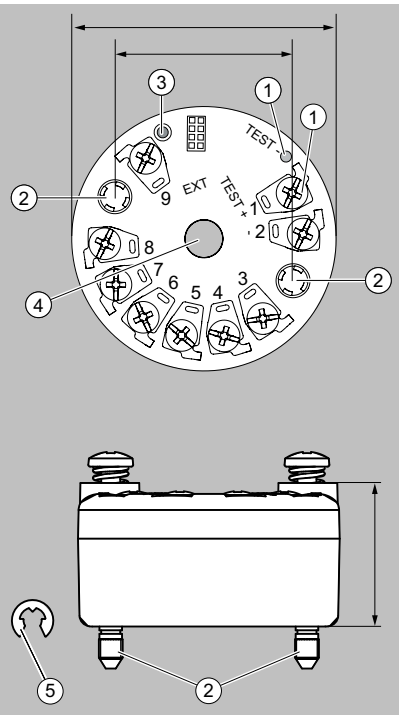


## Technical specifications (continued)

***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Average value measurement | Average of accuracy of input 1 and input 2 | Average of temperature coefficient of input 1 and input 2 |
| Differential measurement | Sum of accuracy of input 1 and input 2 | Sum of temperature coefficient of input 1 and input 2 |
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

## Dimensional drawings




1 Test terminal
2 Mounting screw M4
3 LED
4 Internal diameter of center hole 6.3 (0.25)
5 Lock washer DIN 6799 - 3.2 A2

| | |
|---|---|
| 1 (+) and 2 (-) | Output terminals |
| 3, 4, 5, 6, 7, 8 and 9 | Input terminals |

SITRANS TH420, dimensions and pin assignment, dimensions in mm (inch)

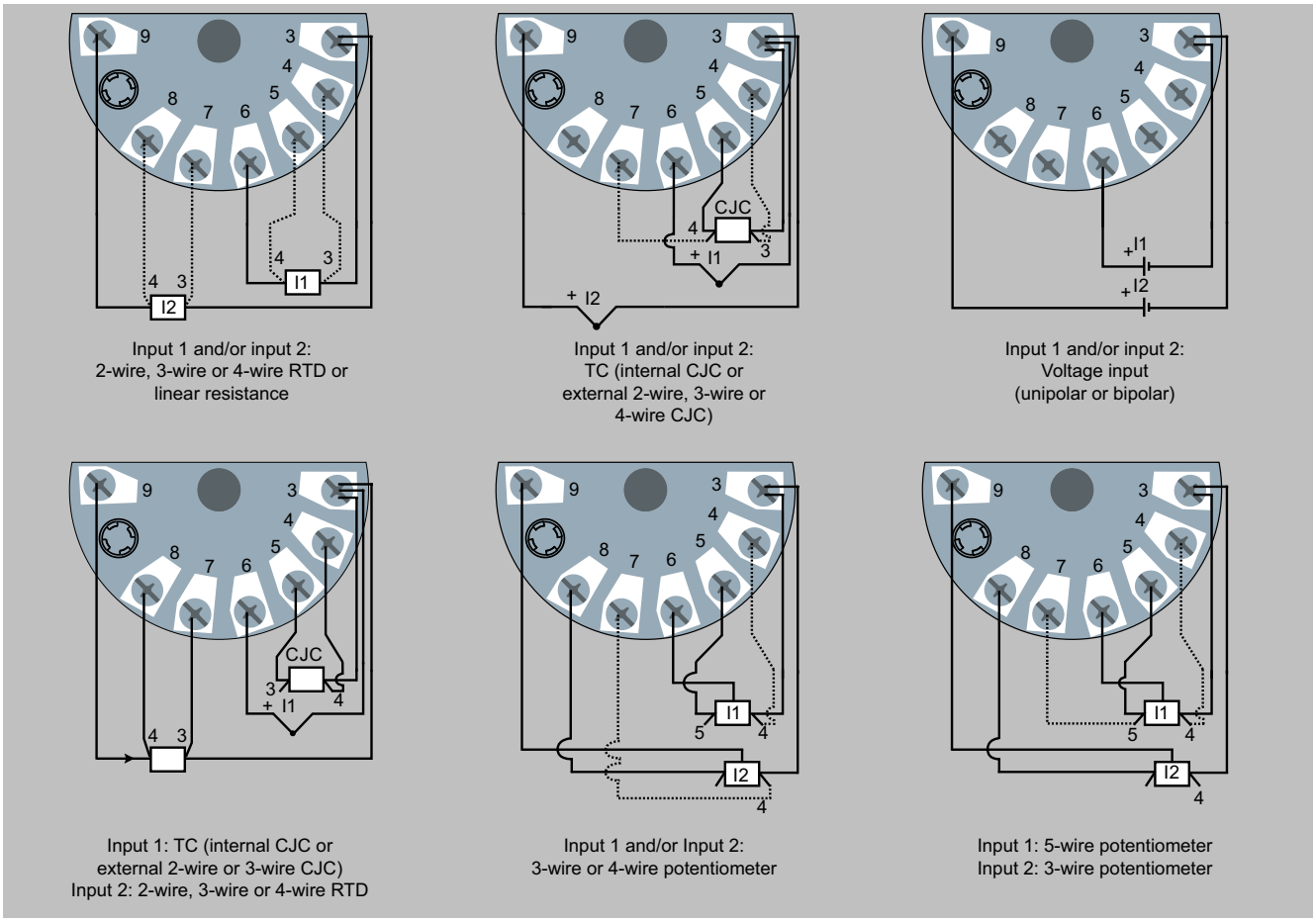
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## Circuit diagrams

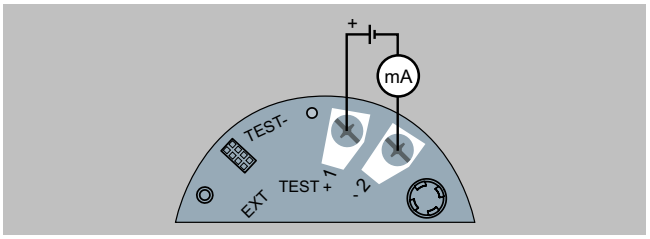
***Connections***

Input connection




SITRANS TH420, input connection assignment

Output connection




SITRANS TH420, output connection assignment

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## Overview



SITRANS TH100 Slim is particularly suited for the production of compact thermometers with integrated transmitter.

Its cylindrical stainless steel enclosure is simply welded to the basic body of the compact thermometer.

Its compact design makes the SITRANS TH100 Slim the ideal solution for manufacturers from a wide variety of industries.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

## Benefits

- Transmitter in 2-wire system with M12 device plug for mounting on compact thermometer.
- Solution for easy and space-saving temperature measurements in a variety of industries.
- Programmable; as a result, the sensor connection, measuring range and much more are programmable.

## Application

The SITRANS TH100 Slim transmitter can be used in combination with Pt100 compact resistance thermometers for temperature measurement in all industries. Thanks to its compact design, it can be mounted to all kinds of designs.

The output signal is a load-independent direct current of 4 to 20 mA which is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "Modem for SITRANS TK" (article number 7NG3190-6KB), you can continue to use this for parameterization of the SITRANS TH100.

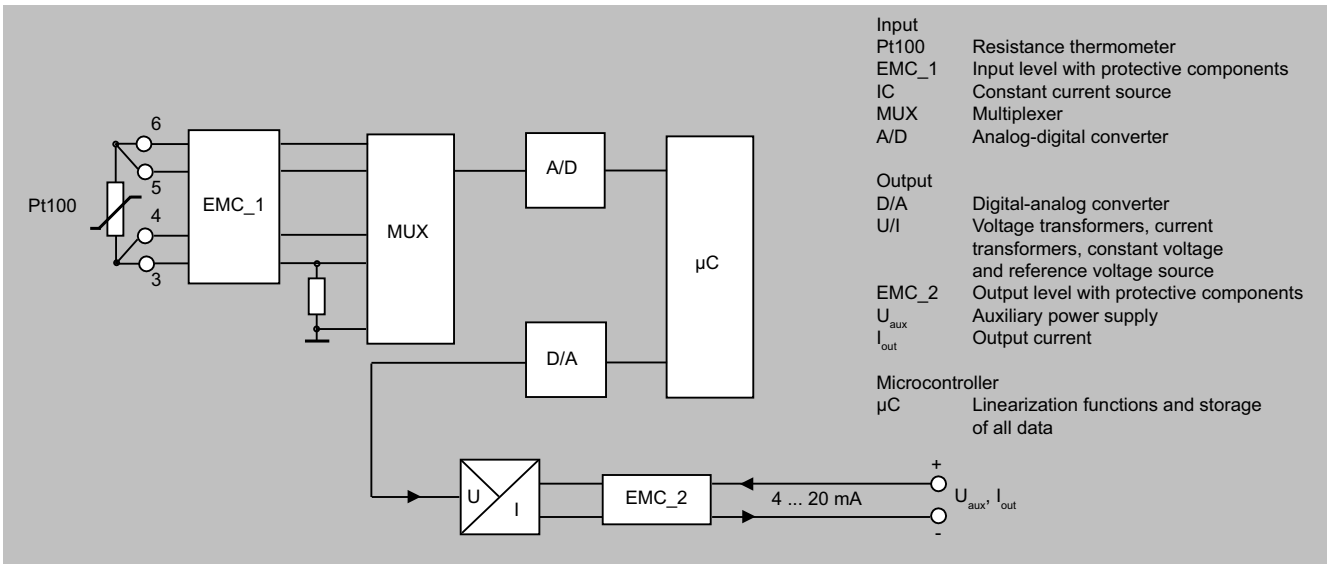
## Function

***Mode of operation***

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire connection) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog-to-digital converter. They are converted in the microcontroller in accordance with the sensor characteristic and additional parameters (measuring range, damping, ambient temperature, etc.).

The signal prepared in this way is converted in an analog-to-digital converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.




SITRANS TH100 Slim, function block diagram

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## Selection and ordering data

| SITRANS TH100 Slim temperature transmitters for Pt100 | Article No. |
|---|---|
| For welding to compact thermometers 2-wire system, 4 ... 20 mA, programmable, without galvanic isolation | |
| • Without explosion protection | **7NG3150-0NN00** |
| Accessories | |
| **Modem** | |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |

## Technical specifications

| SITRANS TH100 Slim (Pt100) | |
|---|---|
| **Input** | |
| ***Resistance thermometer*** | |
| Measured variable | Temperature |
| Input type | Pt100 according to IEC 60751 |
| Characteristic curve | Temperature-linear |
| Connection type | 2, 3, 4-wire connection |
| Resolution | 14 bit |
| Measuring accuracy | < 0.25 °C (0.45 °F) |
| Repeatability | < 0.1 °C (0.18 °F) |
| Measuring current | Approx. 0.4 mA |
| Measuring cycle | < 0.7 s |
| Measuring range | -60 ... +160 °C (-76 ... +320 °F) |
| Measuring span | 25 ... 220 °C (45 ... 396 °F) |
| Unit | °C or °F |
| Offset | Programmable: -100 ... +100 °C (-180 ... +180 °F) |
| Wire resistance | Max. 20 Ω (total from feeder and return conductor) |
| Noise suppression | 50 and 60 Hz |
| **Output** | |
| Output signal | 4 ... 20 mA, 2-wire |
| Auxiliary power | 8.5 ... 36 V DC (30 V for Ex) |
| Max. load | $(U_{aux} - 8.5\ V)/0.023\ A$ |
| Overrange | 3.6 ... 23 mA, continuously adjustable (factory setting: 3.84 ... 20.5 mA) |
| Error signal (in the event of sensor breakage) | 3.6 ... 23 mA, continuously adjustable (factory setting: 3.6 mA or 22.8 mA) |
| Damping time | 0 ... 30 s |
| Protection | Against reverse polarity |
| Resolution | 12 bit |
| Accuracy at 23 °C (73.4 °F) | < 0.1% of measuring span |
| Temperature influence | < 0.13%/10 °C (0.13%/18 °F) |
| Effect of auxiliary power | < 0.02% of measuring span/V |
| Effect of load impedance | < 0.055% of max. measuring span/100 Ω |
| Long-term drift | • < 0.025% of the max. measuring span in the first month<br>• < 0.035% of the max. measuring span after one year<br>• < 0.05% of the max. measuring span after 5 years |
| **Ambient conditions** | |
| Ambient temperature range | -40 ... +85 °C (-40 ... +185 °F) |
| Storage temperature range | -40 ... +85 °C (-40 ... +185 °F) |
| Relative humidity | 98%, with condensation |
| Electromagnetic compatibility | According to EN 61326 and NAMUR NE21 |
| **Structural design** | |
| Weight | 42 g (0.093 lbs) |
| Dimensions | See dimensional drawing |

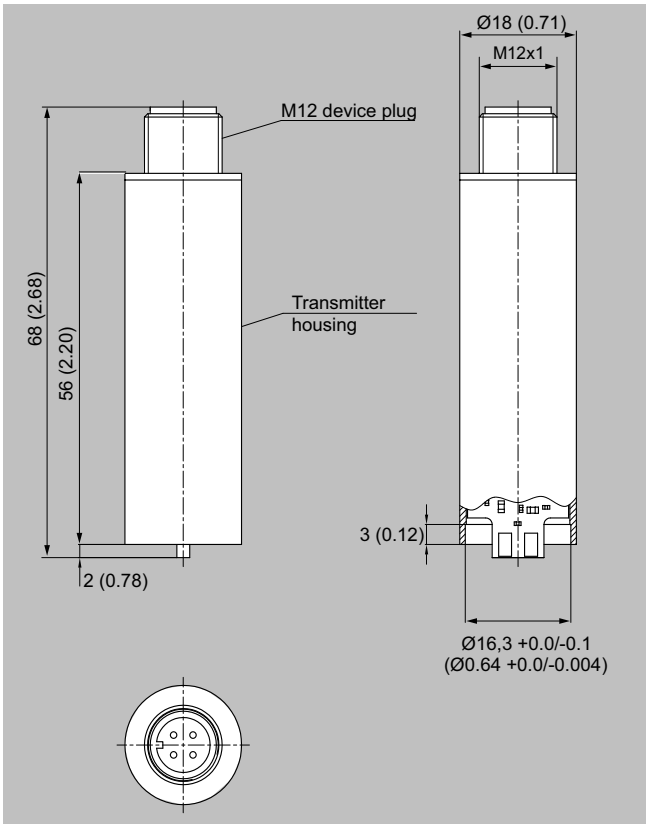
## Technical specifications (continued)

| SITRANS TH100 Slim (Pt100) | |
|---|---|
| Material | 316L stainless steel |
| Degree of protection according to IEC 60529 | |
| • Enclosure | IP67 |
| **Software requirements for SIPROM T** | |
| PC operating system | Windows 10, 7, ME, 2000 and XP; also Windows 95, 98 and 98SE, but only in connection with RS 232 modem |

***Factory setting:***

- Pt100 (IEC 751) in the 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

## Dimensional drawings

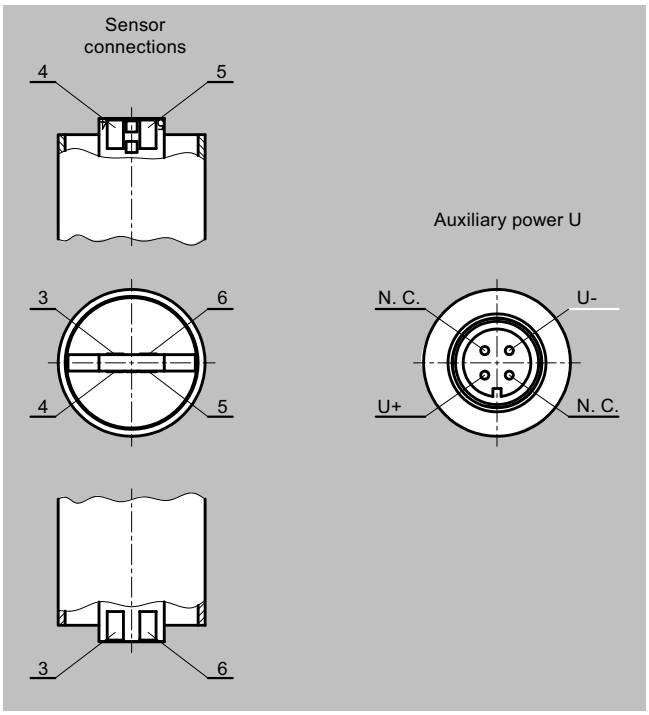



SITRANS TH100 Slim, dimensions in mm (inch)

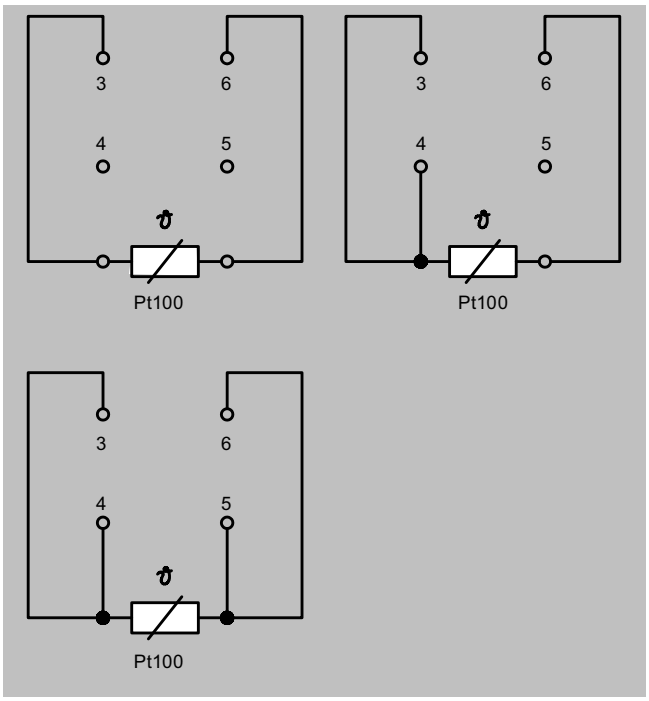
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## Circuit diagrams




SITRANS TH100 Slim, auxiliary power and sensor connection




SITRANS TH100 Slim, sensor connection assignment

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## Overview



- 2-wire rail transmitter with and without HART communications interface
- Enclosure for DIN rail mounting
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7

## Benefits

- Compact design
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21
- SIL2/3 (with order note C20)

## Application

SITRANS TR320 transmitters can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometer (2-wire, 3-wire, 4-wire connection)
- Thermocouples
- Linear resistance, potentiometer and DC voltage sources

With HART communication interface:

- The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

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## Function

***Without HART communications interface***

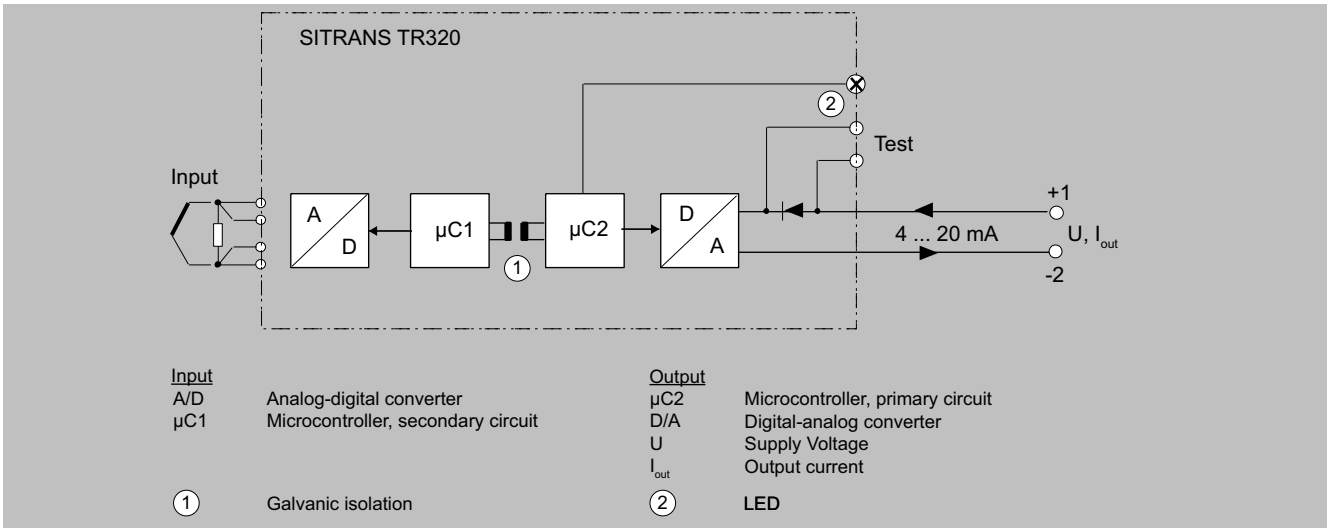
For the SITRANS TR320 without HART functionality, parameters are assigned with the PC. Available for this purpose are a special modem and the software tool SIPROM T.

***With HART communications interface:***

- The SITRANS TR320 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.




SITRANS TR320 function block diagram

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## Selection and ordering data

| SITRANS TR320<br>DIN rail transmitter with 1 input | Article No.<br>7NG032<br>● - ● ● ● ● ● - 0 ● ● ● |
|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | |
| **Communication** | |
| With HART | 0 |
| 2-wire, 4 ... 20 mA | 7 |
| **Primary value output** | |
| Input 1 | 0 |
| **Input 1, type** | |
| RTD | |
| • Pt100 (IEC), 3-wire | B |
| • Pt100 (IEC), 4-wire | C |
| • Pt1000 (IEC), 3-wire | D |
| • Pt1000 (IEC), 4-wire | E |
| TC | |
| • Type B | F |
| • Type E | G |
| • Type J | H |
| • Type K | J |
| • Type L | K |
| • Type N | L |
| • Type R | N |
| • Type S | P |
| • Type T | Q |
| Potentiometer, 4-wire | R |
| **Input 1, type customer-specific** | |
| Define customer-specific input configurations with V options | Y |
| **Input 2, type** | |
| Without input 2 | A |
| **CJC configuration for TC** | |
| Without CJC | 0 |
| Internal CJC | 1 |
| External CJC Pt100 (IEC), 3-wire | 3 |
| External CJC Ni100 (DIN), 3-wire | 6 |
| Define fixed CJC value with option Y60 | 8 |
| **Materials not in contact with media** | |
| None | 0 |
| **Type of protection** | |
| General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK | A |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx) | N |
| **Electrical connection/cable entries** | |
| None | A |
| **Local HMI** | |
| Without display | 0 |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety SIL2/3 (IEC 61508) | **C20** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Device options** | |
| PDF file with device settings | **D10** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL) | **D82** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V60** |
| Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21 | **V61** |
| Pt × (IEC), 4-wire, define RTD factor × in option Y21 | **V62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21 | **V64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21 | **V70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V81** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description (device parameters, max. 32 characters), adhesive label | **Y16** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Tag (device parameters, max. 16 characters), adhesive label on front | **Y19** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| ID number of special design | **Y99** |

### *Accessories*

| | Article No. |
|---|---|
| Other accessories for assembly, connection and transmitter configuration, see page 2/198. | |
| **Modems** | |
| HART modem with USB interface | **7MF4997-1DB** |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |
| **SIMATIC PDM parameterization software** | See Catalog FI 01 section 8 |

### *Ordering example*

7NG0320-0BA00-0AA0-Z Y01
Y01: -10 ... +100 °C

### *Factory setting*

- Pt100 (IEC 751); 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
  - Device fault: < 3.6 mA
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

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## Technical specifications

| SITRANS TR320 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 7.5 ... 48 V DC |
| • With explosion protection (Ex i) | 7.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumpers or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | 4 ... 20 mA: ≤ 55 ms<br>HART: ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |

| SITRANS TR320 (HART, universal) | |
|---|---|
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire or 3-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | -50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Linear resistance*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 10 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |

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## Technical specifications (continued)

| SITRANS TR320 (HART, universal) | |
|---|---|
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Voltage input*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 7.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Ambient temperature for devices with functional safety | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Transmitter enclosure | IP20 |
| • Terminals | IP20 |
| **Structural design** | |
| Weight | 122 g (0.27 lb) |
| Maximum core cross-section | 2.5 mm² (AWG 13) |

| SITRANS TR320 (HART, universal) | |
|---|---|
| Tightening torque for clamping screws | 0.5 ... 0.6 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3] | • DEKRA 17ATEX0116 X<br>• IECEx DEK 17.0054X<br>• A5E43700604A-2018X |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 20, 21, 22 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 D Ex ia IIIC Db<br>• I M1 Ex ia I Ma |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ia IIIC Db<br>• Ex ia I Ma |
| "Intrinsic safety ic" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC Dc |
| "Non-sparking/increased safety nA/ec" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex nA IIC T6...T4 Gc<br>• II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | • Ex nA IIC T6 ... T4 Gc<br>• Ex ec IIC T6 ... T4 Gc |
| ***Explosion protection CSA/FM for Canada and USA*** | |
| Certificates | • CSA 1861385<br>• FM18CA0024<br>• FM18US0046 |
| "Intrinsic safety ia" type of protection | • IS, CL I, Div 1, GP ABCD, T6 ... T4<br>• Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga or Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb |
| "Non incendive field wiring NIFW" type of protection | NIFW, CL I, Div 2, GP ABCD T6 ... T4 |
| "Non incendive NI" type of protection | • NI, CL I, Div 2, GP ABCD T6...T4<br>• Ex nA IIC T6 ... T4 Gc<br>• AEx nA IIC T6 ... T4 Gc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR320. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

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## Technical specifications (continued)

***Measuring ranges/Minimum measuring span***

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in °C$^{-1}$ (°F$^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML R84:20-03 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

***Input accuracy***

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Voltage input** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

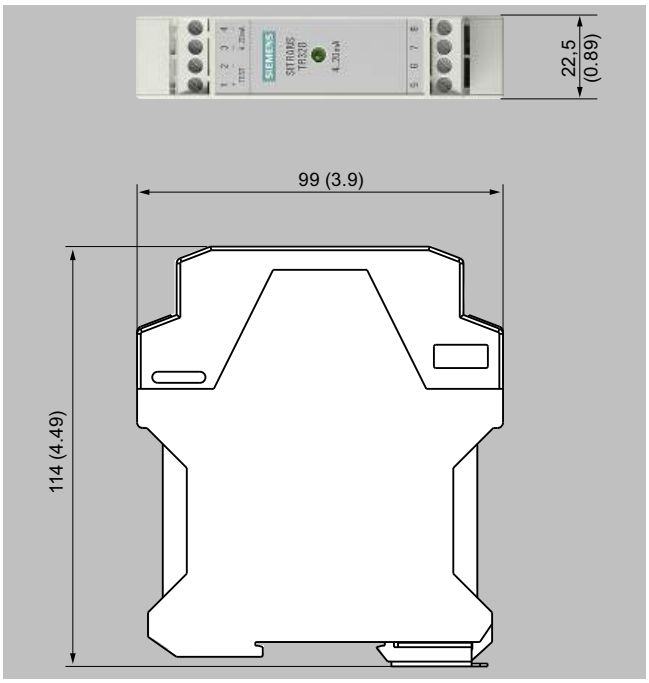
***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

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## Dimensional drawings




SITRANS TR320, dimensions in mm (inch)

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## Circuit diagrams

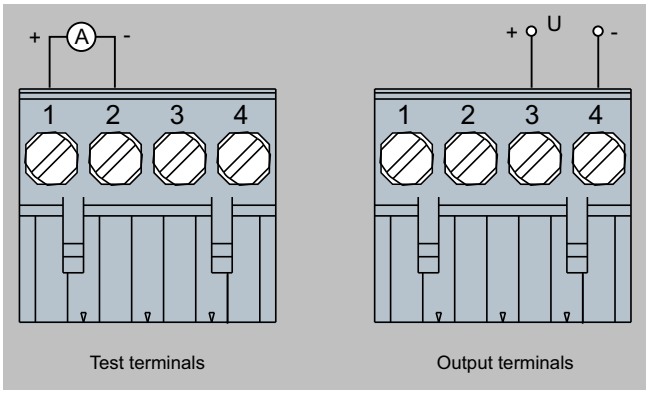
***Connections***




| | |
|---|---|
| 1 (+) and 2 (-) | Test terminals for measurement of the output current with an amperemeter |
| 3 (+) and 4 (-) | Output terminals |
| 5, 6, 7 and 8 | Input terminals |

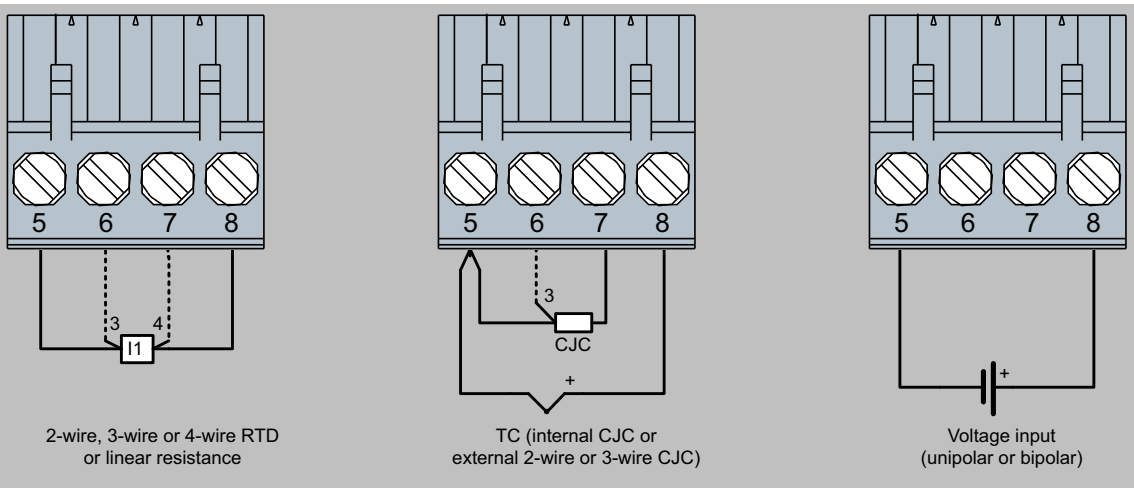
SITRANS TR320, connector assignment

Output and test connection




SITRANS TR320, output connection assignment

Input connection




SITRANS TR320, input connection assignment

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## Overview



- 2-wire rail transmitter with HART communications interface
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Configurable via HART 7

## Benefits

- Compact design
- Connection of two independent input circuits for redundant operation (high input availability)
- Galvanic isolation
- Test terminals for ammeter
- Diagnostics LED (green/red)
- Input monitoring wire break and short-circuit
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility according to EN 61326 and NE21
- SIL2/3 (with order note C20)

## Application

SITRANS TR420 transmitters with two inputs can be used in all sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- 2 resistance thermometers (2-wire, 3-wire, 4-wire connection)
- 2 thermocouples
- 2 linear resistors, potentiometer and DC voltage sources

The output signal is a load-independent direct current from 4 to 20 mA in accordance with the input characteristic, superimposed by the digital HART signal.

The dual input mode also supports drift detection of the inputs, whereby maintenance intervals can be more easily planned.

Transmitters of the "intrinsically safe or Zone 2 increased safety" type of protection can be installed in hazardous areas. The device meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals.

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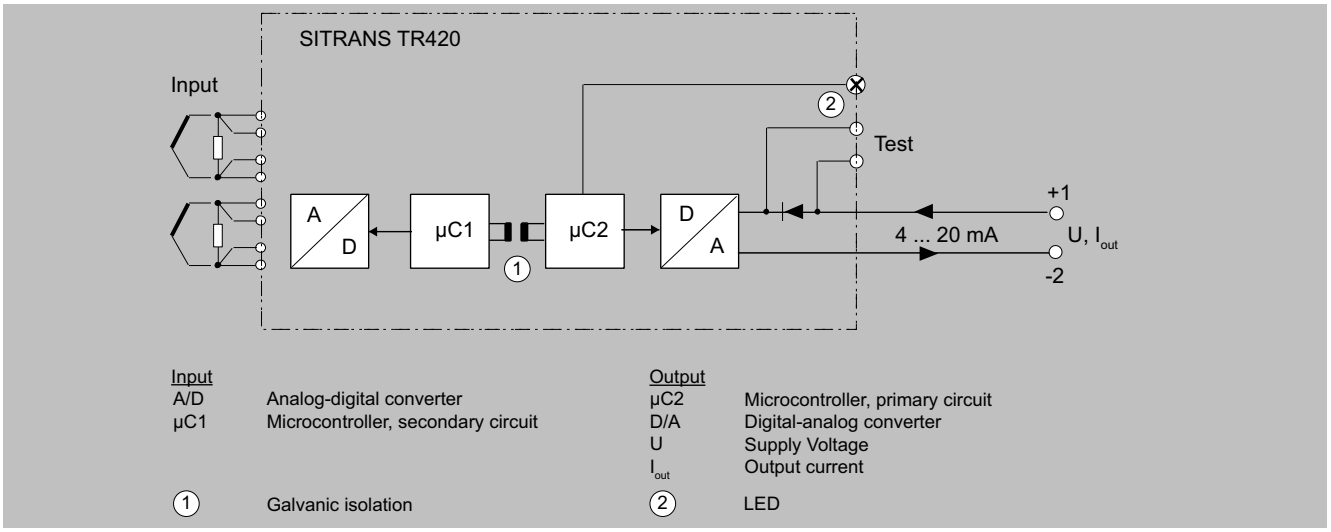


## Function

The SITRANS TR420 is configured via HART. The configuration can be carried out using a handheld communicator or, more conveniently, with a HART modem and the SIMATIC PDM configuration software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

After correct connection of input and supply voltage, the transmitter outputs a temperature-linear output signal and the diagnostics LED is green. In case of external errors, e.g. sensor short circuit or interruption, the LED flashes red; an internal error is indicated by a permanent red light.

An ammeter can be connected at any time for checking and plausibility via the test terminals. The output current can be read without any interruption, or even without opening the current loop.




SITRANS TR420, function block diagram

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## Selection and ordering data

| SITRANS TR420<br>DIN rail transmitter with 2 inputs | Article No.<br>7NG042<br>● - ● ● ● ● ● - 0 ● ● ● | Order code<br>● ● ● |
|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Communication** | | |
| With HART | 0 | |
| **Primary value output** | | |
| Input 1 | 0 | |
| Input 1, input 2 as redundancy | 1 | |
| Input 2, input 1 as redundancy | 2 | |
| Mean value input 1 and input 2, both as redundancy | 3 | |
| Minimum input 1 and input 2, both as redundancy | 4 | |
| Maximum input 1 and input 2, both as redundancy | 5 | |
| Difference input 1 - input 2 | 6 | |
| Difference input 2 - input 1 | 7 | |
| Absolute difference | 8 | |
| **Primary value output, customer-specific** | | |
| Minimum input 1 and input 2, without redundancy | 9 | H 1 A |
| Maximum input 1 and input 2, without redundancy | 9 | H 1 B |
| Mean value input 1 and input 2, without redundancy | 9 | H 1 C |
| Input 2 | 9 | H 1 D |
| **Input 1, type** | | |
| RTD | | |
| • Pt100 (IEC), 3-wire | B | |
| • Pt100 (IEC), 4-wire | C | |
| • Pt1000 (IEC), 3-wire | D | |
| • Pt1000 (IEC), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| **Input 1, type customer-specific** | | |
| Define customer-specific input configurations in V options | Y | |
| **Input 2, type** | | |
| Without input 2 | A | |
| RTD | | |
| • Pt100 (IEC), 3-wire | B | |
| • Pt100 (IEC), 4-wire | C | |
| • Pt1000 (IEC), 3-wire | D | |
| • Pt1000 (IEC), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |

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## Selection and ordering data (continued)

| SITRANS TR420<br>DIN rail transmitter with 2 inputs | Article No.<br>7NG042<br>● - ● ● ● ● ● - 0 ● ● ● | Order code<br>● ● ● |
|---|---|---|
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| **Input 2, type customer-specific** | | |
| Define customer-specific input configurations in W options | Y | |
| **CJC configuration for TC** | | |
| Input 1: no CJC; input 2: No CJC | 0 | |
| Input 1: internal CJC; input 2: internal CJC | 1 | |
| Input 1: external CJC; input 2: external CJC; define type in option Jxx | 2 | |
| Input 1: external CJC; define type in option Jxx; input 2: internal CJC | 3 | |
| Input 1: internal CJC; input 2: external CJC; define type in option Jxx | 4 | |
| Input 1: Internal CJC; Input 2: No CJC | 5 | |
| Input 1: External CJC (define type in option Jxx); input 2: No CJC | 6 | |
| **CJC configuration for TC, customer-specific** | | |
| Input 1: Fixed CJC value (define value in option Y60); Input 2: Fixed CJC value (define value in option Y61) | 9 | L 1 A |
| Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61 | 9 | L 1 B |
| Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx) | 9 | L 1 C |
| Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC | 9 | L 1 D |
| Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61 | 9 | L 1 E |
| **Materials not in contact with media** | | |
| None | 0 | |
| **Type of protection** | | |
| General safety (non-Ex); CE, RCM, FM, KCC, EAC, CSA, UK | A | |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) / increased safety zone 2 (Ex ec) / non-incendive (NI) (ATEX, IECEx, EACEx, CSA, FM, NEPSI, Inmetro, UKEx) | N | |
| **Electrical connection/cable entries** | | |
| None | A | |
| **Local HMI** | | |
| Without display | 0 | |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety SIL2/3 (IEC 61508) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current > 21 mA (instead of < 3.6 mA) (only non-SIL) | **D82** |
| **External CJC types** | |
| Pt100, IEC 60751, 3-wire | **J02** |
| Pt100, IEC 60751, 4-wire | **J03** |
| Ni100, DIN 43760-87, 3-wire | **J05** |
| Ni100, DIN 43760-87, 4-wire | **J06** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V60** |
| Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21 | **V61** |
| Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21 | **V62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21 | **V64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V67** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21 | **V70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V81** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |
| **Input 2: TC** | |
| Type C W5 | **W01** |
| Type D W3 | **W02** |
| Type U | **W03** |
| Type Lr | **W04** |
| **Input 2: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36) | **W50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y36) | **W51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y36) | **W52** |
| **Input 2: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W60** |
| Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22 | **W61** |
| Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22 | **W62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22 | **W64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22 | **W65** |
| Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W67** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22 | **W70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22 | **W71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y22 | **W76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y22 | **W77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W78** |
| Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22 | **W79** |
| Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22 | **W80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W81** |
| Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W82** |
| Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W83** |
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description (device parameters, max. 32 characters), adhesive label | **Y16** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Input 2: RTD factor (e.g. factor "200" - RTD Pt200), adhesive label | **Y22** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y36** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Wire resistance value input 2 in ohms (0 ... 100 ohms) | **Y52** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| Input 2: CJC sensor, fixed value (see measuring range for unit) | **Y61** |
| ID number of special design | **Y99** |

***Accessories***

| | Article No. |
|---|---|
| Other accessories for assembly, connection and transmitter configuration, see page 2/198. | |
| **Modem** | |
| HART modem with USB interface | **7MF4997-1DB** |
| **SIMATIC PDM parameterization software** | See Catalog FI 01 section 8 |

***Ordering example***

7NG0420-0BA00-0AA0-Z Y01
Y01: -10 ... +100 °C

***Factory setting***

- Input 1: Pt100 (IEC 751; 3-wire connection)
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
  - Device fault: < 3.6 mA
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input circuit drift: 22 mA (active when input 2 is active)
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

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## Technical specifications

| SITRANS TR420 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 7.5 ... 48 V DC |
| • With explosion protection (Ex i) | 7.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumpers or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | SIPROM T and HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |

| SITRANS TR420 (HART, universal) | |
|---|---|
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire, 3-wire or 4-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | -50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Linear resistance*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 10 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 3-wire, 4-wire or 5-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |

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## Technical specifications (continued)

| SITRANS TR420 (HART, universal) | |
|---|---|
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Voltage input*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 7.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Ambient temperature for devices with functional safety | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Transmitter enclosure | IP20 |
| • Terminals | IP20 |
| **Structural design** | |
| Weight | 122 g (0.27 lb) |
| Maximum core cross-section | 2.5 mm² (AWG 13) |

| SITRANS TR420 (HART, universal) | |
|---|---|
| Tightening torque for clamping screws | 0.5 ... 0.6 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3] | • DEKRA 17ATEX0116 X<br>• IECEx DEK 17.0054X<br>• A5E43700604A-2018X |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 20, 21, 22 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 D Ex ia IIIC Db<br>• I M1 Ex ia I Ma |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ia IIIC Db<br>• Ex ia I Ma |
| "Intrinsic safety ic" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC Dc |
| "Non-sparking/increased safety nA/ec" type of protection | For use in Zones 2 and 22 |
| • ATEX | • II 3 G Ex nA IIC T6...T4 Gc<br>• II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | • Ex nA IIC T6 ... T4 Gc<br>• Ex ec IIC T6 ... T4 Gc |
| ***Explosion protection CSA/FM for Canada and USA*** | |
| Certificates | • CSA 1861385<br>• FM18CA0024<br>• FM18US0046 |
| "Intrinsic safety ia" type of protection | • IS, CL I, Div 1, GP ABCD, T6 ... T4<br>• Ex ia IIC T6 ... T4 Ga, AEx ia IIC T6 ... T4 Ga<br>or<br>Ex ib [ia Ga] IIC T6...T4 Gb, AEx ib [ia Ga] IIC T6...T4 Gb |
| "Non incendive field wiring NIFW" type of protection | NIFW, CL I, Div 2, GP ABCD T6 ... T4 |
| "Non incendive NI" type of protection | • NI, CL I, Div 2, GP ABCD T6...T4<br>• Ex nA IIC T6 ... T4 Gc<br>• AEx nA IIC T6 ... T4 Gc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TR420. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

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## Technical specifications (continued)

***Measuring ranges/Minimum measuring span***

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in °C$^{-1}$ (°F$^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2-003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML - R84:2003 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

***Input accuracy***

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Voltage input** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

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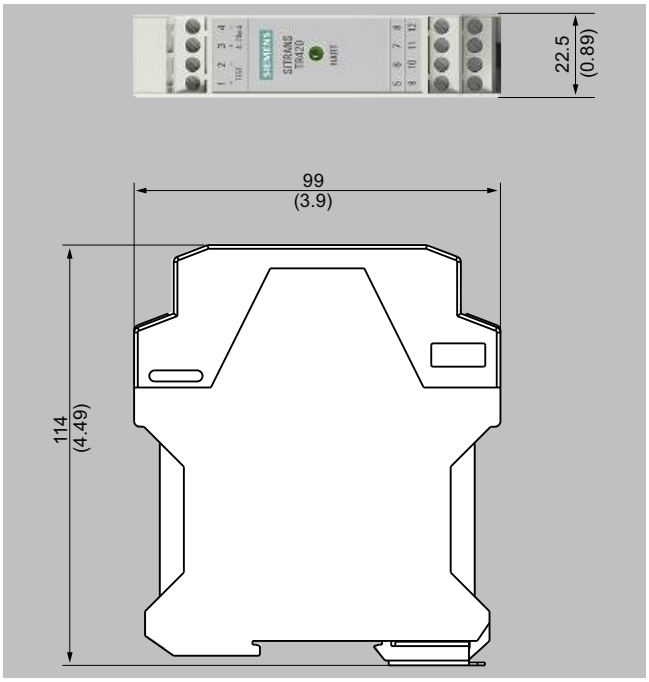


## Technical specifications (continued)

***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Average value measurement | Average of accuracy of input 1 and input 2 | Average of temperature coefficient of input 1 and input 2 |
| Differential measurement | Sum of accuracy of input 1 and input 2 | Sum of temperature coefficient of input 1 and input 2 |
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

## Dimensional drawings




SITRANS TR420, dimensions in mm (inch)

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## Circuit diagrams

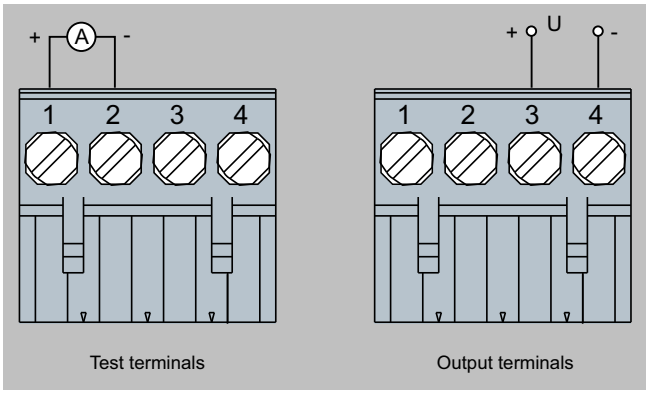
***Connections***




| | |
|---|---|
| 1 (+) and 2 (-) | Test terminals for measurement of the output current with an amperemeter |
| 3 (+) and 4 (-) | Output terminals |
| 5, 6, 7 and 8 | Input 1 terminals |
| 9, 10, 11 and 12 | Input 2 terminals |

SITRANS TR420, connector assignment

Output and test connection



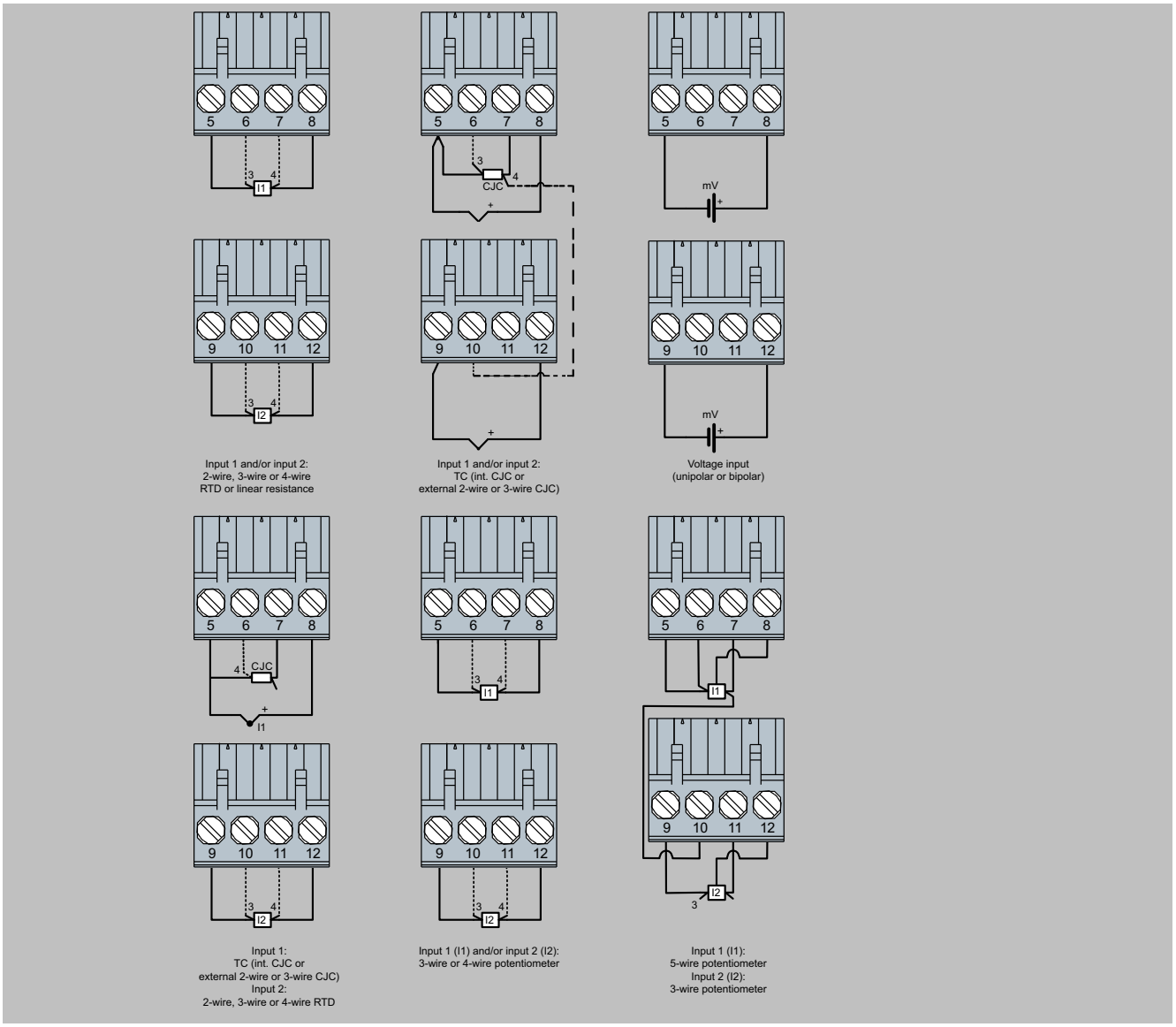

SITRANS TR420, output connection assignment

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## Circuit diagrams (continued)

Input connection




SITRANS TR420, input connection assignment

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## Overview




SITRANS TF320 in dual chamber enclosure

## Overview (continued)




SITRANS TF320 in single chamber enclosure

- 2-wire temperature transmitter with and without HART communication interface
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7 or optional local operation

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## Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
  - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
  - Thermocouples
  - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
  - Measuring point is difficult to access
  - Measuring point is subjected to high temperatures
  - Measuring point is subjected to vibration through plant
  - Long neck pipes and thermowells must be avoided
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

## Application

SITRANS TF320 can be used everywhere where temperatures need to be measured under particularly adverse conditions and where a user-friendly local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

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## Function

***Configuration***

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

For the SITRANS TF320 without HART functionality, parameters are assigned with the PC. A special modem and the software tool SIPROM T are available for this purpose.

The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

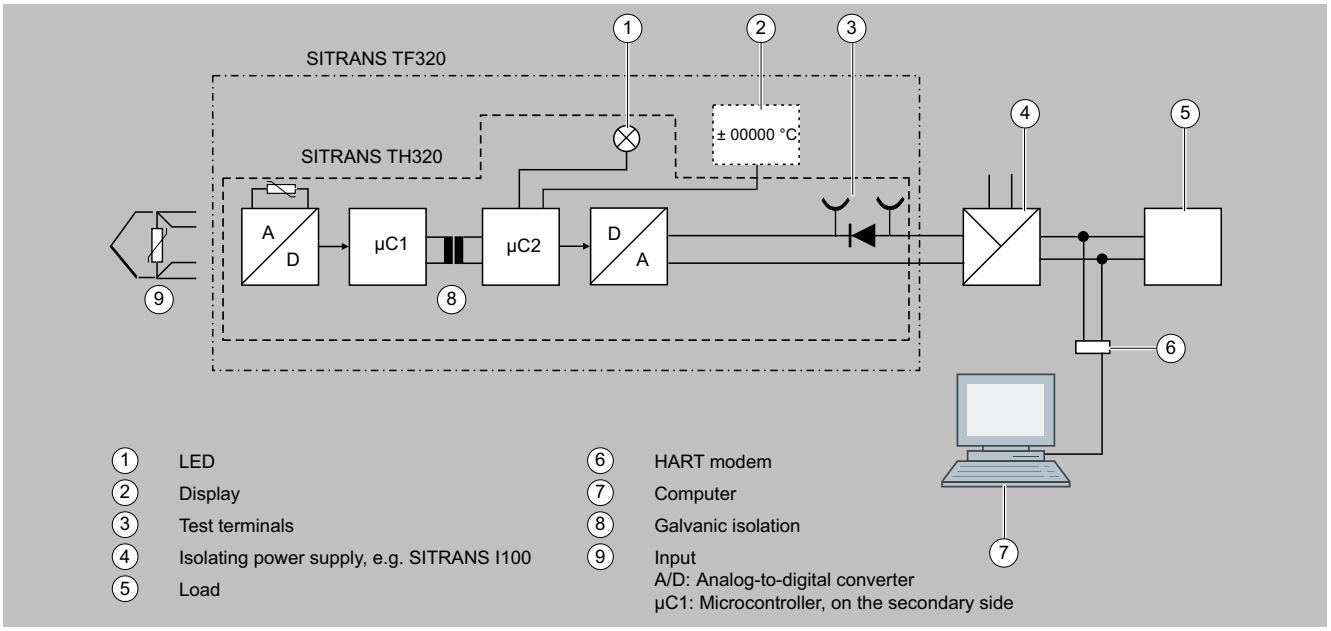
***Principle of operation***

SITRANS TF320 as temperature transmitter

The input signal, whether resistance thermometer (RTD), thermocouple (TC), Ω or mV signal, is amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration.

SITRANS TF320 automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.




Function block diagram SITRANS TF320 with integrated SITRANS TH320

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## Selection and ordering data

### *Single chamber enclosure*

| SITRANS TF320 temperature transmitter with single chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output. | Article No. 7NG034 ● - ● ● ● ● ● - 0 ● ● ● |
|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | |
| **Communication** | |
| With HART (4 ... 20 mA) | 0 |
| Without HART (4 ... 20 mA) | 7 |
| **Primary value output** | |
| Input 1 | 0 |
| **Input 1, type** | |
| RTD | |
| • Pt100 (IEC 60751), 3-wire | B |
| • Pt100 (IEC 60751), 4-wire | C |
| • Pt1000 (IEC 60751), 3-wire | D |
| • Pt1000 (IEC 60751), 4-wire | E |
| TC | |
| • Type B | F |
| • Type E | G |
| • Type J | H |
| • Type K | J |
| • Type L | K |
| • Type N | L |
| • Type R | N |
| • Type S | P |
| • Type T | Q |
| Potentiometer, 4-wire | R |
| More types in option Vxx | Y |
| **Input 2, type** | |
| Without input 2 | A |
| **CJC configuration for TC** | |
| None CJC | 0 |
| Internal CJC | 1 |
| External CJC RTD Pt100 (IEC 60751), 3-wire | 3 |
| External CJC RTD Ni100 (DIN 43760-87), 3-wire | 6 |
| Define fixed CJC value with option Y60 | 8 |
| **Material of non-wetted parts** | |
| Die-cast aluminum enclosure | 1 |
| Enclosure made of stainless steel precision casting 1.4401 (similar to 316) | 3 |
| **Type of protection (Ex)** | |
| General safety | A |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) | B |
| Flameproof enclosure (Ex d) / Explosion proof (XP) | C |
| Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | L |
| Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) | S |
| Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | T |
| **Electrical connection/cable entries** | |
| 2 × M20 × 1.5 | F |
| 2 × ½" NPT | M |
| **Local operation** | |
| Without local operation | 0 |
| Local operation (closed lid) | 1 |
| Local operation (lid with glass window) | 2 |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Cable gland included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A11** |
| CAPRI ADE 4F, stainless steel<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A12** |
| **Han plug** | |
| Device plug Han 7D, mounted on left, metal, straight | **A32** |
| Cable socket included, metal, for device plug Han 7D/8D | **A41** |
| **M12 plug** | |
| Device plug M12, mounted on left, stainless steel, without cable socket | **A62** |
| Device plug M12, mounted on left, stainless steel, with cable socket | **A63** |
| **Mounting cable glands/plugs** | |
| Cable gland mounted | **A97** |
| Device plug for output, mounted right | **A98** |
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1:<br>Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| IP66/IP68 degree of protection (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Nameplate and approval plate, stainless steel 1.4404/316L | **D42** |
| Overvoltage protection up to 20 kV (external) | **D71** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL) | **D82** |
| **General approval without Ex approval** | |
| Worldwide (CE, RCM) except EAC, FM, KCC | **E00** |
| Global | **E01** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection certificates** | |
| ATEX (Europe) | **E20** |
| FM (USA & Canada) | **E22** |
| IECEx (Worldwide) | **E23** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe) and IECEx (Worldwide) | **E47** |
| ATEX, IECEx and FM | **E49** |
| **Factory** | |
| Made in France | **F00** |
| **Mounting clamps** | |
| Pipe mounting kit for single chamber enclosure, stainless steel 316L | **H06** |
| Wall mounting kit for single chamber enclosure, stainless steel 316L | **H07** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V60** |
| Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21 | **V61** |
| Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21 | **V62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21 | **V64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21 | **V70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Tag (device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description (device parameters, max. 32 characters), adhesive label | **Y16** |
| Tag (device parameters, max. 8 characters), adhesive label | **Y17** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| ID number of special design | **Y99** |

***Dual chamber enclosure***

| SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output. | Article No.<br>7NG035<br>● - ● ● ● ● ● - 0 ● ● ● |
|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | |
| **Communication** | |
| With HART (4 ... 20 mA) | 0 |
| Without HART (4 ... 20 mA) | 7 |
| **Primary value output** | |
| Input 1 | 0 |
| **Input 1, type** | |
| RTD | |
| • Pt100 (IEC 60751), 3-wire | B |
| • Pt100 (IEC 60751), 4-wire | C |
| • Pt1000 (IEC 60751), 3-wire | D |
| • Pt1000 (IEC 60751), 4-wire | E |
| TC | |
| • Type B | F |
| • Type E | G |
| • Type J | H |
| • Type K | J |
| • Type L | K |
| • Type N | L |
| • Type R | N |
| • Type S | P |
| • Type T | Q |
| Potentiometer, 4-wire | R |
| More types in option Vxx | Y |
| **Input 2, type** | |
| Without input 2 | A |
| **CJC configuration for TC** | |
| Without CJC | 0 |
| Internal CJC | 1 |

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## Selection and ordering data (continued)

| SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output. | Article No. 7NG035 ● - ● ● ● ● ● - 0 ● ● ● |
|---|---|
| External CJC RTD Pt100 (IEC 60751), 3-wire | 3 |
| External CJC RTD Ni100 (DIN 43760-87), 3-wire | 6 |
| Define fixed CJC value with option Y60 | 8 |
| **Material of non-wetted parts** | |
| Die-cast aluminum enclosure | 1 |
| Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L) | 2 |
| **Type of protection (Ex)** | |
| General safety | A |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) | B |
| Flameproof enclosure (Ex d) / Explosion proof (XP) | C |
| Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | L |
| Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) | S |
| Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | T |
| **Electrical connection/cable entries** | |
| 2 × M20 × 1.5 | F |
| 2 × ½" NPT | M |
| **Local operation** | |
| Without local operation | 0 |
| Local operation (closed lid) | 1 |
| Local operation (lid with glass window) | 2 |

| Options | Order code |
|---|---|
| Add "**-Z**" to article number, specify order code and, if applicable, free text. | |
| **Cable gland included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A11** |
| CAPRI ADE 4F, stainless steel<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A12** |
| **Device plug Han, mounted on left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12, mounted on left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |

| Options | Order code |
|---|---|
| **Mounting cable glands/plugs** | |
| Cable gland mounted | **A97** |
| Device plug for output, mounted right | **A98** |
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| IP66/IP68 degree of protection (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 20 kV (external) | **D71** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL) | **D82** |
| **General approval without Ex approval** | |
| Worldwide (CE, RCM) except EAC, FM, KCC | **E00** |
| Global | **E01** |
| EAC | **E07** |
| FM | **E08** |
| **Explosion protection certificates** | |
| ATEX (Europe) | **E20** |
| FM (USA & Canada) | **E22** |

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## Selection and ordering data (continued)

| Options | Order code |
|---|---|
| IECEx (Worldwide) | **E23** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| ATEX (Europe) and IECEx (Worldwide) | **E47** |
| ATEX and IECEx and FM | **E49** |
| **Factory** | |
| Made in France | **F00** |
| **Mounting brackets (only dual chamber enclosure)** | |
| Wall/pipe mounting bracket for dual chamber enclosure, steel | **H01** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304 | **H02** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L | **H03** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V60** |
| Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21 | **V61** |
| Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21 | **V62** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21 | **V64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21 | **V70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V81** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404 | **Y15** |
| Measuring point description (device parameters, max. 32 characters), stainless steel 316L/1.4404 | **Y16** |
| Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404 | **Y17** |
| Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404 | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| ID number of special design | **Y99** |

### *Accessories*

| | Article No. |
|---|---|
| See section "Other accessories for assembly, connection and transmitter configuration" | |
| **Modems** | |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |
| HART modem with USB interface | **7MF4997-1DB** |
| **Thread adapter** | |
| Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread) | **7MP1990-0BA00** |
| Thread adapter M20x1.5 (external thread) to G½ (feexternal thread) | **7MP1990-0BB00** |
| **Local operation** | |
| Local operation for temperature transmitter in dual chamber enclosure | **7MF7902-1AD** |
| Mounting system for local operation 7MF7902-1AD in single chamber enclosure | **7MF7902-1AS** |

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## Selection and ordering data (continued)

| | Article No. |
|---|---|
| **Mounting brackets (only dual chamber enclosure)** | |
| Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF | 7MF7900-1AB |
| Wall/pipe mounting bracket for dual chamber enclosure, steel, M8 | 7MF7900-1AC |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF | 7MF7900-1AH |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8 | 7MF7900-1AJ |
| **Mounting system (only single chamber enclosures)** | |
| Pipe mounting kit for single chamber enclosure, stainless steel 316L | 7MF7900-1AK |
| Wall mounting kit for single chamber enclosure, stainless steel 316L | 7MF7900-1AL |
| **Cable gland** | |
| Cable gland, gray, non-Ex, M20 | 7MF7906-1AB |
| Cable gland, gray, non-Ex, NPT | 7MF7906-1BB |
| Cable gland, metal, non-Ex, NPT | 7MF7906-1BD |
| Cable gland, metal, non-Ex, M20 | 7MF7906-1AD |
| Cable gland, metal, Ex-d, NPT | 7MF7906-1BE |
| Cable gland, metal, Ex-d, M20 | 7MF7906-1AE |
| Cable gland, 316L, non-Ex, NPT | 7MF7906-1BH |
| Cable gland, 316L, non-Ex, M20 | 7MF7906-1AH |
| Cable gland, 316L, Ex-d, NPT | 7MF7906-1BJ |
| Cable gland, 316L, Ex-d, M20 | 7MF7906-1AJ |
| Cable gland, E1FX Tri-Star ½-14 NPT, CMP | 7MF7906-1NE |
| Cable gland, ½ NPT Capri ADE 4F cpl., CuZn | 7MF7906-1PE |
| Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel | 7MF7906-1PJ |
| **Plug and cable socket** | |
| Plug Han 7D, plastic, straight | 7MF7906-2AB |
| Plug Han 7D, plastic, angled | 7MF7906-2AC |
| Plug Han 7D, metal, straight, blue | 7MF7906-2AQ |
| Plug Han 7D, metal, straight, gray | 7MF7906-2AN |
| Plug Han 7D, metal, angled, blue | 7MF7906-2AR |
| Plug Han 7D, metal, angled, gray | 7MF7906-2AP |
| Plug Han 8D, plastic, straight | 7MF7906-2EB |
| Plug Han 8D, plastic, angled | 7MF7906-2EC |
| Plug Han 8D, metal, straight, blue | 7MF7906-2EQ |
| Plug Han 8D, metal, straight, gray | 7MF7906-2EN |
| Plug Han 8D, metal, angled, blue | 7MF7906-2ER |
| Plug Han 8D, metal, angled, gray | 7MF7906-2EP |
| Cable socket, plastic, for plug Han 7D | 7MF7906-2BB |
| Cable socket, plastic, for plug Han 8D | 7MF7906-2FB |
| Cable socket, metal, for Han 7D blue | 7MF7906-2BQ |
| Cable socket, metal, for Han 8D blue | 7MF7906-2FQ |
| Cable socket, metal, for Han 7D gray | 7MF7906-2BN |
| Cable socket, metal, for Han 8D gray | 7MF7906-2FN |
| Plug M12 with cable socket, stainless steel | 7MF7906-3AB |
| **Overvoltage protection** | |
| Overvoltage protection up to 20 kV, M20 | 7MF7906-3AC |
| Overvoltage protection up to 20 kV, NPT | 7MF7906-3AD |
| **Lid** | |
| Closed lid aluminum, painted 2×, without glass window, with seal NBR | 7MF7901-1BB |
| Closed lid aluminum, painted 2×, without glass window, with seal FVMQ | 7MF7901-1BC |
| Lid aluminum 2x coated, with glass window, with seal NBR | 7MF7901-1BG |
| Lid aluminum 2x coated, with glass window, with seal FVMQ | 7MF7901-1BH |
| Closed lid stainless steel precision casting, without glass window, with seal NBR | 7MF7901-2AB |
| Closed lid stainless steel precision casting, without glass window, with seal FVMQ | 7MF7901-2AC |
| Lid stainless steel precision casting, with glass window, with seal NBR | 7MF7901-2AG |
| Lid stainless steel precision casting, with glass window, with seal FVMQ | 7MF7901-2AH |

***Ordering example***

SITRANS TF320 (single chamber enclosure)

7NG0340-0BA01-0AF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C

Y17: TICA123

***Factory setting***

- Pt100 (IEC 60751) in 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

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## Technical specifications

| SITRANS TF320 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 10.5 ... 48 V DC |
| • With explosion protection (Ex i) | 10.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumper (transmitter), switch (on display) or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | SIPROM T and HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | 4 ... 20 mA: ≤ 55 ms<br>HART: ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar-Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |

| SITRANS TF320 (HART, universal) | |
|---|---|
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire or 3-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | 50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Linear resistance*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 10 Ω ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |

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## Technical specifications (continued)

| SITRANS TF320 (HART, universal) | |
|---|---|
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Supply voltage*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 10.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | |
| • Without local operation in single chamber enclosure | 50 ... +85 °C (-58 ... +185 °F) |
| • With local operation | 40 ... +85 °C (-40 ... +185 °F) |
| • For transmitters with functional safety | 40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | 50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Temperature transmitter enclosure | IP66/IP68 |
| • Terminals | IP00 |

| SITRANS TF320 (HART, universal) | |
|---|---|
| **Structural design** | |
| Weight | |
| • Single chamber enclosure | • Aluminum: 0.85 kg (1.87 lbs)<br>• Stainless steel: 1.69 kg (3.73 lbs) |
| • Dual chamber enclosure | • Aluminum: 1.3 kg (2.87 lbs)<br>• Stainless steel: 3.3 kg (7.28 lbs) |
| Maximum core cross-section | |
| • Single chamber enclosure | 1.5 mm² (AWG 16) |
| • Dual chamber enclosure | 2.5 mm² (AWG 14) |
| Tightening torque for clamping screws | 0.5 ... 0.6 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3] | • IECEx DEK 19.0069X<br>• IECEx DEK 19.0070X<br>• DEKRA 19ATEX0106 X (Category 1)<br>• DEKRA 19ATEX0108X (Category 2)<br>• DEKRA 19ATEX0107X (Category 3)<br>• A5E50642461A-2021X (Category 3) |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 21 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ib [ia Da] IIIC T 100 °C Db |
| "Intrinsic safety ic" type of protection | For use in Zone 2, 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC T100 °C Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC T100 °C Dc |
| "Increased safety ec" type of protection | For use in Zone 2 |
| • ATEX | II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | Ex ec IIC T6 ... T4 Gc |
| • "Flameproof enclosure db" type of protection | For use in Zone 1 |
| • ATEX | II 2 G Ex db IIC T6...T4 Gb |
| • IECEx and others | Ex db IIC T6 ... T4 Gb |
| • "Protection by enclosure tb/tc" type of protection | For use in Zone 21, 22 |
| • ATEX | • II 2 D Ex tb IIC T100 °C Db<br>• II 3 D Ex tc IIIC T100 °C Dc |
| • IECEx and others | • Ex tb IIC T100 °C Db<br>• Ex tc IIIC T100 °C Dc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF320. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

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## Technical specifications (continued)

***Measuring ranges/Minimum measuring span***

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in $°C^{-1}$ ($°F^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar-Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML R84:20-03 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

***Input accuracy***

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Supply voltage** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

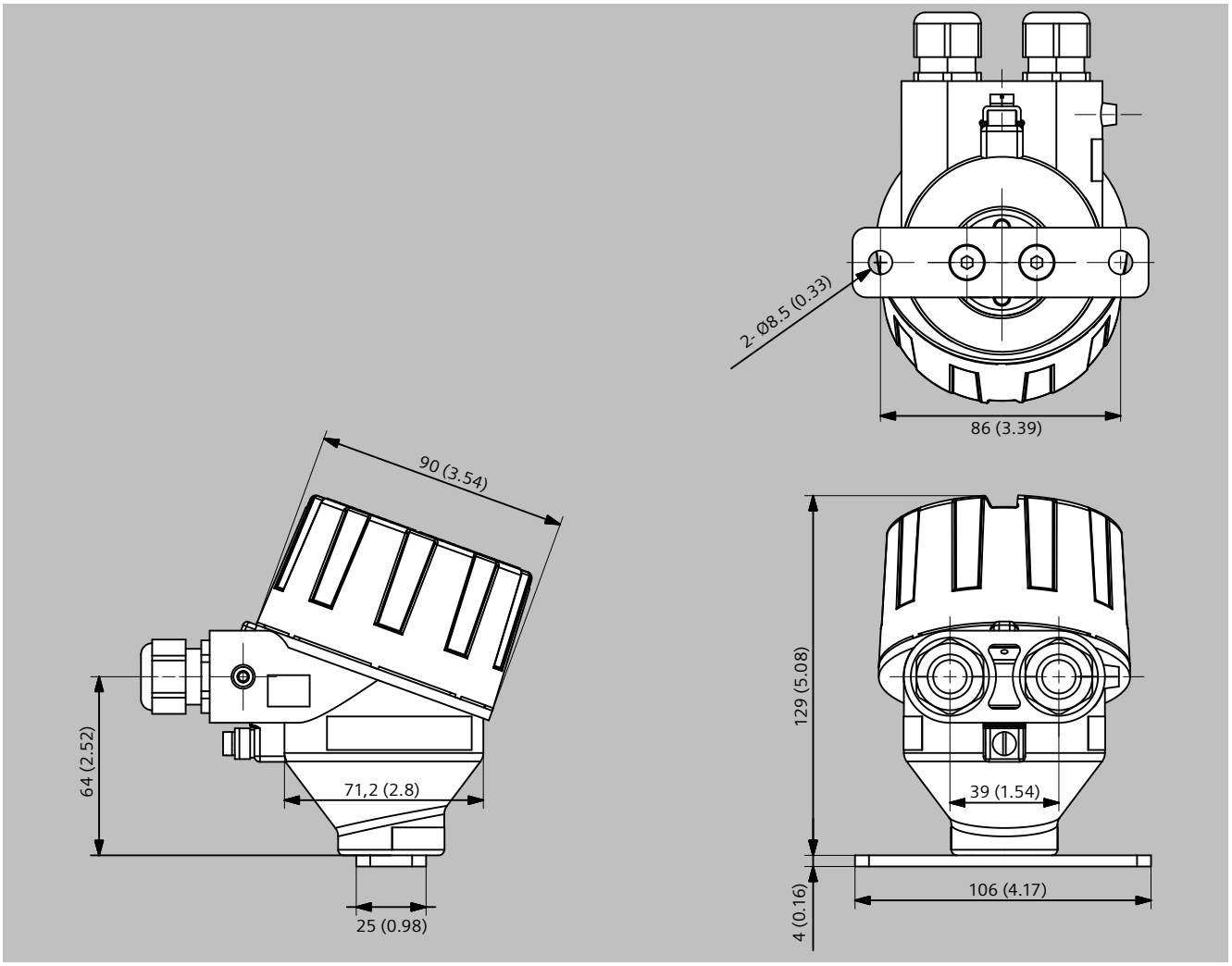
***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

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## Dimensional drawings

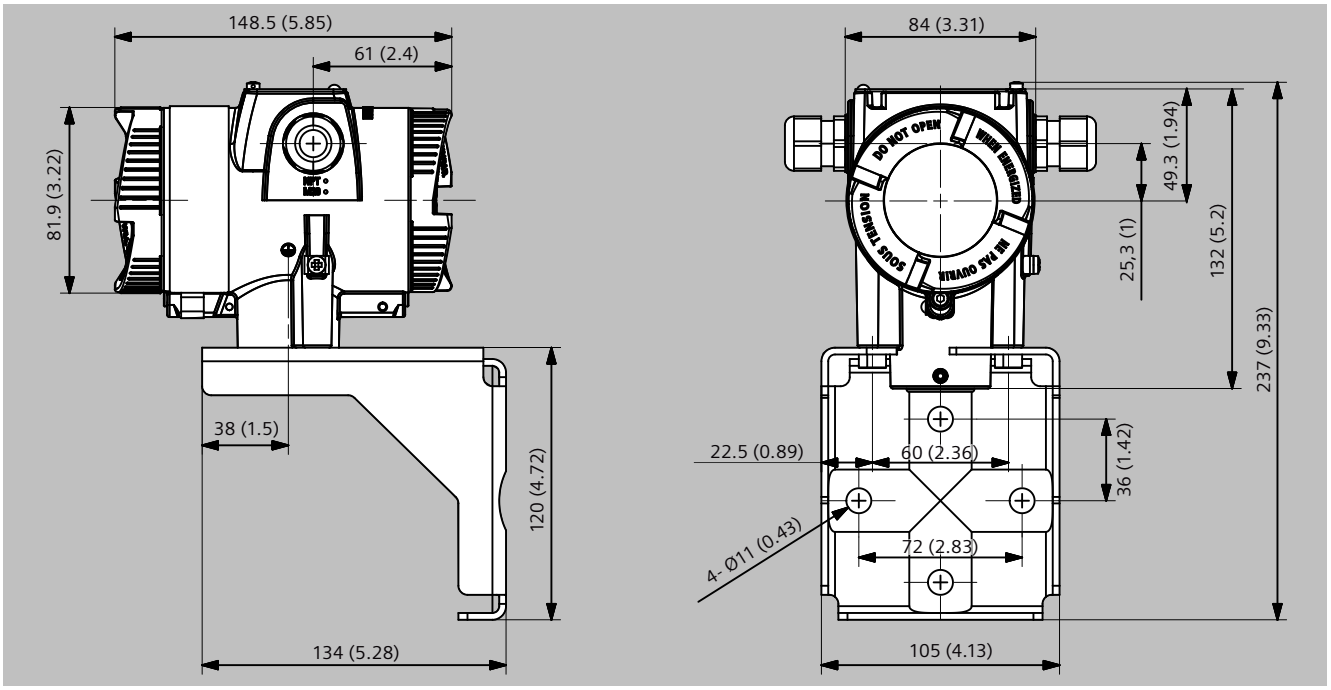



SITRANS TF320, single chamber enclosure, dimensions in mm (inch)

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## Dimensional drawings (continued)




SITRANS TF320, dual chamber enclosure, dimensions in mm (inch)

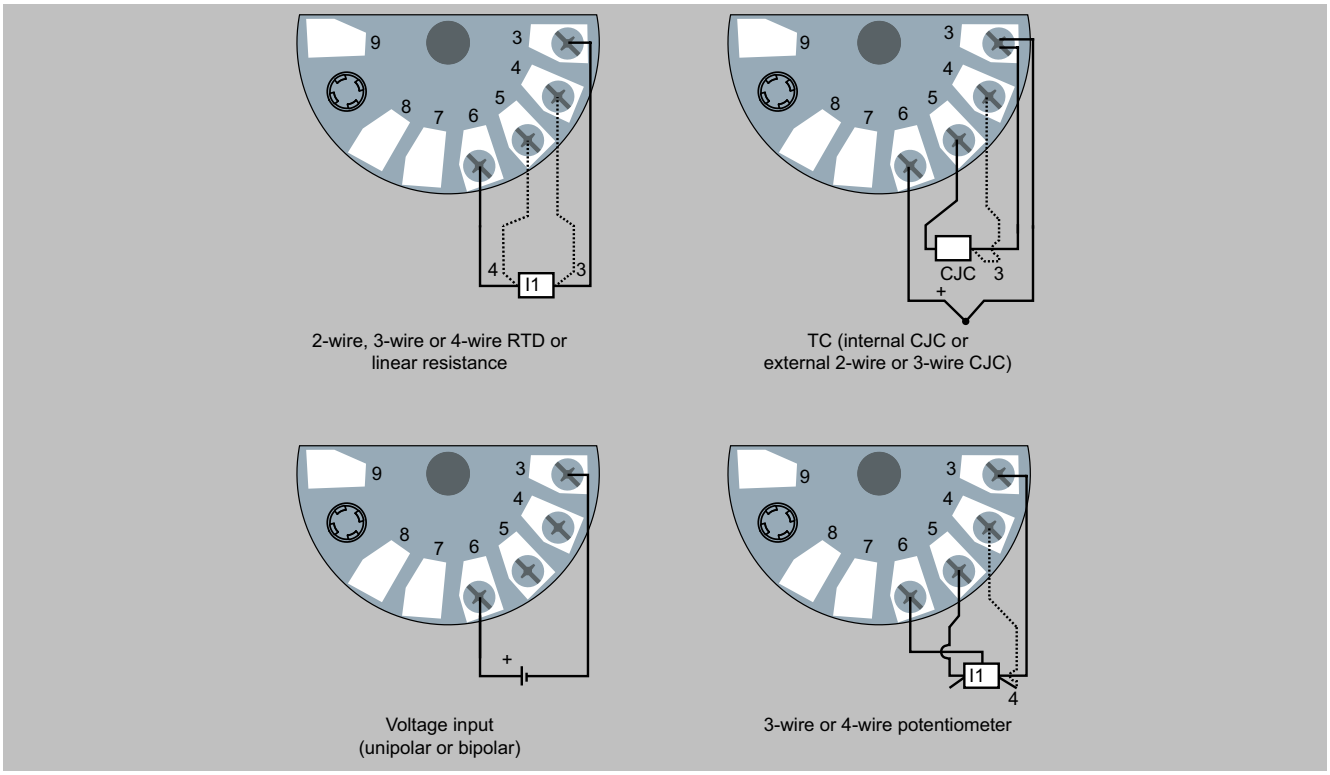
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## Circuit diagrams

***Connections***

Input connection

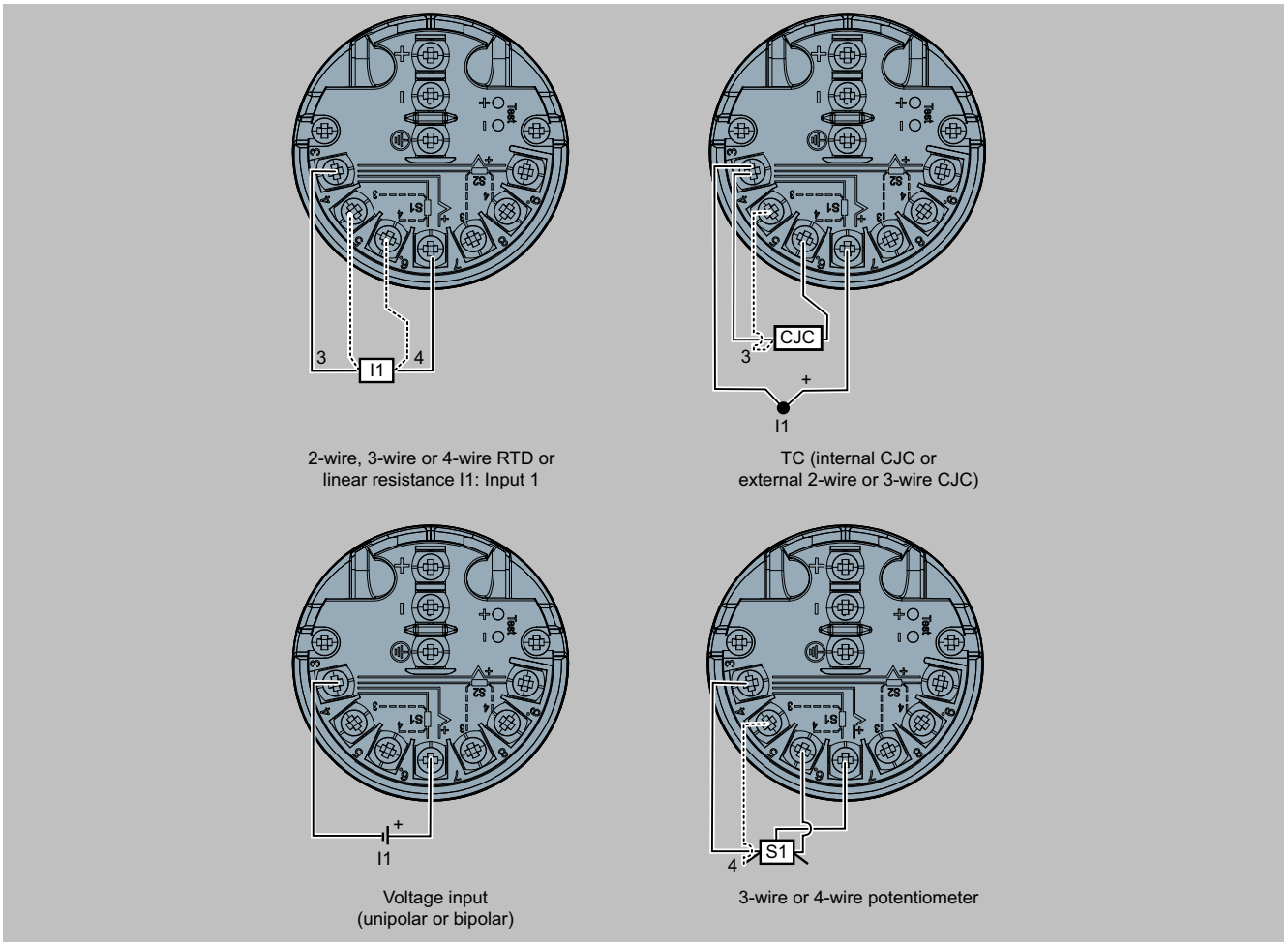



SITRANS TF320 in single chamber enclosure (7NG034*), input connection assignment

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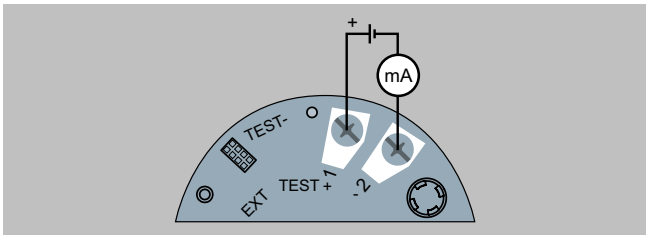


## Circuit diagrams (continued)




SITRANS TF320 in dual chamber enclosure (7NG035*), input connection assignment

Output connection




SITRANS TF320 in single chamber enclosure (7NG034*), output connection assignment

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## Overview




SITRANS TF420 in dual chamber enclosure

## Overview (continued)




SITRANS TF420 in single chamber enclosure

- 2-wire temperature transmitter with HART communication interface
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Can be configured via PC, HART 7 or optional local operation

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## Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
  - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
  - Thermocouples
  - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
  - Measuring point is difficult to access
  - Measuring point is subjected to high temperatures
  - Measuring point is subjected to vibration through plant
  - Long neck pipes and thermowells must be avoided
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

## Application

SITRANS TF420 with its two sensor inputs can be used everywhere where temperatures need to be measured without interruption under particularly adverse conditions and where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

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## Function

***Configuration***

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

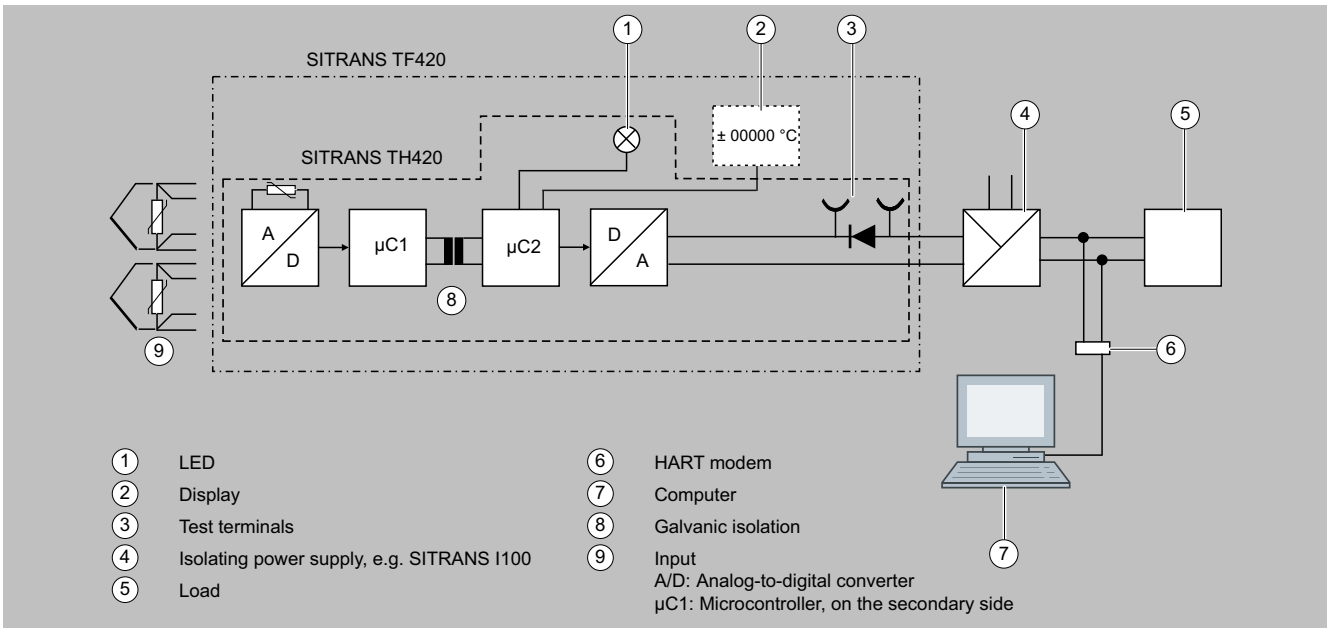
***Principle of operation***

SITRANS TF420 as temperature transmitter

Two sensor signals, whether resistance thermometers (RTD), thermocouples (TC), Ω or mV signals, are amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration.

SITRANS TF420 automatically detects when a sensor should be interrupted or is indicating a short-circuit. If the back-up functionality has been selected in the primary value display, the SITRANS TF420 automatically switches to the 2nd input without interrupting the measured value; e.g. primary value input 1 with input 2 as backup. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.




Function block diagram SITRANS TF420 with integrated SITRANS TH420

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## Selection and ordering data

### *Single chamber enclosure*

| SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output. | Article No. 7NG044 ● - ● ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Communication** | | |
| With HART (4 ... 20 mA) | 0 | |
| **Primary value output** | | |
| Input 1 | 0 | |
| Input 1, input 2 as redundancy (hot backup) | 1 | |
| Input 2, input 1 as redundancy (hot backup) | 2 | |
| Mean value input 1 and input 2, both as redundancy (hot backup) | 3 | |
| Minimum input 1 and input 2,both as redundancy (hot backup) | 4 | |
| Maximum input 1 and input 2, both as redundancy (hot backup) | 5 | |
| Difference input 1 - input 2 | 6 | |
| Difference input 2 - input 1 | 7 | |
| Absolute difference | 8 | |
| **Primary value output, customer-specific** | | |
| Minimum input 1 and input 2, without redundancy (hot backup) | 9 | H 1 A |
| Maximum input 1 and input 2, without redundancy (hot backup) | 9 | H 1 B |
| Mean value input 1 and input 2, without redundancy (hot backup) | 9 | H 1 C |
| Input 2 | 9 | H 1 D |
| **Input 1, type** | | |
| RTD | | |
| • Pt100 (IEC 60751), 3-wire | B | |
| • Pt100 (IEC 60751), 4-wire | C | |
| • Pt1000 (IEC 60751), 3-wire | D | |
| • Pt1000 (IEC 60751), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| More types in option Vxx | Y | |
| **Input 2, type** | | |
| No input | A | |
| RTD | | |
| • Pt100 (IEC 60751), 3-wire | B | |
| • Pt100 (IEC 60751), 4-wire | C | |
| • Pt1000 (IEC 60751), 3-wire | D | |
| • Pt1000 (IEC 60751), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |

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## Selection and ordering data (continued)

| SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output. | Article No. 7NG044 ● - ● ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| More types in option Wxx | Y | |
| **CJC configuration for TC** | | |
| Input 1: None CJC; Input 2: No CJC | 0 | |
| Input 1: Internal CJC; Input 2: Internal CJC | 1 | |
| Input 1: External CJC; input 2: External CJC; define type in option Jxx | 2 | |
| Input 1: External CJC; define type in option Jxx; input 2: Internal CJC | 3 | |
| Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx | 4 | |
| Input 1: Internal CJC; Input 2: No CJC | 5 | |
| Input 1: External CJC (define type in option Jxx); input 2: No CJC | 6 | |
| Input 1: Define fixed CJC value with option Y60; Input 2: None CJC | 7 | |
| **CJC configuration for TC, customer-specific** | | |
| Input 1: Fixed CJC value (define value in option Y60); Input 2: Fixed CJC value (define value in option Y61) | 9 | L 1 A |
| Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61 | 9 | L 1 B |
| Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx) | 9 | L 1 C |
| Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC | 9 | L 1 D |
| Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61 | 9 | L 1 E |
| **Material of non-wetted parts** | | |
| Die-cast aluminum enclosure | 1 | |
| Enclosure made of stainless steel precision casting 1.4401 (similar to 316) | 3 | |
| **Type of protection (Ex)** | | |
| General safety | A | |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) | B | |
| Flameproof enclosure (Ex d) / Explosion proof (XP) | C | |
| Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | L | |
| Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) | S | |
| Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust explosion protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | T | |
| **Electrical connection/cable entries** | | |
| 2 × M20 × 1.5 | F | |
| 2 × ½" NPT | M | |
| **Local operation** | | |
| Without local operation | 0 | |
| Local operation (closed lid) | 1 | |
| Local operation (lid with glass window) | 2 | |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Cable gland included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A11** |
| CAPRI ADE 4F, stainless steel<br>Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)<br>Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A12** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Cable entry accessories** | |
| Sealing element for 2 cables included | **A20** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (metal, straight) | **A32** |
| **Cable socket included** | |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |
| **Mounting cable glands/plugs** | |
| Cable gland mounted | **A97** |
| Device plug for output, mounted right | **A98** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| IP66/IP68 degree of protection (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Nameplate and approval plate, stainless steel 1.4404/316L | **D42** |
| Overvoltage protection up to 20 kV (external) | **D71** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL) | **D82** |
| **General approval without Ex approval** | |
| Worldwide (CE, RCM) except EAC, FM, KCC | **E00** |
| Global | **E01** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection certificates** | |
| ATEX (Europe) | **E20** |
| FM (USA and Canada) | **E22** |
| IECEx (Worldwide) | **E23** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| UKEX (United Kingdom) | **E33** |
| ATEX (Europe) and IECEx (Worldwide) | **E47** |
| ATEX, IECEx and FM | **E49** |
| **Factory** | |
| Made in France | **F00** |
| **Mounting system (only single chamber enclosures)** | |
| Pipe mounting kit for single chamber enclosure, stainless steel 316L | **H06** |
| Wall mounting kit for single chamber enclosure, stainless steel 316L | **H07** |
| **External CJC types** | |
| Pt100, IEC 60751, 3-wire | **J02** |
| Pt100, IEC 60751, 4-wire | **J03** |
| Ni100, DIN 43760-87, 3-wire | **J05** |
| Ni100, DIN 43760-87, 4-wire | **J06** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt x (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V60** |
| Pt x (IEC 60751), 3-wire, define RTD factor x in option Y21 | **V61** |
| Pt x (IEC 60751), 4-wire, define RTD factor x in option Y21 | **V62** |
| Pt x (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V63** |
| Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21 | **V64** |
| Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21 | **V67** |
| Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21 | **V68** |
| Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V69** |
| Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21 | **V70** |
| Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21 | **V71** |
| Ni x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V72** |
| Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21 | **V73** |
| Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu x (ECW-15), 3-wire, define RTD factor x in option Y21 | **V76** |
| Cu x (ECW-15), 4-wire, define RTD factor x in option Y21 | **V77** |
| Cu x (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V78** |
| Cu x (GOST 6651-94), define 3-wire, define RTD factor x in option Y21 | **V79** |
| Cu x (GOST 6651-94), define 4-wire, define RTD factor x in option Y21 | **V80** |
| Cu x (GOST 6651-2009), define 3-wire, define RTD factor x in option Y21 | **V82** |
| Cu x (GOST 6651-2009), define 4-wire, define RTD factor x in option Y21 | **V83** |
| **Input 2: TC** | |
| TC type W5 | **W01** |
| TC type W3 | **W02** |
| TC type U | **W03** |
| TC type Lr | **W04** |
| **Input 2: RTD** | |
| Pt x (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W60** |
| Pt x (IEC 60721), 3-wire, define RTD factor x in option Y22 | **W61** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Pt x (IEC 60721), 4-wire, define RTD factor x in option Y22 | **W62** |
| Pt x (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W63** |
| Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y22 | **W64** |
| Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y22 | **W65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W66** |
| Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22 | **W67** |
| Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22 | **W68** |
| Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W69** |
| Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y22 | **W70** |
| Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y22 | **W71** |
| Ni x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W72** |
| Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22 | **W73** |
| Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22 | **W74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W75** |
| Cu x (ECW-15), 3-wire, define RTD factor x in option Y22 | **W76** |
| Cu x (ECW-15), 4-wire, define RTD factor x in option Y22 | **W77** |
| Cu x (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W78** |
| Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y22 | **W79** |
| Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y22 | **W80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W81** |
| Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22 | **W82** |
| Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22 | **W83** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), adhesive label | **Y15** |
| Measuring point description (device parameters, max. 32 characters), adhesive label | **Y16** |
| Tag (device parameters, max. 8 characters), adhesive label | **Y17** |
| Descriptor (device parameters, max. 16 characters), adhesive label | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label | **Y22** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y36** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Wire resistance value input 2 in ohms (0 ... 100 ohms) | **Y52** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| Input 2: CJC sensor, fixed value (see measuring range for unit) | **Y61** |
| ID number of special design | **Y99** |

### *Dual chamber enclosure*

| **SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.** | **Article No.**<br>**7NG045**<br>● - ● ● ● ● ● - 0 ● ● ● | **Order code**<br>● ● ● |
|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Communication** | | |
| With HART (4 ... 20 mA) | 0 | |
| **Primary value output** | | |
| Input 1 | 0 | |
| Input 1, input 2 as redundancy (hot backup) | 1 | |
| Input 2, input 1 as redundancy (hot backup) | 2 | |
| Mean value input 1 and input 2, both as redundancy (hot backup) | 3 | |
| Minimum input 1 and input 2,both as redundancy (hot backup) | 4 | |
| Maximum input 1 and input 2, both as redundancy (hot backup) | 5 | |
| Difference input 1 - input 2 | 6 | |
| Difference input 2 - input 1 | 7 | |

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## Selection and ordering data (continued)

| SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output. | Article No. 7NG045 ● - ● ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
| Absolute difference | 8 | |
| **Primary value output, customer-specific** | | |
| Minimum input 1 and input 2, without redundancy (hot backup) | 9 | H 1 A |
| Maximum input 1 and input 2, without redundancy (hot backup) | 9 | H 1 B |
| Mean value input 1 and input 2, without redundancy (hot backup) | 9 | H 1 C |
| Input 2 | 9 | H 1 D |
| **Input 1, type** | | |
| RTD | | |
| • Pt100 (IEC 60751), 3-wire | B | |
| • Pt100 (IEC 60751), 4-wire | C | |
| • Pt1000 (IEC 60751), 3-wire | D | |
| • Pt1000 (IEC 60751), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| More types in option Vxx | Y | |
| **Input 2, type** | | |
| Without input 2 | A | |
| RTD | | |
| • Pt100 (IEC 60751), 3-wire | B | |
| • Pt100 (IEC 60751), 4-wire | C | |
| • Pt1000 (IEC 60751), 3-wire | D | |
| • Pt1000 (IEC 60751), 4-wire | E | |
| TC | | |
| • Type B | F | |
| • Type E | G | |
| • Type J | H | |
| • Type K | J | |
| • Type L | K | |
| • Type N | L | |
| • Type R | N | |
| • Type S | P | |
| • Type T | Q | |
| Potentiometer, 4-wire | R | |
| More types in option Wxx | Y | |
| **CJC configuration for TC** | | |
| Input 1: None CJC; Input 2: No CJC | 0 | |
| Input 1: Internal CJC; Input 2: Internal CJC | 1 | |
| Input 1: External CJC; input 2: External CJC; define type in option Jxx | 2 | |
| Input 1: External CJC; define type in option Jxx; input 2: Internal CJC | 3 | |
| Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx | 4 | |
| Input 1: Internal CJC; Input 2: No CJC | 5 | |
| Input 1: External CJC (define type in option Jxx); input 2: No CJC | 6 | |

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## Selection and ordering data (continued)

| SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output. | Article No. 7NG045 ● - ● ● ● ● ● - 0 ● ● ● ● | Order code ● ● ● |
|---|---|---|
| **Material of non-wetted parts** | | |
| Die-cast aluminum enclosure | 1 | |
| Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L) | 2 | |
| **Type of protection (Ex)** | | |
| General safety (non-Ex) | A | |
| Intrinsic safety (Ex i) / non-incendive field wiring (NIFW) | B | |
| Flameproof enclosure (Ex d) / Explosion proof (XP) | C | |
| Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | L | |
| Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) | S | |
| Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI) | T | |
| **Electrical connection/cable entries** | | |
| 2 × M20 × 1.5 | F | |
| 2 × ½" NPT | M | |
| **Local operation** | | |
| Without local operation | 0 | |
| Local operation (closed lid) | 1 | |
| Local operation (lid with glass window) | 2 | |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Cable gland included** | |
| Plastic | **A00** |
| Metal | **A01** |
| Stainless steel | **A02** |
| Stainless steel 316L/1.4404 | **A03** |
| CMP, for XP devices | **A10** |
| CAPRI ADE 4F, CuZn,<br>cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches),<br>cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A11** |
| CAPRI ADE 4F, stainless steel,<br>cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches),<br>cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches) | **A12** |
| **Cable entry accessories** | |
| Sealing element for 2 cables included | **A20** |
| **Device plug Han mounted left** | |
| Device plug Han 7D (plastic, straight) | **A30** |
| Device plug Han 7D (plastic, angled) | **A31** |
| Device plug Han 7D (metal, straight) | **A32** |
| Device plug Han 7D (metal, angled) | **A33** |
| Device plug Han 8D (plastic, straight) | **A34** |
| Device plug Han 8D (plastic, angled) | **A35** |
| Device plug Han 8D (metal, straight) | **A36** |
| Device plug Han 8D (metal, angled) | **A37** |
| **Cable socket included** | |
| Plastic, for device plug Han 7D and Han 8D | **A40** |
| Metal, for device plug Han 7D and Han 8D | **A41** |
| **Device plug M12 mounted left** | |
| Stainless steel, without cable socket | **A62** |
| Stainless steel, with cable socket | **A63** |

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| **Mounting cable glands/plugs** | |
| Cable gland mounted | **A97** |
| Device plug for output, mounted right | **A98** |
| **Manufacturer's declarations** | |
| Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values) | **C11** |
| **Certificates for functional safety** | |
| Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2) | **C20** |
| **Device options** | |
| PDF file with device settings | **D10** |
| Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid | **D20** |
| IP66/IP68 degree of protection (not for device plug M12 and Han) | **D30** |
| Unlabeled TAG plate | **D40** |
| Without labeling of the measuring range on the TAG plate | **D41** |
| Stainless steel Ex plate 1.4404/316L | **D42** |
| Overvoltage protection up to 20 kV (external) | **D71** |
| Jumper plug set on device for write protection | **D81** |
| Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL) | **D82** |
| **General approval without Ex approval** | |
| Worldwide (CE, RCM) except EAC, FM, KCC | **E00** |
| Global | **E01** |
| EAC | **E07** |
| FM | **E08** |
| KCC | **E09** |
| **Explosion protection certificates** | |
| ATEX (Europe) | **E20** |
| FM (USA and Canada) | **E22** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| IECEx (Worldwide) | **E23** |
| NEPSI (China) | **E27** |
| PESO (India) | **E28** |
| ATEX (Europe) and IECEx (Worldwide) | **E47** |
| ATEX, IECEx and FM | **E49** |
| **Mounting brackets (only dual chamber enclosure)** | |
| Wall/pipe mounting bracket for dual chamber enclosure, steel | **H01** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304 | **H02** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L | **H03** |
| **External CJC types** | |
| Pt100, IEC 60751, 3-wire | **J02** |
| Pt100, IEC 60751, 4-wire | **J03** |
| Ni100, DIN 43760-87, 3-wire | **J05** |
| Ni100, DIN 43760-87, 4-wire | **J06** |
| **Noise damping** | |
| Noise damping 60 Hz instead of 50 Hz | **P10** |
| **Input 1: TC** | |
| Type C W5 | **V01** |
| Type D W3 | **V02** |
| Type U | **V03** |
| Type Lr | **V04** |
| **Input 1: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35) | **V50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y35) | **V51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y35) | **V52** |
| **Input 1: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V60** |
| Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21 | **V61** |
| Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21 | **V62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21 | **V64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21 | **V65** |
| Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21 | **V70** |
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21 | **V71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21 | **V73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21 | **V74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21) | **V75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y21 | **V76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y21 | **V77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21) | **V78** |
| Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21 | **V79** |
| Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21 | **V80** |
| Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21 | **V82** |
| Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21 | **V83** |
| **Input 2: TC** | |
| TC type W5 | **W01** |
| TC type W3 | **W02** |
| TC type U | **W03** |
| TC type Lr | **W04** |
| **Input 2: Callendar-Van Dusen** | |
| 2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36) | **W50** |
| 3-wire (define Callendar-Van Dusen parameter in option Y36) | **W51** |
| 4-wire (define Callendar-Van Dusen parameter in option Y36) | **W52** |
| **Input 2: RTD** | |
| Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W60** |
| Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22 | **W61** |
| Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22 | **W62** |
| Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W63** |
| Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22 | **W64** |
| Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22 | **W65** |
| Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W66** |
| Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W67** |
| Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W68** |
| Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W69** |
| Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22 | **W70** |

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and, if applicable, free text | Order code |
|---|---|
| Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22 | **W71** |
| Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W72** |
| Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W73** |
| Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W74** |
| Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W75** |
| Cu × (ECW-15), 3-wire, define RTD factor × in option Y22 | **W76** |
| Cu × (ECW-15), 4-wire, define RTD factor × in option Y22 | **W77** |
| Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22) | **W78** |
| Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22 | **W79** |
| Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22 | **W80** |
| Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22) | **W81** |
| Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22 | **W82** |
| Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22 | **W83** |
| **Device settings** | |
| Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K) | **Y01** |
| Customer-specific programming in plain text (n-lines) | **Y09** |
| Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404 | **Y15** |
| Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404 | **Y16** |
| Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404 | **Y17** |
| Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404 | **Y18** |
| Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label | **Y21** |
| Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label | **Y22** |
| Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6] | **Y31** |
| CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y35** |
| CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12) | **Y36** |
| Wire resistance value input 1 in ohms (0 ... 100 ohms) | **Y51** |
| Wire resistance value input 2 in ohms (0 ... 100 ohms) | **Y52** |
| Input 1: CJC sensor, fixed value (see measuring range for unit) | **Y60** |
| Input 2: CJC sensor, fixed value (see measuring range for unit) | **Y61** |
| ID number of special design | **Y99** |

### *Accessories*

| | Article No. |
|---|---|
| See section "Other accessories for assembly, connection and transmitter configuration" | |
| **Modems** | |
| Modem with USB interface and SIPROM T software | **7NG3092-8KN** |
| HART modem with USB interface | **7MF4997-1DB** |
| **Thread adapter** | |
| Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread) | **7MP1990-0BA00** |
| Thread adapter M20x1.5 (external thread) to G½ (feexternal thread) | **7MP1990-0BB00** |
| **Local operation** | |
| Local operation for temperature transmitter in dual chamber enclosure | **7MF7902-1AD** |
| Mounting system for local operation 7MF7902-1AD in single chamber enclosure | **7MF7902-1AS** |
| **Mounting brackets (only dual chamber enclosure)** | |
| Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF | **7MF7900-1AB** |
| Wall/pipe mounting bracket for dual chamber enclosure, steel, M8 | **7MF7900-1AC** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF | **7MF7900-1AH** |
| Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8 | **7MF7900-1AJ** |
| **Mounting system (only single chamber enclosures)** | |
| Pipe mounting kit for single chamber enclosure, stainless steel 316L | **7MF7900-1AK** |
| Wall mounting kit for single chamber enclosure, stainless steel 316L | **7MF7900-1AL** |
| **Cable gland** | |
| Cable gland, gray, non-Ex, M20 | **7MF7906-1AB** |
| Cable gland, gray, non-Ex, NPT | **7MF7906-1BB** |
| Cable gland, metal, non-Ex, NPT | **7MF7906-1BD** |
| Cable gland, metal, non-Ex, M20 | **7MF7906-1AD** |
| Cable gland, metal, Ex-d, NPT | **7MF7906-1BE** |
| Cable gland, metal, Ex-d, M20 | **7MF7906-1AE** |
| Cable gland, 316L, non-Ex, NPT | **7MF7906-1BH** |
| Cable gland, 316L, non-Ex, M20 | **7MF7906-1AH** |
| Cable gland, 316L, Ex-d, NPT | **7MF7906-1BJ** |
| Cable gland, 316L, Ex-d, M20 | **7MF7906-1AJ** |
| Cable gland, E1FX Tri-Star 1/2-14NPT, CMP | **7MF7906-1NE** |
| Cable gland, ½ NPT Capri ADE 4F cpl., CuZn | **7MF7906-1PE** |
| Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel | **7MF7906-1PJ** |
| Sealing element for 2 cables in cable gland. | **7MF7906-1WN** |
| **Plug and cable socket** | |
| Plug Han 7D, plastic, straight | **7MF7906-2AB** |
| Plug Han 7D, plastic, angled | **7MF7906-2AC** |

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## Selection and ordering data (continued)

| | Article No. |
|---|---|
| Plug Han 7D, metal, straight, blue | 7MF7906-2AQ |
| Plug Han 7D, metal, straight, gray | 7MF7906-2AN |
| Plug Han 7D, metal, angled, blue | 7MF7906-2AR |
| Plug Han 7D, metal, angled, gray | 7MF7906-2AP |
| Plug Han 8D, plastic, straight | 7MF7906-2EB |
| Plug Han 8D, plastic, angled | 7MF7906-2EC |
| Plug Han 8D, metal, straight, blue | 7MF7906-2EQ |
| Plug Han 8D, metal, straight, gray | 7MF7906-2EN |
| Plug Han 8D, metal, angled, blue | 7MF7906-2ER |
| Plug Han 8D, metal, angled, gray | 7MF7906-2EP |
| Cable socket, plastic, for plug Han 7D | 7MF7906-2BB |
| Cable socket, plastic, for plug Han 8D | 7MF7906-2FB |
| Cable socket, metal, for Han 7D blue | 7MF7906-2BQ |
| Cable socket, metal, for Han 8D blue | 7MF7906-2FQ |
| Cable socket, metal, for Han 7D gray | 7MF7906-2BN |
| Cable socket, metal, for Han 8D gray | 7MF7906-2FN |
| Plug M12 with cable socket, stainless steel | 7MF7906-3AB |
| **Overvoltage protection** | |
| Overvoltage protection up to 20 kV, M20 | 7MF7906-3AC |
| Overvoltage protection up to 20 kV, NPT | 7MF7906-3AD |
| **Lid** | |
| Closed lid aluminum, painted 2×, without glass window, with seal NBR | 7MF7901-1BB |
| Closed lid aluminum, painted 2×, without glass window, with seal FVMQ | 7MF7901-1BC |
| Lid aluminum 2x coated, with glass window, with seal NBR | 7MF7901-1BG |
| Lid aluminum 2x coated, with glass window, with seal FVMQ | 7MF7901-1BH |
| Closed lid stainless steel precision casting, without glass window, with seal NBR | 7MF7901-2AB |
| Closed lid stainless steel precision casting, without glass window, with seal FVMQ | 7MF7901-2AC |
| Lid stainless steel precision casting, with glass window, with seal NBR | 7MF7901-2AG |
| Lid stainless steel precision casting, with glass window, with seal FVMQ | 7MF7901-2AH |

***Ordering example***

SITRANS TF420 (single chamber enclosure)

7NG0450-0BA02-0AF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C (32 ... 212 °F)

Y17: TICA123

***Factory setting***

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
  - Input circuit wire break: 22.8 mA
  - Input circuit short-circuit: 22.4 mA
  - Input circuit drift: 22 mA (active when input 2 is active)
  - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

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## Technical specifications

| SITRANS TF420 (HART, universal) | |
|---|---|
| **General** | |
| Supply voltage[1) 2)] | |
| • Without explosion protection (non-Ex) | 10.5 ... 48 V DC |
| • With explosion protection (Ex i) | 10.5 ... 30 V DC |
| Additional minimum supply voltage when using test terminals | 0.8 V |
| Maximum power loss | ≤ 850 mW |
| Minimum load resistance at supply voltage > 37 V | ($V_{supply}$ - 37 V)/23 mA |
| Insulation voltage, test/operation | |
| • Without explosion protection (non-Ex) | 2.5 kV AC/55 V AC |
| • With explosion protection (Ex i) | 2.5 kV AC/42 V AC |
| Polarity protection | All inputs and outputs |
| Write protection | Wire jumper (transmitter), switch (on display) or software |
| Warm-up time | < 5 min |
| Starting time | < 2.75 s |
| Programming | HART |
| Signal-to-noise ratio | > 60 dB |
| Long-term stability | Better than:<br>• ± 0.05% of measuring span/year<br>• ± 0.18% of measuring span/5 years |
| Response time | 4 ... 20 mA: ≤ 55 ms<br>HART: ≤ 75 ms (typically 70 ms) |
| Programmable damping | 0 ... 60 s |
| Signal dynamic | |
| • Input | 24 bit |
| • Output | 18 bit |
| Influence of change in supply voltage | < 0.005% of measuring span/V DC |
| **Input** | |
| ***Resistance thermometer (RTD)*** | |
| Input type | |
| • Pt10 ... 10000 | • IEC 60751<br>• JIS C 1604-8<br>• GOST 6651_2009<br>• Callendar-Van Dusen |
| • Ni10 ... 10000 | • DIN 43760-1987<br>• GOST 6651-2009/OIML R84:2003 |
| • Cu5 ... 1000 | • Edison Copper Winding No. 15<br>• GOST 6651-2009/OIML R84:2003 |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8) | Max. 30 nF |
| • All other input types | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time (RTD) | ≤ 75 ms (typically 70 ms) |
| Fault detection time (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Thermocouples (TC)*** | |

| SITRANS TF420 (HART, universal) | |
|---|---|
| Input type | |
| • B | IEC 60584-1 |
| • E | IEC 60584-1 |
| • J | IEC 60584-1 |
| • K | IEC 60584-1 |
| • L | DIN 43710 |
| • Lr | GOST 3044-84 |
| • N | IEC 60584-1 |
| • R | IEC 60584-1 |
| • S | IEC 60584-1 |
| • T | IEC 60584-1 |
| • U | DIN 43710 |
| • W3 | ASTM E988-96 |
| • W5 | ASTM E988-96 |
| • LR | GOST 3044-84 |
| Cold Junction Compensation (CJC) | Constant, internal or external over Pt100 or Ni100 RTD |
| • Temperature range internal CJC | -50 ... +100 °C (-58 ... +212 °F) |
| • Connection external CJC | 2-wire or 3-wire |
| • External CJC, wire resistance per wire (for 3-wire and 4-wire connections) | 50 Ω |
| • Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| • Input current external CJC | < 0.15 mA |
| • Temperature range external CJC | -50 ... +135 °C (-58 ... +275 °F) |
| • Cable, wire-wire capacity | Max. 50 nF |
| • Total wire resistance | Max. 10 kΩ |
| • Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>The short-circuited fault detection only applies to the CJC input. |
| • Fault detection time (TC) | ≤ 75 ms (typically 70 ms) |
| • Fault detection time, external CJC (for 3-wire and 4-wire) | ≤ 2 000 ms |
| ***Linear resistance*** | |
| Input range | 10 Ω ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 3-wire and 4-wire connections) | < 0.002 Ω/Ω |
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, defective |
| ***Potentiometers*** | |
| Input range | 0 ... 100 kΩ |
| Minimum measuring span | 25 Ω |
| Connection type | 2-wire, 3-wire or 4-wire |
| Wire resistance per wire | Max. 50 Ω |
| Input current | < 0.15 mA |
| Effect of the wire resistance (with 4-wire and 5-wire connections) | < 0.002 Ω/Ω |

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## Technical specifications (continued)

| SITRANS TF420 (HART, universal) | |
|---|---|
| Cable, wire-wire capacity | |
| • R > 400 Ω | Max. 30 nF |
| • R ≤ 400 Ω | Max. 50 nF |
| Fault detection, programmable | None, short-circuited, defective, short-circuited or defective<br>**Note**<br>When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection. |
| Detection limit for short-circuited input | 15 Ω |
| Fault detection time, wiper arm (no short-circuit detection) | ≤ 75 ms (typically 70 ms) |
| Fault detection time, element | ≤ 2 000 ms |
| Fault detection time (for 4-wire and 5-wire) | ≤ 2 000 ms |
| ***Supply voltage*** | |
| Measuring range | |
| • Unipolar | -100 ... 1700 mV |
| • Bipolar | -800 ... +800 mV |
| Minimum measuring span | 2.5 mV |
| Input resistance | 10 MΩ |
| Cable, wire-wire capacity | |
| • Input range: -100 ... 1700 mV | Max. 30 nF |
| • Input range: -20 ... 100 mV | Max. 50 nF |
| Fault detection, programmable | None, defective |
| Fault detection time | ≤ 75 ms (typically 70 ms) |
| **Output and HART communication** | |
| Normal range, programmable | 3.8 ... 20.5 mA/20.5 ... 3.8 mA |
| Extended range (output limits), programmable | 3.5 ... 23 mA/23 ... 3.5 mA |
| Programmable input/output limits | |
| • Fault current | Enable/disable |
| • Fault current setting | 3.5 ... 23 mA |
| Update time | 10 ms |
| Load (with current output) | ≤ ($V_{Supply}$ - 10.5)/0.023 Ω |
| Load stability | < 0.01% of measuring span/100 Ω (measuring span = currently selected range) |
| Input fault detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs) | 3.5 ... 23 mA |
| NAMUR NE43 Upscale | > 21 mA |
| NAMUR NE43 Downscale | < 3.6 mA |
| HART protocol versions | HART 7 |
| **Measuring accuracy** | |
| Input accuracy | See "Input accuracy" table |
| Output accuracy | See "Output accuracy" table |
| **Operating conditions** | |
| Ambient temperature | |
| • Without local operation in single chamber enclosure | -50 ... +85 °C (-58 ... +185 °F) |
| • With local operation | -40 ... +85 °C (-40 ... +185 °F) |
| • For transmitters with functional safety | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -50 ... +85 °C (-58 ... +185 °F) |
| Reference temperature for sensor calibration | 24 °C ±1.0 °C (75.2 °F ±1.8 °F) |
| Relative humidity | < 99% (no condensation) |
| Degree of protection | |
| • Temperature transmitter enclosure | IP66/IP68 |
| • Terminals | IP00 |

| SITRANS TF420 (HART, universal) | |
|---|---|
| **Structural design** | |
| Weight | |
| • Single chamber enclosure | • Aluminum: 0.85 kg (1.87 lbs)<br>• Stainless steel: 1.69 kg (3.73 lbs) |
| • Dual chamber enclosure | • Aluminum: 1.3 kg (2.87 lbs)<br>• Stainless steel: 3.3 kg (7.28 lbs) |
| Maximum core cross-section | |
| • Single chamber enclosure | 1.5 mm² (AWG 16) |
| • Dual chamber enclosure | 2.5 mm² (AWG 14) |
| Tightening torque for clamping screws | 0.5 ... 0.6 Nm |
| Vibrations | IEC 60068-2-6 |
| • 2 ... 25 Hz | ± 1.6 mm (0.07 inches) |
| • 25 ... 100 Hz | ± 4 g |
| **Certificates and approvals** | |
| ***Explosion protection ATEX/IECEx and others*** | |
| Certificates[3] | • IECEx DEK 19.0069X<br>• IECEx DEK 19.0070X<br>• DEKRA 19ATEX0106 X (Category 1)<br>• DEKRA 19ATEX0108X (Category 2)<br>• DEKRA 19ATEX0107X (Category 3)<br>• A5E50642461A-2021X (Category 3) |
| "Intrinsic safety ia/ib" type of protection | For use in Zone 0, 1, 2, 21 |
| • ATEX | • II 1 G Ex ia IIC T6 ... T4 Ga<br>• II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db |
| • IECEx and others | • Ex ia IIC T6 ... T4 Ga<br>• Ex ib [ia Ga] IIC T6 ... T4 Gb<br>• Ex ib [ia Da] IIIC T 100 °C Db |
| "Intrinsic safety ic" type of protection | For use in Zone 2, 22 |
| • ATEX | • II 3 G Ex ic IIC T6...T4 Gc<br>• II 3 D Ex ic IIIC T100 °C Dc |
| • IECEx and others | • Ex ic IIC T6 ... T4 Gc<br>• Ex ic IIIC T100 °C Dc |
| "Increased safety ec" type of protection | For use in Zone 2 |
| • ATEX | II 3 G Ex ec IIC T6...T4 Gc |
| • IECEx and others | Ex ec IIC T6 ... T4 Gc |
| • "Flameproof enclosure db" type of protection | For use in Zone 1 |
| • ATEX | II 2 G Ex db IIC T6...T4 Gb |
| • IECEx and others | Ex db IIC T6 ... T4 Gb |
| • "Protection by enclosure tb/tc" type of protection | For use in Zone 21, 22 |
| • ATEX | • II 2 D Ex tb IIC T100 °C Db<br>• II 3 D Ex tc IIIC T100 °C Dc |
| • IECEx and others | • Ex tb IIC T100 °C Db<br>• Ex tc IIIC T100 °C Dc |

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF420. All external voltage drops must be taken into account.
2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.
3) Additional available certificates are listed on the internet at http://www.siemens.com/processinstrumentation/certificates

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## Technical specifications (continued)

***Measuring ranges/Minimum measuring span***

RTD

| Input type | Standard | Measuring range in °C (°F) | $\alpha_0$ in $°C^{-1}$ ($°F^{-1}$) | Minimum measuring span in °C (°F) |
|---|---|---|---|---|
| **Pt10 ... 10000** | IEC 60751 | -200 ... +850 (-328 ... +1 562) | 0.003851 (0.002139) | 10 (50) |
| | JIS C 1604-8 | -200 ... +649 (-328 ... +1 200) | 0.003916 (0.002176) | 10 (50) |
| | GOST 6651_2009 | -200 ... +850 (-328 ... +1 562) | 0.003910 (0.002172) | 10 (50) |
| | Callendar-Van Dusen | -200 ... +850 (-328 ... +1 562) | - | 10 (50) |
| **Ni10 ... 10000** | DIN 43760-1987 | -60 ... +250 (-76 ... +482) | 0.006180 (0.003433) | 10 (50) |
| | GOST 6651-2009/OIML R84:2003 | -60 ... +180 (-76 ... +356) | 0.006170 (0.003428) | 10 (50) |
| **Cu5 ... 1000** | Edison Copper Winding No. 15 | -200 ... +260 (-328 ... +500) | 0.004270 (0.002372) | 100 (212) |
| | GOST 6651-2009/OIML R84:20-03 | -180 ... +200 (-292 ... +392) | 0.004280 (0.002378) | 100 (212) |
| | GOST 6651-94 | -50 ... +200 (-58 ... +392) | 0.004260 (0.002367) | 100 (212) |

TC

| Input type | Standard | Measuring range in °C (°F) | Minimum measuring span in °C (°F) |
|---|---|---|---|
| B | IEC 60584-1 | 0 (85) ... 1 820 (32 (185) ... 3 308) | 100 (212) |
| E | IEC 60584-1 | -200 ... +1 000 (-392 ... +1 832) | 50 (122) |
| J | IEC 60584-1 | -100 ... +1 200 (-212 ... +2 192) | 50 (122) |
| K | IEC 60584-1 | -180 ... +1 372 (-356 ... +2 502) | 50 (122) |
| L | DIN 43710 | -200 ... +900 (-392 ... +1 652) | 50 (122) |
| Lr | GOST 3044-84 | -200 ... +800 (-392 ... +1 472) | 50 (122) |
| N | IEC 60584-1 | -180 ... +1 300 (-356 ... +2 372) | 50 (122) |
| R | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| S | IEC 60584-1 | -50 ... +1 760 (-122 ... +3 200) | 100 (212) |
| T | IEC 60584-1 | -200 ... +400 (-392 ... +752) | 50 (122) |
| U | DIN 43710 | -200 ... +600 (-392 ... +1 112) | 50 (122) |
| W3 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| W5 | ASTM E988-96 | 0 ... 2 300 (32 ... 4 172) | 100 (212) |
| LR | GOST 3044-84 | -200 ... +800 (-392 ... +1472) | 50 (122) |

***Input accuracy***

Basic values

| Input type | Basic accuracy | Temperature coefficient[1)] |
|---|---|---|
| **RTD** | | |
| Pt10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Pt20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Pt50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Pt100 | ≤ ±0.04 °C (0.072 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt500 | $T_{max.}$ < 180 °C (356 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt2000 | $T_{max.}$ < 300 °C (572 °F) = ≤ ±0.08 °C (0.144 °F)<br>$T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °C (0.72 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt10000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Pt x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Ni10 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Ni20 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Ni50 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Ni100 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |

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## Technical specifications (continued)

| Input type | Basic accuracy | Temperature coefficient[1] |
|---|---|---|
| Ni120 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni200 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni1000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni2000 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni10000 | ≤ ±0.32 °C (0.576 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Ni x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| Cu5 | ≤ ±1.6 °C (2.88 °F) | ≤ ±0.040 °C/°C (°F/°F) |
| Cu10 | ≤ ±0.8 °C (1.44 °F) | ≤ ±0.020 °C/°C (°F/°F) |
| Cu20 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.010 °C/°C (°F/°F) |
| Cu50 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.004 °C/°C (°F/°F) |
| Cu100 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu200 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu500 | ≤ ±0.16 °C (0.288 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu1000 | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |
| Cu x | Largest tolerance of neighboring points | Largest temperature coefficient of neighboring points |
| **Linear resistance** | | |
| 0 ... 400 Ω | ≤ ±40 mΩ | ≤ ±2 mΩ/°C (1.11 mΩ/°F) |
| 0 ... 100 kΩ | ≤ ±4 Ω | ≤ ±0.2 Ω/°C (0.11 Ω/°F) |
| **Potentiometers** | | |
| 0 ... 100% | < 0.05% | < ± 0.005% |
| **Supply voltage** | | |
| mV: -20 ... 100 mV | ≤ ±5 µV | ≤ ±0.2 µV/°C (0.11 µV/°F) |
| mV: -100 ... 1700 mV | ≤ ±0.1 mV | ≤ ±36 µV/°C (20 µV/°F) |
| mV: ± 800 mV | ≤ ±0.1 mV | ≤ ±32 µV/°C (17.8 µV/°F) |
| **TC** | | |
| E | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| J | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| K | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| L | ≤ ±0.35 °C (0.63 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| N | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| T | ≤ ±0.25 °C (0.45 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| U | < 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F)<br>≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F) | ≤ ±0.025 °C/°C (°F/°F) |
| Lr | ≤ ±0.2 °C (0.36 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| R | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| S | < 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F)<br>≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W3 | ≤ ±0.6 °C (1.08 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| W5 | ≤ ±0.4 °C (0.72 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[2] | ≤ ±1 °C (1.8 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[3] | ≤ ±3 °C (5.4 °F) | ≤ ±0.1 °C/°C (°F/°F) |
| B[4] | ≤ ±8 °C (14.4 °F) | ≤ ±0.8 °C/°C (°F/°F) |
| B[5] | Not specified | Not specified |
| CJC (internal) | < ±0.5 °C (0.9 °F) | Included in basic accuracy |
| CJC (external) | ≤ ±0.08 °C (0.144 °F) | ≤ ±0.002 °C/°C (°F/°F) |

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

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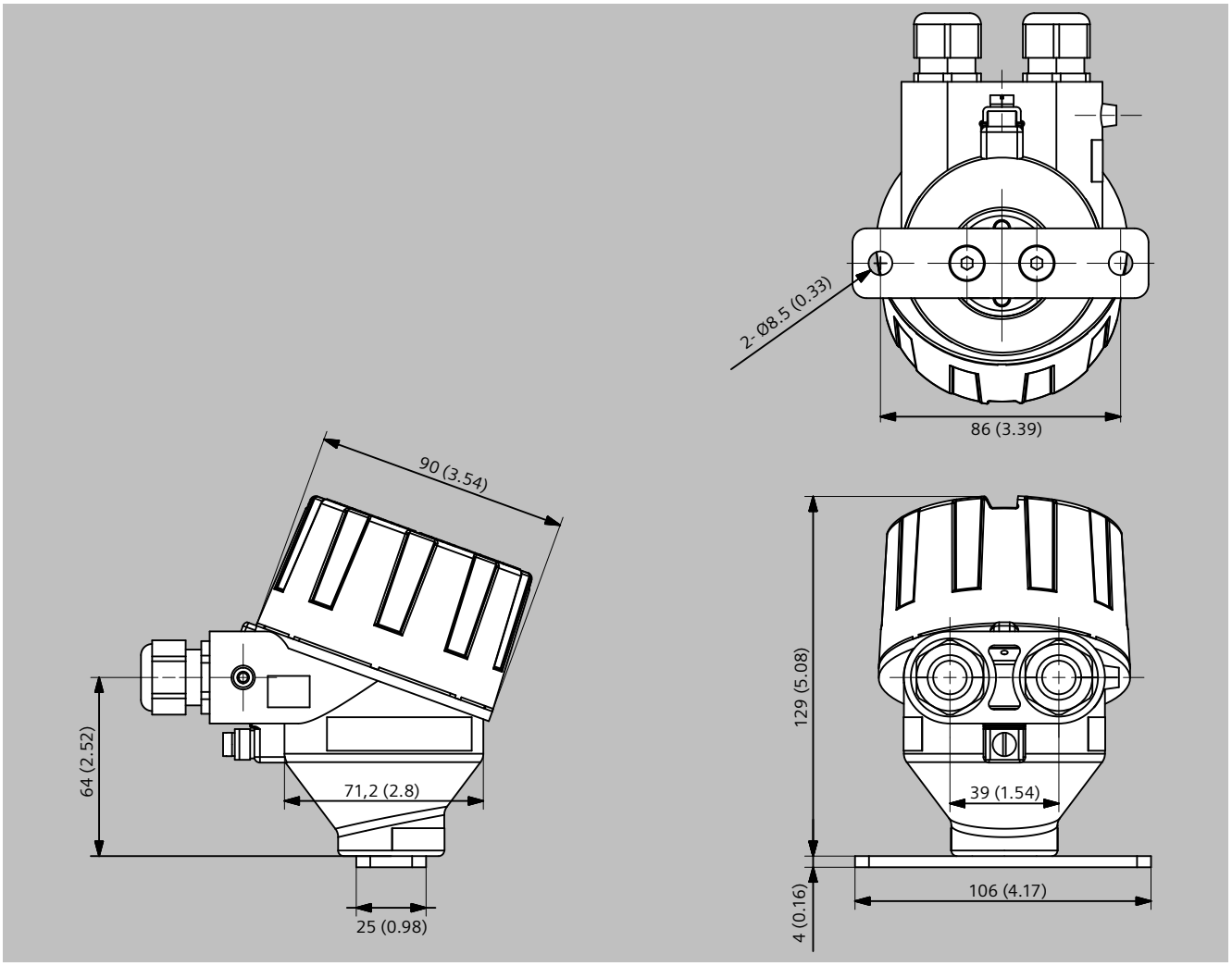


## Technical specifications (continued)

***Output accuracy***

| Output type | Basic accuracy | Temperature coefficient |
|---|---|---|
| Average value measurement | Average of accuracy of input 1 and input 2 | Average of temperature coefficient of input 1 and input 2 |
| Differential measurement | Sum of accuracy of input 1 and input 2 | Sum of temperature coefficient of input 1 and input 2 |
| Analog output | ≤ ±1.6 µA (0.01% of the full output span) | ≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K) |

## Dimensional drawings

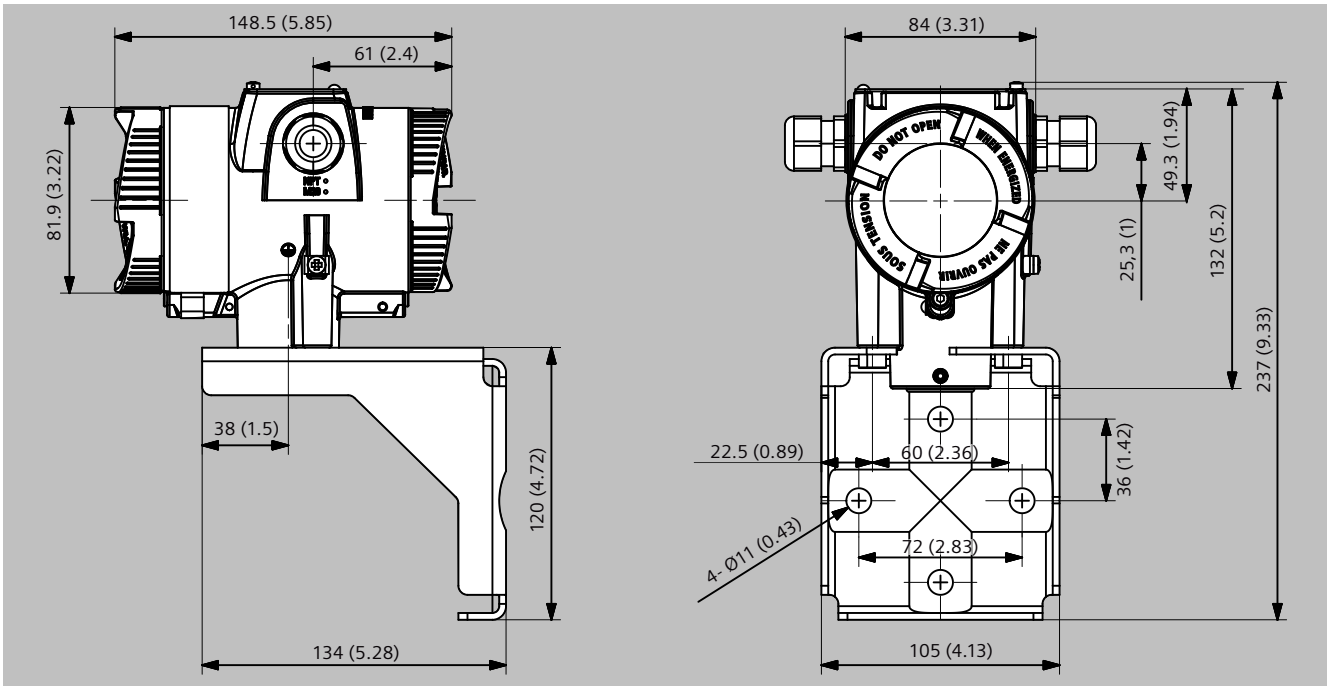



SITRANS TF420, single chamber enclosure, dimensions in mm (inch)

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## Dimensional drawings (continued)




SITRANS TF420, dual chamber enclosure, dimensions in mm (inch)

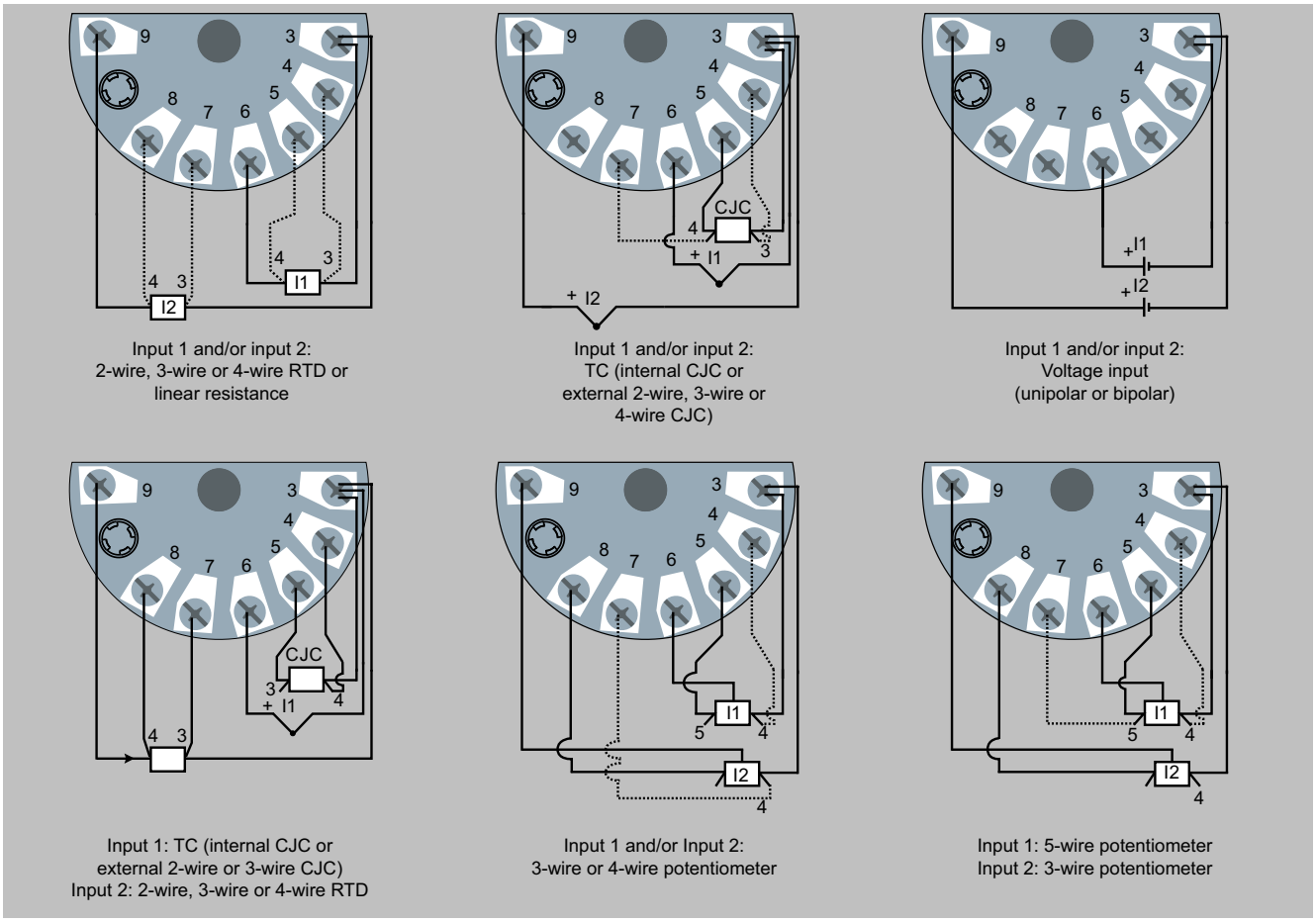
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## Circuit diagrams

***Connections***

Input connection

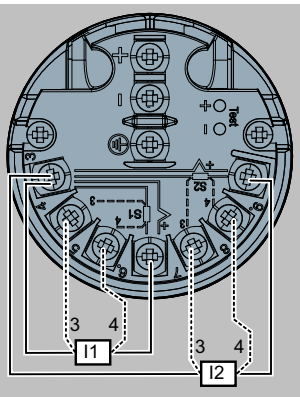



SITRANS TF420 in single chamber enclosure (7NG044*), input connection assignment

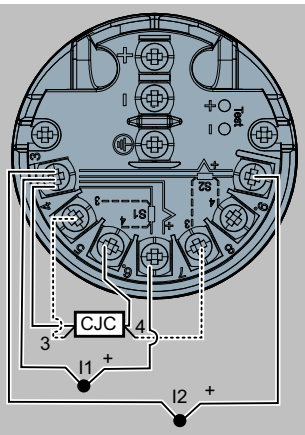
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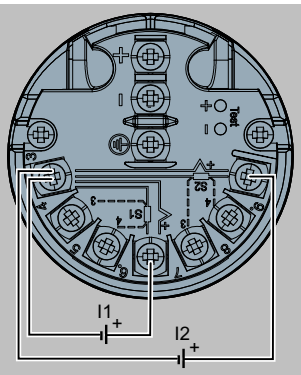
## Circuit diagrams (continued)



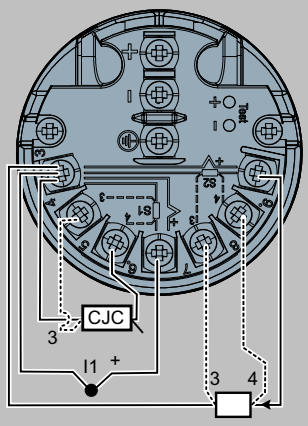

Input 1 (I1) and/or input 2 (I2):
2-wire, 3-wire or 4-wire RTD or
linear resistance



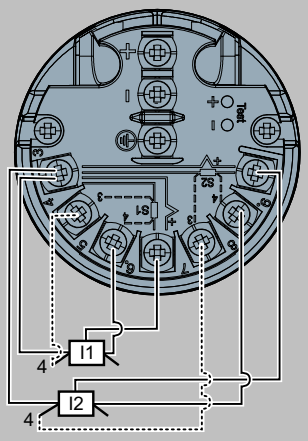

Input 1 (I1) and/or input 2 (I2):
TC (internal CJC or
external 2-wire, 3-wire or
4-wire CJC)



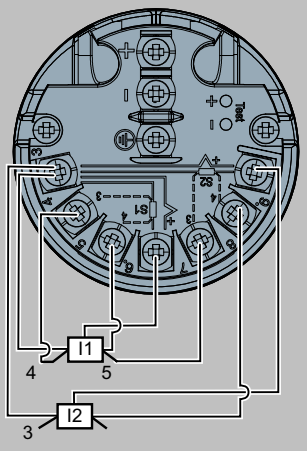

Input 1 (I1) and/or input 2 (I2):
Voltage input
(unipolar or bipolar)




Input 1: TC (internal CJC or
external 2-wire or 3-wire CJC)
Input 2: 2-wire, 3-wire or 4-wire RTD



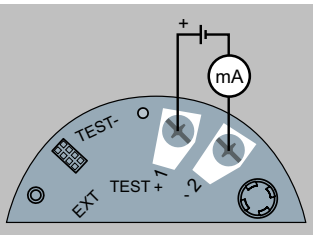

Input 1 (I1) and/or input 2 (I2):
3-wire or 4-wire potentiometer




Input 1 (I1): 5-wire potentiometer
Input 2 (I2): 3-wire potentiometer

SITRANS TF420 in dual chamber enclosure (7NG045*), input connection assignment

Output connection




SITRANS TF420 in single chamber enclosure (7NG044*), output connection assignment

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## Overview

***Other accessories for assembly, connection and transmitter configuration***

- Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS
- Cable glands and adapters for SITRANS TF and SITRANS TS
- Lightning protection for SITRANS TF (SITRANS TS on request)
- Plugs for SITRANS TF and SITRANS TS
- Indicator for SITRANS TS500
- Connection and mounting accessories for SITRANS TH
- Connection and mounting accessories for field transmitter SITRANS TF
- Enclosure gaskets for SITRANS TS500

## Selection and ordering data

***Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS***

| | Article No. |
|---|---|
| **Modems** | |
| Modem with USB interface and SIPROM T software 4 ... 20 mA<br>• With USB connection<br>• For SITRANS TH100, TH200, TH320, TR200, TR320, TF320, TF420 and TF, with TH200 | **7NG3092-8KN** |
| HART modem with USB interface for all HART devices<br>• With USB connection<br>• For SITRANS TH300, TH320, TH420, TR300, TR320, TR420, TF320, TF420, TF in HART | **7MF4997-1DB** |
| SIMATIC PDM parameterization software<br>• For SITRANS TH300, TR300, TH400, TF320, TF420, TF in HART / PROFIBUS PA / FOUNDATION Fieldbus | ***See section 8 "Digitalization and communication"*** |

***Cable glands and adapters for SITRANS TF and SITRANS TS***

| | Article No. |
|---|---|
| M20 × 1.5 nickel-plated brass; with Ex-d approval | **7MF4997-2FR** |
| ½-NPT nickel-plated brass; with Ex-d approval | **7MF4997-2FU** |
| CAPRI screw connection M20 × 1.5 nickel-plated brass; with Ex-d approval | **7MF4997-2LA** |
| CAPRI screw connection M20 × 1.5 stainless steel; with Ex-d approval | **7MF4997-2LB** |
| CAPRI screw connection ½-14 NPT nickel-plated brass; with Ex-d approval | **7MF4997-2LC** |
| CAPRI screw connection ½-14 NPT stainless steel; with Ex-d approval | **7MF4997-2LD** |
| Thread adapter M20 × 1.5 (external thread) to ½-14 NPT (internal thread) | **7MP1990-0BA00** |
| Thread adapter M20 × 1.5 (external thread) to G½ (internal thread) | **7MP1990-0BB00** |

***Lightning protection for SITRANS TF (SITRANS TS on request)***

| | Article No. |
|---|---|
| Transient protector M20 × 1.5 (lightning protection) | **7MF4997-2DU** |
| Transient protector ½-14 NPT (lightning protection) | **7MF4997-2DV** |

***Plugs for SITRANS TF and SITRANS TS***

| | Article No. |
|---|---|
| Han 7D plug made of plastic | **7MF4997-2FB** |
| Han 7D plug made of metal | **7MF4997-2FC** |
| M12 socket angled for cable diameter 4 ... 6 mm (0.158 ... 0.236 inches), -25 ... +85 °C (-13 ... 185 °F) | **3RK1902-4CA00-4AA0** |

***Indicator for SITRANS TS500***

| | Article No. |
|---|---|
| Local operation with temperature transmitters SITRANS TH320/TH420 4 ... 20 mA/HART | **7MF7902-1AD** |
| Mounting system for local operation in single chamber enclosure including fastening and connecting cable | **7MF7902-1AS** |

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## Selection and ordering data (continued)

### *Connection and mounting accessories for SITRANS TH*

| | Article No. |
|---|---|
| Mounting rail adapter for head transmitter (order quantity: 5 units) | 7NG3092-8KA |
| Connecting cable<br>4-wire, 200 mm (7.87 inches), for input connections when using head transmitters in the high spring flap (set with 5 units) | 7NG3092-8KC |

### *Connection and mounting accessories for field transmitter SITRANS TF*

| | Article No. |
|---|---|
| **Mounting bracket and fastening parts** | |
| Made of steel for 7NG313. -..B.. and 7MP1110 | 7MF4997-1AC |
| Made of steel for 7NG313 . -..C.. | 7MF4997-1AB |
| Made of stainless steel 304 for 7NG313. -..B.. and 7MP1110 | 7MF4997-1AJ |
| Made of stainless steel 304 for 7NG313. -..C.. | 7MF4997-1AH |
| Made of stainless steel 316L for 7NG313. -..B.. | 7MF4997-1AQ |
| Made of stainless steel 316L for 7NG313. -..C.. | 7MF4997-1AP |
| Digital indicator for SITRANS TF[1)] | 7MF4997-1BS |
| Connection board for SITRANS TF | A5E02391790 |
| Lid, die-cast aluminum, without inspection window | 7MF4997-1BB |
| Lid, die-cast aluminum, with inspection window | 7MF4997-1BE |

1) Retrofitting not possible with Ex devices.

### *Spare parts/enclosure gaskets for SITRANS TF320/TF420 and SITRANS TS500*

| | Article No. |
|---|---|
| Lid gasket SITRANS TF320/TF420 single chamber enclosure as well as for SITRANS TS500 enclosure AG0, AV0, AU0, AV0 | 7MF7901-3AB |

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| | |
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| **3/3** | **Product overview** |
| **3/13** | **Introduction** |
| 3/13 | Criteria for selection of flowmeter |
| **3/15** | **SITRANS FM (electromagnetic)** |
| 3/15 | System information |
| 3/35 | Flow sensors |
| 3/35 | SITRANS FM MAG 1100 and 1100 HT |
| 3/45 | SITRANS FM MAG 1100 F |
| 3/59 | SITRANS FM MAG 3100 and 3100 HT |
| 3/78 | SITRANS FM MAG 3100 P |
| 3/88 | SITRANS FM MAG 5100 W |
| 3/101 | SITRANS FMS500 |
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| 3/126 | SITRANS FM MAG 6000 I and 6000 I Ex |
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| 3/143 | SITRANS FM100 |
| 3/149 | AC powered alternating field flowmeters |
| 3/149 | SITRANS FM TRANSMAG 2 transmitter with SITRANS FM MAG 911/E sensor |
| 3/160 | Battery-operated water meters |
| 3/160 | SITRANS FM MAG 8000 |
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| | |
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| 3/409 | SITRANS FCT010 |
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| 3/416 | SITRANS FCS300 flow sensor |
| 3/428 | SITRANS FC330 flowmeter system |
| 3/433 | SITRANS FC310 flowmeter system |
| 3/438 | SITRANS FCS300 with FCT070 transmitter |
| 3/443 | SITRANS FCS400 flow sensor |
| 3/450 | SITRANS FC430 flowmeter for OEM customers |
| 3/455 | SITRANS FC410 flowmeter for OEM customers |
| 3/459 | SITRANS FCS400 with FCT070 transmitter |
| 3/464 | SITRANS FC MASS 2100 and FC300 DN 4 |
| 3/479 | MASS 2100 / FC300 DN 4 with FCT030 |
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| 3/494 | Spare parts |
| 3/494 | Digital - Spare parts |
| 3/498 | MASS 6000 Generation - Spare parts |
| 3/502 | SIFLOW FC070 |
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| 3/505 | Clamp-on ultrasonic flowmeters |
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| 3/528 | SITRANS FST030 transmitter |
| 3/534 | SITRANS FS220 ultrasonic flowmeter |
| 3/549 | SITRANS FST020 transmitter, wall mount housing |
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| 3/595 | SITRANS FP230/FPS200 primary elements (ISO 5167) |
| 3/598 | Standard orifice plate with corner pressure tappings |
| 3/610 | Standard orifice plate with annular chamber |
| 3/621 | Orifice meter run |
| 3/631 | Orifice plate |
| 3/635 | Orifice plate with orifice flanges (ASME B16.36) |
| 3/640 | SITRANS FP330/FPS300 averaging pitot tube |
| 3/643 | Averaging pitot tube for gases and liquids |
| 3/652 | Averaging pitot tube for steam applications |
| 3/659 | Averaging pitot tube with FASTLOK |

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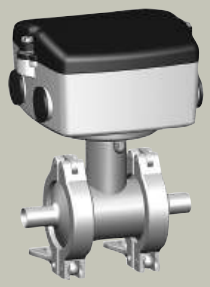
## Overview

| SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter | Application | Description | Software for parameterization |
|---|---|---|---|
| **MAG 5000/6000 transmitter**<br>  | Designed in robust IP67 polyamide enclosures for compact or remote mounting.<br>19", back of panel and front of panel enclosure program. | • Superior signal resolution for optimum turn down ratio<br>• Comprehensively self-diagnostic, for error indication and logging<br>• Multi-lingual display and keypad interface<br>• Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet<br>• Custody transfer approval: MI-001, PTB K7.2 | SIMATIC PDM |
| **MAG 6000 I/6000 I Ex transmitter**<br>  | Designed in robust die-cast aluminum enclosure for demanding applications and where explosion proof protection is necessary. | • Remote and compact mounting with all sensors<br>• Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet<br>• Ex Approval: ATEX, IECEx, FM, CSA<br>• Multi-lingual display and touchpad keypad<br>• Comprehensive self-diagnostic | SIMATIC PDM |
| **FMT020 transmitter**<br>  | High performance, robust and intelligent product, designed to fit perfectly for a wide area of process applications that require accurate, and reliable flow measurement of conductive fluids. | • High accuracy up to 0.2% of rate<br>• 3 totalizers for forward, reverse, and net flow<br>• Backwards compatible with older (up to 15 years) flow meter sensors (MAG 5100W)<br>• Fast start-up without zero-point adjustments<br>• Variety of functions for comprehensive device check, self-diagnosis, and onboard verification<br>• Verificator compatible - Independently verifies performance of sensor, transmitter, and installation (including cable) without process interruption<br>• Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications<br>• Multi-functional outputs for process control, minimum configuration with analog, digital (pulse, frequency, status), and relay output<br>• SD memory card for data logging, configuration backup, and firmware update<br>• Seamless field device integration in host systems | SIMATIC PDM |

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## Overview (continued)

| SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter | Application | Description | Software for parameterization |
|---|---|---|---|
| **MAG 1100 and MAG 1100 HT flow sensors**  | Designed for the general industry environment.<br>The obstructionless performance of the MAG 1100 is unaffected by the suspended solids, viscosity and temperature challenges. | • Metering tube DN 2 ... 100 (1/12 ... 4") flangeless design<br>• Corrosion-resistant AISI 316 stainless steel housing<br>• Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme process media<br>• Temperature rating up to 200 °C (390 °F)<br>• Ex approval: ATEX, FM | |
| **MAG 1100 F flow sensor**  | Specially designed for the food & beverage and pharmaceutical industry. | • AISI 316 stainless steel enclosure<br>• Hygienic seal, 3A<br>• Easy to clean<br>• Supplied with connections according to your specification<br>• Ex approval: ATEX, FM | |
| **MAG 3100 and MAG 3100 HT flow sensors**  | The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media. | • For a wide range of pipe dimensions: DN 15 ... 2200 (½" ... 88")<br>• Wide range of liner and electrode materials<br>• High-temperature version for application with temperatures up to 180 °C (355 °F)<br>• High-pressure solutions | |
| **MAG 3100 P flow sensor**  | The SITRANS FM MAG 3100 P sensor is designed to meet the most common specifications within the chemical and process industries. | • For pipe dimensions DN 15 ... 300 (½" ... 12")<br>• Fully welded construction that is extremely rugged and can withstand special process conditions using extreme measurement electrodes<br>• Approvals for hazardous areas: ATEX, FM, CSA, IECEx<br>• Comprehensive self-diagnostic for error indication and error logging<br>• Temperature resistant up to 150 °C (302 °F) | |

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## Overview (continued)

| SITRANS FM electromagnetic flowmeters – Pulsed DC magnetic flowmeter | Application | Description | Software for parameterization |
|---|---|---|---|
| **MAG 5100 W flow sensor**<br>  | Designed for all water and wastewater applications in water plants and industrial applications. | • Metering tube DN 15 ... 2000 (½" ... 80")<br>• Hard Rubber or EPDM lining<br>• Integral grounding electrodes as standard<br>• Increased low flow accuracy for water leak detection<br>• Drinking water approvals and custody transfer approvals , OIML R 49, MI-001 and PTB K7.2 | |
| **FMS500 flow sensor**<br>  | Magnetic flow meter sensor suitable for volume flow measurement of liquids (conductive) and is the ideal product for applications in water abstraction, wastewater treatment, water distribution networks, and irrigation. | • Zero Up and Zero Down installation capabilities<br>• NBR rubber liner for all water and wastewater applications<br>• EPDM liner specifically for drinking water applications requiring special approvals<br>• Soft elastomer facing provides high abrasion resistance<br>• Increased low flow accuracy for water leak detection<br>• Rugged construction with no moving parts for maintenance-free operation over many years<br>• Simple on-site upgrade to IP68 of a standard sensor allowing underground installation, permanent immersion or underwater installation<br>• Integrated grounding electrodes – no grounding rings required for many applications<br>• Short delivery time<br>• Built-in length according to ISO 20456 (up to DN 400 mm)<br>• SENSORPROM™ Technology provides an automatic upload of start-up settings and calibration data for easy commissioning<br>• Designed to allow in-situ verification for easy performance check<br>• In conformity with ISO 4064, OIML R49 and EN 14154 | |
| **FM100 flowmeter**<br>  | The SITRANS FM100 is an electromagnetic flowmeter for measuring and monitoring small and medium flows. | • Connection ½", ¾", 1", 2"<br>• Flow- and temperature measurement<br>• IO-Link communication<br>• Dosing function with external control output<br>• Flexible usage in different applications due to two individual configurable outputs<br>• Bidirectional measurement<br>• Robust stainless-steel design | |

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## Overview (continued)

| SITRANS FM electromagnetic flowmeters – High-power AC magnetic flowmeter | Application | Description | Software for parameterization |
|---|---|---|---|
| **TRANSMAG 2 transmitter**  | Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles. | • Magnetic flowmeter with a very strong pulsed AC magnetic field<br>• PROFIBUS PA or HART communication<br>• Comprehensive self-test function | SIMATIC PDM |
| **MAG 911/E flow sensor**  | Designed for heavy-duty applications like pulp & paper stock over 3%; heavy mining slurries and mining slurries with magnetic particles. | • Metering tube: DN 15 ... 1000 (½" ... 40")<br>• Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak<br>• Integral smartPLUG for storing of calibration values<br>• Multi-lingual display and touchpad keypad<br>• Only remote version | |

| SITRANS FM electromagnetic flowmeters – Battery-operated magnetic water meter | Application | Description | Software for parameterization |
|---|---|---|---|
| **MAG 8000 water meter**  | Battery-operated electromagnetic water meter for water applications within abstraction, distribution network and revenue metering. | • Battery- and/or mains power operated water meter<br>• Metering tube DN 25 ... 1200 (1 ... 48")<br>• Remote and compact installation IP68/NEMA 6P enclosure<br>• Custody transfer approval: PTB K7.2, OIML R 49 and MI-001<br>• Drinking water approvals<br>• Communication modules: GSM/GPRS, Modbus, Encoder | SIMATIC PDM and Flow Tool |

| SITRANS FC mass flowmeters | Application | Description | Software for parameterization |
|---|---|---|---|
| **FC330 flowmeters (dual tube design)**  | Designed for a variety of liquid and gas applications in the Process Industry. Measurement of mass flow, density, temperature and fraction. | • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150<br>• Flow from 70 ... 860 000 kg/h - water<br>• Pipe material: AISI 316L or Nickel-Alloy C4<br>• Accuracy, typically: Flow: ≤ 0.1 % or 0.2 % version, Density: down to ≤ 0.002 g/cm³<br>• Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F)/up to 100 bar (1450 psi)<br>• Approvals: ATEX, IECEx, cCSAus, CRN, PED (depending on configuration) | |

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## Overview (continued)

| SITRANS FC mass flowmeters | Application | Description | Software for parameterization |
|---|---|---|---|
| **FC310 flowmeters (dual tube design)**<br>  | Designed for a variety of liquid and gas applications<br>Measurement of mass flow, density, temperature<br>Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages | • DN 15, DN 25, DN 50, DN 80, DN 100 and DN 150<br>• Flow from 70 ... 860 000 kg/h<br>• Pipe material: AISI 316L or Nickel-Alloy C4<br>• Accuracy, typically: Flow: ≤ 0.1 % or 0.2 % version, Density: down to ≤ 0.002 g/cm³<br>• Liquid temperature/pressure: -50 ... +205 °C (-58 ... +400 °F)/up to 100 bar (1450 psi)<br>• Approvals: ATEX, IECEx, cCSAus, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping (depending on configuration) | |
| **FC430 flowmeters (dual tube design)**<br>  | Designed for a variety of liquid and gas applications<br>Measurement of mass flow, density, temperature and fraction | • DN 15, DN 25, DN 50<br>• Flow from 20 ... 70 700 kg/h - water<br>• Pipe material: AISI 316L<br>• Accuracy, typically: Flow: ≤ 0.1 %, Density: down to 0.005 g/cm³<br>• Liquid temperature/pressure: -50 ... +200 °C (-58 ... + 392 °F)/up to 100 bar (1450 psi)<br>• Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, CRN, PED, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping | |
| **FC410 flowmeters (dual tube design)**<br>  | Designed for a variety of liquid and gas applications<br>Measurement of mass flow, density, temperature<br>Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages | • DN 15, DN 25, DN 50<br>• Flow from 20 ... 70 700 kg/h<br>• Pipe material: AISI 316L<br>• Accuracy, typically: Flow: ± 0.1 %, Density: down to 0.005 g/cm³<br>• Liquid temperature/pressure: -50 ... +200 °C (-58 ... +392 °F)/up to 100 bar<br>• Approvals: ATEX, IECEx, EAC Ex, cCSAus, NEPSI, Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping | |

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## Overview (continued)

| SITRANS FC mass flowmeters | Application | Description | Software for parameterization |
|---|---|---|---|
| **MASS 2100 and FC300 flowmeter with transmitter FCT010 or FCT030 (single tube design)**<br>  <br>  | Designed for low flow applications | • MASS 2100: DI 1.5, DI 3, DI 6, DI 15<br>• FC300: DN 4<br>• Flow from 0.1 ... 5600 kg/h<br>• Pipe material: Stainless steel AISI 316L/ 1.4435; Hastelloy C22/2.4602<br>• Accuracy, typically:<br>- Flow: down to 0.1 %<br>- Density: down to 0.0005 g/cm³<br>• Liquid temp./pressure: -50 ... +180 °C (-58 ... +356 °F); up to 410 bar (5946 psi)<br>• Approvals: ed according to ATEX, IECEx, c-UL-us, CRN, PED | |
| **SITRANS FCT070 transmitter**<br>  | SITRANS FCT070 can be connected to all Coriolis type Sensors FCS300, FCS400, MASS 2100 and FC300 DN. FCT070 can be used for machine builders and in the process industry plants. The meters are suitable for measuring on liquid and gas. With ET 200SP ST & HF the SITRANS FCT070 can be installed decentralized in small stations, with fast communication to the control room.<br>The faceplates for TIA-Portal and PCS 7 offer the direct full remote access to the flowmeter. | • Easy integration into automation process control as TIA Portal and PCS 7<br>• Cost effective integration of Coriolis flowmeters for PLC controlled machines<br>• SITRANS FCT070 is a ET 200SP technology module and can combined with all other SIMATIC ET 200S SP ST & HF modules<br>• Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate<br>• ATEX Zone 2 FM Class 1 Div 2 approvals<br>• Included advanced batch functionality without additional modules | |

| SITRANS FC Coriolis 2023 | Application | Description | Software for parameterization |
|---|---|---|---|
| **FC120/FC140 flowmeter system**<br>  | The flowmeter systems of the SITRANS FC100 series are the precision Coriolis multi-parameter flowmeter for low flow applications. | • Batching function with batch leakage detection and batch control by transmitter for precise dosing<br>• Accurate density measurement and up to four advanced concentration measurement data sets<br>• Sizes to suit pilot plants, R&D labs and high value fluid additives<br>• Wide choice of process connections, starting with DN 6 (¼ inch) for reduced installation efforts | |

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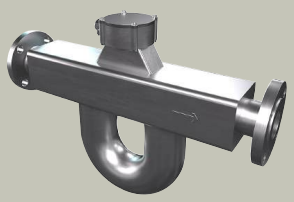
## Overview (continued)

| SITRANS FC Coriolis 2023 | Application | Description | Software for parameterization |
|---|---|---|---|
| **FC520/FC540 flowmeter system**<br>  | The flowmeter systems of the SITRANS FC500 series are the universal Coriolis multi-parameter flowmeter for routine and hygienic applications. | • Energy-efficient low pressure loss design with short tube paths and large tube diameter<br>• Batching function with batch leakage detection and batch control by transmitter for precise dosing<br>• Accurate density measurement and up to four advanced Concentration Measurement data sets<br>• Benefit from viscosity function and capability to handle high viscous process fluids<br>• Hygienic design, self-draining in vertical installation, with hygienic approval options | |
| **FC620/FC640 flowmeter system**<br>  | The flowmeter systems of the SITRANS FC600 series are the resistant Coriolis multi-parameter flowmeter for extreme conditions. | • Temperatures from -196 °C (-321 °F), for cryogenic fluids, up to +350 °C (+662 °F)<br>• Insulation and heat tracing options for viscous and molten liquids<br>• Dynamic pressure compensation for accurate measurement under changing process pressure<br>• Accurate density measurement and up to four advanced concentration measurement data sets | |
| **FC720/FC740 flowmeter system**<br>  | The flowmeter systems of the SITRANS FC500 series are the grande Coriolis multi-parameter flowmeter for large pipes and high flows. | • Energy-efficient low pressure loss design with short tube paths and large tube diameter<br>• Optimal decoupling of the dual tube measuring element from external stress and vibration<br>• Accurate density measurement and up to four advanced concentration measurement data sets<br>• Benefit from viscosity function and capability to handle high viscous process fluids<br>• High power tube driver to detect gas content to maintain dependable measurements with entrained gas | |
| **FCT020 transmitter**<br>  | FCT020 is the standard transmitter, suitable for general purpose applications. It delivers accurate and precise measurements of mass flow rate, density, temperature and volume flow rate. | • Tube health check<br>• Communicaion modules: HART, Modbus | |

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## Overview (continued)

| SITRANS FC Coriolis 2023 | Application | Description | Software for parameterization |
|---|---|---|---|
| **FCT040 transmitter**<br>  | FCT040 is the advanced transmitter, offering a wider range of application solutions with improved performance. | • Tube health check<br>• Standard concentration measurement<br>• Petroleum measurement function<br>• Fraction (advanced concentration)<br>• Viscosity function<br>• Batching function<br>• Communicaion modules: HART, Modbus, PROFIBUS, PROFINET | |
| **FCS100 sensor**<br>  | SITRANS FCS100 sensor is the precision Coriolis flow sensor for low flow applications. | • Install in tight spaces with no inlet and outlet restrictions<br>• Sizes to suit pilot plants, R&D labs, and high value fluid additives<br>• Combination with a remote transmitter via a connecting cable<br>• Installation of sensor and transmitter in different locations | |
| **FCS500 sensor**<br>  | SITRANS FCS500 sensor is the universal Coriolis flow sensor for routine and hygienic applications. | • Dual curved AISI 316L stainless steel tubes with polished option<br>• Hygienic approvals for food, beverage, and pharmaceutical sectors<br>• Versatile solution with superior turndown and low pressure loss<br>• Combination with compact or remote transmitters | |
| **FCS600 sensor**<br>  | SITRANS FCS600 sensor is the resistant Coriolis flow sensor for extreme conditions and corrosive fluids. | • Dual curved AISI 316L or alloy 22 tubes with optimum decoupling from external influences<br>• Temperatures from -196 °C (for cryogenic fluids), up to +350 °C<br>• Insulation and heat tracing options for viscous and molten liquids<br>• Combination with compact or remote transmitters | |
| **FCS700 sensor**<br>  | SITRANS FCS700 sensor is the grande Coriolis flow sensor for large pipes and high flows. | • Dual curved AISI 316L stainless steel or alloy 22 tubes with optimum decoupling from external influences<br>• Energy efficient low pressure loss design with short tube paths and large tube diameter<br>• High power tube driver for dependable measurements in high damping applications<br>• Combination with compact or remote transmitters | |

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## Overview (continued)

| SITRANS FS clamp-on ultrasonic flowmeters | Application | Description | Software for parameterization |
|---|---|---|---|
| **SITRANS FS230**<br>  | SITRANS FS clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense. These dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the:<br>• Water Industry<br>• Wastewater Industry<br>• HVAC Industry<br>• Power Industry<br>• Processing Industry<br>• Hydrocarbon Industry | • Suitable for virtually any liquid, even those with high aeration or suspended solids<br>• Hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or gas<br>• Choice of single, dual or four path versions to suit your operating conditions and requirements<br>• Easy installation; no need to cut pipe or stop flow<br>• Minimal maintenance; external sensors do not require periodic cleaning<br>• Easy to read display with intuitive menu system<br>• Hazardous area approvals for ATEX Zone 1,2, IECEx Zone 1,2 FMc Class I Div. 1,2 | |
| **SITRANS FS220**<br>  | SITRANS FS220 basic is a fast-to-install clamp-on ultrasonic flowmeter for accurate measurements with minimal maintenance. Based on latest technology, this flowmeter is ideal suitable for applications like:<br>• Water Industry<br>• Wastewater Industry<br>• HVAC Industry<br>• Power Industry<br>• Process controls | • Easy installation during process condition, no need to cut pipe or stop flow<br>• Minimal maintenance; external sensors do not require periodic cleaning<br>• No media-contacting parts, no wear, no pressure drop, no energy loss<br>• Wide turn-down ratio, very sensitive in low flow condition<br>• Optional WideBeam technology ensures high performance<br>• Compatible with all previously fielded transit time sensors | |
| **SITRANS FS290**<br>  | The portable clamp-on ultrasonic flow measurement system SITRANS FS290 is formed by the SITRANS FST090 portable clamp-on flowmeter with FSS200 sensors.<br>This system represents the next generation of digital flow measurement which allows you to easily measure or check flows in pipes. | • Easy installation: just clamp it on, with no need to cut pipe or stop flow<br>• Minimal maintenance: sensors do not require upkeep or cleaning<br>• No moving parts to foul or wear<br>• No pressure drop or energy loss<br>• Wide turn-down ratio<br>• Precise single path measuring | |
| **SITRANS FST070**<br>  | The technology module SITRANS FST070 is an ultrasonic clamp-on flowmeter transmitter for the SIMATIC ET200SP.<br>The SITRANS FST070 can be used for machine builders, in the chemical industry or water treatments and is suitable for measuring on liquid, hydrocarbon and gas | • Easy integration into automation process control as TIA Portal and PCS 7 (SIMATIC)<br>• Easy selection and integration of flowmeters via TIA selector<br>• Precast face plates for TIA Portal and PCS 7<br>• No additional transmitter between automation and clamp-on sensors required<br>• Cost effective integration of clamp-on flowmeters for water treatments, control rooms with PCS 7<br>• SITRANS FST070 ET 200SP technology module can combined with all other SIMATIC ET200 modules<br>• Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate | |

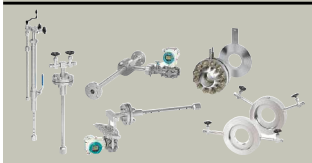
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## Overview (continued)

| SITRANS FS clamp-on ultrasonic flowmeters | Application | Description | Software for parameterization |
|---|---|---|---|
| | | • ATEX Zone 2 Class 1 Div. 2. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1/0 Class 1 Div. 1 approval | |

| SITRANS FX Vortex flowmeter | Application | Description | Software for parameterization |
|---|---|---|---|
| **SITRANS FX330**<br>  | Very versatile and flexible for use in many process applications. Flow sensors combines flow, pressure and temperature measurement into one user-friendly, two-wire device.<br>• Measurement of saturated steam and superheated steam<br>• Heat metering of steam and hot water<br>• Measurement of consumption in compressed air systems<br>• Evaluation of Free Air Delivery (FAD)<br>• SIP and CIP processes in the food, beverage and pharmaceutical industries<br>• Measurement of conductive and non-conductive liquids<br>• Safety-related measurement in SIL applications (SIL2). | • Integrated pressure and temperature compensation<br>• Temperature compensation for saturated steam included as standard<br>• SIL2 certified according to IEC 61508 Edition 2<br>• Use in hazardous areas<br>• Integrated reduction of nominal diameter for space-saving and economic installation<br>• Exchange of electronics without loss of calibration and configuration data<br>• Gross and net heat calculation to support energy management<br>• Remote version with cable length up to 50 m (164 ft) | |

| SITRANS FP differential pressure flow measurement | Application | Description | Software for parameterization |
|---|---|---|---|
|  | SITRANS FP product line is suitable for all kinds of applications – liquids, dry or humid gases and steam. Due to the robust though variable design it has been and still is one of the main technologies for flow measurement in various industries.<br>A new digital sizing process ensures minimum effort during presales and full traceability in aftersales. The differential pressure portfolio consists of<br>• pitot tubes SITRANS FPS300<br>• primary elements according to ISO 5167 (orifices) SITRANS FPS200 | • Suitable for a vast range of different applications<br>• Available as pre-mounted compact system as well as remote parts<br>• Advanced intelligent sizing procedure<br>• Web-based sizing and data storage enables full traceability and easy communication<br>• All benefits of SITRANS P320 available | |

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## Overview

### *Criteria for selection of flowmeter*

Each method for measuring flow has specific properties, and each flow measuring point is characterized by specific requirements. The table shown below compares the properties of the various measuring instruments and thus provides assistance in selection of the optimum device.

This section of the field device catalog includes the following instruments for measuring flow:

- Electromagnetic
- Coriolis mass flow
- Ultrasonic
- Vortex volumetric- and mass flow
- Variable area meter
- Primary element

| Measurement principle | Electromagnetic | Coriolis | Ultrasonic (inline) | Ultrasonic (clamp-on) | Vortex | Variable area meter | Primary element |
|---|---|---|---|---|---|---|---|
| Medium | Liquid (conductive) | Liquid or gas | Liquid | Liquid or gas | Steam/vapor, gases, liquid | Liquid or gas | Liquid, vapor, gas |
| Nominal size | DN 2 ... 2000 (0.08" ... 78") | 1.5 ... 150 mm (0.06" ... 6") | DN 50 ... 1200 (2" ... 48") | 6.4 mm ... 9.14 m (0.25" ... 360") | DN 15 ... 300 (½" ... 12") | DN 10 ... 100 (0.4" ... 4") G½" ... G3" | DN 10 ... 4000 (0.4" ... 160") |
| Temperature range [°C (°F)] | -40 ... +200 (-40 ... +392) | -50 ... +180 (-58 ... +356) | -20 ... +200 (-4 ... +392) | -40 ... +120 (-40 ... +248) | -40 ... +240 (-40 ... +464) | -20 ... +300 (-4 ... +572) | -100 ... +490 (-148 ... +914) |
| Max. pressure [bar (psi)] | 160 (2 320), optional higher | Up to 410 (Up to 5 950) | 40 (580) | Unlimited | 100 (1 450) | 100 (1 450) | 315 (4 569) |
| Accuracy [%] | ± 0.25 or ± 0.4 | ± 0.1 or ± 0.15 | ± 0.5 ... ± 2 | 0.5 ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) | ± 0.75 ... ± 1 | ± 1.6 ... ± 2.0 | ± 0.5 ... ± 1.2 |
| Repeatability [%] | 0.1/0.2 | 0.05 | 0.25 | 0.15% of flow, for velocities greater than 0.3 m/s (1 ft/s) | 0.1 | 0.5 | 0.1 |
| Dynamic response range | 1:100 | 1:100 | 1:400 | 1:100 | 1:25 | 1:10 | 1:6 |
| Start-of-scale value [m/s (ft/s)] | 0 (0) | 0 (0) | 0.1 (0.33) | 0 (0) | 0.4 (1.31) 2.0 (6.56) | 0.2 (0.66) | Re > 500 |
| Full-scale value | | | | ± 36/120 | | | Re < $10^8$ |
| • For liquids [m/s (ft/s)] | 0.25 ... 10 (0.825 ... 32.8) | 10 (32.8) | 10 (32.8) | ± 12/40 | 10 (32.8) | 3.5 (11.4) | 3 (9.8) |
| • For steam/vapor, gases [m/s (ft/s)] | | Approx. 300 (1000) | | ± 12/40 | 80 (262.5) | 60 (197) | 50/25 (164/82) |
| **Measured values** | | | | | | | |
| Volume flow | ● | ● | ● | ● | ● | ● | ● |
| Sound velocity | | | ● | ● | | | |
| Sound amplitude | | | ● | ● | | | |
| Density | | ● | | ● | | | |
| Mass flow | | ● | ● | ● | ● | | |
| Bidirectional measurement | ● | ● | ● | ● | | | ● |
| **Use** | | | | | | | |
| • For custody transfer | ● | ● | ● | ● | | | |
| • As batching system | ● | ● | | ● | | | |
| • In viscosity range [mPa s (cp)] | 0.1 ... 100 000 (0.1 ... 100 000) | 0 ... 100 000 (0 ... 100 000) | 0 ... 350 (0 ... 350) | 0.5 ... 2800 (0.5 ... 2800) | 0 ... 10 (0 ... 10) | 0.5 ... 100 (0.5 ... 100) | 0 ... 10 (0 ... 10) |
| **Power supply** | Mains or battery | Mains | Mains or battery | 90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W | 2-wire | non | 2-wire |

### *Communication solutions*

| Product | HART | PROFIBUS PA | PROFIBUS DP | FOUNDATION Fieldbus H1 | DeviceNet | Modbus RTU | GSM/GPRS |
|---|---|---|---|---|---|---|---|
| **SITRANS FM** | | | | | | | |
| MAG 5000 | ● *1) 2) 4)* | | | | | | |
| MAG 6000 | ● *1) 2) 4) 5)* | ● *1) 5) 6) 7)* | ● *1) 5) 6) 7)* | ● *2) 4) 5)* | ● *5)* | ● *1) 5) 10)* | |
| MAG 5000/6000 CT[8)] | | | | | | | |
| MAG 6000 I | ● *1) 2) 4) 5)* | ● *1) 5) 6) 7)* | ● *1) 5) 6) 7)* | ● *2) 4) 5)* | ● *5)* | ● *1) 5) 10)* | |
| MAG 6000 I Ex | ● *1) 2) 4) 5)* | ● 1) 5) 6) 7) | | ● *2) 4) 5)* | | | |
| TRANSMAG 2 | ● *1) 4)* | ● *1) 6)* | | | | | |
| MAG 8000 | | | | | | ● *1) 3) 10) 11) 12)* | ● *14)* |

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## Overview (continued)

| Product | HART | PROFIBUS PA | PROFIBUS DP | FOUNDATION Fieldbus H1 | DeviceNet | Modbus RTU | GSM/GPRS |
|---|---|---|---|---|---|---|---|
| **SITRANS FC** | | | | | | | |
| FCT010 | | | | | | ● 1) 10) | |
| FCT030 | ● 1) 2) 4) 8) | ● 1) 2) 4) 8) | ● 1) 2) 4) 8) | | | ● 1) 2) 4) 8) | |
| MASS 6000 | ● 1) 2) 4) 5) | ● 1) 5) 6) 7) | ● 1) 5) 6) 7) | ● 2) 4) 5) | ● 5) | ● 1) 10) | |
| MASS 6000 Ex d | ● 1) 2) 4) 5) | ● 1) 5) 6) 7) | | ● 2) 4) 5) | ● 5) | | |
| SIFLOW FC070 | | | ● 13) | | | ● 1) 10) 11) | |
| **SITRANS FS** | | | | | | | |
| FUS060 | ● 1) | ● 1) 6) | | | | | |
| FUS080 | | ● 1) 8) 12) | | | | | |
| **SITRANS FX** | | | | | | | |
| SITRANS FX330 | ● 1) | | | | | | |

1) Supports SIMATIC PDM
2) Supports AMS
3) Supports Siemens Flow Tool
4) Supports HH275/375
5) Pluggable add-on module
6) Profile 2
7) Profile 3
8) CT versions are not approved with communication modules
9) All wall mount models
10) RS 485
11) RS 232
12) IrDA (Infrared)
13) Connected to ET200M PROFIBUS interface
14) Only with 7ME6810

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## Overview

SITRANS FM electromagnetic flowmeters are designed for measuring the flow of electrically conductive liquids.

The full SITRANS FM program consists of three different types of flowmeters making Siemens unique in that it covers all possible applications where electromagnetic flowmeters are a suitable match:

**Modular pulsed DC flowmeters** cover all ordinary applications within all industries. The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task and application.



SITRANS FM products

**Battery-operated water meters** (fully electronic) are the perfect match for drinking water applications like network distribution, revenue metering and irrigation where mains power is not available. In addition, it complies with the MID (EU) and OIML R 49 water meter standards and has the MCERTS certificate.



SITRANS FM MAG 8000

**AC powered alternating field flowmeters** are used for difficult applications where other flowmeters cannot stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp and paper.

## Overview (continued)





SITRANS FM MAG 911/E

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## Benefits



Greater flexibility

- Wide product program
- Compact or remote installation using the same transmitter and sensor
- USM II communication platform for easy integration with all systems

Easier commissioning of MAG 5000, 6000, 6000 I

All SITRANS FM pulsed DC electromagnetic flowmeters feature a unique SENSORPROM memory unit which stores sensor calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer specified settings are downloaded to the unit. Should the transmitter be replaced, the new transmitter will upload all previous settings and resume measurement without any need for reprogramming.

Further, the "fingerprint" used in connection with the SITRANS FM Verificator is stored during the initial sensor calibration.

Easier service

Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

USM II the Universal Signal Module with "plug & play" simplicity, makes it easy to access and integrate the flow measurement with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.

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## Benefits (continued)

***SITRANS FM platform concept***

**Pulsed DC electromagnetic flowmeters**


MAG 6000 I


MAG 5000


MAG 6000


Wall mounting unit


MAG 6000 I
(Ex de)


MAG 6000
Ex safety barrier


MAG 5000 / 6000 19"
Panel mount


MAG 3100
MAG 3100 HT


MAG 3100 P


MAG 5100 W


Communication modules:
- HART
- Profibus PA
- Profibus DP
- Modbus RTU / RS485
- DeviceNet
- Foundation Fieldbus


MAG 1100 F


MAG 1100
MAG 1100 HT

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## Application

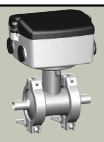
Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries.

A prerequisite is that the medium must have a minimum conductivity. The temperature, pressure, density and viscosity have no influence on the result.

The main applications of the electromagnetic flowmeters can be found in the following sectors:

- Water and waste water
- Chemical industries
- Pharmaceutical industries
- Food and beverage industry
- Mining, aggregates and cements industries
- Pulp and paper industry
- Steel industry
- Power; utility and chilled water industry

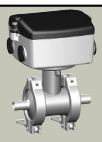
The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

| **Please see Product selector on the Internet, because some constrains might be related to some of the features:** www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| | **FM100** | **MAG 1100** | **MAG 1100 HT** | **MAG 1100 F** | **MAG 3100** | **MAG 3100 HT** | **MAG 3100 P** | **MAG 5100 W** | **MAG 911/E** | **MAG 8000 MAG 8000 CT** |
| | **7ME6010** | **7ME6110** | **7ME6120** | **7ME6140** | **7ME6310** | **7ME6320** | **7ME6340** | **7ME6520** | **7ME5610** | **7ME6810 7ME6820** |
| **Industry** | | | | | | | | | | |
| Water/waste water | | XX | | | XX | | X | XXX | X | XXX[1] |
| Chemical | ● | XXX | XXX | XX | XXX | XXX | XXX | X | | X |
| Pharmaceutical | ● | XX | XX | XXX | XX | XX | XX | X | | X |
| Food and beverage | | XX | | XXX | X | X | X | X | | X |
| Mining, aggregates and cement | | XX | | | XXX | | | X | XXX | X |
| HPI | | XX | X | | XX | X | XX | X | | X |
| Other | ● | XX | XX | XX | XX | XX | XX | XX | XXX | X |
| **Design** | | | | | | | | | | |
| Compact | ● | ● | | ● | ● | ● | ● | ● | | ● |
| Remote | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Constant field (DC) | | ● | ● | ● | ● | ● | ● | ● | | ● |
| Alternating field (AC) | | | | | | | | | ● | |
| Battery-operated constant field (DC) | | | | | | | | | | ● |
| **Size** | | | | | | | | | | |
| DN 2 ($^1/_{12}$") | | ● | | | | | | | | |
| DN 3 ($^1/_8$") | | ● | | | | | | | | |
| DN 6 (¼") | | ● | | | | | | | | |
| DN 10 ($^3/_8$") | | ● | | ● | | | | | | |
| DN 15 (½") | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| DN 25 (1") | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 32 (1¼") | | | | ●[2] | | | | | | |
| DN 40 (1½") | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 50 (2") | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 65 (2½") | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 80 (3") | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 100 (4") | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| DN 125 (5") | | | | | ● | ● | ● | ● | ● | ● |
| DN 150 (6") | | | | | ● | ● | ● | ● | ● | ● |
| DN 200 (8") | | | | | ● | ● | ● | ● | ● | ● |
| DN 250 (10") | | | | | ● | ● | ● | ● | ● | ● |
| DN 300 (12") | | | | | ● | ● | ● | ● | ● | ● |
| DN 350 (14") | | | | | ● | | | ● | ● | ● |
| DN 400 (16") | | | | | ● | | | ● | ● | ● |
| DN 450 (18") | | | | | ● | | | ● | ● | ● |

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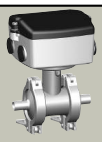
## Application (continued)

| Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| | FM100 | MAG 1100 | MAG 1100 HT | MAG 1100 F | MAG 3100 | MAG 3100 HT | MAG 3100 P | MAG 5100 W | MAG 911/E | MAG 8000<br>MAG 8000 CT |
| | 7ME6010 | 7ME6110 | 7ME6120 | 7ME6140 | 7ME6310 | 7ME6320 | 7ME6340 | 7ME6520 | 7ME5610 | 7ME6810<br>7ME6820 |
| DN 500 (20") | | | | | ● | | | ● | ● | ● |
| DN 600 (24") | | | | | ● | | | ● | ● | ● |
| DN 700 (28") | | | | | ● | | | ● | ● | ● |
| DN 750 (30") | | | | | ● | | | ● | ● | ● |
| DN 800 (32") | | | | | ● | | | ● | ● | ● |
| DN 900 (36") | | | | | ● | | | ● | ● | ● |
| DN 1000 (40") | | | | | ● | | | ● | ● | ● |
| DN 1050 (42") | | | | | ● | | | ● | | ● |
| DN 1100 (44") | | | | | ● | | | ● | | ● |
| DN 1200 (48") | | | | | ● | | | ● | | ● |
| DN 1400 (54") | | | | | ● | | | | | |
| DN 1500 (60") | | | | | ● | | | | | |
| DN 1600 (66") | | | | | ● | | | | | |
| DN 1800 (72") | | | | | ● | | | | | |
| DN 2000 (80") | | | | | ● | | | | | |
| **Process connection** | | | | | | | | | | |
| Wafer design | | ● | ● | | | | | | | |
| Sanitary process connections | | | | ● | | | | | | |
| Flanges | | | | | ● | ● | ● | ● | ● | ● |
| **Pressure ratings** [3] | | | | | | | | | | |
| EN 1092-1 PN 10 | | | | | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 16 | | ● | | ● | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 25 | | | | | ● | ● | | | ● | |
| EN 1092-1 PN 40 | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 63 | | | | | ● | | | | | |
| EN 1092-1 PN 100 | | | | | ● | | | | | |
| ANSI B 16.5 class 150 | | | | | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 class 300 | | | | | ● | ● | | | ● | |
| ANSI B 16.5 class 600 | | | | | ● | | | | | |
| AWWA class D | | | | | ● | | | ● | ● | ● |
| AS 2129 table E | | | | | ● | ● | | | | |
| AS 4087, PN 16 | | | | | ● | ● | | ● | | ● |
| AS 4087, PN 21 | | | | | ● | ● | | | | |
| AS 4087, PN 35 | | | | | ● | ● | | | | |
| JIS B 2220:2004 10K | | | | | ● | | | ● | ● | |
| JIS B 2220:2004 20K | | | | | ● | | | | | |
| **Accuracy** | | | | | | | | | | |
| Flow error ± 0.2 % of rate | | ● | ● | ● | ● | ● | ● | ● | | ● |
| Flow error ± 0.4 % of rate | | ● | ● | ● | ● | ● | ● | ● | | ● |
| Flow error ± 0.5 % of rate | | | | | | | | | ● | |
| **Repeatability** [4] | | | | | | | | | | |
| 0.1 % | | ● | ● | ● | ● | ● | ● | ● | | |
| 0.2 % | ● | | | | | | | | ● | |
| **Grounding electrodes** | | | | | | | | | | |
| Grounding electrodes, incl. | | | | | ● | | ● | ● | (●) | ● |

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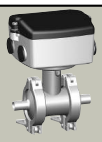
## Application (continued)

| Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| | FM100 | MAG 1100 | MAG 1100 HT | MAG 1100 F | MAG 3100 | MAG 3100 HT | MAG 3100 P | MAG 5100 W | MAG 911/E | MAG 8000<br>MAG 8000 CT |
| | 7ME6010 | 7ME6110 | 7ME6120 | 7ME6140 | 7ME6310 | 7ME6320 | 7ME6340 | 7ME6520 | 7ME5610 | 7ME6810<br>7ME6820 |
| **Materials/temperature** | | | | | | | | | | |
| ***Liner material/max. temperatures*** | | | | | | | | | | |
| NBR: 70 °C (158 °F) | | | | | | | | ● | | |
| EPDM: 70 °C (158 °F) | | | | | ● | | | ● | | ● |
| Soft rubber: 70 °C (158 °F) | | | | | ● | | | | ● | |
| PTFE: 100 °C (212 °F) | | | | | ● | | | | | |
| PTFE: 150°C (302 °F) | | | | | | ● | ● | | ● | |
| PTFE: 180 °C (356 °F) | | | | | | ● | | | ● | |
| Ebonite: 95 °C (203 °F) | | | | | ● | | | | ● | |
| Linatex: 70 °C (158 °F) | | | | | ● | | | | ● | |
| Ceramic: 150 °C (302 °F) | | ● | | ● | | | | | | |
| Ceramic: 200 °C (392 °F) | | | ● [6] | | | | | | | |
| PFA: 100 °C (212 °F) | | | | | ● | | | | | |
| PFA: 150 °C (302 °F) | | ● | | ● | | ● | ● | | | |
| Novolak: 130 °C (266 °F) | | | | | | | | | ● | |
| ***Electrodes*** | | | | | | | | | | |
| Stainless steel | ● | | | | ● | ● | | | ● | |
| Hastelloy C | | ● | | ● | ● | ● | ● | ● | ● | ● |
| Platinum | | ● | ● | ● | ● | ● | ● [5] | | ● | |
| Titanium | | | | | ● | ● | | | ● | |
| Tantalum | | | | | ● | ● | ● [5] | | ● | |
| Ceramic coated stainless steel | | | | | ● | | | | | |
| Ceramic coated Hastelloy C | | | | | ● | | | | | |
| ***Flange/housing material*** | | | | | | | | | | |
| Carbon steel | | | | | ● | ● | ● | ● | ● | ● |
| Stainless steel/carbon steel | ● | | | | ● | ● | | | ● | |
| Polished stainless steel | | ● | ● | ● | ● | ● | | | | |
| **Approvals** | | | | | | | | | | |
| ***Custody transfer*** | | | | | | | | | | |
| Cold Water – MI-001 (EU) | | | | | | | | ● | | ● |
| Cold water approval - OIML R 49/OIML R 49 MAA | | | | | | | | | | ● [7] |
| NMI 10(Australia) | | | | | | | | ● [7] | | ● [7] |
| Chilled water pattern approval - PTB K 7.2 | | | | | | | | ● [7] | | |
| OE 12/C 040 (Austria) Chilled water pattern approval | | | | | | | | ● | | |
| KIWA water approval | | | | | | | | ● | | ● |
| ***Marine*** | | | | | | | | | | |
| DNV | | | | | | | | ● | | |
| ***Hazardous areas*** | | | | | | | | | | |
| ATEX – 2 GD (Zone 1/21) | | ● | ● | ● | ● | ● | ● | | | |
| IECEx Zone 1/21 | | | | | ● | ● | ● | | | |
| FM Class I/II/III | | | | | ● [13] | ● [13] | ● [13] | | | |
| FM Class I, Zone 1/21 | | | | | ● | ● | ● | | | |

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## Application (continued)

| Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| | FM100 | MAG 1100 | MAG 1100 HT | MAG 1100 F | MAG 3100 | MAG 3100 HT | MAG 3100 P | MAG 5100 W | MAG 911/E | MAG 8000<br>MAG 8000 CT |
| | 7ME6010 | 7ME6110 | 7ME6120 | 7ME6140 | 7ME6310 | 7ME6320 | 7ME6340 | 7ME6520 | 7ME5610 | 7ME6810<br>7ME6820 |
| FM - Class I, Div 2 | | ● | ● | ● | ● | ● | ● | ● | | |
| FM - Class I, Zone 2 | | ● | ● | ● | ● | ● | ● | ● | | |
| CSA Class I, Zone 1/21 | | | | | ● | ● | ● | | | |
| CSA - Class I, Div 2 | | | | | ● | ● | ● | ● | | |
| NEPSI Zone 1 | | | | | ● | | ● | | | |
| EAC Ex | | ● | ● | ● | ● | ● | ● | | | |
| ***Hygienic*** | | | | | | | | | | |
| 3A | | | | ● | | | | | | |
| EC 1935:2004 European food contact material | | | | ● | | | | | | |
| ***Drinking water*** | | | | | | | | | | |
| WRAS ($WR_c$) | | | | | ● | | | ● [9] | | ● |
| ANSI/NSF 61 (US) | | | | | ● | | | ● [9] | | ● |
| ACS (FR) | | | | | ● [9] | | | ● [9] | | ● |
| Belgaqua (B) | | | | | ● [9] | | | ● [9] | | ● |
| DVGW-W270 (D) | | | | | ● [9] | | | ● [9] | | ● |
| KIWA (NL) | | | | | ● [9] | | | ● [9] | | ● |
| AS/NZS 4020 (AU) | | | | | ● | | | ● [9] | | ● |
| GB/T5750 (China) | | | | | ● | | | | | |
| ***Other*** | | | | | | | | | | |
| CRN (Canada) | | ● [14] | | | ● | ● | ● | ● | | ● |
| FM Fire Service (class number 1044) | | | | | | | | ● [12] | | ● [12] |
| MCERTS (GB) | | | | | ● [10] | | | ● [9] | | ● |
| EAC (Russia, Belarus, and Kasakhstan) | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| CPA (China) | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| VdS | | | | | | | | ● [11] | | |
| **Verificator** | | | | | | | | | | |
| Verificator compatible | | ● [8] | ● [8] | ● [8] | ● [8] | ● [8] | ● [8] | ● [8] | | |

● = available

**X** = can be used
**XX** = often used
**XXX** = most often used

1) Not suitable for wastewater applications
2) Only in combination with DN 32 adapter A5E02054637, A5E02218297, FDK:083G2120 and FDK:083G2160
3) Pressure may be limited by the liner material chosen
4) Of actual flow for v ≥ 0.5 m/s (1.5 ft/s) and conductivity > 10 µS/cm
5) Only for PTFE
6) Ex sensor: 180 °C (356 °F)
7) For verification submit Product Variation Request (PVR)
8) Only in combination with MAG 5000 and MAG 6000 transmitters
9) EPDM liner
10) EPDM or PTFE liner with AISI 316 or Hastelloy electrodes
11) Only valid for DN 50 to DN 300 (2" to 12")
12) Sizes: DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges
13) Only DN 15 to DN 300 (½" to 12") with MAG 6000 I Ex, compact mounted
14) Only PFA liner

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## Application (continued)

| Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| | **MAG 5000** | **MAG 6000** | **MAG 6000 I** | **MAG 6000 I Ex** | **MAG 6000 + Safety barrier** | **TRANSMAG 2** | **MAG 8000 MAG 8000 CT** |
| | **7ME6910** | **7ME6920** | **7ME6930** | **7ME6930** | **7ME6920** | **7ME5034** | **7ME6810 7ME6820** |
| **Industry** | | | | | | | |
| Water/waste water | XXX | XXX | XX | X | | X | XXX |
| Chemical | X | XX | XX | XXX | X | | X |
| Pharmaceutical | X | XXX | XX | XXX | X | | X |
| Food and beverage | XX | XXX | XX | | | | X |
| Mining, aggregates and cement | XX | X | XX | X | | XXX | X |
| HPI | X | X | X | XX | | | X |
| Other | XX | XX | XX | XX | | XX | X |
| **Design** | | | | | | | |
| Compact | ● | ● | ● | ● | | | ● |
| Remote | ● | ● | ● | ● | ● | ● | ● |
| Constant field (DC) | ● | ● | ● | ● | ● | | ● |
| Alternating field (AC) | | | | | | ● | |
| Battery-operated constant field (DC) | | | | | | | ● |
| **Enclosure transmitter** | | | | | | | |
| Polyamide, IP67 | ● | ● | | | | | |
| Die-cast aluminum | | | ● | ● | | ● | |
| Stainless steel | | ● | | | | | ● [1] |
| 19" rack | ● | ● | | | ● | | |
| Front panel mounting | ● | ● | | | ● | | |
| Panel mounting | ● | ● | | | ● | | |
| IP66 wall mounting | ● | ● | ● | ● | ● | | |
| **Accuracy** | | | | | | | |
| Flow error ± 0.2 % of rate | | ● | ● | ● | ● | | ● |
| Flow error ± 0.4 % of rate | ● | | | | | | ● |
| Flow error ± 0.5 % of rate | | | | | | ● | |
| **Repeatability[3]** | | | | | | | |
| 0.1 % | ● | ● | ● | ● | ● | | |
| 0.2 % | | | | | | ● | |
| **Communication** | | | | | | | |
| HART | ● | ● | ● | ● | ● | ● | |
| PROFIBUS PA | | ● | ● | ● | ● | ● | |
| PROFIBUS DP | | ● | ● | | ● | | |
| FOUNDATION Fieldbus H1 | | ● | ● | ● | ● | | |
| DeviceNet | | ● | ● | | ● | | |
| Modbus RTU/RS 485 | | ● | ● | | ● | | ● [2] |
| Encoder interface module (Sensus protocol for Itron 200WP radio | | | | | | | ● |
| GSM/GPRS module | | | | | | | ● |
| **Batching** | | | | | | | |
| Batching | | ● | ● | ● | ● | | |
| **Power supply** | | | | | | | |
| 24 V | ● [4] | ● [4] | ● | ● | | | ● [4] [5] |
| 115 V - 230 V | ● | ● | ● | ● | ● | ● | ● [5] |
| Battery | | | | | | | ● |

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## Application (continued)

| Please see Product selector on the Internet, because some constrains might be related to some of the features: www.pia-portal.automation.siemens.com |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| | MAG 5000 | MAG 6000 | MAG 6000 I | MAG 6000 I Ex | MAG 6000 + Safety barrier | TRANSMAG 2 | MAG 8000<br>MAG 8000 CT |
| | 7ME6910 | 7ME6920 | 7ME6930 | 7ME6930 | 7ME6920 | 7ME5034 | 7ME6810<br>7ME6820 |
| **Approvals** | | | | | | | |
| ***Custody transfer*** | | | | | | | |
| Cold water - MI-001 (EU) | ● | ● | | | | | ● |
| Cold water approval - OIML R 49/OIML R 49 MAA | | | | | | | ● |
| NMI 10 (Australia) | | ● [8] | | | | | ● [8] |
| Chilled water pattern approval PTB K 7.2 | ● [8] | ● [8] | | | | | ● [8] |
| OE12/C 040 (Austria) Chilled water pattern approval | ● | ● | | | | | |
| KIWA water approval | | ● | | | | | ● |
| ***Marine*** | | | | | | | |
| ABS | ● | ● | | | | | |
| Bureau Veritas | ● | ● | | | | | |
| DNV-GL | ● | ● | | | | | |
| Lloyd's Register | ● | ● | | | | | |
| ***Hazardous areas*** | | | | | | | |
| ATEX - 2G GD (Zone 1/21) | | | | ● | (●) [6] | | |
| IECEx Gb Zone 1/21 | | | | ● | | | |
| FM Class I/II/III, Div 1 | | | | ● [7] | | | |
| FM Class I, Zone 1/21 | | | | ● | | | |
| FM Class I, Div 2 | ● | ● | ● | | | | |
| FM Class I, Zone 2 | ● | ● | ● | | | | |
| CSA Class I, Zone 1/21 | | | | ● | | | |
| CSA Class I, Div 2 | ● | ● | ● | | | | |
| UL/C-UL-general safety | ● | ● | | | ● | | |
| NEPSI Zone 1 | | | | ● | | | |
| EAC Ex | | | | ● | ● | | |
| ***Other*** | | | | | | | |
| FM Fire Service (1044) | ● | ● | | | | | ● |
| KCs (South Korea) | ● | ● | ● | ● | ● | | |
| EAC (Russia, Belarus, Kazakhstan) | ● | ● | ● | ● | ● | ● | ● |
| CPA (China) | ● | ● | ● | ● | ● | ● | ● |
| VdS | ● | ● | | | | | |
| Other national approvals, see internet | ● | ● | ● | ● | ● | ● | ● |
| **Verificator** | | | | | | | |
| Verificator compatible | ● | ● | | | | | |

● = available
**X** = can be used
**XX** = often used
**XXX** = most often used
1) IP68 enclosure
2) Modbus RTU also as serial RS 232
3) Of actual flow for v ≥ 0.5 m/s (1.5 ft/s) and conductivity > 10 µS/cm
4) 12/24 V AC/DC
5) Main power with battery backup
6) Only sensor in hazardous area
7) Only with sensors sizes DN 15 to DN 300 (½" to 12") compact
8) For verification submit Product Variation Request (PVR)

For more national approvals please check our internet page
http://support.automation.siemens.com/WW/view/en/10806954/134200

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## Application (continued)

***SITRANS FM compact installation***



MAG 6000 compact mounted on a MAG 3100 sensor

A compact installation is built by assembling of a MAG 6000 transmitter with a MAG 3100 sensor.

| Example of a SITRANS FM compact installation | |
|---|---|
| **Sensor** | **7ME6310-3TC11-1JA1** |
| Pipe size | DN 100 |
| Liner | Soft rubber |
| Electrodes | SS 316 |
| Flanges | EN 1092-1, PN 16 |
| **Transmitter** | **MAG 6000, Polyamide, 115 ... 230 V AC** |
| Accuracy | ± 0.2 % ± 1 mm/s |
| Supply | 230 V AC |

Note:

MAG 5000/6000 transmitters, sensors and communication modules are packed in separate boxes, the final assembly takes place during installation at the customer's place.

***SITRANS FM remote installation***



Remote installlation: MAG 600 with a wall bracket



Remote installation: MAG 3100 with coil and electrode cable

A remote installation is built by assembling of a MAG 6000 transmitter with a wall bracket and a MAG 3100 with two cables.

| Example of a SITRANS FM remote installation | |
|---|---|
| **Sensor** | **7ME6310-3TC11-1AA1** |
| Pipe size | DN 100 |
| Liner | Soft rubber |
| Electrodes | SS 316 |
| Flanges | EN 1092-1, PN 16 |
| **Transmitter** | **7ME6920-1AA10-0AA0** |
| Accuracy | ± 0.2 % ± 1 mm/s |
| Supply | 230 V AC |
| **Wall mounting kit** | **FDK:085U1018** |
| **Cable kit with coil cable and electrode cable** | **A5E01181647** |

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## Technical specifications

***Flowmeter Calibration and traceability***

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

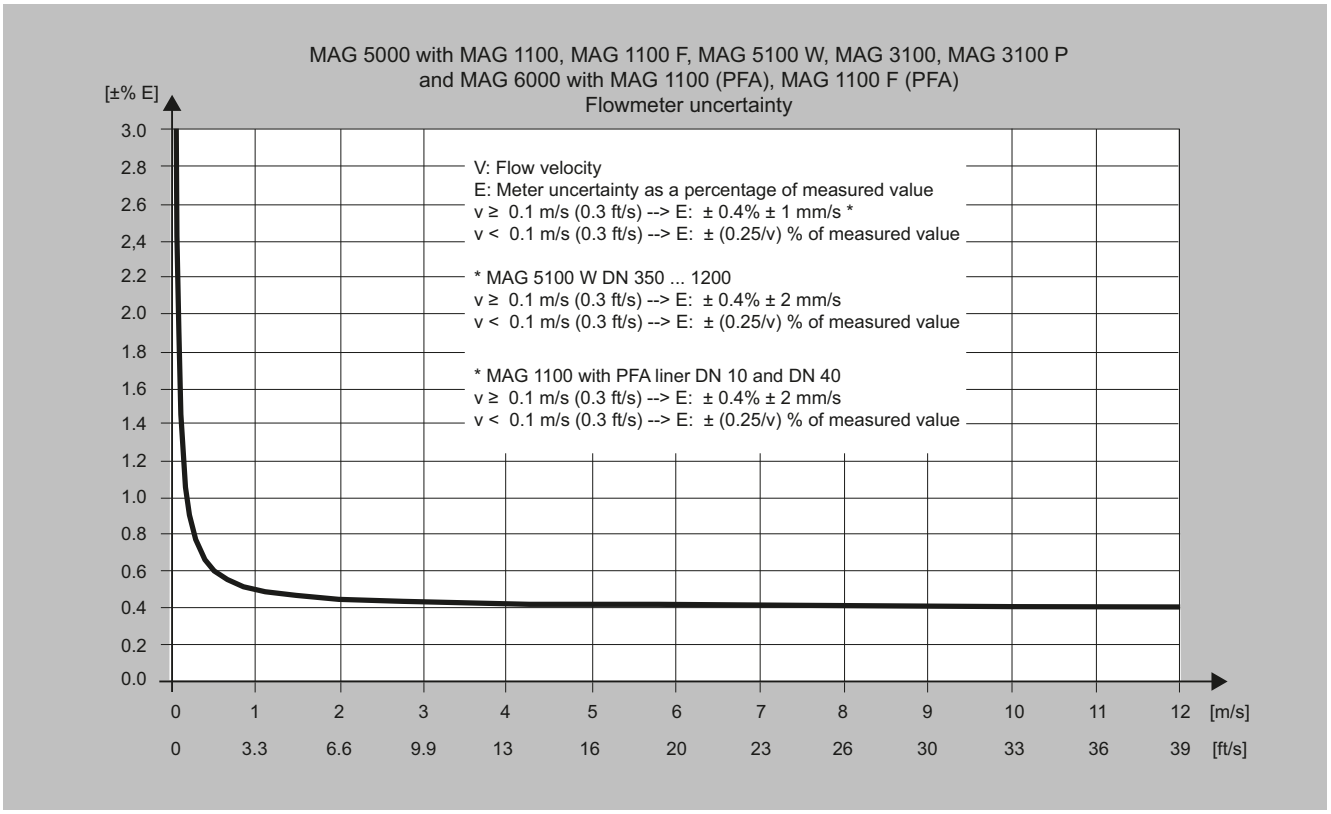
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h.

The calibration follows the ISO 4185 performing calibrations under two methods: Static Weighing and Reference meter. Providing a measurement uncertainty of ±0.1 %.

Siemens accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.

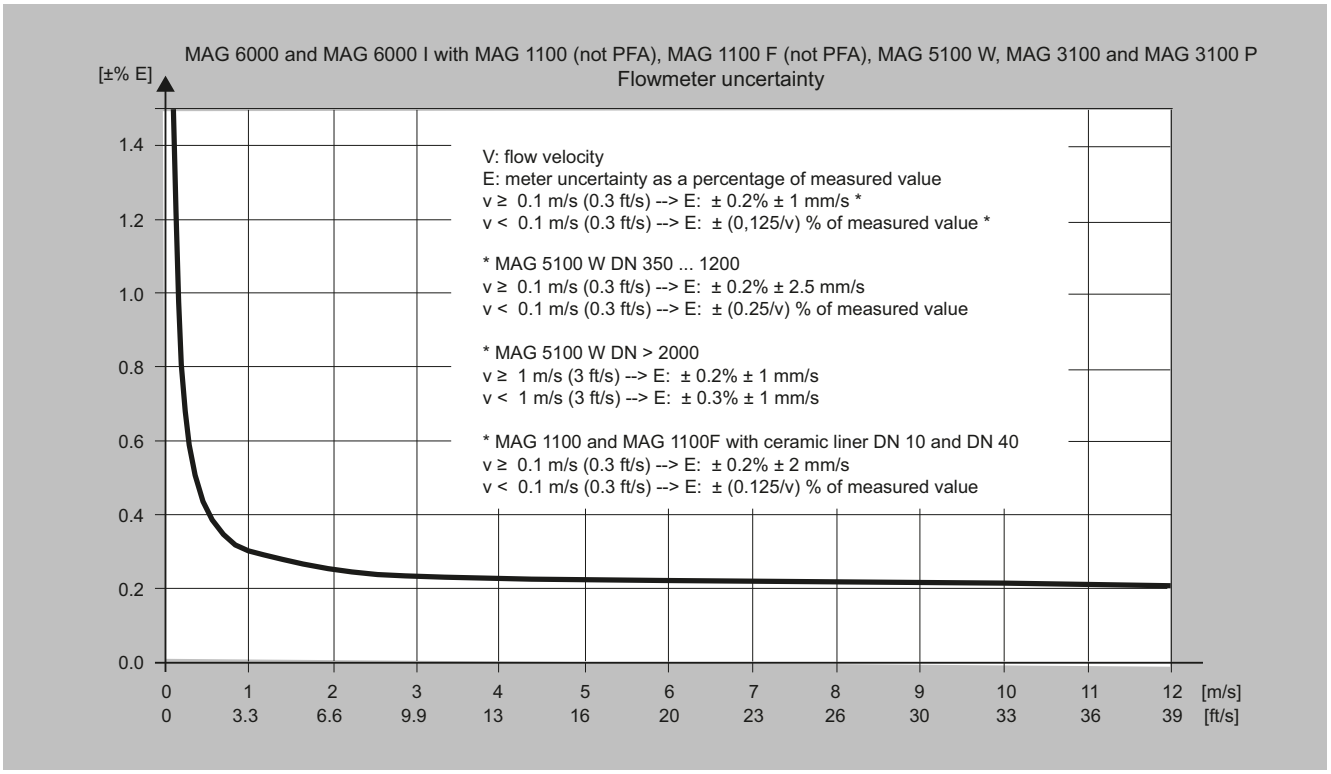
***Flowmeter uncertainty***



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## Technical specifications (continued)




### *Calibration reference conditions*

| Calibration reference conditions | |
|---|---|
| **Reference conditions (ISO 9104 and EN 29104)** | |
| Temperature medium | 20 °C ± 10 K (68 °F ± 18 °F) |
| Temperature ambient | 25 °C ± 10 K (77 °F ± 18 °F) |
| Supply voltage | $U_n$ ± 1 % |
| Warming-up time | 30 minutes |
| Incorporation in conductive pipe section | |
| • Inlet section | 10 × DN (DN ≤ 1200/48") |
| | 5 × DN (DN > 1200/48") |
| • Outlet section | 5 × DN (DN ≤ 1200/48") |
| | 3 × DN (DN > 1200/48") |
| Flow conditions | Developed flow profile |
| **Additions in the event of deviations from reference conditions** | |
| Current output | As pulse output (± 0,1 % of actual flow +0,05 % FSO) |
| Effect of ambient temperature | |
| • Display frequency/pulse output | < ± 0.003 %/K act. |
| • Current output | < ± 0.005 %/K act. |
| Effect of supply voltage | < 0.005 % of measuring value on 1 % change |
| Repeatability | ± 0.1 % of actual flow for v ≥ 0,5 m/s (1.5 ft/s) and conductivity > 10 µS/cm |
| **Certificates** | |
| • EN 10204-2.1 | Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered. Available as Z option C15. |
| • EN 10204-2.2 | Test report certificate, a non-batch specific material analysis of the ordered material. Available as Z-option C14. |

| Calibration reference conditions | |
|---|---|
| • EN 10204-3.1 | Material analysis certificate, a batch specific analysis of the material issued by an independent inspector. Certification covers all pressure containing and wetted parts. Available as Z option C12. |

### *Calibration test point*

Test points for default calibration at 25% and 90% of factory $Q_{max}$.

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## Technical specifications (continued)

| Calibration test point<br>Size<br>mm | $Q_{max}$<br>m3/h | 90%<br>m3/h | 25%<br>m3/h |
|---|---|---|---|
| 2 | 0.055 | 0.0495 | 0.01375 |
| 3 | 0.127 | 0.1143 | 0.01375 |
| 6 | 0.5 | 0.45 | 0.125 |
| 10 | 1.4 | 1.26 | 0.35 |
| 15 | 3 | 2.7 | 0.75 |
| 25 | 9 | 8.1 | 2.25 |
| 40 | 23 | 20.7 | 5.75 |
| 50 | 35 | 31.5 | 8.75 |
| 65 | 60 | 54 | 15 |
| 80 | 90 | 81 | 22.5 |
| 100 | 140 | 126 | 35 |
| 125 | 220 | 198 | 55 |
| 150 | 320 | 288 | 80 |
| 200 | 550 | 495 | 137.5 |
| 250 | 900 | 810 | 225 |
| 300 | 1300 | 1170 | 325 |
| 350 | 1700 | 1530 | 425 |
| 400 | 2250 | 2025 | 562.5 |
| 450 | 2800 | 2520 | 700 |
| 500 | 2800 | 2520 | 700 |
| 600 | 2800 | 2520 | 700 |
| 700 | 6000 | 5400 | 1500 |
| 750 | 6000 | 5400 | 1500 |
| 800 | 6000 | 5400 | 1500 |
| 900 | 6000 | 5400 | 1500 |
| 1000 | 6000 | 5400 | 1500 |
| 1050 | 6000 | 5400 | 1500 |
| 1100 | 6000 | 5400 | 1500 |
| 1200 | 6000 | 5400 | 1500 |
| 1400 | 7000 | 6300 | 1750 |
| 1500 | 7000 | 6300 | 1750 |
| 1600 | 7000 | 6300 | 1750 |
| 1800 | 7000 | 6300 | 1750 |
| 2000 | 7000 | 6300 | 1750 |

### *Technical specifications PROFIBUS PA/DP*

| Technical specifications PROFIBUS PA/DP | |
|---|---|
| **General specifications** | |
| PROFIBUS device profile | 3.00 Class B |
| Certified | No |
| MS0 connections | 1 |
| MS1 connections | 1 |
| MS2 connections | 2 |

### *Electrical specification DP*

| Electrical specification DP | |
|---|---|
| **Physical layer specifications** | |
| Applicable standard | IEC 61158/EN 50170 |
| Physical Layer (Transmission technology) | RS 485 |
| Transmission speed | ≤ 1.5 Mbits/s |
| Number of stations | Up to 32 per line segment, (maximum total of 126) |

| Electrical specification DP | |
|---|---|
| **Cable specification ( Type A)** | |
| Cable design | Two-wire twisted pair |
| Shielding | CU shielding braid or shielding braid and shielding foil |
| Impedance | 35 up to 165 Ω at frequencies from 3 ... 20 MHz |
| Cable capacity | < 30 pF per meter |
| Core diameter | > 0,34 $mm^2$, corresponds to AWG 22 |
| Resistance | < 110 Ω per km |
| Signal attenuation | Max. 9 dB over total length of line section |
| Max. bus length | 200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters |

### *Electrical specification PA*

| Electrical specification PA | |
|---|---|
| **Physical layer specifications** | |
| Applicable standard | IEC 61158/EN 50170 |
| Physical Layer (Transmission technology) | IEC 61158-2 |

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## Technical specifications (continued)

| Electrical specification PA | |
|---|---|
| Transmission speed | 31.25 Kbits/second |
| Number of stations | Up to 32 per line segment, (maximum total of 126) |
| Max. basic current [$I_B$] | 14 mA |
| Fault current [$I_{FDE}$] | 0 mA |
| Bus voltage | 9 ... 32 V (non Ex) |
| **Preferred cable specification (Type A)** | |
| Cable design | Two wire twisted pair |
| Conductor area (nominal) | 0.8 $mm^2$ (AWG 18) |
| Loop resistance | 44 Ω/km |
| Impedance | 100 Ω ± 20 % |
| Wave attenuation at 39 kHz | 3 dB/km |
| Capacitive asymmetry | 2 nF/km |
| Bus termination | Passive line termination at both |
| Max. bus length | Up to 1.9 km. Extendable by repeaters |
| **IS (Intrinsic Safety) data** | |
| Required sensor electronics | Compact or remote mounted SITRANS F M MAG 6000 I Ex |
| FISCO | YES |
| Max. $U_I$ | 17,5 V |
| Max. $I_I$ | 380 mA |
| Max. $P_I$ | 5,32 V |
| Max. $L_I$ | 0 µH |
| Max. $C_I$ | 0 nF |
| **FISCO cable requirements** | |
| Loop resistance $R_C$ | 15 ... 150 Ω/km |
| Loop inductance $L_C$ | 0,4 ... 1 mH/km |
| Capacitance $C_C$ | 80 ... 200 nF/km |
| Max. Spur length in IIC and IIB | 30 m |
| Max. Trunk length in IIC | 1 km |
| Max. Trunk length in IIB | 5 km |

***PROFIBUS parameter support***

The following parameters are accessible using a MS0 relationship from a Class 1 Master. MS0 specifies cyclic Data Exchange between a Master and a Slave.

| Cyclic services | | |
|---|---|---|
| **Input (Master view)** | **Parameter** | **MAG 6000/MAG 6000 I** |
| | Mass flow | |
| | Volume flow | ✓ |
| | Temperature | |
| | Density | |
| | Fraction A | |
| | Fraction B | |
| | Pct Fraction A | |
| | Totalizer 1 | ✓ |
| | Totalizer 2[1)] | ✓ |
| | Batch progress[1)] | ✓ |
| | Batch setpoint | ✓ |
| | Batch compensation | ✓ |
| | Batch status (running ...) | ✓ |
| **Output (Master view)** | Set Totalizer 1+2 | ✓ |
| | Set Mode Totalizer 1+2 | ✓ |
| | Batch control (start, stop ...) | ✓ |
| | Batch setpoint | ✓ |
| | Batch compensation | ✓ |

1) Value returned is dependent on the BATCH function.

When ON, Batch progress is returned.
When OFF, TOTALIZER 2 is returned.

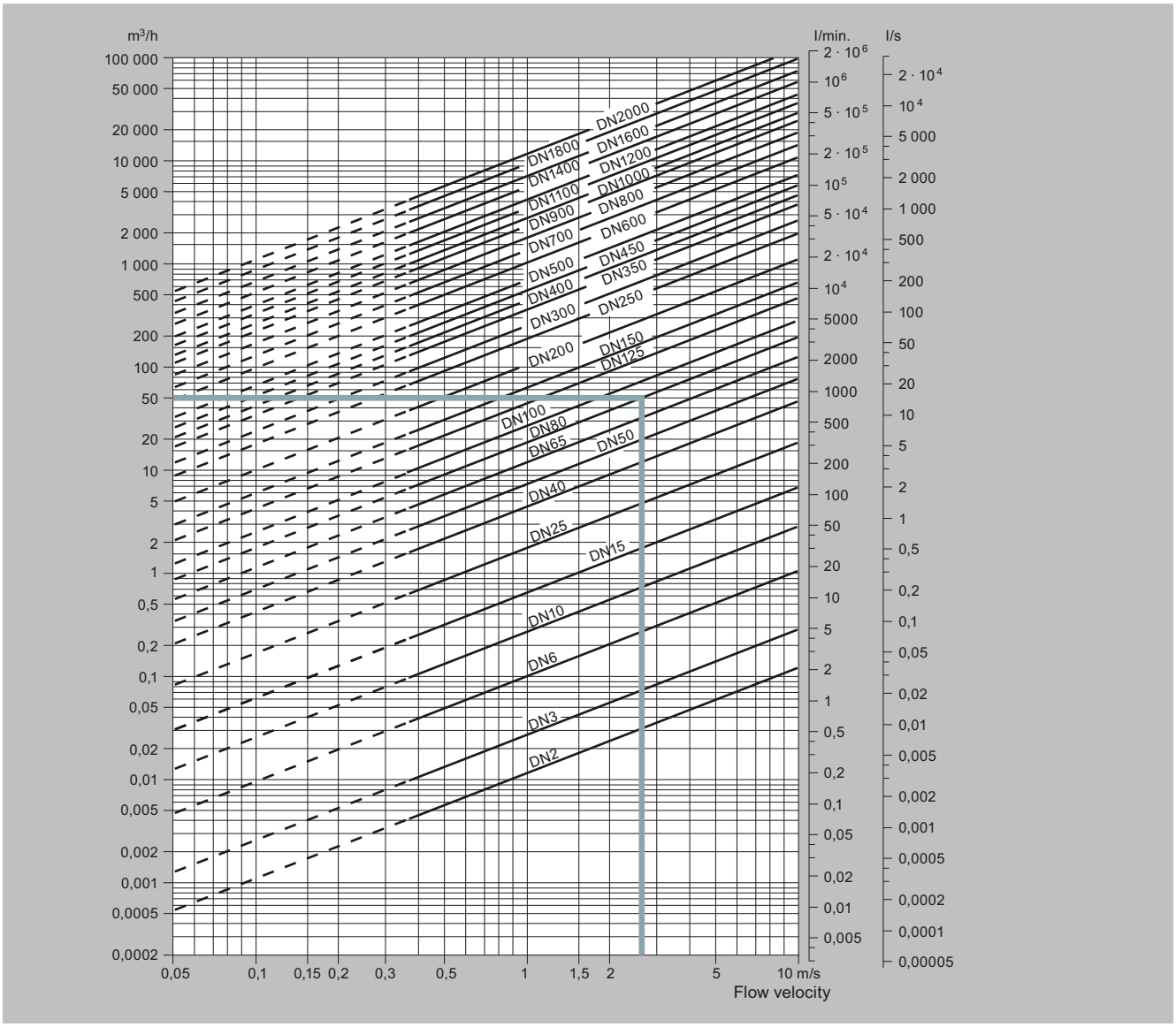
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## Technical specifications (continued)

***Flow and speed chart***

Metric




Sizing table (DN 2 ... DN 2000)

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension DN.

***Guidelines for selection of sensor***

Min. measuring range: 0 ... 0.25 m/s

Max. measuring range: 0 ... 10 m/s

Normally the sensor size is selected so that nominal flow velocity v lies within the measuring range 1 to 3 m/s.

***Example:***

Flow quantity of 50 $m^3/h$ and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

| Flow velocity calculation formula | Units |
|---|---|
| $v = 1273.24 \cdot Q/DN^2$ or | v: [m/s], Q: [l/s], DN: [mm] |
| $v = 353.68 \cdot Q/DN^2$ | v: [m/s], Q: [$m^3/h$], DN: [mm] |

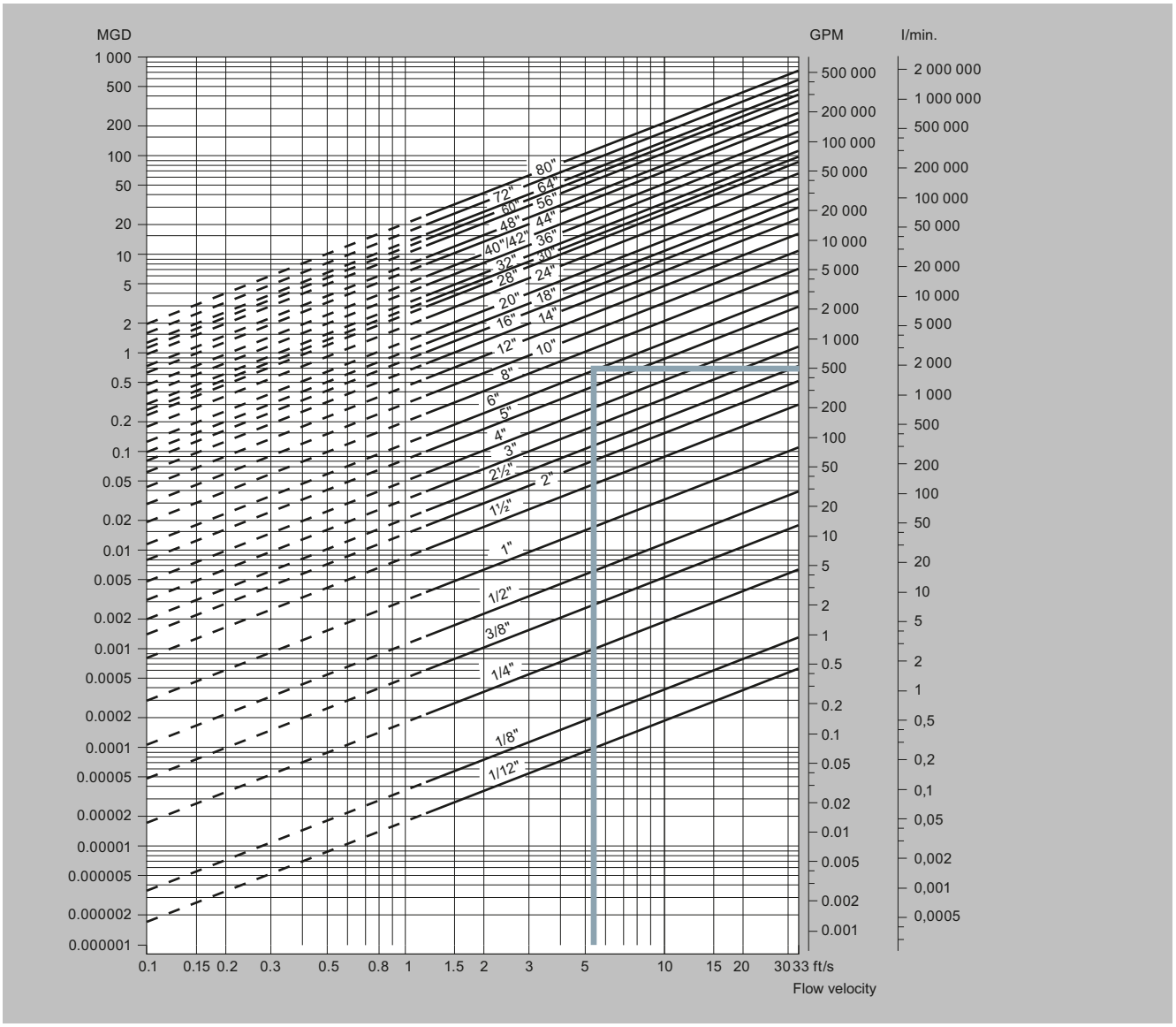
For more information visit:
https://new.siemens.com/global/en/products/automation/process-instrumentation/flow-measurement/electromagnetic.html

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## Technical specifications (continued)

Imperial




Sizing table (1/12" ... 78")

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension size.

***Guidelines for selection of sensor***

Min. measuring range: 0 ... 0.8 ft/s

Max. measuring range: 0 ... 33 ft/s

Normally the sensor size is selected so that nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

***Example:***

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

| Flow velocity calculation formula | Units |
|---|---|
| $v = 0.408 \cdot Q/(\text{Pipe I.D.})^2$ or | v: [ft/s], Q: [GPM], Pipe I.D.: [inch] |
| $v = 283.67 \cdot Q/(\text{Pipe I.D.})^2$ | v: [ft/s], Q: [MGD], Pipe I.D.: [inch] |

For more information visit:
https://new.siemens.com/global/en/products/automation/process-instrumentation/flow-measurement/electromagnetic.html

***Installation conditions***

***Vibrations***

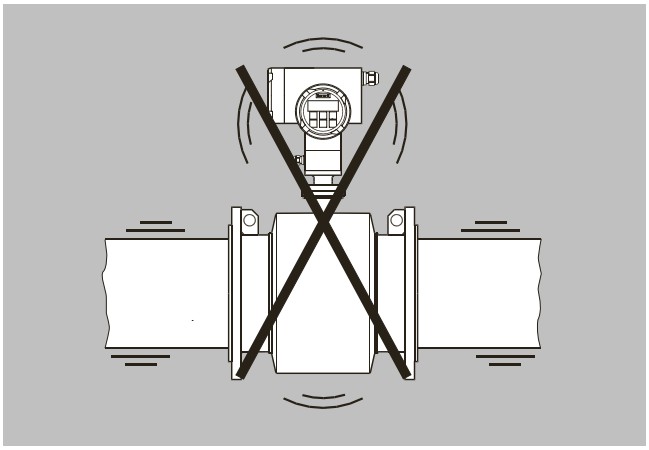
Strong vibrations should be avoided.

In applications with strong vibrations, remote mounting of the transmitter is recommended.

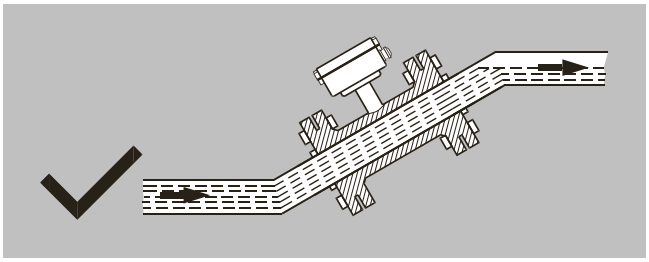
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## Technical specifications (continued)



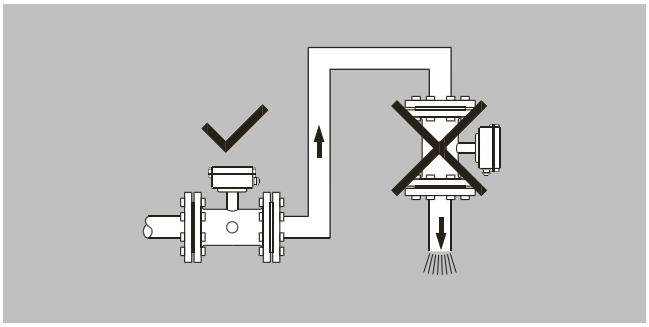
The sensor must always be completely filled with liquid.

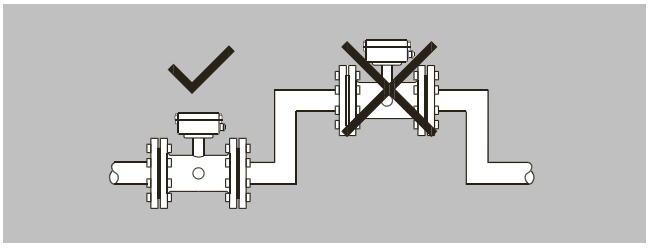


Install in pipelines which are always full

The sensor must always be completely filled with liquid. Therefore avoid:

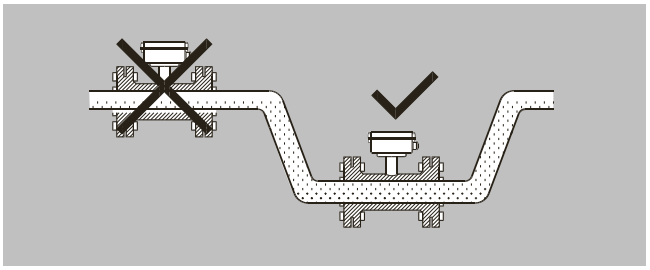
- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet





Do not install in pipelines which can run empty

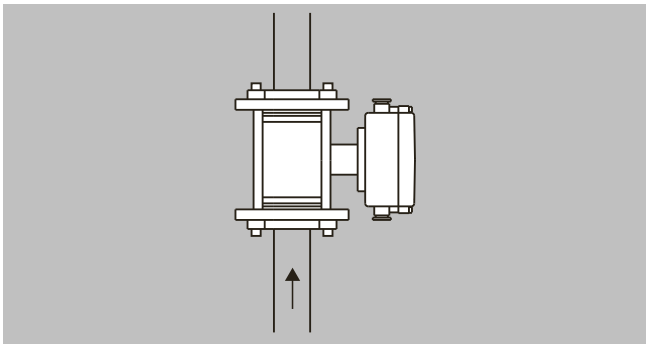
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-Tube.



Install in U-tubes when pipe is partially filled

Installation in vertical pipes

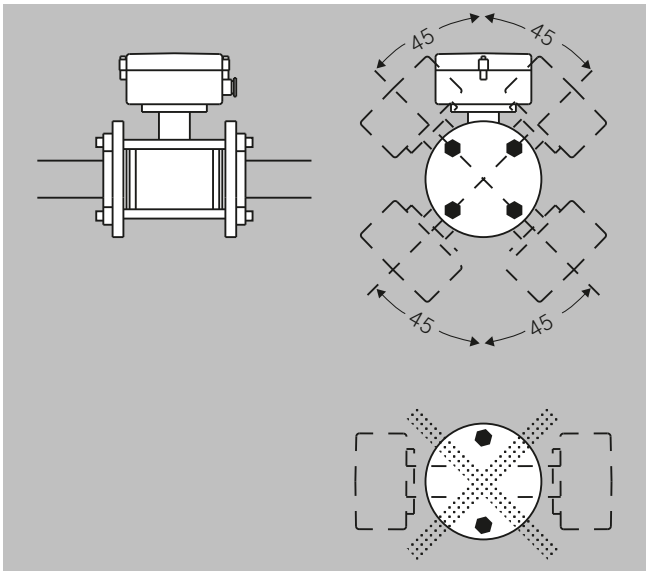
Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.



Install in vertical pipes with upward flow direction

Installation in horizontal pipes

The sensor must be mounted as shown in the below figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.



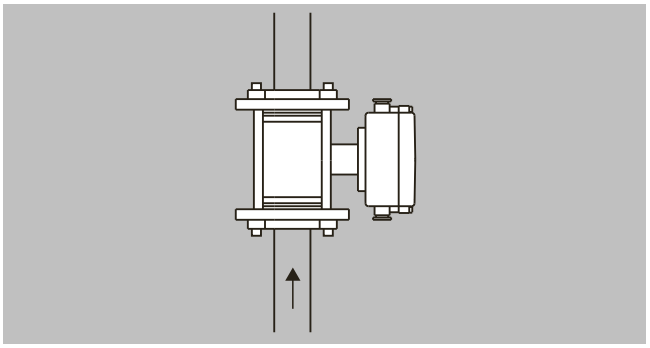
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## Technical specifications (continued)

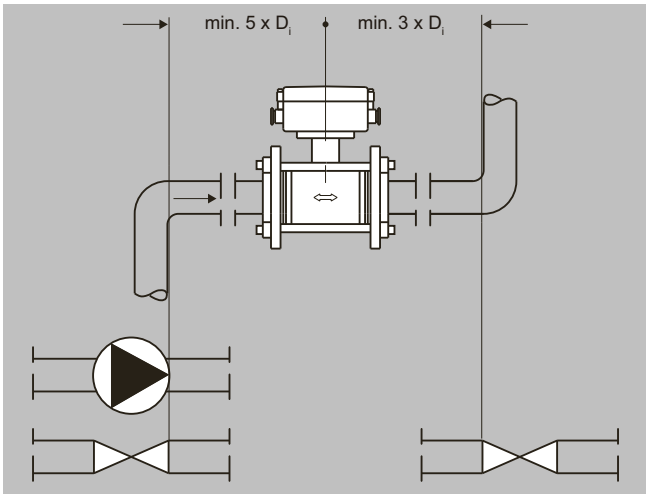
Measuring abrasive liquids and liquids containing particles

Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.



Install in vertical pipelines with upward flow direction if measuring abrasive liquids

Inlet and outlet conditions




Recommended straight pipe lengths up and downstream for installations between elbows, pumps and valves

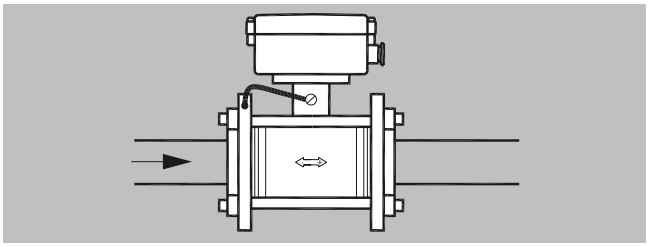
To achieve maximum accurate flow measurement it is essential to have straight pipe lengths up and downstream. For installations with non-optimal piping arrangements MAG 5100W and MAG 8000 still provide acceptable accuracy.

Tested in accordance with OIML R49 in various configurations that do not meet the suggested installation conditions MAG 5100W and MAG 8000 have received the qualification for mounting in zero diameter (0xDN) inlet/outlet installations.

Ambient temperature-Installation

Temperature changes can cause expansion or contraction in the pipe system. To avoid damage on the sensor use of proper gasket and torque should be ensured. For more information see sensor instruction.

Potential equalization

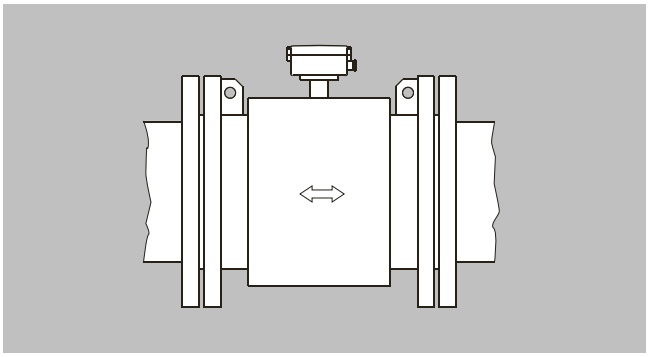


Potential equalization

The electrical potential of the liquid must always be equal to the electrical potential of the sensor. This can be achieved in different ways depending on the application:

- Wire jumper between sensor and adjacent flange (MAG 1100, MAG 3100)
- Direct metallic contact between sensor and fittings (MAG 1100 F)
- Built-in grounding electrodes (MAG 3100, MAG 5100 W)
- Optional grounding/protection flanges/rings (MAG 1100, MAG 3100, MAG 8000)
- Optional graphite gaskets on MAG 1100 (standard for MAG 1100 High Temperature)
- MAG 8000 installed in plastic or coated pipes: two grounding rings to be used.

***Grounding***

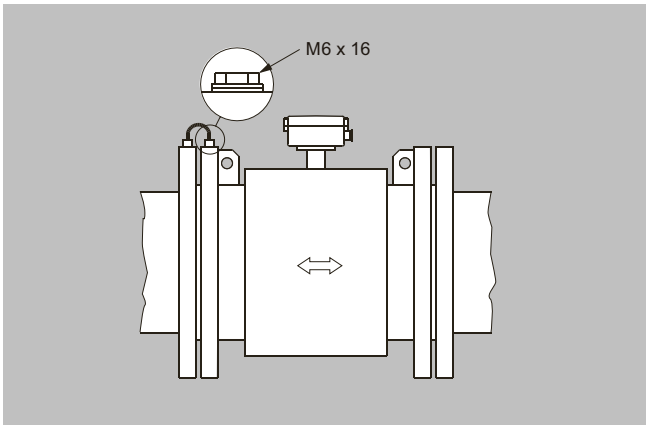


MAG 3100 and MAG 5100 W: with grounding electrodes in conductive and non-conductive pipes (no further action necessary)

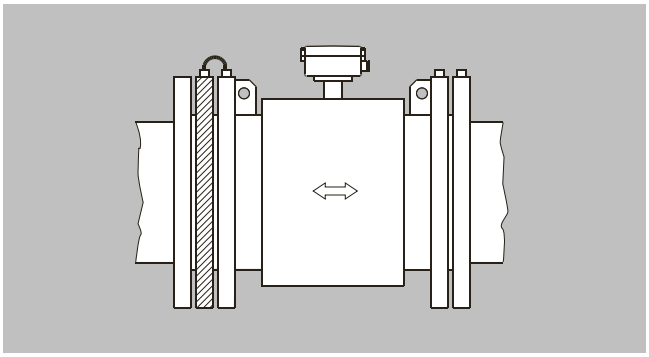
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## Technical specifications (continued)



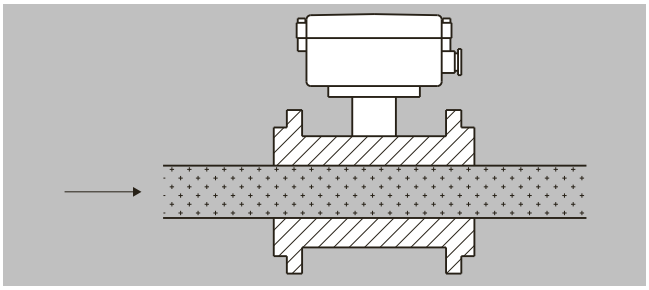

MAG 1100 and MAG 3100; without grounding electrodes in conductive pipes (MAG 1100 use graphite gasket)



Without grounding electrodes in non-conductive pipes use grounding ring(MAG 1100 use graphite gasket)

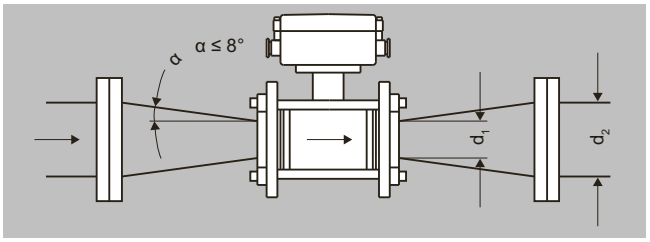
MAG 1100 F grounding via process connections. MAG 8000 grounding see the section about MAG 8000.

Vacuum



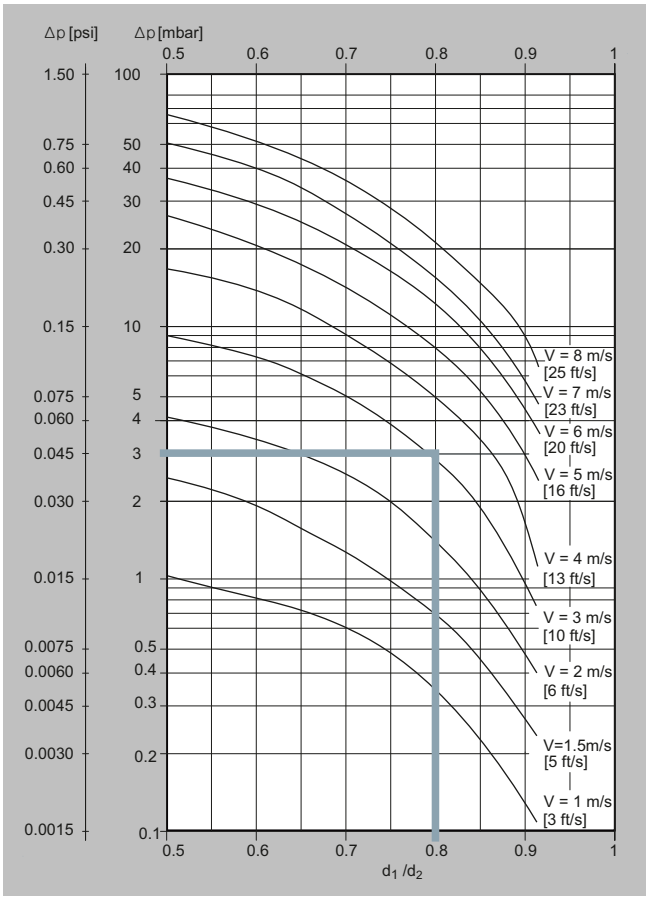
In order to prevent damages of liner when operating meters under vacuum please take note of the information "Operating pressure" given in section "Technical specification".

Installation in large pipes




Reduction in nominal pipe diameter

The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at 8° the following pressure drop curve applies. The curves are applicable to water.




Pressure drop as function of diameter reduction between reducers

Example:

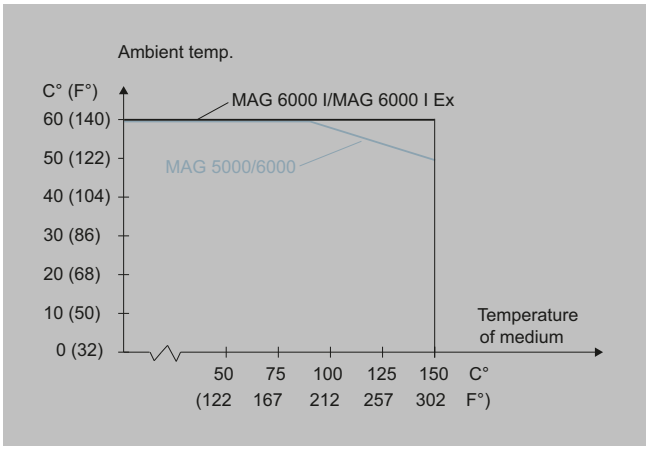
Flow velocity (v) of 3 m/s (10 ft/s) in a sensor with a diameter reduction DN 100 (4") to DN 80 (3") ($d_1/d_2$ = 0.8) gives a pressure drop of 2.9 mbar (0.04 psi).

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## Technical specifications (continued)

Ambient temperature




Max. ambient temperature as a function of temperature of medium

The transmitter can be installed either compact or remote.
With compact installation the temperature of medium must be according to the graph.

***Sensor cables and conductivity of medium***

Compact installation:

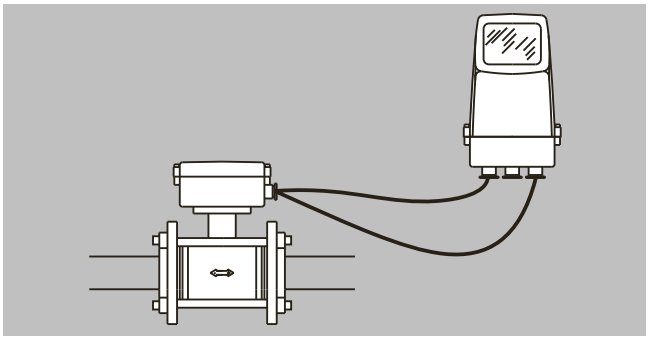
Liquids with an electrical conductivity ≥ 5 µS/cm.

***Note for MAG 1100 sizes DN2 and DN3:***

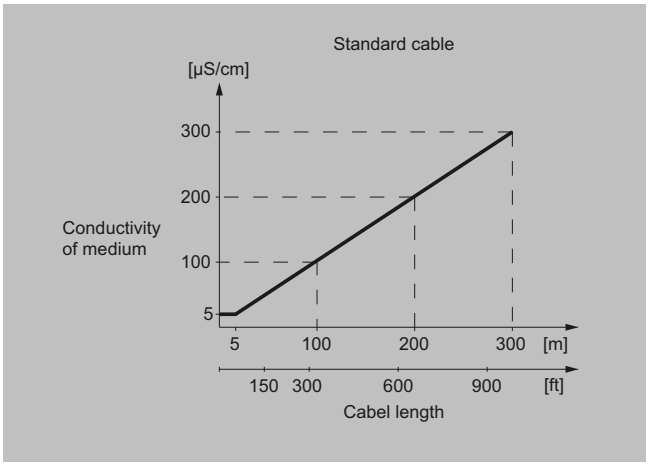
- The media conductivity must be ≥ 30 uS/cm

***Note for MAG 8000:***

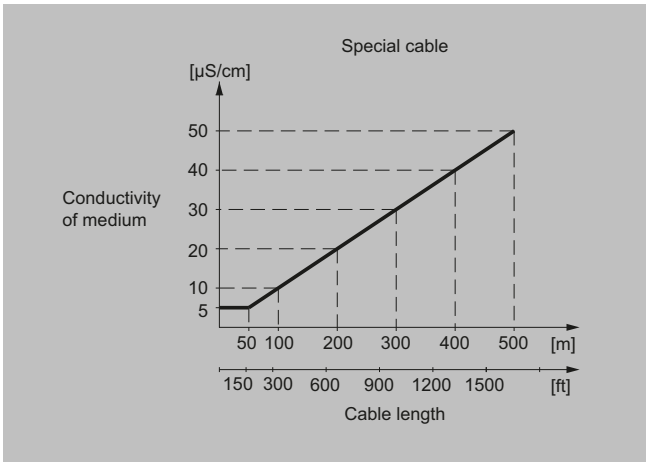
- The media conductivity must be ≥ 20 uS/cm



Remote installation




Minimum conductivity of medium (using standard electrode cable)




Minimum conductivity of medium (using special electrode cable)

***Empty pipe detection***

The installation has to fulfill the following limitations for usage of the empty pipe detection function:

- Media conductivity ≥ 20 µS/cm
- Length of cable at remote installation ≤ 50 m (150 ft)
- Special shield cable must be used

Note for MAG 1100 sizes DN 2 and DN 3:

- Empty pipe detection is not available

Note for MAG 5000/6000 CT:

- Empty pipe detection is not available

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## Overview



The SITRANS FM MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

## Benefits

- Sensor sizes: DN 2 to DN 100 ($^1/_{12}$" to 4")
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (392 °F)
- Hose proof IP67/NEMA 6 enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

## Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

## Design

- Compact or remote mounting possible
- Easy “plug & play” field changeability of transmitter
- Simple on-site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version
- FM Class I Div 2

## Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

## Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS FM MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

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## Selection and ordering data

| Sensor SITRANS FM MAG 1100<br>EPDM gaskets included | Article No.<br>7ME6110- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | A | ● | 0 | - | ● | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Diameter** | | | | | | | | | | |
| DN 2 (1/12") | 1 | D | | | | | | | | |
| DN 3 (1/8") | 1 | H | | | | | | | | |
| DN 6 (¼") | 1 | M | | | | | | | | |
| DN 10 (3/8") | 1 | R | | | | | | | | |
| DN 15 (½") | 1 | V | | | | | | | | |
| DN 25 (1") | 2 | D | | | | | | | | |
| DN 40 (1½") | 2 | R | | | | | | | | |
| DN 50 (2") | 2 | Y | | | | | | | | |
| DN 65 (2½") | 3 | F | | | | | | | | |
| DN 80 (3") | 3 | M | | | | | | | | |
| DN 100 (4") | 3 | T | | | | | | | | |
| **Liner material** | | | | | | | | | | |
| PFA - DN 10 ... 100 (3/8" ... 4") | | | | 1 | | | | | | |
| Ceramic | | | | 2 | | | | | | |
| **Electrode material** | | | | | | | | | | |
| Hastelloy C (only with PFA liner) | | | | | | | 1 | | | |
| Platinum (only with ceramic liner) | | | | | | | 2 | | | |
| **Transmitter** | | | | | | | | | | |
| Standard sensor for remote transmitter (order transmitter separately) | | | | | | | | A | | |
| Ex sensor for remote transmitter (order transmitter separately) | | | | | | | | B | | |
| MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | | | | | | | | C | | |
| MAG 6000 I, Aluminum 18 ... 30 V DC, Ex | | | | | | | | D | | |
| MAG 6000 I, Aluminum, 18 ... 90 V DC,115 ... 230 V AC (non-Ex) | | | | | | | | F | | |
| MAG 6000 I, Aluminum 115 ... 230 V AC, Ex | | | | | | | | E | | |
| MAG 6000 Polyamide, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | H | | |
| MAG 6000, Polyamide, 115 ... 230 V AC | | | | | | | | J | | |
| MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | K | | |
| MAG 5000, Polyamide, 115 ... 230 V AC | | | | | | | | L | | |
| **Communication** | | | | | | | | | | |
| No communication, add-on possible | | | | | | | | | A | |
| HART | | | | | | | | | B | |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | | | | | | | | | F | |
| PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) | | | | | | | | | G | |
| Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) | | | | | | | | | E | |
| FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) | | | | | | | | | J | |
| **Cable glands/terminal box** | | | | | | | | | | |
| Metric: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 1 |
| ½" NPT: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 2 |
| Metric: Stainless steel terminal box | | | | | | | | | | 3 |
| ½" NPT: Stainless steel terminal box | | | | | | | | | | 4 |

1) Quick ship only in combination with Ceramic liner

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Special calibration** | |
| 5-point calibration[1] | **D01** |
| 10-point calibration[2] | **D06** |

| | Order code |
|---|---|
| Default (2 × 25 % and 2 × 90 %) matched-pair calibration | **D11** |
| 5-point, matched-pair calibration[1] | **D15** |
| 10-point, matched-pair calibration[2] | **D18** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Country specific label** | |
| CRN (Canadian Registration Number) | **H25** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |

| | Order code |
|---|---|
| **Additional calibrations** | |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [3] |
| Customer-specified calibration up to 10 points | ***On request*** [3] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [3] |

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
3) Product Variation Request (PVR)

| **Sensor SITRANS FM MAG 1100 HT High Temperature<br>Ceramic liner, Platinum electrode, Graphite gaskets included** | **Article No.<br>7ME6120-** ● | ● | A | 2 | 0 | - | 2 | ● | A | ● |
|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Diameter** | | | | | | | | | | |
| DN 15 (½") | **1** | **V** | | | | | | | | |
| DN 25 (1") | **2** | **D** | | | | | | | | |
| DN 40 (1½") | **2** | **R** | | | | | | | | |
| DN 50 (2") | **2** | **Y** | | | | | | | | |
| DN 80 (3") | **3** | **M** | | | | | | | | |
| DN 100 (4") | **3** | **T** | | | | | | | | |
| **Transmitter** | | | | | | | | | | |
| Standard sensor for remote transmitter (order transmitter separately) | | | | | | | | **A** | | |
| Ex sensor for remote transmitter (order transmitter separately) | | | | | | | | **B** | | |
| Cable glands/terminal box | | | | | | | | | | |
| Metric: Stainless steel terminal box | | | | | | | | | | **3** |
| ½" NPT: Stainless steel terminal box | | | | | | | | | | **4** |

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Special calibration** | |
| 5-point calibration[1] | **D01** |
| 10-point calibration[2] | **D06** |
| Default (2 × 25 % and 2 × 90 %) matched-pair calibration | **D11** |
| 5-point, matched-pair calibration[1] | **D15** |
| 10-point, matched-pair calibration[2] | **D18** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Tag name plate** | |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |

| | Order code |
|---|---|
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |
| **Additional calibrations** | |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [3] |
| Customer-specified calibration up to 10 points | ***On request*** [3] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [3] |

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
3) Product Variation Request (PVR)

| Description | Article No. |
|---|---|
| • English | **A5E02435647** |

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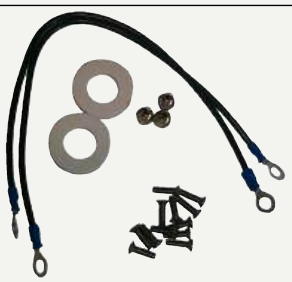


## Selection and ordering data (continued)

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Potting kit for IP68/ NEMA 6P sealing of sensor junction box** | **FDK:085U0220** |  |

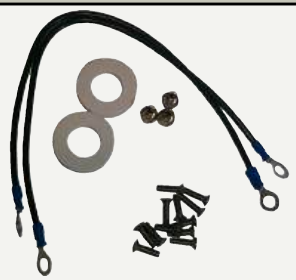
### *Accessories for MAG 1100 sensor*

| Description | Article No. | |
|---|---|---|
| **Pipe connection ½" external thread** | |  |
| For DN 2 ... 10 (1/12" ... 3/8") sensor<br>Material: Stainless steel AISI 316L 2 pcs. pipe connections, 2 pcs. EPDM gaskets, 12 pcs. M4×12 screws | | |
| • R½" ISO 7-1 tapered thread | **FDK:083G0080** | |
| • ½" NPT thread | **FDK:083G4330** | |
| For DN 2 ... 10 (1/12" ... 3/8") sensor<br>Material: Hastelloy C, 2 pcs. pipe connections, 2 pcs. PTFE gaskets, 12 pcs. M4x12 screws | | |
| • R½" ISO 7-1 tapered thread | **FDK:083G4332** | |
| • ½" NPT thread | **FDK:083G4331** | |
| For DN 2 ... 10 (1/12" ... 3/8") sensor<br>Material PVDF (Kynar 1000) 2 pcs. pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 pc. grounding ring [1], 1 pc. grounding wire, 3 pcs. PTFE gaskets, 2 pcs. space rings, 6 pcs. M4×12 and 6 pcs. M4×20 screws | | |
| • G½" ISO 7-1 tapered thread incl. grounding ring | **A5E01018395** | |
| • ½" NPT thread incl. grounding ring | **A5E01018400** | |
| **EPDM gaskets**<br>Material: EPDM; each set includes: 2 pcs. EPDM gaskets, 1 pc. grounding wire, 1 pc. M6 screw, 1 pc. nut, 1 pc. washer, 1 pc. bolt grounding plate | |  |
| • DN 2 ... 10 (1/12" ... 3/8") | **FDK:083G3116** | |
| • DN 15 (½") | **FDK:083G3117** | |
| • DN 25 (1") | **FDK:083G3119** | |
| • DN 40 (1½") | **FDK:083G3121** | |
| • DN 50 (2") | **FDK:083G3122** | |
| • DN 65 (2½") | **FDK:083G3123** | |
| • DN 80 (3") | **FDK:083G3124** | |
| • DN 100 (4") | **FDK:083G3125** | |
| **PTFE gaskets**<br>Material: PTFE; each set includes: 2 pcs. gaskets, 2 pcs. grounding wires, 3 pcs. M6 screws (DN 2 ... 10: 12 pcs. M4×14) | |  |
| • DN 2 ... 10 (1/12" ... 3/8") | **FDK:083G0156** | |
| • DN 15 (½") | **FDK:083G0157** | |
| • DN 25 (1") | **FDK:083G0159** | |
| • DN 40 (1½") | **FDK:083G0161** | |
| • DN 50 (2") | **FDK:083G0162** | |
| • DN 65 (2½") | **FDK:083G0163** | |
| • DN 80 (3") | **FDK:083G0164** | |

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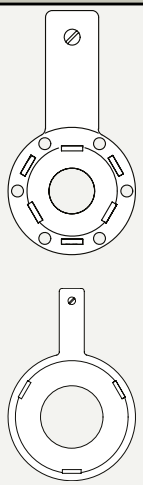
## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • DN 100 (4") | FDK:083G0165 |  |
| **Graphite gaskets**<br>Material: Graphite; conductive, each set includes: 2 pcs. gaskets (can also be used as grounding ring) | |  |
| • DN 2 ... 10 (1/12" ... 3/8") | FDK:083G0116 | |
| • DN 15 (½") | FDK:083G0117 | |
| • DN 25 (1") | FDK:083G0119 | |
| • DN 40 (1½") | FDK:083G0121 | |
| • DN 50 (2") | FDK:083G0122 | |
| • DN 65 (2½") | FDK:083G0123 | |
| • DN 80 (3") | FDK:083G0124 | |
| • DN 100 (4") | FDK:083G0125 | |
| **Grounding ring (stainless steel)**<br>Material: AISI 316L/1.4404; each set includes: 1 pc. grounding ring[1)], 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw | |  |
| • DN 2 ... 10 (1/12" ... 3/8") | FDK:083G0686 | |
| • DN 15 (½") | FDK:083G0687 | |
| • DN 25 (1") | FDK:083G0689 | |
| • DN 40 (1½") | FDK:083G0691 | |
| • DN 50 (2") | FDK:083G0692 | |
| • DN 65 (2½") | FDK:083G0693 | |
| • DN 80 (3") | FDK:083G0694 | |
| • DN 100 (4") | FDK:083G0695 | |
| **Grounding ring (Hastelloy C)**<br>Material: Hastelloy C22/2.4602; each set includes: 1 pc. grounding ring[1)], 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw | |  |
| • DN 2 ... 10 (1/12" ... 3/8") | FDK:083G3256 | |
| • DN 15 (½") | FDK:083G3257 | |
| • DN 25 (1") | FDK:083G3259 | |
| • DN 40 (1½") | FDK:083G3261 | |
| • DN 50 (2") | FDK:083G3262 | |
| • DN 65 (2½") | FDK:083G3263 | |
| • DN 80 (3") | FDK:083G3264 | |
| • DN 100 (4") | FDK:083G3265 | |
| **Grounding ring (Tantalum)**<br>Material: Tantalum; each set includes: 1 pc. grounding ring[1)], 3 pcs. PTFE gaskets, 1 pc. earth wire, 1 pc. M6 screw | | |
| • DN 2 ... 10 (1/12" ... 3/8") | A5E01181599 | |
| • DN 15 (½") | A5E01181606 | |
| • DN 25 (1") | A5E01181610 | |
| • DN 40 (1½") | A5E01181613 | |
| • DN 50 (2") | A5E01181615 | |
| • DN 65 (2½") | A5E01181616 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • DN 80 (3") | A5E01181619 |  |
| • DN 100 (4") | A5E01181622 |  |
| **Studs and nuts**<br>For DN 100 PN 25/40, 8 pcs. M20 studs, 16 pcs. M20 nuts<br>Material: AISI 304/1.4305 | | |
| • DN 100 (4") | FDK:083G0226 |  |

1) Thickness of grounding ring is 2 mm (0.08 inch)

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## Technical specifications

| Version | MAG 1100 | MAG 1100 HT (High Temperature) |
|---|---|---|
| Measuring principle | Electromagnetic induction | Electromagnetic induction |
| Excitation frequency (mains supply: 50 Hz/60 Hz) | DN 2 ... 65 (1/12" ... 2½"): 12.5 Hz/15 Hz<br>DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz | DN 15 ... 50 (½" ... 2"): 12.5 Hz/15 Hz<br>DN 80, 100 (3", 4"): 6.25 Hz/7.5 Hz |
| **Process connection** | | |
| Nominal size | | |
| • MAG 1100 (Ceramic) | DN 2 ... 100 (1/12" ... 4") | DN 15 ... 100 (½" ... 4") |
| • MAG 1100 (PFA) | DN 10 ... 100 (3/8" ... 4") | |
| Mating flanges | EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent<br>Option:<br>DN 2 ... 10 (1/12" ... 3/8"): G½"/1/2" NPT pipe connection adapters | EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent |
| **Rated operating conditions** | | |
| ***Ambient conditions*** | | |
| Ambient temperature | | |
| • Standard sensor | -40 ... +100 °C (-40 ... +212 °F) | -40 ... +100 °C (-40 ... +212 °F) |
| • Ex sensor | -20 ... +60 °C (-4 ... +140 °F) | -20 ... +60 °C (-4 ... +140 °F) |
| • Compact with transmitter MAG 5000/6000 | -20 ... +60 °C (-4 ... +140 °F) | |
| • Compact with transmitter MAG 6000 I [1)] | -20 ... +60 °C (-4 ... +140 °F) | |
| • Compact with transmitter MAG 6000 I Ex [1)] | -20 ... +60 °C (-4 ... 140 °F) | |
| ***Temperature of medium*** | | |
| • MAG 1100 (Ceramic) | -20 ... +150 °C (-4 ... +302 °F) | -20 ... +200 °C (-4 ... +392 °F) |
| • MAG 1100 Ex (Ceramic) | -20 ... +150 °C (-4 ... +302 °F) | -20 ... +180 °C (-4 ... +356 °F) |
| • MAG 1100 (PFA) | -30 ... +130 °C (-22 ... +266 °F)<br>Suitable for steam sterilization at 150 °C (302 °F) | |
| ***Temperature shock*** | | |
| • MAG 1100 (Ceramic) | | |
| • Duration ≤ 1 min, followed by 10 min rest | • DN 2, 3 (1/12", 1/8") No limitations | • DN 15, 25: Max. ΔT ≤ 80 °C/min (½", 1": Max. ΔT ≤ 144 °F/min) |
| | • DN 6, 10, 15, 25: Max. ΔT ≤ 80 °C/min (¼", 3/8", ½", 1": Max. ΔT ≤ 144 °F/min) | • DN 40, 50: Max. ΔT ≤ 70 °C/min (1½", 2": Max. ΔT ≤ 126 °F/min) |
| | • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½", 2", 2½": Max. ΔT ≤ 126 °F/min) | • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min) |
| | • DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min) | |
| • MAG 1100 (PFA) | Max. ± 100 °C (212 °F) momentarily | |
| ***Operating pressure*** | | |
| • MAG 1100 (Ceramic) | • DN 2 ... 65: 40 bar (1/12" ... 2½": 580 psi) | • DN 15 ... 50: 40 bar (½" ... 2": 580 psi) |
| | • DN 80: 37.5 bar (3": 540 psi) | • DN 80: 37.5 bar (3": 540 psi) |
| | • DN 100: 30 bar (4": 435 psi) | • DN 100: 30 bar (4": 435 psi) |
| | Vacuum: 1 x $10^{-6}$ $bar_{abs}$ (1.5 - x $10^{-5}$ $psi_{abs}$) | Vacuum: 1 x $10^{-6}$ $bar_{abs}$ (1.5 - x $10^{-5}$ $psi_{abs}$) |

## Technical specifications (continued)

| Version | MAG 1100 | MAG 1100 HT (High Temperature) |
|---|---|---|
| • MAG 1100 (PFA) | 20 bar (290 psi)<br>Vacuum: 0.02 $bar_{abs}$ (0.3 $psi_{abs}$)<br>DN 80 ... 100: $CO_2$ pressure max. 7 bar (101.5 psi) | |
| ***Mechanical load (vibration)*** | • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36<br>• Sensor: 3.17 g RMS<br>• Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS<br>• Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS<br>• For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part. | • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36<br>• Sensor: 3.17 g RMS |
| ***Enclosure rating (standard)*** | IP67 to EN 60529 (NEMA 6), 1 $mH_2O$ for 30 min | IP67 to EN 60529 (NEMA 6), 1 $mH_2O$ for 30 min |
| EMC | 2014/30/EU | 2014/30/EU |
| **Design** | | |
| Weight | See Dimensional drawings | See Dimensional drawings |
| ***Material*** | | |
| • Enclosure | | |
| - MAG 1100 | Stainless steel AISI 316L/1.4404 | Stainless steel AISI 316L/1.4404 |
| • Terminal box | | |
| - Standard | Fibre glass reinforced polyamide (not for Ex) | Stainless steel AISI 316/1.4436 |
| - Option | Stainless steel AISI 316/1.4436 | |
| • Fixing studs | Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001 | Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001 |
| • Gaskets | | |
| - Standard | EPDM (max. 150 °C, PN 40 (max. 302 °F, 600 psi)) | Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi)) |
| - Option | • Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))<br>• PTFE (max. 130 °C, PN 25 (max. 266 °F, 300 psi)) | |
| • Pipe connection adapters: DN 2, 3, 6 and 10 (1/12", 1/8", ¼" and 3/8") | • Stainless steel, AISI 316 /1.4436<br>• Hastelloy C22/2.4602<br>• PVDF | |
| **Liner** | | |
| • MAG 1100 (Ceramic) | • DN 2, 3 (1/12", 1/8"): Zirconium oxide ($ZrO_2$) (ceramic)<br>• DN 6 ... 100 (¼" ... 4"): Aluminum oxide $Al_2O_3$ | DN 15 ... 100 (½", 4"): Aluminum oxide $Al_2O_3$ |
| • MAG 1100 (PFA) | Reinforced PFA (not for Ex) | |
| **Electrodes** | | |
| • MAG 1100 (Ceramic) | • DN 10 ... 100 (3/8" ... 4"): Platinum with gold/Titanium brazing alloy<br>• DN 2 ... 6 (1/12" ... ¼"): Platinum | Platinum with gold/Titanium brazing alloy |

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## Technical specifications (continued)

| Version | MAG 1100 | MAG 1100 HT (High Temperature) |
|---|---|---|
| • MAG 1100 (PFA) | • DN 10 ... 15 (3/8" ... ½"): Hastelloy C276/2.4819<br>• DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602 | |
| **Cable entries** | • Remote installation 2 x M20 or 2 x ½" NPT<br>• Compact installation<br>- MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT<br>- MAG 6000 I: 2 x M25 (for supply/output)<br>- MAG 6000 I Ex: 2 x M25 (for supply/output) | Remote installation 2 x M20 or 2 x ½" NPT |
| **Certificates and approvals** | | |
| Calibration | | |
| • Default calibration | Zero-point, 2 x 25 %, 2 x 90 % | Zero-point, 2 x 25 %, 2 x 90 % |
| • Special calibration | 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$<br>10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$<br>Matched-pair calibration: default, 5-point or 10-point | |
| Hazardous areas | | |
| • MAG 1100 F (Ceramic) | | |
| - Ex-sensor in compact or remote version with MAG 6000 I Ex | • ATEX, EAC Ex<br>- Zone 1 Ex d e ia IIB T6 Gb<br>• ATEX<br>- Zone 21 Ex tD A21 IP67 | • ATEX, EAC Ex<br>- Zone 1 Ex d e ia IIB T6 Gb<br>• ATEX<br>- Zone 21 Ex tD A21 IP67 |
| - Standard sensor in compact or remote version with MAG 5000/6000/6000 I | • FM<br>- NI Class I Div. 2 Groups A, B, C, D | • FM<br>- NI Class I Div. 2 Groups A, B, C, D |
| • MAG 1100 F (PFA) | | |
| - Standard sensor in compact or remote version with MAG 5000/6000/6000 I | • FM<br>- NI Class I Div. 2 Groups A, B, C, D | |
| Pressure equipment | • PED – 2014/68/EU<br>• CRN (only PFA) | • PED – 2014/68/EU |
| Others | • EAC (Kazakhstan) | • EAC (Kazakhstan) |

1) With HART communication max. ambient temperature 50 °C (122 °F).

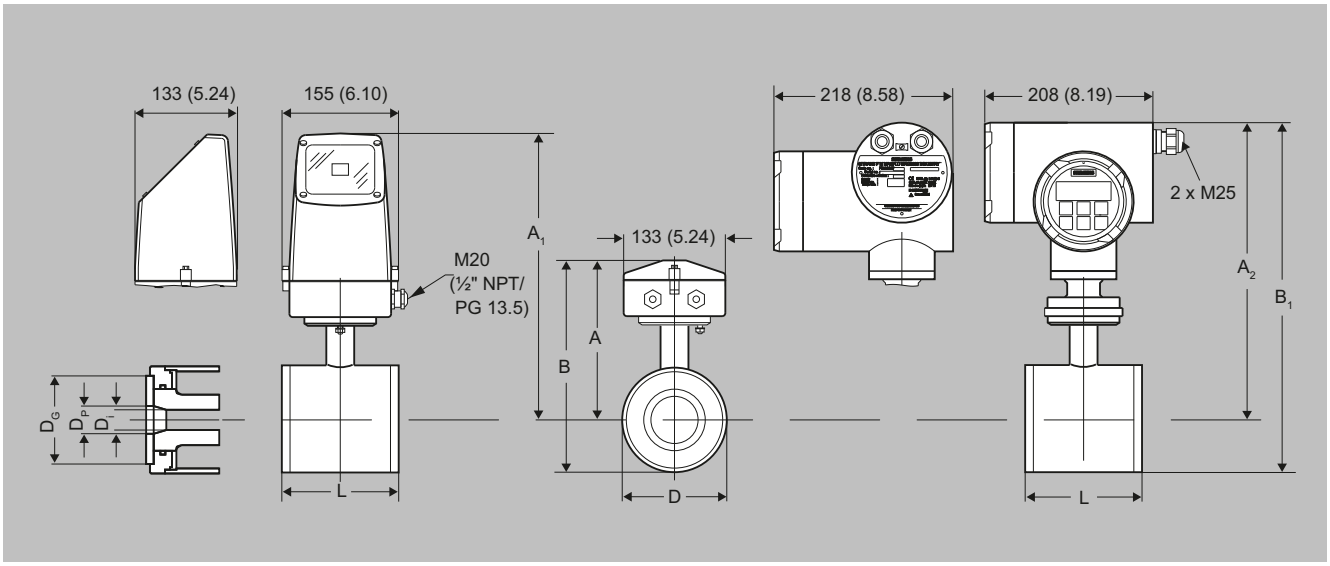
For technical specification for transmitter - please see section about transmitters.

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## Dimensional drawings

***Sensor MAG 1100, compact/remote***




Dimensions in mm (inch)

***Important note: For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part***

| Size DN | A[1] [mm] | B[1] [mm] | $A_1/A_2$ [3] [mm] | $B_1$ [mm] | D [mm] | $D_i$ [mm] | $D_i$ (PFA) [mm] | $D_P$ [mm] | $D_G$ [mm] | Weight[2] [kg] |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 161 | 186 | 315 | 340 | 48.7 | 2 | | 17.3 | 34 | 2.2 |
| 3 | 161 | 186 | 315 | 340 | 48.7 | 3 | | 17.3 | 34 | 2.2 |
| 6 | 161 | 186 | 315 | 340 | 48.7 | 6 | | 17.3 | 34 | 2.2 |
| 10 | 161 | 186 | 315 | 340 | 48.7 | 10 | 10 | 13.6 | 34 | 2.2 |
| 15 | 161 | 186 | 315 | 340 | 48.7 | 15 | 16 | 17.3 | 40 | 2.2 |
| 25 | 169 | 201 | 323 | 354 | 63.5 | 25 | 26 | 28.5 | 56 | 2.7 |
| 40 | 179 | 221 | 333 | 375 | 84.0 | 40 | 38 | 43.4 | 75 | 3.4 |
| 50 | 188 | 239 | 342 | 393 | 101.6 | 50 | 50 | 54.5 | 90 | 4.2 |
| 65 | 198 | 258 | 351 | 412 | 120.9 | 65 | 66 | 68.0 | 112 | 5.5 |
| 80 | 204 | 270 | 357 | 424 | 133.0 | 80 | 81 | 82.5 | 124 | 7.0 |
| 100 | 217 | 296 | 370 | 450 | 159.0 | 100 | 100 | 107.1 | 150 | 10.0 |

| Size [inch] | A[1] [inch] | B[1] [inch] | $A_1/A_2$ [3] [inch] | $B_1$ [inch] | D [inch] | $D_i$ [inch] | $D_i$ (PFA) [inch] | $D_P$ [inch] | $D_G$ [inch] | Weight[2] [lbs] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/12 | 6.34 | 7.33 | 12.40 | 13.39 | 1.92 | 0.08 | | 0.68 | 1.34 | 4.8 |
| 1/8 | 6.34 | 7.33 | 12.40 | 13.39 | 1.92 | 0.12 | | 0.68 | 1.34 | 4.8 |
| ¼ | 6.34 | 7.33 | 12.40 | 13.39 | 1.92 | 0.24 | | 0.68 | 1.34 | 4.8 |
| 3/8 | 6.34 | 7.33 | 12.40 | 13.39 | 1.92 | 0.39 | 0.39 | 0.53 | 1.34 | 4.8 |
| ½ | 6.34 | 7.33 | 12.40 | 13.39 | 1.92 | 0.59 | 0.63 | 0.68 | 1.57 | 4.8 |
| 1 | 6.66 | 7.92 | 12.72 | 13.94 | 2.50 | 0.98 | 1.02 | 1.12 | 2.20 | 5.9 |
| 1½ | 7.05 | 8.70 | 13.11 | 14.76 | 3.31 | 1.57 | 1.50 | 1.71 | 2.95 | 7.5 |
| 2 | 7.40 | 9.41 | 13.47 | 15.47 | 4.00 | 1.97 | 1.97 | 2.15 | 3.54 | 9.2 |
| 2½ | 7.80 | 10.16 | 13.82 | 16.22 | 4.76 | 2.56 | 2.60 | 2.68 | 4.41 | 12 |
| 3 | 8.03 | 10.63 | 14.06 | 16.70 | 5.24 | 3.15 | 3.19 | 3.25 | 4.88 | 15 |
| 4 | 8.54 | 11.65 | 14.57 | 17.72 | 6.26 | 3.94 | 3.94 | 4.22 | 5.91 | 22 |

1) 14.5 mm (0.571") shorter when the stainless steel terminal box is used (Ex or high temperature 200 °C (392 °F) version).
2) With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb). With MAG 6000 I weight is increased with 5.5 kg (12.1 lbs).
3) $A_2$ is 3 mm (0.12") shorter than $A_1$

The total built-in length "L" [mm]/[inch] before assembling depends on the gasket selected.

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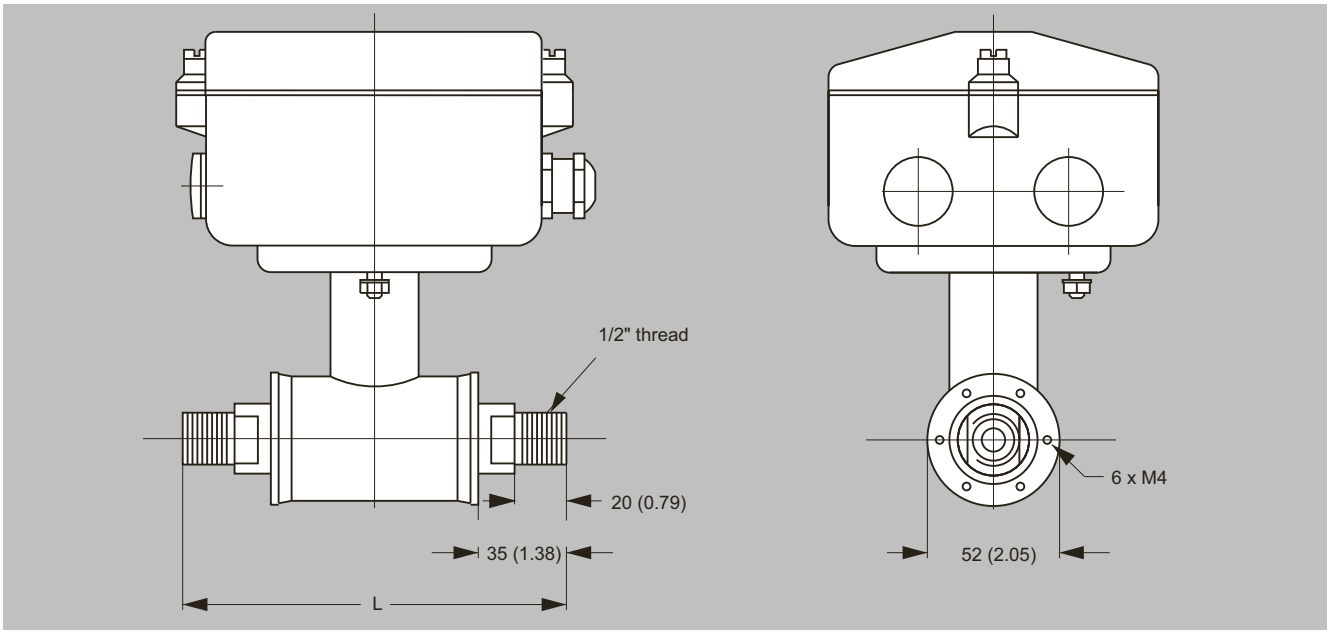


## Dimensional drawings (continued)

| Size | | EPDM | | Graphite | | PTFE (Teflon) | | Without gasket | | Grounding ring | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | Inch | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 2 ... 10 [1] | $^1/_{12}$ ... $^3/_8$ | 64 | 2.52 | 66 | 2.60 | 70 | 2.75 | 64 | 2.52 | 77 | 3.03 |
| 15 | ½ | 65 | 2.56 | 66 | 2.60 | 70 | 2.75 | 64 | 2.52 | 77 | 3.03 |
| 25 | 1 | 80 | 3.15 | 81 | 3.19 | 85 | 3.35 | 79 | 3.10 | 92 | 3.62 |
| 40 | 1½ | 95 | 3.74 | 96 | 3.78 | 100 | 3.94 | 94 | 3.70 | 107 | 4.21 |
| 50 | 2 | 105 | 4.13 | 106 | 4.17 | 110 | 4.33 | 104 | 4.05 | 117 | 4.61 |
| 65 | 2½ | 130 | 5.12 | 131 | 5.15 | 135 | 5.31 | 129 | 5.05 | 142 | 5.60 |
| 80 | 3 | 155 | 6.10 | 156 | 6.14 | 160 | 6.30 | 154 | 6.00 | 167 | 6.57 |
| 100 | 4 | 185 | 7.28 | 186 | 7.31 | 190 | 7.48 | 184 | 7.20 | 197 | 7.76 |

[1] Mounting between two flanges

Sensor MAG 1100 DN 2 ... 10 ($^1/_{12}$" ... $^3/_8$") with adapters




The MAG 1100 DN 2, 3, 6 and 10 ($^1/_{12}$", $^1/_8$", ¼" and $^3/_8$") are prepared for assembly with the ½" pipe connections. Dimensions in mm (inch)

The length "L" varies dependent on the gasket choice.

| Stainless steel and Hastelloy pipe connections | | | | | | | | PVDF pipe connections | |
|---|---|---|---|---|---|---|---|---|---|
| Without gasket | | EPDM | | Graphite | | PTFE | | PTFE | |
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 150 | 5.9 | 150 | 5.9 | 152 | 6.0 | 156 | 6.1 | 133 | 5.2 |

***Important note:***
***For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.***

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## Overview



The electromagnetic sensor SITRANS FM MAG 1100 F is designed to meet applications in the food and beverage industry.

## Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval
- Sanitary design for CIP/SIP cleaning
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 6 enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

## Application

The main applications of the SITRANS FM electromagnetic sensors can be found in the following fields:

- Food industry
- Beverage industry
- Pharmaceutical industry

## Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy “plug & play” field changeable
- Simple on-site upgrade to IP68/NEMA 6P terminal box
- ATEX 2G D version for hazardous areas (ceramic liner)

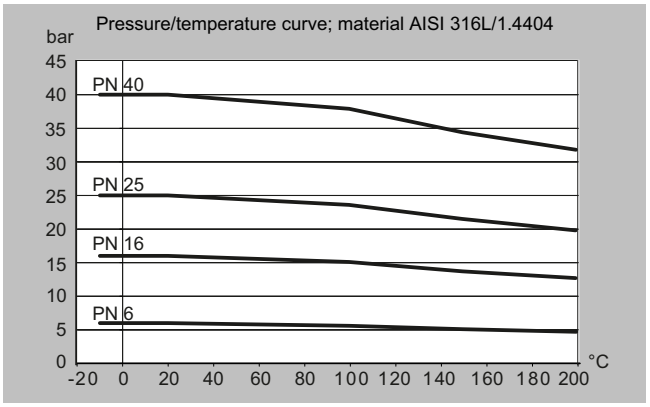
## Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

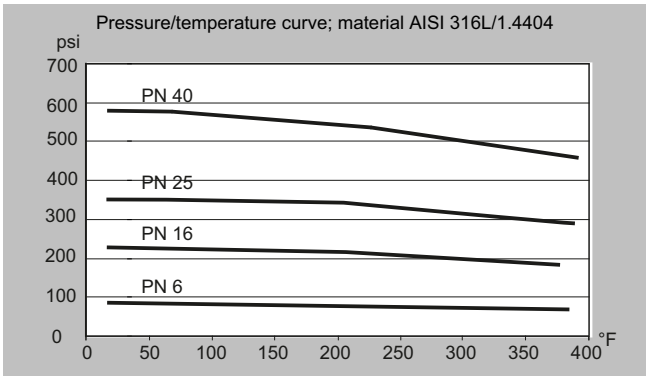
## Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS FM MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, Modbus RTU/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

***Pressure/temperature curve; material AISI 316L/1.4404***




***Pressure/temperature curve; material AISI 316L/1.4404***



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## Selection and ordering data

| Sensor SITRANS FM MAG 1100 F | Article No. 7ME6140- ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Diameter** | |
| DN 10 (3/8") | 1 R |
| DN 15 (½") | 1 V |
| DN 25 (1") | 2 D |
| DN 40 (1½") | 2 R |
| DN 50 (2") | 2 Y |
| DN 65 (2½") | 3 F |
| DN 80 (3") | 3 M |
| DN 100 (4") | 3 T |
| **Process connections** | |
| None (not suitable for 3A approval) | A |
| ***Weld in*** | |
| DIN 11850 | B |
| ISO 2037 (SMS 3008) | C |
| Tri-Weld/BS 4825-1 | D |
| ***Clamp type*** | |
| DIN 32676 | G |
| ISO 2852 (SMS 3016) | H |
| Tri-Clamp/BS 4825-3 | J |
| ***Threaded type*** | |
| DIN 11851 | M |
| SMS 1145[1)] | N |
| **Liner material** | |
| PFA | 1 |
| Ceramic | 2 |
| **Gasket material[1)]** | |
| EPDM flat gasket (3A) | 0 |
| FPM/FKM flat gasket (3A) (only with ceramic liner) | 2 |
| EPDM P gasket (3A) (only with PFA liner) | 3 |
| **Electrode material** | |
| Hastelloy C (only with PFA liner) | 1 |
| Platinum (only with ceramic liner) | 2 |
| **Transmitter** | |
| Standard sensor for remote transmitter (order transmitter separately), 3A approved | A |
| Ex sensor for remote transmitter (order transmitter separately), 3A approved | B |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | C |
| MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex | D |
| MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex | E |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex) | F |
| MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | H |
| MAG 6000, Polyamide, 115 ... 230 V AC | J |
| MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | K |
| MAG 5000, Polyamide, 115 ... 230 V AC | L |
| **Communication** | |
| No communication, add-on possible | A |
| HART | B |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | F |
| PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) | G |
| Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) | E |
| FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) | J |
| **Cable glands/terminal box** | |
| Metric: Polyamide terminal box or MAG 6000 I compact | 1 |
| ½" NPT: Polyamide terminal box or MAG 6000 I compact | 2 |
| Metric: Stainless steel terminal box | 3 |
| ½" NPT: Stainless steel terminal box | 4 |

[1)] SMS 1145 standard is not approved by 3A.

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## Selection and ordering data (continued)

| Additional information | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Pressure test certificate according to EN 10204-3.1 | **C01** |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Country specific label** | |
| CRN (Canadian Registration Number) | **H25** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |

| Additional information | Order code |
|---|---|
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |
| **Additional calibrations** | |
| Matched-pair calibration | ***On request*** [1] |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [1] |
| Customer-specified calibration up to 10 points | ***On request*** [1] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [1] |

[1] Product Variation Request (PVR).

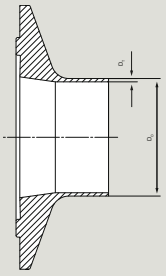
| Description | Article No. |
|---|---|
| • English | **A5E02435647** |

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Potting kit for IP68/ NEMA 6P sealing of sensor junction box** | **FDK:085U0220** |  |

### *Spare parts for MAG 1100 F sensor*

| Description | | | | Article No. |
|---|---|---|---|---|
| **Weld-in connection fittings for use with P gaskets (stainless steel)**<br>Material: AISI 316L (1.4404)<br>Only for PFA liner<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>P gaskets not included | | | | |
| **DIN 11850** | | | |  |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 10 | 13 | 1.5 | 10 | **A5E02054630** |
| 15 | 19 | 1.5 | 15 | **A5E02054633** |

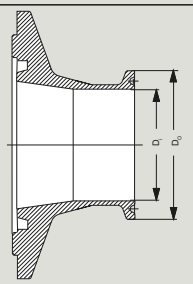
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## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| 20 | 23 | 1.5 | 15 | A5E02054634 |
| 25 | 29 | 1.5 | 25 | A5E02054635 |
| 32 | 35 | 1.5 | 25 | A5E02054637 |
| 40 | 41 | 1.5 | 40 | A5E02054638 |
| 50 | 53 | 1.5 | 50 | A5E02054640 |
| 65 | 70 | 2.0 | 65 | A5E02054643 |
| 80 | 85 | 2.0 | 80 | A5E02054644 |
| 100 | 104 | 2.0 | 100 | A5E02054646 |
| **ISO 2037** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 12.7 | 12.7 | 1.0 | 10 | A5E03727946 |
| 17.2 | 17.2 | 1.0 | 15 | A5E03728098 |
| 25 | 25 | 1.6 | 25 | A5E02196073 |
| 33 | 33.7 | 1.6 | 25 | A5E02196074 |
| 38 | 38 | 1.6 | 40 | A5E02196075 |
| 40 | 40 | 1.6 | 40 | A5E02196076 |
| 51 | 51 | 1.6 | 50 | A5E02196077 |
| 63.5 | 63.5 | 1.6 | 65 | A5E02196078 |
| 76.1 | 76.1 | 1.6 | 80 | A5E02196080 |
| 101.6 | 101.6 | 2.0 | 100 | A5E02196082 |
| **Tri-Weld (BS 4825-1)** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 12.7 | 12.7 | 1.2 | 10 | A5E02199113 |
| 19.05 | 19.05 | 1.2 | 15 | A5E02199114 |
| 25.4 | 25.4 | 1.6 | 25 | A5E02199115 |
| 38.1 | 38.1 | 1.6 | 40 | A5E02199116 |
| 50.8 | 50.8 | 1.6 | 50 | A5E02199117 |
| 63.5 | 63.5 | 1.6 | 65 | A5E02199118 |
| 76.2 | 76.2 | 1.6 | 80 | A5E02199119 |
| 101.6 | 101.6 | 2.0 | 100 | A5E02199120 |

| Description | | | | Article No. |
|---|---|---|---|---|
| **Clamp-type connection fittings for use with P gaskets (stainless steel)**<br>Material: AISI 316L (1.4404)<br>Only for liner PFA<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>P gaskets not included | | | | |
| **DIN 32676** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 10 | 34 | 10 | 10 | A5E02211143 |
| 15 | 34 | 16 | 15 | A5E02211144 |



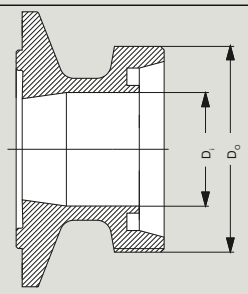
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## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| 25 | 50.5 | 22.6 | 25 | A5E02211146 |
| 40 | 50.5 | 38 | 40 | A5E02211147 |
| 50 | 64 | 50 | 50 | A5E02211148 |
| 65 | 91 | 66 | 65 | A5E02211151 |
| 80 | 106 | 81 | 80 | A5E02211152 |
| 100 | 119 | 100 | 100 | A5E02211153 |
| **ISO 2852** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 25 | 50.5 | 22.6 | 25 | A5E02213581 |
| 33.7 | 50.5 | 31.3 | 25 | A5E02213582 |
| 38 | 50.5 | 35.6 | 40 | A5E02213583 |
| 51 | 64 | 48.6 | 50 | A5E02213584 |
| 63.5 | 77.5 | 60.3 | 65 | A5E02213585 |
| 76.1 | 91 | 72.9 | 80 | A5E02213586 |
| 101.6 | 119 | 97.6 | 100 | A5E02213587 |
| **Tri-Clamp (BS 4825-3)** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 12.7 | 25.4 | 9.5 | 10 | A5E02213596 |
| 19.05 | 25.4 | 15.85 | 15 | A5E02213597 |
| 25.4 | 50.5 | 22.2 | 25 | A5E02213598 |
| 38.1 | 50.5 | 34.9 | 40 | A5E02213599 |
| 50.8 | 64 | 47.6 | 50 | A5E02213600 |
| 63.5 | 77.5 | 60.3 | 65 | A5E02213601 |
| 76.2 | 91 | 73 | 80 | A5E02213602 |
| 101.6 | 119 | 97.6 | 100 | A5E02213603 |

$D_o$: Outer diameter
$D_i$: Inner diameter

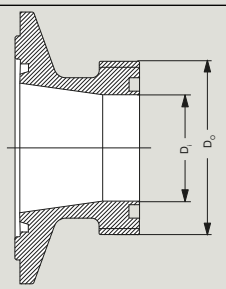
| Description | | | | Article No. |
|---|---|---|---|---|
| **Threaded type connection fittings for use with P gaskets (stainless steel)**<br>Material: AISI 316L (1.4404)<br>Only for PFA liner<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>P gaskets not included | | | | |
| **DIN 11851** | | | |  |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 10 | 28 | 10 | 10 | A5E02218293 |
| 15 | 34 | 16 | 15 | A5E02218294 |
| 20 | 44 | 20 | 15 | A5E02218295 |
| 25 | 52 | 26 | 25 | A5E02218296 |
| 32 | 58 | 32 | 25 | A5E02218297 |

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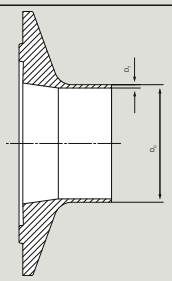
## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| 40 | 65 | 38 | 40 | A5E02218298 |
| 50 | 78 | 50 | 50 | A5E02218299 |
| 65 | 95 | 66 | 65 | A5E02218300 |
| 80 | 110 | 81 | 80 | A5E02218301 |
| 100 | 130 | 100 | 100 | A5E02218302 |
| **SMS 1145** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 25 | 40 | 22.6 | 25 | A5E02218310 |
| 38 | 60 | 35.6 | 40 | A5E02218312 |
| 51 | 70 | 48.6 | 50 | A5E02218313 |
| 63.5 | 85 | 60.3 | 65 | A5E02218314 |
| 76 | 98 | 72 | 65 | A5E02218315 |




$D_o$: Outer diameter
$D_i$: Inner diameter

| Description | | | | Article No. |
|---|---|---|---|---|
| **Weld-in connection fittings for use with flat gaskets (stainless steel)** | | | | |
| Material: AISI 316L (1.4404)<br>For PFA liner and ceramic<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>Flat gaskets not included | | | | |
| **DIN 11850[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 10 | 13 | 1.5 | 10 | FDK:083G2116 |
| 15 | 19 | 1.5 | 15 | FDK:083G2117 |
| 20 | 23 | 1.5 | 15 | FDK:083G2118 |
| 25 | 29 | 1.5 | 25 | FDK:083G2119 |
| 32 | 35 | 1.5 | 25 | FDK:083G2120 |
| 40 | 41 | 1.5 | 40 | FDK:083G2121 |
| 50 | 53 | 1.5 | 50 | FDK:083G2122 |
| 65 | 70 | 2.0 | 65 | FDK:083G2123 |
| 80 | 85 | 2.0 | 80 | FDK:083G2124 |
| 100 | 104 | 2.0 | 100 | FDK:083G2125 |
| **ISO 2037[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |



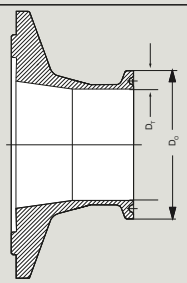
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## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| 12.7 | 12.7 | 1.0 | 10 | A5E03720273 |
| 17.2 | 17.2 | 1.0 | 15 | FDK:083G2107 |
| 25 | 25.6 | 1.6 | 25 | FDK:083G2109 |
| 33.7 | 33.7 | 1.6 | 25 | FDK:083G2100 |
| 38 | 38 | 1.6 | 40 | FDK:083G2111 |
| 40 | 40 | 1.6 | 40 | FDK:083G2101 |
| 51 | 51 | 1.6 | 50 | FDK:083G2112 |
| 63.5 | 63.5 | 1.6 | 65 | FDK:083G2113 |
| 76.1 | 76.1 | 1.6 | 80 | FDK:083G2114 |
| 101.6 | 101.6 | 2.0 | 100 | FDK:083G2115 |
| 114.3 | 118.3 | 2.0 | 100 | FDK:083G2105 |
| **Tri-Weld (BS 4825-1)[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 12.7 | 12.7 | 1.2 | 10 | FDK:083G2276 |
| 19.05 | 19.05 | 1.2 | 15 | FDK:083G2277 |
| 25.4 | 25.4 | 1.6 | 25 | FDK:083G2279 |
| 38 | 38.1 | 1.6 | 40 | FDK:083G2281 |
| 50.8 | 50.8 | 1.6 | 50 | FDK:083G2282 |
| 63.5 | 63.5 | 1.6 | 65 | FDK:083G2283 |
| 76.2 | 76.2 | 1.6 | 80 | FDK:083G2284 |
| 101.6 | 101.6 | 2.0 | 100 | FDK:083G2285 |

| Description | | | | Article No. |
|---|---|---|---|---|
| **Clamp-type connection fittings for use with flat gaskets (stainless steel)**<br>Material: AISI 316L (1.4404)<br>For PFA liner and ceramic<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>Flat gaskets not included | | | | |
| **DIN 32676[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 10 | 34 | 10 | 10 | FDK:083G2186 |
| 15 | 34 | 16 | 15 | FDK:083G2187 |
| 25 | 50.5 | 26 | 25 | FDK:083G2179 |
| 40 | 50.5 | 38 | 40 | FDK:083G2181 |
| 50 | 64 | 50 | 50 | FDK:083G2182 |
| 65 | 91 | 66 | 65 | FDK:083G2183 |
| 80 | 106 | 81 | 80 | FDK:083G2184 |
| 100 | 119 | 100 | 100 | FDK:083G2185 |
| **ISO 2852[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 25 | 50.5 | 22.6 | 25 | FDK:083G2189 |
| 33.7 | 50.5 | 31.3 | 25 | FDK:083G2190 |
| 38 | 50.5 | 35.6 | 40 | FDK:083G2191 |



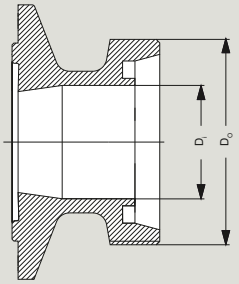
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## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| 51 | 64 | 48.6 | 50 | FDK:083G2192 |
| 63.5 | 77.5 | 60.3 | 65 | FDK:083G2193 |
| 76.1 | 91 | 72.9 | 80 | FDK:083G2194 |
| 101.6 | 119 | 97.6 | 100 | FDK:083G2195 |
| **Tri-Clamp (BS 4825-3)[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_T$ (mm) | DN (mm) | |
| 12.7 | 25.4 | 9.5 | 10 | FDK:083G2286 |
| 19.05 | 25.4 | 15.85 | 15 | FDK:083G2287 |
| 25.4 | 50.5 | 22.2 | 25 | FDK:083G2289 |
| 38.1 | 50.5 | 34.9 | 40 | FDK:083G2291 |
| 50.8 | 64 | 47.6 | 50 | FDK:083G2292 |
| 63.5 | 77.5 | 60.3 | 65 | FDK:083G2293 |
| 76.2 | 91 | 73 | 80 | FDK:083G2294 |
| 101.6 | 119 | 97.6 | 100 | FDK:083G2295 |

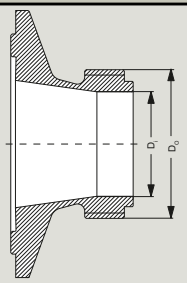
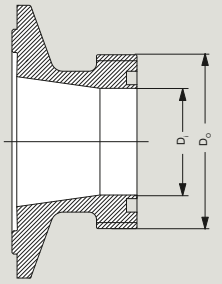
$D_o$: Outer diameter
$D_i$: Inner diameter
1) Suitable for 3A

| Description | | | | Article No. |
|---|---|---|---|---|
| **Threaded type connection fittings for use with flat gaskets (stainless steel)**<br>Material: AISI 316L (1.4404)<br>For PFA liner and ceramic<br>2 pcs. fittings<br>2 pcs. clamps (to join flow sensor and fitting),<br>Flat gaskets not included | | | | |
| **DIN 11851[1)]** | | | |  |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 10 | 28 | 10 | 10 | FDK:083G2156 |
| 15 | 34 | 16 | 15 | FDK:083G2157 |
| 20 | 44 | 20 | 15 | FDK:083G2158 |
| 25 | 52 | 26 | 25 | FDK:083G2159 |
| 32 | 58 | 32 | 25 | FDK:083G2160 |
| 40 | 65 | 38 | 40 | FDK:083G2161 |
| 50 | 78 | 50 | 50 | FDK:083G2162 |
| 65 | 95 | 66 | 65 | FDK:083G2163 |
| 80 | 110 | 81 | 80 | FDK:083G2164 |
| 100 | 130 | 100 | 100 | FDK:083G2165 |
| **ISO 2853[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |

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## Selection and ordering data (continued)

| Description | | | | Article No. |
|---|---|---|---|---|
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) |  |
| 25 | 37 | 22.6 | 25 | **FDK:083G2149** |
| 38 | 51 | 35.6 | 40 | **FDK:083G2151** |
| 51 | 64 | 48.6 | 50 | **FDK:083G2152** |
| 63.5 | 78 | 60.3 | 65 | **FDK:083G2153** |
| 76.1 | 91 | 72.9 | 80 | **FDK:083G2154** |
| **BS 4825-4[1)]** | | | | |
| ***Adapter*** | | | ***Sensor*** | |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 101.6 | 126 | 97.6 | 100 | **FDK:083G2145** |
| **SMS 1145[2)]** | | | | |
| ***Adapter*** | | | ***Sensor*** |  |
| DN (mm) | $D_o$ (mm) | $D_i$ (mm) | DN (mm) | |
| 25 | 40 | 22.6 | 25 | **FDK:083G2139** |
| 38 | 60 | 35.6 | 40 | **FDK:083G2141** |
| 51 | 70 | 48.6 | 50 | **FDK:083G2142** |
| 63.5 | 85 | 60.3 | 65 | **FDK:083G2143** |
| 76 | 98 | 72 | 65 | **FDK:083G2144** |

$D_o$: Outer diameter
$D_i$: Inner diameter
1) Suitable for 3A
2) Not suitable for 3A

### *Accessories for MAG 1100 F sensor*

| Description | Article No. |
|---|---|
| **Gaskets**<br>(delivered in pairs, to be placed between flow sensor and adapter) | |
| ***MAG 1100 F (PFA) - P gaskets*** | |
| Rubber: EPDM[1)] | |
| • DN 10 | **A5E02055286** |
| • DN 15 | **A5E02055287** |
| • DN 25 | **A5E02055290** |
| • DN 40 | **A5E02055291** |

| Description | Article No. |
|---|---|
| • DN 50 | **A5E02055292** |
| • DN 65 | **A5E02055293** |
| • DN 80 | **A5E02055295** |
| • DN 100 | **A5E02055297** |
| ***MAG 1100 F (ceramic) - Flat gaskets*** | |
| Rubber: FKM/FPM | |
| • DN 10 | **A5E00915707** |
| • DN 15 | **A5E00915764** |
| • DN 25 | **A5E00915771** |
| • DN 40 | **A5E00915773** |

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## Selection and ordering data (continued)

| Description | Article No. |
|---|---|
| • DN 50 | A5E00915775 |
| • DN 65 | A5E00915780 |
| • DN 80 | A5E00915782 |
| • DN 100 | A5E00915784 |
| ***MAG 1100 F (PFA, ceramic) - Flat gaskets*** | |
| Rubber: EPDM | |
| • DN 10 | FDK:083G2206 |
| • DN 15 | FDK:083G2207 |
| • DN 25 | FDK:083G2209 |
| • DN 40 | FDK:083G2211 |
| • DN 50 | FDK:083G2212 |
| • DN 65 | FDK:083G2213 |
| • DN 80 | FDK:083G2214 |
| • DN 100 | FDK:083G2215 |
| Rubber: NBR | |
| • DN 10 | FDK:083G2216 |
| • DN 15 | FDK:083G2217 |
| • DN 25 | FDK:083G2219 |
| • DN 40 | FDK:083G2221 |
| • DN 50 | FDK:083G2222 |
| • DN 65 | FDK:083G2223 |
| • DN 80 | FDK:083G2224 |
| • DN 100 | FDK:083G2225 |

1) Suitable for 3A

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## Technical specifications

| MAG 1100 F | |
|---|---|
| Measuring principle | Electromagnetic induction |
| Excitation frequency (Mains supply: 50 Hz/60 Hz) | DN 10 ... 65 (¼" ... 2½"): 12.5 Hz/15 Hz<br>DN 80 ... 100 (3", 4"): 6.25 Hz/7.5 Hz |
| **Process connection** | |
| Nominal size | DN 10 ... 100 (3/8" ... 4") |
| Process connection | Hygienic adapters available for:<br>• Direct welding onto pipe<br>• Clamp fitting<br>• Threaded fitting |
| **Rated operating conditions** | |
| ***Ambient conditions*** | |
| Ambient temperature | |
| • Sensor | -40 ... +100 °C (-40 ... +212 °F) |
| • Ex sensor | -20 ... +60 °C (-4 ... +140 °F) |
| • Compact with transmitter MAG 5000/6000 | -20 ... +60 °C (-4 ... +140 °F) |
| • Compact with transmitter MAG 6000 I [1] | -20 ... +60 °C (-4 ... +140 °F) |
| • Compact with transmitter MAG 6000 I Ex [1] | -10 ... +60 °C (14 ... 140 °F) |
| ***Temperature of medium*** | |
| MAG 1100 F (Ceramic) | -20 ... +150 °C (-4 ... +302 °F)<br>Suitable for steam sterilization |
| MAG 1100 F (PFA) | -30 ... +130 °C (-22 ... +266 °F)<br>Suitable for steam sterilization at 150 °C (302 °F) |
| ***Temperature shock*** | |
| MAG 1100 F | |
| • Duration ≤ 1 min, followed by 10 min rest | • DN 10, 15, 25: Max. ΔT ≤ 80 °C/min (3/8", ½", 1": Max. ΔT ≤ 144 °F/min)<br>• DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½", 2", 2½": Max. ΔT ≤ 126 °F/min)<br>• DN 80, 100: Max. ΔT ≤ 60 °C/min (3", 4": Max. ΔT ≤ 108 °F/min) |
| MAG 1100 F (PFA) | Max. ± 100 °C (212 °F) momentarily |
| ***Operating pressure*** | |
| MAG 1100 F (Ceramic) | DN 10 ... 65: 40 bar (3/8" ... 2½": 580 psi)<br>DN 80: 25 bar (3": 363 psi)<br>DN 100: 25 bar (4": 363 psi)<br>Vacuum: 1 x $10^{-6}$ $bar_{abs}$ (1.5 x $10^{-5}$ $psi_{abs}$) |
| MAG 1100 F (PFA) | 20 bar (290 psi)<br>Vacuum: 0.02 $bar_{abs}$ (0.3 $psi_{abs}$)<br>DN 80 ... DN 100: $CO_2$ pressure max. 7 bar (101.5 psi) |
| ***Mechanical load (vibration)*** | 18 ... 1 000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36<br>Sensor: 3.17 g RMS<br>Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 grms<br>Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 grms<br>For compact installation with the MAG 6000 I/MAG 6000 I Ex, transmitter to be supported to avoid tension on sensor part. |
| ***Enclosure rating*** | IP67 to EN 60529 (NEMA 6), 1 $mH_2O$ for 30 min |
| EMC | 2014/30/EU |
| **Design** | |
| Weight | See Dimensional drawings |
| ***Material*** | |

## Technical specifications (continued)

| MAG 1100 F | |
|---|---|
| Enclosure | |
| • MAG 1100 F | Stainless steel AISI 316L/1.4404 |
| Terminal box (remote version only) | |
| • Standard | Fibre glass reinforced polyamide |
| • Option | Stainless steel AISI 316/1.4436 |
| • Ex ATEX (remote version only) | Stainless steel AISI 316/1.4436 |
| **Liner** | |
| MAG 1100 F (Ceramic) | Aluminum oxide $Al_2O_3$ (ceramics) |
| MAG 1100 F (PFA) | Reinforced PFA (teflon) (not for Ex) |
| **Electrodes** | |
| MAG 1100 F (Ceramic) | Platinum with gold/Titanium brazing alloy |
| MAG 1100 F (PFA) | • DN 10 ... 15 (3/8" ... ½"): Hastelloy C276/2.4819<br>• DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602 |
| **Cable entries** | • Remote installation 2 x M20 or 2 x ½" NPT<br>• Compact installation<br>- MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT<br>- MAG 6000 I: 2 x M25 (for supply/output)<br>- MAG 6000I Ex: 2 x M25 (for supply/output) |
| **Certificates and approvals** | |
| Calibration | |
| • Default calibration | Zero-point, 2 x 25 %, 2 x 90 % |
| Hazardous areas | |
| • MAG 1100 F (Ceramic) | |
| - Ex-sensor in compact or remote version with MAG 6000 I Ex | • ATEX, EAC Ex<br>- Zone 1 Ex d e ia IIB T6 Gb<br>• ATEX<br>- Zone 21 Ex tD A21 IP67 |
| - Standard sensor in compact or remote version with MAG MAG 5000/6000/6000 I Ex | • FM<br>- NI Class I Div. 2 Groups A, B, C, D |
| • MAG 1100 F (PFA) | |
| - Standard sensor in compact or remote version with MAG MAG 5000/6000/6000 I Ex | • FM<br>- NI Class I Div. 2 Groups A, B, C, D |
| Hygienic | |
| • MAG 1100 F (Ceramic) | • 3A (remote version with Polyamide terminal box) |
| • MAG 1100 F (PFA) | • 3A (remote version with Polyamide terminal box)<br>• Hygienic EC 1935:2004 European food contact material |
| Pressure equipment | PED - 2014/68/EU |
| Others | • EAC (Kazakhstan) |

| Accessories for MAG 1100 F | |
|---|---|
| **Weld-in adapter** | |
| Adapter for welding onto dairy pipe, stainless steel 1.4404 | Tri-Weld ISO 2037, DIN 11850, SMS 3008, BS 4825-1 |
| • DN 10, 15, 25, 40, 50 and 65 (3/8", ½", 1", 1½", 2" and 2½") | PN 40 (600 psi) |
| • DN 8 and DN 100 (3" and 4") | PN 25 (350 psi) |
| **Clamp adapter** | Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3 |
| DN 10, 15, 25, 40 and 50 (3/8", ½", 1", 1½" and 2") | PN 16 (200 psi) |
| DN 65, 80 and 100 (2½", 3" and 4") | PN 10 (150 psi) |

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## Technical specifications (continued)

| Accessories for MAG 1100 F | |
|---|---|
| **Thread adapter** | |
| DIN 11851 | |
| • DN 10, 15, 25, and 40 (3/8", ½", 1", and 1½") | PN 40 (600 psi) |
| • DN 50, 65, 80 and 100 (2", 2½", 3" and 4") | PN 25 (350 psi) |
| ISO 2853, BS 4825-4 | |
| • DN 10, 15, 25, 40, 50, 65 and 80 (3/8", ½", 1", 1½", 2", 2½" and 3") | PN 16 (200 psi) |
| SMS 1145 | |
| • DN 25, 40, 50, 65 and 80 (1", 1½", 2", 2½" and 3") | PN 6 (80 psi) |
| **Design** | |
| ***Material*** | |
| Adapter | Stainless steel AISI 316/1.4436 |
| Gasket | |
| • MAG 1100 F (Ceramic) | FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 ... +150 °C (-4 ... +302 °F)) |
| | EPDM (-20 ... +150 °C (-4 ... +302 °F)) |
| • MAG 1100 F (PFA) | EPDM (-20 ... +150 °C (-4 ... +302 °F)) |
| | NBR (-20 ... +100 °C (-4 ... +212 °F)) |

[1] With HART communication max. ambient temperature 50 °C (122 °F).

***Note:***

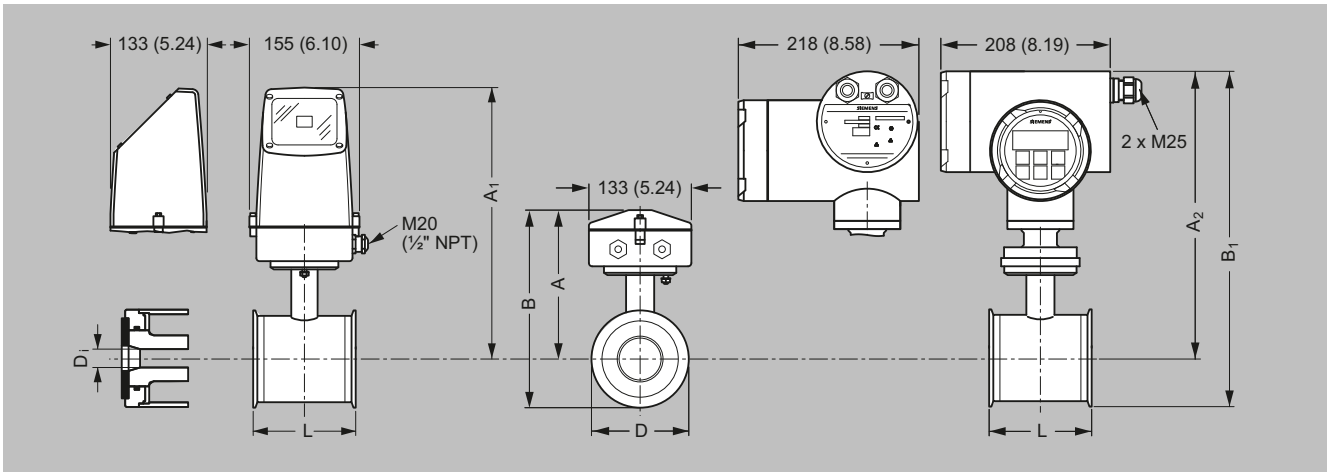
When combined sensor and adapter, the operating pressure is the lower rated of the pair.

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## Dimensional drawings

***Sensor MAG 1100 F compact/remote***




Dimensions in mm (inch)

Important note: For compact installation with MAG 6000 I/Ex - Supports the transmitter to avoid tension on the sensor part.

| Size DN | L [mm] | A [mm] | | B [2] [mm] | $B_1$ [mm] | D [mm] | $D_i$ ($Al_2O_3$) [mm] | $D_i$ PFA [mm] | Weight [1] [kg] |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 64 | 161 | 315 | 193.7 | 344.7 | 64.0 | 10 | 10 | 2.2 |
| 15 | 64 | 161 | 315 | 193.7 | 344.7 | 64.0 | 15 | 16 | 2.2 |
| 25 | 79 | 169 | 323 | 207.5 | 359.0 | 77.5 | 25 | 26 | 2.7 |
| 40 | 94 | 179 | 333 | 228.0 | 379.0 | 91.0 | 40 | 38 | 3.4 |
| 50 | 104 | 188 | 342 | 247.7 | 398.7 | 119.0 | 50 | 50 | 4.2 |
| 65 | 131 | 197.5 | 351 | 262.6 | 413.6 | 130.0 | 65 | 66 | 5.5 |
| 80 | 156 | 204 | 357 | 281.0 | 432.0 | 155.0 | 80 | 81 | 7.0 |
| 100 | 186 | 217 | 370 | 308.0 | 459.0 | 183.0 | 100 | 100 | 10.0 |

| Size [inch] | L [inch] | A [inch] | | B [2] [inch] | $B_1$ [inch] | D [inch] | $D_i$ ($Al_2O_3$) [inch] | $D_i$ PFA [inch] | Weight [1] [lb] |
|---|---|---|---|---|---|---|---|---|---|
| 3/8 | 2.52 | 6.34 | 12.40 | 7.62 | 13.57 | 2.52 | 0.39 | 0.39 | 4.8 |
| ½ | 2.52 | 6.34 | 12.40 | 7.62 | 13.57 | 2.52 | 0.59 | 0.63 | 4.8 |
| 1 | 3.11 | 6.66 | 12.72 | 8.17 | 14.13 | 3.05 | 0.98 | 1.02 | 4.9 |
| 1½ | 3.70 | 7.05 | 13.11 | 8.98 | 14.92 | 3.58 | 1.57 | 1.50 | 7.5 |
| 2 | 4.09 | 7.40 | 13.47 | 9.75 | 15.70 | 4.68 | 1.97 | 1.97 | 9.2 |
| 2½ | 5.16 | 7.78 | 13.82 | 10.34 | 16.28 | 5.12 | 2.56 | 2.60 | 12.0 |
| 3 | 6.14 | 8.03 | 14.06 | 11.06 | 17.01 | 6.10 | 3.15 | 3.19 | 15.0 |
| 4 | 7.32 | 8.54 | 14.57 | 12.13 | 18.07 | 7.20 | 3.94 | 3.94 | 22.0 |

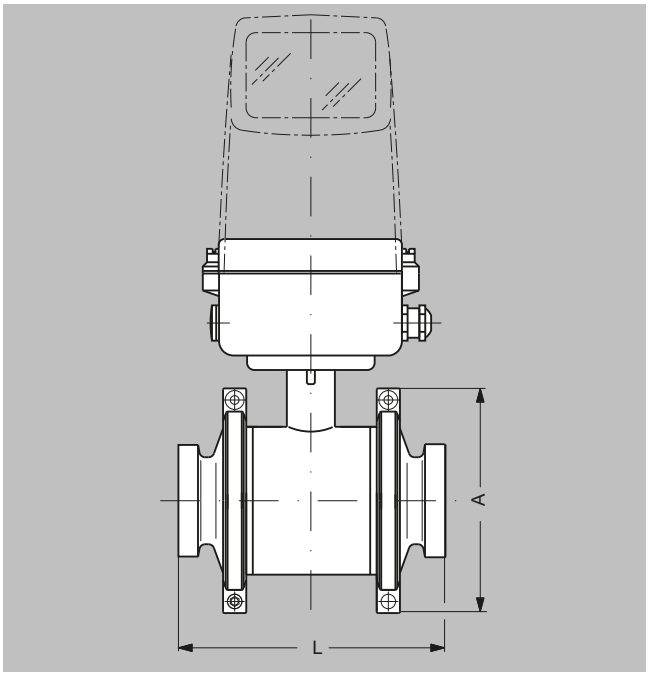
1) With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb). With MAG 6000 I weight is increased with 5.5 kg ( 12.1 lbs).
2) 14.5 mm (0.571") shorter when the stainless steel terminal box is used (always Ex version).
3) $A_2$ is 3 mm (0.12") shorter than $A_1$.

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## Dimensional drawings (continued)

***Sensor MAG 1100 F compact/separate – built-in length***




| Size DN | [Inch] | A [mm] | [inch] | L [1] [mm] | [inch] |
|---|---|---|---|---|---|
| 10 | 3/8 | 99 | 3.90 | 146 | 5.75 |
| 15 | ½ | 99 | 3.90 | 146 | 5.75 |
| 25 | 1 | 113 | 4.45 | 161 | 6.34 |
| 40 | 1½ | 126 | 4.96 | 176 | 6.93 |
| 50 | 2 | 154 | 6.06 | 186 | 7.32 |
| 65 | 2½ | 165 | 6.50 | 223 | 8.78 |
| 80 | 3 | 200 | 7.87 | 258 | 10.16 |
| 100 | 4 | 225 | 8.86 | 288 | 11.34 |

[1] The total built-in length "L" is independent of the adapter type selected.

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## Overview



The SITRANS FM MAG 3100 is an electromagnetic flow sensor in a large variety that meets the demands of almost every flow application.

## Benefits

- Wide range of sizes: DN 15 to DN 2000 (½" to 78")
- The flexible design is for all applications not covered by the standard industry-specific sensors: MAG 1100, MAG 1100 F, MAG 3100 P and MAG 5100 W
- Wide pressure range: PN 6 to PN 100
- ANSI Class 150/300, AS 2129, AS 4087, JIS K10 and K20. On request up to 690 bar (10 000 psi)
- Wide range of electrode and liner material to fit even the most extreme process media
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Designed to allow patented SITRANS FM in-situ verification using the SENSORPROM fingerprints.

## Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Steel industry
- Mining
- Utility
- Power generation and distribution
- Oil and gas/HPI
- Water and waste water

## Design

- Compact or remote mounting possible
- Easy “plug & play” field changeability of transmitter
- ATEX and FM/CSA versions
- High temperature sensor for applications with temperatures up to 180 °C (356 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN 1092-1 flanges
- Built-in length according to ISO 20456, the standard includes sizes up to DN 400
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

## Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

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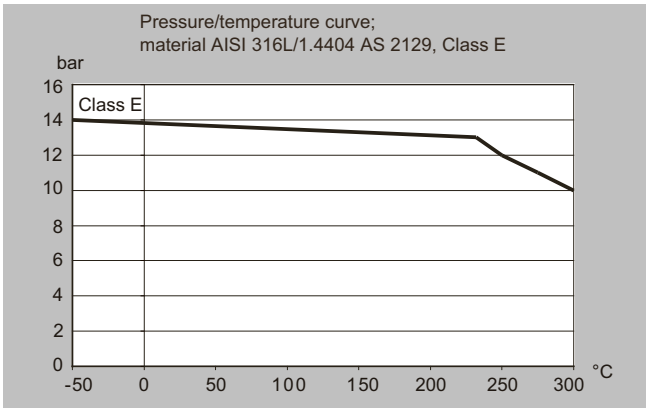


## Integration

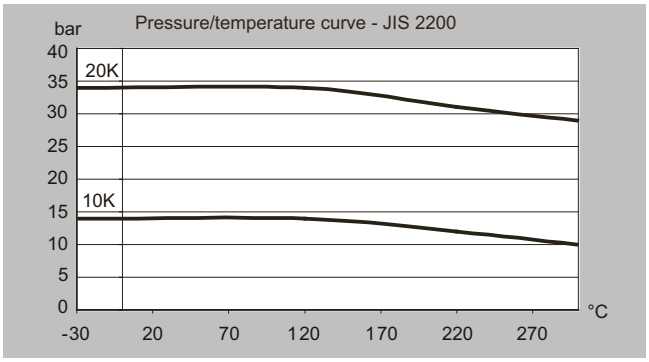
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

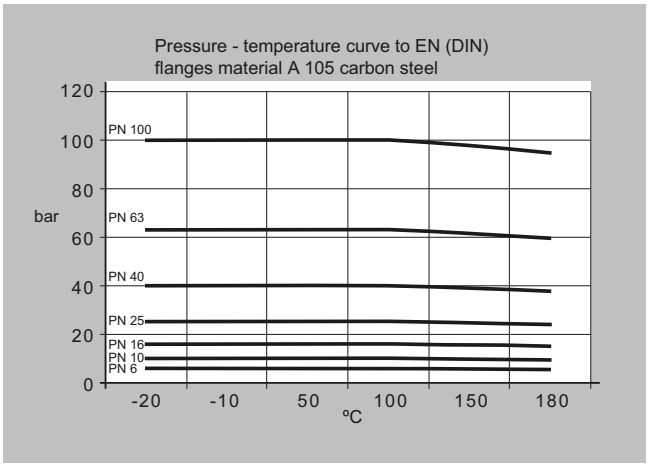
***Pressure/temperature curve; material AISI 316L/1.4404 AS 2129, Class E***




***Pressure/temperature curve - JIS 2200***

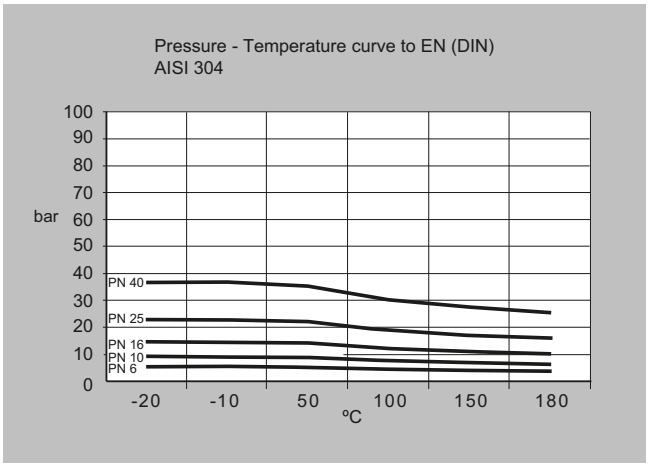



***Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel***

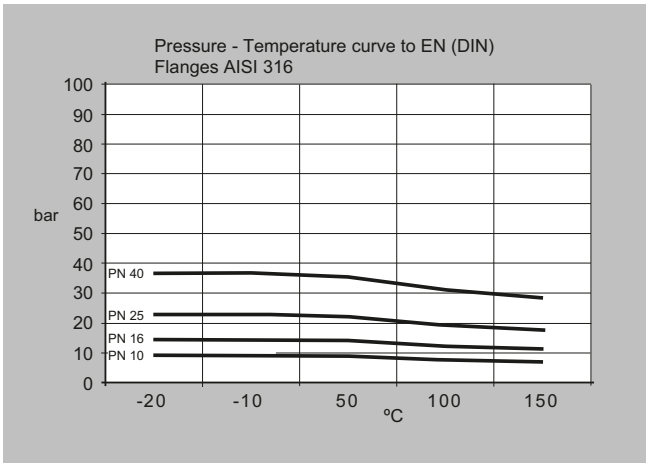



## Integration (continued)

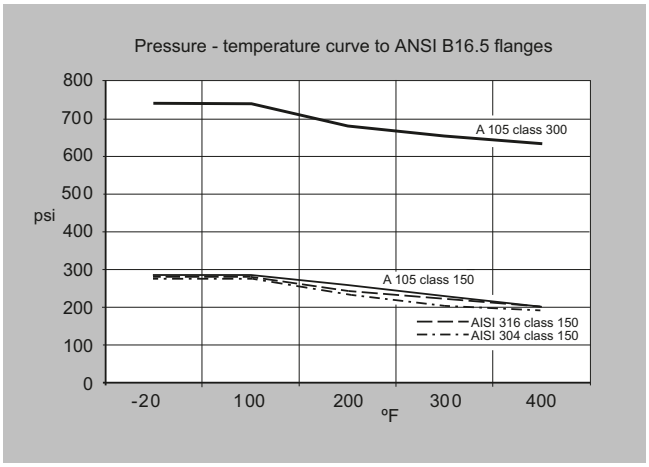
***Pressure/temperature curve to EN (DIN) flanges AISI 304***




***Pressure/temperature curve to EN (DIN) flanges AISI 316***




***Pressure/temperature curve to ANSI B16.5 flanges***




**Note:** The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the inform-

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## Integration (continued)

ation. For further information on PED standard see the section about Pressure Equipment Directive.

## Selection and ordering data

| Sensor SITRANS FM MAG 3100 | Article No. 7ME6310- ● ● ● ● ● - ● ● ● ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Diameter** | |
| DN 15 (½") (PTFE and PFA liner) | 1 V |
| DN 25 (1") | 2 D |
| DN 32 (1 1/4") | 2 H |
| DN 40 (1½") | 2 R |
| DN 50 (2") | 2 Y |
| DN 65 (2½") | 3 F |
| DN 80 (3") | 3 M |
| DN 100 (4") | 3 T |
| DN 125 (5") | 4 B |
| DN 150 (6") | 4 H |
| DN 200 (8") | 4 P |
| DN 250 (10") | 4 V |
| DN 300 (12") | 5 D |
| DN 350 (14") | 5 K |
| DN 400 (16") | 5 R |
| DN 450 (18") | 5 Y |
| DN 500 (20") | 6 F |
| DN 600 (24") | 6 P |
| DN 700 (28") | 6 Y |
| DN 750 (30") (only AWWA and AS 2129) | 7 D |
| DN 800 (32") | 7 H |
| DN 900 (36") | 7 M |
| DN 1000 (40") | 7 R |
| DN 1050 (42") (only AWWA) | 7 U |
| DN 1100 (44") (only AWWA) | 7 V |
| DN 1200 (48") | 8 B |
| DN 1400 (54") | 8 F |
| DN 1500 (60") | 8 K |
| DN 1600 (66") | 8 P |
| DN 1800 (72") | 8 T |
| DN 2000 (80") | 8 Y |
| DN 2200 (88") | 8 V |
| **Flange norm and pressure rating** | |
| ***EN 1092-1*** | |
| PN 6 (DN 65 ... 2200 (2½" ... 88")) | A |
| PN 10 (DN 200 ... 2200 (8" ... 88")) | B |
| PN 16 (DN 65 ... 1200 (2½" ... 48")) | C |
| PN 16, non-PED (DN 700 ... 2000 (28" ... 80")) | D |
| PN 25 (DN 200 ... 600 (8" ... 24")) | E |
| PN 40 (DN 15 ... 600 (½" ... 24")) | F |
| PN 63 (DN 50 ... 300 (2" ... 12")) | G |
| PN 100 (DN 25 ... 300 (1" ... 12")) | H |
| ***ANSI B16.5*** | |
| Class 150 (½" ... 24") | J |
| Class 300 (½" ... 24") | K |
| Class 600 (½" ... 16") | U |
| ***AWWA C-207*** | |

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## Selection and ordering data (continued)

| Sensor SITRANS FM MAG 3100 | Article No. 7ME6310- ● ● ● ● ● - ● ● ● ● ● ● ● |
|---|---|
| Class D (28" ... 88") | L |
| ***AS*** | |
| 2129, table E | M |
| 4087, PN 16 (DN 50 ... 1200 (2" ... 48")) (not PTFE and PFA) | N |
| 4087, PN 21 (DN 50 ... 600 (2" ... 24")) (not PTFE and PFA) | P |
| 4087, PN 35 (DN 50 ... 600 (2" ... 24")) (not PTFE and PFA) | Q |
| ***JIS B 2220:2004*** | |
| K10 (1" ... 24") | R |
| K20 (1" ... 24") | S |
| **Flange material** | |
| Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4 | 1 |
| Stainless steel flanges, AISI 304/1.4301, corrosion-resistant coating of category C4 | 2 |
| Stainless steel flanges and sensor body, AISI 316L/1.4404, polished | 3 |
| Carbon steel flanges ASTM A 105, 300 µm corrosion-resistant coating of category C5 | 4 |
| Stainless steel flanges, AISI 304/1.4301, 300 µm corrosion-resistant coating of category C5 | 5 |
| **Liner material** | |
| Soft rubber | 1 |
| EPDM | 2 |
| PTFE (DN ≤ 300, PN ≤ 50 bar / ≤ 12", PN ≤ 725 psi), PTFE (350 ≤ DN ≤ 600, PN ≤ 40 bar / 14" ≤ DN ≤ 24", PN ≤ 580 psi) | 3 |
| Ebonite | 4 |
| Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24")) | 5 |
| PFA (DN 15 ... 150 (½" ... 6")) (PN ≤ 40 bar (580 psi)) | 7 |
| **Electrode material** (Grounding electrodes not for pressure rating PN 100) | |
| AISI 316Ti/1.4571 (not for PFA) | 1 |
| Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602) | 2 |
| Platinum (DN ≤ 300 (12")) (not for Ebonite) | 3 |
| Titanium (not for PFA) (DN ≤ 600/24") | 4 |
| Tantalum (DN ≤ 600/24") (not for Ebonite) | 5 |
| Hastelloy C incl. grounding electrodes (only PFA and PTFE) | 6 |
| Platinum incl. grounding electrodes (only PFA and PTFE) | 7 |
| Tantalum incl. grounding electrodes (only PFA and PTFE) | 8 |
| Ceramic coated stainless steel | 9 N 0 A |
| Ceramic coated Hastelloy C | 9 N 0 B |
| AISI 316Ti incl. grounding electrodes (only PTFE) | 9 N 0 C |
| Titanium incl. grounding electrodes (only PTFE) | 9 N 0 D |
| **Transmitter** | |
| Standard sensor for remote transmitter (order transmitter separately) | A |
| Ex sensor for remote transmitter (order transmitter separately) | B |
| MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | C |
| MAG 6000 I, Aluminum 18 ... 30 V DC, Ex | D |
| MAG 6000 I, Aluminum 115 ... 230 V, Ex | E |
| MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC (non-Ex) | F |
| MAG 6000 Polyamide, 11... 30 V DC / 11...24 V AC | H |
| MAG 6000, Polyamide, 115 ... 230 V AC | J |
| MAG 5000, Polyamide, 11 ... 30 V DC / 11 ... 24 V AC | K |
| MAG 5000, Polyamide, 115 ... 230 V AC | L |
| **Communication** | |
| No communication, add-on possible | A |
| HART | B |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | F |
| PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) | G |
| Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) | E |
| FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) | J |
| **Cable glands/terminal box** | |
| Metric: Polyamide terminal box or MAG 6000 I compact | 1 |
| ½" NPT: Polyamide terminal box or MAG 6000 I compact | 2 |

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## Selection and ordering data (continued)

| Sensor SITRANS FM MAG 3100 | Article No. 7ME6310- |
|---|---|
| Metric: Stainless steel terminal box | 3 |
| 1/2" NPT: Stainless steel terminal box | 4 |

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Pressure test certificate according to EN 10204-3.1 | **C01** |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Special calibration** | |
| 5-point calibration for DN 15 ... 200[1] | **D01** |
| 5-point calibration for DN 250 ... 600[1] | **D02** |
| 5-point calibration for DN 700 ... 1200[1] | **D03** |
| 10-point calibration for DN 15 ... 200[2] | **D06** |
| 10-point calibration for DN 250 ... 600[2] | **D07** |
| 10-point calibration for DN 700 ... 1200[2] | **D08** |
| Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 15 ... 200 | **D11** |
| Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 250 ... 600 | **D12** |
| Default (2 × 25 % and 2 × 90 %) match-pair calibration for DN 700 ... 1200 | **D13** |
| 5-point, matched-pair calibration for DN 15 ... 200[1] | **D15** |
| 5-point, matched-pair calibration for DN 250 ... 600[1] | **D16** |
| 5-point, matched-pair calibration for DN 700 ... 1200[1] | **D17** |
| 10-point, matched-pair calibration for DN 15 ... 200[2] | **D18** |
| 10-point, matched-pair calibration for DN 250 ... 600[2] | **D19** |
| 10-point, matched-pair calibration for DN 700 ... 1200[2] | **D20** |
| **Sensor cables** | |
| ***Standard coil and electrode cable, PVC jacket*** | |
| • 5 m (16 ft) | **K01** |
| • 10 m (33 ft) | **K02** |
| • 20 m (65 ft) | **K04** |
| • 30 m (98 ft) | **K06** |
| • 40 m (131 ft) | **K07** |
| • 50 m (164 ft) | **K08** |
| • 60 m (197 ft) | **K09** |
| • 100 m (328 ft) | **K10** |
| • 150 m (492 ft) | **K11** |
| • 200 m (656 ft) | **K12** |
| • 500 m (1640 ft) | **K13** |
| ***Standard coil and special electrode cable, PVC jacket*** | |
| • 5 m (16 ft) | **K51** |
| • 10 m (33 ft) | **K52** |
| • 20 m (65 ft) | **K54** |
| • 30 m (98 ft) | **K56** |
| • 40 m (131 ft) | **K57** |
| • 50 m (164 ft) | **K58** |
| • 60 m (197 ft) | **K59** |
| • 100 m (328 ft) | **K60** |
| • 150 m (492 ft) | **K61** |
| • 200 m (656 ft) | **K62** |
| • 500 m (1640 ft) | **K63** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Country specific label** | |
| CRN (Canadian Registration Number) | **H25** |
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |
| **Additional calibrations** | |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [3] |
| Customer-specified calibration up to 10 points | ***On request*** [3] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [3] |

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
3) Product Variation Request (PVR)

| Description | Article No. |
|---|---|
| • English | **A5E03005599** |
| • German | **A5E03086288** |

All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation

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## Selection and ordering data (continued)

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Potting kit for IP68/NEMA 6P sealing of sensor junction box** | **FDK-085U0220** |  |

Please use online Product selector to get latest updates.
Product selector link:
http://www.pia-portal.automation.siemens.com

| **Sensor SITRANS FM MAG 3100 HT (High Temperature)** | **Article No. 7ME6320-** ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Diameter** | |
| DN 15 (½") | **1 V** |
| DN 25 (1") | **2 D** |
| DN 40 (1½") | **2 R** |
| DN 50 (2") | **2 Y** |
| DN 65 (2½") | **3 F** |
| DN 80 (3") | **3 M** |
| DN 100 (4") | **3 T** |
| DN 125 (5") | **4 B** |
| DN 150 (6") | **4 H** |
| DN 200 (8") | **4 P** |
| DN 250 (10") | **4 V** |
| DN 300 (12") | **5 D** |
| **Flange norm and pressure rating** | |
| ***EN 1092-1*** | |
| PN 10 (DN 200 ... 300 (8" ... 12")) | **B** |
| PN 16 (DN 65 ... 300 (2½" ... 12")) | **C** |
| PN 25 (DN 200 ... 300 (8" ... 12")) | **E** |
| PN 40 (DN 15 ... 300 (½" ... 12")) | **F** |
| ***ANSI B16.5*** | |
| Class 150 (½" ... 12") | **J** |
| Class 300 (½" ... 12") | **K** |
| ***AS*** | |
| 2129, table E | **M** |
| **Flange material** | |
| Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4 | **1** |
| Stainless steel flanges, AISI 304/1.4301, corrosion-resistant coating of category C4 | **2** |
| Stainless steel flanges and sensor body, AISI 316L/1.4404, polished | **3** |
| **Liner material** | |
| PTFE (150 °C (302 °F)) | **2** |
| PTFE including type E protection rings AISI 316/1.4436 (180 °C (356 °F)) | **3** |
| PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6")) | **7** |
| **Electrode material** | |
| AISI 316Ti/1.4571 (not for PFA) | **1** |
| Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602) | **2** |
| Platinum | **3** |
| Titanium (not for PFA) | **4** |
| Tantalum | **5** |

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## Selection and ordering data (continued)

| Sensor SITRANS FM MAG 3100 HT (High Temperature) | Article No. 7ME6320- ● ● ● ● ● - ● ● ● ● |
|---|---|
| Hastelloy C22/2.4602 incl. grounding electrodes (PFA only) | 6 |
| Platinum incl. grounding electrodes (PFA only) | 7 |
| Tantalum incl grounding electrodes (PFA only) | 8 |
| **Transmitter** | |
| Standard sensor for remote transmitter (order transmitter separately) | A |
| Ex sensor for remote transmitter (order transmitter separately) | B |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | C |
| MAG 6000 I, Aluminum 18 ... 30 V DC, Ex | D |
| MAG 6000 I, Aluminum 115 ... 230 V AC, Ex | E |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex) | F |
| MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | H |
| MAG 6000, Polyamide, 115 ... 230 V AC | J |
| MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | K |
| MAG 5000, Polyamide, 115 ... 230 V AC | L |
| **Communication** | |
| No communication, add-on possible | A |
| HART | B |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | F |
| PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I) | G |
| Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I) | E |
| FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I) | J |
| **Cable glands/terminal box** | |
| Metric: Polyamide terminal box (max. 150 °C (302 °F)) or MAG 6000 I compact | 1 |
| ½" NPT: Polyamide terminal box (max. 150 °C (302 °F)) or MAG 6000 I compact | 2 |
| Metric: Stainless steel terminal box | 3 |
| ½" NPT: Stainless steel terminal box | 4 |

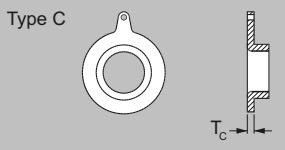
| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Pressure test certificate according to EN 10204-3.1 | **C01** |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Country specific label** | |
| CRN (Canadian Registration Number) | **H25** |
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |

| | Order code |
|---|---|
| **Additional calibrations** | |
| Matched-pair calibration | ***On request*** [1] |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [1] |
| Customer-specified calibration up to 10 points | ***On request*** [1] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [1] |

[1] Product Variation Request (PVR).

### *Accessories for MAG 3100 and MAG 3100 HT sensor*

Grounding and protection ring - Type C (Stainless steel)[1]




- Material AISI 304
- For all liners except PTFE and PFA
- 1 pc.

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## Selection and ordering data (continued)

| Size DN | Nominale pressure PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | AS 2129 Table E |
|---|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | Article No. | Article No. | Article No. |
| DN 25 | | | | | FDK:083N8361 | FDK:083N8361 |
| DN 40 | | | | | FDK:083N8362 | FDK:083N8362 |
| DN 50 | | | | | FDK:083N8344 | FDK:083N8344 |
| DN 65 | FDK:083N8345 | | FDK:083N8345 | | FDK:083N8345 | FDK:083N8346 |
| DN 80 | FDK:083N8347 | | FDK:083N8347 | | FDK:083N8347 | FDK:083N8347 |
| DN 100 | FDK:083N8070 | | FDK:083N8025 | | FDK:083N8025 | FDK:083N8025 |
| DN 125 | FDK:083N8071 | | FDK:083N8071 | | FDK:083N8071 | FDK:083N8071 |
| DN 150 | FDK:083N8072 | | FDK:083N8008 | | FDK:083N8073 | FDK:083N8008 |
| DN 200 | FDK:083N8074 | FDK:083N8011 | FDK:083N8011 | FDK:083N8011 | FDK:083N8075 | FDK:083N8011 |
| DN 250 | FDK:083N8078 | FDK:083N8013 | FDK:083N8013 | FDK:083N8013 | FDK:083N8079 | FDK:083N8013 |
| DN 300 | FDK:083N8080 | FDK:083N8012 | FDK:083N8012 | FDK:083N8081 | FDK:083N8082 | FDK:083N8012 |
| DN 350 | FDK:083N8083 | FDK:083N8039 | FDK:083N8039 | FDK:083N8084 | FDK:083N8085 | FDK:083N8039 |
| DN 400 | FDK:083N8099 | FDK:083N8100 | FDK:083N8100 | FDK:083N8101 | FDK:083N8102 | FDK:083N8100 |
| DN 450 | FDK:083N8103 | FDK:083N8103 | FDK:083N8104 | FDK:083N8104 | FDK:083N8105 | FDK:083N8104 |
| DN 500 | FDK:083N8107 | FDK:083N8107 | FDK:083N8108 | FDK:083N8108 | FDK:083N8109 | FDK:083N8108 |
| DN 600 | FDK:083N8111 | FDK:083N8111 | FDK:083N8112 | FDK:083N8112 | | FDK:083N8113 |
| DN 700 | FDK:083N8300 | FDK:083N8294 | FDK:083N8294 | | | FDK:083N8372 |
| DN 750 | | | | | | |
| DN 800 | FDK:083N8303 | FDK:083N8304 | FDK:083N8304 | | | FDK:083N8373 |
| DN 900 | FDK:083N8306 | FDK:083N8307 | FDK:083N8307 | | | FDK:083N8396 |
| DN 1000 | FDK:083N8309 | FDK:083N8310 | FDK:083N8310 | | | FDK:083N8397 |
| DN 1100 | | FDK:083N8367 | FDK:083N8367 | | | FDK:083N8367 |
| DN 1200 | FDK:083N8312 | FDK:083N8313 | FDK:083N8313 | | | FDK:083N8398 |
| DN 1400 | FDK:083N8467 | FDK:083N8468 | FDK:083N8469 | | | |
| DN 1500 | FDK:083N8471 | FDK:083N8472 | FDK:083N8473 | | | |
| DN 1600 | FDK:083N8475 | FDK:083N8476 | FDK:083N8477 | | | |
| DN 1800 | FDK:083N8479 | FDK:083N8480 | FDK:083N8481 | | | |
| DN 2000 | FDK:083N8483 | FDK:083N8484 | FDK:083N8485 | | | |

| Size Inch | ANSI Class 150 | Class 300 | JIS K10 | JIS K20 |
|---|---|---|---|---|
| | Article No. | Article No. | Article No. | Article No. |
| 1" | FDK:083N8361 | FDK:083N8361 | FDK:083N8361 | FDK:083N8361 |
| 1½" | FDK:083N8362 | FDK:083N8362 | FDK:083N8362 | FDK:083N8362 |
| 2" | FDK:083N8344 | FDK:083N8344 | FDK:083N8344 | FDK:083N8344 |
| 2½" | FDK:083N8345 | FDK:083N8345 | FDK:083N8345 | FDK:083N8345 |
| 3" | FDK:083N8347 | FDK:083N8347 | FDK:083N8347 | FDK:083N8347 |
| 4" | FDK:083N8025 | FDK:083N8025 | FDK:083N8070 | FDK:083N8025 |
| 5" | FDK:083N8071 | FDK:083N8071 | FDK:083N8071 | FDK:083N8071 |
| 6" | FDK:083N8008 | FDK:083N8073 | FDK:083N8008 | FDK:083N8008 |
| 8" | FDK:083N8011 | FDK:083N8076 | FDK:083N8011 | FDK:083N8011 |
| 10" | FDK:083N8013 | FDK:083N8079 | FDK:083N8013 | FDK:083N8079 |
| 12" | FDK:083N8012 | FDK:083N8082 | FDK:083N8012 | FDK:083N8081 |
| 14" | FDK:083N8039 | FDK:083N8085 | FDK:083N8083 | FDK:083N8039 |
| 16" | FDK:083N8100 | FDK:083N8102 | FDK:083N8100 | FDK:083N8101 |
| 18" | FDK:083N8104 | FDK:083N8106 | FDK:083N8103 | FDK:083N8104 |
| 20" | FDK:083N8107 | FDK:083N8110 | FDK:083N8107 | FDK:083N8108 |
| 24" | FDK:083N8113 | FDK:083N8114 | FDK:083N8111 | FDK:083N8112 |

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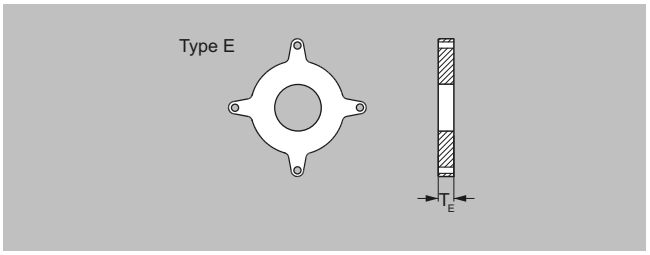


## Selection and ordering data (continued)

| Size Inch | AWWA C-207 |
|---|---|
| | Article No. |
| 28" | FDK:083N8302 |
| 30" | FDK:083N8366 |
| 32" | FDK:083N8305 |
| 36" | FDK:083N8308 |
| 40" | FDK:083N8311 |
| 42" | FDK:083N8394 |
| 44" | FDK:083N8395 |
| 48" | FDK:083N8314 |
| 54" | FDK:083N8470 |
| 60" | FDK:083N8474 |
| 66" | FDK:083N8478 |
| 72" | FDK:083N8482 |
| 80" | FDK:083N8486 |

1) Also for MAG 5100 W (7ME6520 > DN 300/12 inch and 7ME6580).

Grunding and protection ring - Type E (Stainless steel)




- Material: AISI 316
- For all PTFE liners
- 1 pc. incl. straps and screws

***Note:***

For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C (356 °F) versions - grounding ring type E is included and factory mounted.

For use as protection ring order 2 pcs. For use as grounding ring order 1 pc.

| Size DN | Nominale pressure PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | AS2129, Table E |
|---|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | Article No. | Article No. | Article No. |
| DN 15 | | | | | FDK:083N8365 | FDK:083N8365 |
| DN 25 | | | | | FDK:083N8271 | FDK:083N8272 |
| DN 40 | | | | | FDK:083N8278 | FDK:083N8280 |
| DN 50 | | | | | FDK:083N8282 | FDK:083N8281 |
| DN 65 | FDK:083N8284 | | FDK:083N8285 | | FDK:083N8286 | FDK:083N8284 |
| DN 80 | FDK:083N8288 | | FDK:083N8289 | | FDK:083N8290 | FDK:083N8293 |
| DN 100 | FDK:083N8116 | | FDK:083N8117 | | FDK:083N8118 | FDK:083N8117 |
| DN 125 | FDK:083N8120 | | FDK:083N8121 | | FDK:083N8122 | FDK:083N8121 |
| DN 150 | FDK:083N8124 | | FDK:083N8125 | | FDK:083N8126 | FDK:083N8128 |
| DN 200 | FDK:083N8129 | FDK:083N8130 | FDK:083N8130 | FDK:083N8131 | FDK:083N8132 | FDK:083N8134 |
| DN 250 | FDK:083N8135 | FDK:083N8136 | FDK:083N8137 | FDK:083N8138 | FDK:083N8139 | FDK:083N8143 |
| DN 300 | FDK:083N8144 | FDK:083N8144 | FDK:083N8145 | FDK:083N8146 | FDK:083N8147 | FDK:083N8151 |
| DN 350 | FDK:083N8152 | FDK:083N8153 | FDK:083N8154 | FDK:083N8155 | FDK:083N8156 | FDK:083N8153 |
| DN 400 | FDK:083N8160 | FDK:083N8161 | FDK:083N8162 | FDK:083N8163 | FDK:083N8164 | FDK:083N8161 |
| DN 450 | FDK:083N8168 | FDK:083N8169 | FDK:083N8170 | FDK:083N8171 | FDK:083N8172 | FDK:083N8176 |
| DN 500 | FDK:083N8177 | FDK:083N8178 | FDK:083N8179 | FDK:083N8180 | FDK:083N8181 | FDK:083N8185 |
| DN 600 | FDK:083N8186 | FDK:083N8187 | FDK:083N8188 | FDK:083N8189 | | A5E32710253 |

| Size Inch | ANSI Class 150 | Class 300 | JIS K10 | JIS K20 |
|---|---|---|---|---|
| | Article No. | Article No. | Article No. | Article No. |
| ½" | FDK:083N8365 | FDK:083N8365 | | |
| 1" | FDK:083N8272 | FDK:083N8272 | FDK:083N8271 | FDK:083N8271 |
| 1½" | FDK:083N8279 | FDK:083N8279 | FDK:083N8278 | FDK:083N8278 |
| 2" | FDK:083N8283 | FDK:083N8283 | FDK:083N8282 | FDK:083N8282 |
| 2½" | FDK:083N8287 | FDK:083N8287 | FDK:083N8285 | FDK:083N8285 |
| 3" | FDK:083N8291 | FDK:083N8292 | FDK:083N8288 | FDK:083N8289 |
| 4" | FDK:083N8118 | FDK:083N8119 | FDK:083N8116 | FDK:083N8117 |
| 5" | FDK:083N8122 | FDK:083N8123 | FDK:083N8121 | FDK:083N8122 |

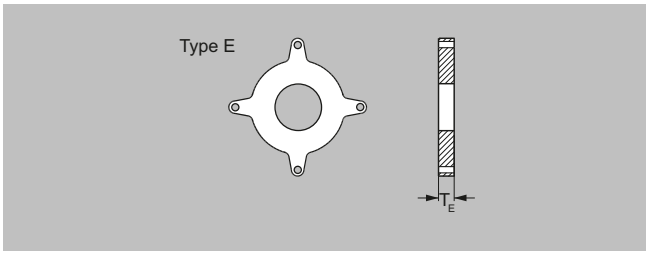
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## Selection and ordering data (continued)

| Size Inch | ANSI Class 150 | Class 300 | JIS K10 | JIS K20 |
|---|---|---|---|---|
| 6" | FDK:083N8126 | FDK:083N8127 | FDK:083N8125 | FDK:083N8126 |
| 8" | FDK:083N8370 | FDK:083N8133 | FDK:083N8130 | FDK:083N8370 |
| 10" | FDK:083N8140 | FDK:083N8141 | FDK:083N8137 | FDK:083N8139 |
| 12" | FDK:083N8148 | FDK:083N8149 | FDK:083N8144 | FDK:083N8146 |
| 14" | FDK:083N8157 | FDK:083N8158 | FDK:083N8152 | FDK:083N8154 |
| 16" | FDK:083N8165 | FDK:083N8166 | FDK:083N8160 | FDK:083N8165 |
| 18" | FDK:083N8173 | FDK:083N8174 | FDK:083N8169 | FDK:083N8171 |
| 20" | FDK:083N8182 | FDK:083N8183 | FDK:083N8178 | FDK:083N8180 |
| 24" | FDK:083N8190 | FDK:083N8191 | A5E32709738 | A5E32710253 |

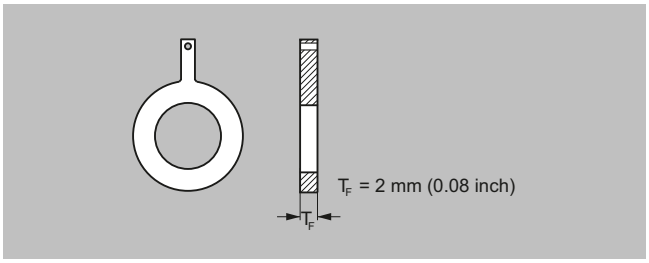
Grounding and protecting ring - Type E (Hastelloy)[1)]




- Material: Hastelloy C276
- For all PTFE liners
- 1 pc. incl. straps and screws

| Size DN | Nominale pressure PN 6 | PN 16 | PN 40 | Size Inch | ANSI Class 150 | Class 300 |
|---|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. | Article No. |
| DN 15 | | | FDK:083N8487 | ½" | FDK:083N8487 | FDK:083N8487 |
| DN 25 | | | FDK:083N8488 | 1" | FDK:083N8489 | FDK:083N8489 |
| DN 40 | | | FDK:083N8490 | 1½" | FDK:083N8491 | FDK:083N8491 |
| DN 50 | | | FDK:083N8492 | 2" | FDK:083N8493 | FDK:083N8493 |
| DN 65 | FDK:083N8494 | FDK:083N8495 | FDK:083N8496 | 2½" | FDK:083N8497 | FDK:083N8497 |
| DN 80 | FDK:083N8498 | FDK:083N8499 | FDK:083N8500 | 3" | FDK:083N8501 | FDK:083N8502 |
| DN 100 | FDK:083N8503 | FDK:083N8504 | FDK:083N8505 | 4" | FDK:083N8506 | FDK:083N8507 |

Grounding ring - Type Flat ring (Stainless steel)




- Material: AISI 316
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

| Size DN | Nominale pressure PN 10 | PN 16 | PN 40 | Size Inch | ANSI Class 150 | Class 300 |
|---|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. | Article No. |
| DN 15 | | | A5E01191968 | ½" | A5E01191969 | |
| DN 25 | | | A5E01150880 | 1" | A5E01150022 | A5E01150378 |
| DN 40 | | | A5E01191952 | 1½" | A5E01191961 | |
| DN 50 | | | A5E01150918 | 2" | A5E01151121 | A5E01151194 |
| DN 65 | | A5E01191940 | A5E01191954 | 2½" | A5E01191962 | |

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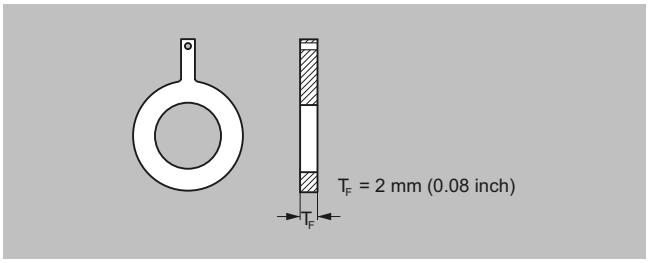


## Selection and ordering data (continued)

| Size DN | Nominale pressure PN 10 | PN 16 | PN 40 | Size Inch | ANSI Class 150 | Class 300 |
|---|---|---|---|---|---|---|
| DN 80 | | A5E01152876 | A5E01152876 | 3" | A5E01152910 | A5E01153422 |
| DN 100 | | A5E01158875 | A5E01159072 | 4" | A5E01159146 | A5E01159628 |
| DN 125 | | A5E01191941 | A5E01191956 | 5" | A5E01191963 | |
| DN 150 | | A5E01191943 | A5E01191957 | 6" | A5E01191964 | |
| DN 200 | A5E01191951 | A5E01191944 | A5E01191958 | 8" | A5E01191965 | |
| DN 250 | A5E01191950 | A5E01191946 | A5E01191959 | 10" | A5E01191966 | |
| DN 300 | A5E01191949 | A5E01191947 | A5E01191960 | 12" | A5E01191967 | |

1) Also for MAG 5100 W (7ME6580).

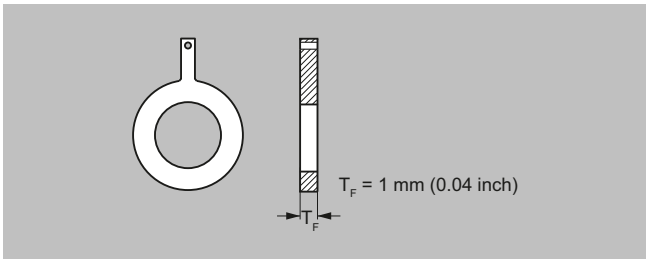
Grounding ring - Type Flat ring (Hastelloy)




- Material: Hastelloy C276
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

| Size DN | Nominale pressure PN 6 | PN 16 | PN 40 | Size Inch | ANSI Class 150 | Class 300 |
|---|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. | Article No. |
| DN 15 | | | A5E01191981 | ½" | A5E01191989 | |
| DN 25 | | | A5E01150882 | 1" | A5E01150028 | A5E01150379 |
| DN 40 | | | A5E01191982 | 1½" | A5E01191990 | |
| DN 50 | | | A5E01150922 | 2" | A5E01151124 | A5E01151197 |
| DN 65 | | A5E01191971 | A5E01191983 | 2½" | A5E01191991 | |
| DN 80 | | A5E01152889 | A5E01152889 | 3" | A5E01152913 | A5E01153424 |
| DN 100 | | A5E01158886 | A5E01159074 | 4" | A5E01159150 | A5E01159629 |
| DN 125 | | A5E01191973 | A5E01191984 | 5" | A5E01191992 | |
| DN 150 | | A5E01191974 | A5E01191985 | 6" | A5E01191993 | |
| DN 200 | A5E01191978 | A5E01191975 | A5E01191986 | 8" | A5E01191994 | |
| DN 250 | A5E01191979 | A5E01191976 | A5E01191987 | 10" | A5E01191995 | |
| DN 300 | A5E01191980 | A5E01191977 | A5E01191988 | 12" | A5E01191996 | |

Grounding ring - Type Flat ring (Tantalum)




- Material: Tantalum
- For all liners (PTFE max. 150 °C (302 °F))
- 1 pc.

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## Selection and ordering data (continued)

| Size DN | Nominale pressure PN 16 | PN 40 | Size Inch | ANSI Class 150 | Class 300 |
|---|---|---|---|---|---|
| | Article No. | Article No. | | Article No. | Article No. |
| DN 15 | | A5E01192007 | ½" | A5E01192010 | |
| DN 25 | | A5E01150883 | 1" | A5E01150030 | A5E01150381 |
| DN 40 | | A5E01192008 | 1½" | A5E01192011 | |
| DN 50 | | A5E01150926 | 2" | A5E01151129 | A5E01151199 |
| DN 65 | A5E01192005 | A5E01192009 | 2½" | A5E01192012 | |
| DN 80 | A5E01152890 | A5E01152890 | 3" | A5E01152916 | A5E01153427 |
| DN 100 | A5E01158891 | A5E01159076 | 4" | A5E01159156 | A5E01159631 |

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## Technical specifications

| Version | MAG 3100 | MAG 3100 HT (High Temperature) |
|---|---|---|
| Product characteristic | Flexible product program | Flexible product program |
| Nominal size | DN 15 ... 2000 (½" ... 80") | DN 15 ... 300 (½" ... 12") |
| Measuring principle | Electromagnetic induction | Electromagnetic induction |
| Excitation frequency (Mains supply: 50 Hz/60 Hz) | • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz | • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz |
| | • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz | • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz |
| | • DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz | • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz |
| | • DN 1400 ... 2200 (54" ... 88"): 1.5625 Hz/1.875 Hz | |
| **Process connection** | | |
| Flanges | EN 1092-1, raised face[1] (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) | EN 1092-1, raised face (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) |
| | • DN 65 ... 2200 (2½" ... 88"): PN 6 (87 psi) | • DN 15 ... 300 (½" ... 12"): PN 40 (580 psi) |
| | • DN 200 ... 2200 (8" ... 88"): PN 10 (145 psi) | • DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) |
| | • DN 65 ... 2000 (2½" ... 80"): PN 16 (232 psi) | • DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) |
| | • DN 200 ... 600 (8" ... 24"): PN 25 (362 psi) | • DN 200 ... 300 (8" ... 12"): PN 25 (362 psi) |
| | • DN 15 ... 600 (½" ... 24"): PN 40 (580 psi) | |
| | • DN 50 ... 300 (2" ... 12"): PN 63 (913 psi) | |
| | • DN 25 ... 300 (1" ... 12"): PN 100 (1450 psi) | |
| | ANSI B16.5 (~BS 1560), raised face: | ANSI B16.5 (~BS 1560), raised face: |
| | • ½" ... 24": Class 150 (20 bar (290 psi)) | • ½" ... 12": Class 150 (20 bar (290 psi)) |
| | • ½" ... 24": Class 300 (50 bar (725 psi)) | • ½" ... 12": Class 300 (50 bar (725 psi)) |
| | • ½" ... 16": Class 600 (100 bar (1450 psi)) | |
| | AWWA C-207, flat face 28" ... 88": Class D (10 bar) | |
| | AS 2129, raised face ½" ... 48": Table E | AS 2129, raised face ½" ... 12": Table E |
| | AS 4087, raised face: | |
| | • PN 16 (DN 50 ... 1200, 16 bar (232 psi)) | |
| | • PN 21 (DN 50 ... 600, 21 bar (304 psi)) | |
| | • PN 35 (DN 50 ... 600, 35 bar (508 psi)) | |
| | JIS B 2220:2004 | |
| | • K10 (1" ... 24") | |
| | • K20 (1" ... 24") | |
| | Other flanges and pressure ratings on request | Other flanges and pressure ratings on request |
| ***Rated operation conditions*** | | |
| Ambient temperature (conditions also dependent on liner characteristics) | | |
| • Standard sensor | -40 ... +100 °C (-40 ... +212 °F) | -40 ... +100 °C (-40 ... +212 °F) |
| • Ex sensor | -20 ... +60 °C (-4 ... +140 °F) | For medium temperature up to 150 °C (302 °F): -20 ... +60 °C (-4 ... +140 °F) |

## Technical specifications (continued)

| Version | MAG 3100 | MAG 3100 HT (High Temperature) |
|---|---|---|
| • Ex sensor | -20 ... +60 °C (-4 ... +140 °F) | For medium temperature 150 ... 180 °C (302 ... 356 °F): -20 ... +50 °C (-4 ... +122 °F) |
| • Compact with transmitter | | |
| - MAG 5000/6000 | -20 ... +60 °C (-4 ... +140 °F) | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I [8] | -20 ... +60 °C (-4 ... +140 °F) | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I Ex [8] | -20 ... +60 °C (-4 ... +140 °F) | -20 ... +60 °C (-4 ... +140 °F) |
| **Operating pressure** | | |
| [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges) | • Softrubber 0.01 ... 100 bar (0.15 ... 1450 psi) | |
| | • EPDM 0.01 ... 40 bar (0.15 ... 580 psi) | |
| | • Linatex 0.01 ... 40 bar (0.15 ... 580 psi) | |
| | • Ebonite 0.01 ... 100 bar (0.15 ... 1450 psi) | |
| | • PTFE | • PTFE Teflon |
| | - DN ≤ 300 (≤ 12"): 0.3 ... 50 bar (4 ... 725 psi) | - DN 15 ... 300 (½" ... 12"): 0.3/0.6 ... 50 bar (4/8 ... 725 psi) (180 °C (356 °F). Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. |
| | - 350 ≤ DN ≤ 600 (14"≤ DN ≤ 24"): 0.3 ... 40 bar (4 ... 580 psi) | |
| | • PFA | • PFA |
| | - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi) | - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi) |
| Enclosure rating | IP67 to EN 60529/NEMA 6, 1 m$H_2O$ for 30 min | IP67 to EN 60529/NEMA 6, 1 m$H_2O$ for 30 min |
| | Option: IP68 to EN 60529/NEMA 6P,10 m$H_2O$ cont. | Option: IP68 to EN 60529/NEMA 6P,10 m$H_2O$ cont. |
| Pressure drop at 3 m/s | As straight pipe | |
| Test pressure | 1.5 x PN (where applicable) | |
| Mechanical load (vibration) | 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 | 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 |
| | Sensor: 3.17 g RMS | Sensor: 3.17 g RMS |
| | Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS | Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS |
| | Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS | Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS |
| Temperature of medium | • Soft rubber 0 ... +70 °C (32 ... 158 °F) | • PTFE -20 ... +150 °C (-4 ... +302 °F) |
| | • EPDM -10 ... +70 °C (14 ... 158 °F) | • PTFE -20 ... +180 °C (-4 ... +356 °F) Factory mounted grounding rings type E in stainless steel and stainless steel terminal box. Can only be used with remote transmitter. |
| | • Linatex (rubber) -40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 304 or 316 flanges must be used) | • PFA -20 ... +150 °C (-4 ... +302 °F) |

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## Technical specifications (continued)

| Version | MAG 3100 | MAG 3100 HT (High Temperature) |
|---|---|---|
| Temperature of medium | • Ebonite 0 ... 95 °C (32 ... 203 °F)<br>• PTFE -20 ... +100 °C (-4 ... +212 °F)<br>• PFA -20 ... +100 °C (-4 ... +212 °F) | |
| EMC | 2014/30/EU | 2014/30/EU |
| **Design** | | |
| Weight | See dimensional drawings | |
| Flange and housing material | Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 or grade C5 (medium durability ≤15 years)<br>or<br>Stainless steel AISI 304/1.4301 flanges and carbon steel housing with corrosion protection EN ISO 12944 grade C4 or grade C5 (durability up to 15 years)<br>or<br>Stainless steel AISI 316L/1.4404 flanges and housing, polished | Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4<br>or<br>Stainless steel AISI 304/1.4301 flanges and carbon steel housing with corrosion protection EN ISO 12944 grade C4<br>or<br>Stainless steel AISI 316L/1.4404 flanges and housing, polished |
| Measuring pipe material | Stainless steel AISI 304/1.4301 | Stainless steel AISI 304/1.4301 |
| Electrode material | • Stainless steel AISI 316Ti/1.4571<br>• Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602)<br>• Platinum<br>• Titanium<br>• Tantalum<br>• Ceramic coated stainless steel<br>• Ceramic coated Hastelloy C | • Stainless steel AISI 316Ti/1.4571<br>• Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602)<br>• Platinum<br>• Titanium<br>• Tantalum |
| Grounding electrode material | • Soft rubber, EPDM, Linatex, Ebonite: grounding electrodes built-in by default for stainless steel and Hastelloy C<br>• PTFE: optional in Stainless steel, Hastelloy C, Titanium, Platinum or Tantalum<br>• PFA: optional in Hastelloy, Tantalum or Platinum<br>• Ceramic coated stainless steel and Hastelloy C276: grounding electrodes built-in by default | • PTFE: no grounding electrodes<br>• PFA: optional in Hastelloy, Tantalum or Platinum |
| Terminal box (remote version only) | • Standard fibre glass reinforced polyamide<br>• Option Stainless steel AISI 316/1.4436<br>• Ex Stainless steel AISI 316/1.4436 | • Standard fibre glass reinforced polyamide (max. 150 °C (302 °F))<br>• Stainless steel AISI 316/1.4436<br>• Ex Stainless steel AISI 316/1.4436 |
| Cable entries | • Remote installation 2 x M20 or 2 x ½" NPT<br>• Compact installation | • Remote installation 2 x M20 or 2 x ½" NPT |

## Technical specifications (continued)

| Version | MAG 3100 | MAG 3100 HT (High Temperature) |
|---|---|---|
| Cable entries | • MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT<br>• MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output)<br>• MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output) | |
| **Certificates and approvals** | | |
| Calibration | | |
| • Default calibration | Zero-point, 2 x 25 % and 2 x 90 % (default) | Zero-point, 2 x 25 % and 2 x 90 % |
| • Special calibration | 5-point calibration: 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$<br>10-point calibration: ascending and descending at 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$<br>Matched pair calibration: default, 5-point or 10-point | |
| Hazardous areas[2] | | |
| • Ex-sensor in compact or remote version with MAG 6000 I Ex | • ATEX, FM, CSA, IECEx, EAC Ex, NEPSI<br>- Zone 1 Ex d e ia IIC T6 Gb[4]<br>- Zone 1 Ex e ia IIC T6 Gb[5]<br>• ATEX, FM, CSA, IECEx<br>- Zone 21 Ex tD A21 IP67<br>• FM<br>- XP IS Class I Div. 1 Groups A, B, C, D[6]<br>- DIP Class II+III Div. 1 Groups E, F, G[6]<br>• KCs<br>- Zone 1 Ex d e ia IIC T6 [4]<br>- Zone 1 Ex e ia IIC T6 [5] | • ATEX, FM, CSA, IECEx, EAC Ex, NEPSI<br>- Zone 1 Ex d e ia IIC T6 Gb[4]<br>- Zone 1 Ex e ia IIC T6 Gb[5]<br>• ATEX, FM, CSA, IECEx<br>- Zone 21 Ex tD A21 IP67<br>• FM<br>- XP IS Class I Div. 1 Groups A, B, C, D [6]<br>- DIP Class II+III Div. 1 Groups E, F, G [6] |
| • Standard sensor with/without MAG 5000/6000/6000 I | • FM<br>- NI Class I Div. 2 Groups A, B, C, D<br>- NI Class I Zone 2 Groups IIC | • FM<br>- NI Class I Div. 2 Groups A, B, C, D<br>- NI Class I Zone 2 Groups IIC |
| Drinking water | EPDM liner:<br>• WRAS (WRc, BS6920 material approval for cold water, GB)<br>• NSF/ANSI Standard 617) (Cold water, US)<br>• ACS listed (F)<br>• DVGW W270 (D)<br>• KIWA (NL)<br>• Belgaqua (B)<br>• AS/NZS4020 (Australia/New Zealand)<br>• MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes)<br>Ebonite liner<br>• NSF/ANSI Standard 61/372) (Cold water, US)<br>• GB/T5750 (CN)<br>• AS/NZS4020 (Australia/New Zealand) | |

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## Technical specifications (continued)

| Version | MAG 3100 | MAG 3100 HT (High Temperature) |
|---|---|---|
| Pressure equipment | PED conforming: All EN 1092-1 flanges 2014/68/EU [3] | PED conforming: All EN 1092-1 flanges 2014/68/EU [3] |
| Others | • CRN (Canadian Registration Number)<br>• CPA (China)<br>• EAC (Kazakhstan) | • CRN (Canadian Registration Number)<br>• CPA (China)<br>• EAC (Kazakhstan) |

Technical specification for transmitter - please see section about transmitters.

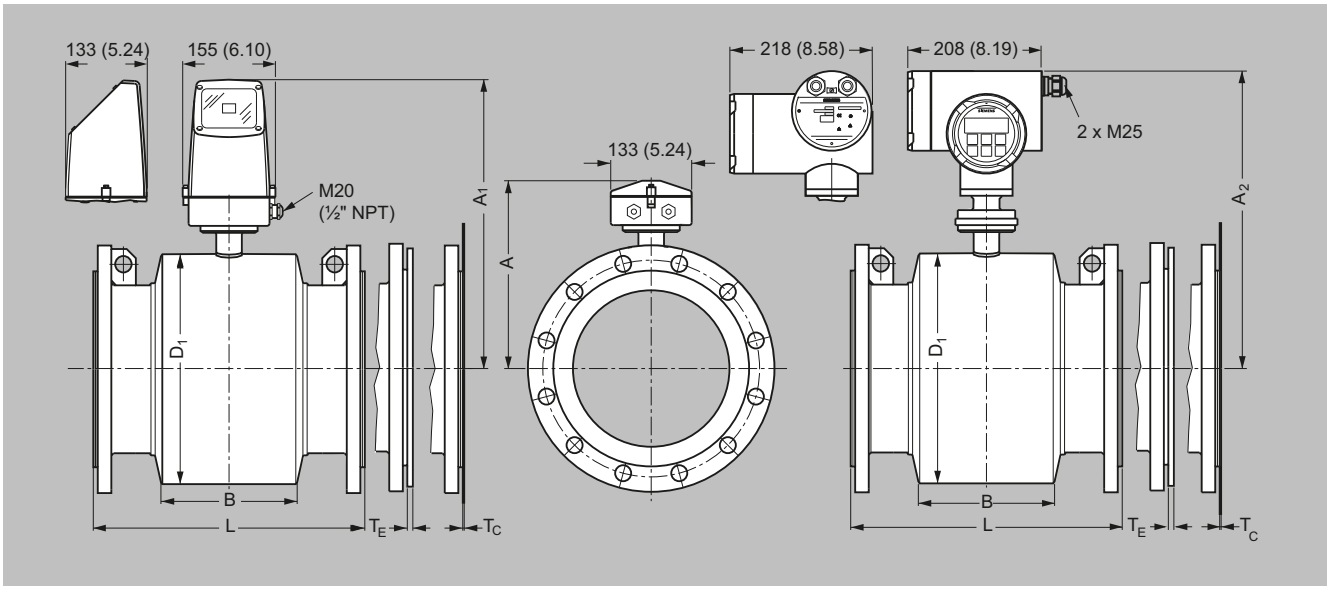
1) PN 6-40: DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF); PN 63-100: type 11 (WNRF).
2) Not for sensors with 300 µm coating.
3) For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the Pressure Equipment directive, also products sold into certain market sectors are excluded. These include: (a) Meters used in networks for the supply, distribution and discharge of water; (b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore; (c) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment; (d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see the section about Pressure Equipment Directive.
4) In remote version with sensor size DN 15 ... 300 (½" ... 12").
5) In remote version with sensor size DN 350 ... 2000 (14" ... 80").
6) In compact version with sensor size DN 15 ... 300 (½" ... 12").
7) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
8) With HART communication max. ambient temperature 50 °C (122 °F).

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## Dimensional drawings

***MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter***




Dimensions in mm (inch)

Metric

| DN | A[1)] | | $A_2$ | B | $D_1$ | L[2)3)] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | EN 1092-1-201 | | | | | | ANSI 16.5 | | |
| | | | | | | PN 6, 10 | PN 16/ PN 16 non-PED | PN 25 | PN 40 | PN 63 | PN 100 | Class 1-50 | Class 3-00 | Class 6-00 |
| [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 15 | 187 | 341 | 338 | 59 | 104 | - | -/- | - | 200 | - | - | 200 | 200 | - |
| 25 | 187 | 341 | 338 | 59 | 104 | - | -/- | - | 200 | - | 260 | 200 | 200 | 280[4)] |
| 32 | 193 | 346 | 336 | 86 | 114 | - | -/- | - | 200 | - | 280 | 200 | 200 | 300[4)] |
| 40 | 197 | 351 | 348 | 82 | 124 | - | -/- | - | 200 | - | 280 | 200 | 200 | 320[4)] |
| 50 | 205 | 359 | 356 | 72 | 139 | - | -/- | - | 200 | 276 | 300 | 200 | 200 | 330[4)] |
| 65 | 212 | 366 | 363 | 72 | 154 | 200 | 200/- | - | 200 | 320 | 350 | 200 | 272 | 370[4)] |
| 80 | 222 | 376 | 373 | 72 | 174 | 200 | 200/- | - | 272[4)] | 323 | 340 | 272[4)] | 272[4)] | 350 |
| 100 | 242 | 396 | 393 | 85 | 214 | 250 | 250/- | - | 250 | 380 | 400 | 250 | 310 | 460[4)] |
| 125 | 255 | 409 | 406 | 85 | 239 | 250 | 250/- | - | 250 | 420 | 450 | 250 | 335 | 480[4)] |
| 150 | 276 | 430 | 427 | 85 | 282 | 300 | 300/- | - | 300 | 415 | 450 | 300 | 300 | 500[4)] |
| 200 | 304 | 458 | 455 | 137 | 338 | 350 | 350/- | 350 | 350 | 480 | 530 | 350 | 350 | 600[4)] |
| 250 | 332 | 486 | 483 | 157 | 393 | 450 | 450/- | 450 | 450 | 550 | 620 | 450 | 450 | 600[4)] |
| 300 | 357 | 511 | 508 | 157 | 444 | 500 | 500/- | 500 | 500 | 600 | 680 | 500 | 500 | 700[4)] |
| 350 | 362 | 516 | 513 | 270 | 451 | 550 | 550/- | 550 | 550 | - | - | 550 | 550 | 800[4)] |
| 400 | 387 | 541 | 538 | 270 | 502 | 600 | 600/- | 600 | 600 | - | - | 600 | 600 | 820[4)] |
| 450 | 418 | 572 | 569 | 310 | 563 | 600 | 600/- | 600 | 600 | - | - | 600 | 640 | - |
| 500 | 443 | 597 | 594 | 350 | 614 | 600 | 600/- | 625 | 680 | - | - | 600 | 730 | - |
| 600 | 494 | 648 | 645 | 320 | 715 | 600 | 600/- | 750 | 800 | - | - | 600 | 860 | - |
| 700 | 544 | 698 | 695 | 450 | 816 | 700 | 875/700 | 800 | - | - | - | 800 | - | - |
| 750 | 571 | 725 | 722 | 556 | 869 | - | -/- | - | - | - | - | 950 | - | - |
| 800 | 606 | 760 | 757 | 560 | 927 | 800 | 1000/800 | 900 | - | - | - | 900 | - | - |
| 900 | 653 | 807 | 804 | 630 | 1032 | 900 | 1125/900 | 1000 | - | - | - | 1100 | - | - |
| 1000 | 704 | 858 | 855 | 670 | 1136 | 1000 | 1250/1000 | 1100 | - | - | - | 1100 | - | - |
| 1050 | 704 | 858 | 855 | 670 | 1136 | - | -/- | - | - | - | - | - | - | - |
| 1100 | 755 | 904 | 901 | 770 | 1238 | - | -/- | - | - | - | - | - | - | - |
| 1200 | 810 | 964 | 961 | 792 | 1348 | 1200 | 1500/1200 | 1300 | - | - | - | 1400 | - | - |
| 1400 | 925 | 1079 | 1076 | 1000 | 1574 | 1400 | -/1400 | - | - | - | - | - | - | - |

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## Dimensional drawings (continued)

| DN | A[1] | | $A_2$ | B | $D_1$ | L[2][3] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | EN 1092-1-201 | | | | | | ANSI 16.5 | | |
| | | | | | | PN 6, 10 | PN 16/ PN 16 non-PED | PN 25 | PN 40 | PN 63 | PN 100 | Class 1-50 | Class 3-00 | Class 6-00 |
| [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| 1500 | 972 | 1126 | 1123 | 1020 | 1672 | 1500 | -/1500 | - | - | - | - | - | - | - |
| 1600 | 1025 | 1179 | 1176 | 1130 | 1774 | 1600 | -/1600 | - | - | - | - | - | - | - |
| 1800 | 1123 | 1277 | 1274 | 1250 | 1974 | 1800 | -/1800 | - | - | - | - | - | - | - |
| 2000 | 1223 | 1377 | 1374 | 1375 | 2174 | 2000 | -/2000 | - | - | - | - | - | - | - |
| 2200 | 1353 | 1507 | - | 1496 | 2400 | 2200 | -/- | - | - | - | - | - | - | - |

1) 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)
2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length
3) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):
DN 15 to DN 200: +0/-3 mm
DN 250 to DN 400: +0/-5 mm
DN 450 to DN 600: +5/-5 mm
DN 700 to DN 2000: +10/-10 mm
Tolerances on built-in length (PN 63 and PN 100): All sizes +8/-8 mm
4) Not according to ISO 20456

| DN | L[1][2] | | | | $T_C$[3] | $T_E$[3] | $T_F$[3] | Weight[4] |
|---|---|---|---|---|---|---|---|---|
| | AS 2129 E AS 4087 PN 16, 21, 35 | AWWA C-207 Class D | JIS K10 | JIS K20 | | | | |
| [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [kg] |
| 15 | 200 | - | 200 | 200 | - | 6 | 2 | 4 |
| 25 | 200 | - | 200 | 200 | 1.2 | 6 | 2 | 5 |
| 32 | 200 | - | 200 | 240[9] | 1.2 | 6 | 2 | 5 |
| 40 | 200 | - | 200 | 240[9] | 1.2 | 6 | 2 | 7 |
| 50 | 200 | - | 200 | 240[9] | 1.2 | 6 | 2 | 9 |
| 65 | 200 | - | 200 | 272[9] | 1.2 | 6 | 2 | 11 |
| 80 | 200 [5] | - | 200[9] | 272[9] | 1.2 | 6 | 2 | 12 |
| 100 | 250 | - | 250 | 310 | 1.2 | 6 | 2 | 16 |
| 125 | 250 | - | 250 | 335 | 1.2 | 6 | 2 | 19 |
| 150 | 300 | - | 300 | 300 | 1.2 | 6 | 2 | 27 |
| 200 | 350 | - | 350 | 350 | 1.2 | 8 | 2 | 40 |
| 250 | 450 | - | 450 | 450 | 1.2 | 8 | 2 | 60 |
| 300 | 500 | - | 500 | 500 | 1.6 | 8 | 2 | 80 |
| 350 | 550 | - | 550 | 550 | 1.6 | 8 | - | 110 |
| 400 | 600 | - | 600 | 600 | 1.6 | 10 | - | 125 |
| 450 | 600 | - | 600 | 640 | 1.6 | 10 | - | 175 |
| 500 | 600[6] | - | 600 | 680 | 1.6 | 10 | - | 200 |
| 600 | 600[7] | - | 600 | 800 | 1.6 | 10 | - | 287 |
| 700 | 700[8] | 700 | - | - | 2.0 | - | - | 330 |
| 750 | 750[8] | 750 | - | - | 2.0 | - | - | 360 |
| 800 | 800[8] | 800 | - | - | 2.0 | - | - | 450 |
| 900 | 900[8] | 900 | - | - | 2.0 | - | - | 530 |
| 1000 | 1000[8] | 1000 | - | - | 2.0 | - | - | 660 |
| 1050 | - | 1000 | - | - | 2.0 | - | - | 660 |
| 1100 | - | 1100 | - | - | 2.0 | - | - | 1140 |
| 1200 | 1200[6] | 1200 | - | - | 2.0 | - | - | 1180 |
| 1400 | - | 1400 | - | - | 2.0 | - | - | 1600 |
| 1500 | - | 1500 | - | - | 3.0 | - | - | 2460 |
| 1600 | - | 1600 | - | - | 3.0 | - | - | 2525 |
| 1800 | - | 1800 | - | - | 3.0 | - | - | 2930 |
| 2000 | - | 2000 | - | - | 3.0 | - | - | 3665 |
| 2200 | - | 2200 | - | - | - | - | - | 5690 |

1) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.
2) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):
DN 15 to DN 200: +0/-3 mm
DN 250 to DN 400: +0/-5 mm
DN 450 to DN 600: +5/-5 mm
DN 700 to DN 2000: +10/-10 mm
Tolerances on built-in length (PN 63 and PN 100): All sizes +8/-8 mm
3) $T_C$ = Protection ring type C , $T_E$ = Grounding ring type E (included and factory mounted for 180 °C PTFE liner), $T_F$ = Grounding ring Type Flat ring

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## Dimensional drawings (continued)

4) Weights are approx. (for PN 16) without transmitter.
5) PN 35 DN 80 = 272 mm (not according to ISO 20456)
6) PN 35 DN 500 = 680 mm
7) PN 35 DN 600 = 750 mm
8) Not AS 4087 PN 21 or PN 35
9) Not according to ISO 20456
D = Outside diameter of flange, see flange tables

***MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter***

Imperial

| DN | A[1] | | $A_2$ | B | $D_1$ | L[2)3)] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | EN 1092-1-201 | | | | | | ANSI 16.5/ASME B16.47[4] | | |
| | | | | | | PN 6, 10 | PN 16/PN 16 non-PED | PN 25 | PN 40 | PN 63 | PN 100 | Class 150 | Class 300 | Class 600 |
| [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| ½ | 7.36 | 13.31 | 13.25 | 2.32 | 4.09 | - | - | - | 7.87 | - | - | 7.87 | 7.87 | - |
| 1 | 7.36 | 13.31 | 13.25 | 2.32 | 4.09 | - | - | - | 7.87 | - | 10.24[5] | 7.87 | 7.87 | 11.02[5] |
| 1¼ | 7.6 | 13.6 | 13.6 | 3.4 | 4.5 | - | - | - | 7.87 | - | 11.02 | 7.87 | 7.87 | 11.8[5] |
| 1½ | 7.76 | 13.70 | 13.64 | 3.23 | 4.88 | - | - | - | 7.87 | - | 11.02 | 7.87 | 7.87 | 12.60[5] |
| 2 | 8.07 | 14.01 | 13.95 | 2.83 | 5.47 | - | - | - | 7.87 | 10.87[5] | 11.81 | 7.87 | 7.87 | 12.99[5] |
| 2½ | 8.35 | 14.29 | 14.23 | 2.83 | 6.06 | 7.87 | 7.87/- | - | 7.87 | 12.60[5] | 13.78 | 7.87 | 10.71[5] | 14.6[5] |
| 3 | 8.74 | 14.69 | 14.63 | 2.83 | 6.85 | 7.87 | 7.87/- | - | 10.71[5] | 12.72[5] | 13.39 | 10.71[5] | 10.71[5] | 13.78[5] |
| 4 | 9.53 | 15.47 | 15.41 | 3.35 | 8.43 | 9.84 | 9.84/- | - | 9.84 | 14.96[5] | - | 9.84 | 12.20[5] | 18.11[5] |
| 5 | 10.04 | 15.98 | 15.92 | 3.35 | 9.41 | 9.84 | 9.84/- | - | 9.84 | 16.54[5] | - | 9.84 | 13.10[5] | 18.90[5] |
| 6 | 10.87 | 16.81 | 16.75 | 5.39 | 11.10 | 11.81 | 11.81/- | - | 11.81 | 16.34[5] | - | 11.81 | 11.81 | 19.68[5] |
| 8 | 11.97 | 17.91 | 17.85 | 5.39 | 13.31 | 13.78 | 13.78/- | 13.78 | 13.78 | 18.90[5] | - | 13.78 | 13.78 | 23.62[5] |
| 10 | 13.07 | 19.02 | 18.96 | 6.18 | 15.47 | 17.72 | 17.72/- | 17.72 | 17.72 | - | - | 17.72 | 17.72 | 23.62[5] |
| 12 | 14.05 | 20.00 | 19.94 | 6.18 | 17.48 | 19.69 | 19.69/- | 19.69 | 19.69 | - | - | 19.69 | 19.69 | 27.56[5] |
| 14 | 14.25 | 20.20 | 20.14 | 10.63 | 17.76 | 21.65 | 21.65/- | 21.65 | 21.65 | - | - | 21.65 | 21.65 | 31.5[5] |
| 16 | 15.24 | 21.18 | 21.12 | 10.63 | 19.76 | 23.62 | 23.62/- | 23.62 | 23.62 | - | - | 23.62 | 23.62 | 32.3[5] |
| 18 | 16.45 | 22.40 | 22.34 | 12.20 | 22.16 | 23.62 | 23.62/- | 23.62 | 23.62 | - | - | 23.62 | 25.20 | - |
| 20 | 17.44 | 23.39 | 23.33 | 13.78 | 24.17 | 23.62 | 23.62/- | 24.61 | 26.77 | - | - | 23.62 | 28.70 | - |
| 24 | 19.45 | 25.39 | 25.33 | 12.59 | 28.15 | 23.62 | 23.62/- | 29.53 | 31.50 | - | - | 23.62 | 33.80 | - |
| 28 | 21.42 | 27.36 | 27.30 | 17.72 | 32.13 | 27.56 | 34.45/27.5-6 | 31.50 | - | - | - | 31.50 | - | - |
| 30 | 22.48 | 28.43 | 28.37 | 21.89 | 34.21 | - | -/- | - | - | - | - | 37.41 | - | - |
| 32 | 23.86 | 29.80 | 29.74 | 22.05 | 36.50 | 31.50 | 39.37/31.5-0 | 35.44 | - | - | - | 35.44 | - | - |
| 36 | 25.71 | 31.65 | 31.59 | 24.80 | 40.63 | 35.43 | 44.29/35.4-3 | 39.38 | - | - | - | 43.32 | - | - |
| 40 | 27.72 | 33.85 | 33.79 | 26.38 | 44.72 | 39.37 | 49.21/39.3-7 | 43.32 | - | - | - | 43.32 | - | - |
| 42 | 27.72 | 33.85 | 33.79 | 26.38 | 44.72 | - | -/- | - | - | - | - | - | - | - |
| 44 | 29.72 | 35.67 | 35.61 | 30.31 | 48.74 | - | -/- | - | - | - | - | - | - | - |
| 48 | 31.89 | 37.83 | 37.77 | 31.18 | 53.07 | 47.24 | 59.06/47.2-4 | 51.19 | - | - | - | 55.12 | - | - |
| 54 | 36.42 | 42.36 | 42.30 | 39.37 | 61.97 | 55.12 | -/55.12 | - | - | - | - | - | - | - |
| 60 | 38.27 | 44.21 | 44.15 | 40.15 | 65.83 | 59.06 | 59.06/59.0-6 | - | - | - | - | - | - | - |
| 66 | 40.35 | 46.30 | 46.24 | 44.49 | 69.84 | 62.99 | -/62.99 | - | - | - | - | - | - | - |
| 72 | 44.21 | 50.16 | 50.10 | 49.21 | 77.72 | 70.87 | -/70.87 | - | - | - | - | - | - | - |
| 80 | 48.15 | 54.09 | 54.03 | 54.13 | 85.59 | 78.74 | -/78.74 | - | - | - | - | - | - | - |
| 88 | 53.30 | 59.03 | - | 58.90 | 94.50 | 86.60 | - | - | - | - | - | - | - | - |

1) 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)
2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length
3) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):
½" to 8": +0/-0.12", 10" to DN 16" : +0/-0.20", 18" to DN 24" : +0.20/-0.20", 28" to DN 80" : +0.39/-0.39"
Tolerances on built-in length (PN 63 and PN 100): All sizes +0.31"/-0.31"
4) ANSI 16.5 for DN ≤ 24"; ASME B16.47 for DN ≥ 28"
5) Not according to ISO 20456

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## Dimensional drawings (continued)

| Size | L[1)2)] | | | | $T_{C3}$[3)] | $T_E$[3)] | $T_F$[3)] | Weight[4)] |
|---|---|---|---|---|---|---|---|---|
| | AS 2129 E AS 4087 PN 16, 21, 35 | AWWA C-207 Class D | JIS K10 | JIS K20 | | | | |
| [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [lbs] |
| ½ | 7.87 | - | 7.87 | 7.87 | - | 0.24 | 0.08 | 9 |
| 1 | 7.87 | - | 7.87 | 7.87 | 0.05 | 0.24 | 0.08 | 11 |
| 1¼ | 7.87 | - | 7.87 | 9.44 | 0.05 | 0.24 | 0.08 | 11 |
| 1½ | 7.87 | - | 7.87 | 9.44 | 0.05 | 0.24 | 0.08 | 17 |
| 2 | 7.87 | - | 7.87 | 9.44 | 0.05 | 0.24 | 0.08 | 20 |
| 2½ | 7.87 | - | 7.87 | 10.70 | 0.05 | 0.24 | 0.08 | 24 |
| 3 | 7.87[5)] | - | 7.87[8)] | 10.70[9)] | 0.05 | 0.24 | 0.08 | 26 |
| 4 | 9.84 | - | 9.84 | 12.20 | 0.05 | 0.24 | 0.08 | 35 |
| 5 | 9.84 | - | 9.84 | 13.18 | 0.05 | 0.24 | 0.08 | 42 |
| 6 | 11.81 | - | 11.81 | 11.81 | 0.05 | 0.24 | 0.08 | 60 |
| 8 | 13.78 | - | 13.77 | 13.77 | 0.05 | 0.31 | 0.08 | 88 |
| 10 | 17.72 | - | 17.71 | 17.71 | 0.05 | 0.31 | 0.08 | 132 |
| 12 | 19.69 | - | 19.68 | 19.68 | 0.06 | 0.31 | 0.08 | 176 |
| 14 | 21.65 | - | 21.65 | 21.65 | 0.06 | 0.31 | - | 242 |
| 16 | 23.62 | - | 23.62 | 23.62 | 0.06 | 0.39 | - | 275 |
| 18 | 23.62 | - | 23.62 | 25.19 | 0.06 | 0.39 | - | 385 |
| 20 | 23.62[6)] | - | 23.62 | 26.77 | 0.06 | 0.39 | - | 440 |
| 24 | 23.62[7)] | - | 23.62 | 31.49 | 0.06 | 0.39 | - | 633 |
| 28 | 27.56[8)] | 27.56 | - | - | 0.08 | - | - | 728 |
| 30 | 29.53[8)] | 29.52 | - | - | 0.08 | - | - | 794 |
| 32 | 31.80[7)] | 31.50 | - | - | 0.08 | - | - | 992 |
| 36 | 35.43[8)] | 35.43 | - | - | 0.08 | - | - | 1168 |
| 40 | 39.37[8)] | 39.37 | - | - | 0.08 | - | - | 1455 |
| 42 | - | 39.37 | - | - | 0.08 | - | - | 1455 |
| 44 | - | 43.31 | - | - | 0.08 | - | - | 2513 |
| 48 | 47.24[8)] | 47.24 | - | - | 0.08 | - | - | 2601 |
| 54 | - | 55.12 | - | - | 0.12 | - | - | 3528 |
| 60 | - | 59.06 | - | - | 0.12 | - | - | 5423 |
| 66 | - | 63.00 | - | - | 0.12 | - | - | 5566 |
| 72 | - | 70.87 | - | - | 0.12 | - | - | 6460 |
| 80 | - | 78.74 | - | - | 0.12 | - | - | 8080 |
| 88 | - | 86.6 | - | - | - | - | - | 12544 |

1) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.
2) Tolerances on built-in length (PN 6, PN 10, PN 16, PN 25 and PN 40):
½" to 8": +0/-0.12", 10" to 16": +0/-0.2", 18" to 24": +0.2"/-0.2", 28" to 80": +0.39"/-0.39"
Tolerances on built-in length (PN 63 and PN 100): All sizes +0.31"/-0.31"
3) $T_C$ = Protection ring type C , $T_E$ = Grounding ring type E (included and factory mounted for 356 °F PTFE liner), $T_F$ = Grounding ring Type Flat ring
4) Weights are for ANSI 150 without transmitter.
5) PN 35 DN 80 = 10.07 inch
6) PN 35 DN 500 = 26.77 inch
7) PN 35 DN 600 = 2.53 inch
8) Not AS 4087 PN 21 or PN 35
9) Not according to ISO 20456
D = Outside diameter of flange, see flange tables

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## Overview



The SITRANS FM MAG 3100 P is designed to meet the most common specifications within chemical and process industries.

## Benefits

- DN 15 to DN 300 (½" to 12")
- Included in Quick Ship Program (delivery time see PIA LCP)
- Most used flowmeter in the chemical and process industries with PTFE/PFA liner and Hastelloy electrodes
- Excellent chemical resistance
- Full scope of global approvals for hazardous areas:
  - ATEX, FM, CSA, IEcEx
  - 24 V and 115/230 V Ex compact and remote
  - intrinsically safe ia analog output
- Comprehensive self-diagnostic for error indication and error logging
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Conforming to NAMUR recommendations NE 21, NE 32, NE 43, NE 53 and NE 70

## Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Chemical industry
- Process industry
- Pulp and paper
- Industrial waste water

## Design

- Compact or remote mounting possible
- Easy “plug & play” field changeability of transmitter
- High temperature sensor for applications with temperatures up to 150 °C (302 °F)
- Meets EEC directives: PED, 2014/68/EU pressure directive for EN 1092-1 flanges
- Build-in length according to ISO 20456
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

## Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

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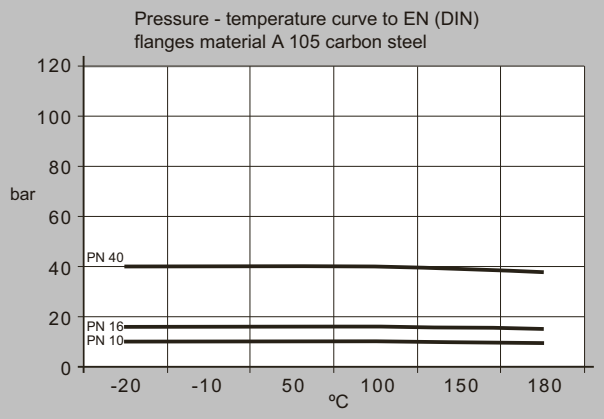


## Integration

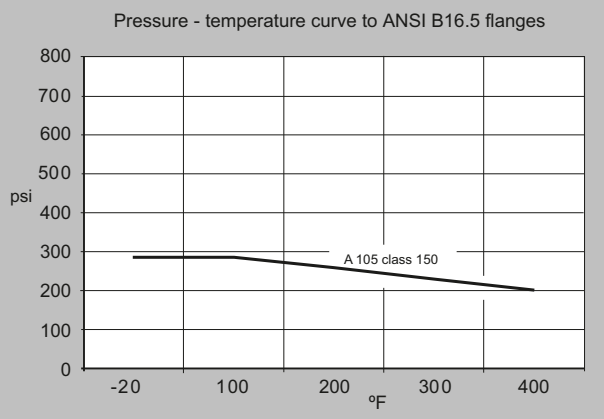
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

***Pressure-temperature curve to EN (DIN) flanges, material A 105 carbon steel***




***Pressure-temperature curve to ANSI B16.5 flanges***




**Note:** The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For exact data please refer to the PED requirements.

For further information on the PED standard and requirements, see the section about Pressure Equipment Directive.

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## Selection and ordering data

| Sensor SITRANS FM MAG 3100 P (Short delivery time) | Article No. 7ME6340- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Diameter** | | | | | | | | | | |
| DN 15 (½") | 1 | V | | | | | | | | |
| DN 25 (1") | 2 | D | | | | | | | | |
| DN 40 (1½") | 2 | R | | | | | | | | |
| DN 50 (2") | 2 | Y | | | | | | | | |
| DN 65 (2½") | 3 | F | | | | | | | | |
| DN 80 (3") | 3 | M | | | | | | | | |
| DN 100 (4") | 3 | T | | | | | | | | |
| DN 125 (5") | 4 | B | | | | | | | | |
| DN 150 (6") | 4 | H | | | | | | | | |
| DN 200 (8") | 4 | P | | | | | | | | |
| DN 250 (10") | 4 | V | | | | | | | | |
| DN 300 (12") | 5 | D | | | | | | | | |
| **Flange norm and pressure rating** | | | | | | | | | | |
| ***EN 1092-1*** | | | | | | | | | | |
| PN 10 (DN 200 ... 300 (8" ... 12")) | | | B | | | | | | | |
| PN 16 (DN 65 ... 300 (2½" ... 12")) | | | C | | | | | | | |
| PN 40 (DN 15 ... 50 (½" ... 2")) | | | F | | | | | | | |
| ***ANSI B16.5*** | | | | | | | | | | |
| Class 150 (½" ... 12") | | | J | | | | | | | |
| **Flange material** | | | | | | | | | | |
| Carbon steel flanges ASTM A 105 | | | | 1 | | | | | | |
| **Liner material** | | | | | | | | | | |
| PTFE (150 °C (302 °F)) | | | | | 3 | | | | | |
| PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6")) | | | | | 7 | | | | | |
| **Electrode material** | | | | | | | | | | |
| Hastelloy C | | | | | | | 2 | | | |
| Platinum | | | | | | | 3 | | | |
| Tantalum | | | | | | | 5 | | | |
| Hastelloy C incl. grounding electrodes | | | | | | | 6 | | | |
| **Transmitter** | | | | | | | | | | |
| Standard sensor for remote transmitter (order transmitter separately) | | | | | | | | A | | |
| Ex sensor for remote transmitter (order transmitter separately) | | | | | | | | B | | |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | | | | | | | | C | | |
| MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex | | | | | | | | D | | |
| MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex | | | | | | | | E | | |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex) | | | | | | | | F | | |
| MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | H | | |
| MAG 6000, Polyamide, 115 ... 230 V AC | | | | | | | | J | | |
| MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | K | | |
| MAG 5000, Polyamide, 115 ... 230 V AC | | | | | | | | L | | |
| **Communication** | | | | | | | | | | |
| No communication, add-on possible | | | | | | | | | A | |
| HART | | | | | | | | | B | |
| Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I) | | | | | | | | | E | |
| PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I) | | | | | | | | | F | |
| PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I) | | | | | | | | | G | |
| FOUNDATION Fieldbus H1 (only MAG 6000/6000 I) | | | | | | | | | J | |
| **Cable glands/terminal box** | | | | | | | | | | |
| Metric: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 1 |
| ½" NPT: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 2 |
| Metric: Stainless steel terminal box | | | | | | | | | | 3 |
| ½" NPT: Stainless steel terminal box | | | | | | | | | | 4 |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| **Country specific label** | |
| CRN (Canadian Registration Number) | **H25** |
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |

| | Order code |
|---|---|
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |
| **Additional calibrations** | |
| Matched-pair calibration | ***On request*** [1] |
| Accredited matched-pair calibration acc. to ISO/IEC 17025: 2005 | ***On request*** [1] |
| Customer-specified calibration up to 10 points | ***On request*** [1] |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [1] |

[1] Product Variation Request (PVR).

| Description | Article No. |
|---|---|
| • English | **A5E03005599** |
| • German | **A5E03086288** |

All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation

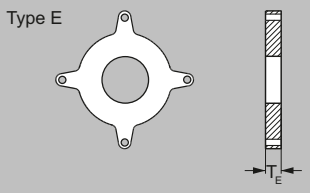
***Accessories***

| Description | Article No. | |
|---|---|---|
| **Potting kit for IP68/NEMA 6P sealing of sensor junction box** | **FDK-085U0220** |  |

Please use online Product selector to get latest updates.
Product selector link:
http://www.pia-portal.automation.siemens.com

***Accessories for MAG 3100 P sensor***

Grounding and protection ring - Type E (Stainless steel)




- Material: AISI 316
- For liner PTFE
- 1 pc. incl. straps and screws

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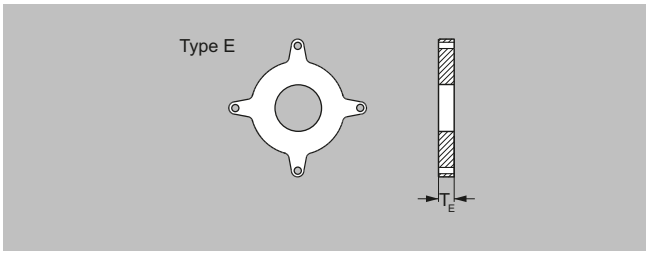
## Selection and ordering data (continued)

| Size DN | Nominale pressure PN 10 | PN 16 | PN 40 | Size Inch | ANSI[1] Class 150 |
|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. |
| DN 15 | | | FDK:083N8365 | ½" | FDK:083N8365 |
| DN 25 | | | FDK:083N8271 | 1" | FDK:083N8272 |
| DN 40 | | | FDK:083N8278 | 1½" | FDK:083N8279 |
| DN 50 | | | FDK:083N8282 | 2" | FDK:083N8283 |
| DN 65 | | FDK:083N8285 | | 2½" | FDK:083N8287 |
| DN 80 | | FDK:083N8289 | | 3" | FDK:083N8291 |
| DN 100 | | FDK:083N8117 | | 4" | FDK:083N8118 |
| DN 125 | | FDK:083N8121 | | 5" | FDK:083N8122 |
| DN 150 | | FDK:083N8125 | | 6" | FDK:083N8126 |
| DN 200 | FDK:083N8130 | FDK:083N8130 | | 8" | FDK:083N8370 |
| DN 250 | FDK:083N8136 | FDK:083N8137 | | 10" | FDK:083N8140 |
| DN 300 | FDK:083N8144 | FDK:083N8145 | | 12" | FDK:083N8148 |

***Note:***

For use as protection ring order 2 pcs.
For use as grounding ring order 1 pc.

Grounding and protection ring - Type E (Hastelloy)

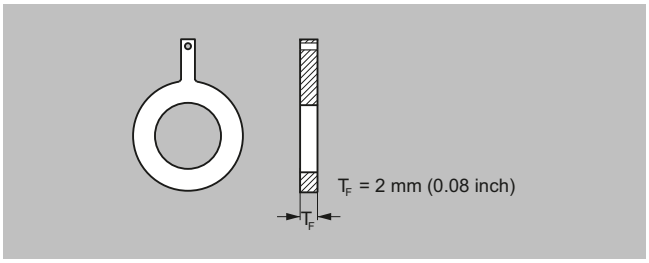



- Material: Hastelloy C276
- For liner PTFE
- 1 pc. incl. straps and screws

| Size DN | Nominale pressure PN 16 | PN 40 | Size Inch | ANSI[1] Class 150 |
|---|---|---|---|---|
| | Article No. | Article No. | | Article No. |
| DN 15 | | FDK:083N8487 | ½" | FDK:083N8487 |
| DN 25 | | FDK:083N8488 | 1" | FDK:083N8489 |
| DN 40 | | FDK:083N8490 | 1½" | FDK:083N8491 |
| DN 50 | | FDK:083N8492 | 2" | FDK:083N8493 |
| DN 65 | FDK:083N8495 | | 2½" | FDK:083N8497 |
| DN 80 | FDK:083N8499 | | 3" | FDK:083N8501 |
| DN 100 | FDK:083N8504 | | 4" | FDK:083N8506 |

[1] For dimensions of MAG 3100 P see Dimensional drawings.

Grounding ring - Type Flat ring (Stainless steel)




- Material: AISI 316
- For liner PTFE and PFA
- 1 pc.

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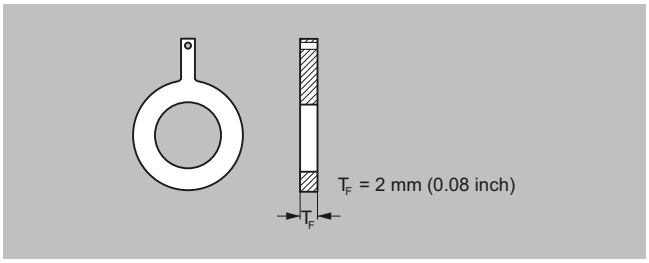


## Selection and ordering data (continued)

| Size DN | Nominale pressure PN 10 | PN 16 | PN 40 | Size Inch | ANSI[1] Class 150 |
|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. |
| DN 15 | | | A5E01191968 | ½" | A5E01191969 |
| DN 25 | | | A5E01150880 | 1" | A5E01150022 |
| DN 40 | | | A5E01191952 | 1½" | A5E01191961 |
| DN 50 | | | A5E01150918 | 2" | A5E01151121 |
| DN 65 | | A5E01191940 | | 2½" | A5E01191962 |
| DN 80 | | A5E01152876 | | 3" | A5E01152910 |
| DN 100 | | A5E01158875 | | 4" | A5E01159146 |
| DN 125 | | A5E01191941 | | 5" | A5E01191963 |
| DN 150 | | A5E01191943 | | 6" | A5E01191964 |
| DN 200 | A5E01191951 | A5E01191944 | | 8" | A5E01191965 |
| DN 250 | A5E01191950 | A5E01191946 | | 10" | A5E01191966 |
| DN 300 | A5E01191949 | A5E01191947 | | 12" | A5E01191967 |

[1] For dimensions of MAG 3100 P see Dimensional drawings.

Grounding ring - Type Flat ring (Hastelloy)




- Material: Hastelloy C276
- For liner PTFE and PFA
- 1 pc.

| Size DN | Nominale pressure PN 10 | PN 16 | PN 40 | Size Inch | ANSI[1] Class 150 |
|---|---|---|---|---|---|
| | Article No. | Article No. | Article No. | | Article No. |
| DN 15 | | | A5E01191981 | ½" | A5E01191989 |
| DN 25 | | | A5E01150882 | 1" | A5E01150028 |
| DN 40 | | | A5E01191982 | 1½" | A5E01191990 |
| DN 50 | | | A5E01150922 | 2" | A5E01151124 |
| DN 65 | | A5E01191971 | | 2½" | A5E01191991 |
| DN 80 | | A5E01152889 | | 3" | A5E01152913 |
| DN 100 | | A5E01158886 | | 4" | A5E01159150 |
| DN 125 | | A5E01191973 | | 5" | A5E01191992 |
| DN 150 | | A5E01191974 | | 6" | A5E01191993 |
| DN 200 | A5E01191978 | A5E01191975 | | 8" | A5E01191994 |
| DN 250 | A5E01191979 | A5E01191976 | | 10" | A5E01191995 |
| DN 300 | A5E01191980 | A5E01191977 | | 12" | A5E01191996 |

[1] For dimensions of MAG 3100 P see Dimensional drawings.

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## Technical specifications

| Version | MAG 3100 P |
|---|---|
| **Product characteristic** | Chemical and process industry-oriented (included in Quick Ship Program) |
| Nominal size | • PTFE: DN 15 ... 300 (½" ... 12") |
| | • PFA: DN 15 ... 150 (½" ... 6") |
| Measuring principle | Electromagnetic induction |
| Excitation frequency (Mains supply: 50 Hz/60 Hz) | • DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz |
| | • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz |
| | • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz |
| **Process connection** | |
| Flanges | EN 1092-1, raised face[1] (EN 1092-1, DIN 2501 & BS 4504 have the same mating dimensions) |
| | • DN 15 ... 50 (½" ... 2"): PN 40 (580 psi) |
| | • DN 65 ... 300 (2½" ... 12"): PN 16 (232 psi) |
| | • DN 200 ... 300 (8" ... 12"): PN 10 (145 psi) |
| | ANSI B16.5 (BS 1560), raised face |
| | • ½" ... 12": Class 150 (20 bar (290 psi)) |
| **Rated operation conditions** | |
| **Ambient temperature** (conditions also dependent on liner characteristics) | |
| • Standard sensor | -40 ... +100 °C (-40 ... +212 °F) |
| • Ex sensor | -20 ... +60 °C (-4 ... +140 °F) |
| • Compact with transmitter | |
| - MAG 5000/6000 | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I [3] | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I Ex [3] | -20 ... +60 °C (-4 ... +140 °F) |
| Operating pressure | |
| **Operating pressure** [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges) | • PTFE |
| | - DN 15 ... 300 (½" ... 12"): 0.3 ... 40 bar (4 ... 580 psi) |
| | • PFA |
| | - DN 15 ... 150 (½" ... 6"): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi) |
| Enclosure rating | IP67 to EN 60529/NEMA 6, 1 m$H_2O$ for 30 min |
| | Option: IP68 to EN 60529/NEMA 6P, 10 m$H_2O$ cont. (not for Ex) |
| Pressure drop at 3 m/s | As straight pipe |
| Test pressure | 1.5 x PN (where applicable) |
| Mechanical load (Vibration) | • 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 |
| | • Sensor: 3.17 g RMS |
| | • Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS |
| | • Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS |
| Temperature of medium | • PTFE -20 ... +150 °C (-4 ... +302 °F) |
| | • PFA -20 ... +150 °C (-4 ... +302 °F) |
| EMC | 2014/30/EU |
| **Design** | |
| Weight | See dimensional drawings |
| Flange and housing material | Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 |

| Version | MAG 3100 P |
|---|---|
| Measuring pipe material | Stainless steel AISI 304/1.4301 |
| Electrode material | PTFE: Hastelloy C276/2.4819, Tantalum |
| | PFA: Hastelloy C22/2.4602 |
| Grounding electrode material | Optional in Hastelloy C22/2.602 |
| Terminal box (remote version only) | • Standard fibre glass reinforced polyamide |
| | • Option Stainless steel AISI 316/1.4436 |
| | • Ex sensor: Stainless steel AISI 316/1.4436 |
| Cable entries | • Remote installation 2 x M20 or 2 x ½" NPT |
| | • Compact installation |
| | - MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT |
| | - MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) |
| | - MAG 6000 I Ex de: 2 x M25 or 2 x ½" NPT (for supply/output) |
| **Certificates and approvals** | |
| Calibration | |
| • Default calibration | Zero-point, 2 x 25 % and 2 x 90 % |
| Hazardous areas | |
| • Ex-sensor in compact or remote version with MAG 6000 I Ex | • ATEX, FM, CSA, IECEx, EAC Ex, NEPSI |
| | - Zone 1 Ex d e ia IIC T6 Gb |
| | • ATEX, FM, CSA, IECEx |
| | - Zone 21 Ex tD A21 IP67 |
| | • FM |
| | - XP IS Class I Div. 1 Groups A, B, C, D[2] |
| | - DIP Class II+III Div. 1 Groups E, F, G[2] |
| | • KCs<br>- Zone 1 Ex d e ia IIC T6 |
| • Standard sensor with/without MAG 5000/6000/6000 I | • FM |
| | - NI Class I Div. 2 Groups A, B, C, D |
| | - NI Class I Zone 2 Groups IIC |
| Pressure equipment | PED conforming: All EN1092-1 flanges - 2014/68/EU |
| Others | • CRN (Canadian Registration Number) |
| | • CPA (China) |
| | • EAC (Kazakhstan) |

1) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF).
2) In compact version only.
3) With HART communication max. ambient temperature 50 °C (122 °F).

### *Available Options for the SITRANS MAG 3100 P*

The MAG 3100P is designed to meet the most common specifications within chemical and process industries. Therefore not all options are available. If you miss a few options please check out or product MAG 3100 which is covering many more options.

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## Technical specifications (continued)

Available Options for Liner PTFE with Platinum electrodes

| Diameter MAG 3100 P | Order code | Connection EN 1092-1, PN 10 | EN 1092-1, PN 16 | EN 1092-1, PN 40 | AISI B 16.5, class 150 |
|---|---|---|---|---|---|
| DN 15, ½" | *1V* | | | ● | |
| DN 25, 1" | *2D* | | | ● | ● |
| DN 40, 1 ½" | *2R* | | | ● | |
| DN 50, 2" | *2Y* | | | ● | ● |
| DN 65, 2 ½" | *3F* | | | | |
| DN 80, 3" | *3M* | | ● | | |
| DN 100, 4" | *3T* | | ● | | |
| DN 125, 5" | *4B* | | ● | | |
| DN 150, 6" | *4H* | | ● | | |
| DN 200, 8" | *4P* | | | | |
| DN 250, 10" | *4V* | | | | |
| DN 300, 12" | *5D* | | | | |

Available Options for Liner PTFE with Tantalum electrodes

| Diameter MAG 3100 P | Order code | Connection EN 1092-1, PN 10 | EN 1092-1, PN 16 | EN 1092-1, PN 40 | AISI B 16.5, class 150 |
|---|---|---|---|---|---|
| DN 15, ½" | *1V* | | | ● | |
| DN 25, 1" | *2D* | | | ● | ● |
| DN 40, 1 ½" | *2R* | | | ● | |
| DN 50, 2" | *2Y* | | | ● | ● |
| DN 65, 2 ½" | *3F* | | ● | | |
| DN 80, 3" | *3M* | | ● | | ● |
| DN 100, 4" | *3T* | | ● | | ● |
| DN 125, 5" | *4B* | | | | |
| DN 150, 6" | *4H* | | ● | | |
| DN 200, 8" | *4P* | | ● | | |
| DN 250, 10" | *4V* | | ● | | |
| DN 300, 12" | *5D* | | | | |

Available Options for Liner PTFE with Hastelloy C electrodes incl. grounding electrodes

| Diameter MAG 3100 P | Order code | Connection EN 1092-1, PN 10 | EN 1092-1, PN 16 | EN 1092-1, PN 40 | AISI B 16.5, class 150 |
|---|---|---|---|---|---|
| DN 15, ½" | *1V* | | | ● | |
| DN 25, 1" | *2D* | | | ● | ● |
| DN 40, 1 ½" | *2R* | | | ● | |
| DN 50, 2" | *2Y* | | | ● | ● |
| DN 65, 2 ½" | *3F* | | ● | | |
| DN 80, 3" | *3M* | | ● | | ● |
| DN 100, 4" | *3T* | | ● | | ● |
| DN 125, 5" | *4B* | | | | |
| DN 150, 6" | *4H* | | ● | | ● |

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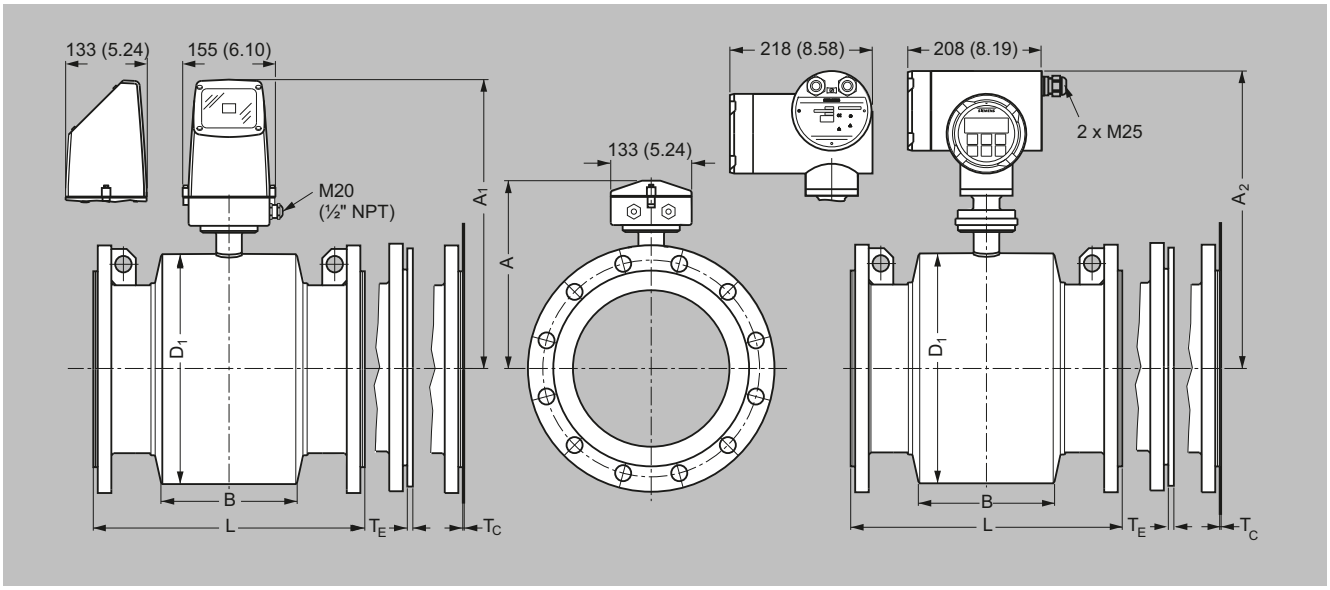


## Technical specifications (continued)

| Diameter MAG 3100 P | Order code | Connection EN 1092-1, PN 10 | EN 1092-1, PN 16 | EN 1092-1, PN 40 | AISI B 16.5, class 150 |
|---|---|---|---|---|---|
| DN 200, 8" | *4P* | | | | ● |
| DN 250, 10" | *4V* | | | | ● |
| DN 300, 12" | *5D* | | | | |

## Dimensional drawings

***MAG 3100 P sensor with compact or remote transmitter***




Dimensions in mm (inch)

Metric

| DN | A[1] | A1 | A2 | B | D1 | L[2] EN 1092-1-201 PN 10 | L[2] EN 1092-1-201 PN 16 | L[2] EN 1092-1-201 PN 40 | L[2] ANSI 16.5 Class 150 | TE[3] | TF[3] | Weight[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [kg] |
| 15 | 187 | 341 | 338 | 59 | 104 | - | - | 200 | 200 | 6 | 2 | 4 |
| 25 | 187 | 341 | 338 | 59 | 104 | - | - | 200 | 200 | 6 | 2 | 5 |
| 40 | 197 | 351 | 348 | 82 | 124 | - | - | 200 | 200 | 6 | 2 | 8 |
| 50 | 205 | 359 | 356 | 72 | 139 | - | - | 200 | 200 | 6 | 2 | 9 |
| 65 | 212 | 369 | 366 | 72 | 154 | - | 200/- | - | 200 | 6 | 2 | 11 |
| 80 | 222 | 376 | 373 | 72 | 174 | - | 200/- | - | 272[5] | 6 | 2 | 12 |
| 100 | 242 | 396 | 393 | 85 | 214 | - | 250/- | - | 250 | 6 | 2 | 16 |
| 125 | 255 | 409 | 406 | 85 | 239 | - | 250/- | - | 250 | 6 | 2 | 19 |
| 150 | 276 | 430 | 427 | 85 | 282 | - | 300/- | - | 300 | 6 | 2 | 27 |
| 200 | 304 | 458 | 455 | 137 | 338 | 350 | 350/- | - | 350 | 8 | 2 | 40 |
| 250 | 332 | 486 | 483 | 157 | 393 | 450 | 450/- | - | 450 | 8 | 2 | 60 |
| 300 | 357 | 511 | 508 | 157 | 444 | 500 | 500/- | - | 500 | 8 | 2 | 80 |

1) 14.5 mm shorter with stainless steel terminal box (Ex and high temperature version)
2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.
3) $T_E$ = Grounding ring Type E, $T_F$ = Grounding ring Type Flat ring
4) Weights are approx. (for PN 16) without transmitter
5) Not according to ISO 20456
- Not available
D = Outside diameter of flange, see flange tables

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## Dimensional drawings (continued)

***MAG 3100 P sensor with compact or remote transmitter***

Imperial

| DN | A[1] | $A_1$ | $A_2$ | B | D1 | L[2] EN 1092-1-201 PN 10 | L[2] EN 1092-1-201 PN 16 | L[2] EN 1092-1-201 PN 40 | L[2] ANSI 16.5 Class 150 | $T_E$[3] | $T_F$[3] | Weight[4] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [lbs] |
| ½ | 7.36 | 13.4 | 13.34 | 2.32 | 4.09 | - | - | 7.87 | 7.87 | 0.24 | 0.08 | 9 |
| 1 | 7.36 | 13.4 | 13.34 | 2.32 | 4.09 | - | - | 7.87 | 7.87 | 0.24 | 0.08 | 11 |
| 1½ | 7.76 | 13.8 | 13.74 | 3.23 | 4.88 | - | - | 7.87 | 7.87 | 0.24 | 0.08 | 17 |
| 2 | 8.07 | 14.1 | 14.04 | 2.83 | 5.47 | - | - | 7.87 | 7.87 | 0.24 | 0.08 | 20 |
| 2½ | 8.35 | 14.4 | 14.34 | 2.83 | 6.06 | - | 7.87/- | - | 7.87 | 0.24 | 0.08 | 24 |
| 3 | 8.74 | 14.8 | 14.74 | 2.83 | 6.85 | - | 7.87/- | - | 10.71[5] | 0.24 | 0.08 | 26 |
| 4 | 9.53 | 15.6 | 15.54 | 3.35 | 8.43 | - | 9.84/- | - | 9.84 | 0.24 | 0.08 | 35 |
| 5 | 10.04 | 16.1 | 16.04 | 3.35 | 9.41 | - | 9.84/- | - | 9.84 | 0.24 | 0.08 | 42 |
| 6 | 10.87 | 16.9 | 16.84 | 3.35 | 11.10 | - | 11.81/- | - | 11.81 | 0.24 | 0.08 | 60 |
| 8 | 11.97 | 18.0 | 17.94 | 5.39 | 13.31 | 13.78 | 13.78/- | - | 13.78 | 0.31 | 0.08 | 88 |
| 10 | 13.07 | 19.1 | 19.04 | 6.18 | 15.47 | 17.72 | 17.72/- | - | 17.72 | 0.31 | 0.08 | 132 |
| 12 | 14.05 | 20.1 | 20.04 | 6.18 | 17.48 | 19.69 | 19.69/- | - | 19.69 | 0.31 | 0.08 | 176 |

1) 0.571 inch shorter with stainless steel terminal box (Ex and high temperature version)
2) When grounding rings are used, the thickness of the grounding ring must be added to the built-in length.
3) $T_E$ = Grounding ring Type E, $T_F$ = Grounding ring Type Flat ring
4) Weights are for ANSI 150 without transmitter.
5) Not according to ISO 20456
D = Outside diameter of flange, see flange tables

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## Overview



The SITRANS FM MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, wastewater, sewage or sludge applications.

## Benefits

- DN 15 to DN 2000 (½" to 80")
- Stock program of MAG 5100 W secures short delivery time
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA, AS and JIS
- NBR Hard Rubber and Ebonite Hard Rubber liner for all water applications
- EPDM liner with drinking water approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals for cold water and energy metering (MI-001, KIWA, NMI M10, PTB K7.2)
- Built-in length according to ISO 20456; the standard includes sizes up to DN 400
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings
- Designed to allow patented in-situ verification using SENSORPROM fingerprint
- Qualified for operation in non-optimal installation conditions with no straight inlet and outlet run of piping (0 × DN)
- Conform to ISO 4064 and EN 14154 for mechanical flowmeters
- FM Fire Service Meter (Class Number 1044) for automatic fire protection systems
- Meets EEC directives: PED 2014/68/EU pressure directive for EN 1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor
- Type approval of marine equipment (DNV)

## Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra-filtration)
- Industrial water applications

## Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

## Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS FM MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, DeviceNet, PROFIBUS DP and PA, FOUNDATION Fieldbus H1 or Modbus RTU/RS 485.

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## Selection and ordering data

| Sensor SITRANS FM MAG 5100 W | Article No. 7ME6520- | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | 2 | ● | ● | ● | | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Diameter** | | | | | | | | | | | | | | |
| DN 15 (½") | 1 | V | | | | | | | | | | | | |
| DN 25 (1") | 2 | D | | | | | | | | | | | | |
| DN 40 (1½") | 2 | R | | | | | | | | | | | | |
| DN 50 (2") | 2 | Y | | | | | | | | | | | | |
| DN 65 (2½") | 3 | F | | | | | | | | | | | | |
| DN 80 (3") | 3 | M | | | | | | | | | | | | |
| DN 100 (4") | 3 | T | | | | | | | | | | | | |
| DN 125 (5") | 4 | B | | | | | | | | | | | | |
| DN 150 (6") | 4 | H | | | | | | | | | | | | |
| DN 200 (8") | 4 | P | | | | | | | | | | | | |
| DN 250 (10") | 4 | V | | | | | | | | | | | | |
| DN 300 (12") | 5 | D | | | | | | | | | | | | |
| DN 350 (14") | 5 | K | | | | | | | | | | | | |
| DN 400 (16") | 5 | R | | | | | | | | | | | | |
| DN 450 (18") | 5 | Y | | | | | | | | | | | | |
| DN 500 (20") | 6 | F | | | | | | | | | | | | |
| DN 600 (24") | 6 | P | | | | | | | | | | | | |
| DN 700 (28") | 6 | Y | | | | | | | | | | | | |
| DN 750 (30") | 7 | D | | | | | | | | | | | | |
| DN 800 (32") | 7 | H | | | | | | | | | | | | |
| DN 900 (36") | 7 | M | | | | | | | | | | | | |
| DN 1000 (40") | 7 | R | | | | | | | | | | | | |
| DN 1050 (42") | 7 | U | | | | | | | | | | | | |
| DN 1100 (44") | 7 | V | | | | | | | | | | | | |
| DN 1200 (48") | 8 | B | | | | | | | | | | | | |
| DN 1400 (54") | 8 | F | | | | | | | | | | | | |
| DN 1500 (60") | 8 | K | | | | | | | | | | | | |
| DN 1600 (66") | 8 | P | | | | | | | | | | | | |
| DN 1800 (72") | 8 | T | | | | | | | | | | | | |
| DN 2000 (80") | 8 | Y | | | | | | | | | | | | |
| **Flange norm and pressure rating** | | | | | | | | | | | | | | |
| ***EN 1092-1*** | | | | | | | | | | | | | | |
| PN 6 DN 1400 ... 2000 (54" ... 80") | | | A | | | | | | | | | | | |
| PN 10 (DN 200 ... 2000 (8" ... 80")) | | | B | | | | | | | | | | | |
| PN 16 (DN 50 ... 1200 (2" ... 48")) | | | C | | | | | | | | | | | |
| PN 16, non PED (DN 700 ... 1200 (28" ... 48")) | | | D | | | | | | | | | | | |
| PN 40 (DN 15 ... 40 (½" ... 1½")) | | | F | | | | | | | | | | | |
| ***ANSI B16.5*** | | | | | | | | | | | | | | |
| Class 150 (½" ... 24") | | | J | | | | | | | | | | | |
| ***AWWA C-207*** | | | | | | | | | | | | | | |
| Class D (28" ... 80") | | | L | | | | | | | | | | | |
| ***AS 4087*** | | | | | | | | | | | | | | |
| PN 16 (DN 50 ... 1200 (2" ... 48")) | | | N | | | | | | | | | | | |
| ***JIS*** | | | | | | | | | | | | | | |
| B 2220:2004 K10 (1" ... 24") | | | R | | | | | | | | | | | |
| **Flange material and coating** | | | | | | | | | | | | | | |
| Carbon steel flanges ASTM A 105, corrosion-resistant coating of category C4 | | | | 1 | | | | | | | | | | |
| Carbon steel flanges ASTM A 105, 300 µm corrosion-resistant coating of category C5 | | | | 4 | | | | | | | | | | |
| **Liner material** | | | | | | | | | | | | | | |
| EPDM | | | | | 2 | | | | | | | | | |
| NBR | | | | | 3 | | | | | | | | | |
| **Transmitter** | | | | | | | | | | | | | | |
| Sensor for remote transmitter (order transmitter separately) | | | | | | | | A | | | | | | |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC, FM / CSA Class I Div. 2 | | | | | | | | C | | | | | | |

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## Selection and ordering data (continued)

| Sensor SITRANS FM MAG 5100 W | Article No. 7ME6520- | | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | 2 | ● | ● | ● | | | ● | ● | ● |
| MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC (non-Ex) | | | | | | | | F | | | | | | | |
| MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | H | | | | | | | |
| MAG 6000, Polyamid, 115 ... 230 V AC | | | | | | | | J | | | | | | | |
| MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | K | | | | | | | |
| MAG 5000, Polyamid, 115 ... 230 V AC | | | | | | | | L | | | | | | | |
| MAG 6000 CT, Polyamid, 115 ... 230 V AC | | | | | | | | M | | | | | | | |
| MAG 6000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | R | | | | | | | |
| MAG 5000 CT, Polyamid, 115 ... 230 V AC | | | | | | | | S | | | | | | | |
| MAG 5000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC | | | | | | | | T | | | | | | | |
| ***Transmitter including wall-mounting kit for remote design*** | | | | | | | | | | | | | | | |
| MAG 5000, Polyamid, 115 ... 230 V AC, incl. special wall-mounting unit (approved marine equipment) | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | C |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | D |
| MAG 6000, Polyamid, 115 ... 230 V AC, incl. special wall-mounting unit (approved marine equipment) | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | G |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | H |
| MAG 6000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC, incl. wall-mounting unit | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | J |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | K |
| MAG 6000 CT, Polyamid, 115 ... 230 V AC, incl. wall-mounting unit | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | L |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | M |
| MAG 5000 CT, Polyamid, 11 ... 30 V DC/11 ... 24 V AC, incl. wall-mounting unit | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | N |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | P |
| MAG 5000 CT, Polyamid, 115 ... 230 V AC, incl. wall-mounting unit | | | | | | | | | | | | | | | |
| • M20×1.5 cable glands | | | | | | | | Z | | | | | P | 0 | Q |
| • ½" NPT cable glands | | | | | | | | Z | | | | | P | 0 | R |
| **Communication** | | | | | | | | | | | | | | | |
| None | | | | | | | | | A | | | | | | |
| HART | | | | | | | | | B | | | | | | |
| PROFIBUS PA Profile 3 (only MAG 6000/ MAG 6000 I) | | | | | | | | | F | | | | | | |
| PROFIBUS DP Profile 3 (only MAG 6000/ MAG 6000 I) | | | | | | | | | G | | | | | | |
| Modbus RTU/RS 485 (only MAG 6000/ MAG 6000 I) | | | | | | | | | E | | | | | | |
| FOUNDATION Fieldbus H1 (only MAG 6000/ MAG 6000 I) | | | | | | | | | J | | | | | | |
| **Cable glands/terminal box** | | | | | | | | | | | | | | | |
| Metric: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 1 | | | | | |
| ½" NPT: Polyamide terminal box or MAG 6000 I compact | | | | | | | | | | 2 | | | | | |

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates** | |
| Pressure test certificate according to EN 10204-3.1 | **C01** |
| Material certificate according to EN 10204-3.1 | **C12** |
| Factory certificate according to EN 10204-2.2 | **C14** |
| Factory certificate according to EN 10204-2.1 | **C15** |
| **Special calibration** | |
| 5-point calibration for DN 15 ... 200[1)] | **D01** |
| 5-point calibration for DN 250 ... 600[1)] | **D02** |

| | Order code |
|---|---|
| 5-point calibration for DN 700 ... 1200[1)] | **D03** |
| 10-point calibration for DN 15 ... 200[2)] | **D06** |
| 10-point calibration for DN 250 ... 600[2)] | **D07** |
| 10-point calibration for DN 700 ... 1200[2)] | **D08** |
| Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 15 ... 200 | **D11** |
| Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 250 ... 600 | **D12** |
| Default (2 × 25 % and 2 × 90 %) matched-pair calibration for DN 700 ... 1200 | **D13** |
| 5-point, matched-pair calibration for DN 15 ... 200[1)] | **D15** |
| 5-point, matched-pair calibr. for DN 250 ... 600[1)] | **D16** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 5-point, matched-pair calibr. for DN 700 ... 1200[1)] | **D17** |
| 10-point, matched-pair calibration for DN 15 ... 200[2)] | **D18** |
| 10-point, matched-pair calibr. for DN 250 ... 600[2)] | **D19** |
| 10-point, matched-pair calibr. for DN 700 ... 1200[2)] | **D20** |
| Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 15 ... 200 | **D21** |
| Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 250 ... 600 | **D22** |
| Accredited 5-point matched-pair calibration acc. to ISO 17025 DN 600 ... 1200 | **D23** |
| **Country of origin** | |
| France | **F55** |
| **Sensor cables** | |
| Standard coil and electrode cable, PVC jacket | |
| • 5 m (16 ft) | **K01** |
| • 10 m (33 ft) | **K02** |
| • 20 m (65 ft) | **K04** |
| • 30 m (98 ft) | **K06** |
| • 40 m (131 ft) | **K07** |
| • 50 m (164 ft) | **K08** |
| • 60 m (197 ft) | **K09** |
| • 100 m (328 ft) | **K10** |
| • 150 m (492 ft) | **K11** |
| • 200 m (656 ft) | **K12** |
| • 500 m (1640 ft) | **K13** |
| Standard coil and special electrode cable, PVC jacket | |
| • 5 m (16 ft) | **K51** |
| • 10 m (33 ft) | **K52** |
| • 20 m (65 ft) | **K54** |
| • 30 m (98 ft) | **K56** |
| • 40 m (131 ft) | **K57** |
| • 50 m (164 ft) | **K58** |
| • 60 m (197 ft) | **K59** |
| • 100 m (328 ft) | **K60** |
| • 150 m (492 ft) | **K61** |
| • 200 m (656 ft) | **K62** |
| • 500 m (1640 ft) | **K63** |
| **Terminal blocks** | |
| Factory mounted terminal blocks | **N02** |
| Factory mounted terminal blocks, including wall-mounting kit | **N03** |
| **Approval/Verification[3)]** | |
| Without verification acc. to OIML R 49 (DN 50 ... 300) | **P10** |
| MI-001 Q3/Q1 = 40 (DN 50 ... 300) | **P11** |
| MI-001 Q3/Q1 = 63 (DN 50 ... 300) | **P12** |
| MI-001 Q3/Q1 = 80 (DN 50 ... 300) | **P13** |
| MI-001 Q3/Q1 = 160 (DN 50 ... 300) | **P16** |
| MI-001 Q3/Q1 = 200 (DN 50 ... 300) | **P17** |
| MI-001 Q3/Q1 = 250 (DN 50 ... 300) | **P18** |
| Without verification according to OIML R 49 (DN 350 ... 600) | **P23** |
| MI-001 Q3/Q1 = 40 (DN 350 ... 600) | **P24** |
| MI-001 Q3/Q1 = 63 (DN 350 ... 600) | **P25** |
| MI-001 Q3/Q1 = 80 (DN 350 ... 600) | **P26** |
| MI-001 Q3/Q1 = 100 (DN 350 ... 600) | **P27** |
| Without verification according to OIML R 49 (DN 700 ... 1200) | **P28** |
| MI-001 Q3/Q1 = 40 (DN 700 ... 1200) | **P29** |
| MI-001 Q3/Q1 = 63 (DN 700 ... 1200) | **P30** |
| MI-001 Q3/Q1 = 80 (DN 700 ... 1200) | **P31** |
| PTB K7.2 QP/QI = 25 (DN 15 ... 300) | **P41** |
| PTB K7.2 QP/QI = 50 (DN 15 ... 300) | **P42** |
| PTB K7.2 QP/QI = 100 Lower range (DN 15 ... 300) | **P43** |
| PTB K7.2 QP/QI = 100 Upper range (DN 15 ... 300) | **P44** |
| PTB K7.2 QP/QI = 250 (DN 50 ... 300) | **P45** |
| PTB K7.2 QP/QI = 25 (DN 350 ... 600) | **P47** |
| PTB K7.2 QP/QI = 50 (DN 350 ... 600) | **P48** |
| PTB K7.2 QP/QI = 100 Lower range (DN 350 ... 600) | **P49** |
| **Pulse output setting** | |
| Volume / Pulse | |
| • 0.01 l/pulse | **L01** |
| • 0.1 l/pulse | **L02** |
| • 0.5 l/pulse | **L03** |
| • 1 l/pulse | **L04** |
| • 2.5 l/pulse | **L05** |
| • 5 l/pulse | **L06** |
| • 10 l/pulse | **L07** |
| • 25 l/pulse | **L08** |
| • 50 l/pulse | **L09** |
| • 100 l/pulse | **L10** |
| • 250 l/pulse | **L11** |
| • 500 l/pulse | **L12** |
| • 1 $m^3$/pulse | **L13** |
| • 5 $m^3$/pulse | **L14** |
| • 10 $m^3$/pulse | **L15** |
| • 50 $m^3$/pulse | **L16** |
| • 100 $m^3$/pulse | **L17** |
| • 500 $m^3$/pulse | **L18** |
| • 1000 $m^3$/pulse | **L19** |
| Pulse width | |
| • 2 ms | **L61** |
| • 4.1 ms | **L62** |
| • 8.2 ms | **L63** |
| • 16 ms | **L64** |
| • 33 ms | **L65** |
| • 66 ms | **L66** |
| • 130 ms | **L67** |
| • 260 ms | **L68** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| • 520 ms | **L69** |
| FM Fire Service Approval (with ANSI B16.5 Class 150 flanges) | |
| DN 50, DN 80 and DN 100 (2", 3" and 4") | **P20** |
| DN 150 and DN 200 (6" and 8") | **P21** |
| DN 250 and DN 300 (10" and 12") | **P22** |
| **Country specific label** | |
| FP2E label (France) | **H20** |
| ADDC label (Abu Dhabi) | **H23** |
| CRN (Canadian Registration Number) | **H25** |
| **Tag name plate** | |
| Tag name plate transmitter, stainless steel (specify in plain text) | **Y15** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Tag name plate, plastic (self-adhesive) | **Y18** |

| | Order code |
|---|---|
| **Device settings** | |
| Customer-specific transmitter setting | **Y20** |
| **Factory mounted sensor cables** | |
| Sensor cables wired | **Y40** |
| Sensor cables wired and IP68 sealing | **Y41** |
| **Additional calibrations** | |
| Customer-witnessed calibration (any of above calibration) | ***On request*** [4] |

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$
3) For more details and references of the ranges please see the tables under "Technical specifications"
4) Product Variation Request (PVR)

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Potting kit for IP68/NEMA 6P sealing of sensor junction box** | **FDK:085U0220** |  |

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I transmitters and sensors are delivered compact mounted from factory. Communication module will be premounted in the transmitter.

Please use online Product selector to get latest updates.
http://www.pia-portal.automation.siemens.com

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## Technical specifications

| Version | MAG 5100 W |
|---|---|
| **Product characteristic** | For demanding applications in the water & wastewater industry |
| Design and nominal size | Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½") |
| | Coned sensor: DN 50 ... 300 (2" ... 12") |
| | Full bore sensor: DN 350 ... 2000 (14" ... 80") |
| Measuring principle | Electromagnetic induction |
| Excitation frequency (mains supply: 50/60 Hz) | DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz |
| | DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz |
| | DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz |
| | DN 350 ... 2000 (14" ... 80"):1.5625 Hz/1.875 Hz |
| **Process connection** | |
| Flanges[1] | |
| • EN 1092-1 | PN 6 (87 psi): DN 1400 ... 2000 (54" ... 80") Raised face[3]<br>PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face<br>PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face[3]<br>PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face[3]<br>PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face<br>PN 40 (580 psi): DN 15 ... 40 (½" ... 1½") Flat face |
| • ANSI B16.5 | Class 150: ½" ... 12" Flat face; 14" ... 24" Raised face |
| • AWWA C-207 | Class D: 28" ... 80", Flat face |
| • AS4087 | PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat Face<br>PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face |
| • JIS B 2220:2004 | K10 (1" ... 24") |
| **Rated operation conditions** | |
| Ambient temperature | |
| • Sensor | -40 ... +70 °C (-40 ... +158 °F) |
| • Compact with transmitter | |
| - MAG 5000/6000 [4] | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I [5] | -20 ... +60 °C (-4 ... +140 °F) |
| Operating pressure (Abs) [abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature) | DN 15 ... 40 (½" ... 1½"): 0.01 ... 40 bar (0.15 ... 580 psi) |
| | DN 50 ... 300 (2" ... 12"): 0.03 ... 20 bar (0.44 ... 290 psi) |
| | DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi) |
| | DN 1400 ... 2000 (54" ... 80"): 0.01 ... 10 bar (0.15 ... 145 psi) |
| Enclosure rating | |
| • Standard | IP67 to EN 60529/NEMA 6 (1 m$H_2O$ for 30 min) |
| • Option | IP68 to EN 60529/NEMA 6P (10 m$H_2O$ continuously) |
| Pressure drop | DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s) |
| | DN 40 ... 300 (1½" ... 12"): Max. 25 mbar (0.36 psi) at 3 m/s (10 ft/s) |
| | DN 350 ... 2000 (14" ... 80"): Insignificant |
| Test pressure | 1.5 × PN (where applicable), FM Fire Service: 2 × PN |
| Mechanical load (vibration) | 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 |
| | Sensor: 3.17 g RMS |
| | Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS |
| | Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS |

| Version | MAG 5100 W |
|---|---|
| ***Medium conditions*** | |
| Temperature of medium | |
| • NBR | -10 ... +70 °C (14 ... 158 °F) |
| • EPDM | -10 ... +70 °C (14 ... 158 °F) |
| • EPDM (MI-001) | 0.1 ... 30 °C (32 ... 76 °F) |
| • Ebonite | - |
| EMC | 2014/30/EU |
| **Design** | |
| Material | |
| • Housing and flanges | Carbon steel ASTM A 105 with corrosion protection EN ISO 12944 grade C4 or C5 (durability up to 15 years) |
| • Electrode | Hastelloy C276 |
| • Grounding electrode | Hastelloy C276 |
| • Measuring pipe | Stainless steel AISI 304/1.4301 |
| • Terminal box | Fibre glass reinforced polyamide |
| **Certificates and approvals** | |
| Calibration | |
| • Default calibration | Zero-point, 2 x 25 % and 2 x 90 % |
| • Special calibration | 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$<br>10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory $Q_{max}$<br>Matched pair calibration: default, 5-point or 10-point |
| Custody transfer | • MI-001 cold water (EU): DN 50 ... 2000 (2" ... 80") |
| | • Kiwa water approval (NL): DN 50 ...DN 1200 (2" ... 48") |
| | • Chilled water pattern approval PTB K 7.2 DN 15 ... 1200 (Germany)[6] |
| Drinking water | EPDM liner: |
| | • WRAS (WRc, BS6920 material approval for cold water, GB) |
| | • NSF/ANSI Standard 61[7] (Cold water, US) |
| | • ACS listed (France) |
| | • DVGW W270 (Germany) |
| | • Belgaqua (Belgium) |
| | • AS/NZS 4020 (Australia/New Zealand) |
| Marine[8] | • DNV |
| Hazardous areas[7] | |
| Standard sensor with/without MAG 5000/6000/6000 I | • FM |
| | - NI Class I Div. 2 Groups A, B, C, D[11] |
| | - NI Class I Zone 2 Groups IIC |
| Pressure equipment | • PED conforming: All EN1092-1 flanges and ANSI Class 150 (< DN 300 /<12") – 2014/68/EU[9] |
| Others | • CRN (Canadian Registration Number) |
| | • EAC (Russia, Belarus, Kazakhstan) |
| | • FM Fire Service Meter acc. to class 1044[10] |
| | • VdS: Extinguishing systems DN 50 ... 300 |
| | • MCERTS (GB environmental) |

1) DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS4087 flanges
2) Type 01 (SORF)
3) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF)
4) Compact with transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... 122 °F)
5) With HART communication max. ambient temperature 50 °C (122 °F)
6) For verification submit Product Variation Request
7) Including Annex G
8) In remote version with sensor size DN 50 ... 300 (2" ... 12")

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## Technical specifications (continued)

9) For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will only carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the directive, also products sold into certain market sectors are excluded. These include: (a) Meters used in networks for the supply, distribution and discharge of water; (b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore; (c) Meters used in the extraction of petroleum or gas, including Christmas tree and manifold equipment; (d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see the section about Pressure Equipment Directive.
10) Not for sensors with 300 µm coating
11) FM Class I Div. 2 not available for DN 15

***MAG 5100 W (7ME6520) with MAG 6000 CT (Revenue program) MI-001***

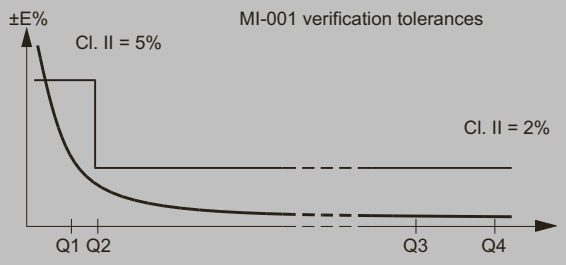
MAG 5100 W CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 5100 W MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex III Water meters (MI-001) in the sizes from DN 50 to DN 1200 (Article No. 7ME6520).

The MID certification is obtained as a modul B + D module approval according to the above mentioned directive.

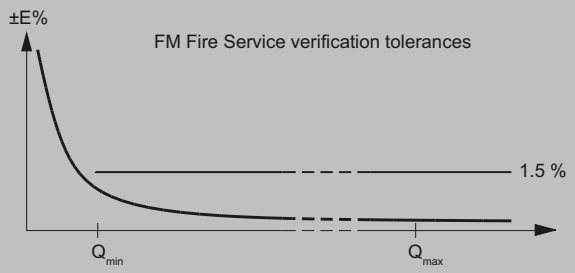
Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production




***MAG 5100 W (7ME6520) with MAG 5000/MAG 6000 or MAG 6000 CT for Fire Service applications***

MAG 5100 W (7ME6520) is FM Fire Service approved for automatic fire protection systems. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250 and DN 300 (2", 3", 4", 6", 8", 10" and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.




MI-001 approval

MAG 5100 W (7ME6520) MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see table below:

| Order code: P11 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Q4 [m³/h] | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 |
| **Q3 [m³/h]** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Q2 [m³/h] | 0.64 | 1.0 | 1.6 | 2.52 | 4.0 | 6.4 | 10.0 | 16.0 | 25.2 |
| Q1 [m³/h] | 0.4 | 0.63 | 1.0 | 1.58 | 2.5 | 4.0 | 6.25 | 10.0 | 15.75 |

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## Technical specifications (continued)

| Order code: P12 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| Q4 [m³/h] | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 |
| **Q3 [m³/h]** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Q2 [m³/h] | 0.41 | 0.63 | 1.02 | 1.6 | 2.5 | 4.1 | 6.3 | 10.2 | 16.0 |
| Q1 [m³/h] | 0.25 | 0.40 | 0.63 | 1.00 | 1.59 | 2.54 | 3.97 | 6.35 | 10.0 |

| Order code: P13 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Q4 [m³/h] | 20 | 31.3 | 50 | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 |
| **Q3 [m³/h]** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Q2 [m³/h] | 0.32 | 0.5 | 0.8 | 1.26 | 2.0 | 3.2 | 5.0 | 8.0 | 12,6 |
| Q1 [m³/h] | 0.20 | 0.31 | 0.50 | 0.79 | 1.25 | 2.00 | 3.13 | 5.00 | 7.9 |

| Order code: P16 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| Q4 [m³/h] | 50 | 78.5 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 |
| **Q3 [m³/h]** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** |
| Q2 [m³/h] | 0.4 | 0.63 | 1.0 | 1.6 | 2.5 | 4.0 | 6.3 | 10.0 | 16.0 |
| Q1 [m³/h] | 0.25 | 0.39 | 0.63 | 1.0 | 1.56 | 2.5 | 3.94 | 6.3 | 10.0 |

| Order code: P17 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| Q4 [m³/h] | 50 | 78.5 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 |
| **Q3 [m³/h]** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** |
| Q2 [m³/h] | 0.32 | 0.50 | 0.80 | 1.28 | 2.0 | 3.2 | 5.0 | 8.0 | 12.8 |
| Q1 [m³/h] | 0.2 | 0.32 | 0.50 | 0.8 | 1.25 | 2.0 | 3.15 | 5.0 | 8.0 |

| Order code: P18 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Q4 [m³/h] | 50 | 78.5 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 |
| **Q3 [m³/h]** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** |
| Q2 [m³/h] | 0.26 | 0.4 | 0.64 | 1.02 | 1.6 | 2.56 | 4.0 | 6.4 | 10.24 |
| Q1 [m³/h] | 0.16 | 0.25 | 0.4 | 0.64 | 1.0 | 1.6 | 2.52 | 4.0 | 6.4 |

| Order code: P24 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| "R" Q3/Q1 | 40 | 40 | 40 | 40 | 40 |
| Q4 [m³/h] | 1250 | 1250 | 2000 | 2000 | 3125 |
| **Q3 [m³/h]** | **1000** | **1000** | **1600** | **1600** | **2500** |
| Q2 [m³/h] | 40.0 | 40.0 | 64.0 | 64.0 | 100.0 |
| Q1 [m³/h] | 25.0 | 25.0 | 40.0 | 40.0 | 62.5 |

| Order code: P25 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| "R" Q3/Q1 | 63 | 63 | 63 | 63 | 63 |
| Q4 [m³/h] | 1250 | 2000 | 3125 | 3125 | 5000 |
| **Q3 [m³/h]** | **1000** | **1600** | **2500** | **2500** | **4000** |
| Q2 [m³/h] | 25.4 | 40.63 | 63.49 | 63.49 | 101.6 |
| Q1 [m³/h] | 15.9 | 25.4 | 39.7 | 39.7 | 63.49 |

| Order code: P26 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| "R" Q3/Q1 | 80 | 80 | 80 | 80 | 80 |
| Q4 [m³/h] | 2000 | 3125 | 5000 | 5000 | 7875 |
| **Q3 [m³/h]** | **1600** | **2500** | **4000** | **4000** | **6300** |
| Q2 [m³/h] | 32.0 | 50.0 | 80.0 | 80.0 | 126.0 |
| Q1 [m³/h] | 20.0 | 31.25 | 50.0 | 50.0 | 78.75 |

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## Technical specifications (continued)

| Order code: P27 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| "R" Q3/Q1 | 100 | 100 | 100 | 100 | 100 |
| Q4 [m³/h] | 3125 | 3125 | 5000 | 5000 | 7875 |
| **Q3 [m³/h]** | **2500** | **2500** | **4000** | **4000** | **6300** |
| Q2 [m³/h] | 40.0 | 2540.0 | 64.0 | 64.0 | 100.8 |
| Q1 [m³/h] | 25.0 | 25.0 | 40.0 | 40.0 | 63.0 |

| Order code: P29 | DN 700 (28") | DN 750 (30") | DN 800 (32") | DN 900 (36") | DN 1000 (40") | DN 1200 (48") |
|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 40 | 40 | 40 | 40 | 40 | 40 |
| Q4 [m³/h] | 5000 | 5000 | 5000 | 7875 | 7875 | 7875 |
| **Q3 [m³/h]** | **4000** | **4000** | **4000** | **6300** | **6300** | **6300** |
| Q2 [m³/h] | 160.0 | 160.0 | 160.0 | 252.0 | 252.0 | 252.0 |
| Q1 [m³/h] | 100.0 | 100.0 | 100.0 | 157.5 | 157.5 | 157.5 |

| Order code: P30 | DN 700 (28") | DN 750 (30") | DN 800 (32") | DN 900 (36") | DN 1000 (40") | DN 1200 (48") |
|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 63 | 63 | 63 | 63 | 63 | - |
| Q4 [m³/h] | 5000 | 5000 | 5000 | 7875 | 7875 | - |
| **Q3 [m³/h]** | **4000** | **4000** | **4000** | **6300** | **6300** | **-** |
| Q2 [m³/h] | 101.6 | 101.6 | 101.6 | 160.0 | 160.0 | - |
| Q1 [m³/h] | 63.5 | 63.5 | 63.5 | 100.0 | 100.0 | - |

| Order code: P31 | DN 700 (28") | DN 750 (30") | DN 800 (32") | DN 900 (36") | DN 1000 (40") | DN 1200 (48") |
|---|---|---|---|---|---|---|
| "R" Q3/Q1 | 80 | 80 | 80 | 80 | 80 | - |
| Q4 [m³/h] | 5000 | 5000 | 5000 | 7875 | 7875 | - |
| **Q3 [m³/h]** | **4000** | **4000** | **4000** | **6300** | **6300** | **-** |
| Q2 [m³/h] | 80.0 | 80.0 | 80.0 | 126.0 | 126.0 | - |
| Q1 [m³/h] | 50.0 | 50.0 | 50.0 | 78.75 | 78.75 | - |

The label is placed on the transmitter housing. An example of the product label is shown below:




MI-001 approval valid for:

- DN 50 to 2000 mm (2" to 80")
- Horizontal and vertical installation
- Compact or remote with max. 500 m cable
- Power supply 115 to 230 V AC, 12 to 24 V AC/DC
- With[1)] or without communication module

Other restrictions may apply (see certificate).

Special MI-001 settings:

- Unit: m³
- Qmax: Q3
- Low flow cut-off: 0.1 %
- Digital output: Frequency

For other factory settings, see Operating Instructions.

PTB K7.2 approval

MAG 5100 W (7ME6520) PTB K7.2 verified and labeled products at a given Qp and Qs = 1.25 * Qp measuring ranges see table below:

| Order code: P41 | DN 15 (½") | DN 25 (1") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Qp/Qi | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Qs [m³/h] | 1.90 | 4.40 | 12.50 | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.50 | 500 | 787.50 |
| **Qp [m³/h]** | **1.5** | **3.5** | **10** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Qi [m³/h] | 0.06 | 0.14 | 0.40 | 0.64 | 1 | 1.60 | 2.52 | 4 | 6.40 | 10 | 16 | 25.20 |

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## Technical specifications (continued)

| Order code: P42 | DN 15 (½") | DN 25 (1") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Qp/Qi | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Qs [m³/h] | 2.50 | 4.40 | 12.50 | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.50 | 500 | 787.50 |
| **Qp [m³/h]** | **2** | **3.5** | **10** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Qi [m³/h] | 0.04 | 0.07 | 0.20 | 0.32 | 0.50 | 0.80 | 1.26 | 2 | 3.20 | 5 | 8 | 12.60 |

| Order code: P43 | DN 15 (½") | DN 25 (1") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Qp/Qi | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Qs [m³/h] | 5 | 5 | 12.50 | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.50 | 500 | 787.50 |
| **Qp [m³/h]** | **4** | **4** | **10** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Qi [m³/h] | 0.04 | 0.04 | 0.10 | 0.16 | 0.25 | 0.40 | 0.63 | 1 | 1.60 | 2.50 | 4 | 6.30 |

| Order code: P44 | DN 15 (½") | DN 25 (1") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Qp/Qi | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Qs [m³/h] | 5 | 5 | 12.50 | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.50 | 500 | 787.50 |
| **Qp [m³/h]** | **4** | **4** | **10** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** |
| Qi [m³/h] | 0.04 | 0.04 | 0.10 | 0.16 | 0.25 | 0.40 | 0.63 | 1 | 1.60 | 2.50 | 4 | 6.30 |

| Order code: P45 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| Qp/Qi | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 |
| Qs [m³/h] | 79 | 78.75 | 125 | 200 | 313 | 500 | 787.50 | 1250 | 2000 |
| **Qp [m³/h]** | **63** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** |
| Qi [m³/h] | 0.25 | 0.25 | 0.40 | 0.64 | 1 | 1.60 | 2.52 | 4 | 6.40 |

| Order code: P47 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| Qp/Qi | 25 | 25 | 25 | 25 | 25 |
| Qs [m³/h] | 1250 | 2000 | 3125 | 3125 | 5000 |
| **Qp [m³/h]** | **1000** | **1600** | **2500** | **2500** | **4000** |
| Qi [m³/h] | 40 | 64 | 100 | 100 | 160 |

| Order code: P48 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| Qp/Qi | 50 | 50 | 50 | 50 | 50 |
| Qs [m³/h] | 1250 | 2000 | 3125 | 3125 | 5000 |
| **Qp [m³/h]** | **1000** | **1600** | **2500** | **2500** | **4000** |
| Qi [m³/h] | 20 | 32 | 50 | 50 | 80 |

| Order code: P49 | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|
| Qp/Qi | 100 | 100 | 100 | 100 | 100 |
| Qs [m³/h] | 2000 | 3125 | 5000 | 5000 | 5000 |
| **Qp [m³/h]** | **1000** | **1600** | **2500** | **2500** | **4000** |
| Qi [m³/h] | 40 | 64 | 100 | 100 | 160 |

The label is placed on the transmitter housing. An example of the product label is shown below:




PTB K7.2 approval valid for:

- DN 15 to 1200 mm (½" to 48")
- Horizontal and vertical installation
- Compact or remote with max. 500 m cable
- Power supply 115 to 230 V AC, 12 to 24 V AC/DC
- With[1)] or without communication module

Other restrictions may apply (see certificate).
Special PTB K7.2 settings:

- Qmax: Qs
- Current output: 4 ... 20 mA

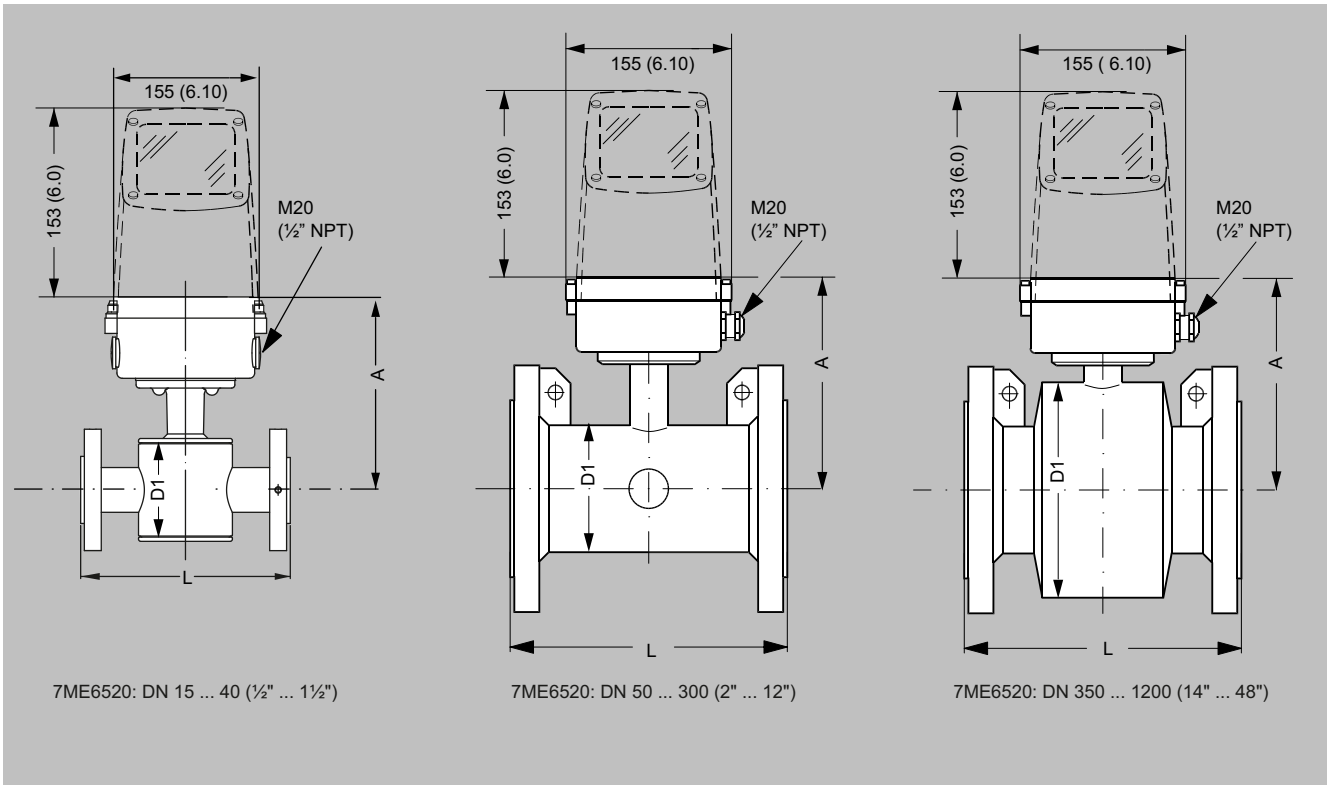
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## Technical specifications (continued)

For other factory settings, see Operating Instructions.

## Dimensional drawings




7ME6520: DN 15 ... 40 (½" ... 1½")

7ME6520: DN 50 ... 300 (2" ... 12")

7ME6520: DN 350 ... 1200 (14" ... 48")

| Nominal size | | 7ME6520 NBR or EPDM liner A | | D1 | | L[1)] | |
|---|---|---|---|---|---|---|---|
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 15 | ½ | 177 | 7.0 | 77 | 3.0 | 200 | 7.9 |
| 25 | 1 | 187 | 7.4 | 96 | 3.8 | 200 | 7.9 |
| 40 | 1½ | 202 | 8.0 | 127 | 5.0 | 200 | 7.9 |
| 50 | 2 | 188 | 7.4 | 76 | 3.0 | 200 | 7.9 |
| 65 | 2½ | 194 | 7.6 | 89 | 3.5 | 200 | 7.9 |
| 80 | 3 | 200 | 7.9 | 102 | 4.0 | 200 | 7.9 |
| 100 | 4 | 207 | 8.1 | 114 | 4.5 | 250 | 9.8 |
| 125 | 5 | 217 | 8.5 | 140 | 5.5 | 250 | 9.8 |
| 150 | 6 | 232 | 9.1 | 168 | 6.6 | 300 | 11.8 |
| 200 | 8 | 257 | 10.1 | 219 | 8.6 | 350 | 13.8 |
| 250 | 10 | 284 | 11.2 | 273 | 10.8 | 450 | 17.7 |
| 300 | 12 | 310 | 12.2 | 324 | 12.8 | 500 | 19.7 |
| 350 | 14 | 382 | 15.0 | 451 | 17.8 | 550 | 21.7 |
| 400 | 16 | 407 | 16.0 | 502 | 19.8 | 600 | 23.6 |
| 450 | 18 | 438 | 17.2 | 563 | 22.2 | 600 | 23.6 |
| 500 | 20 | 463 | 18.2 | 614 | 24.2 | 600 | 23.6 |
| 600 | 24 | 514 | 20.2 | 715 | 28.2 | 600 | 23.6 |
| 700 | 28 | 564 | 22.2 | 816 | 32.1 | 700 | 27.6 |
| 750 | 30 | 591 | 23.3 | 869 | 34.2 | 750 | 29.5 |
| 800 | 32 | 616 | 24.3 | 927 | 36.5 | 800 | 31.5 |
| 900 | 36 | 663 | 26.1 | 1032 | 40.6 | 900 | 35.4 |

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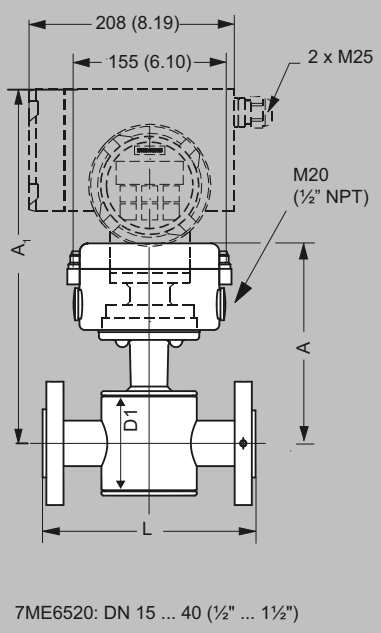


## Dimensional drawings (continued)

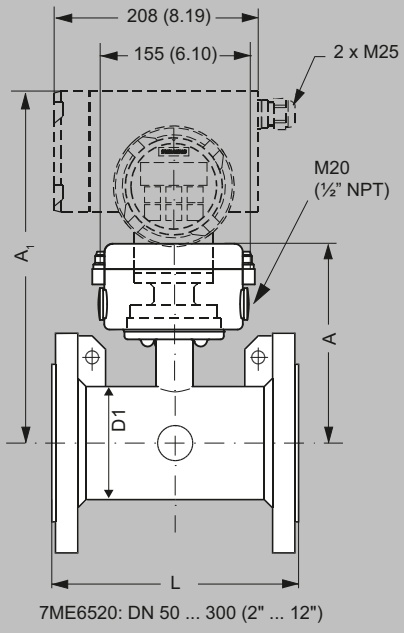
| Nominal size | | 7ME6520 NBR or EPDM liner A | | D1 | | L[1)] | |
|---|---|---|---|---|---|---|---|
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 1000 | 40 | 714 | 28.1 | 1136 | 44.7 | 1000 | 39.4 |
| | 42 | 714 | 28.1 | 1136 | 44.7 | 1000 | 39.4 |
| | 44 | 765 | 30.1 | 1238 | 48.7 | 1100 | 43.3 |
| 1200 | 48 | 820 | 32.3 | 1348 | 53.1 | 1200 | 47.2 |
| 1400 | 54 | 925 | 36.4 | 1574 | 65.94 | 1400 | 55.1 |
| 1500 | 60 | 972 | 38.2 | 1672 | 65.83 | 1500 | 59.1 |
| 1600 | 66 | 1025 | 40.4 | 1774 | 75.39 | 1600 | 63.0 |
| 1800 | 72 | 1123 | 44.2 | 1974 | 77.72 | 1800 | 70.9 |
| 2000 | 80 | 1223 | 48.1 | 2174 | 85.59 | 2000 | 78.7 |

1) Tolerances on built-in length:
DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"),
DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

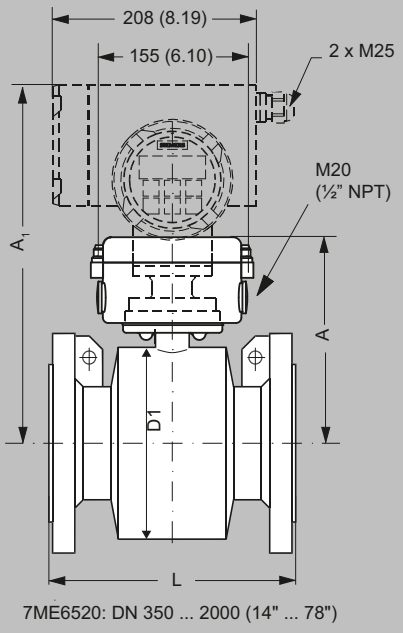
MAG 5100 W/6000 I Compact



7ME6520: DN 15 ... 40 (½" ... 1½")



7ME6520: DN 50 ... 300 (2" ... 12")



7ME6520: DN 350 ... 2000 (14" ... 78")

| Nominal size | | 7ME6520 NBR or EPDM liner A | | A1 | | D1 | | L[1)] | |
|---|---|---|---|---|---|---|---|---|---|
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 15 | ½ | 177 | 7.0 | 331 | 13.0 | 77 | 3.0 | 200 | 7.9 |
| 25 | 1 | 187 | 7.4 | 341 | 13.4 | 96 | 3.8 | 200 | 7.9 |
| 40 | 1½ | 202 | 8.0 | 356 | 14.0 | 127 | 5.0 | 200 | 7.9 |
| 50 | 2 | 188 | 7.4 | 342 | 13.5 | 76 | 3.0 | 200 | 7.9 |
| 65 | 2½ | 194 | 7.6 | 348 | 13.7 | 89 | 3.5 | 200 | 7.9 |
| 80 | 3 | 200 | 7.9 | 354 | 14.0 | 102 | 4.0 | 200 | 7.9 |
| 100 | 4 | 207 | 8.1 | 361 | 14.2 | 114 | 4.5 | 250 | 9.8 |
| 125 | 5 | 217 | 8.5 | 371 | 14.6 | 140 | 5.5 | 250 | 9.8 |
| 150 | 6 | 232 | 9.1 | 386 | 15.2 | 168 | 6.6 | 300 | 11.8 |
| 200 | 8 | 257 | 10.1 | 411 | 16.2 | 219 | 8.6 | 350 | 13.8 |
| 250 | 10 | 284 | 11.2 | 438 | 17.2 | 273 | 10.8 | 450 | 17.7 |
| 300 | 12 | 310 | 12.2 | 464 | 18.3 | 324 | 12.8 | 500 | 19.7 |

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## Dimensional drawings (continued)

| Nominal size | | 7ME6520 NBR or EPDM liner A | | A1 | | D1 | | L[1] | |
|---|---|---|---|---|---|---|---|---|---|
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] |
| 350 | 14 | 382 | 15.0 | 536 | 21.1 | 451 | 17.8 | 550 | 21.7 |
| 400 | 16 | 407 | 16.0 | 561 | 22.1 | 502 | 19.8 | 600 | 23.6 |
| 450 | 18 | 438 | 17.2 | 592 | 23.3 | 563 | 22.2 | 600 | 23.6 |
| 500 | 20 | 463 | 18.2 | 617 | 24.3 | 614 | 24.2 | 600 | 23.6 |
| 600 | 24 | 514 | 20.2 | 668 | 26.3 | 715 | 28.2 | 600 | 23.6 |
| 700 | 28 | 564 | 22.2 | 718 | 28.3 | 816 | 32.1 | 700 | 27.6 |
| 750 | 30 | 591 | 23.3 | 745 | 29.3 | 869 | 34.2 | 750 | 29.5 |
| 800 | 32 | 616 | 24.3 | 770 | 30.3 | 927 | 36.5 | 800 | 31.5 |
| 900 | 36 | 663 | 26.1 | 817 | 32.2 | 1032 | 40.6 | 900 | 35.4 |
| 1000 | 40 | 714 | 28.1 | 868 | 34.2 | 1136 | 44.7 | 1000 | 39.4 |
| | 42 | 714 | 28.1 | 868 | 34.2 | 1136 | 44.7 | 1000 | 39.4 |
| | 44 | 765 | 30.1 | 919 | 36.2 | 1238 | 48.7 | 1100 | 43.3 |
| 1200 | 48 | 820 | 32.3 | 974 | 38.3 | 1348 | 53.1 | 1200 | 47.2 |
| 1400 | 54 | 925 | 36.4 | 1079 | 42.5 | 1574 | 61.97 | 1400 | 55.1 |
| 1500 | 60 | 972 | 38.2 | 1126 | 44.3 | 1672 | 65.83 | 1500 | 59.1 |
| 1600 | 66 | 1025 | 40.4 | 1179 | 46.4 | 1774 | 59.84 | 1600 | 63.0 |
| 1800 | 72 | 1123 | 44.2 | 1277 | 50.3 | 1974 | 77.72 | 1800 | 70.9 |
| 2000 | 80 | 1223 | 48.1 | 1377 | 54.2 | 2174 | 85.59 | 2000 | 78.7 |

[1] Tolerances on built in length:
DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20")
DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 2000 (28" to 78"): +10/-10 mm (+0.39/-0.39")

| Nominal size | | 7ME6520 PN 10 | | PN 16 | | PN 40 | | Class 150 | | AWWA C-207 | | AS 4087 | | JIS10K | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [mm] | [inch] | [kg] | [lbs] | [kg] | [lbs] | [kg] | [lbs] | [kg] | [lbs] | [kg] | [lbs] | [kg] | [lbs] | [kg] | [lbs] |
| 15 | ½ | - | - | - | - | 5 | 11 | 5 | 11 | - | - | - | - | 5 | 11 |
| 25 | 1 | - | - | - | - | 6 | 13 | 6 | 13 | - | - | - | - | 6 | 13 |
| 40 | 1½ | - | - | - | - | 9 | 20 | 9 | 20 | - | - | - | - | 9 | 20 |
| 50 | 2 | - | - | 10 | 22 | - | - | 10 | 22 | - | - | 10 | 22 | 10 | 22 |
| 65 | 2½ | - | - | 12 | 26 | - | - | 12 | 26 | - | - | 12 | 26 | 12 | 26 |
| 80 | 3 | - | - | 13 | 29 | - | - | 13 | 29 | - | - | 13 | 29 | 13 | 29 |
| 100 | 4 | - | - | 17 | 37 | - | - | 18 | 40 | - | - | 17 | 37 | 17 | 37 |
| 125 | 5 | - | - | 20 | 44 | - | - | 21 | 46 | - | - | - | - | 20 | 44 |
| 150 | 6 | - | - | 27 | 60 | - | - | 30 | 66 | - | - | 21 | 57 | 26 | 57 |
| 200 | 8 | 38 | 84 | 39 | 86 | - | - | 47 | 104 | - | - | 64 | 106 | 35 | 77 |
| 250 | 10 | 51 | 115 | 56 | 123 | - | - | 64 | 141 | - | - | 48 | 152 | 51 | 112 |
| 300 | 12 | 62 | 137 | 72 | 159 | - | - | 92 | 203 | - | - | 61 | 189 | 59 | 130 |
| 350 | 14 | 99 | 218 | 115 | 254 | - | - | 131 | 289 | - | - | 106 | 254 | 88 | 194 |
| 400 | 16 | 121 | 267 | 143 | 315 | - | - | 161 | 355 | - | - | 124 | 277 | 113 | 249 |
| 450 | 18 | 144 | 317 | 177 | 390 | - | - | 182 | 401 | - | - | 145 | 311 | 135 | 298 |
| 500 | 20 | 165 | 364 | 222 | 489 | - | - | 217 | 478 | - | - | 175 | 418 | 151 | 333 |
| 600 | 24 | 225 | 496 | 321 | 708 | - | - | 305 | 672 | - | - | 285 | 664 | 179 | 395 |
| 700 | 28 | 272 | 600 | 331 | 730 | - | - | - | - | 284 | 626 | 350 | 704 | - | - |
| 750 | 30 | - | - | - | - | - | - | - | - | 331 | 730 | - | - | - | - |
| 800 | 32 | 300 | 661 | 386 | 851 | - | - | - | - | 394 | 869 | 485 | 944 | - | - |
| 900 | 36 | 372 | 820 | 482 | 1063 | - | - | - | - | 487 | 1074 | 645 | 1362 | - | - |
| 1000 | 40 | 454 | 1001 | 672 | 1482 | - | - | - | - | 589 | 1299 | 696 | 1399 | - | - |
| | 42 | - | - | - | - | - | - | - | - | 693 | 1528 | - | - | - | - |
| | 44 | - | - | - | - | - | - | - | - | 774 | 1706 | - | - | - | - |
| 1200 | 48 | 728 | 1605 | 1116 | 2460 | - | - | - | - | 916 | 2019 | 1116 | 1789 | - | - |
| 1400 | 56 | 1338 | 2944 | 1592 | 3502 | 1890 | 4158 | - | - | - | - | 1592 | 3502 | - | - |
| 1500 | 60 | 1520 | 3344 | 1850 | 4070 | 2238 | 4924 | - | - | - | - | 1950 | 4290 | - | - |
| 1600 | 64 | 1696 | 3731 | 2110 | 4642 | 2525 | 5555 | - | - | - | - | 2110 | 4642 | - | - |
| 1800 | 72 | 2110 | 4642 | 2560 | 5632 | 3460 | 7612 | - | - | - | - | 2560 | 5632 | - | - |
| 2000 | 80 | 2564 | 5641 | 3640 | 8008 | 4205 | 9251 | - | - | - | - | 3640 | 8008 | - | - |

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## Overview



The SITRANS FMS500 is a magnetic flow meter sensor suitable for volume flow measurement of liquids (conductive) and is the ideal product for applications in water abstraction, wastewater treatment, water distribution networks, and irrigation.

The rugged, fully welded design supports direct burial, constant flooding and to stand up a wide range of harsh chemicals found in water-based applications in many different industries.

Designed for highly accurate measurement in low-flow conditions, these meters can measure from very low velocities up to 10 m/s, giving it a very wide measurement range.

Combined with a flow meter transmitter it is a traditional externally powered electromagnetic flow meter system

## Benefits

- Zero Up and Zero Down installation capabilities
- NBR rubber liner for all water and wastewater applications
- EPDM liner specifically for drinking water applications requiring special approvals
- Soft elastomer facing provides high abrasion resistance
- Increased low flow accuracy for water leak detection
- Rugged construction with no moving parts for maintenance-free operation over many years.
- Simple on-site upgrade to IP68 of a standard sensor allowing underground installation, permanent immersion or underwater installation
- Integrated grounding electrodes – no grounding rings required for many applications
- Short delivery time
- Built-in length according to ISO 20456 (up to DN 400 mm)
- SENSORPROM™ Technology provides an automatic upload of start-up settings and calibration data for easy commissioning
- Designed to allow in-situ verification for easy performance check
- In conformity with ISO 4064, OIML R49 and EN 14154

## Application

The SITRANS FMS500 with its NBR or EPDM soft rubber lining is a flow meter sensor for all kinds of water applications such as ground water, potable water, cooling water, wastewater, sewage, or sludge applications.

Connected to the compatible transmitter SITRANS FMT020, either mounted remotely or as a compact unit, it forms the magnetic flow meter system SITRANS FM520 which can be used in almost all general-purpose water applications.

SITRANS FM520

Perfect match for a cost-effective solution for all water and wastewater applications. Measuring accuracy ±0.4% of flow rate, optional ± 0.2% of flow rate available.

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## Selection and ordering data

| Sensor SITRANS FMS500 | Article No. 7ME653- | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | • | - | • | • | • | • | • | - | 2 | • | A | • | |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Transmitter variant** | | | | | | | | | | | | | |
| No transmitter (sensor only) | 0 | | | | | | | | | | | | |
| Transmitter SITRANS FMT020 | 2 | | | | | | | | | | | | |
| **Diameter** | | | | | | | | | | | | | |
| DN 15, 1/2 inch | | | 1 | V | | | | | | | | | |
| DN 25, 1 inch | | | 2 | D | | | | | | | | | |
| DN 40, 1 1/2 inch | | | 2 | R | | | | | | | | | |
| DN 50, 2 inch | | | 2 | Y | | | | | | | | | |
| DN 65, 2 1/2 inch | | | 3 | F | | | | | | | | | |
| DN 80, 3 inch | | | 3 | M | | | | | | | | | |
| DN 100, 4 inch | | | 3 | T | | | | | | | | | |
| DN 125, 5 inch | | | 4 | B | | | | | | | | | |
| DN 150, 6 inch | | | 4 | H | | | | | | | | | |
| DN 200, 8 inch | | | 4 | P | | | | | | | | | |
| DN 250, 10 inch | | | 4 | V | | | | | | | | | |
| DN 300, 12 inch | | | 5 | B | | | | | | | | | |
| DN 350, 14 inch | | | 5 | D | | | | | | | | | |
| DN 400, 16 inch | | | 5 | H | | | | | | | | | |
| DN 450, 18 inch | | | 5 | K | | | | | | | | | |
| DN 500, 20 inch | | | 5 | R | | | | | | | | | |
| DN 600, 24 inch | | | 5 | Y | | | | | | | | | |
| DN 700, 28 inch | | | 6 | B | | | | | | | | | |
| DN 750, 30 inch | | | 6 | D | | | | | | | | | |
| DN 800, 32 inch | | | 6 | H | | | | | | | | | |
| DN 900, 36 inch | | | 6 | K | | | | | | | | | |
| DN 1000, 40 inch | | | 6 | R | | | | | | | | | |
| DN 1050, 42 inch | | | 6 | Y | | | | | | | | | |
| DN 1100, 44 inch | | | 7 | D | | | | | | | | | |
| DN 1200, 48 inch | | | 7 | H | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| EN 1092-1 PN 10 flanges | | | | | B | | | | | | | | |
| EN 1092-1 PN 16 flanges | | | | | C | | | | | | | | |
| EN 1092-1 PN16 flanges, non-PED version | | | | | D | | | | | | | | |
| ANSI B16.5 Class 150 flanges | | | | | J | | | | | | | | |
| AWWA C-207 Class D flanges | | | | | M | | | | | | | | |
| AS 4087 PN 16 flanges | | | | | S | | | | | | | | |
| **Process connection material** | | | | | | | | | | | | | |
| Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C4 | | | | | | 0 | | | | | | | |
| Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C5 (300 µm) | | | | | | 1 | | | | | | | |
| **Liner material** | | | | | | | | | | | | | |
| EPDM (soft rubber) | | | | | | | 2 | | | | | | |
| NBR (soft rubber) | | | | | | | 3 | | | | | | |
| **Electrode material** | | | | | | | | | | | | | |
| Hastelloy C276 / 2.4819 | | | | | | | | | 2 | | | | |
| **Transmitter mounting & enclosure type** | | | | | | | | | | | | | |
| No transmitter (sensor only) | | | | | | | | | | A | | | |
| Compact design (integral mount), plastic enclosure | | | | | | | | | | G | | | |
| Remote design, plastic enclosure (wall-mounting unit and sensor terminal board included) | | | | | | | | | | J | | | |
| **Power supply** | | | | | | | | | | | | | |
| None (sensor only) | | | | | | | | | | | | 0 | |
| 24 V DC | | | | | | | | | | | | 2 | |
| 100 ... 240 V AC, 50/60 Hz | | | | | | | | | | | | 3 | |

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## Selection and ordering data (continued)

| Additional information | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Cable glands** | |
| Without cable glands (blind plugs) | A00 |
| M20x1.5 cable glands, material polyamide | A02 |
| 1/2 inch NPT cable glands, material polyamide | A05 |
| **Certificates** | |
| Declaration of compliance with the order 2.1 (EN 10204) | C00 |
| Inspection certificate 3.1 (EN 10204) - Material of pressure-containing and wetted parts | C12 |
| Test report 2.2 (EN 10204) | C14 |
| Inspection certificate 3.1(EN 10204) - Pressure test | C18 |
| **High accuracy calibration** | |
| High accuracy factory calibration 0.2%, DN ≤ 200, ≤ 8 inch | D01 |
| High accuracy factory calibration 0.2%, DN 250 ... 600, 10 ... 24 inch | D02 |
| High accuracy factory calibration 0.2%, DN 700 ... 1200, 28 ... 48 inch | D03 |
| **5-point calibration** | |
| 5-point factory calibration, DN ≤200, ≤ 8 inch | D10 |
| 5-point factory calibration, DN 250 ... 600, 10 ... 24 inch | D11 |
| 5-point factory calibration, DN 700 ... 1200, 28 ... 48 inch | D12 |
| **10-point calibration** | |
| 10-point factory calibration, DN ≤ 200, ≤ 8 inch | D15 |
| 10-point factory calibration, DN 250 ... 600, 10 ... 24 inch | D16 |
| 10-point factory calibration, DN 700 ... 1200, 28 ... 48 inch | D17 |
| **Default matched-pair calibration** | |
| Default matched-pair factory calibration, DN ≤ 200, ≤ 8 inch | D20 |
| Default matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch | D21 |
| Default matched-pair factory calibration, DN 700 ... 1200, 28 ...48 inch | D22 |
| **5-point matched-pair calibration** | |
| 5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch | D25 |
| 5-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch | D26 |
| 5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch | D27 |
| **10-point matched-pair calibration** | |
| 10-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch | D30 |
| 10-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch | D31 |
| 10-point, matched-pair factory calibration, DN 700 ... 1200, 28 ...48 inch | D32 |
| **Accredited ISO/IEC 17025 calibration** | |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch | D35 |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 250 ... 600, 10 ...24 inch | D36 |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch | D37 |
| **General safety** | |
| CSA General Purpose | E06 |

| Additional information | Order code |
|---|---|
| **Country of origin** | |
| France | E90 |
| **Communication** | |
| HART with 4 ... 20 mA output, active or passive | F01 |
| Modbus RTU / RS485 | F04 |
| PROFINET | F07 |
| EtherNet/IP | F09 |
| **Device options** | |
| Sensor terminal board factory mounted | J00 |
| Sensor cables factory mounted | J01 |
| Factory preconfigured for transmitter mounting in compact design (integral mount) | J02 |
| **Type of protection (IP)** | |
| IP68 (NEMA 6P) protection class for sensor in remote design, without potting (to 2 m depth, 10 days) | L50 |
| IP68 (NEMA 6P) protection class for sensor in remote design, factory potted (to 10 m depth, continuously) | L51 |
| **Sensor cables** | |
| Cable kit with coil and electrode cable, standard type (3 × 1.5 mm²), PVC-jacket | |
| • 5 m (16 ft) | T00 |
| • 10 m (33 ft) | T01 |
| • 20 m (65 ft) | T03 |
| • 30 m (98 ft) | T05 |
| • 40 m (131 ft) | T06 |
| • 50 m (164 ft) | T07 |
| • 60 m (197 ft) | T08 |
| • 100 m (328 ft) | T11 |
| • 150 m (492 ft) | T14 |
| • 200 m (656 ft) | T16 |
| • 500 m (1640 ft) | T18 |
| Cable kit with coil cable standard type (3 × 1.5 mm²) and electrode cable special type (3 × 0.25 mm²), PVC-jacket | |
| • 5 m (16 ft) | T50 |
| • 10 m (33 ft) | T51 |
| • 15 m (49 ft) | T52 |
| • 20 m (65 ft) | T53 |
| • 25 m (82 ft) | T54 |
| • 30 m (98 ft) | T55 |
| • 40 m (131 ft) | T56 |
| • 50 m (164 ft) | T57 |
| • 60 m (197 ft) | T58 |
| • 100 m (328 ft) | T61 |
| • 150 m (492 ft) | T64 |
| • 200 m (656 ft) | T66 |
| • 500 m (1640 ft) | T68 |
| **Device settings** | |
| Measuring range: Upper range value ($Q_{max}$), unit | Y01 |
| Current output damping | Y02 |
| Current output signal range | Y03 |
| Low flow cut off | Y04 |
| Flow direction (Default setting: Positive) | Y05 |

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## Selection and ordering data (continued)

| Additional information | Order code |
|---|---|
| Empty pipe detection (Default setting: On) | Y06 |
| Mains frequency (Default setting: 50 Hz) | Y07 |
| Operation language display (default setting English) | Y24 |
| **Device identification** | |
| Location designation (TAG), device parameter and stainless-steel plate for transmitter (max. 32 characters) | Y11 |
| Measuring point description, device parameter and stainless-steel plate for transmitter (max. 32 characters) | Y12 |
| Location designation (TAG), device parameter and adhesive label for transmitter (max. 32 characters) | Y13 |
| Measuring point description, device parameter and adhesive label for transmitter (max. 32 characters) | Y14 |
| Location designation (TAG), device parameter and stainless-steel plate (max. 32 characters) | Y15 |
| Measuring point description, device parameter and stainless-steel plate (max. 32 characters) | Y16 |
| Location designation (TAG), device parameter and adhesive label (max. 32 characters) | Y18 |
| Measuring point description, device parameter and adhesive label (max. 32 characters) | Y19 |

| Additional information | Order code |
|---|---|
| **Totalizer 1 settings** | |
| Preset value | Y30 |
| Unit | Y31 |
| Direction | Y32 |
| Failure mode | Y33 |
| Decimal point | Y34 |
| **Totalizer 2 settings** | |
| Preset value | Y35 |
| Unit | Y36 |
| Direction | Y37 |
| Failure mode | Y38 |
| Decimal point | Y39 |
| **Totalizer 3 settings** | |
| Preset value | Y40 |
| Unit | Y41 |
| Direction | Y42 |
| Failure mode | Y43 |
| Decimal point | Y44 |
| **Pulse output settings** | |
| Volume per pulse | Y50 |
| Pulse width | Y51 |

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## Technical specifications

| SITRANS FMS500 flowmeter sensor | |
|---|---|
| **Product characteristic** | For demanding applications in the water & wastewater industry |
| **Measurement of** | Volume flow, flow velocity, electrical conductivity |
| **Nominal diameter** | • Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½")<br>• Coned sensor: DN 50 ... 300 (2" ... 12")<br>• Full bore sensor: DN 350 ... 1200 (14" ... 48") |
| **Mode of operation** | |
| Measuring principle | Electromagnetic induction |
| Medium conductivity | Liquids with an electrical conductivity ≥ 5 µS/cm. |
| Excitation frequency (mains supply: 50 Hz / 60 Hz) | • DN 15 ... 65 (1/2" ... 2 1/2"): 12.5 Hz / 15 Hz<br>• DN 80 ... 150 (3" ... 6"): 6.25 Hz / 7.5 Hz<br>• DN 200 ... 300 (8" ... 12"): 3.125 Hz / 3.75 Hz<br>• DN 350 ... 1200 (14" ... 48"): 1.5625 Hz / 1.875 Hz |
| **Process connection** | |
| Flanges [1] | |
| • EN 1092-1 | PN 10 (145 psi) Flat face DN 200 ... 300 (8" ... 12")<br>PN 10 (145 psi) Raised face DN 350 ... 1200 (14" ... 48")<br>PN 16 (232 psi) Flat face DN 50 ... 300 (2" ... 12")<br>PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48")<br>PN 40 (580 psi) Flat face DN 15 ... 40 (½" ... 1½") |
| • ANSI B16.5 | Class 150 Flat face ½" ... 12"<br>Class 150 Raised face 14" ... 24" |
| • AWWA C-207 | Class D Flat face 28 ... 48" |
| • AS/NZS 4087 | PN 16 (232 psi) Flat Face DN 50 ... 300 (2" ... 12")<br>PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48") |
| • JIS B 2220:2004 | 10K DN 15 ... 600 (1" ... 24") |
| **Rated operating conditions** | |
| Ambient temperature | |
| • Sensor | -20 ... +70 °C (-40 ... +158 °F) |
| • Compact with transmitter | -20 ... +65 °C (-40 ... +149 °F) |
| Operating pressure (abs) (maximum operating pressure depending on flange type) | DN 15 ... 40 (1/2" ... 1 1/2"): 0.01 ... 40 bar (0.15 ... 580 psi)<br>DN 50 ... 300 (2" ... 12"): 0.03 ... 20 bar (0.44 ... 290 psi)<br>DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi) |
| Protection class | |
| • Standard | IP66/67, NEMA 4X/6 |
| • Optional | IP68 and NEMA 6P (2m, 10 days) for sensor in remote design<br>IP68 and NEMA 6P (10m, continuously) for sensor in remote design |
| Mechanical load (vibration) | |
| • Integral mount / compact version | Vibration, sinusoidal according to IEC 60068-2-6<br>• 2 ... 4 Hz, 3.5 mm peak<br>• 8.4 ... 500 Hz, 1 g peak<br>Vibration broad-band random, according to IEC 60068-2-64<br>• 10 ... 200 Hz, 0.003 g2/Hz<br>• 200 ... 500 Hz, 0.001 g2/Hz<br>• Total: 1.54 g rms |
| • Remote version | Vibration, sinusoidal according to IEC 60068-2-6<br>Sensor: • 2 ... 8.4 Hz, 7.5 mm peak; • 8.4 ... 500 Hz, 2 g peak<br>Transmitter: • 2 ... 8.4 Hz, 1.5 mm peak; • 8.4 ... 500 Hz, 0.7 g peak<br>Vibration broad-band random, according to IEC 60068-2 64<br>Sensor: • 10 ... 200 Hz, 0.01 g2/Hz; • 200 ... 500 Hz, 0.003 g2/Hz; • Total: 1.54 g rms<br>Transmitter: • 10 ... 200 Hz, 0.003 g2/Hz; • 200 ... 500 Hz, 0.001 g2/Hz; • Total: 1.54 g rms |
| Process temperature | |

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## Technical specifications (continued)

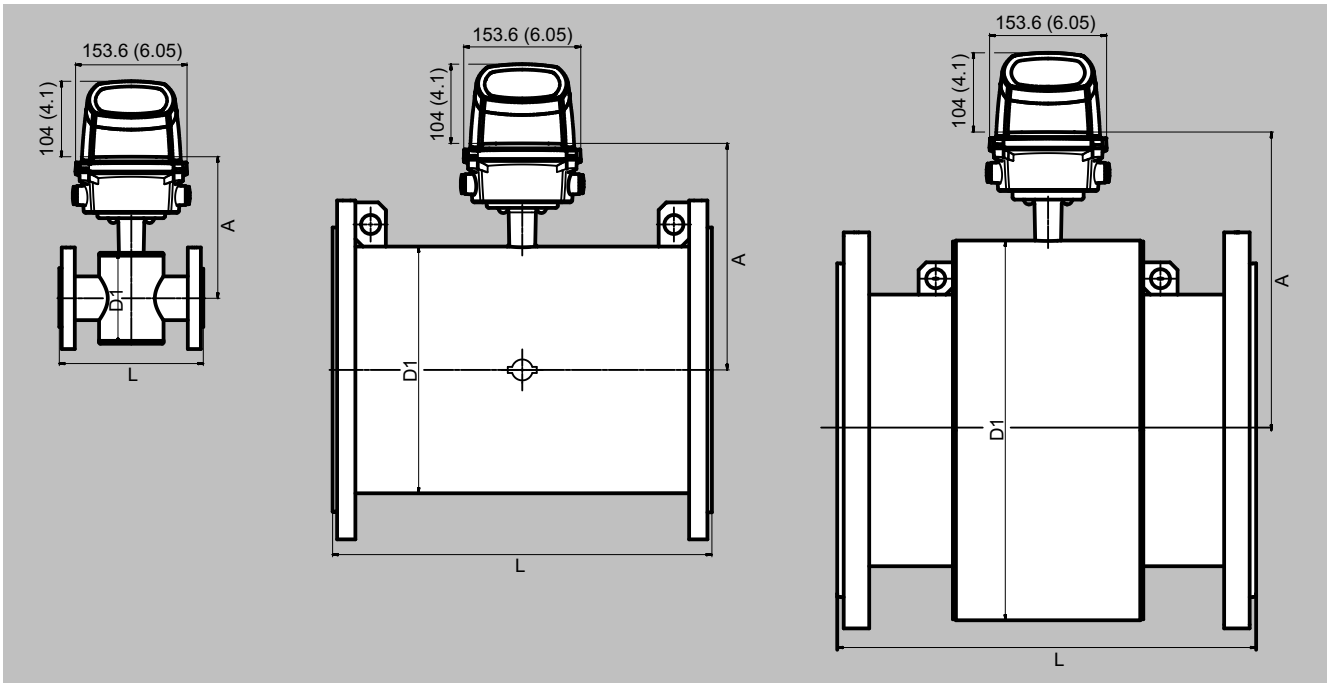
| SITRANS FMS500 flowmeter sensor | |
|---|---|
| • NBR liner | -10 ... +70 °C (14 ... 158 °F) |
| • EPDM liner | -10 ... +70 °C (14 ... 158 °F) |
| Pressure drop | DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s)<br>DN 40 ... 300 (1½" ... 12"): Max. 25 mbar (0.36 psi) at 3 m/s (10 ft/s)<br>DN 350 ... 1200 (14" ... 48"): Insignificant |
| Test pressure | 1.5 × PN (where applicable) |
| **Design** | |
| Dimensions | See dimensional drawings |
| Weight | See dimensional drawings |
| Material | |
| • Housing and flanges | Carbon steel ASTM A 105 with corrosion resistant coating of class C4 or C5 (durability up to 15 years) EN ISO 12944 |
| • Measuring electrode | Hastelloy C276 / 2.4819 |
| • Grounding electrode | Hastelloy C276 / 2.4819 |
| • Measuring pipe [2] | Stainless steel AISI 304 / 1.4301 |
| • Terminal box | Polycarbonate |
| Cable entries | 4 x metric thread (size M20 x 1.5) |
| Pressure equipment | Conforming with 97/23 EC |
| Electromagnetic compatibility | Conforming with 2004/108/EC |
| **Calibration** | |
| Standard | Zero-point, 2 × 25 % and 2 × 90 % |
| Optional | • 5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax<br>• 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax<br>• Matched pair calibration: default, 5-point or 10-point<br>• ISO/IEC 17025 accredited, 5-point, matched-pair calibration |
| **Certificates and approvals** | |
| General purpose | CE (LVD, PED, EMC, RoHS), UKCA |
| Drinking water | • WRAS (WRc, BS 6920 material approval for cold water, GB)<br>• NSF/ANSI Standard 61 (Cold water, US)<br>• ACS listed (France)<br>• DVGW W270 (Germany)<br>• Belgaqua (Belgium)<br>• AS/NZS 4020 (Australia/New Zealand)<br>• GB/T 5750 (China) |
| Others | • Environmental Product Declaration (EPD)<br>• EAC (Kazakhstan) |

[1] DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS 4087 flanges
[2] DN > 300 (12")

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## Dimensional drawings




SITRANS FMS500 Sensor: version 7ME6530 DN 15 ... 40 (½" ... 1½") (left), version 7ME6530 DN 50 ... 300 (2" ... 12") (middle) and version 7ME6530 DN 350 ... 1200 (14" ... 48") (right)

| Sensor SITRANS FMS500 (7ME653) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Nominal diameter | | A | | D1 | | L1) | | Weight 2) | |
| [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [kg] | [lbs] |
| 15 | ½ | 170 | 6.7 | 77 | 3.0 | 200 | 7.9 | 5 | 11 |
| 25 | 1 | 180 | 7.1 | 96 | 3.8 | 200 | 7.9 | 6 | 13 |
| 40 | 1½ | 195 | 7.7 | 127 | 5.0 | 200 | 7.9 | 9 | 20 |
| 50 | 2 | 181 | 7.1 | 76 | 3.0 | 200 | 7.9 | 10 | 22 |
| 65 | 2½ | 187 | 7.4 | 89 | 3.5 | 200 | 7.9 | 12 | 26 |
| 80 | 3 | 193 | 7.6 | 102 | 4.0 | 200 | 7.9 | 13 | 29 |
| 100 | 4 | 200 | 7.9 | 114 | 4.5 | 250 | 9.8 | 17 | 37 |
| 125 | 5 | 210 | 8.3 | 140 | 5.5 | 250 | 9.8 | 20 | 44 |
| 150 | 6 | 225 | 8.9 | 168 | 6.6 | 300 | 11.8 | 27 | 60 |
| 200 | 8 | 250 | 9.8 | 219 | 8.6 | 350 | 13.8 | 39 | 86 |
| 250 | 10 | 277 | 10.9 | 273 | 10.8 | 450 | 17.7 | 56 | 123 |
| 300 | 12 | 303 | 11.9 | 324 | 12.8 | 500 | 19.7 | 72 | 159 |
| 350 | 14 | 375 | 14.8 | 451 | 17.8 | 550 | 21.7 | 115 | 254 |
| 400 | 16 | 400 | 15.7 | 502 | 19.8 | 600 | 23.6 | 143 | 315 |
| 450 | 18 | 431 | 17.0 | 563 | 22.2 | 600 | 23.6 | 177 | 390 |
| 500 | 20 | 456 | 18.0 | 614 | 24.2 | 600 | 23.6 | 222 | 489 |
| 600 | 24 | 507 | 20.0 | 715 | 28.2 | 600 | 23.6 | 321 | 708 |
| 700 | 28 | 557 | 21.9 | 816 | 32.1 | 700 | 27.6 | 331 | 730 |
| 750 | 30 | 584 | 23.0 | 869 | 34.2 | 750 | 29.5 | - | - |
| 800 | 32 | 609 | 24.0 | 927 | 36.5 | 800 | 31.5 | 386 | 851 |
| 900 | 36 | 656 | 25.8 | 1032 | 40.6 | 900 | 35.4 | 482 | 1063 |
| 1000 | 40 | 707 | 27.8 | 1136 | 44.7 | 1000 | 39.4 | 672 | 1482 |
| 1050 | 42 | 707 | 27.8 | 1136 | 44.7 | 1000 | 39.4 | - | - |
| 1100 | 44 | 758 | 29.8 | 1238 | 48.7 | 1100 | 43.3 | - | - |
| 1200 | 48 | 813 | 32.0 | 1348 | 53.1 | 1200 | 47.2 | 1116 | 2460 |

1) Tolerances on built-in length: DN 15 ... 200 (½" ... 8"): +0/-3 mm (+0/-0.12"), DN 250 ... 400 (10" ... 16"): +0/-5 mm (+0/-0.20"), DN 450 ... 600 (18" ... 24"): +5/-5 mm (+0.20/-0.20"), DN 700 ... 1200 (28" ... 48"): +10/-10 mm (+0.39/-0.39")

2) Weights in kg/lbs are for PN 40 DN ≤40, PN 16 DN >40 without transmitter. With transmitter FMT020 installed, weight is increased by approximately 1.0 kg (2.2 lb).

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## Overview




Transmitter MAG 5000/6000 compact version (left) and 19“ insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS FM sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error ± 0.4 % ± 1 mm/s (incl. sensor)
- MAG 6000: Max. measuring error ± 0.2 % ± 1 mm/s (incl. sensor, see also sensor specifications) and with additional features such as: “plug & play” add-on bus modules; integrated batch functions.

## Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
- 3 lines, 20 characters display in 11 languages
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: MI-001 for cold water, PTB K 7.2 and OE12/C 040 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS 485, PROFIBUS PA and DP

## Application

The SITRANS FM flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

## Design

The transmitter is designed as either IP67 NEMA 6 enclosure for compact or wall mounting or 19" version as a 19" insert as a base to be used in:

- 19" rack systems
- Front panel mounting IP65/NEMA 2
- Panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19" versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

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## Function

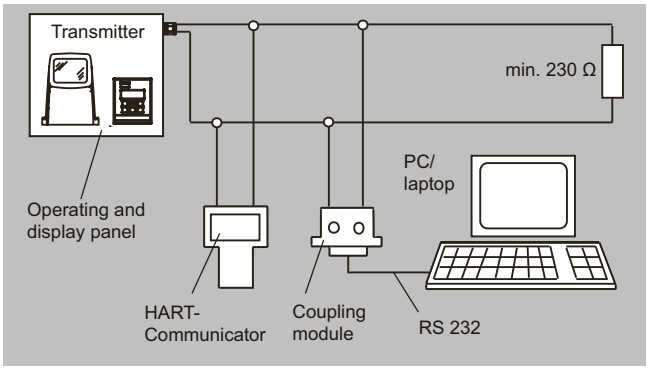
The MAG 5000/6000 are transmitters with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

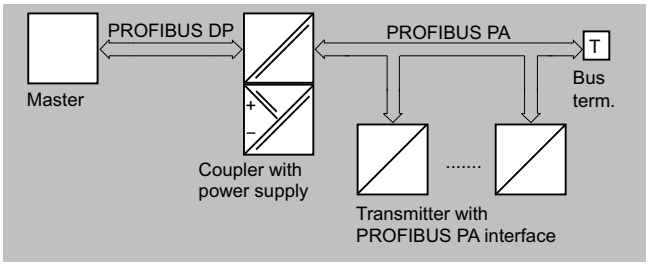
***Displays and controls***

Operation of the transmitter can be carried out using:

- Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication




HART communication




PROFIBUS PA communication

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## Selection and ordering data

*Transmitter MAG 5000*

| Description | Article No. | |
|---|---|---|
| **Transmitter MAG 5000 blind for compact and wall mounting; IP67/NEMA 6, fibre glass reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6910-1AA30-0AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6910-1AA10-0AA0** | |
| **Transmitter MAG 5000 display for compact and wall mounting; IP67/NEMA 6, fibre glass reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6910-1AA30-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6910-1AA10-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz, with HART communication | **7ME6910-1AA10-1BA0** | |
| **Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer, without initial verification (no type approval marking); IP67/NEMA 6, glass fibre reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6910-1AA30-1AD0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6910-1AA10-1AD0** | |
| **Transmitter MAG 5000 for 19" rack and wall mounting** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6910-2CA30-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6910-2CA10-1AA0** | |

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## Selection and ordering data (continued)

***Transmitter MAG 6000***

| Description | Article No. | |
|---|---|---|
| **Transmitter MAG 6000 blind for compact and wall mounting; IP67/NEMA 6, glass fibre reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-1AA30-0AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6920-1AA10-0AA0** | |
| Transmitter MAG 6000 Display for compact and wall mounting; IP67/NEMA 6, glass fibre reinforced polyamide | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-1AA30-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6920-1AA10-1AA0** | |
| **Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, stainless steel AISI 316/1.4436 (only for sensor with stainless steel terminal box) (for remote version order stainless steel terminal box separately)** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-1QA30-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6920-1QA10-1AA0** | |
| **Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer without initial verification (no type approval marking); IP67/NEMA 6, glass fibre reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-1AA30-1AD0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6920-1AA10-1AD0** | |
| **Transmitter MAG 6000 SV for compact and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1" IP67/NEMA 6, glass fibre reinforced polyamide** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-1AB30-1AA0** | |
| • 115 ... 230 V AC, 50/60 Hz | **7ME6920-1AB10-1AA0** | |
| **Transmitter MAG 6000 for 19" rack and wall mounting** | | |
| • 11 ... 30 V DC/11 ... 24 V AC | **7ME6920-2CA30-1AA0** | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • 115 ... 230 V AC, 50/60 Hz | 7ME6920-2CA10-1AA0 |  |
| **Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation frequency 44 Hz for Batch application DN ≤ 25/1"** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | 7ME6920-2CB30-1AA0 | |
| • 115 ... 230 V AC, 50/60 Hz | 7ME6920-2CB10-1AA0 | |
| **MAG 6000 19" insert, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic;115 ... 230 V AC, 50/60 Hz; cable gland PG13.5** | 7ME6920-2EA10-1AA0 |  |
| **MAG 6000 19" insert with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic, 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5** | |  |
| • For ATEX 2G D sensors | 7ME6920-2MA11-1AA0 | |
| **MAG 6000 SV 19" insert, complete mounted with IP66/NEMA 4X wall mounting enclosure in ABS plastic, special excitation frequency 44 Hz for Batch application DN ≤ 25/1"; cable gland PG13.5** | |  |
| • 11 ... 30 V DC/11 ... 24 V AC | 7ME6920-2EB30-1AA0 | |
| • 115 ... 230 V AC, 50/60 Hz | 7ME6920-2EB10-1AA0 | |

***Communication modules for MAG 6000***

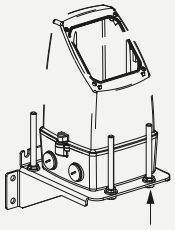
| Description | Article No. | |
|---|---|---|
| HART (not for MAG 6000 I) | FDK:085U0226 |   |
| Modbus RTU/RS485 | FDK:085U0234 | |
| PROFIBUS PA Profile 3 | FDK:085U0236 | |
| PROFIBUS DP Profile 3 | FDK:085U0237 | |
| DeviceNet | FDK:085U0229 | |
| FOUNDATION Fieldbus H1 | A5E02054250 | |

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## Selection and ordering data (continued)

*Accessories for MAG 5000 and MAG 6000*

| Description | Article No. | |
|---|---|---|
| **Accessory kit for remote use of sensor with two 5-pin terminal blocks** | **A5E34827189** |  |
| **Wall mounting unit for MAG 5000/6000 with IP67/NEMA 6, terminal box in polyamide[2)]** | |  |
| • 4 × M20 cable glands | **FDK:085U1018** | |
| • 4 × ½" NPT cable glands | **FDK:085U1053** | |
| **Special wall mounting unit for MAG 5000/6000 IP67/NEMA 6, mounting bracket in stainless steel AISI 316 (1.4401), terminal box in polyamide** | |  |
| • 4 × M20 cable glands | **A5E36699702** | |
| • 4 × ½" NPT cable glands | **A5E36699938** | |
| **Sun lid for MAG 5000/6000 transmitter (frame and lid)** | **A5E02328485** |   |
| **Standard coil or electrode cable, 3 × 1.5 mm²/18 gage, single shielded with PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)** | |  |
| • 5 m (16.5 ft) | **A5E02296523** | |
| • 10 m (33 ft) | **FDK:083F0121** | |
| • 20 m (65 ft) | **FDK:083F0210** | |
| • 30 m (98 ft) | **A5E02297309** | |
| • 40 m (131 ft) | **FDK:083F0211** | |
| • 50 m (164 ft) | **A5E02297317** | |
| • 60 m (197 ft) | **FDK:083F0212** | |
| • 100 m (328 ft) | **FDK:083F0213** | |
| • 150 m (492 ft) | **FDK:083F3052** | |
| • 200 m (656 ft) | **FDK:083F3053** | |
| • 500 m (1640 ft) | **FDK:083F3054** | |
| **Special electrode cable[1)] (empty pipe detection or low conductivity), 3 × 0.25 mm² double shielded with PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F)** | |  |
| • 10 m (33 ft) | **FDK:083F3020** | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • 20 m (65 ft) | FDK:083F3095 |  |
| • 40 m (131 ft) | FDK:083F3094 | |
| • 60 m (197 ft) | FDK:083F3093 | |
| • 100 m (328 ft) | FDK:083F3092 | |
| • 150 m (492 ft) | FDK:083F3056 | |
| • 200 m (656 ft) | FDK:083F3057 | |
| • 500 m (1640 ft) | FDK:083F3058 | |
| **Low-noise electrode coaxial cable for low conductivity and high vibration levels, 3 × 0.13 mm², Temperature range -25 ... +85 °C (-13 ... +185 °F)** | |  |
| • 2 m (6.6 ft) | A5E02272692 | |
| • 5 m (16.5 ft) | A5E02272723 | |
| • 10 m (33 ft) | A5E02272730 | |
| **Cable kit including standard coil cable (3 × 1.5 mm²/18 gage, single shielded with PVC jacket) and special electrode cable[1] (3 × 0.25 mm², double shielded with PVC jacket). Temperature range -30 ... +70 °C (-22 ... +158 °F)** | |  |
| • 5 m (16.5 ft) | A5E02296329 | |
| • 10 m (33 ft) | A5E01181647 | |
| • 15 m (49 ft) | A5E02296464 | |
| • 20 m (65 ft) | A5E01181656 | |
| • 25 m (82 ft) | A5E02296490 | |
| • 30 m (98 ft) | A5E02296494 | |
| • 40 m (131 ft) | A5E01181686 | |
| • 50 m (164 ft) | A5E02296498 | |
| • 60 m (197 ft) | A5E01181689 | |
| • 100 m (328 ft) | A5E01181691 | |
| • 150 m (492 ft) | A5E01181699 | |
| • 200 m (656 ft) | A5E01181703 | |
| • 500 m (1640 ft) | A5E01181705 | |
| **Potting kit for IP68/NEMA 6P sealing of sensor junction box** | FDK:085U0220 |  |
| **19" safety barrier (21 TE)[1] [EEx e ia] IIC for MAG 1100 Ex sensors 12 ... 24 V, 115 ... 230 V and MAG 3100 Ex sensors, incl. back plate (A5E02559810)** | FDK:083F5034 |  |
| **Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (21 TE)** | FDK:083F5030 |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Front panel mounting enclosure IP65/NEMA 2 in ABS plastic for 19" insert (42 TE)** | **FDK:083F5031** |  |
| **Panel mounting enclosure IP20/NEMA 1 in aluminum for 19" insert (21 TE)** | **FDK:083F5032** |  |
| **Panel mounting enclosure IP20/NEMA 1 in aluminum for 19" insert (42 TE)** | **FDK:083F5033** |  |
| **Wall mounting enclosure IP66/NEMA 4X in ABS plastic for 19" insert (cable glands and connection board not included).** | | |
| • 21 TE | **FDK:083F5037** |  |
| • 42 TE | **FDK:083F5038** |  |
| **Front cover (7TE) for panel mounting enclosure** | **FDK:083F4525** |  |
| **Sun shield for MAG 5000/6000 transmitter in remote design** | **A5E01209496** |  |
| **Sun Shield for MAG 5000/6000 transmitter in compact design on MAG 3100 (DN 15 ... 2000 (½" ... 78") or MAG 5100 W (DN 150 ... 1200 (6" ... 48")** | **A5E01209500** |  |

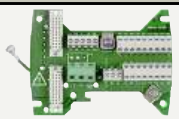
1) Safety cables cannot be used with 19" safety barrier
2) For stainless steel wall mounting kit, order:- M20: FDK:085U1018 and A5E00836867- ½ NPT: FDK:085U1053 and A5E00836868

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## Selection and ordering data (continued)

***Spare parts***

| Description | Article No. | |
|---|---|---|
| **Connection board (for polyamide terminal box)** | |  |
| • 12 ... 24 V | A5E02559817 | |
| • 115 ... 230 V | A5E02559816 | |
| **Connection board (for stainless steel terminal box)** | | |
| • 12 ... 24 V | A5E02604280 | |
| • 115 ... 230 V | A5E02604272 | |
| **Connection board MAG 5000/6000 19" insert for panel mounting enclosure, 12 ... 24 V/115 ... 230 V** | A5E02559809 |  |
| **Connection board MAG 5000/6000 19" insert** | |  |
| • with safety barrier for panel mounting enclosure, 12 ... 24 V/115 ... 230 V | A5E02559810 | |
| • with safety barrier for panel mounting enclosure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007) | A5E02559811 | |
| • with cleaning unit for panel mounting enclosure, 12 ... 24 V/115 ... 230 V | FDK:083F4123 | |
| **SENSORPROM memory unit (sensor code and serial numbers must be specified on order)** | |  |
| • 2 kB (for MAG 5000/6000/6000 I) | | |
| - 1 pc. | FDK:085U1005 | |
| - 10 pcs. | FDK:083F5052 | |
| **Display unit for MAG 5000/6000** | |  |
| • Black neutral front | FDK:085U1038 | |
| • SIEMENS front | FDK:085U1039 |  |
| **HW key** | On request |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Cable glands (polyamide), 4 pcs.** | | |
| • M20 | A5E00822490 | |
| • ½" NPT | A5E00822501 | |
| • PG 13.5, 2 pcs. | FDK:083G0228 |  ½" NPT  M20 |
| **Sealing screws for sensor/transmitter, 2 pcs.** | FDK:085U0221 |  |
| **Terminal box, in polyamide, inclusive lid, terminal blocks, gasket and screws** | |  |
| • M20 | FDK:085U1050 | |
| • ½" NPT | FDK:085U1052 | |
| **Terminal box lid, in polyamide** | FDK:085U1003 |  |
| **Terminal box, in stainless steel, inclusive lid, terminal blocks, gasket and screws, for MAG 6000 in stainless steel and for all Ex sensors** | |  |
| • M20 | A5E00836867 | |
| • ½" NPT | A5E00836868 | |
| **Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid, terminal blocks, gasket and screws** | |  |
| • M20 | A5E00822478 | |
| • ½" NPT | A5E00822479 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Gasket for terminal box lid in polyamide or for MAG 5000/6000 IP67/ NEMA 6 enclosure in polyamide (5 pcs.)** | **A5E37086797** |  |
| **Spare part kit for remote use of sensor with twenty 5-pin terminal blocks** | **A5E34346873** |  |
| **Display frame in polyamide for MAG 5000/6000 IP67/NEMA 6 (5 pcs.)** | **A5E43491675** | |
| **Connection board MAG 5000/6000 19" insert for wall mounting enclosure, 12 ... 24 V/115 ... 230 V** | **A5E02559813** |  |
| **Connection board MAG 5000/6000 19" insert** | |  |
| • with safety barrier for wall mounting enclosure, 12 ... 24 V/115 ... 230 V | **A5E02559814** | |
| • with safety barrier for wall mounting enclosure, 12 ... 24 V/115 ... 230 V (only for sensors produced before October 2007) | **A5E02559812** | |
| • with cleaning unit for wall mounting enclosure, 12 ... 24 V/115 ... 230 V | **A5E02559815** | |

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## Technical specifications

| MAG 5000 and MAG 6000 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Electromagnetic with pulsed constant field |
| Empty pipe | Detection of empty pipe (special cable required in remote mounted installation) |
| Excitation frequency | Depend on sensor size |
| Electrode input impedance | $> 1 \times 10^{14}$ Ω |
| **Input** | |
| Digital input | 11 ... 30 V DC, $R_i$ = 4. 4 KΩ |
| • Activation time | 50 ms |
| • Current | $I_{11\ V\ DC}$ = 2.5 mA, $I_{30\ V\ DC}$ = 7 mA |
| **Output** | |
| Current output | |
| • Signal range | 0 ... 20 mA or 4 ... 20 mA |
| • Load | < 800 Ω |
| • Time constant | 0.1 ... 30 s, adjustable |
| Digital output | |
| • Frequency | 0 ... 10 kHz, 50 % duty cycle (uni/bidirectional) |
| • Pulse (active) | 24 V DC, 30 mA, 1 kΩ ≤ $R_i$ ≤ 10 kΩ, short-circuit-protected (power supplied from flowmeter) |
| • Pulse (passive) | 3 ... 30 V DC, max. 110 mA, 200 Ω ≤ $R_i$ ≤ 10 - kΩ powered from connected equipment) |
| • Time constant | 0.1 ... 30 s, adjustable |
| Relay output | |
| • Time constant | Changeover relay, same as current output |
| • Load | 42 V AC/2 A, 24 V DC/1 A |
| **Low flow cut off** | 0 ... 9.9 % of maximum flow |
| **Galvanic isolation** | All inputs and outputs are galvanically isolated |
| **Max. measuring error (incl. sensor and zero point) (for detailed accuracy specifications see "System information")** | |
| • MAG 5000 | ± 0.4 % ± 1 mm/s |
| • MAG 6000 | ± 0.2 % ± 1 mm/s |
| **Rated operation conditions** | |
| Ambient temperature | |
| • Operation | • Display version: -20 ... +60 °C (-4 ... +140 °F)<br>• Blind version: -20 ... +60 °C (-4 ... +140 °F)<br>• Custody transfer (CT) version: -20 ... +50 °C (-4 ... +122 °F) |
| • Storage | -40 ... +70 °C (-40 ... +158 °F) |
| **Mechanical load (vibration)** | |
| Compact version | 18 ... 1000 Hz, 3.17 g RMS, sinusoidal in all directions to IEC 68-2-36 |
| 19" insert | 1 ... 800 Hz, 1 G, sinusoidal in all directions to IEC 68-2-36 |
| **Degree of protection** | |
| Compact version | IP67/NEMA 6 to IEC 529 and DIN 40050 (1 $mH_2O$ 30 min.) |
| 19" insert | IP20/NEMA 1 to IEC 529 and DIN 40050 |
| **EMC performance** | IEC/EN 61326-1 (all environments)<br>IEC/EN 61326-2-5 |
| **Display and keypad** | |
| Totalizer | Two eight-digit counters for forward, net or reverse flow |
| **Display** | Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign |
| Time constant | Time constant as current output time constant |

| MAG 5000 and MAG 6000 | |
|---|---|
| **Design** | |
| Enclosure material | |
| • Compact version | IP67 / NEMA 6; Fiber glass reinforced polyamide<br>IP65 / NEMA 2; Stainless steel AISI 316/1.4436 |
| • 19"-insert | DIN 41494 steel sheet housing and aluminum front plate with display; width: 21 TE, height: 3 HE |
| - Panel mounting | IP20/NEMA 1; Aluminium |
| - Front panel mounting | IP65/NEMA 2; ABS plastic |
| - Wall mounting | IP66/NEMA 4X; ABS plastic |
| **Dimensions** | |
| • Compact version | See dimensional drawings |
| • 19" insert | See dimensional drawings |
| **Weight** | |
| • Compact version | 0.75 kg (2 lbs) |
| • 19" insert | See dimensional drawings |
| **Power supply** | • 115 ... 230 V AC +10 % -15 %, 50 ... 60 Hz<br>• 11 ... 30 V DC or 11 ... 24 V AC |
| **Power consumption** | • 230 V AC: 17 VA<br>• 24 V AC: 9 VA, $I_N$ = 380 mA, $I_{ST}$ = 8 A (30 ms)<br>• 12 V DC: 11 W, $I_N$ = 920 mA, $I_{ST}$ = 4 A (250 ms)<br>• 24 V DC: 8.4 VA, $I_N$ = 350 mA, $I_{ST}$ = 4 A (10 ms)<br>$I_{ST}$= 4 A (250 ms): for solar panel please securestable current supply |
| **Certificates and approvals** | |
| General purpose | • CE (LVD, EMC, PED, RoHS)<br>• UL (c-UL-us) |
| Hazardous area | • FM, CSA<br>- NI Class I Div. 2 Groups A, B, C, D |
| Custody transfer | • Cold water: MI-001<br>• Chilled water<br>- PTB K 7.2 (Germany)<br>- OE 12/C 040 (Austria) |
| Marine (only for remote version with MAG 5100 W, DN 50 ... 300) | • ABS<br>• Bureau Veritas<br>• DNV-GL<br>• Lloyd's Register |
| Others | • CPA (China)<br>• EAC (Russia, Belarus, Kazakhstan)<br>• KCs (South Korea) |
| **Communication** | |
| Standard | |
| • MAG 5000 | HART 5.2 optional |
| • MAG 6000 | Optional as add-on modules<br>• HART 5.2<br>• Modbus RTU/RS 485<br>• FOUNDATION Fieldbus H1<br>• DeviceNet<br>• PROFIBUS PA<br>• PROFIBUS DP |

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## Technical specifications (continued)

***Safety barrier (e/ia)***



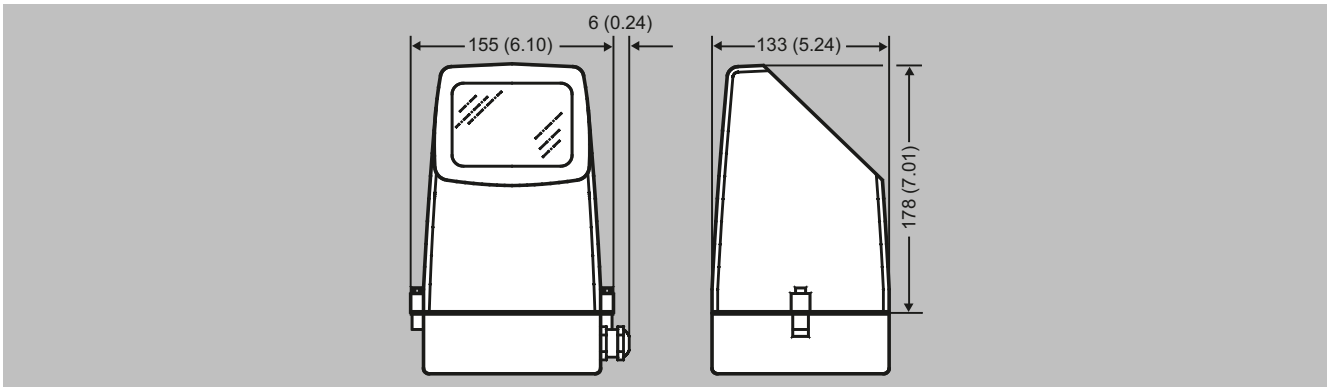
| Application | For use with MAG 5000/MAG 6000 19" and MAG 1100 Ex/MAG 3100 Ex | | |
|---|---|---|---|
| **Ex approval** | MAG 1100 Ex [EEx e ia] IIB ATEX, EAC Ex | | |
| | MAG 3100 Ex [EEx e ia] IIC ATEX, EAC Ex | | |
| **Cable parameter** Electrode | Group | Capacity in µF | Inductance in mH |
| | IIC | ≤ 4.1 | ≤ 80 |
| | IIB | ≤ 45 | ≤ 87 |
| | IIA | ≤ 45 | ≤ 87 |
| **Ambient temperature** | | | |
| • During operation | -20 ... +50 °C (-4 ... +122 °F) | | |
| • During storage | -20 ... +70 °C (-4 ... +158 °F) | | |
| **Enclosure** | | | |
| • Material | Standard 19" insert in aluminum/steel (DIN 41494) | | |
| • Width | 21 TE (4.75") | | |
| • Height | 3 HE (5.25") | | |
| • Rating | IP20/NEMA 1 to EN 60529 | | |
| • Mechanical load | 1 g, 1 ... 800 Hz sinusoidal in all directions to EN 60068-2-36 | | |

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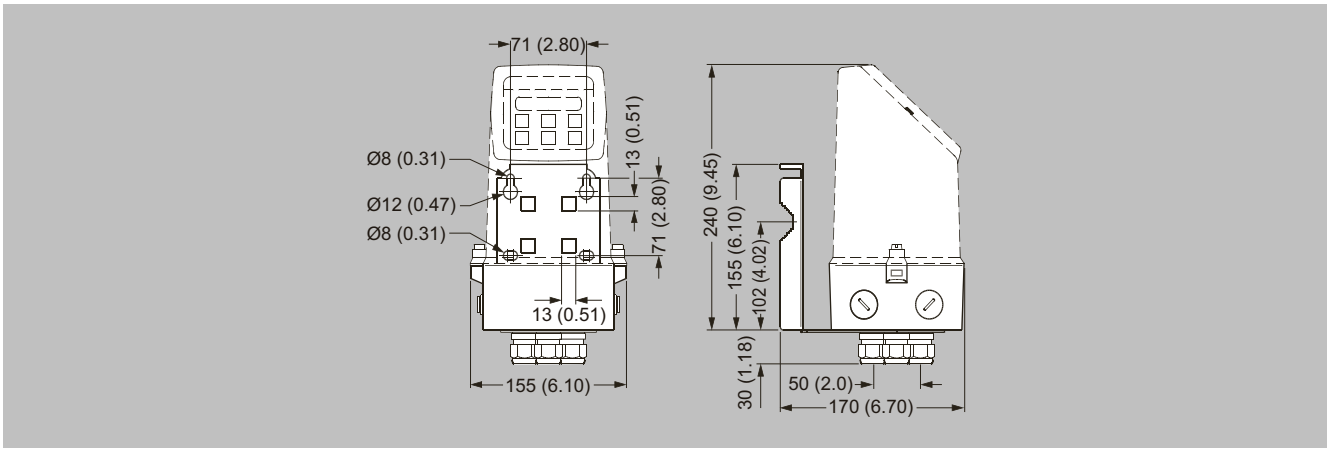


## Dimensional drawings

***Transmitter IP67/NEMA 6 compact polyamide***




Transmitter compact mounted, dimensions in mm (inch)



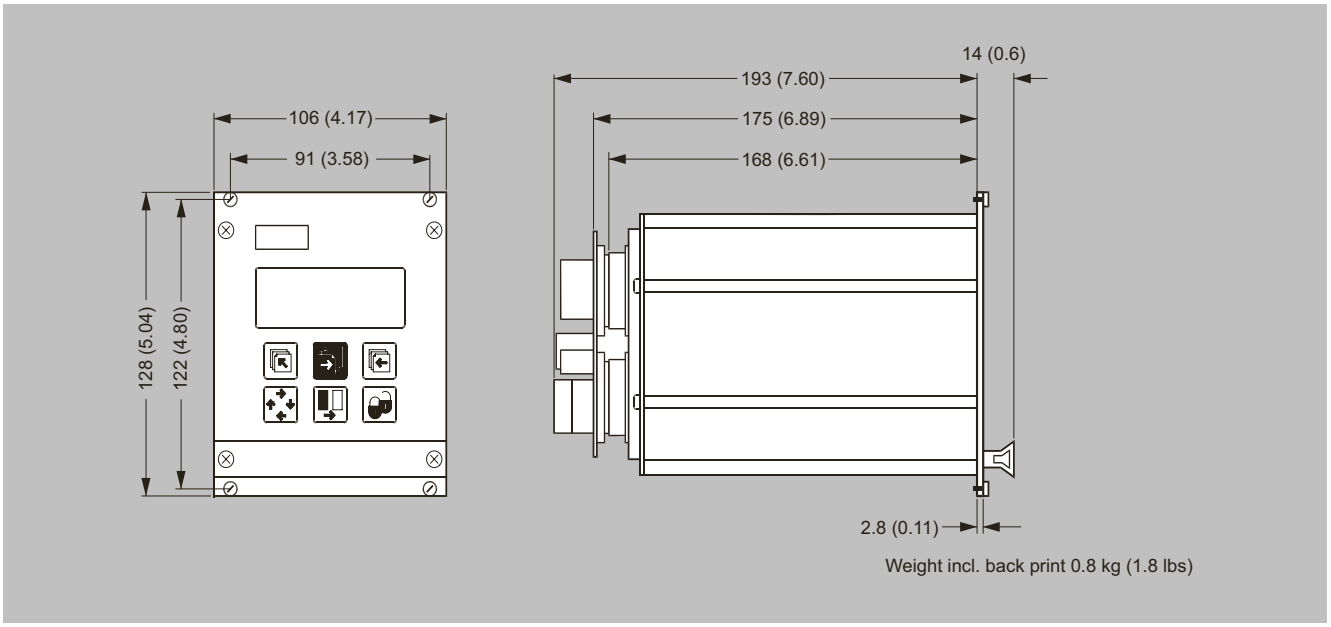

Transmitter wall mounted, dimensions in mm (inch)

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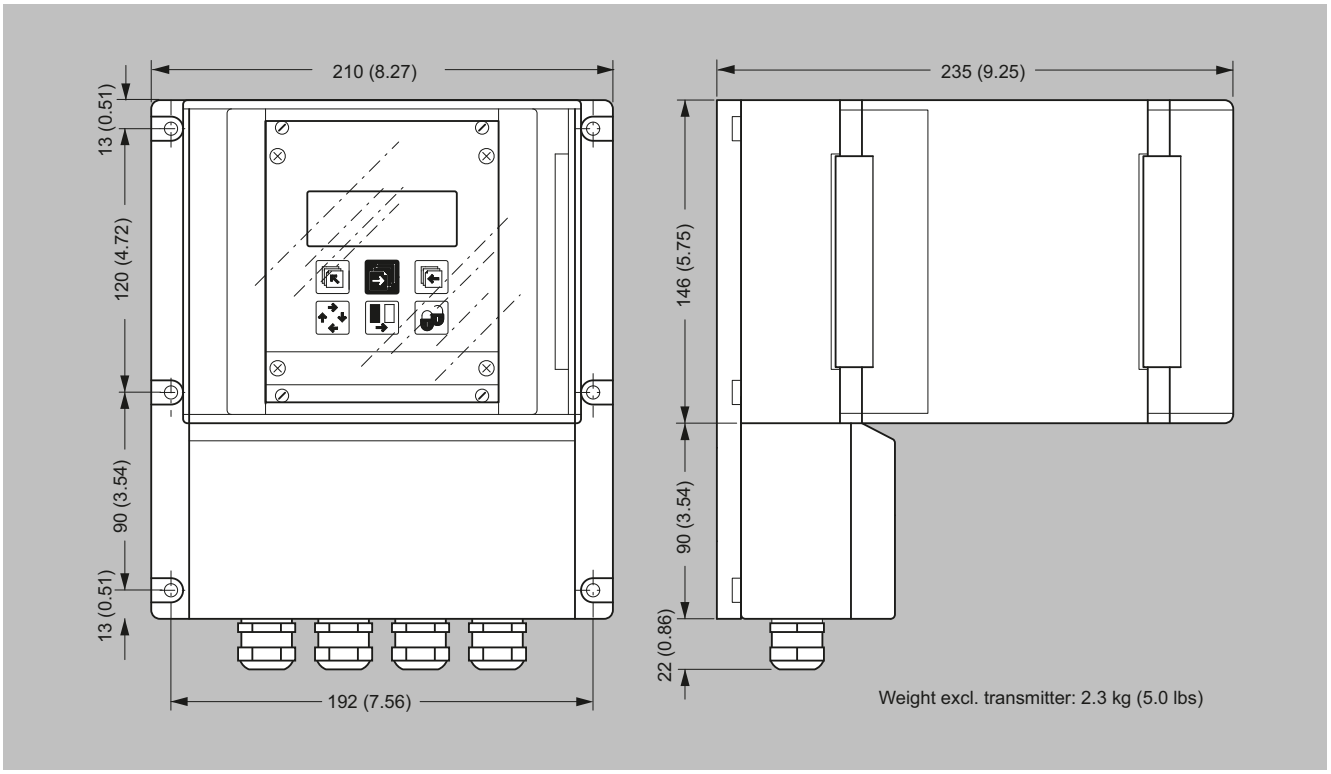
## Dimensional drawings (continued)

***Transmitter, 19" IP20/NEMA 2 standard unit***




Dimensions in mm (inch)

***Transmitter, wall mounting IP66/NEMA 4X, 21 TE***



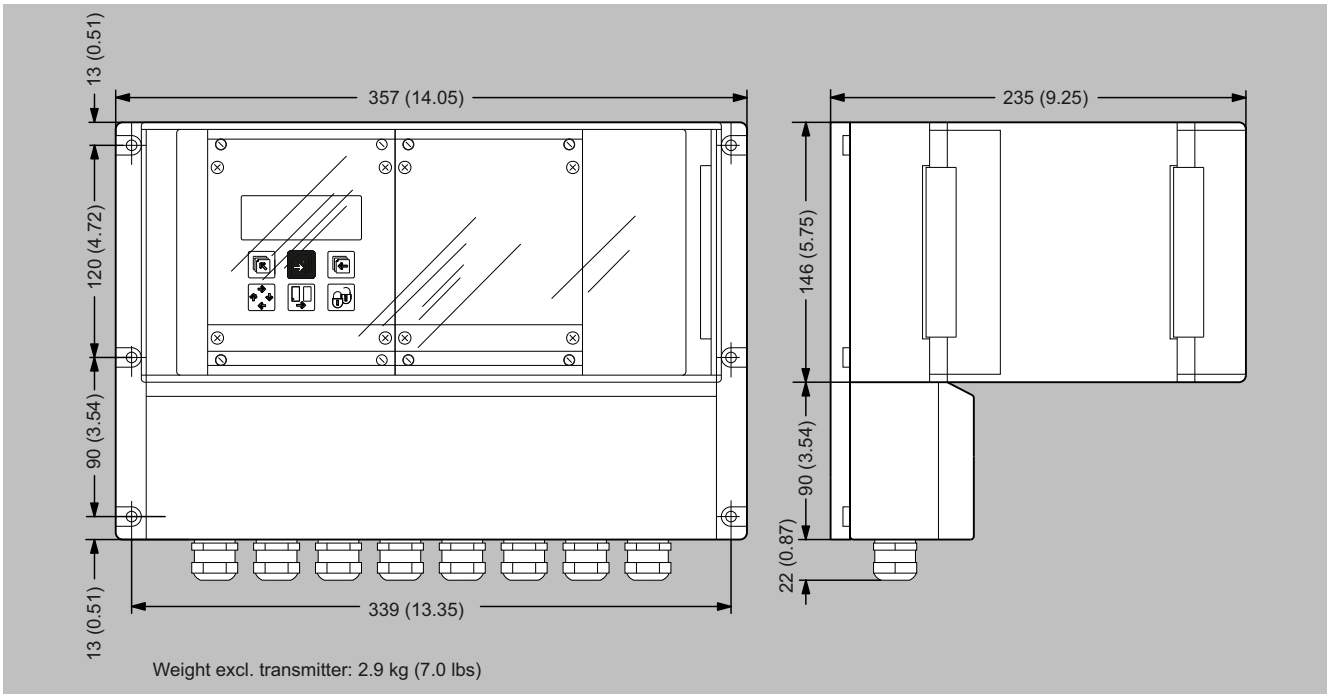

Dimensions in mm (inch)

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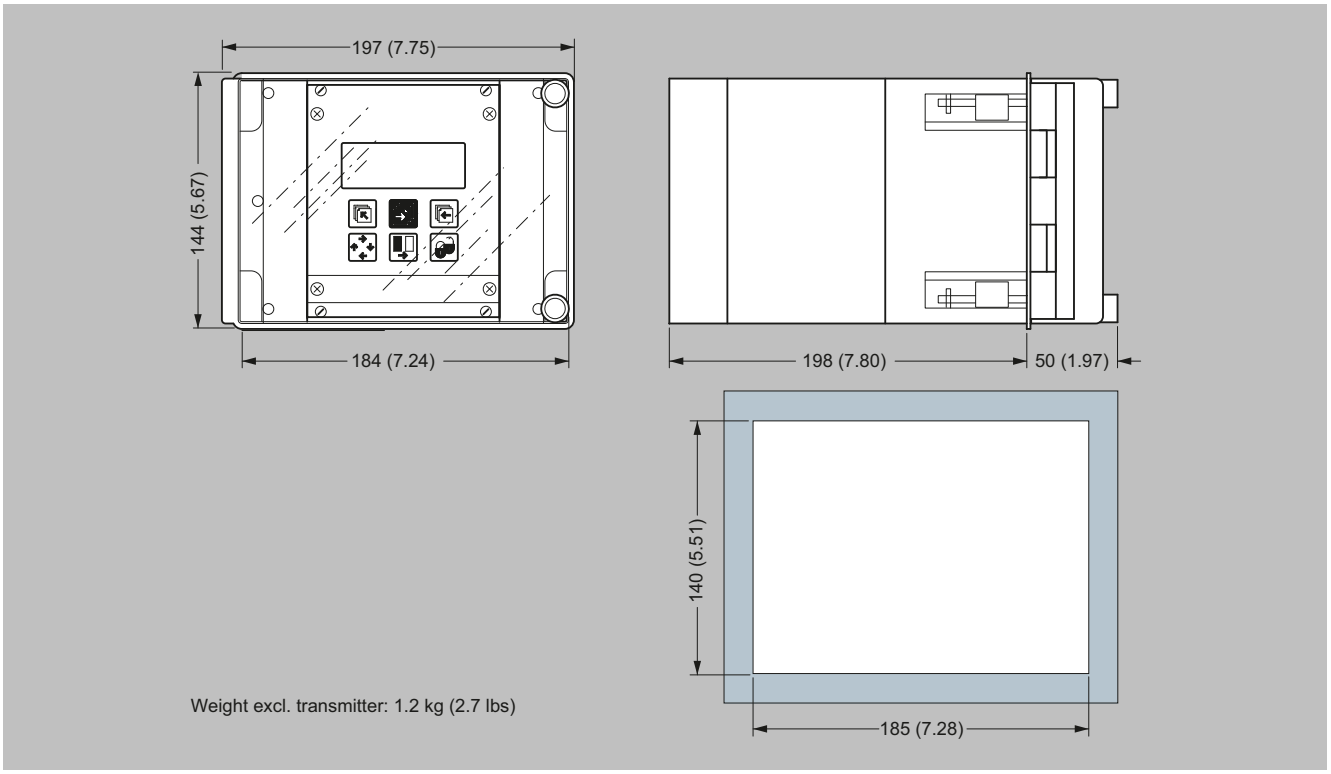
## Dimensional drawings (continued)

***Transmitter, wall mounting IP66/NEMA 4X, 42 TE***




Dimensions in mm (inch)

***Transmitter, front panel mounting IP65/NEMA 4, 21 TE***



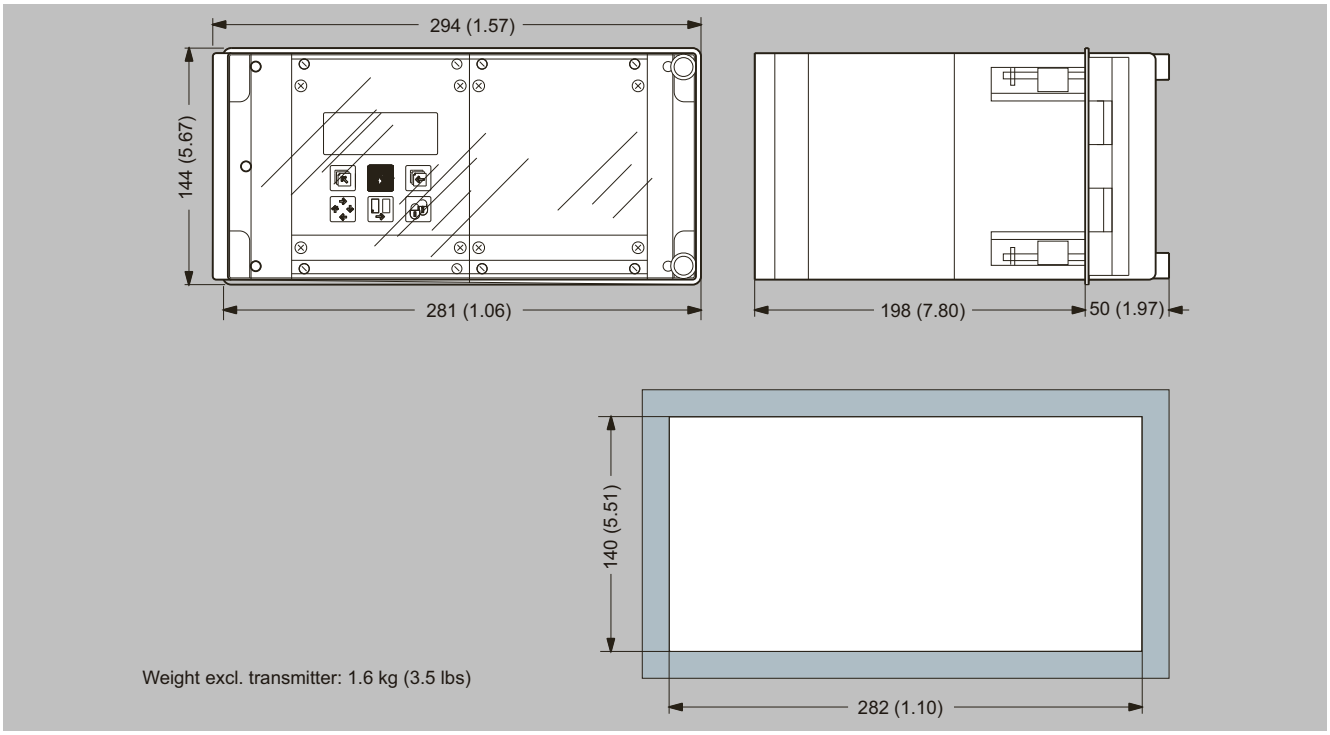

Dimensions in mm (inch)

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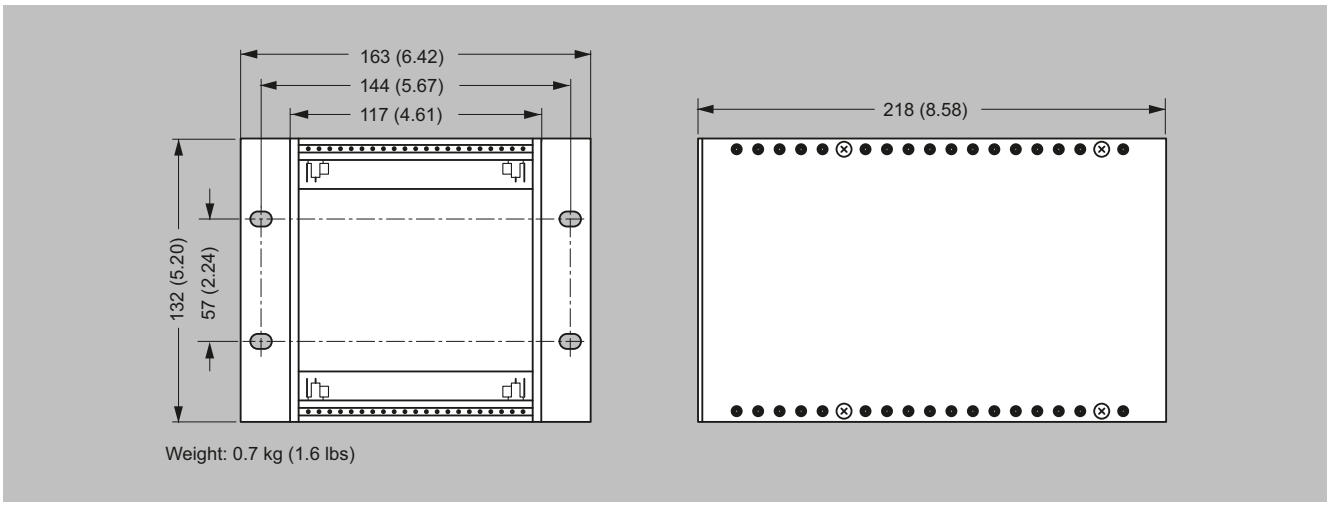
## Dimensional drawings (continued)

***Transmitter, front panel mounting IP65/NEMA 4, 42 TE***




Dimensions in mm (inch)

***Transmitter, panel mounting IP20/NEMA 2, 21 TE***



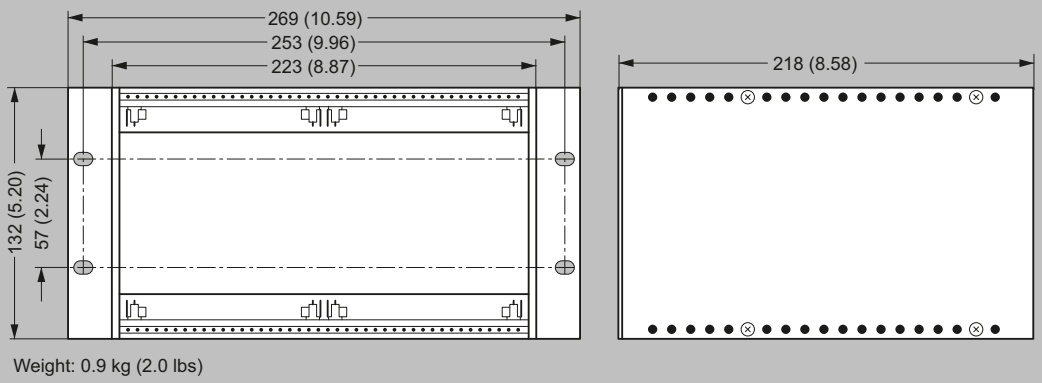

Dimensions in mm (inch)

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## Dimensional drawings (continued)

***Transmitter, panel mounting IP20/NEMA 2, 42 TE***




Dimensions in mm (inch)

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## Overview



The SITRANS FM MAG 6000 I/MAG 6000 I Ex de transmitter is designed for the demands in the process industry. The robust die-cast aluminum housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

## Benefits

- Full range of Ex-rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, Modbus RTU/RS 485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Flow rate in various units
  - Totalizer for forward, reverse and net flow as well as much more information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging
- Batch control
- Conforming to NAMUR recommendations NE 21, NE 32, NE 43, NE 53 and NE 70
- Self verification

## Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensor).

## Function

The following functions are available:

- Flow rate
- 2 measuring ranges
- 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- Operating time
- Uni-/bidirectional flow
- Limit switches and pulse output
- Batch control

The MAG 6000 I/6000 I Ex de is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

***Displays and keypads***

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication

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## Selection and ordering data

| SITRANS FM Transmitter MAG 6000 I<br>Remote with standard wall mounting bracket, local display, die cast aluminum | Article No.<br>7ME6930- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | B | A | ● | ● | - | 1 | ● | A | 7 |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Supply voltage** | | | | | | | | | | |
| Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC, 50 ... 60 Hz | | | | 2 | | | | | | |
| Ex transmitter: 18 ... 30 V DC | | | | 4 | | | | | | |
| Ex transmitter: 115 ... 230 V AC, 50 ... 60 Hz | | | | 5 | | | | | | |
| **Ex approval** | | | | | | | | | | |
| Standard sensor: FM Class I, Div 2, CSA Class I, Div 2 | | | | | 0 | | | | | |
| Standard sensor: no approval for use in hazardous areas | | | | | 1 | | | | | |
| Ex sensor: Hazardous area (ATEX 2 GD; FM Class I, Zone 1; CSA Class I, Zone 1) | | | | | 2 | | | | | |
| **Communication** | | | | | | | | | | |
| None | | | | | | | | A | | |
| HART | | | | | | | | B | | |
| PROFIBUS PA Profile 3 | | | | | | | | F | | |
| PROFIBUS DP Profile 3 (not for Ex version) | | | | | | | | G | | |
| Modbus RTU/RS 485 (not for Ex version) | | | | | | | | E | | |
| FOUNDATION Fieldbus H1 | | | | | | | | J | | |
| **Cable gland entries** | | | | | | | | | | |
| Metric | | | | | | | | | | 0 |
| ½" NPT | | | | | | | | | | 2 |

1) Product Variation Request (PVR).

| Further design | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text | |
| Tag name plate, stainless steel (specify in plain text) | Y17 |
| Tag name plate, plastic (self-adhesive) | Y18 |
| Special version (specify in plain text) | Y99 |

### *Communication modules for MAG 6000 I (All standard outputs can still be used)*

| Description | Article No. | |
|---|---|---|
| HART (only for MAG 6000 I/Ex) | FDK:085U0321 |  |
| Modbus RTU/RS 485[1)] | FDK:085U0234 | |
| PROFIBUS PA Profile 3 | FDK:085U0236 | |
| PROFIBUS DP Profile 3[1)] | FDK:085U0237 | |
| DeviceNet[1)] | FDK:085U0229 | |
| FOUNDATION Fieldbus H1 | A5E02054250 | |

1) Not for Ex versions

### *Accessories for MAG 6000 I/6000 I Ex*

| Description | Article No. | |
|---|---|---|
| **Standard coil or electrode cable**<br>3 × 1.5 mm²/18 gage, single shielded with PVC jacket<br>Temperature range: -30 ... +70 °C (-22 ... +158 °F) | |  |
| • 5 m (16.5 ft) | A5E02296523 | |
| • 10 m (33 ft) | FDK:083F0121 | |
| • 20 m (65 ft) | FDK:083F0210 | |
| • 30 m (98 ft) | A5E02297309 | |
| • 40 m (131 ft) | FDK:083F0211 | |
| • 50 m (164 ft) | A5E02297317 | |
| • 60 m (197 ft) | FDK:083F0212 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • 100 m (328 ft) | FDK:083F0213 |  |
| • 150 m (492 ft) | FDK:083F3052 | |
| • 200 m (656 ft) | FDK:083F3053 | |
| • 500 m (1640 ft) | FDK:083F3054 | |
| **Special electrode cable (empty pipe detection or low conductivity)**<br>3 × 0.25 mm², double shielded with PVC jacket<br>Temperature range: -30 ... +70 °C (-22 ... +158 °F) | |  |
| • 10 m (33 ft) | FDK:083F3020 | |
| • 20 m (65 ft) | FDK:083F3095 | |
| • 40 m (131 ft) | FDK:083F3094 | |
| • 60 m (197 ft) | FDK:083F3093 | |
| • 100 m (328 ft) | FDK:083F3092 | |
| • 150 m (492 ft) | FDK:083F3056 | |
| • 200 m (656 ft) | FDK:083F3057 | |
| • 500 m (1640 ft) | FDK:083F3058 | |
| **Cable kit including standard coil cable and special electrode cable**<br>Standard coil cable: 3 × 1.5 mm²/ 18 gage, single shielded with PVC jacket<br>Special electrode cable: 3 × 0.25 mm², double shielded with PVC jacket)<br>Temperature range: -30 ... +70 °C (-22 ... +158 °F) | |  <br>  |
| • 5 m (16.5 ft) | A5E02296329 | |
| • 10 m (33 ft) | A5E01181647 | |
| • 15 m (49 ft) | A5E02296464 | |
| • 20 m (65 ft) | A5E01181656 | |
| • 25 m (82 ft) | A5E02296490 | |
| • 30 m (98 ft) | A5E02296494 | |
| • 40 m (131 ft) | A5E01181686 | |
| • 50 m (164 ft) | A5E02296498 | |
| • 60 m (197 ft) | A5E01181689 | |
| • 100 m (328 ft) | A5E01181691 | |
| • 150 m (492 ft) | A5E01181699 | |
| • 200 m (656 ft) | A5E01181703 | |
| • 500 m (1640 ft) | A5E01181705 | |
| **Low noise electrode coax cable for low conductivity and high vibration levels**<br>3 × 0.13 mm². Temperature range -25 °C ... +85 °C (-13 °F ... +185 °F) | |  |
| • 2 m (6.6 ft) | A5E02272692 | |
| • 5 m (16.5 ft) | A5E02272723 | |
| • 10 m (33 ft) | A5E02272730 | |

*Spare parts*

| Description | Article No. | |
|---|---|---|
| **Display unit** | FDK:085U3122 |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Accessory bag including cable gland inserts and connectors for sensor cables** | **FDK:085U3144** | |
| **Display lid (non-Ex, Ex) in die-cast aluminum, with corrosions resitant coating (min. 60 µm)** | **7ME5933-0AC01** |  |
| **Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 µm) incl. O-ring seal** | **7ME5933-0AC02** |  |
| **Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 µm)** | **7ME5933-0AC03** |  |
| **Safety clamp** | **7ME5933-0AC06** |  |
| **Standard wall-mounting bracket, stainless steel AISI 316L/1.4404** | **7ME5933-0AC04** |  |
| **Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17** | **7ME5933-0AC05** |  |

***Complete spare part PCB unit***

| Description | Article No. | |
|---|---|---|
| **MAG 6000 I std. (not for Ex), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA** | **FDK:085U3123** |  |
| **MAG 6000 I Ex d 115 ... 230 V AC** Spare PCBA only for use with Ex approved sensor and explosion protection "Increased safety" (Ex e) | **A5E01013127** | |
| **MAG 6000 I Ex d 18 ... 30 V DC** Spare PCBA only for use with Ex approved sensor and explosion protection "Increased safety" (Ex e) | **A5E01013340** | |

Please use online Product selector to get latest updates.

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## Selection and ordering data (continued)

Product selector link:
http://www.pia-portal.automation.siemens.com

## Technical specifications

| MAG 6000 I and MAG 6000 I Ex | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Electromagnetic with pulsed constant field |
| Empty pipe | Detection of empty pipe (special cable required in remote mounted installation) |
| Excitation frequency | Depend on sensor size |
| Electrode input impedance | > 1 × $10^{14}$ Ω |
| **Input** | |
| Digital input | 11 ... 30 V DC, Ri = 4.4 kΩ |
| • Activation time | 50 ms |
| • Current | $I_{11\ V\ DC}$ = 2.5 mA, $I_{30\ V\ DC}$ = 7 mA |
| **Output** | |
| Current output | |
| • Signal range | 4 ... 20 mA (active/passive) |
| • Load | < 560 Ω |
| • Time constant | 0.1 ... 30 s, adjustable |
| Digital output | |
| • Frequency | 0 ... 10 kHz, 50 % duty cycle (uni-/bidirectional) |
| • Time constant | 0.1 ... 30 s, adjustable |
| • Pulse (passive) | 3 ... 30 V DC, max. 110 mA (30 mA Ex version), 200 Ω ≤ Ri ≤ 10 kΩ (powered from connected equipment) |
| • Time constant | 0.1 ... 30 s, adjustable |
| Relay output | |
| • Time constant | Changeover relay, same as current output |
| • Load | 42 V AC/2 A, 24 V DC/1 A |
| **Low flow cut off** | 0 ... 9.9 % of maximum flow |
| **Galvanic isolation** | All inputs and outputs are galvanic isolated. |
| **Max. measuring error** | |
| MAG 6000 I/MAG 6000 I Ex (incl. sensor) | ± 0.2 % ± 1 mm/s |
| **Rated operation conditions** | |
| Ambient temperature | |
| • Operation | |
| - MAG 6000 I [2] | -20 ... +60 °C (-4 ... +140 °F) |
| - MAG 6000 I Ex [2] | -20 ... +60 °C (-4 ... 140 °F) |
| • Storage | -40 ... +70 °C (-40 ... +158 °F) |
| Mechanical load | 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 |
| | Transmitter: 1.14 g RMS |
| Degree of protection | IP67/NEMA 4X to IEC 529 and DIN 40050 (1 $mH_2O$ 30 min.) |
| EMC performance | • IEC/EN 61326-1 (all environments) |
| | • IEC/EN 61326-2-5 |
| | • NAMUR NE 21 |
| **Display and keypad** | |
| Totalizer | Two eight-digit counters for forward, net or reverse flow |
| Display | Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign |
| Keypad | Capacitive touch keypad with LED light for feedback indication |
| Time constant | Time constant as current output time constant |

## Technical specifications (continued)

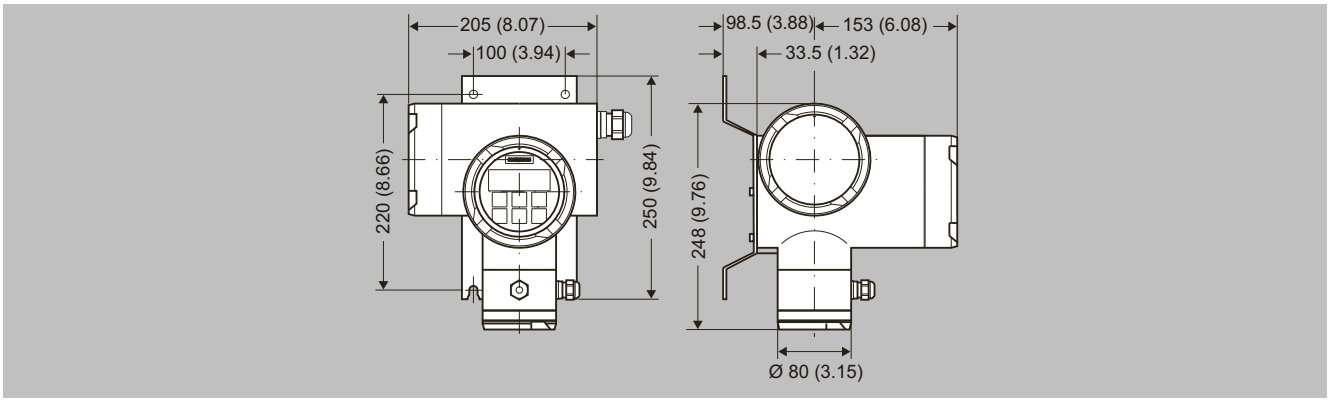
| MAG 6000 I and MAG 6000 I Ex | |
|---|---|
| **Design** | |
| Enclosure material | Die-cast aluminum, with corrosion resistant Basic Polyester powder coating (min. 60 µm) |
| • Wall mounting | Wall mounting bracket enclosed for remote version |
| Dimensions | See dimensional drawings |
| Weight | See dimensional drawings |
| **Power supply** | • Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC; 50 ... 60 Hz |
| | • Ex transmitter: 18 ... 30 V DC |
| | • Ex transmitter: 115 ... 230 V AC; 50 ... 60 Hz |
| Power consumption | • 230 V AC: 20 VA |
| | • 24 V DC: 9.6 W, $I_N$ = 0.4 A, $I_{ST}$ = 1 A (3 ms) |
| **Certificates and approvals** | |
| General purpose | • CE (LVD, EMC, PED, RoHS) |
| Hazardous areas | • ATEX, IECEx, FM, CSA, EAC Ex, NEPSI<br>- Zone 1 Ex d e [ia] ia IIC T6 Gb |
| | • ATEX, IECEx, CSA<br>- Zone 21 Ex tD A21 IP67 T85 °C |
| | • FM<br>- XP IS Class I Div. 1 Groups A, B, C, D<br>- DIP Class II+III Div. 1 Groups E, F, G |
| Others | • CPA (China) |
| | • EAC (Russia, Belarus, Kazakhstan) |
| | • KCs (South Korea) |
| **Cable entries** | |
| MAG 6000 I | |
| • Power supply and outputs | 2 × M20 (HART)/M25 (PROFIBUS) or 2 × ½" NPT (HART) |
| • Sensor connection | 2 × M16 or 2 × ½" NPT |
| MAG 6000 I Ex ATEX 2G D | |
| • Power supply and outputs | 2 × M20 |
| • Sensor connection | 2 × M16 |
| **Communication** | |
| Standard versions | HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules |
| Ex versions | HART, PROFIBUS PA (not for Ex version) |

[1] Applicable for: Compact mounted MAG 6000 I Ex on MAG 3100, sizes DN 15 ... 300 (½" ... 12").
[2] With HART communication max. ambient temperature 50 °C (122 °F).

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## Dimensional drawings




SITRANS FM transmitter MAG 6000 I with wall-mounting bracket, dimensions in mm (inch)

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## Overview



Magnetic flowmeter transmitter SITRANS FMT020

The new magnetic flow meter transmitter model SITRANS FMT020 is a high performance, robust and intelligent product, designed to fit perfectly for a wide area of process applications that require accurate, and reliable flow measurement of conductive fluids.

The SITRANS FMT020 is the next generation successor for the well-proven MAG 5000 and MAG 6000 transmitter series. The FMT020 retains all the unique features of this transmitter series such as the flexible installation concept with common housing for compact and remote mounting. It also maintains the modular design supporting easy exchangeability of the transmitter as well as the add-on communication modules, or the Sensorprom memory unit for fast commissioning, instant measurement, and data storage.

In addition, the FMT020 features the ability to simultaneously measure volumetric flow, flow velocity and electrical conductivity. It also offers enhanced diagnostics like empty pipe monitoring and device self-check, and comes with multi-functional input/output channels for process control, a unified operating concept and much more:

- High accuracy up to 0.2% of rate
- 3 totalizers for forward, reverse, and net flow
- Multi language, menu-guided operation
- Field bus: HART, PROFINET, EtherNet/IP, MODBUS RTU
- Integrated self-verification via SIMATIC PDM and Webserver

The transmitter can be configured locally via display and remotely over Fieldbus or Webserver. EDDs are available for SIMATIC PDM, AMS Device Manager, and AMS Trex Device Communicator, plus DTMs for FDTs (Field Device Tools).

## Benefits

- Backwards compatible with older (up to 15 years) flow meter sensors (MAG 5100W)
- Fast start-up without zero-point adjustments
- Variety of functions for comprehensive device check, self-diagnosis, and onboard verification
- Verificator compatible - Independently verifies performance of sensor, transmitter, and installation (including cable) without process interruption
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- Multi-functional outputs for process control, minimum configuration with analog, digital (pulse, frequency, status), and relay output
- SD memory card for data logging, configuration backup, and firmware update
- Seamless field device integration in host systems

## Application

The SITRANS FMT020 transmitter is engineered for high performance, easy installation, commissioning, and reduced maintenance.

The device is a truly robust solution and suitable for all-around applications but is also the ideal choice for demanding applications where higher diagnostics capability and functionality are important.

The transmitter can be combined with magnetic flow sensors of type SITRANS FMS500.

SITRANS FMS500

A flow meter sensor for all water and wastewater applications. With its coned design, increased low-flow accuracy is achieved making it especially useful for leak detection. It is suitable for direct burial and constant flooding. The SITRANS FMS500 complies with drinking water approvals.

Accuracy: 0,4% of rate, option for: 0,2% of rate

Range: DN 15 ... 1200 (½ ... 48")

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## Design

The transmitter is housed in a IP66/67, NEMA 4X/6 enclosure made of durable polycarbonate and creates together with a flow sensor a complete measurement system providing the measured flow values via a local display, multiple signal outputs or a fieldbus interface.

The modular design concept of the FMT020 makes it flexible to be remote connected or integral mounted with magnetic flow sensors of type SITRANS FMS500.

Integral-mount design

For devices with an integral-mount design, the transmitter and the sensor form a single mechanical unit.

Remote mount design

For devices with a remote mount design, the transmitter and sensor are mounted in separate locations. The electrical connection between the transmitter and the sensor is provided by sensor cables.



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## Selection and ordering data

| Transmitter SITRANS FMT020 | Article No. 7ME6942- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | A | A | 0 | 0 | - | 0 | A | A | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Power supply** | | | | | | | | | | |
| 24 V DC | | | | | | | | | | 2 |
| 100 ... 240 V AC, 50/60 Hz | | | | | | | | | | 3 |

| Additional information | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **General safety** | |
| CSA General Purpose | **E06** |
| **Communication** | |
| HART with 4...20 mA output, active or passive | **F01** |
| Modbus RTU / RS485 | **F04** |
| PROFINET | **F07** |
| EtherNet/IP | **F09** |

### *Accessories FMT020*

| Description | Article No. | |
|---|---|---|
| **Communication add-on modules** | | |
| HART with 4...20 mA output, active or passive | **7ME6940-1CM10** |  |
| PROFINET | **7ME6940-1CM20** | |
| EtherNet/IP | **7ME6940-1CM30** | |
| Modbus RTU/RS485 | **7ME6940-1CM40** | |
| **Wall-mounting unit** (including sensor terminal board), terminal box material polycarbonate, 1 pc. | | |
| • M20 × 1.5 cable glands (4 pcs.) | **7ME6940-1WU10** |  |
| • ½ inch NPT cable glands (4 pcs.) | **7ME6940-1WU15** |  |
| **Sun shield for FMT020 transmitter, remote mount** | **A5E01209496** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Sun shield for FMT020 transmitter, integral mount (compact design)**<br>Only suitable for FMS500 sensors DN 150 ... 1200 (6" ... 48") | A5E01209500 |  |
| **Transmitter conversion kit[1] for MAG 5000/6000 units, integral mount (compact design)**<br>including SensorPROM programmed, terminal box in polyamide, cable glands (4 pcs.), sensor housing seal, grounding wire , new sensor nameplate (sensor order code and serial numbers must be specified when ordering) | | |
| • M20 × 1.5 cable glands | 7ME6940-1RF10 |  |
| • ½ inch NPT cable glands | 7ME6940-1RF15 |  |
| **Transmitter conversion kit[1] for MAG 5000/6000 unit, remote mount**<br>including wall-mounting unit, cable glands (4 pcs.), SensorPROM programmed (sensor order code and serial numbers must be specified when ordering) | | |
| • M20 × 1.5 cable glands | 7ME6940-1RF30 |  |
| • 1½ inch NPT cable glands | 7ME6940-1RF35 |  |

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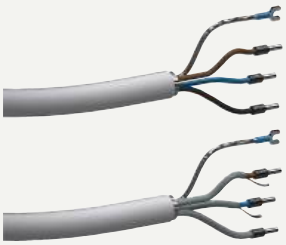
## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Cable glands, material polyamide**<br>4 pcs | | |
| • M20 × 1.5 | A5E52770729 |  |
| • ½ inch NPT | A5E52909970 |  |
| **Industrial Micro-SD memory card**<br>8 GB storage capacity | A5E52967303 |  |
| **Coil / electrode cable standard type, 3 × 1.5 mm², screened, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F)** | | |
| • 5 m (16.5 ft) | A5E02296523 |  |
| • 10 m (33 ft) | FDK:083F0121 | |
| • 20 m (65 ft) | FDK:083F0210 | |
| • 30 m (98 ft) | A5E02297309 | |
| • 40 m (131 ft) | FDK:083F0211 | |
| • 50 m (164 ft) | A5E02297317 | |
| • 60 m (197 ft) | FDK:083F0212 | |
| • 100 m (328 ft) | FDK:083F0213 | |
| • 150 m (492 ft) | FDK:083F3052 | |
| • 200 m (656 ft) | FDK:083F3053 | |
| • 500 m (1640 ft) | FDK:083F3054 | |
| **Electrode cable special type**<br>(empty pipe detection or low conductivity), 3 × 0.25 mm², screened single core, PVC jacket; Temperature range -30 ... +70 °C (-22 ... +158 °F) | | |
| • 10 m (33 ft) | FDK:083F3020 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • 20 m (65 ft) | FDK:083F3095 |  |
| • 40 m (131 ft) | FDK:083F3094 | |
| • 60 m (197 ft) | FDK:083F3093 | |
| • 100 m (328 ft) | FDK:083F3092 | |
| • 150 m (492 ft) | FDK:083F3056 | |
| • 200 m (656 ft) | FDK:083F3057 | |
| • 500 m (1640 ft) | FDK:083F3058 | |
| **Sensor cable kit**<br>including coil cable standard type (3 × 1.5 mm², screened) and electrode cable special type (3 × 0.25 mm², screened single core), PVC jacket, Temperature range -30 ... +70 °C (-22 ... +158 °F) | | |
| • 5 m (16.5 ft) | A5E02296329 |  |
| • 10 m (33 ft) | A5E01181647 | |
| • 15 m (49 ft) | A5E02296464 | |
| • 20 m (65 ft) | A5E01181656 | |
| • 25 m (82 ft) | A5E02296490 | |
| • 30 m (98 ft) | A5E02296494 | |
| • 40 m (131 ft) | A5E01181686 | |
| • 50 m (164 ft) | A5E02296498 | |
| • 60 m (197 ft) | A5E01181689 | |
| • 100 m (328 ft) | A5E01181691 | |
| • 150 m (492 ft) | A5E01181699 | |
| • 200 m (656 ft) | A5E01181703 | |
| • 500 m (1640 ft) | A5E01181705 | |
| **Potting kit**<br>for IP68 / NEMA 6P sealing of sensor terminal box | FDK:085U0220 |  |

1) Only SITRANS FM MAG 5100W sensors made in France are supported. Please check the sensor serial number or the country of origin specified on the name-plate.

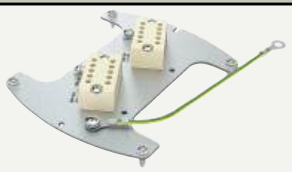
### *Spare parts FMT020*

| Description | Article No. | |
|---|---|---|
| **Transmitter connection board with power supply**<br>(including screws, grounding wire), 1 pc. | | |
| • 100 ... 240 V AC, 50/60 Hz | 7ME6940-1CB10 |  |
| • 24 V DC | 7ME6940-1CB20 | |

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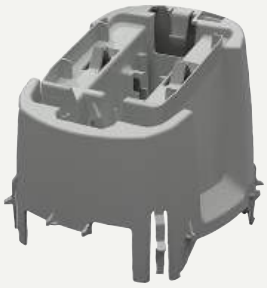
## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Sensor terminal board**<br>(including screws, grounding wire), 1 pc | A5E52775102 |  |
| **Connector set for transmitter connection board**<br>(power supply, IOs and communication) including earthing clips | A5E52775452 | |
| **Local display and operating unit**<br>(incl. ribbon cable and display holder), 1 pc. | 7ME6940-1DU10 |  |
| **FMT020 Sensorprom memory unit**<br>(sensor order code and serial numbers must be specified when ordering) | |  |
| • Programmed<br>1 pc. | 7ME6940-1SM10 | |
| • Not programmed<br>10 pcs. | A5E52771927 | |
| **Top housing**<br>(including screws, gasket and display frame), 1 pc. | A5E52784564 |  |
| **Display frame**<br>1 pc | A5E52771997 |  |
| **Terminal box**<br>material polycarbonate (without cable glands and lid), 1 pc. | A5E52729542 |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Terminal box lid**<br>material polycarbonate (including gasket), 1 pc. | A5E52729452 |  |
| **Terminal box gasket**<br>5 pcs. | A5E52729547 |  |
| **Main board cover housing**<br>1 pc. | A5E52784657 |  |
| **Device nameplate** | | |
| • Transmitter | A5E52864071 |  |
| • Sensor | A5E52864088 |  |

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## Technical specifications

| SITRANS FMT020 transmitter | |
|---|---|
| **Measurement of** | |
| | • Volume flow<br>• Flow velocity<br>• Electrical conductivity |
| **Mode of operation** | |
| Measuring principle | Electromagnetic with pulsed constant field |
| Empty pipe | Detection of empty pipe (electrode cable special type required in remote mounted installation) |
| Excitation frequency | Depends on the sensor size, please refer to "Technical specifications" for SITRANS FM sensors |
| Electrode input impedance | > 1 × 1014 Ω |
| **Current output (active/passive)** | |
| Signal range | 0 ... 20 mA or 4 ... 20 mA<br>Signal levels compliant with NAMUR NE 43 (3.8 to 20.5 mA) |
| Load | < 470 Ω |
| Resolution | < 1 µA |
| Accuracy | ±20 µA |
| Temperature coefficient | < 50 ppm/K |
| Time constant | 0.1 ... 100 s, adjustable |
| **Digital output (active/passive)** | |
| Frequency | 0 ... 10 kHz, 50 % duty cycle (uni/bidirectional) |
| Pulse | 40 µs ... 5 s pulse duration |
| Rating | |
| • Active operation mode | 24 V DC, 30 mA, 1 kΩ ≤Ri ≤10 kΩ, short-circuit protected (powered from transmitter) |
| • Passive operation mode | 3 ... 30 V DC, max. 110 mA, 200 Ω ≤Ri ≤10 kΩ (powered from connected supply) |
| Time constant | 0.1 ... 100 s, adjustable |
| **Relay output (passive)** | |
| Type | SPDT Form C relay, potential-free change-over contacts, resistive load |
| Rating | 2 A at 42 V AC, 1 A at 24 V DC |
| Durability | 50 000 operations min. per relay |
| **Galvanic isolation** | All inputs and outputs are galvanically isolated, isolation voltage 500 V |
| **Rated operating conditions** | |
| Installation environment | |
| • Location | Indoor/outdoor (altitude up to 2000 m) |
| • Installation (overvoltage) category | II |
| • Pollution degree | 2 |
| Ambient temperature | |
| • Transmitter | -40 ... +65 °C (-40 ... +149 °F) (max. humidity 98% RH) |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | |
| • Transmitter | -40 ... +80 °C (-58 ... +158 °F) (max. humidity 98% RH) |
| • Display | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Enclosure | |
| • Material | Polycarbonate |

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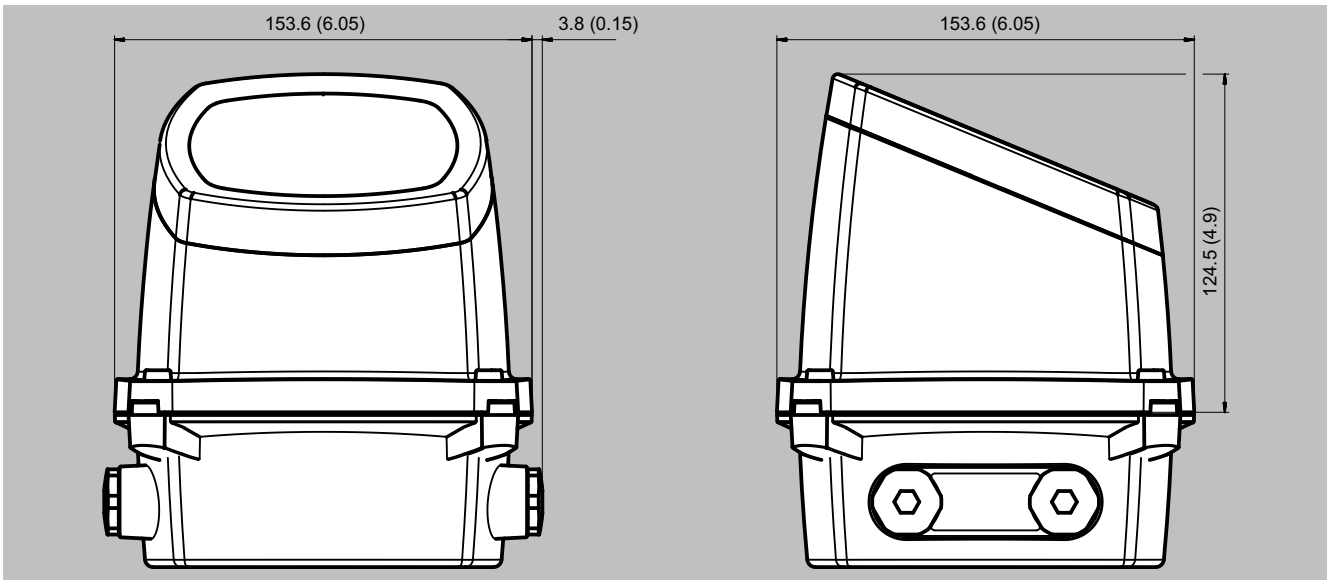
## Technical specifications (continued)

| SITRANS FMT020 transmitter | |
|---|---|
| • Degree of protection | IP66/67, NEMA 4X/6 |
| Mechanical load | |
| Integral mount / compact version | Vibration, sinusoidal according to IEC 60068-2-6<br>• 2 ... 8.4 Hz, 3.5 mm peak<br>• 8.4 ... 500 Hz, 1.0 g peak<br>Vibration broad-band random, according to IEC 60068-2-64<br>• 10 ... 200 Hz, 0.003 g2/Hz<br>• 200 ... 500 Hz, 0.001 g2/Hz<br>• Total: 1.54 g rms |
| Remote version | Vibration, sinusoidal according to IEC 60068-2-6<br>• 2 ... 8.4 Hz, 1.5 mm peak<br>• 8.4 ... 500 Hz, 0.7 g peak<br>Vibration broad-band random, according to IEC 60068-2-64<br>• 10 ... 200 Hz, 0.003 g2/Hz<br>• 200 ... 500 Hz, 0.001 g2/Hz<br>• Total: 1.54 g rms |
| EMC performance | IEC/EN 61326-1, EN 55011 (Class A) |
| Dimensions | See dimensional drawings |
| Weight | See dimensional drawings |
| **Display and control** | |
| LCD display | 60 × 40 mm (2.36 × 1.57 inch) LCD, 240 × 160 pixels resolution |
| Menu navigation | 4 capacitive touch keys |
| Update time | Less than 1 second |
| Totalizers | 3 × 14-digit counters for forward, net, or reverse flow |
| **Memory card** | Integrated Micro-SD interface supporting memory cards up to 32 GB storage capacity |
| **Power supply** | |
| AC version | 100 ... 240 V AC, 50/60 Hz, 25 VA |
| DC version | 24 V DC ±20%, 12 W |
| **Power consumption** | |
| AC version | 6.24 W |
| DC version | 6.45 W |
| **Communication** | |
| Webserver | Web-based interface for local programming via web browser (only with PROFINET, EtherNet/IP communication) |
| Fieldbus | • HART 7<br>• PROFINET<br>• EtherNet/IP<br>• MODBUS RTU |
| Remote configuration | • EDD via SIMATIC PDM<br>• SITRANS DTM via PACTware<br>• EDS-AOP file |
| **Certificates and approvals** | |
| General purpose | CE (LVD, EMC, RoHS), UKCA<br>UL, CSA certified per standard EN / IEC 61010-1 |
| Others | Environmental Product Declaration (EPD)<br>EAC (Kazakhstan) |

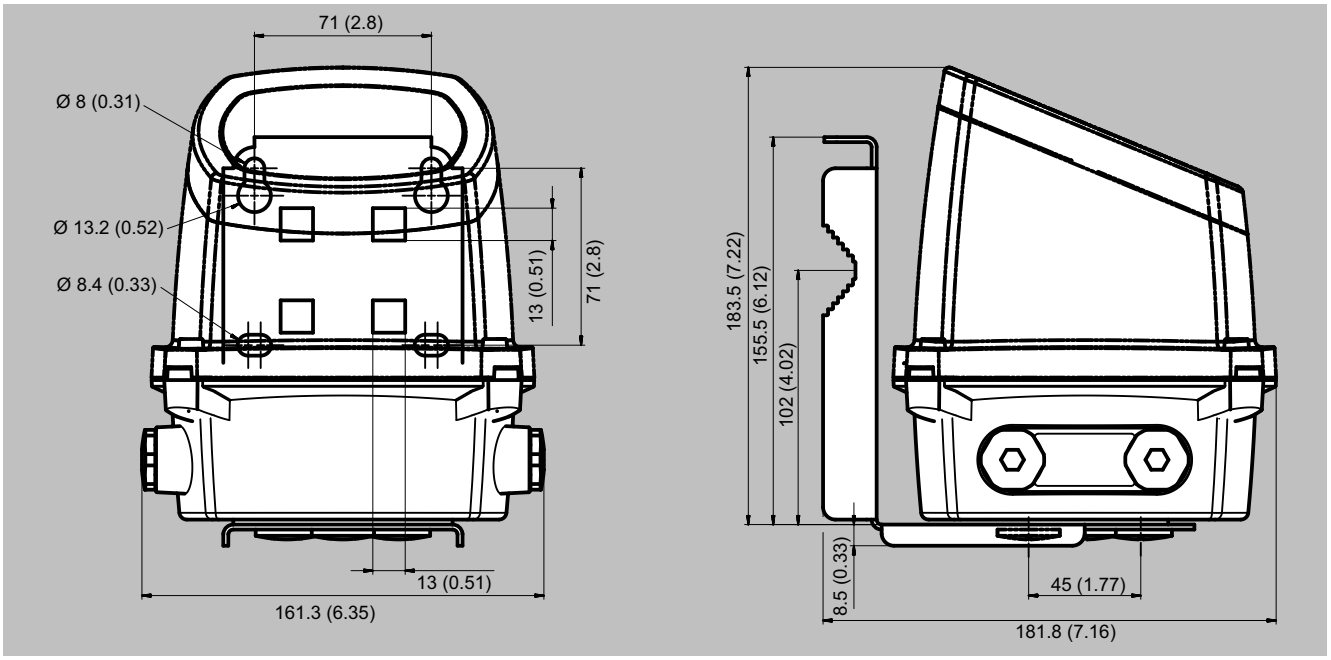
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## Dimensional drawings




FMT020 transmitter integral mounted, dimensions in mm (inch)




FMT020 transmitter remote mounted, dimensions in mm (inch)

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## Overview




The SITRANS FM100 is an electromagnetic flow sensor in a compact design for basic applications in the process and OEM industry.

## Benefits

- Connection ½", ¾", 1", 2"
- Flow- and temperature measurement
- IO-Link communication
- Dosing function with external control output
- Colored, multi-parameter configurable TFT display, rotatable 90°
- Bidirectional measuring
- Intuitive setup menu via 4 optical touch keys
- 2 freely configurable outputs
- All-metal design: stainless steel
- Included in Quick Ship Program (delivery time see PIA LCP)

## Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- OEM industry
- Process industry
- Small water cycles: e.g. cooling water, water leakage
- Dosing e.g. in chemical industry

## Design

The SITRANS FM100 is designed to measure small- and medium sized flow of conductive liquids. The small build allows to fit the device in almost any space. The robust stainless-steel housing protects the device in changing surroundings.

The measurement is displayed on the local screen as well as accessible via 2 freely configurable outputs (pulse-/frequency-/alarm- and analogue).

## Mode of operation

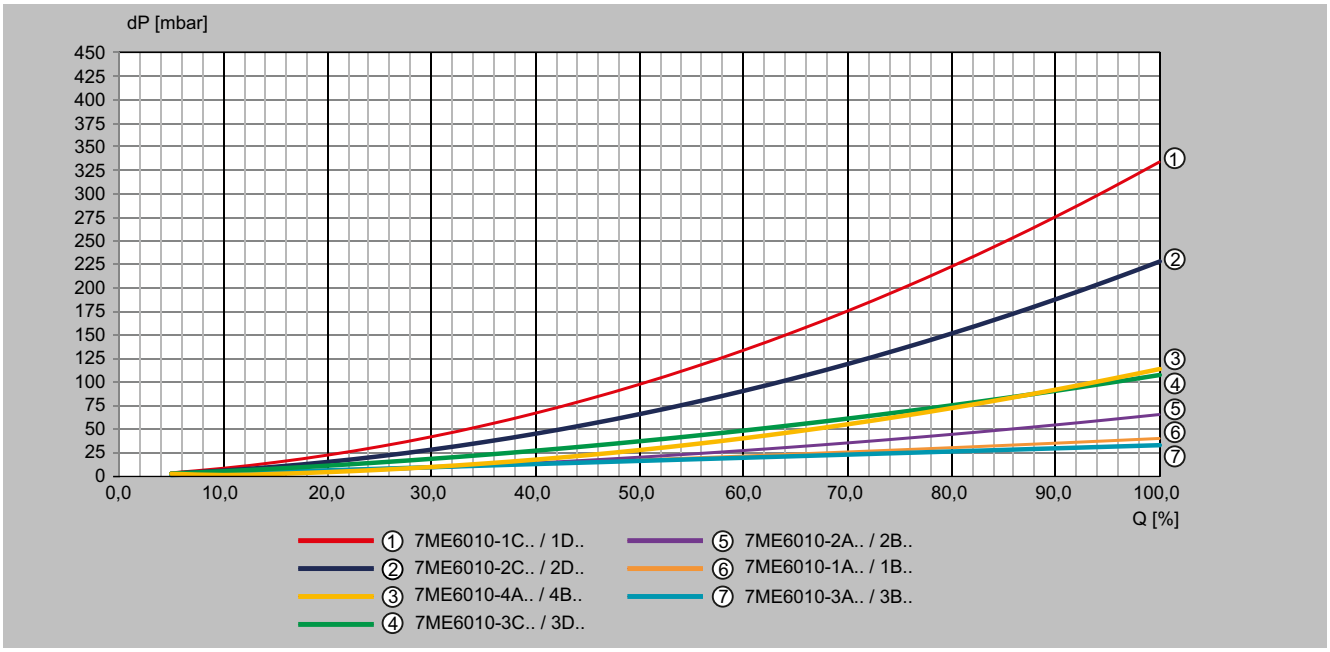
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

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## Integration

***Pressure loss***




## Selection and ordering data

| SITRANS FM100 flowmeter | Article No. 7ME6010- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Process connection, measuring range** | | | | | | |
| Male thread G1/2", 0.03 ... 3 l/min | | 1 | A | | | |
| Male thread G1/2", 0.25 ... 48 gal/h | | 1 | B | | | |
| Male thread G1/2", 0.04 ... 10 l/min | | 1 | C | | | |
| Male thread G1/2", 0.011 ... 2,6 gal/min | | 1 | D | | | |
| Male thread G3/4", 0.1 ... 25 l/min | | 2 | A | | | |
| Male thread G3/4", 0.025 ... 6,6 gal/min | | 2 | B | | | |
| Male thread G3/4", 0.2 ... 50 l/min | | 2 | C | | | |
| Male thread G3/4", 0.053 ... 13 gal/min | | 2 | D | | | |
| Male thread G1", 0.2 ... 50 l/min | | 3 | A | | | |
| Male thread G1", 0.053 ... 13 gal/min | | 3 | B | | | |
| Male thread G1", 0.4 ... 100 l/min | | 3 | C | | | |
| Male thread G1", 0.1 ... 26 gal/min | | 3 | D | | | |
| Male thread G2", 1.5 ... 350 l/min | | 4 | A | | | |
| Female thread 2" NPT, 0.4 ... 92 gal/min | | 4 | B | | | |
| **Transmitter design** | | | | | | |
| Compact design without cable | | | | A | | |
| **Gasket material** | | | | | | |
| FKM/FPM | | | | | 0 | |
| EPDM | | | | | 1 | |
| **Quality inspection certificate** | | | | | | |
| Without | | | | | | 0 |
| 3-point factory calibration | | | | | | 3 |
| 5-point factory calibration | | | | | | 5 |

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## Technical specifications

| FM100 | |
|---|---|
| Measuring principle | Electromagnetic induction |
| Media | Conductive liquid with ≥ 20 µS/cm |
| Accuracy | < ±(0.8 % of reading + 0.5 % of full scale)[1] |
| Repeatability | ±0.2 % of full scale |
| Response time flow $t_{90}$ | |
| • Alarm/pulse/frequency output | < 100 ms |
| • Current output | < 1 s |
| **Temperature measurement** | |
| Sensor | PT1000 |
| Accuracy | ≤ ±2 °C (flow > 0.2 m/s) |
| Measuring range | Temperature range of media |
| Response time temperature $t_{90}$ (signal output) | < 20 s |
| **Process connection** | |
| Nominal size | G ½" ... G 2"<br>Compatible NPT adapter available (¼" ... 2") |
| Process connection | Threaded fitting |
| **Rated operation conditions** | |
| Mounting position | In all directions, bidirectional measuring |
| In-/outlet | 3 × diameter / 2 × diameter |
| Ambient temperature | -20 ... +70 °C (-4 ... +158 °F) |
| Enclosure rating | IP67 |
| Operating pressure | Max. 16 bar |
| Pressure drop | See pressure loss diagram |
| Mechanical load | |
| • Shock resistance | DIN EN 60068-2-27:2010: 20 g (11 ms) |
| • Vibration resistance | DIN EN 60068-2-6:2008: 5 g<br>(10 ... 2 000 Hz) |
| • Environmental testing | DIN EN 60068-2-30:2006: severity level b |
| EMC | 2014/30/EU |
| **Design** | |
| Weight | See dimensional drawings |
| Housing material | Stainless steel 1.4404 |
| Electrode material | Stainless steel 1.4404 |
| Connection fitting | Stainless steel 1.4404 |
| Insulation parts | PEEK |
| Seals | FKM (Option: EPDM) |
| Display | PMMA |
| | Operation via 4 optical touch sensors (operation with hand gloves) |
| | TFT display, 128 × 128 pixels, 1.4" display, orientation in 90° steps adjustable, repetition rate adjustable 0.5 ... 10 s |
| Cable entries | M12x1 4-pin connection |
| Dimensions | See dimensional drawings |

| FM100 | |
|---|---|
| **Electrical data** | |
| Power supply | 19 ... 30 V DC |
| Power consumption | Max. 200 mA |
| Outputs | |
| • Frequency | Push-Pull, freely scalable, 2kHz @ overflow |
| | $f_{min}$ @ FS = 50 Hz |
| | $f_{max}$ @ FS = 1 000 Hz |
| • Pulse | Push-Pull, freely scalable, configurable for partial and accumulated totalizer |
| • Alarm | NPN, PNP, Push-Pull, configurable max. 30 V DC, max. 200 mA short-circuit proof |
| • Current | 0(4) ... 20 mA (active) or 0(2) ... 10 V DC |
| | Max. load 500 Ω |
| Input | |
| • Control | Active signal $U_{high}$ max. 30 V DC |
| | 0 < Low < 10 V DC |
| | 15 V DC < High < Vs |
| • Dosing function | Dosing output OUT2: |
| | Push-Pull, High active |
| | Control input OUT1: |
| | START/STOP 0.5 s < $t_{high}$ < 4 s |
| | RESET $t_{high}$ > 5 s |
| **Communication** | **IO-Link** |
| • Manufacturer ID | 42 (decimal), 0x002A (hex) |
| • Manufacturer name | Siemens AG |
| • Version | V1.1 |
| • Bitrate | COM3 |
| • Minimal cycle time | 1.1 ms |
| • SIO-Mode | Yes (OUT1 in configuration IO-Link) |
| • Block parameterization | Yes |
| • Operational readiness | 10 s |
| • Max. cable length | 20 m |

[1] Under reference conditions:
- Media temperature: 15 ... 30 °C
- Ambient temperature: 15 ... 30 °C
- 1 cST
- 500 µS/cm
- 1 bar

### *Factory calibration points*

| Type | Measuring range | Quality inspection certificate | Measuring point [l/min] 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| **7ME6010** | 1A, 1B | 0 | 1.5 | - | - | - | - |
| | | 3 | 0.5 | 1.5 | 2.5 | - | - |
| | | 5 | 0.5 | 1 | 1.5 | 2 | 2.5 |
| | 1C, 1D | 0 | 5 | - | - | - | - |
| | | 3 | 1 | 5 | 8 | - | - |
| | | 5 | 0.5 | 2 | 5 | 6 | 8 |
| | 2A, 2B | 0 | 12 | - | - | - | - |
| | | 3 | 2 | 12 | 20 | - | - |
| | | 5 | 0.5 | 2 | 12 | 15 | 20 |

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**Technical specifications** (continued)

| Type | Measuring range | Quality inspection certificate | Measuring point [l/min] 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| **7ME6010** | 2C, 2D | 0 | 25 | - | - | - | - |
| | | 3 | 4 | 25 | 50 | - | - |
| | | 5 | 4 | 15 | 25 | 30 | 40 |
| | 3C, 3D | 0 | 50 | - | - | - | - |
| | | 3 | 20 | 50 | 80 | - | - |
| | | 5 | 8 | 20 | 50 | 60 | 80 |
| | 4A, 4B | 0 | 170 | - | - | - | - |
| | | 3 | 20 | 170 | 280 | - | - |
| | | 5 | 20 | 100 | 170 | 200 | 280 |

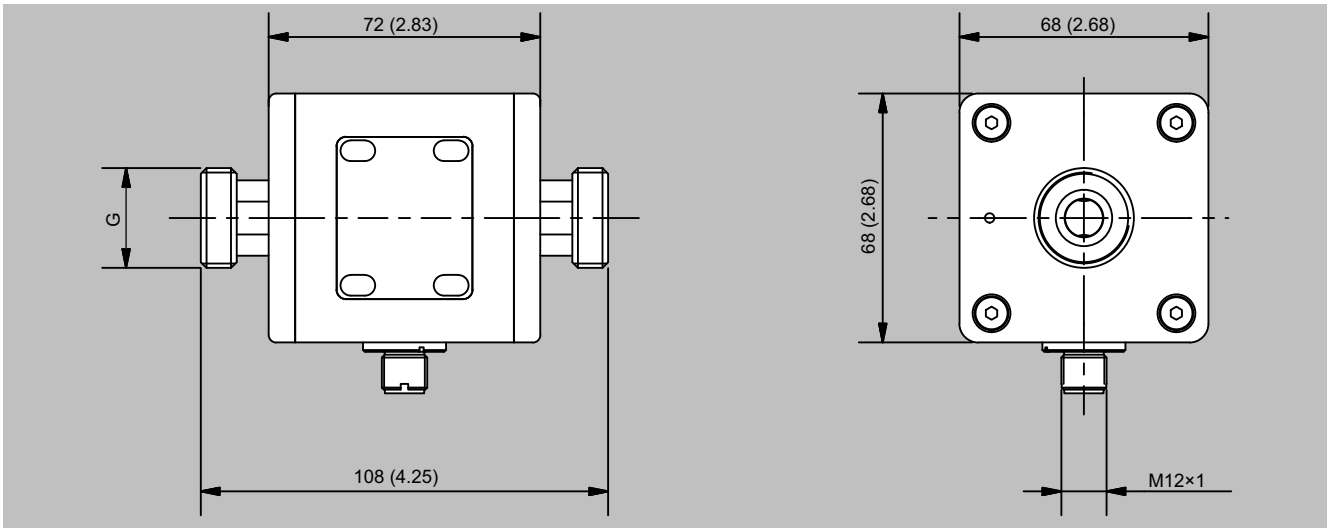
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## Dimensional drawings

***SITRANS FM100 flowmeter with compact transmitter***

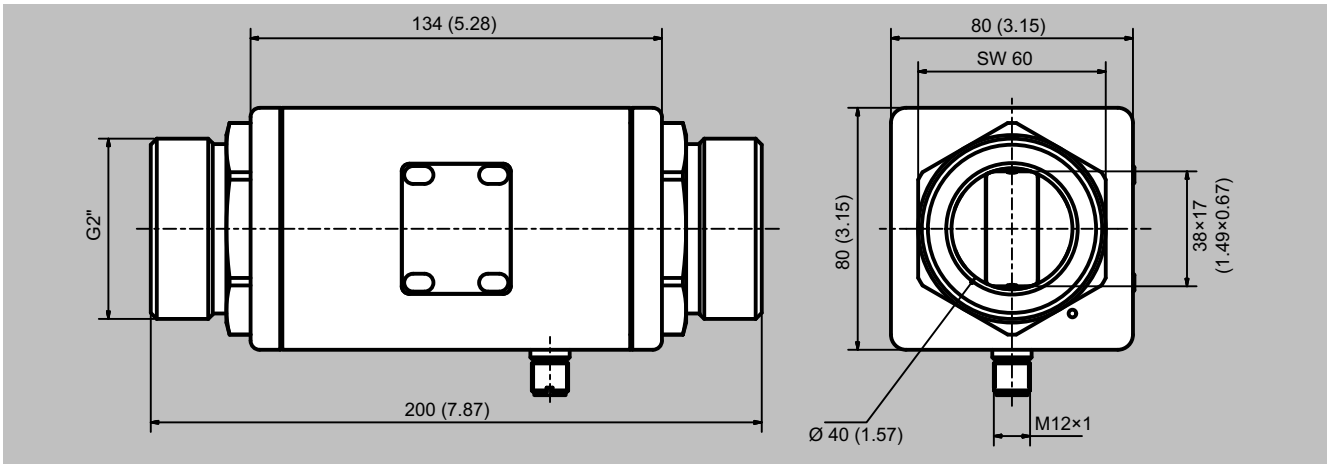
Process connection G1/2", G3/4" and G1




SITRANS FM100 with compact transmitter, process connection G1/2", G3/4" and G1"; dimensions in mm (inch)

| Process connection | Nominal size | Weight (g) |
|---|---|---|
| Male thread | G1/2" | 998 |
| Male thread | G3/4" | 988 |
| Male thread | G1" | 1010 |

Process connection G2"




SITRANS FM100 with compact transmitter, process connection G2"; dimensions in mm (inch)

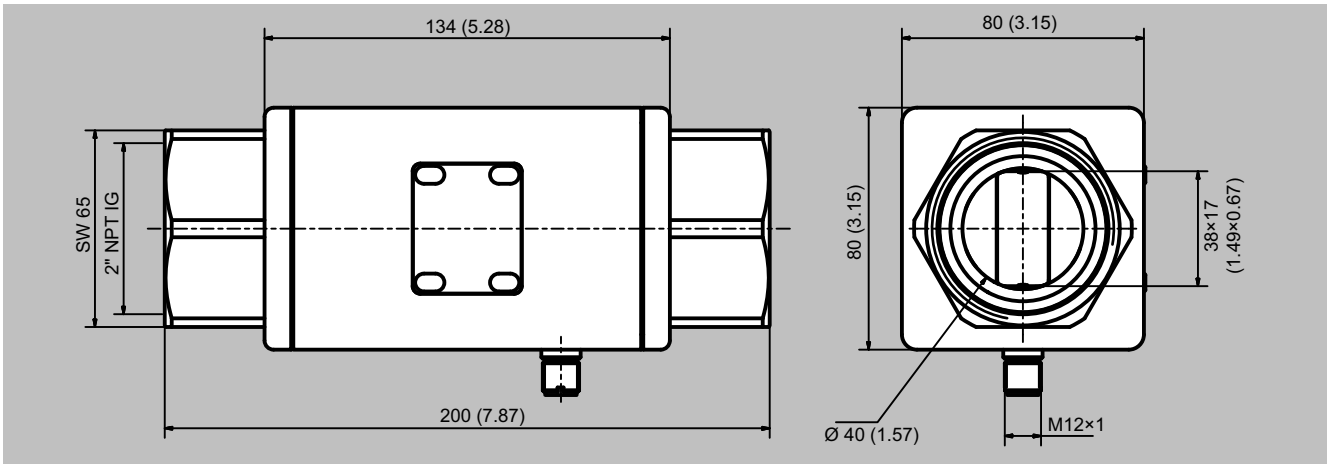
| Process connection | Nominal size | Weight (g) |
|---|---|---|
| Male thread | G2" | 2420 |

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## Dimensional drawings (continued)

Process connection 2" NPT IG




SITRANS FM100 with compact transmitter, process connection 2" NPT (female); dimensions in mm (inch)

| Process connection | Nominal size | Weight (g) |
|---|---|---|
| Female thread | 2" NPT IG | 2140 |

SITRANS FM100 inner diameters

| Connection, nominal size | Inside diameters (DN) | Range |
|---|---|---|
| G1/2" | 5 mm | 0.03 ... 3 l/min / 0.04 ... 10 l/min |
| G3/4" | 10 mm | 0.1 ... 25 l/min / 0.2 ... 50 l/min |
| G1" | 15 mm | 0.2 ... 50 l/min / 0.4 ... 100 l/min |
| 2" NPT IG | see dimensional drawings | 1.5 ... 350 l/min |

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## Overview



SITRANS FM TRANSMAG 2 with the SITRANS FM MAG 911/E sensor is an AC pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

## Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensive self-diagnostic with self-monitoring and internal simulation

## Application

The main applications of the SITRANS FM transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
- Mining industry

The patented pulse alternating field technology is ideal for difficult applications like:

- High concentrated paper stock > 3 %
- Heavy mining slurries up to 70 % solid concentration
- Mining slurries with magnetic particles
- Low conductive medias ≥1 µS/cm

## Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

## Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

## Function

The TRANSMAG 2 is a microprocessor-based transmitter with a built-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfill the task of a power supply unit which provides the magnet coils with a constant current.

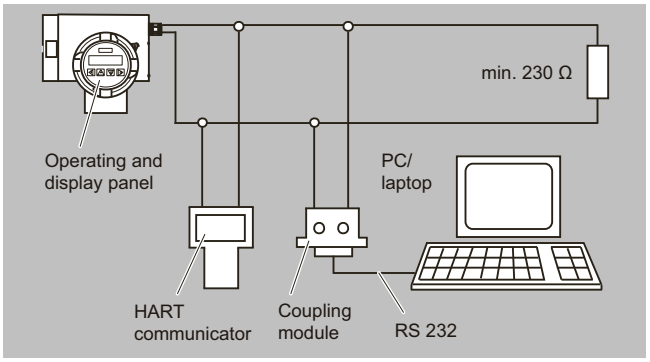
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

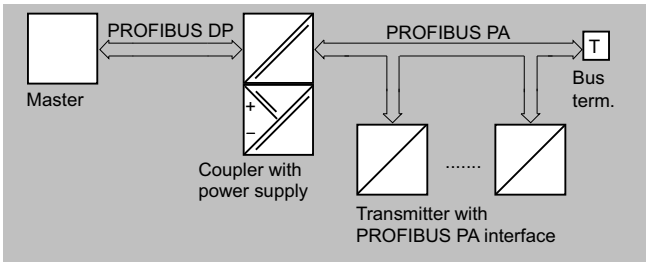
***Displays and keypads***

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication




HART communication




PROFIBUS PA communication

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## Selection and ordering data

| Transmitter TRANSMAG 2<br>Remote with standard wall mounting bracket, local display, die cast aluminum | Article No.<br>7ME5034- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | A | A | 1 | 1 | - | ● | A | A | 0 |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Output/communication** | | | | | | | | | | |
| 4 ... 20 mA with HART | **0** | | | | | | | | | |
| PROFIBUS PA | **1** | | | | | | | | | |
| 4 ... 20 mA with HART and digital input | **2** | | | | | | | | | |
| **Cable glands** | | | | | | | | | | |
| M20 × 1.5 | | | | | | | **1** | | | |
| ½" NPT | | | | | | | **2** | | | |

| | Order code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| Special mounting bracket for wall and pipeline installation | **A02** |
| Transmitter setting for parameter "TAG number" (specify in plain text, max. 8 characters) | **Y15** |
| Transmitter setting for parameter "TAG descriptor" (specify in plain text, max. 16 characters) | **Y16** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Special version (specify in plain text) | **Y99** |

| Sensor MAG 911/E | Article No.<br>7ME5610- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | A | A | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | |
| DN 15 (½") | **1** | **V** | | | | | | | | |
| DN 25 (1") | **2** | **D** | | | | | | | | |
| DN 40 (1½") | **2** | **R** | | | | | | | | |
| DN 50 (2") | **2** | **Y** | | | | | | | | |
| DN 65 (2½") | **3** | **F** | | | | | | | | |
| DN 80 (3") | **3** | **M** | | | | | | | | |
| DN 100 (4") | **3** | **T** | | | | | | | | |
| DN 125 (5") | **4** | **B** | | | | | | | | |
| DN 150 (6") | **4** | **H** | | | | | | | | |
| DN 200 (8") | **4** | **P** | | | | | | | | |
| DN 250 (10") | **4** | **V** | | | | | | | | |
| DN 300 (12") | **5** | **D** | | | | | | | | |
| DN 350 (14") | **5** | **K** | | | | | | | | |
| DN 400 (16") | **5** | **R** | | | | | | | | |
| DN 450 (18") | **5** | **Y** | | | | | | | | |
| DN 500 (20") | **6** | **F** | | | | | | | | |
| DN 600 (24") | **6** | **P** | | | | | | | | |
| DN 700 (28") | **6** | **Y** | | | | | | | | |
| DN 800 (32") | **7** | **H** | | | | | | | | |
| DN 900 (36") | **7** | **M** | | | | | | | | |
| DN 1000 (40") | **7** | **R** | | | | | | | | |
| **Flange norm and pressure rating** | | | | | | | | | | |
| EN 1092-1, PN 10 (DN 200 ... 1000 (8" ... 40")) | | | **B** | | | | | | | |
| EN 1092-1, PN 16 (DN 65 ... 1000 (2½" ... 40")) | | | **C** | | | | | | | |
| EN 1092-1, PN 25 (DN 200 ... 1000 (8" ... 40")) | | | **E** | | | | | | | |
| EN 1092-1, PN 40 (DN 15 ... 1000 (½" ... 40")) | | | **F** | | | | | | | |
| ANSI B16.5, Class 150 (½" ... 24")[1] | | | **J** | | | | | | | |
| ANSI B16.5, Class 300 (½" ... 24")[2] | | | **K** | | | | | | | |
| AWWA C-207 Class D (28" ... 40") | | | **L** | | | | | | | |
| JIS 10 K (½" ... 24") | | | **R** | | | | | | | |

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## Selection and ordering data (continued)

| Sensor MAG 911/E | Article No. 7ME5610- ● ● ● ● ● - ● A A ● |
|---|---|
| **Flange material** | |
| Mid steel flanges 1.0460/1.0570 | 1 |
| Stainless steel flanges, AISI 316L/1.4404 | 3 |
| **Liner material** | |
| Soft rubber (DN 25 to DN 1000) | 1 |
| PTFE (DN 15 to DN 600) | 3 |
| Hardrubber (DN 15 to DN 1000) | 4 |
| Linatex (DN 25 to DN 1000) | 5 |
| Novolak (sealing material FFKM) (DN 50 to DN 1000) | 6 |
| **Electrode material** | |
| AISI 316Ti/1.4571 | 1 |
| Hastelloy C276/2.4819 | 2 |
| Platinum | 3 |
| Titanium | 4 |
| Tantalum | 5 |
| **Cable glands/terminal box** | |
| Metric: Polyamide terminal box | 1 |
| ½" NPT: Polyamide terminal box | 2 |
| Metric: Stainless steel terminal box | 3 |
| ½" NPT: Stainless steel terminal box | 4 |

1) 20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless seel flanges
2) 20 °C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless seel flanges

| | Order Code |
|---|---|
| **Additional information** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| Two grounding electrodes made of stainless steel AISI 316Ti/1.4571 | **A02** |
| Two grounding electrodes made of Hastelloy C276/2.4819 | **A04** |
| Two grounding electrodes made of Platinum | **A05** |
| Two grounding electrodes made of Titanum | **A06** |

| | Order Code |
|---|---|
| Two grounding electrodes made of Tantalum | **A07** |
| Factory certificate to EN 10204-2.2 | **C14** |
| Material certificate according to EN 10204-3.1 | **C16** |
| Power supply 110 V/60 Hz | **P01** |
| Flow range setting: Specify upper flow range value | **Y01** |
| Pulse output setting: Specify pulse value (1 puse/unit) | **Y02** |
| Silicon-free version | **Y04** |
| Tag name plate, stainless steel (specify in plain text) | **Y17** |
| Special version (specify in plain text) | **Y99** |

| Cable kit for sensor MAG 911/E | Article No. 7ME5930- 5 ● A 0 0 - 0 A A 0 | Order code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Cable** | | |
| Cable kit for sensor MAG 911/E, coil cable 3 × 1.0 mm² (3 × 0.0016 inch²), electrode cable 7 × 0.5 mm² (7 × 0.0008 inch²), single shielded with PVC jacket | | |
| • Length: 5 m (16.4 ft) | B | |
| • Length: 10 m (32.8 ft) | C | |
| • Length: 20 m (65.6 ft) | D | |
| • Length: 30 m (98.4 ft) | E | |
| • Length: 40 m (131 ft) | F | |
| • Length: 50 m (164 ft) | G | |
| • Length: 60 m (197 ft) | H | |
| • Length: 80 m (260 ft) | J | |
| • Length: 100 m (328 ft) | K | |
| • Other length (specify in plain text) | Z | J 1 Y |

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## Selection and ordering data (continued)

| | Article No. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Grounding and protection ring for sensor MAG 911/E** | | | | | | | | | | | |
| **Protection ring** | **7ME5942-** | | | | | | | ● | ● | ● | ● | ● |
| **Grounding ring** | **7ME5943-** | | | | | | | ● | ● | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | |
| DN 15 (½") | | | | | | | | **1** | **V** | | | |
| DN 25 (1") | | | | | | | | **2** | **D** | | | |
| DN 40 (1½") | | | | | | | | **2** | **R** | | | |
| DN 50 (2") | | | | | | | | **2** | **Y** | | | |
| DN 65 (2½") | | | | | | | | **3** | **F** | | | |
| DN 80 (3") | | | | | | | | **3** | **M** | | | |
| DN 100 (4") | | | | | | | | **3** | **T** | | | |
| DN 125 (5") | | | | | | | | **4** | **B** | | | |
| DN 150 (6") | | | | | | | | **4** | **H** | | | |
| DN 200 (8") | | | | | | | | **4** | **P** | | | |
| DN 250 (10") | | | | | | | | **4** | **V** | | | |
| DN 300 (12") | | | | | | | | **5** | **D** | | | |
| DN 350 (14") | | | | | | | | **5** | **K** | | | |
| DN 400 (16") | | | | | | | | **5** | **R** | | | |
| DN 450 (18") | | | | | | | | **5** | **Y** | | | |
| DN 500 (20") | | | | | | | | **6** | **F** | | | |
| DN 600 (24") | | | | | | | | **6** | **P** | | | |
| DN 700 (28") | | | | | | | | **6** | **Y** | | | |
| DN 800 (32") | | | | | | | | **7** | **H** | | | |
| DN 900 (36") | | | | | | | | **7** | **M** | | | |
| DN 1000 (40") | | | | | | | | **7** | **R** | | | |
| **Flange design** | | | | | | | | | | | | |
| EN 1092-1, PN10 | | | | | | | | | | **B** | | |
| EN 1092-1, PN16 | | | | | | | | | | **C** | | |
| EN 1092-1, PN25 | | | | | | | | | | **E** | | |
| EN 1092-1, PN40 | | | | | | | | | | **F** | | |
| AISI B16.5, class 150 | | | | | | | | | | **J** | | |
| AISI B16.5, class 300 | | | | | | | | | | **K** | | |
| AWWA C-207, class D | | | | | | | | | | **L** | | |
| JIS B2220, 10K | | | | | | | | | | **R** | | |
| **Material** | | | | | | | | | | | | |
| Stainless steel AISI 316/1.4571 | | | | | | | | | | | **1** | |
| Hastelloy C4/2.4610 | | | | | | | | | | | **2** | |
| **Liner** | | | | | | | | | | | | |
| Soft rubber | | | | | | | | | | | | **1** |
| PTFE | | | | | | | | | | | | **3** |
| Hard rubber | | | | | | | | | | | | **4** |
| Linatex | | | | | | | | | | | | **5** |
| Novolak | | | | | | | | | | | | **6** |

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Standard wall-mounting bracket, stainless steel AISI 316L/1.4404** | **7ME5933-0AC04** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| Special wall-mounting bracket, BI 2.5 DIN 59382 X6Cr17 | 7ME5933-0AC05 |  |
| Potting kit for IP68/ NEMA 6P sealing of sensor junction box | FDK:085U0220 |  |

*Spare parts*

| Description | Article No. | |
|---|---|---|
| Display unit | 7ME5933-0AC00 |  |
| Display lid in die-cast aluminum, with corrosion resistant coating (min. 60 mm) | 7ME5933-0AC01 |  |
| Blind lid for sensor cables connection compartment (only remote version) in die-cast aluminum, with corrosion resistant coating (min. 60 mm) incl. O-ring seal | 7ME5933-0AC02 |  |
| Blind lid (mains supply, input/outputs) in die-cast aluminum, with corrosion resistant coating (min. 60 mm) | 7ME5933-0AC03 |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Safety clamp for electronic cover with glass plate (7ME5933-0AC01)** | **7ME5933-0AC06** |  |
| **M20 cable gland set for power and output connection, gray PA plastic, 2 pcs.**<br>• cables Ø 6 ... 12 mm (0.24" ... 0.47")<br>• -40 ... +100 °C (-40 ... +212 °F) | **A5E02246350** |  |
| **1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs.**<br>• cables Ø 6 ... 12 mm (0.24" ... 0.47")<br>• -40 ... +100 °C (-40 ... +212 °F) | **A5E02246396** |  |
| **M16 × 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind**<br>• cables Ø 5 ... 9 mm (0.20" ... 0.35")<br>• -20 ... +105 °C (-4 ... +221 °F) | **A5E02246369** |  |

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## Technical specifications

| TRANSMAG 2 | |
|---|---|
| **Mode of operation and design** | |
| Measuring principle | Electromagnetic with pulsed alternating field (PAC) |
| Magnetic field excitation | Automatic power supply synchronization |
| • 50 Hz AC power supply | Bipolar (16.7 Hz)<br>Bipolar with prepulse (10 Hz)<br>Unipolar (8.33 Hz) |
| • 60 Hz AC power supply | Bipolar (20 Hz)<br>Bipolar with prepulse (12 Hz)<br>Unipolar (10 Hz) |
| **Accuracy under reference conditions** | |
| Measuring tolerance of pulse output | |
| • With v > 0.25 m/s (0.82 ft/s) | ≤ ± 0.5 % of measured value ± 1.2 mm/s (0.05 inch/s) |
| • With v < 0.25 m/s (0.82 ft/s) | ± 2.5 mm/s (0.1 inch/s) |
| Measuring tolerance of analog output | As pulse output plus ± 0.1 % conversion error ± 20 µA |
| Repeatability | 0.2 % of measured value |
| ***Reference conditions*** | |
| • Process temperature | 25 °C ± 5 °C (77 °F ± 9 °F) |
| • Ambient temperature | 25 °C ± 5 °C (77 °F ± 9 °F) |
| • Warm-up time | Min. 30 min |
| • Installation conditions | Inlet pipe section ≥ 10 × DN<br>Outlet pipe section ≥ 5 × DN<br>Installed centered in pipe |
| • Medium | Water without gaseous or solid components |
| **Calibration** | |
| Default calibration, calibration report shipped with sensor | 2 × 20 %, 2 × 50 % and 2 × 100 % |
| **Outputs** | |
| Electrical isolation | Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding |
| ***Current output*** | 0/4 ... 20 mA (7ME5034-0.... or 7ME5034-2....) |
| • Signal | |
| - Upper limit | 0/4 ... 20 mA, selectable |
| - Failure | 20 ... 22.5 mA, optional 3.6; 20 or 24 mA |
| • Load | |
| - Output | max. 600 Ω, max. load voltage 15 V DC |
| - For HART communication | ≥ 250 Ω |
| Communication | Via analog output with PC coupling module or HART communicator |
| • Protocol | HART, version 5.1 |
| ***Digital output*** | |
| Signal | |
| • Output | Configurable as active or passive signals |
| - Active signal | 24 V DC, ≤ 24 mA, $R_i$ = 170 Ω |
| - Passive signal | Open collector, max. 30 V DC, 200 mA |
| Output configuration | |
| • Pulse | |
| - Pulse significance | ≤ 5000 pulses/s |
| - Pulse width | ≥ 0.1 ms |
| • Limit frequency | ≤ 10000 Hz |
| • Limits | Limits for flow and quantity, flow direction, alarm |
| ***Digital output 2 (relay)*** | |
| (only 7ME5034-0...) | |

| TRANSMAG 2 | |
|---|---|
| Relay | NC or NO function |
| • Rating | Max. 5 W, max. 50 V AC/DC, max. 200 mA |
| • Output configuration | Limits for flow and quantity, flow direction, alarm |
| ***Digital input (optional to digital output 2)*** | Non-intrinsically-safe |
| (only 7ME5034-2...) | |
| • Input function configurable as high-active or low-active | Set measured value to zero or reset totalizer |
| • Signal voltage | Max. 30 V DC, $R_i$ = 3 kΩ:<br>High level: +11 ... +30 V DC<br>Low level: -30 ... +5 V DC |
| *For PROFIBUS devices* | |
| PROFIBUS PA (for PROFIBUS-devices 7ME5034-1...) | |
| • Communication | Layer 1 and 2 according to PROFIBUS PA<br>Transmission according to IEC 1158-2<br>Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170)<br>Device Class B, device profile 2.0<br>Max. 4 simultaneous C2 connections |
| • Bus voltage | 9 ... 32 V DC permissible |
| • Current consumption from bus | 10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation |
| **Rated operating conditions** | |
| Ambient temperature | |
| • Operation | -20 ... +60 °C (-4 ... +140 °F) |
| • Storage | -25 ... +80 °C (-13 ... +176 °F) |
| Degree of protection | IP67/NEMA 4X |
| Electromagnetic compatibility (EMC) | |
| • Emitted interference | To IEC/EN 61326 for use in industrial areas |
| • Noise immunity | To IEC/EN 61326 for use in industrial areas |
| **Design** | |
| Weight of transmitter | 4.4 kg (9.7 lb) |
| Remote version | Transmitter must be connected to sensor using shielded cable |
| Maximum cable length | 100 m (328 ft) |
| Housing | Die-cast aluminum, painted |
| **Cables entries** | Remote installations |
| • Power supply and outputs | 2 x M20 (HART)/M25 (PROFIBUS) or 2 x ½" NPT (HART) |
| • Sensor connections | 2 x M16 (HART) or 2 x ½" NPT |
| **Displays and keypad** | |
| General display | LCD, backlid, two lines with 16 characters each |
| Multi-display for | Flow, totalizer, flow velocity |
| Keypad | 4 keys for entering parameters |
| **Power supply** | |
| corresponding to rating plate | |
| • AC supply | 100 ... 250 V AC ± 15 %, 47 ... 63 Hz |
| • Power consumption | Approx. 120 ... 630 VA, depending on sensor |
| Line fuse | 100 ... 230 V AC: T1.6A |
| Magnet current fuse | F5A/250 V |

### *Sensor cables between sensor and transmitter*

Sufficient shielding must be provided, as well as fixed routing of the signal cables (electrode and coil cable).

Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in grounded steel conduit. The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

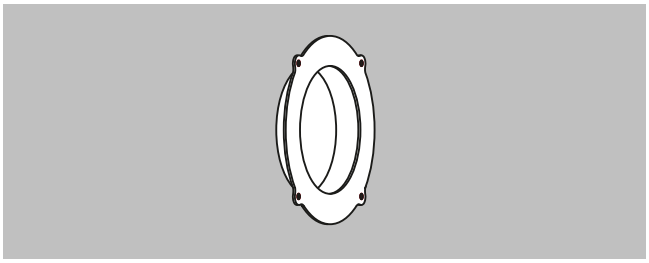
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## Technical specifications (continued)

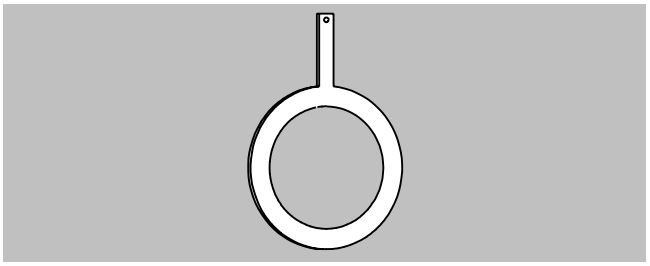
| MAG 911/E | |
|---|---|
| **Process connection** | |
| Flanges | |
| • EN 1092-1, raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) | • DN 200 ... 1000 (8" ... 40"): PN 10 (145 psi) |
| | • DN 65 ... 1000 (2½" ... 40"): PN 16 (232 psi) |
| | • DN 200 ... 1000 (8" ... 40"): PN 25 (362 psi) |
| | • DN 15 ... 1000 (½" ... 40"): PN 40 (580 psi) |
| • ANSI B16.5 (BS 1560), raised face | • ½" ... 40": Class 150 (20 bar (290 psi)) |
| | • ½" ... 24": Class 300 (50 bar (725 psi)) |
| • AWWA C-207, raised face | 28" ... 40": Class D (10 bar) |
| • JIS B 2220:2004 | ½" ... 24": K10 |
| **Media conductivity** | Minimum conductivity ≥ 1 µS/cm |
| **Rated operating conditions** | |
| Enclosure rating | IP67/NEMA 6<br>Optional IP68/NEMA 6P |
| ***Temperature of medium*** | |
| • Soft rubber | 0 ... +70 °C (32 ... 158 °F) |
| • Hard rubber | 0 ... +90 °C (32 ... 194 °F)<br>Option: 100 °C (212 °F) |
| • PTFE | -20 ... +150 °C (-4 ... +302 °F) at 25 bar (363 psi) |
| | -20 ... +100 °C (-4 ... +212 °F) at 40 bar (580 psi) |
| • Linatex | -40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used) |
| • Novolac | 130 °C (266 °F) at 40 bar (580 psi) |
| **Design** | |
| Weight | See dimensional drawings |
| Flange and housing material | • Carbon steel ASTM A 105, with corrosion protection EN ISO 12944 grade C3<br>or<br>• AISI 316L/1.4404 flanges and carbon steel housing ASTM A105, with corrosion protection EN ISO 12944 grade C3 |
| Measuring pipe material | Stainless steel AISI 304 or higher |
| Electrode material | • AISI 316/1.4571 |
| | • Hastelloy C276/2.4819 |
| | • Platinum |
| | • Titanium |
| | • Tantalum |
| Grounding electrode material | Defined via the order code |
| Terminal box (remote version only) | • Standard: Fibre glass reinforced polyamide |
| | • Option: Stainless steel AISI 316/1.4436 |

### *Protection ring*



| Technical specifications | |
|---|---|
| **Function** | To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F). |
| **Contact with medium** | Yes, please always check resistance to measured medium. |
| **Material** | Stainless steel AISI 316/1.4571, optionally Hastelloy C276/2.4819 |
| **Material thickness** | The overall length of the sensor is increased by<br>6 mm for DN 15 ... 150 (0.24" for ½" ... 6")<br>or<br>10 mm for DN 200 ... 600 (0.4" for 8" ... 24") |
| **Standard** | Optional for all liners. Must be ordered separately. |
| **Article No.** | **7ME5942-...** |

### *Grounding ring*



| Technical specifications | |
|---|---|
| **Function** | Electrical reference and grounding of the medium. Required if the pipelines are not electrically conducting or are lined (plastic pipelines, concrete pipelines etc.). All grounding rings must be connected to the grounding screw present on the sensor. |
| **Contact with medium** | Yes, please always check resistance to measured medium. |
| **Material** | Stainless steel AISI 316/1.4571 or Hastelloy C4/2.4610 |
| **Material thickness** | The overall length of the sensor is increased by 2 mm (0.08") per grounding ring. |
| **Standard** | Optional for all liners. Required between the medium and sensor for equipotential bonding between non-conducting pipelines or lined pipelines. |
| **Article No.** | **7ME5943-...** |

Important:

The rings must be ordered together with the sensor. Gaskets are not included. In case of replacement please include the sensor MLFB code on the order.

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## Technical specifications (continued)

***Classification according to pressure equipment directive (PED 2014/68/EU)***

| Nominal size DN | (inches) | Nominal pressure PN | (MWP psi) | Permissible media | Category |
|---|---|---|---|---|---|
| **15 ... 25** | (½" ... 1") | 40 | 580 | Gases fluid group 1 and liquids fluid group 1 | Article 4.3 |
| **200 ... 300** | (8" ... 12") | 10 | (145) | Gases fluid group 1 and liquids fluid group 1 | II |
| **65 ... 250** | (2½" ... 10") | 16 | (232) | Gases fluid group 1 and liquids fluid group 1 | II |
| **40 ... 100** | (1½" ... 4") | 40 | (580) | Gases fluid group 1 and liquids fluid group 1 | II |
| **350 ... 1000** | (14" ... 40") | 10 | (145) | Gases fluid group 1 and liquids fluid group 1 | III |
| **300 ... 1000** | (12" ... 40") | 16 | (232) | Gases fluid group 1 and liquids fluid group 1 | III |
| **200 ... 600** | (8" ... 24") | 25 | (363) | Gases fluid group 1 and liquids fluid group 1 | III |
| **125 ... 600** | (5" ... 24") | 40 | (580) | Gases fluid group 1 and liquids fluid group 1 | III |

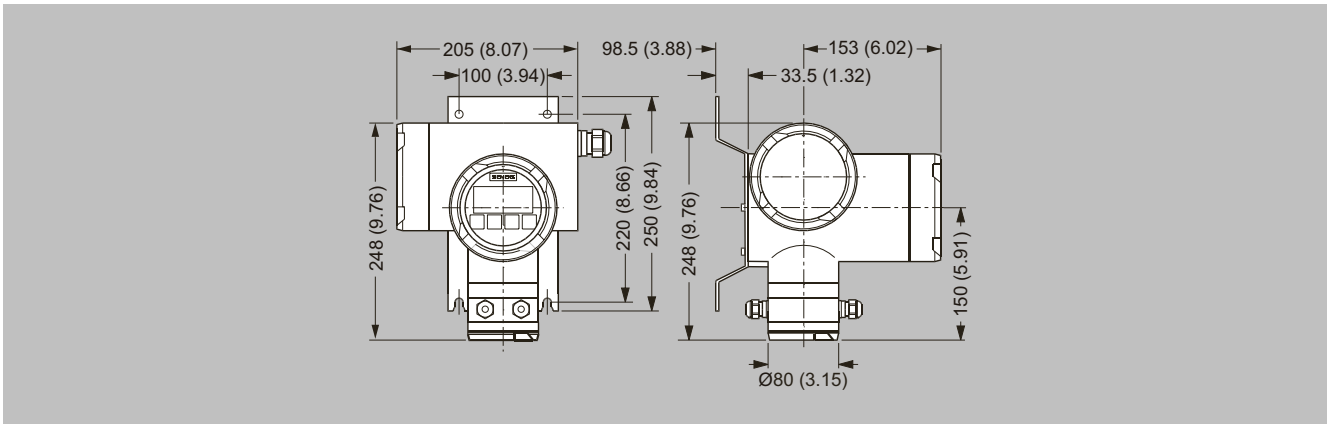
Notes on pressure equipment directive

The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.

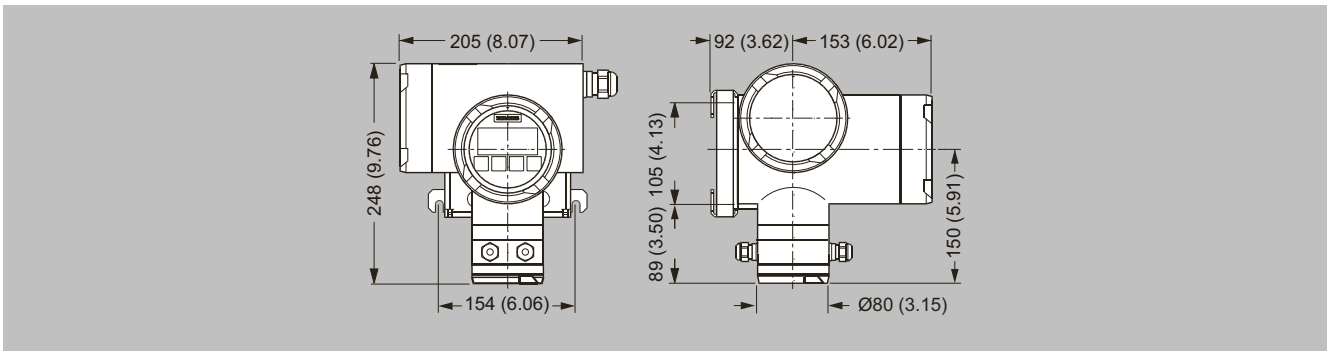
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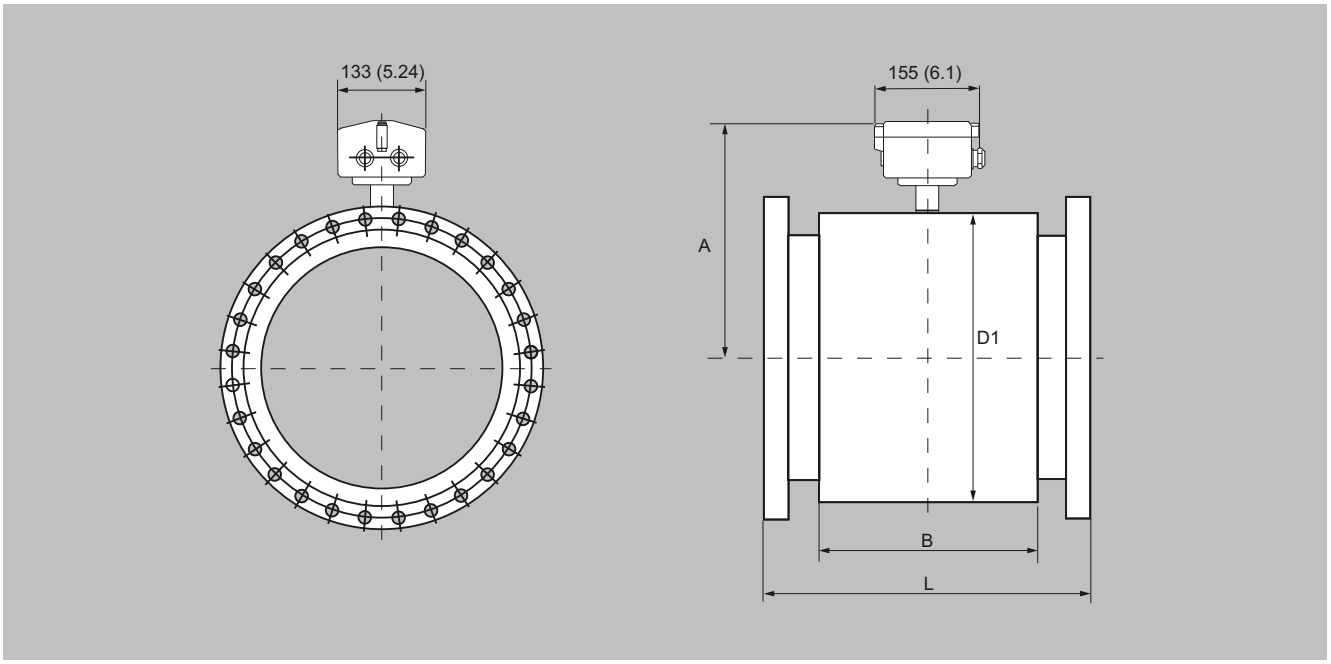
## Dimensional drawings




SITRANS FM transmitter TRANSMAG 2 with wall-mounting bracket, dimensions in mm (inch)




SITRANS FM transmitter TRANSMAG 2 with special wall-mounting bracket, dimensions in mm (inch)




SITRANS FM flow sensor MAG 911/E, compact version, dimensions in mm (inches)

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## Dimensional drawings (continued)

Built-in length MAG 911/E

| Nominal size | DN 15<br>½" | DN 25<br>1" | DN 40<br>1½" | DN 50<br>2" | DN 65<br>2½" | DN 80<br>3" | DN 100<br>4" | DN 125<br>5" | DN 150<br>6" | DN 200<br>8" | DN 250<br>10" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Built-in length L[1)]** | | | | | | | | | | | |
| Hard rubber version Linatex/soft rubber version | 270 (10.63) | 270 (10.63) | 280 (11.02) | 280 (11.02) | 330 (12.99) | 340 (13.39) | 340 (13.39) | 370 (14.57) | 370 (14.57) | 410 (16.14) | 470(18.50) |
| PTFE-liner without protection rings | 270 (10.63) | 270 (10.63) | 280 (11.02) | 280 (11.02) | 330 (12.99) | 340 (13.39) | 340 (13.39) | 370 (14.57) | 370 (14.57) | 410 (16.14) | 470 (18.50) |
| Novolak-version | - | - | 275 (10.83) | 275 (10.83) | 325 (12.79) | 335 (13.19) | 333 (13.11) | 362 (14.25) | 362 (14.25) | 401 (15.79) | 460 (18.11) |
| **Dimensions of sensor housing** | | | | | | | | | | | |
| Housing width B | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 170 (6.69) | 240 (9.45) | 240 (9.45) |
| Height A | 206 (8.11) | 206 (8.11) | 222 (8.74) | 229 (9.02) | 262 (10.32) | 262 (10.32) | 274 (10.79) | 286 (11.26) | 299 (11.78) | 334 (13.15) | 358 (14.10) |
| Housing diameter $D_1$ | 135 (5.35) | 135 (5.35) | 167 (6.58) | 182 (7.17 | 247 (9.73) | 247 (9.73) | 272 (10.71) | 296 (11.65) | 322 (12.68) | 392 (15.43) | 440 (17.32) |
| Weight of PN 16 version in kg (MWP 232 psi version in lb) approx. | 8.0 (17.64) | 8.5 (18.74) | 11.5 (25.35) | 25.0 (55.12) | 26 (57.32) | 27 (59.53) | 28 (61.73) | 34 (74.95) | 38 (83.78) | 68 (149.9) | 81 (178.6) |

| Nominal size | DN 300<br>12" | DN 350<br>14" | DN 400<br>16" | DN 450<br>18" | DN 500<br>20" | DN 600<br>24" | DN 700<br>28" | DN 750<br>30" | DN 800<br>32" | DN 900<br>36" | DN 1000<br>40" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Built-in length L[1)]** | | | | | | | | | | | |
| Hard rubber version Linatex/soft rubber version | 500 (19.68) | 550 (21.65) | 600 (23.62) | 650 (25.59) | 650 (25.59) | 780 (30.71) | 910 (35.83) | 910 (35.83) | 1040 (40.95) | 1170 (46.06) | 1300 (51.18) |
| PTFE-liner without protection rings | 500 (19.68) | 550 (21.65) | 600 (23.62) | 660 (25.98) | 650 (25.59) | 780 (30.71) | - | - | - | - | - |
| Novolak-version | 489 (19.25) | 538 (21.18) | 592 (23.31) | 638 (25.12) | 638 (25.12) | 772 (30.39) | 903 (35.55) | 903 (35.55) | 1033 (40.63) | 1163 (45.79) | 1293 (50.91) |
| **Dimensions of sensor housing** | | | | | | | | | | | |
| Housing width B | 240 (9.45) | 225 (8.86) | 250 (9.84) | 270 (10.63) | 300 (11.81) | 360 (14.17) | 420 (16.54) | | 500 (19.69) | 560 (22.05) | 620 (24.41) |
| Height A | 383 (15.08) | 375 (14.76) | 400 (15.75) | 433 (17.05) | 453 (17.84) | 505 (19.88) | 558 (21.97) | 590 (23.23) | 608 (23.94) | 658 (25.91) | 713 (28.07) |
| Housing diameter $D_1$ | 490 (19.29) | 474 (18.66) | 524 (20.63) | 591 (23.26) | 629 (24.76) | 734 (28.90) | 839 (33.03) | 904 (35.59) | 939 (36.97) | 1039 (40.91) | 1150 (45.28) |
| Weight of PN 16 version in kg (MWP 232 psi version in lb) approx. | 95 (209.4) | 118 (260.2) | 161 (354.9) | 185 (407.9) | 233 (513.7) | 401 (884.1) | 420 (925.9) | 450 (992.1) | 500 (1102.3) | 560 (1234.6) | 620 (1366.9) |

1) Tolerance for built-in lenght: L + 0.0 mm/-4.0 mm (-0.00/-0.157 inches). With protection rings for > DN 25 +6.0 mm, > DN 200 +10.0 mm (> 1" +0.236 inches, > 8" +0.394 inches)

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## Overview



MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

## Benefits

***Easy to install***

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- Superior measurement
- Down to 0.2% maximum uncertainty
- Suitable for 0D in- and outlet conditions
- OIML R 49 type approval
- FM Fire Service Approval
- Bi-directional measurement

***Long lasting performance/Low cost of Ownership***

- No moving parts means less wear and tear.
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

***Intelligent information, easy to access***

- Embedded self-testing and alarm/fault detection feature
- Internal data logger
- Advanced statistics and diagnostics
- Various add-on communication modules

## Application

The following MAG 8000 versions are available as stand-alone water meters:

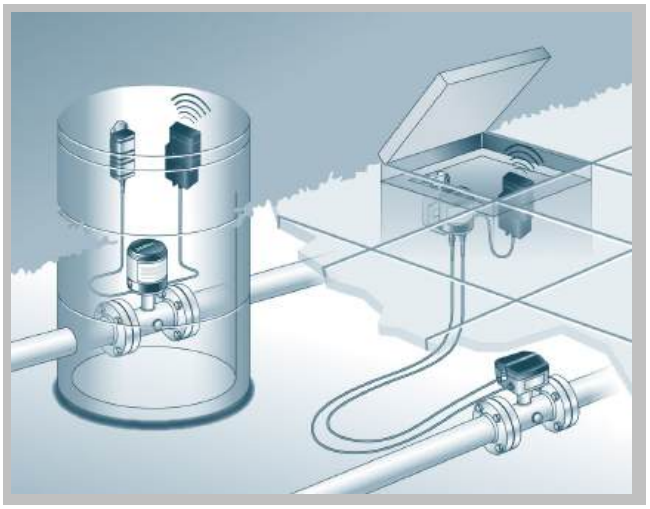
- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering

## Design

MAG 8000 is designed to minimize power consumption.

The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares





Modbus/Encoder module

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## Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostic ensure optimum meter performance and information to optimize water supply and billing.



MAG 8000 can be ordered as a Basic or an Advanced version.

| Features/Version | MAG 8000 Basic | MAG 8000 Advanced |
|---|---|---|
| Measuring frequency in battery power mode (Manually selected)[1)] | 1/15 or 1/30 or 1/60 Hz | 6.25 ... 1/60 Hz depending of sensor size |
| Output MAG 8000 | 2 FW/RV/AI/CA | 2 FW/RV/AI/CA |
| Communication | Add-on | Add-on |
| Data logger | Yes | Yes |
| Insulation test | Yes | Yes |
| Leakage detection | No | Yes |
| Meter utilization | No | Yes |
| Statistics | No | Yes |
| Tariff | No | Yes |
| Settle date (Revenue) | No | Yes |

1) Excitation frequency settings with mains power supply, see technical specifications for each version

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.

## Function (continued)



***SIMATIC PDM***

For more details about SIMATIC PDM please go to "Communication".

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## Technical specifications

| MAG 8000 | |
|---|---|
| **Installation** | Compact (integral) |
| | Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft) |
| **Enclosure** | Stainless steel top housing (AISI 316) and coated brass bottom |
| | Remote wall mount bracket in stainless steel (AISI 304) |
| | Remote version terminal box in fibre glass reinforced polyamide |
| **Cable entries** | 2 × M20 (one gland for one cable of size 6 ... 8 mm (0.02 ... 0.026 ft) is included in the standard delivery) |
| **Display** | Display with 8 digits for main information |
| | Index, menu and status symbols for dedicated information |
| Resolution | Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default) |
| **Flow unit** | |
| Europe | Volume in $m^3$ and flow rate in $m^3/h$ |
| US | Volume in Gallon and flow rate in GPM |
| Australia | Volume in Mi and flow rate as Ml/d |
| **Optional display units** | Volume: $m^3$ × 100, l × 100, G × 100, G × 1000, MG, CF × 100, CF × 1000, AF, Al, kl, BBL42 |
| | Flow: $m^3$/min, $m^3$/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d |
| **Digital output** | 2 passive outputs (MOS), individual galvanically isolated |
| | Maximum load ±35 V DC, 50 mA short circuit protected |
| Output A function | Programmable as pulse volume – forward – reverse – forward/net – reverse/net |
| Output B function | Programmable as pulse volume (like output A), alarm |
| Output | Max. pulse rate of 50 Hz (pulse B) and 100 Hz (pulse A), pulse width of 5, 10, 50, 100, 500 ms |
| **Communication** | IrDA: Standard integrated infrared communication interface with Modbus RTU protocol |
| Add-on modules | • RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable |
| | • RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable |
| | • Encoder interface module (for Itron 200WP) "Sensus protocol" |
| | • 3G/UMTS module with or without analog input cable |
| | • IIoT Wireless Communication Module with or without analog input cable |
| **Power supply** | Auto detection of power source with display symbol for operation power |
| Internal battery pack | 1 D-Cell 3.6 V/16.5 Ah |
| | 2 D-Cell 3.6 V/33 Ah |
| External battery pack | 4 D-Cell 3.6 V/66 Ah |
| **Mains power supply** | 12 ... 24 V AC/DC (10 ... 32 V) 2 VA |
| | 115 ... 230 V AC (85 ... 264 V) 2 VA |
| | Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack. |
| Cable | 3 m (9.8 ft) for external connection to mains supply (without cable plug) |

| Features | |
|---|---|
| **Application identification** | Tag number up to 15 characters |
| **Time and date** | Device embedded Real Time Clock (Synchronization with NTP server if 3G/UMTS module or IIoT WCM connected) |
| **Totalizer** | |
| MAG 8000 | Totalizer 1 and Totalizer 2: Configurable to Forward, Reverse and Bidirectional netflow |
| | Totalizer 3: (following totalizer 1 setting) resettable via display key |
| **Measurement** | |
| Low flow cut-off | |
| • 7ME6810 | Cut-off at 15 mm/s[1)] |
| • 7ME6820 | Cut-off at 15 mm/s[1)] |
| Empty pipe detection | Symbolized in display |
| Data logger | Logging of 26 records: selectable as daily, weekly or monthly logging |
| **Alarm** | Active alarm is indicated on the display. |
| **Data protection** | All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hours. |
| | Password protection of all parameters and hardware protection of calibration and revenue parameters. |
| **Battery power management** | Optimal battery information on remaining capacity. |
| | Calculated capacity includes all consuming elements and available battery capacity is adjusted related to change in ambient temperature. |
| | Numbers of power-ups |
| | Date and time registered for first and last time power alarm. |
| **Diagnostic** | |
| Continuous self test including | Coil current to drive the magnetic field |
| | Signal input circuit |
| | Data calculation, handling and storing |
| Alarm statistics and logging for fault analyzing | Electrode impedance to check actual media contact |
| | Flow simulation to check pulse and communication signal chain for correct scaling |
| | Number of sensor measurements (excitations) |
| | Transmitter temperature (battery capacity calculation) |
| | Low impedance alarm for change in media |
| | Flow alarm when defined high flow exceeds |
| | Verification mode for fast measure performance check |
| **Insulation test** | Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min. |
| **Leakage detection** (only Advanced version) | Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min. and max. values are stored with date registration. Last store value visible on the display. |
| **Meter Utilization** (only Advanced version) | 6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of $Q_n$ (Q3). |

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## Technical specifications (continued)

| Features | |
|---|---|
| **Tariff** (only Advanced version) | 6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination.<br>Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates.<br>Tariff values visible on the display. |
| **Settling date** (only Advanced version) | On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values.<br>Settling values visible on the display. |
| **Statistic** (only Advanced version) | Min. flow rate with time and date registration<br>Max. flow rate with time and date registration<br>Min. daily consumption with date registration<br>Max. daily consumption with date registration<br>Latest 7 days total and daily consumption<br>Actual month consumption<br>Latest month consumption |
| **PC Configuration Software PDM** | • Meter configuration – online and offline mode<br>• Own parameter settings<br>• Parameter documentation |
| **PC Configuration Software PDM** | • Print and export of data and parameters<br>PDM 9.0/9.1 Service Pack 1 |

1) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.

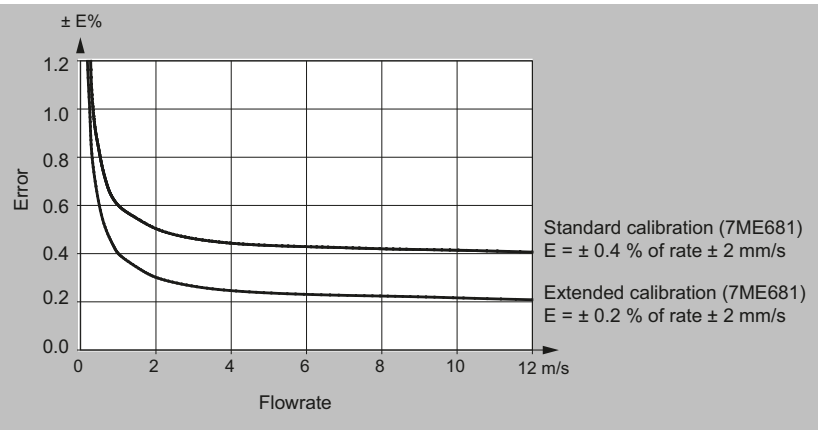
### *MAG 8000 water meter uncertainty*

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

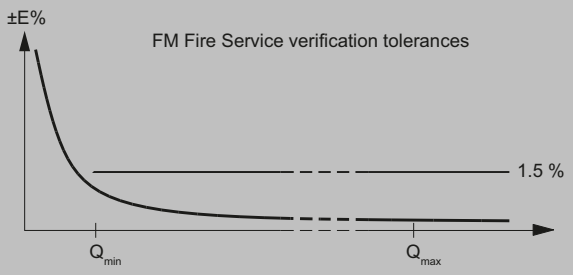
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m³/h to 10 000 m³/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

The selected calibration determines the accuracy of the meter. A standard calibration results in max. ±0.4% uncertainty and an extended calibration ±0.2%. A calibration certificate follows every sensor and calibration data are stored in the meter unit.




### *MAG 8000 (7ME6810) for Fire Service applications*

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



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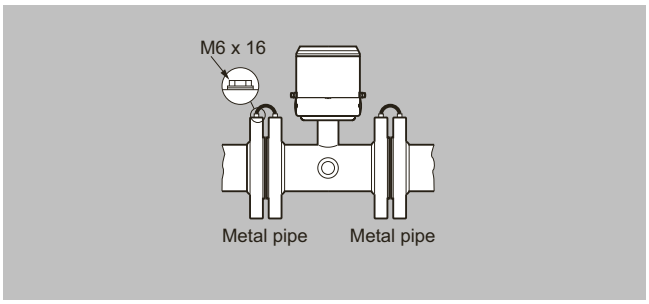
## Technical specifications (continued)

***Grounding***

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.

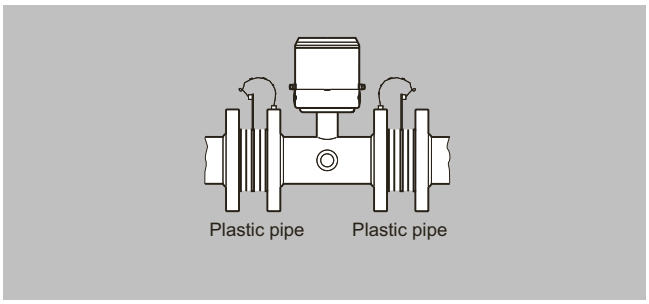
Metal pipes

On metal pipes, connect the straps to both flanges.



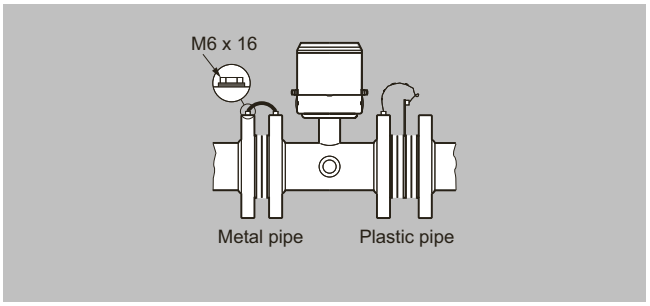

Plastic pipes

On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends.Grounding rings has to be ordered separately see “grounding ring kit”.




Combination of metal and plastic pipes

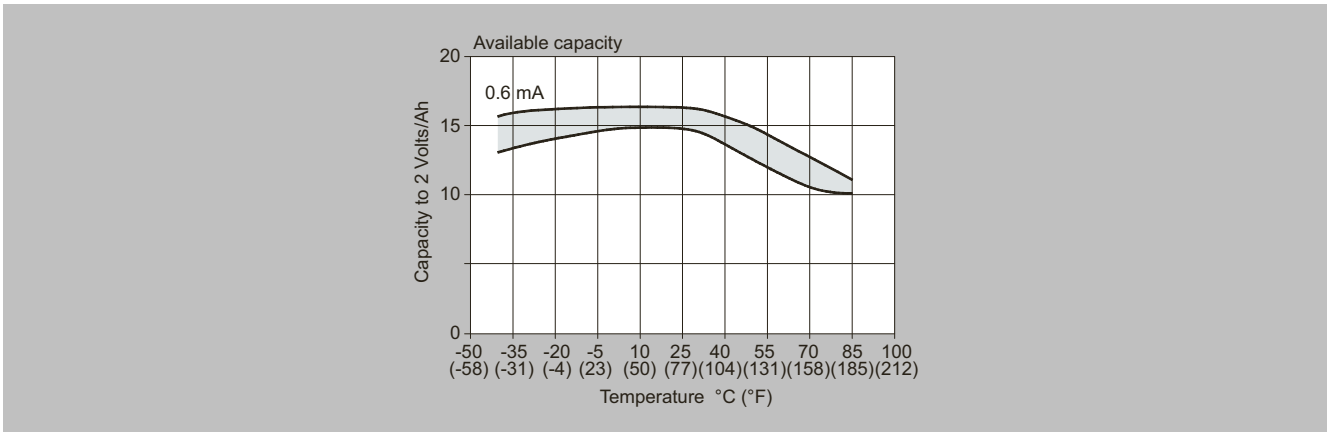
A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.




***Battery operation time and calculation***

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity.




The graphic shows the effect from other temperatures. A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17% in the table from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table below.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

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## Technical specifications (continued)

| Scenario - Revenue application | |
|---|---|
| Output A | Pulse rate max. 10 Hz |
| Output B | Alarm or call-up |
| Meter dialog | 1 hour per month |
| Add-com | None |
| Temperature profile | • 5% at 0 °C (32 °F)<br>• 80% at 15 °C (59 °F)<br>• 15% at 50 °C (122 °F) |

***Battery lifetime (subject to the assumptions mentioned above)***

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)

| Excitation frequency (24 h operation) | | 1/60 Hz | 1/30 Hz | 1/15 Hz | 1/5 Hz | 1.5625 Hz | 3.125 Hz | 6.25 Hz |
|---|---|---|---|---|---|---|---|---|
| **2 D-Cell battery 33 Ah Internal battery pack** | DN 25 ... 150 (1" ... 6") | 9 years | 9 years | 7 years | 43 months | 8 months | 3 months | 2 months |
| | DN 200 ... 600 (8" ... 24") | 9 years | 6 years | 4 years | 22 months | 3 months | 1 month | N/A |
| | DN 700 ... 1200 (28" ... 48") | 7 years | 4 years | 2 years | 12 months | 1 months | N/A | N/A |
| **4 D-Cell battery 66 Ah External battery pack** | DN 25 ... 150 (1" ... 68") | 15 years | 15 years | 14 years | 86 months | 16 months | 7 months | 4 months |
| | DN 200 ... 600 (8" ... 24") | 15 years | 13 years | 8 years | 44 months | 7 months | 3 months | N/A |
| | DN 700 ... 1200 (28" ... 48") | 14 years | 9 years | 5 years | 24 months | 3 months | N/A | N/A |

Typical battery lifetime scenario for MAG 8000 with 3G or IIoT Wireless Communication Module

| Transmission once a day and MAG 8000 factory settings | |
|---|---|
| 2 D-Cell battery 33 Ah Internal battery pack | 3 ... 4 years |
| 4 D-Cell battery 66 Ah External battery pack | 7 ... 8 years |

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories)

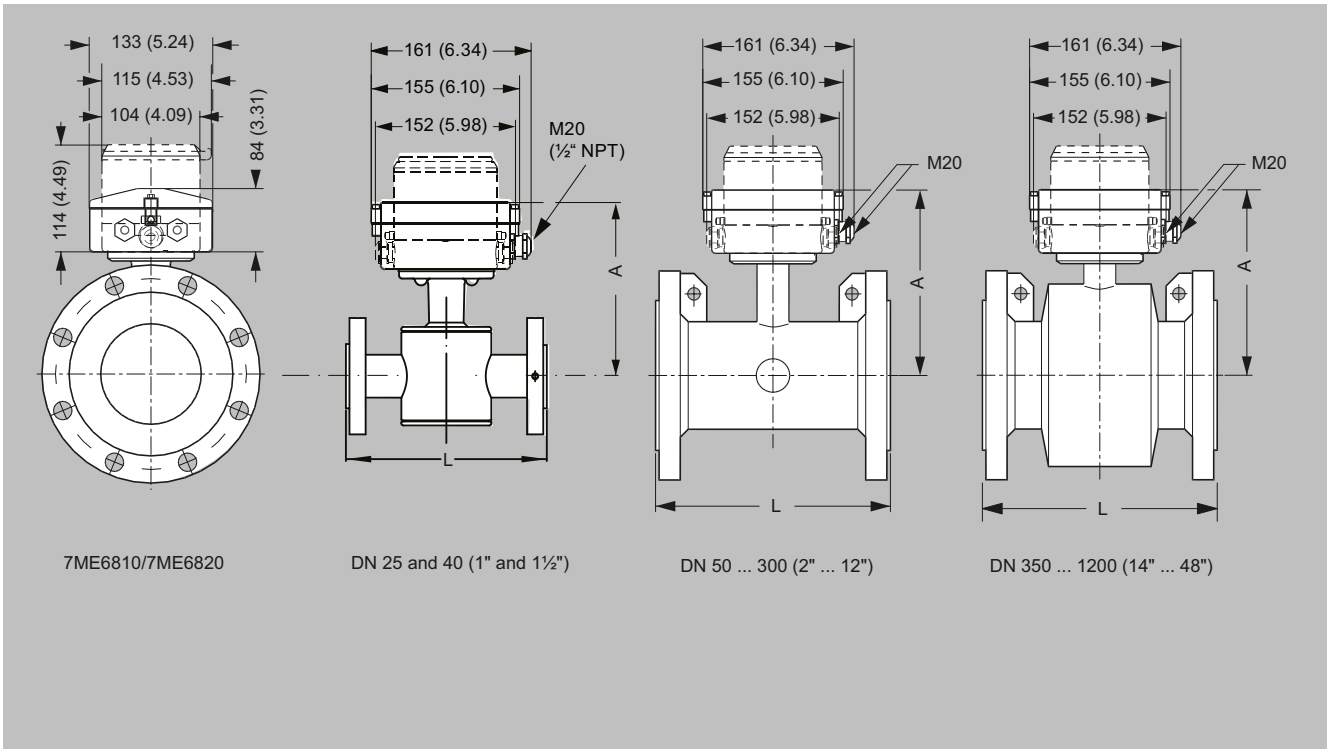
Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

- RS 232:
  - Switched on constantly:
    6.4 months for 2 D-cell internal battery pack / 12.8 months for 4 D-cell ext. battery pack
  - Switched on 2 s/day:
    39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack
- RS 485:
  - With the termination resistor on:
    2.3 months for 2 D-cell internal battery pack / 4.6 months for 4 D-cell ext. battery pack
  - With the termination resistor off:
    39 months for 2 D-cell internal battery pack / 78 months for 4 D-cell ext. battery pack, in case the entire communication time is less than 4 hours/day

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## Dimensional drawings




Dimensions in mm (inch)

| Nominal DN size | A | L, lengths[1] | | | | | | | Weight[2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | EPDM (7ME6810 and 7ME6820) | EN 1092-1 PN 10 | EN 1092-1 PN 16/PN 1-6 non-PED | EN 1092-1 PN 40 | ANSI 16.5 Class 150 | AS 4087 PN 16 | AWA C-207 Class D | AS 2129 | | |
| mm (inch) | mm (inch) | mm | mm | mm | inch | mm | mm | mm | kg | lb |
| 25 (1) | 188 (7.4) | - | - | 200 | 7.9 | 200 | - | 200 | 6 | 13 |
| 40 (1½) | 203 (8.0) | - | - | 200 | 7.9 | 200 | - | 200 | 9 | 20 |
| 50 (2) | 178 (7.0) | - | 200 | - | 7.9 | 200 | - | - | 11 | 25 |
| 65 (2½) | 181 (7.1) | - | 200 | - | 7.9 | 200 | - | - | 13 | 29 |
| 80 (3) | 191 (7.5) | - | 200 | - | 7.9 | 200 | - | - | 15 | 34 |
| 100 (4) | 197 (7.8) | - | 250 | - | 9.8 | 250 | - | - | 17 | 38 |
| 125 (5) | 210 (8.3) | - | 250 | - | 9.8 | 250 | - | 250 | 22 | 50 |
| 150 (6) | 224 (8.8) | - | 300 | - | 11.8 | 300 | - | - | 28 | 63 |
| 200 (8) | 249 (9.8) | 350 | 350 | - | 13.8 | 350 | - | - | 50 | 113 |
| 250 (10) | 276 (10.9) | 450 | 450 | - | 17.7 | 450 | - | - | 71 | 160 |
| 300 (12) | 303 (11.9) | 500 | 500 | - | 19.7 | 500 | - | - | 88 | 198 |
| 350 (14) | 365 (14.4) | 550 | 550 | - | 21.7 | 550 | - | - | 127 | 279 |
| 400 (16) | 391 (15.4) | 600 | 600 | - | 23.6 | 600 | - | - | 145 | 318 |
| 450 (18) | 421 (16.6) | 600 | 600 | - | 23.6 | 600 | - | - | 175 | 384 |
| 500 (20) | 447 (17.6) | 600 | 600 | - | 23.6 | 600 | - | - | 225 | 494 |
| 600 (24) | 497 (19.6) | 600 | 600 | - | 23.6 | 600 | - | - | 340 | 747 |
| 700 (28) | 548 (21.6) | 700 | 875/700 | - | N/A | 700 | 700 | - | 316 | 694 |
| 750 (30) | 573 (22.6) | N/A | N/A | - | N/A | N/A | 750 | - | N/A | N/A |
| 800 (32) | 603 (23.7) | 800 | 1000/800 | - | N/A | 800 | 800 | - | 398 | 1045 |
| 900 (36) | 656 (25.8) | 900 | 1125/900 | - | N/A | 900 | 900 | - | 476 | 1045 |
| 1000 (40) | 708 (27.9) | 1000 | 1250/1000 | - | N/A | 1000 | 1000 | - | 602 | 1322 |
| 1050 (42) | 708 (27.9) | N/A | N/A | - | N/A | N/A | 1050 | - | N/A | N/A |
| 1100 (44) | 759 (29.9) | N/A | N/A | - | N/A | N/A | 1100 | - | N/A | N/A |
| 1200 (48) | 814 (32.0) | 1200 | 1500/1200 | - | N/A | 1200 | 1200 | - | 887 | 1996 |

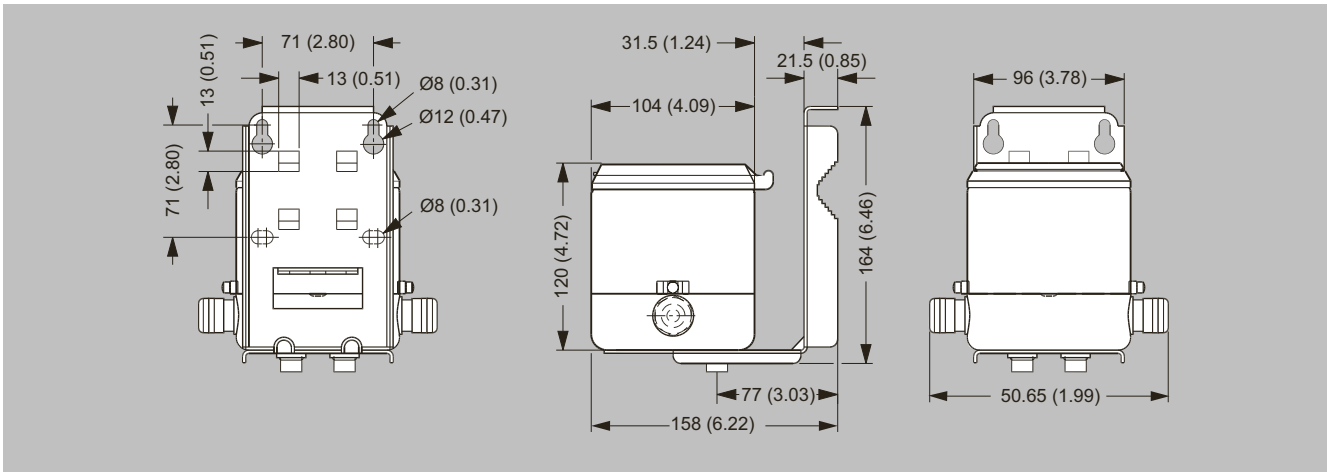
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## Dimensional drawings (continued)

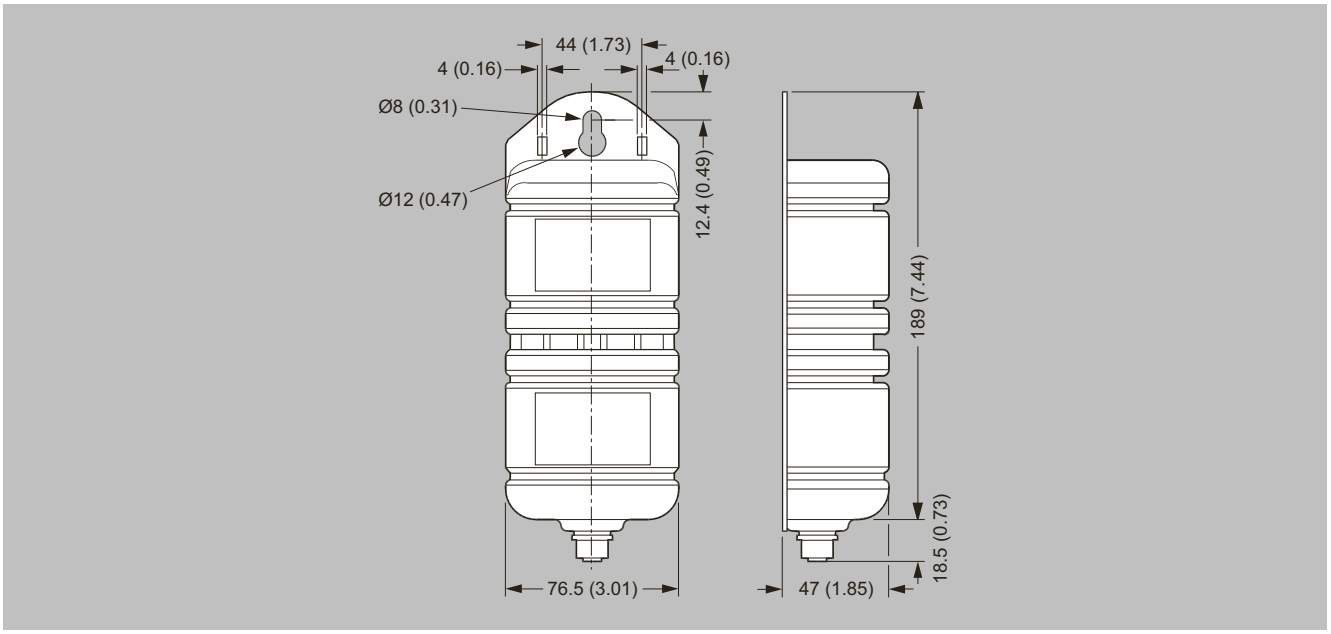
1) Tolerances on built-in length: DN 15 to DN 200 (½" to 8"): +0/-3 mm (+0/-0.12"), DN 250 to DN 400 (10" to 16"): +0/-5 mm (+0/-0.20"), DN 450 to DN 600 (18" to 24"): +5/-5 mm (+0.20/-0.20"), DN 700 to DN 1200 (28" to 48"): +10/-10 mm (+0.39/-0.39").
2) For remote version the sensor weight is reduced with 2 kg (4.5 lbs).

Remote version




Dimensions in mm (inch), weight 3.5 kg (8 lbs)

External battery pack




Dimensions in mm (inch), weight 2.0 kg (4.5 lbs)

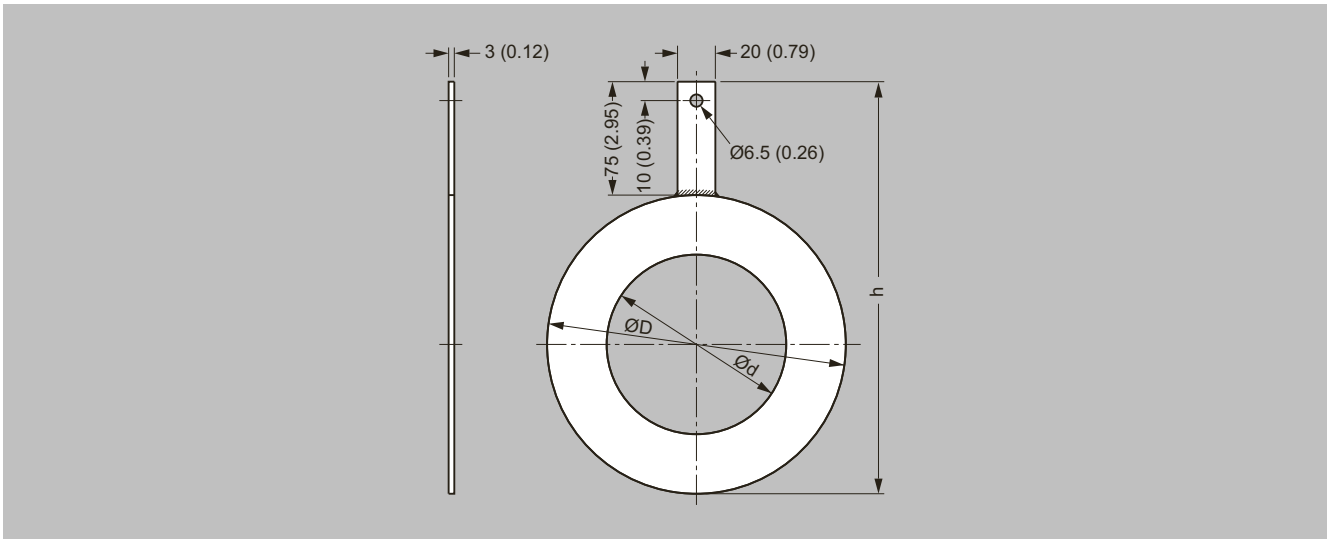
Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

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## Dimensional drawings (continued)

Grounding rings




Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

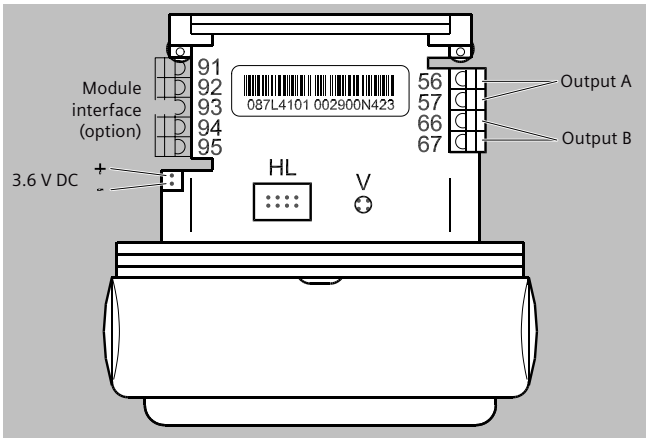
| Dimension | Internal diameter (d) | Outside diameter (D) | h |
|---|---|---|---|
| DN 25 | 27 | 68 | 143 |
| DN 40 | 38 | 88 | 163 |
| DN 50 | 52 | 100 | 175 |
| DN 65 | 64 | 120 | 195 |
| DN 80 | 79 | 133 | 208 |
| DN 100 | 95 | 158 | 233 |
| DN 125 | 115 | 188 | 263 |
| DN 150 | 145 | 216 | 291 |
| DN 200 | 193 | 268 | 343 |
| DN 250 | 246 | 324 | 399 |
| DN 300 | 295 | 374 | 449 |

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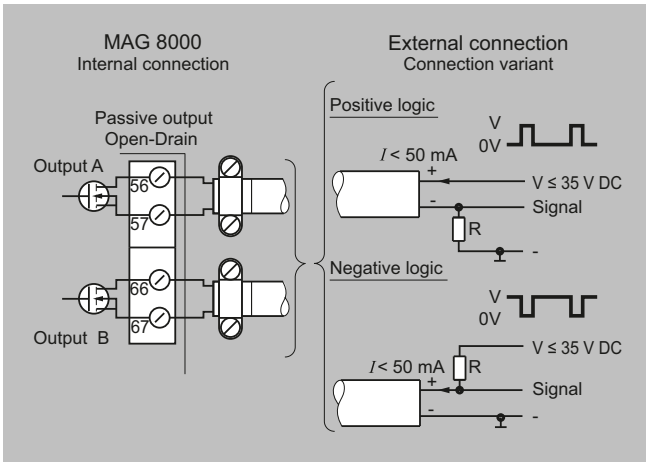
## Circuit diagrams

Electrical installation and pulse output – Connection diagram




HL = Hardware lock key connection
V = Push button for verification mode

Pulse wire connection




The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic. R = pull up/down is selected in relation to the Vx power supply and with a max. current I of 50 mA.

Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).

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## Overview



SITRANS FM MAG 8000 for abstraction and distribution network application

## Benefits

***Easy to install***

- Compact or remote solution with factory mounted cable
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

***Long-term stability/Low cost of ownership***

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfill various customer requirements for high cost efficiency
- Up to 0.2% maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

***Intelligent information, easy to access***

- Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance 3G/UMTS module offers an efficient solution for remote measurement and monitor via wireless networks

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## Selection and ordering data

| SITRANS FM MAG 8000 water meter | Article No. 7ME6810- ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Diameter** | |
| DN 25 (1“) | 2 D |
| DN 40 (1½“) | 2 R |
| DN 50 (2“) | 2 Y |
| DN 65 (2½“) | 3 F |
| DN 80 (3“) | 3 M |
| DN 100 (4“) | 3 T |
| DN 125 (5“) | 4 B |
| DN 150 (6“) | 4 H |
| DN 200 (8“) | 4 P |
| DN 250 (10“) | 4 V |
| DN 300 (12“) | 5 D |
| DN 350 (14“) | 5 K |
| DN 400 (16“) | 5 R |
| DN 450 (18“) | 5 Y |
| DN 500 (20“) | 6 F |
| DN 600 (24“) | 6 P |
| DN 700 (28“)[1)] | 6 Y |
| DN 750 (30“)[1)] | 7 D |
| DN 800 (32“)[1)] | 7 H |
| DN 900 (36“)[1)] | 7 M |
| DN 1000 (40“)[1)] | 7 R |
| DN 1050 (42“)[1)] | 7 U |
| DN 1100 (44“)[1)] | 7 V |
| DN 1200 (48“)[1)] | 8 B |
| **Flange norm and pressure rating** | |
| EN 1092-1, PN 10 (DN 200 ... 1200 (8“ ... 48“)) | B |
| EN 1092-1, PN 16 (DN 50 ... 1200 (2“ ... 48“)) | C |
| EN 1092-1, PN 16, non-PED (DN 700 ... 1200 (28“ ... 48“)) | D |
| EN 1092-1, PN 25 (DN 350 ... 600 (12" ... 24")) | E |
| EN 1092-1, PN 40 (DN 25 ... 50 (1“ ... 1½“), DN 350 ... 600 (12" ... 24")) | F |
| ANSI B16.5, Class 150 | J |
| AWWA C-207, Class D (28“ ... 48“) | L |
| AS 4087, PN 16 (DN 50 ... 1200 (2" ... 48")) | N |
| **Sensor version** | |
| EPDM liner and Hastelloy electrodes, corrosion-resistant coating of category C4 | 3 |
| EPDM liner and Hastelloy electrodes, 300 µm corrosion-resistant coating of category C5 | 4 |
| **Calibration** | |
| Standard ±0.4% of rate ±2 mm/s | 1 |
| Extended ±0.2% of rate ±2 mm/s DN 50 ... 300 (2" ... 12") | 2 |
| NMI M 10 (2.5%) without verification | 3 |
| **Region version** | |
| Europe ($m^3$, $m^3/h$, 50 Hz) | 1 |
| USA (Gallon, GPM, 60 Hz) | 2 |
| Australia (Ml, Ml/d, 50 Hz) | 3 |
| **Transmitter type and installation** | |
| Basic version integral on sensor | A |
| Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs: | |
| • 5 m (16.4 ft) | B |
| • 10 m (32.8 ft) | C |
| • 20 m (65.6 ft) | D |
| • 30 m (98.4 ft) | E |
| Advanced version integral on sensor | K |
| Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs: | |

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## Selection and ordering data (continued)

| SITRANS FM MAG 8000 water meter | Article No. 7ME6810- ● ● ● ● ● - ● ● ● ● |
|---|---|
| • 5 m (16.4 ft) | L |
| • 10 m (32.8 ft) | M |
| • 20 m (65.6 ft) | N |
| • 30 m (98.4 ft) | P |
| **Communication interface** | |
| No additional "add-on" communication module installed | A |
| Serial RS 485 with Modbus RTU (terminated as end device) | B |
| Serial RS 232 with Modbus RTU | C |
| Encoder interface with Sensus protocol | D |
| IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft)[2] | L |
| IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) and connection cable 2.5 m (8.2 ft) for analog inputs[2] | N |
| 3G/UMTS communication module with remote antenna; 5 m (16.4 ft)[2] | S |
| 3G/UMTS communication module with remote antenna cable 5 m (16.4 ft) and analog input cable 2.5 m (8.2 ft)[2] | T |
| **Power supply** | |
| Internal battery (battery not included) | 0 |
| Internal battery pack installed[2] | 1 |
| Power cable 1.5 m (4.9 ft) with IP68/NEMA 6P plugs for external battery (no battery included) | 2 |
| 12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) | 3 |
| 115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) | 4 |
| External battery (battery included) and 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs[2] | 5 |
| 12/24 V AC/DC power supply with backup battery included and 3 m (9.8 ft) power cable for external connection[2] | 6 |
| 115 ... 230 V AC power supply with backup battery included and 3 m (9.8 ft) power cable for external connection[2] | 7 |
| 115 ... 230 V AC power supply with 3 m (9.8 ft) power cable for external connection, with external battery included) and 1.5 m (4.9 ft) power cable with IP68/NEMA 6P plugs[2] | 8 |

1) The diameter DN 700 (28") to DN 1200 (48") is only available as remote transmitter type installation.
2) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

| | Order code |
|---|---|
| **Options** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificate** | |
| Inspection certificate 3.1 (EN 10204) - pressure test | **C01** |
| Material certificate according to EN 10204-3.1[1] | **C12** |
| **Special calibration** | |
| 5-point calibration for DN 25 ... 200[2] | **D01** |
| 5-point calibration for DN 250 ... 600[2] | **D02** |
| 5-point calibration for DN 700 ... 1200[2] | **D03** |
| 10-point calibration for DN 25 ... 200[3] | **D06** |
| 10-point calibration for DN 250 ... 600[3] | **D07** |
| 10-point calibration for DN 700 ... 1200[3] | **D08** |
| Default (2 × 25% and 2 × 90%) match-pair calibration for DN 25 ... 200 | **D11** |
| Default (2 × 25% and 2 × 90%) match-pair calibration for DN 250 ... 600 | **D12** |
| Default (2 × 25% and 2 × 90%) match-pair calibration for DN 700 ... 1200 | **D13** |
| 5-point, matched-pair calibration for DN 25 ... 200[2] | **D15** |
| 5-point, matched-pair calibration for DN 250 ... 600[2] | **D16** |
| 5-point, matched-pair calibration for DN 700 ... 1200[2] | **D17** |
| 10-point, matched-pair calibration for DN 25 ... 200[3] | **D18** |
| 10-point, matched-pair calibration for DN 250 ... 600[3] | **D19** |
| 10-point, matched-pair calibration for DN 700 ... 1200[3] | **D20** |

| | Order code |
|---|---|
| **Flow unit** | |
| l/s | **L00** |
| MGD | **L01** |
| CFS | **L02** |
| l/min | **L03** |
| $m^3$/min | **L04** |
| GPM | **L05** |
| CFM | **L06** |
| l/h | **L07** |
| $m^3$/h | **L08** |
| GPH | **L09** |
| CFH | **L10** |
| GPS | **L11** |
| Ml/d | **L12** |
| $m^3$/d | **L13** |
| GPD | **L14** |
| BBL42/s | **L15** |
| BBL42/min | **L16** |
| BBL42/h | **L17** |
| BBL42/d | **L18** |
| **Totalizer** Volume calculation (default totalizer 1= forward and totalizer 2 = reverse) | |
| Totalizer 1 = RV, reverse flow | **L20** |
| Totalizer 1 = NET, net flow | **L22** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| Totalizer 2 = FW, forward flow | **L30** |
| Totalizer 2 = NET, net flow | **L31** |
| **Volume unit** | |
| $m^3$ | **L40** |
| Ml | **L41** |
| G | **L42** |
| AF | **L43** |
| l × 100 | **L44** |
| $m^3$ × 100 | **L45** |
| G × 100 | **L46** |
| CF × 100 | **L47** |
| MG | **L48** |
| G × 1000 | **L49** |
| CF × 1000 | **L50** |
| AI | **L51** |
| kl | **L52** |
| BBL42 (US oil barrel, 1 barrel = 42 US gallons) | **L54** |
| Volume unit = AF, amount per pulse A = 1 US Gallon[5)] | **L55** |
| Volume unit = AI, amount per pulse A = 1 US Gallon[5)] | **L56** |
| Volume unit = CFx100, amount per pulse A = 1 US Gallon[5)] | **L57** |
| Volume unit = BBL42, amount per pulse A = 1 US Gallon[5)] | **L58** |
| **Pulse set up** (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms) | |
| A function = RV, reverse flow | **L62** |
| A function = FWnet, forward net flow | **L63** |
| A function = RVnet, reverse net flow | **L64** |
| A function = Off | **L65** |
| Volume per pulse A = × 0.0001[4)] | **L70** |
| Volume per pulse A = × 0.001[4)] | **L71** |
| Volume per pulse A = × 0.01[4)] | **L72** |
| Volume per pulse A = × 0.1[4)] | **L73** |
| Volume per pulse A = × 1[4)] | **L74** |
| Pulse A pulse width 5 ms (volume per pulse × 1) | **L75** |
| Pulse A pulse width 10 ms (volume per pulse × 1) | **L76** |
| Pulse A pulse width 50 ms (volume per pulse × 1) | **L77** |
| Pulse A pulse width 100 ms (volume per pulse × 1) | **L78** |
| Pulse A pulse width 500 ms (volume per pulse × 1) | **L79** |
| B function = FW, forward flow | **L80** |
| B function = RV, verse flow | **L81** |
| B function = FWnet, forward net flow | **L82** |
| B function = RVnet, reverse net flow | **L83** |
| B function = Alarm | **L84** |
| B function = Call up | **L85** |
| Volume per pulse B = × 0.0001[4)] | **L90** |
| Volume per pulse B = × 0.001[4)] | **L91** |
| Volume per pulse B = × 0.01[4)] | **L92** |
| Volume per pulse B = × 0.1[4)] | **L93** |
| Volume per pulse B = × 1[4)] | **L94** |
| **Device operation** | |
| Only operator menu activated | **M11** |

| | Order code |
|---|---|
| **Data logger set up (default month logging)** | |
| DataloggerInterval = Daily | **M31** |
| DataloggerInterval = Weekly | **M32** |
| **Region specific settings** | |
| Low flow cut off = 5 mm/s[6)] | **M50** |
| **Factory mounted cables** | |
| 4.8 m (15.75 ft) pulse cable A+B | **M81** |
| 4.8 m (15.75 ft) communication cable RS 232/RS 485 terminated as end device | **M82** |
| Fixed cable/COM cable, 2 × 4.8 m, connected at A and B and COM 2 × 2 × 2-wire twisted. Marking on Modbus cable | **M83** |
| 20 m (65.6 ft) pulse cable A+B | **M84** |
| 20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device | **M85** |
| Fixed cable/COM cable, 2 × 20 m, connected at A and B and COM 2 × 2 × 2-wire twisted. Marking on Modbus cable | **M86** |
| Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector | **M87** |
| Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors | **M89** |
| Encoder interface cable with connector for ITRON 200WP radio, length 25 ft | **M90** |
| Encoder interface cable with connector for ITRON 200WP radio, length 5 ft | **M91** |
| SOFREL cable 2 m for LS42 data logger | **M92** |
| Adaptors for conduit installation | **M94** |
| SOFREL cable 2 m for LS-Flow data logger | **M97** |
| **FM Fire Service Approval** (with ANSI B16.5 Class 150 flanges) | |
| DN 50, DN 80, DN 100 (2", 3", 4") | **P20** |
| DN 150, DN 200 (6", 8") | **P21** |
| DN 250, DN 300 (10", 12") | **P22** |
| **Region/customer specific labels** | |
| KCC label (South Korea) | **W28** |
| DIN 43863 label[1)] | **H21** |
| DIN 43863 label with SWM mark[1)] | **H22** |
| ADDC label | **H23** |
| **Country of origin** | |
| France | **F55** |

1) Under preparation.
2) 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$
3) Ascending and descending at 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$
4) Pulse width = 10 ms
5) Pulse width = 5 ms
6) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.

### *Operating instructions for SITRANS FM MAG 8000*

| Description | Article No. |
|---|---|
| • English | **A5E03071515** |
| • German | **A5E00740986** |

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## Selection and ordering data (continued)

***Operating instructions for MAG 8000 3G/UMTS communication module***

| Description | Article No. |
|---|---|
| • English | A5E03644134 |

## Technical specifications

| MAG 8000 for abstraction and distribution network application (7ME6810) | |
|---|---|
| **Accuracy** | Standard calibration: ±0.4% ±2 mm/s |
| | Extended calibration DN 50 ... 300 (2" ... 12"): ± 0.2% of rate ±2 mm/s[5] |
| **Low flow cut-off (default)** | 15 mm/s |
| **Media conductivity** | Clean water > 20 µs/cm |
| **Temperature** | |
| Ambient | -20 ... +60 °C (-4 ... +140 °F) |
| Media | 0 ... 70 °C (32 ... 158 °F) |
| Storage | -40 ... +70 °C (-40 ... +158 °F) |
| **Enclosure rating** | |
| Remote sensor | IP68 to EN 60529/NEMA 6P, 10 m$H_2O$ continuously |
| Compact version | IP68 to EN 60529/NEMA 6P, 3 m$H_2O$ for six months |
| **Certificates and approvals** | |
| Calibration | |
| • Standard calibration | 2 × 25% and 2 × 90% (default) |
| • Special calibration | 5-point calibration: 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$<br>10-point calibration: ascending and descending at 20%, 40%, 60%, 80%, 100% of factory $Q_{max}$<br>Matched-pair calibration: default, 5-point, 10-point |
| Material certificate EN 10204-3.1 | Available when ordering together with meter[1] |
| Drinking water approvals | • NSF/ANSI Standard 61[2] (cold water) USA |
| | • WRAS (BS 6920 cold water) UK |
| | • ACS Listed France |
| | • DVGW W270 Germany |
| | • Belgaqua (B) |
| | • MCERTS (GB) |
| | • AS/NZS4020 (Australia/New Zealand) up to 70°C water temperature |
| Fire Service Approvals | FM Fire Service Meter (Class Number 1044)[3] |
| Conformity | • PED: 2014/68/EU[4] |
| | • EMC: IEC/EN 61326 |
| **Sensor version** | Coned sensor (octagon liner): DN 25 and 40 (½" ... 1½") |
| | Coned sensor: DN 50 ... 300 (2" ... 12") |
| | Full bore sensor: DN 350 ... 1200 (14" ... 48") |
| **Sensor material** | |
| • Housing and flanges | DN 25 ... 1200 (2" ... 48"): Carbon steel ASTM A 105 with corrosion-resistant coating of category C4 or C5 according to ISO 12944-2 |
| • Measuring pipe | DN 350 ... 1200 (14" ... 48"): Stainless steel AISI 304/1.4301 |
| **Measuring principle** | Electromagnetic induction |
| **Excitation frequency** | |
| Basic version | |
| | DN 25 ... 150 (1" ... 6"): 1/15 Hz |

## Technical specifications (continued)

| MAG 8000 for abstraction and distribution network application (7ME6810) | |
|---|---|
| • Battery-powered | DN 200 ... 600 (8" ... 24"): 1/30 Hz |
| | DN 700 ... 1200 (28" ... 48"): 1/60 Hz |
| • Mains-powered | DN 25 ... 150 (1" ... 6"): 6.25 Hz |
| | DN 200 ... 600 (8" ... 24"): 3.125 Hz |
| | DN 700 ... 1200 (28" ... 48"): 1.5625 Hz |
| Advanced version | |
| • Battery-powered | DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) |
| | DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) |
| | DN 700 ... 1200 (28" ... 48"): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime) |
| • Mains-powered | DN 25 ... 150 (1" ... 6"): 6.25 Hz |
| | DN 200 ... 600 (8" ... 24"): 3.125 Hz |
| | DN 700 ... 1200 (28" ... 48"): 1.5625 Hz |
| **Flanges** | |
| EN 1092-1 (DIN 2501) | PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face<br>PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face[6]<br>PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face[6]<br>PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face<br>PN 40 (580 psi): DN 25 and 40 (½" ... 1½") Flat face |
| ANSI 16.5 | Class 150 (20 bar (290 psi)): 1" ... 12" Flat face<br>Class 150 (20 bar (290 psi)): 14" ... 24" Raised face |
| AWWA C-207 | PN 10 (145 psi): 28" ... 48" Flat face |
| AS 4087 | PN 16 (232 psi): DN 50 ... DN 300 (2" ... 12") Flat face<br>PN 16 (232 psi): DN 350 ... DN 1200 (14" ... 48") Raised face |
| **Liner** | EPDM |
| **Electrode and grounding electrodes** | Hastelloy C276/2.4819 |
| **Grounding straps** | Grounding straps are premounted from the factory on each side of the sensor. |

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
2) Including Annex G.
3) Not for sensors with 300 µm coating.
4) For further information on PED standard and requirements see the section about Pressure Equipment Directive.
5) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.
6) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF).

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## Overview



SITRANS FM MAG 8000 CT, compact version

## Benefits

***Approvals***

- MI-001, OIML R 49/OIML R 49 MAA
- FM Fire Service

***Easy to install***

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

***Long-term stability/Low cost of ownership***

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfill various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

***Intelligent information, easy to access***

- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

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## Selection and ordering data

| SITRANS FM MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes | Article No. 7ME6820- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Diameter** | | | | | | | | | | |
| DN 50 (2") | 2 | Y | | | | | | | | |
| DN 65 (2½") | 3 | F | | | | | | | | |
| DN 80 (3") | 3 | M | | | | | | | | |
| DN 100 (4") | 3 | T | | | | | | | | |
| DN 125 (5") | 4 | B | | | | | | | | |
| DN 150 (6") | 4 | H | | | | | | | | |
| DN 200 (8") | 4 | P | | | | | | | | |
| DN 250 (10") | 4 | V | | | | | | | | |
| DN 300 (12") | 5 | D | | | | | | | | |
| DN 350 (14") | 5 | K | | | | | | | | |
| DN 400 (16") | 5 | R | | | | | | | | |
| DN 450 (18") | 5 | Y | | | | | | | | |
| DN 500 (20") | 6 | F | | | | | | | | |
| DN 600 (24") | 6 | P | | | | | | | | |
| **Flange norm and pressure rating** | | | | | | | | | | |
| EN 1092-1, PN 10 | | | B | | | | | | | |
| EN 1092-1, PN 16 | | | C | | | | | | | |
| ANSI B16.5, Class 150 | | | J | | | | | | | |
| AS 4087, PN 16 | | | N | | | | | | | |
| **Sensor version** | | | | | | | | | | |
| EPDM liner and Hastelloy electrodes, corrosion-resistant coating of category C4 | | | | 0 | | | | | | |
| EPDM liner and Hastelloy electrodes, 300 µm corrosion-resistant coating of category C5 | | | | 4 | | | | | | |
| **Approval/Verification**[2] | | | | | | | | | | |
| Without verification according to OIML R 49[3] | | | | | 0 | | | | | |
| MI-001 Q3/Q1 = 40 | | | | | 1 | | | | | |
| MI-001 Q3/Q1 = 63 | | | | | 2 | | | | | |
| MI-001 Q3/Q1 = 80 | | | | | 3 | | | | | |
| MI-001 Q3/Q1 = 160 | | | | | 4 | | | | | |
| MI-001 Q3/Q1 = 200 | | | | | 5 | | | | | |
| MI-001 Q3/Q1 = 250 | | | | | 6 | | | | | |
| MI-001 Q3/Q1 = 100 | | | | | 7 | | | | | |
| Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 250) | | | | | 8 | | | | | |
| **Region version** | | | | | | | | | | |
| Europe ($m^3$, $m^3/h$, 50 Hz) | | | | | | | 1 | | | |
| USA ($m^3$, $m^3/h$, 60 Hz) | | | | | | | 2 | | | |
| **Transmitter type and installation** | | | | | | | | | | |
| Basic version integral on sensor | | | | | | | | A | | |
| Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs | | | | | | | | | | |
| • 5 m (16.4 ft) | | | | | | | | B | | |
| • 10 m (32.8 ft) | | | | | | | | C | | |
| • 20 m (65.6 ft) | | | | | | | | D | | |
| • 30 m (98.4 ft) | | | | | | | | E | | |
| Advanced version integral on sensor | | | | | | | | K | | |
| Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs | | | | | | | | | | |
| • 5 m (16.4 ft) | | | | | | | | L | | |
| • 10 m (32.8 ft) | | | | | | | | M | | |
| • 20 m (65.6 ft) | | | | | | | | N | | |
| • 30 m (98.4 ft) | | | | | | | | P | | |
| **Communication interface** | | | | | | | | | | |
| No additional "add-on" communication module installed | | | | | | | | | A | |
| Serial RS 485 with Modbus RTU (Terminated as end device) | | | | | | | | | B | |
| Serial RS 232 with Modbus RTU | | | | | | | | | C | |
| Encoder interface for ITRON 200WP radio with "Sensus" protocol" | | | | | | | | | D | |
| IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft)[1] | | | | | | | | | L | |

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## Selection and ordering data (continued)

| SITRANS FM MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes | Article No. 7ME6820- ● ● ● ● ● - ● ● ● ● |
|---|---|
| IIoT Wireless Communication Module with remote antenna including cable 5 m (16.4 ft) and connection cable 2.5 m (8.2 ft) for analog inputs[1] | N |
| 3G/UMTS communication module with remote antenna; cable 5 m (16.4 ft)[1] | S |
| 3G/UMTS communication module with analog inputs and remote antenna; cable 5 m (16.4 ft)[1] | T |
| **Power supply** | |
| Internal battery (battery not included) | 0 |
| Internal battery pack installed[1] | 1 |
| Power cable 1.5 m (4.9 ft) with IP68/NEMA 6P plugs for external battery (battery not included) | 2 |
| 12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (battery not included) | 3 |
| 115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (battery not included) | 4 |

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
2) For more details and references of the ranges please see the tables on the previous pages.
3) Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.

| | Order code |
|---|---|
| **Options** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificate** | |
| Inspection certificate 3.1 (EN 10204) - pressure test | **C01** |
| Material certificate according to EN 10204-3.1[1] | **C12** |
| **Totalizer** Volume calculation (default totalizer 1= forward and totalizer 2 = reverse) | |
| Totalizer 1 = RV, reverse flow | **L20** |
| Totalizer 1 = NET, net flow | **L22** |
| Totalizer 2 = FW, forward flow | **L30** |
| Totalizer 2 = NET, net flow | **L31** |
| **Pulse set up** (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms) | |
| A function = RV, reverse flow | **L62** |
| A function = FWnet, forward net flow | **L63** |
| A function = RVnet, reverse net flow | **L64** |
| A function = Off | **L65** |
| Volume per pulse A = × 0.001[2] | **L71** |
| Volume per pulse A = × 0.01[2] | **L72** |
| Volume per pulse A = × 0.1[2] | **L73** |
| Volume per pulse A = × 1[2] | **L74** |
| B function = FW, forward flow | **L80** |
| B function = RV, reverse flow | **L81** |
| B function = FWnet, forward net flow | **L82** |
| B function = RVnet, reverse net flow | **L83** |
| B function = Alarm | **L84** |
| B function = Call up | **L85** |
| Volume per pulse B = × 0.001[2] | **L91** |
| Volume per pulse B = × 0.01[2] | **L92** |
| Volume per pulse B = × 0.1[2] | **L93** |
| Volume per pulse B = × 1[2] | **L94** |
| **Data logger set up (default month logging)** | |
| DataloggerInterval = Daily | **M31** |
| DataloggerInterval = Weekly | **M32** |

| | Order code |
|---|---|
| **Factory mounted cables** | |
| 4.8 m (15.75 ft) pulse cable A+B | **M81** |
| 4.8 m (15.75 ft) communication cable RS 232/RS 485 terminated as end device | **M82** |
| 20 m (65.6 ft) pulse cable A+B | **M84** |
| 20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device | **M85** |
| Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector | **M87** |
| Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors | **M89** |
| Encoder interface cable with connector for ITRON 200WP radio, length 25 ft (7.6 m) | **M90** |
| Encoder interface cable with connector for ITRON 200WP radio, length 5 ft (1.5 m) | **M91** |
| SOFREL cable 2 m (6.6 ft) for LS42 data logger | **M92** |
| SOFREL cable 2 m (6.6 ft) for LS-Flow data logger | **M97** |
| **FM Fire Service Approval** (with ANSI B16.5 Class 150 flanges) | |
| DN 50, DN 80 and DN 100 (2", 3" and 4") | **P20** |
| DN 150 and DN 200 (6" and 8") | **P21** |
| DN 250 and DN 300 (10" and 12") | **P22** |
| **Customer label** | |
| FP2E marking (France market only) | **C17** |
| FP2E label (France) | **H20** |
| DIN 43863 label[1] | **H21** |
| DIN 43863 label with SWM mark[1] | **H22** |
| ADDC label | **H23** |
| **Region approval and certificate** | |
| KCC label (South Korea) | **W28** |

1) Under preparation.
2) Pulse width = 10 ms.

### *Operating instructions for SITRANS FM MAG 8000*

| Description | Article No. |
|---|---|
| • English | A5E03071515 |
| • German | A5E00740986 |

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## Selection and ordering data (continued)

***Operating instructions for MAG 8000 3G/UMTS communication module***

| Description | Article No. |
|---|---|
| • English | A5E03644134 |

## Technical specifications

| MAG 8000 CT for revenue and bulk metering (7ME6820) | |
|---|---|
| **Accuracy** | OIML R 49/OIML R 49 MAA<br>accuracy class I for DN 50, DN 350 ... 600<br>accuracy class II for DN 50 ... 600 |
| | MI-001 verification for<br>DN 50 ... 600 (2" ... 24"), with Q3/Q1 = 315 |
| | FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") ±1,5% ($Q_{min}$ to $Q_{max}$)[5] |
| **Low flow cut-off (default)** | 15 mm/s |
| **Media conductivity** | Clean water > 20 µs/cm |
| **Temperature** | |
| Ambient | -20 ... +60 °C (-4 ... +140 °F)<br>MI-001: -25 ... +55 °C (-13 ... +131 °F) |
| Media | 0.1 ... 50 °C (32 ... 122 °F) |
| Storage | -40 ... +70 °C (-22 ... +158 °F) |
| **Enclosure rating** | |
| Remote sensor | IP68 to EN 60529/NEMA 6P, 10 m$H_2O$ continuously |
| Compact version | IP68 to EN 60529/NEMA 6P, 3 m$H_2O$ for six months |
| **Certificates and approvals** | |
| Calibration (standard) | 2 × 25% and 2 × 90% |
| Material certificate EN 10204-3.1 | Available when ordering together with meter[1] |
| Drinking water approvals | • NSF/ANSI Standard 61[2] (cold water) USA |
| | • WRAS (BS 6920 cold water) UK |
| | • ACS Listed France |
| | • DVGW W270 Germany |
| | • Belgaqua (B) |
| | • MCERTS (GB) |
| Fire Service approval | FM Fire Service (1044)[3] |
| Custody transfer approval | • OIML R 49 and OIML R 49 MAA approval |
| | • MI-001 approval (DK-0200-MI001-011) |
| Conformity | • CEN EN 14154, ISO 4064 |
| | • PED: 2014/68/EU[4] |
| | For pressure/temperature curves see MAG 3100 |
| | • EMC: IEC/EN 61326 |
| | • CRN (DN 50 ... 1200 (2" ... 48")) |
| **Sensor version** | Coned sensor: DN 50 ... 300 (2" ... 12") |
| | Full bore sensor: DN 350 ... 600 (14" ... 24") |
| **Sensor material** | |
| • Housing and flanges | DN 50 ... 600 (2" ... 24"): Carbon steel ASTM A 105, with corrosion-resistant coating of category C4 or C5 according to ISO 12944-2 |
| • Measuring pipe | DN 350 ... 600 (14" ... 24"): Stainless steel AISI 304/1.4301 |
| **Measuring principle** | Electromagnetic induction |

| MAG 8000 CT for revenue and bulk metering (7ME6820) | |
|---|---|
| **Excitation frequency** | |
| Basic version | |
| • Battery-powered | DN 50 ... 150 (2" ... 6"): 1/15 Hz |
| | DN 200 ... 600 (8" ... 24"): 1/30 Hz |
| • Mains-powered | DN 50 ... 150 (2" ... 6"): 6.25 Hz |
| | DN 200 ... 600 (8" ... 24"): 3.125 Hz |
| Advanced version | |
| • Battery-powered | DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) |
| | DN 200 ... 600 (8" ... 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) |
| • Mains-powered | DN 50 ... 150 (2" ... 6"): 6.25 Hz |
| | DN 200 ... 600 (8" ... 24"): 3.125 Hz |
| **Flanges** | |
| EN 1092-1 (DIN 2501) | PN 10 (145 psi): DN 200 ... 300 (8" ... 12") Flat face<br>PN 10 (145 psi): DN 350 ... 600 (14" ... 24") Raised face[6]<br>PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face[6]<br>PN 16 (232 psi): DN 350 ... 600 (14" ... 24") Raised face<br>PN 40 (580 psi): DN 25 and 40 (½" ... 1½") Flat face |
| ANSI 16.5 | Class 150 (20 bar (290 psi)): 1" ... 12" Flat face<br>Class 150 (20 bar (290 psi)): 14" ... 24" Raised face |
| AS 4087 | PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat Face<br>PN 16 (232 psi): DN 350 ... 600 (14" ... 24") Raised face |
| **Liner** | EPDM |
| **Electrode and grounding electrodes** | Hastelloy C276/2.4819 |
| **Grounding straps** | Grounding straps are premounted from the factory on each side of the sensor. |

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
2) Including Annex G
3) Not for sensors with 300 µm coating.
4) For further information on the PED standard and requirements see the section about Pressure Equipment Directive.
5) Siemens warrants the measurement accuracy down to a flow velocity of 15 mm/s. For a flow velocity below 15 mm/s, we don't warrant the measurement accuracy.
6) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF)

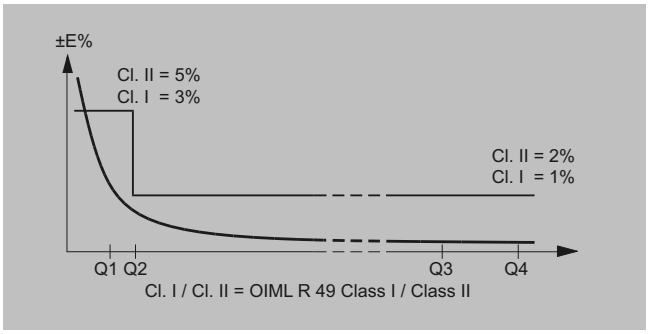
### *MAG 8000 CT (Revenue program) water meter type approval*

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The custody transfer program is approved as Class 1 (DN 50, DN 350 ... 600) and Class 2 (DN 50 ... 600), at different Q3 and Q3/Q1, according to OIML R 49:2013 specification.

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## Technical specifications (continued)




OIML R 49:2013 specification for Class 1[1)]

| 7ME6820 | DN 50 (2") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|
| **R (Q3/Q1)** | **200** | **125** | **125** | **125** | **125** | **125** |
| Q4 [m³/h] | 78.75 | 3125 | 5000 | 5000 | 7875 | 7875 |
| **Q3 [m³/h]** | **63** | **2500** | **4000** | **4000** | **6300** | **6300** |
| Q2 [m³/h] | 0.5 | 32 | 51.2 | 51.2 | 80.64 | 80.64 |
| Q1 [m³/h] | 0.32 | 20 | 32 | 32 | 50.4 | 50.4 |

OIML R 49:2013 specification for Class 2[1)]

| | Horizontal installation | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7ME6820 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
| **R (Q3/Q1)** | **315** | **315** | **315** | **315** | **315** | **315** | **315** | **315** | **315** | **200** | **200** | **200** | **200** | **200** |
| Q4 [m³/h] | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 | 2000 | 3125 | 5000 | 5000 | 7875 | 7875 |
| **Q3 [m³/h]** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **1600** | **2500** | **4000** | **4000** | **6300** | **6300** |
| Q2 [m³/h] | 0.32 | 0.51 | 0.81 | 1.27 | 2.03 | 3.2 | 5.08 | 8.13 | 8.13 | 20 | 32 | 32 | 50.4 | 50.4 |
| Q1 [m³/h] | 0.2 | 0.32 | 0.51 | 0.79 | 1.27 | 2 | 3.18 | 5.08 | 5.08 | 12.5 | 20 | 20 | 31.5 | 31.5 |

[1)] The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

***MAG 8000 CT (Revenue program) MI-001***

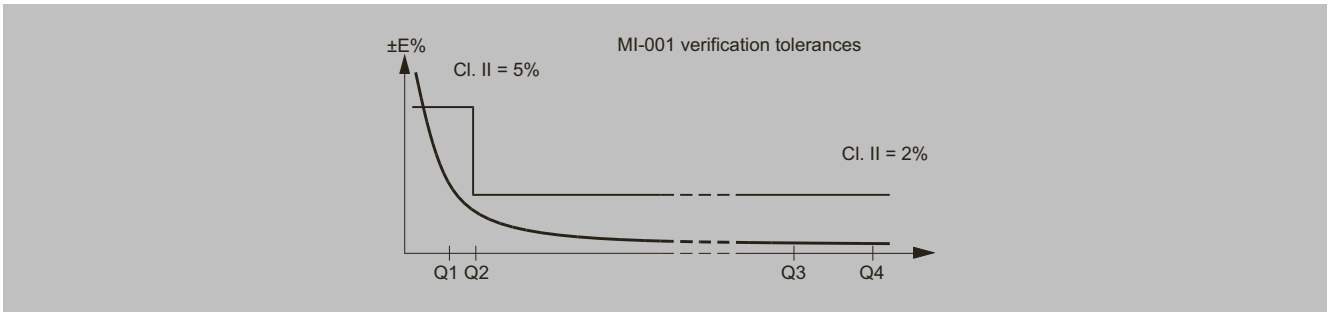
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II approval according to Directive 2014/32/EU of the European Parliament and Council of 26 February, 2014 on measuring instruments, Annex III Water meters (MI-001) in the sizes from DN 50 to DN 600.

The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B: Type approval according to OIML R 49

Module D: Quality insurance approval of production




**MAG 8000 CT MI-001** verified and labeled products at a given Q3 and Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

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## Technical specifications (continued)

| 7ME6820-xxxx1 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | | 3 × DN | | | | |
| Orientation: | All | | | | | | | | | Horizontal | | | | |
| R (Q3/Q1) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| Q4 [m³/h] | 20 | 31.25 | 50 | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 | 787.5 | 1250 | 2000 | 3125 | 5000 |
| **Q3 [m³/h]** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **630** | **1000** | **1600** | **2500** | **4000** |
| Q2 [m³/h] | 0.64 | 1 | 1.6 | 2.52 | 4 | 6.4 | 10 | 16 | 25.2 | 25.2 | 40 | 64 | 100 | 160 |
| Q1 [m³/h] | 0.4 | 0.63 | 1 | 1.58 | 2.5 | 4 | 6.25 | 10 | 15.75 | 15.75 | 25 | 40 | 62.5 | 100 |

| 7ME6820-xxxx2 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | | 3 × DN | | | | |
| Orientation: | All | | | | | | | | | Horizontal | | | | |
| R (Q3/Q1) | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| Q4 [m³/h] | 20 | 31.25 | 50 | 79 | 125 | 200 | 312.5 | 500 | 788 | 1250 | 2000 | 3125 | 5000 | 7875 |
| **Q3 [m³/h]** | **16** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **2500** | **4000** | **6300** |
| Q2 [m³/h] | 0.41 | 0.64 | 1.02 | 1.6 | 2.54 | 4.06 | 6.35 | 10.16 | 16 | 25.4 | 40.63 | 63.49 | 101.59 | 160 |
| Q1 [m³/h] | 0.25 | 0.4 | 0.64 | 1 | 1.59 | 2.54 | 3.97 | 6.35 | 10 | 15.87 | 25.4 | 39.68 | 63.49 | 100 |

| 7ME6820-xxxx3 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | | 3 × DN | | | | |
| Orientation: | All | | | | | | | | | Horizontal | | | | |
| R (Q3/Q1) | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Q4 [m³/h] | 31.25 | 50 | 79 | 125 | 200 | 312.5 | 500 | 788 | 1250 | 2000 | 3125 | 3125 | 5000 | 7875 |
| **Q3 [m³/h]** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **2500** | **2500** | **4000** | **6300** |
| Q2 [m³/h] | 0.5 | 0.8 | 1.26 | 2 | 3.2 | 5 | 8 | 12.6 | 20 | 32 | 50 | 50 | 80 | 126 |
| Q1 [m³/h] | 0.31 | 0.5 | 0.79 | 1.25 | 2 | 3.13 | 5 | 7.88 | 12.5 | 20 | 31.25 | 31.25 | 50 | 78.75 |

| 7ME6820-xxxx7 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | | 3 × DN | | | | |
| Orientation: | All | | | | | | | | | Horizontal | | | | |
| R (Q3/Q1) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Q4 [m³/h] | 31.25 | 50 | 78.5 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 | 3125 | 5000 | 5000 | 7875 |
| **Q3 [m³/h]** | **25** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **2500** | **4000** | **4000** | **6300** |
| Q2 [m³/h] | 0.40 | 0.64 | 1.008 | 1.6 | 2.56 | 4 | 6.4 | 10.08 | 16 | 25.6 | 40 | 64 | 64 | 100.8 |
| Q1 [m³/h] | 0.25 | 0.4 | 0.63 | 1 | 1.6 | 2.5 | 4 | 6.3 | 10 | 16 | 25 | 40 | 40 | 63 |

| 7ME6820-xxxx4 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") | DN 350 (14") | DN 400 (16") | DN 450 (18") | DN 500 (20") | DN 600 (24") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | | 3 × DN | | | | |
| Orientation: | Horizontal | | | | | | | | | | | | | |
| R (Q3/Q1) | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| Q4 [m³/h] | 50 | 79 | 125 | 200 | 312.5 | 500 | 788 | 1250 | 2000 | 3125 | 5000 | 5000 | 7875 | 7875 |
| **Q3 [m³/h]** | **40** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **2500** | **4000** | **4000** | **6300** | **6300** |
| Q2 [m³/h] | 0.4 | 0.63 | 1 | 1.6 | 2.5 | 4 | 6.3 | 10 | 16 | 25 | 40 | 40 | 63 | 63 |
| Q1 [m³/h] | 0.25 | 0.39 | 0.63 | 1 | 1.56 | 2.5 | 3.94 | 6.25 | 10 | 15.63 | 25 | 25 | 39.38 | 39.38 |

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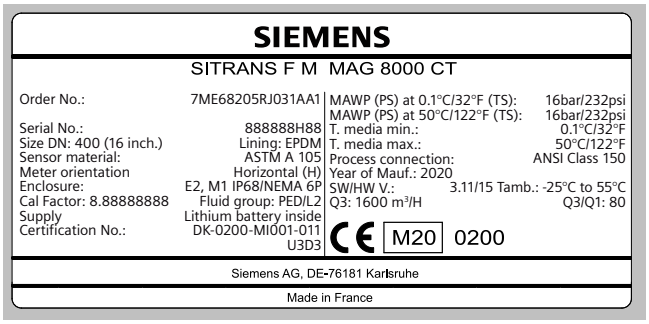


## Technical specifications (continued)

| 7ME6820-xxxx5 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
|---|---|---|---|---|---|---|---|---|---|
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | |
| Orientation: | Horizontal | | | | | | | | |
| **R (Q3/Q1)** | **200** | **200** | **200** | **200** | **200** | **200** | **200** | **200** | **200** |
| Q4 [m³/h] | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 | 2000 |
| **Q3 [m³/h]** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **1600** |
| Q2 [m³/h] | 0.5 | 0.8 | 1.28 | 2 | 3.2 | 5.04 | 8 | 12.8 | 12.8 |
| Q1 [m³/h] | 0.36 | 0.5 | 0.8 | 1.25 | 2 | 3.15 | 5 | 8 | 8 |

| | Horizontal installation | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7ME6820-xxxx6 | DN 50 (2") | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 125 (5") | DN 150 (6") | DN 200 (8") | DN 250 (10") | DN 300 (12") |
| Straight pipe up/ downstream: | 0 × DN | | | | | | | | |
| Orientation: | Horizontal | | | | | | | | |
| **R (Q3/Q1)** | **250** | **250** | **250** | **250** | **250** | **250** | **250** | **250** | **250** |
| Q4 [m³/h] | 78.75 | 125 | 200 | 312.5 | 500 | 787.5 | 1250 | 2000 | 2000 |
| **Q3 [m³/h]** | **63** | **100** | **160** | **250** | **400** | **630** | **1000** | **1600** | **1600** |
| Q2 [m³/h] | 0.40 | 0.64 | 1.02 | 1.6 | 2.56 | 4.03 | 6.4 | 10.24 | 10.24 |
| Q1 [m³/h] | 0.25 | 0.4 | 0.64 | 1 | 1.6 | 2.52 | 4 | 6.4 | 6.4 |

The Label is placed on the side of the encapsulation.
An example of the product label is shown below:




Installation conditions

Please refer to "System information SITRANS FM electromagnetic flowmeters".

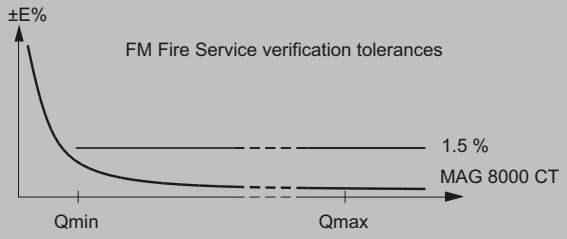
Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

***MAG 8000 CT (7ME6820) for Fire Service applications***

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



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## Overview



IIoT Wireless Communication Module

The IIoT Wireless Communication Module[1)] for SITRANS FM MAG 8000 is a communication system consisting of a hardware part combined with a web-hosted application for device management and measurement data transfer. The main features of the module are to transmit periodically the flow readings from a MAG 8000 field device to an end user, real time notifications of alarms, online configuration, and remote diagnosis of the field device.

The IIoT Wireless Communication Module is using the public mobile network as channel for transferring the measurement data to the MAG 8000 IIoT Web Application, where only authorized users have access to. In addition, the IIoT Web Application serves as an interface for the end user to provide the measurement data per Email or FTP.

Communication between the field device and web application runs over MQTT protocol, which is a widely used protocol in the IoT (Internet of Things) world.

The IIoT Wireless Communication Module can be installed in the existing MAG 8000 with SW version 3.11 and higher. A Cat M1, NB-IoT or 2G network must be available at the installation site of the MAG 8000.

1) A rechargeable buffer battery is mandatory, even if the MAG 8000 is mains power operated.

## Benefits

The MAG 8000 IIoT Web Application provides options for remote configuration of all MAG 8000 parameters, remote diagnostics, remote qualification and communication via email, FTP / FTPS (TLS/SSL-based encryption).

This provides customers with the flexibility to receive data via email or FTP for the monitoring and control with SITRANS serveIQ or other systems anywhere in the world.

TLS/SSL based data encryption provides a highlevel information security to protect customers data privacy.

The IIoT Wireless Communication Module offers:

- LTE-M and NB-IoT communication with 2G fallback
- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately timestamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices. The package of information retrieved via the csv file includes:
  - Time stamp
  - Flow rate
  - Totalizer 1
  - Totalizer 2
  - Totalizer 3
  - Analog 1 (V)
  - Analog 2 (V)
  - Battery lifetime
  - Alarm list (as decimal format)

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## Selection and ordering data

*Accessories for SITRANS FM MAG 8000 IIoT Wireless Communication Module*

| Description | Article No. | |
|---|---|---|
| **Upgrade kit MAG 8000 IIoT Wireless Communication Module (LTE-M, NB-IoT, 2G)**<br>including module, SIM-Card, antenna, adaptor cable, cable gland, O-ring (without rechargeable battery) | A5E51150447 |  |
| **MAG 8000 IIoT Wireless Communication Module (LTE-M, NB-IoT, 2G)**<br>including SIM-Card (without rechargeable battery) | A5E51093917 | |
| **Antenna set for MAG 8000 IIoT WCM**<br>PVC, IP68, cable length 5 m (16.4 ft) with SMA male connector (type RG 58) and internal antenna adaptor cable, and single entry cable gland | A5E51198820 |  |
| **Rechargeable Lithium battery for MAG 8000 IIoT Wirless Communication Module**[1)] | A5E03436686 |  |
| **Analog input cable for MAG 8000 IIoT WCM or 3G WCM**<br>2.5 m (8.2 ft) cable with M12 connector (IP67) A-Coding female 5 pins, and two-entry cable gland | A5E03436698 |  |
| **Antenna adaptor cable for IIoT WCM or 3G WCM**<br>Package: 2 pieces | A5E41896494 |  |
| **Cable entry 2 ... 5 mm (0.08 ... 0.20") M12 brass glands with M20 reduction**<br>Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable | FDK:087L4154 |  |
| **Two cable entries 3.5 ... 5 mm (0.14 ... 0.20") M20 brass glands**<br>Package: 10 pcs | FDK:087L4158 |  |
| **Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30"), M20 brass glands**<br>Package: 10 pcs | FDK:087L4159 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Potting kit for terminal box of flow sensors for IP68/NEMA 6P** | **FDK:085U0220** |  |

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

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## Overview



3G/UMTS communication module



PC-IrDA connection

***MAG 8000 3G/UMTS Wireless Communication Module***

The 3G/UMTS wireless communication module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher, supporting HSDPA cat. 8/HSUPA Cat.6 at 5 UMTS bands, with the ability to fall back to GSM/GPRS network in case there is no 3G signal. The 3G/UMTS module collects comprehensive measurement data from MAG 8000 at an interval down to 1 minute, allows for data transmission via numerous protocols including SMS, email via SMTP, email via SMTPS (TLS/SSL-based encryption), FTP, and FTPS (TLS/SSL-based encryption, implicit), with a customer configurable transmission interval (down to 1 hour). This provides customers with the flexibility to receive data via email, FTP or text message for the monitoring and control systems anywhere in the world.

TLS/SSL based data encryption provides a high level information security to protect customers data privacy.

The 3G/UMTS module offers:

- Remote Qualification Certificate feature to enable the offsite diagnostic and audit on devices installed anywhere in the world
- 2-channel analog input measurement for external ratiometric pressure transmitter, transmission together with flow measurement (2-in-1 solution)
- 4-20 mA alarm signal detection and realtime SMS alarm for tamper protection and flooding situations
- Real-time clock synchronization with internet NTP server, ensuring that all measurement data is accurately timestamped
- Data transmission at customer-specified points in time, allowing for synchronization of information from multiple MAG 8000 devices

The OPC server specifically designed for the MAG 8000 3G/UMTS module is offered free of charge. With this value-added package, the

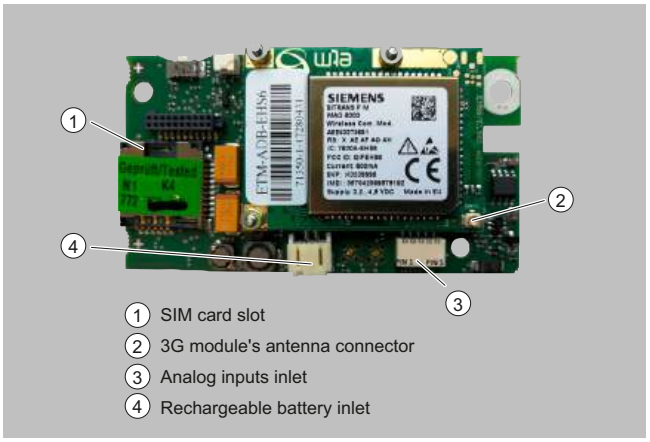
## Overview (continued)

opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered.

The package of information retrieved via the csv file includes:

- Time stamp
- Flow rate
- Tot 1
- Tot 2
- Tot 3
- Analog 1 (mA)
- Analog 2 (V)
- Battery lifetime
- Alarm list (as decimal format)

***Electrical installation of 3G/UMTS module***




1 SIM card slot
2 3G module's antenna connector
3 Analog inputs inlet
4 Rechargeable battery inlet

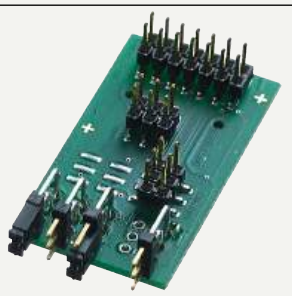
A rechargeable buffer battery is mandatory, even if the MAG 8000 is mains power operated.

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## Selection and ordering data

*Accessories for SITRANS FM MAG 8000 3G WCM*

| Description | Article No. | |
|---|---|---|
| **MAG 8000 3G/UMTS module**<br>Rechargeable battery, antenna and analog cable input must be ordered separately | A5E41011589 |  |
| **High gain antenna for MAG 8000 3G/UMTS**<br>PVC, IP68, cable length 5 m (16.4 ft), with SMA male connector (type RG 58) and internal antenna adaptor cable, and single entry cable gland | A5E40957990 |  |
| **Rechargeable lithium battery for MAG 8000 IIoT Wirless Communication Module**[1)] | A5E03436686 |  |
| **Analog input cable for MAG 8000 IIoT WCM or 3G WCM**<br>2.5 m (8.2 ft) cable with M12 connector (IP67) A-Coding female 5 pins, and two-entry cable gland | A5E03436698 |  |
| **Service adaptor for 3G/UMTS module** | A5E03436699 |  |
| **Antenna adaptor cable for IIoT WCM or 3G WCM (2 pieces)** | A5E41896494 |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Cable entry 2 ... 5 mm (0.08 ... 0.20") M12 brass glands with M20 reduction**<br>Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable. | FDK:087L4154 |  |
| **Two cable entries 3.5 ... 5 mm (0.14 ... 0.20") M20 brass glands**<br>Package: 10 pcs | FDK:087L4158 |  |
| **Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30"), M20 brass glands**<br>Package: 10 pcs | FDK:087L4159 | |
| **Potting kit for terminal box of flow sensors for IP68/NEMA 6P** | FDK:085U0220 |  |

[1] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

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## Selection and ordering data

*Accessories*

| Description | Article No. | |
|---|---|---|
| **IrDA infrared interface adapter**<br>with USB for data acquisition with 1.2 m (3.9 ft) cable | FDK:087L4163 |  |
| **Battery backup for mains power supply**<br>1 pc. D-cell (3.6 V, 16.5 Ah)[1)] | A5E03354392 |  |
| **Internal battery pack**<br>one set of 2 D-cell (3.6 V, 33 Ah) and accessories for replacement[1)] incl. NBR O-ring | FDK:087L4150 |  |
| **Internal battery pack with connector**<br>2 D-cell (3.6 V, 33 Ah), incl. accessories for replacement[1)] and NBR O-ring. Made in Europe. | A5E50698081 |  <br>  |
| **External battery pack IP68/NEMA 6P with connector**<br>4 D-cell (3.6 V, 66 Ah)[1)]; order cable FDK:087L4152 separately. | FDK:087L4151 |  |
| **External battery pack, IP68/NEMA 6P with connector**<br>4 D-Cell (3.6 V 66 Ah) without power cable. Made in Europe.[1)] | A5E50698048 | |
| **Mains power supply 12 ... 24 V AC/DC**<br>(average power consumption during line ≤ 0.1 VA) with battery backup and 3 m (9.8 ft) power cable for external connection (backup battery not included)<br>***Temperature range***<br>Fixed laying: -40 ... +90 °C (-40 ... +194 °F)<br>Flexible application: -30 ... +80 °C (-22 ... +176 °F) | FDK:087L4210 |  |
| **Mains power supply 115 ... 230 V AC, 50/60 Hz**<br>with battery backup up and 3 m (9.8 ft) power cable for external connection (backup battery not included) | FDK:087L4211 | |
| **RS 232 add-on module**<br>point to point communication interface with Modbus RTU protocol | FDK:087L4212 |  |
| **RS 485 add-on module**<br>multidrop communication interface with Modbus RTU protocol | FDK:087L4213 | |
| **Encoder interface module**<br>with "Sensus" protocol for ITRON 200WP and 100W radio | A5E02475650 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **One cable entry 2 ... 5 mm (0.08 ... 0.20 "), M12 brass glands with M20 reduction**[2)]<br>Package of 10 pcs, for 3G/UMTS module antenna cable, power cable of external battery pack, encoder card cable. | FDK:087L4154 |  |
| **One cable entry 6 ... 8 mm (0.24 ... 0.31 "), M20 brass glands package**[2)]<br>Package of 10 pcs, for pulse output cable or MODBUS cable, cello cable or mains power supply | FDK:087L4155 |  |
| **One cable entry 8 ... 11 mm (0.31 ... 0.43 "), M20 brass glands package**[2)]<br>Package of 10 pcs, for SOFREL cable | FDK:087L4156 | |
| **One cable entry 11 ... 15 mm (0.43 ... 0.59 "), M20 brass glands package**[2)]<br>Package of 10 pcs | FDK:087L4157 | |
| **Two cable entries 3.5 ... 5 mm (0.14 ... 0.20 "), M20 brass glands package**[2)]<br>Package of 10 pcs | FDK:087L4158 | |
| **Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30 "), M20 brass glands package**[2)]<br>Package of 10 pcs | FDK:087L4159 | |
| **Potting kit for terminal box of flow sensors for IP68/NEMA 6P** | FDK:085U0220 |  |
| **MAG 8000 Hardware key to access protected parameters** | FDK:087L4165 |  |
| **MAG 8000 demo - training unit pack operating on Alkaline batteries**<br>Transmitter with Flow tool CD, IrDA interface adapter and hardware key (No dangerous goods limitations) | FDK:087L4080 |  <br>  |
| **Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah)**<br>(No dangerous goods limitations) | FDK:087L4142 |  |

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## Selection and ordering data (continued)

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
2) For cable connection through MAG 8000 transmitter bottom part.

***Spare parts***

| Description | Article No. | |
|---|---|---|
| **MAG 8000 transmitter compact replacement kit[1].** No battery included. With original product label. System number specified by ordering | FDK:087L4166 |  |
| **MAG 8000 transmitter remote replacement kit[1)]** No battery included. With original product label. System number specified by ordering | FDK:087L4202 |  |
| **MAG 8000 (Advanced version) transmitter compact replacement kit[1)]** No battery included. With blank product label. No system number required | FDK:087L4203 |  |
| **MAG 8000 (Advanced version) transmitter remote replacement kit[1)]** No battery included. No system number required | FDK:087L4204 |  |
| **MAG 8000 (Basic version) transmitter PCB replacement kit[1)]** No system number required | A5E01171569 |  |
| **MAG 8000 (advanced version) transmitter PCB replacement kit[1)]** No system number required | FDK:087L4168 | |

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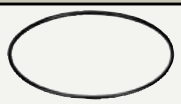
## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Enclosure top including plastic lid, screws, O-ring and blank product label** | FDK:087L4167 |  |
| **Power cable 1.5 m (4.9 ft)**<br>with IP68/NEMA 6P plugs for external battery (no battery included); PE jacket, ambient temperature: -20 °C ... +60 °C (-4 °F ... 140 °F) | FDK:087L4152 |  |
| **Encoder interface cable**<br>with IP68/NEMA 6P plugs included, for ITRON 200WP and 100W radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket | | |
| • Length: 152.4 cm (5 ft) | A5E02551263 |  |
| • Length: 762 cm (25 ft) | A5E02551182 | |
| **Service tool kit package with various component for service and replacement.**<br>Content:<br>• 10 × plastic top lids<br>• 20 × screws<br>• 10 × wire holders<br>• 10 × battery cups, 10 × greased O-rings<br>• 20 × clamp kits<br>• 10 × IrDA adaptor holding rings | FDK:087L4162 |  <br>  <br>  <br>  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| | |  |
| | |  |
| **Remote cable set with IP68/NEMA 6P plugs, M20, 1 pc.** | |  |
| • 5 m (16.4 ft) | A5E00862482 | |
| • 10 m (32.8 ft) | A5E00862487 | |
| • 20 m (65.6 ft) | A5E00862492 | |
| • 30 m (98.4 ft) | A5E00862497 | |
| **Remote cable set, M20 plug with pre-mounted M40 conduit adaptor** | | |
| • 10 m (32.8 ft) | A5E33400834 | |
| • 20 m (65.6 ft) | A5E33400836 | |
| **Grounding ring service kit, flat ring, in stainless steel AISI 316 1.4436, incl. screws and gaskets, 2 pcs[2)]** | |  |
| • DN 25 (1") | A5E01002946 | |
| • DN 40 (1½") | A5E01002947 | |
| • DN 50 (2") | A5E01002948 | |
| • DN 65 (2½") | A5E01002950 | |
| • DN 80 (3") | A5E01002952 | |
| • DN 100 (4") | A5E01002953 | |
| • DN 125 (5") | A5E01002954 | |
| • DN 150 (6") | A5E01002955 | |
| • DN 200 (8") | A5E01002957 | |
| • DN 250 (10") | A5E01002958 | |
| • DN 300 (12") | A5E01002962 | |

1) Not applicable to custody transfer (CT) verified systems without re-verification.
2) When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally. Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a "grounding ring kit".

### *Operating instructions for SITRANS FM MAG 8000*

| Description | Article No. |
|---|---|
| • English | A5E03071515 |
| • German | A5E00740986 |

### *Operating instructions for MAG 8000 3G/UMTS communication module*

| Description | Article No. |
|---|---|
| • English | A5E03644134 |

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

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## Overview



The SITRANS FM Verificator is an external tool designed for MAG 5000 and MAG 6000 with MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P or MAG 5100 W sensors to verify the entire product, the installation and the application.

The goal is to improve operation, reduce downtime and maintain measurement accuracy as long as possible.

The SITRANS FM Verificator is highly advanced and carries out the complex verification and performance check of the entire flowmeter system, according to unique SIEMENS patented principles. The whole verification test is automated and easy to operate so there is no opportunity for human error or influence. The system is traceable to international standards and tested by WRc (Water Research Council).

- Stand alone Verificator to measure a number of selected parameters in the flow sensor and a transmitter which affects the integrity of the flow measurement.
- Up to 20 measurements can be stored in the Verificator.
- The Verificator can be connected via a serial cable to a PC enabling download of the data. A Windows program enables printing and management of verificator reports.

## Mode of operation

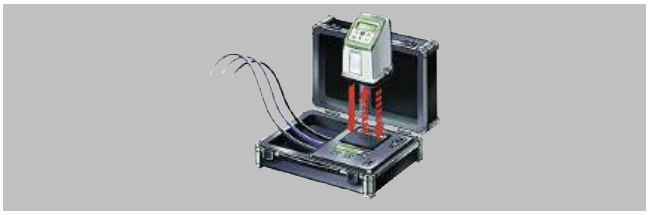
***Verification - Steps***

Verification of a SITRANS FM flowmeter consists of the following test routines:

1. Transmitter test
2. Flowmeter and cable insulation test
3. Sensor magnetism test

1. Transmitter test

The transmitter test is the traditional way of on-site testing on the market and checks the complete electronic system from signal input to output.

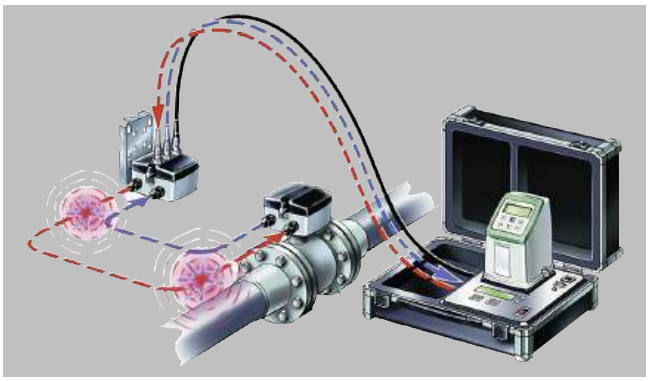


Transmitter test

Using the excitation power output, which is generated to drive the magnetic field of the sensor, the verificator simulates flow signal to the transmitter input. By measuring the transmitter outputs the verificator calculates its accuracy against defined values. Test includes:

- Excitation power to drive the magnetic field
- Signal function from signal input to output
- Signal processing – gain, offset and linearity
- Test of analogue and frequency output

2. Insulation test



Flowmeter insulation test

The verification test of the flowmeter insulation is a “cross-talk” test of the entire flowmeter which ensures that the flow signal generated in the sensor is not affected by any external influences.

In the “cross-talk” test the verificator generates a high voltage disturbance within the coil circuit and then looks for any “cross-talk” induced in the flow signal circuit. By generating dynamic disturbances close-coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level:

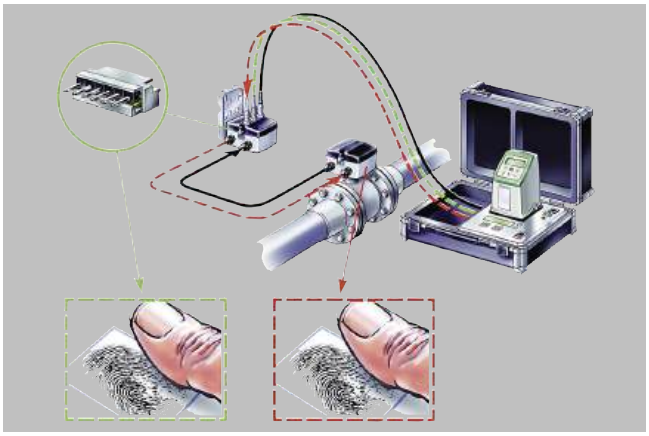
- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes within the sensor
- Missing or poor grounding, shielding and cable connection

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## Mode of operation (continued)

3. Sensor magnetism test



Sensor magnetism test

The verification of the sensor magnetism is a "boost" test of the magnetic field coil. The test ensures that the magnetism behaviour is like the first time, by comparing the current sensor magnetism with the "fingerprint" which was determined during initial calibration and stored in the SENSORPROM memory unit.

In the "boost" test the verificator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is fulfilled without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection

***Certificate***

The test certificate generated by a PC contains:

- Test result with passed or failed
- Installation specification
- Flowmeter specification and configuration
- Verificator specification with date of calibration ensuring traceability to international standards.

## Mode of operation (continued)

MAGFLO® Verification Certificate

Customer:
Name
Address
Phone
Email

MAGFLO® Identification:
TAG No./Name 0
Sensor Code No. 7ME634
Sensor Serial No. 057701H142
Transmitter Code No. 7ME692
Transmitter Serial No. 109418N080
Location

Results:
Verification file name or No. FT-103FT2801
Transmitter Passed
Sensor Insulation Passed
Magnetic Circuit Passed

| Velocity | Current Output | | | Frequency Output | | |
|---|---|---|---|---|---|---|
| Theoretical | Theoretical | Actual | Deviation | Theoretical | Actual | Deviation |
| 0.5m/s | 4.800mA | 4.802mA | 0.25% | 0.500kHz | 0.501kHz | 0.11% |
| 1.0m/s | 5.600mA | 5.601mA | 0.08% | 1.000kHz | 1.001kHz | 0.07% |
| 3.0m/s | 8.800mA | 8.804mA | 0.08% | 3.000kHz | 3.004kHz | 0.14% |
| | Current Output 4-20mA | | | Frequency Output 0-10kHz | | |

Transmitter Settings:

| | | |
|---|---|---|
| Basic | Qmax. | 2.00000 m³/h |
| | Flow Direction | Positive |
| | Low flow Cut-off | 1.50% |
| | Empty Pipe | ON |
| Output | Current Output | ON (4-20mA) |
| | Time Constant | 5.0 Sec. |
| | Relay Output | Error Level |
| | Digital Output | Pulse |
| | Frequency Range | N/A |
| | Time Constant | N/A |
| | Volume/pulse | 1.0 l/p |
| | Pulse width | 0.51999998 sec. |
| | Pulse polarity | Positiv |
| Totalizer 1 value before test | | 819442.93213 l |
| Totalizer 1 value after test | | 819458.92334 l |
| Totalizer 2 value before test | | 693.87579 l |
| Totalizer 2 value after test | | 693.88145 l |
| Operating time in days | | 1068 |

Sensor Details:
Size DN 15 1/2 IN
Cal. Factor 0.16531426
Correction Factor 1.0
Excitation Freq. 12.5Hz

Verificator Details (083F5060)
Serial No. 107920N490
Device No. 94683
Software Version 1.40
PC-Software Version 5.01
Cal. date 2015.10.26
ReCal. date 2016.10.26

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.
Verification is traceable to National and International Standards.

Date and signature
2016.10.26

Note:
It is mandatory to have the Verificator returned to the factory once a year for check and re-verification.

## Selection and ordering data

| Description | Article No. |
|---|---|
| **SITRANS FM Verificator** | |
| 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 50 Hz | **FDK:083F5060** |
| 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 60 Hz | **FDK:083F5061** |

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## Overview



In-situ verification tool SITRANS Verificator

The SITRANS Verificator is the next generation in-situ verification device for use with a various of SITRANS FM flow meters. The battery powered device carries out a complex verification and performance check of the entire flowmeter system. The whole verification test is fully automated and can be controlled using a mobile software application via the Bluetooth interface.

Key features

- In-situ check of performance without interrupting the flowmeter installation
- Simple method of checking product health
- Easy-to-use connection to your device
- Automated input/output tester
- Field-replaceable battery
- Full verification test with one click
- Generation of verification test certificate
- Fast feedback of device condition
- Easy emailing of verification test certificate in the field
- Condition monitoring for predictive maintenance to optimize asset reliability
- Full traceability – Annual certification of verification system insures complete documentation for regulatory and ISO standards compliances
- Always up to date through periodic recalibration and service checks

The software application SITRANS mobile IQ gives you easy access to the SITRANS Verificator via your smartphone or tablet.

Download the software application SITRANS mobile IQ for free and activate the verification license to provide the best possible check of measurement accuracy, without stopping your process. The validation device verifies the condition and performance of the device under test. With the mobile IQ software, test reports can be generated and stored locally for further analysis on the mobile device.

License model

To perform a verification, a token-based license (pay-per-use) must be purchased and activated for the Verificator. This is a hardware-locked license that can only be assigned to one SITRANS Verificator at a time. After activation the license validity is 12 months (plus 2 months grace period). Various license packs are available:

## Overview (continued)

- Basic 1 (20 tokens)
- Basic 2 (50 tokens)
- Pro 100 (100 tokens)
- Pro 200 (200 tokens)
- Pro 300 (300 tokens)
- Premium (unlimited tokens)

Supported products

The SITRANS Verificator confirms accurate performance for the following SITRANS FM products:

- FMS500 flow sensor
- FMT020 flow transmitter

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## Benefits

External verification

The inspection of the flowmeter is carried out by an external verification device. During the entire testing process, the verification device is connected to the flowmeter via test interfaces, and a functional test is carried out by simulating calibrated reference signals and observing system response.

- Traceable check of entire electromagnetic flowmeter by performing functional tests using injected reference signals for flow simulation
- Qualitative assessment based on a pass-fail criterion
- Verificator calibration concept according to ISO 17025 standards ensuring long term stability of the external test system
- Metrologically traceable factory references for user confidence
- Annual calibration of verification system to meet ISO 9001 quality regulations

Test coverage

- Signal input processing - Linearity of the amplifier
- I/O processing - Current and digital output
- Crosstalk measurement
- Insulation resistance
- Coil boost time (“Fingerprint”)
- Coil resistance

Device status

The verification device itself includes LED indicators to advise operation status:

- Bluetooth connection
- Instrument detected
- Under test (verification in progress)
- Device power ON indicator
- Battery condition

Mobile software application

The SITRANS Verificator is designed to be connected to the software application SITRANS mobile IQ running on an Android and iOS mobile device in order to communicate information and data via the Bluetooth interface.

- Easy to operate testing of product performance and maintenance needs
- Detailed certificate printing for regulatory and quality system management
- Move from reactive to predictive maintenance planning with historical data analysis
- Local data storage capabilities

Verification test certificate

The test certificate generated by the SITRANS mobile IQ software application contains:

- Test result with passed or failed
- Detailed measurement results for all verification tests
- Customer and operator information
- Flowmeter specification and configuration

## Benefits (continued)

- Verificator specification with date of calibration ensuring traceability to international standards.







## Application

The SITRANS Verificator can be used in:

- New applications: to approve new installations with valid certificate for handover
- Existing applications: to ensure correct product quality and continuous accuracy
- To confirm that a flowmeter fulfills certain technical requirements of functionality as defined by the manufacturer
- As assessment tool to produce a qualitative statement about the product stability

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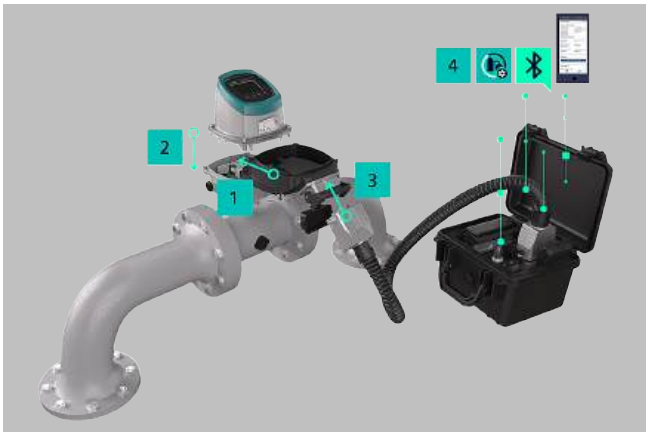
## Mode of operation

***Test functions***

Transmitter test

The transmitter verification checks the whole electronic system from signal input to output. Using a traceable calibrated precision network, the Verificator simulates flow signals to the transmitter input. By measuring the transmitter outputs, the Verificator calculates its accuracy against defined factory values.

- Signal function from signal input to output
- Signal processing – gain, offset, and linearity
- Test of current and digital output



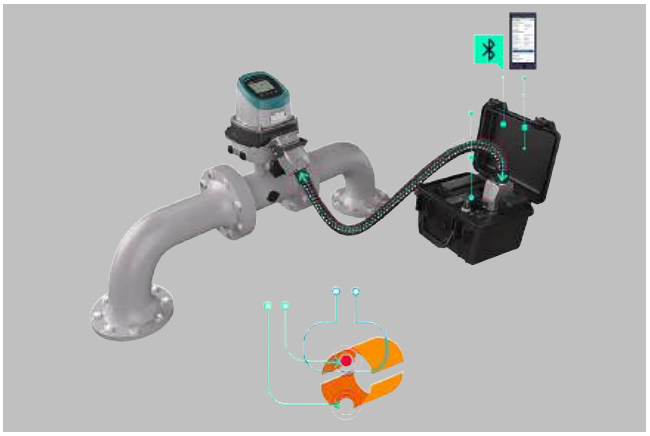

Transmitter test: Steps for connecting SITRANS Verificator to SITRANS FMx20

Insulation test

The verification test of the flowmeter insulation is a “crosstalk” test of the entire flowmeter and installation, which ensures that the flow signal generated in the sensor is not affected by any external influences. By generating dynamic disturbances close coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level.

- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes
- Missing or poor grounding, shielding and cable connection

## Mode of operation (continued)



Flowmeter insulation test

Coil circuit test

The verification of the coil circuit is an integrity check of the sensor magnetic field coil. The test ensures that the magnetism behavior is like the first time, by comparing the current sensor magnetism with the “fingerprint” (coil boost time) which was determined during initial calibration and stored in the SENSORPROM memory unit.

In the “Coil Boost Time” test the Verificator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is performed without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection




Fingerprint test

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## Selection and ordering data

| Description | Article No. | |
|---|---|---|
| **SITRANS Verificator**<br>Validation device for in-situ performance check of magnetic flow meters without process interruption.<br>Scope of supply: Protective case with Verificator test unit, connection cable, battery charger, batteries (2 pcs.),<br>SITRANS FMT020 adapter, snap hook | **7ME6900-1AA10-....** |  |

| SITRANS Verificator | Article No.<br>7ME6900- | 1 | A | A | 1 | 0 | - | 1 | ● | ● | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **License** | | | | | | | | | | | |
| Without license | | | | | | | | | A | | |
| Basic 20 (token quantity 20) | | | | | | | | | C | | |
| Basic 50 (token quantity 50) | | | | | | | | | D | | |
| Pro 100 (token quantity 100) | | | | | | | | | F | | |
| Pro 200 (token quantity 200) | | | | | | | | | G | | |
| Pro 300 (token quantity 300) | | | | | | | | | H | | |
| Premium (token quantity unlimited) | | | | | | | | | P | | |
| **Battery charger** | | | | | | | | | | | |
| Type A, CEE7/7 mains connector (Europe) | | | | | | | | | | A | |
| Type C, AS3112 mains connector (Australia) | | | | | | | | | | B | |
| Type D, BS1363 mains connector (United Kingdom) | | | | | | | | | | C | |
| Type K, NEMA 5-15P mains connector (United States) | | | | | | | | | | D | |
| Type L, SEV1011 mains connector (Switzerland) | | | | | | | | | | E | |
| Type J, JIS8303 mains connector (Japan) | | | | | | | | | | F | |

| Additional information | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Device options** | |
| Car charger for battery | **J01** |

***Licenses SITRANS Verificator***

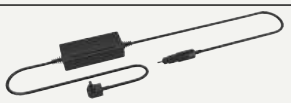
| Description | Article No. | |
|---|---|---|
| **Token-based license type (pay-per-use)**<br>License validity 12 months (plus 2 months grace period) after activation | |  |
| • License pack - Basic 20 | **7ME6901-1AA10-1LB0** | |
| • License pack - Basic 50 | **7ME6901-1AA10-1LB1** | |
| • License pack - Pro 100 | **7ME6901-1AA10-1LE0** | |
| • License pack - Pro 200 | **7ME6901-1AA10-1LE1** | |
| • License pack - Pro 300 | **7ME6901-1AA10-1LE2** | |
| • License pack – Premium | **7ME6901-1AA10-1LU0** | |

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## Selection and ordering data (continued)

### *Accessories SITRANS Verificator*

| Description | Article No. | |
|---|---|---|
| **Battery charger**<br>License validity 12 months (plus 2 months grace period) after activation | |  |
| • Type C (AS3112) for Australia | **7ME3940-4PS00** | |
| • Type D (BS1363) for U.K. | **7ME3940-4PT00** | |
| • Type J (JIS8303) for Japan | **7ME3940-4PQ00** | |
| • Type K (NEMA 5-15P) for United States | **7ME3940-4PU00** | |
| • Type L (SEV1011) for Switzerland | **7ME3940-4PV00** | |
| • Type A (CEE7/7) for Europe | **7ME3940-4PR00** | |
| **Car adapter** | **A5E50441092** |  |

### *Spare parts SITRANS Verificator*

| Description | Article No. | |
|---|---|---|
| **SITRANS FMT020 adapter**<br>(serial number of SITRANS Verificator must be specified when ordering) | **7ME6901-1AD10** |  |
| **Connection cable** | **7ME6901-1CA10** |  |
| **Portable protective case**<br>including foam padding | **A5E50441009** |  |
| **Rechargeable battery**<br>1 pc. | **A5E50441091** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| Shoulder strap | A5E50441096 |  |
| Gasket for SITRANS FMT020 adapter | A5E50441094 |  |
| Snap hook | A5E50441093 |  |

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## Technical specifications

| FM Verificator | |
|---|---|
| **Test capability** | |
| Transmitter test | • Signal input<br>• Current output<br>• Digital output |
| Coil circuit test | • Coil boost time (Fingerprint)<br>• Coil resistance |
| Insulation test | • Signal immunity |
| **Verification accuracy** | |
| Current output (active/passive) | |
| • 4 ... 20 mA signal | ±0.1 % |
| Digital output (active/passive) | |
| • 0.5 ... 10 kHz signal | ±0.02 % |
| Signal input | |
| • 0.5 m/s (1.6 ft/s) | ±0.05 % |
| • 1.0 m/s (3.3 ft/s) | ±0.05 % |
| • 3.0 m/s (9.8 ft/s) | ±0.05 % |
| Fingerprint (coil boost time) | ±0.5 % |
| Coil resistance | ±0.2 % |
| Insulation | Threshold = 12.5 mm/s |
| **Operating conditions** | |
| Ambient temperature | |
| • Operation (Humidity max. 90 %) | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage (without battery) (Humidity max. 90 %) | -40 ... +70 °C (-40 ... +158 °F) |
| • Storage with battery | -20 ... +50 °C (-4 ... +122 °F) |
| Environnemental class | 4M11 |
| Altitude | Up to 2000 m (6560 ft) |
| Pollution degree | 3 |
| Overvoltage category | II |
| **Design** | |
| Material | |
| • Enclosure | Polycarbonate |
| • Interface adapter | Aluminum |
| Degree of protection | IP54 |
| Mechanical load | |
| • Vibration resistance | Vibration, sinusoidal according to EN 60068-2-6 / IEC 60068-2-6 |
| • Shock resistanc | Shock, half-sine according to EN 60068-2-27 / IEC 60068-2-27 |
| EMC performance | |
| • Emission | EN 300328 |
| • Immunity | IEC/EN 61326-1 |
| Dimensions | See dimensional drawings |
| Weight | See dimensional drawings |
| **Power supply** | Battery-powered, battery capacity allows for 10 hours continuous use |
| Battery pack | Lithium-ion battery, 14.4 V DC, 3800 mAh |
| Charger for battery pack | External battery charger, AC-Adapter: 100 ... 240 V AC, 60 Hz, 1.7 A |
| **Connectivity** | |
| Bluetooth interface | BLE 4.2 |
| • Range | Class 2; approx. 10 m depending on mounting position |

## Technical specifications (continued)

| FM Verificator | |
|---|---|
| **Certificates and approvals** | |
| General purpose | CE (LVD, EMC, RoHS)<br>UL certified per standard IEC 61010-1 |
| Radio approvals | RED (EU, UK)<br>FCC (US)<br>IC (Canada)<br>RCM (Australia) |

| SITRANS Mobile IQ | |
|---|---|
| **Device connectivity** | Manages connection with SITRANS Verificator to enable data sharing |
| **Device cockpit** | Indicates useful information about the connected devices, and license status |
| **License management** | Activation and management of verification licenses |
| **Test result analysis** | Documentation and management of past test results |
| **Charts** | History of selected test results and diagnostic values |

***Download app***

SITRANS mobile IQ App in App Store

SITRANS mobile IQ App in Google Play Store

## Dimensional drawings

***Dimensions of SITRANS Verificator***

Portable protective case

Size: 603 × 470 × 230 mm (23.8 × 18.5 × 9.1 inch)

Weight: 15.25 kg (33.1 lb)

Verificator test unit

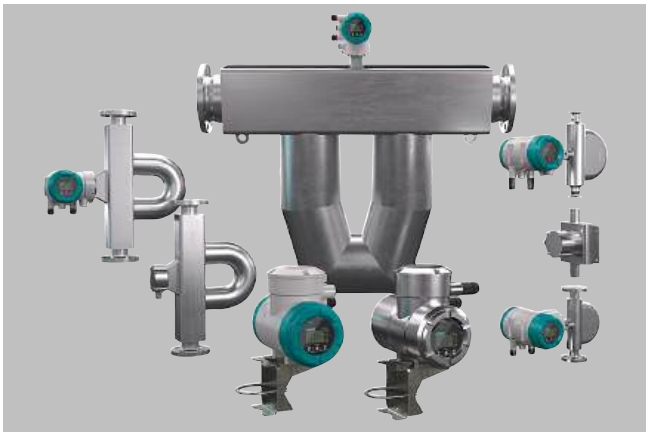
Size: 269 × 245 × 175 mm (10.6 × 9.6 × 6.9 inch)

Weight: 4.1 kg (8.8 lb)

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## Overview



SITRANS FC is the range of Siemens Coriolis mass flowmeters that provides high performance process measurements. The extensive portfolio provides multi-parameter measurement solutions for all fluid types, including liquids, gases and multi-phase fluids.

Primary measurements of mass flow, density and temperature are available immediately on device start-up.

SITRANS FC also calculates multiple secondary measurements including:

- Fraction (or concentration)
- Liquid volume flow
- Normal (standard) volume flow of gases
- Viscosity (requires external input)
- Thermal energy

Siemens measurement experts are available globally. They provide application guidance to optimize the whole life value of SITRANS FC multi-parameter instruments, across all process industry sectors.

Diligence in the design, carried through manufacturing and calibration, is evident in the solution-specific range of sensors and transmitters, described on the following pages.

***Product overview***

| SITRANS FC sensors | | |
|---|---|---|
| **SITRANS FCS100** |  | **Precision sensors for low flow applications**<br>• Alloy 22 measuring tubes<br>• Process connection: flange, thread or hygienic clamp<br>• Nominal sizes: DN 1, DN 2, DN 4, DN 6, DN 8<br>• Connection sizes: DN 6 ... 40 (¼ ... 1½")<br>• Nominal flow: 21 ... 950 kg/h (46 ... 2 094 lb/h) |
| **SITRANS FCS500** |  | **Universal sensors for standard applications**<br>• Wetted parts: stainless steel 316L<br>• Process connections: flange or thread<br>• Nominal sizes: DN 10, DN 15, DN 25, DN 50, DN 80<br>• Connection sizes: DN 8 ... 125 (⅜ ... 5")<br>• Nominal flow: 1 600 ... 170 000 kg/h (3 527... 374 786 lb/h)<br>**Hygienic sensors with 3A and EHEDG approvals**<br>• Wetted parts: stainless steel 316L<br>• Process connection: hygienic, thread or clamp<br>• Nominal sizes: DN 10, DN 15, DN 25, DN 50<br>• Connection sizes: DN 25 ... 80 (1 ... 3")<br>• Nominal flow: 1 600 ... 51 000 kg/h (3 527 ... 112 436 lb/h) |
| **SITRANS FCS600** |  | **Resistant sensors for extreme conditions**<br>• Resistant to high temperature, up to 350 °C (662 °F)<br>• Resistant to high pressure, up to 700 bar (10 153 psi) (gauge)<br>• Resistant to corrosive fluids<br>• Wetted parts: stainless steel 316L or alloy 22<br>• Process connection: flange or thread<br>• Nominal sizes: DN 2, DN 4, DN 15, DN 25, DN 40, DN 65<br>• Connection sizes: DN 8 ... 125 (⅜ ... 5")<br>• Nominal flow: 45 ... 100 000 kg/h (99 ... 220 462 lb/h) |

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## Overview (continued)

| SITRANS FC sensors | | |
|---|---|---|
| **SITRANS FCS700** |  | **Grand sensors for high flow applications**<br>• Wetted parts: stainless steel 316L or alloy 22<br>• Process connection: flange<br>• Nominal sizes: DN 100, DN 150, DN 200<br>• Connection sizes: DN 100 ... 250 (4 ... 10")<br>• Nominal flow: 250 000 kg/h ... 900 000 kg/h (551 156 ... 1 984 160 lb/h) |

| SITRANS FC transmitters | | |
|---|---|---|
| **SITRANS FCT020** |  | **Standard transmitter for routine applications**<br>• Mass flow accuracy: ±0.2% (of rate)<br>• Density accuracy: ±4 kg/m³ (±0.25 lb/ft³)<br>• Easy setup wizard, microSD card, self-verification<br>• Digital communication: HART, Modbus |
| **SITRANS FCT040** |  | **Advanced transmitter with extended functionality**<br>• Mass flow accuracy: ±0.1% (of rate)<br>• Density accuracy: ±0.5 kg/m³ (±0.03 lb/ft³)<br>• Easy setup wizard, microSD card, self-verification<br>• Batch control, viscosity measurement<br>• Fraction (percent concentration), e.g. API, Brix, ABV<br>• Thermal energy calculation<br>• Digital communication: HART, Modbus, PROFIBUS PA, PROFINET |

Each SITRANS FC Coriolis mass flowmeter system comprises one sensor and one transmitter. The FCS100 precision sensors for low flow are compatible with remote mounted transmitters only. The user can select either compact or remote mounted transmitters in the specification of all other sensor types.

| Transmitter | Compact | Remote | Ex | Sensor |
|---|---|---|---|---|
| **FCT020 (standard)** | Yes | Yes | Yes | FCS500 |
| | Yes | Yes | Yes | FCS500 hygienic |
| | No | Yes | Yes | FCS100 |
| | Yes | Yes | Yes | FCS600 |
| | Yes | Yes | Yes | FCS700 |
| **FCT040 (advanced)** | Yes | Yes | Yes | FCS500 |
| | Yes | Yes | Yes | FCS500 hygienic |
| | No | Yes | Yes | FCS100 |
| | Yes | Yes | Yes | FCS600 |
| | Yes | Yes | Yes | FCS700 |

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## Benefits

| | User value targets | SITRANS FC features and solutions |
|---|---|---|
| **Engineering and project management** | • Reduce engineering investment<br>• Cut specification effort<br>• Minimize project expenditure<br>• Decrease the spending on each measurement point<br>• Eliminate function duplication<br>• Reduce number of suppliers | • Siemens project teams offer complimentary evaluation of customer specifications, provided by regional and HQ experts<br>• Simple product selection using intuitive sizing software<br>• One SITRANS FC device can typically provide 3 to 6 individual measurements, all transmitted via digital communication, when planned during pre-project design<br>• Added value functions: batch control, viscosity, thermal energy, concentration measurement (Fraction) of two-component solutions, and pressure compensation |
| **Installation** | • Reduce footprint and transport outlay of OEM machinery<br>• Lower installation complexity<br>• Avoid costly modifications of existing plant | • Can be installed in horizontal or vertical (self-draining) pipes<br>• Twin tube bend design delivers strong signal to noise characteristic resistant to external influence, so install in tight spaces with no inlet and outlet restrictions<br>• Adaptable to existing pipes: typically, 3 or 4 connection sizes for each sensor size<br>• Flexible selection of traditional inputs, outputs, and digital communications |
| **Configuration and commissioning** | • Shorter commissioning schedules with lower costs<br>• Faster start-up with reduced outgoings | • Easy setup wizard delivers working meters straight after start-up<br>• microSD card stores sensor calibration data and default setup<br>• Simple configuration using Process Device Manager (PDM)<br>• Siemens device-specific faceplates simplify operation in plantwide control systems |
| **Efficient plant operation** | • Improve finished product consistency to reduce waste<br>• Keep process performance when scaling production up or down<br>• Optimize process control<br>• Improve finished product quality enabling higher levels of profit<br>• Reduce downtime with fast resolution of process upsets<br>• Improve asset performance | • SITRANS FC meters are calibrated in rigs accredited to EN/ISO 17025 to ensure consistently high performance of flow, density, and concentration measurements<br>• First-class zero-point quality maintains high accuracy into the low flow region<br>• High sensitivity and intelligent dynamic range keeps the measurement active in demanding high fluid damping cases<br>• Designed-in resilience to process extremes<br>• Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout or solid deposits building up in the tubes<br>• Diagnostic data via local menu or PDM is backed by Siemens applications experts<br>• Intelligent Siemens SITRANS IQ apps for continuing asset evaluation |
| **Maintenance and asset management** | • Optimize technician training<br>• Reduce cost of spare parts<br>• Increase predictive maintenance<br>• Reduce production downtime and associated costs<br>• Decrease unplanned maintenance<br>• Maximize asset value | • Simple product design with interchangeable modular parts<br>• microSD card loads sensor-specific data to deliver fast service exchange<br>• Self-verification: tube health check monitors key diagnostics, including tube stiffness, driver and pickups; the user defines verification frequency and alarm behavior<br>• Verification results indicate whether preventive maintenance action is required<br>• Siemens SIMATIC Maintenance Station uses cyclical acquisition to provide life cycle reports and intelligent preventive maintenance strategies |
| **Industry compliance** | • Cut effort required to comply with Industry-specific demands<br>• Reduce resource needed to maintain regulatory compliance | • Food and beverage sector covered with EHEDG and 3-A approvals, polished tubes<br>• Global hazardous area approvals for international plant duplications<br>• Common and emerging digital networks covered: HART, PROFIBUS PA, PROFINET<br>• Class-leading safety: SIL2/SIL3, secondary containment, PED, NAMUR NE95 |

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## Application

***The SITRANS FC Coriolis family provides flexibility to the user including***

- Choice of sizes from DN 1 to DN 250
- Choice of performance levels
- Optionally selectable functions, approvals and certification
- Selection of sensor types, process connections and materials to suit specific application demands
- Resistance to extreme process conditions where necessary

This flexibility and extensive range of options means an excellent value solution is available for routine and challenging applications alike, with no industry sector excluded.

***Generic measurement and application examples found in all industry sectors***

- Mass flow rate, density and temperature of liquids, gases, and mixed phase fluids
- Bulk volume flow rate of all fluid types
- Concentration measurement (fraction) of two-component slurries, solutions and mixtures
- Fractional mass flow rate of each component in a two-component fluid (net flow)
- Fractional volume flow rate of each component in a two-component fluid (net flow)
- Single or two stage batch control
- Viscosity measurement (requires differential pressure via analog input or digital communication)
- Thermal energy measurement
- Accumulated (totalized) mass and volume values of the bulk fluid and each fractional component
- Finished product filling and dosing into appropriate containers

During the selection of any SITRANS FC Coriolis flow meter it is important to obtain sufficient application data. The application checklist below provides guidance on what to look out for.

***Application checklist***

- Name of fluid?
- What type of fluid are you measuring – gas, liquid, slurry, other?
- Fluid properties and operating conditions – density, viscosity, temperature, pressure?
- Measurement(s) required: mass flow, volume flow, density, concentration, temperature?
- Expected flow rates – minimum, normal, maximum?
- Any hazardous area or corrosive properties?
- Adjacent pipe layout, disturbances (e.g. valves, bends)?
- What are the priorities – accuracy, installation and running costs, approvals?
- Power supply and outputs – analog, digital network?
- Will periodic verification or re-calibration be required – consider isolation valves, and bypass?

## Application (continued)

***Application examples for SITRANS FC multi-parameter meters across diverse industry sectors***

| Industry sector | Application |
|---|---|
| **Chemical and petrochemical**<br>Bulk chemicals<br>Industrial gases<br>Polymers<br>Agrochemicals<br>Fine chemicals<br>Aroma chemicals | • Transfer, loading and unloading of bulk chemicals<br>• Concentration control of acids and alkalis (process optimization)<br>• Accurate mass or volume flow of feed chemicals to in-line blending systems<br>• Accurate mass flow and density (quality) of reactor fluid feeds catalyst<br>• Chemical recovery<br>• Mass balance optimization<br>• Compressed and cryogenic gases<br>• Lubricating oil blending and dosing<br>• High-accuracy measurement of critical fluid components<br>• Low flow control in pilot plants and R&D facilities |
| **Food and beverage**<br>Food processing<br>Dairies<br>Breweries<br>Distilleries<br>Confectionary<br>Soft drinks<br>Animal feed plants<br>OEM | • Accurate bulk transfer (mass or volume) of all dairy products: milk, cream, whey and yoghurt<br>• Fat concentration in cream<br>• Flow, density, temperature, and concentration (Plato) during all fermentation processes<br>• Flow, density, temperature, and sugar concentration (Brix) in soft drink processing<br>• Distilled spirits – % alcohol by volume (ABV), liters of pure alcohol, volume transfer, blending, batch and column still optimization and energy management, cask filling, tanker loading<br>• Flow and density of fruit juices and pulps<br>• Mixing and inventory control of confectionary ingredients, e.g. chocolate, syrup, oils, flavors<br>• Metering pump control<br>• Oils, fat enzymes dosing in animal feed plants<br>• $CO_2$ dosing<br>• CIP liquids<br>• Bottling of beer, spirits, wine, soft drinks, etc.<br>• Bulk sugar processing – molasses, sugar slurries, density, Brix of finished product |
| **Oil and gas**<br>Offshore, onshore<br>Upstream, downstream<br>Pipelines<br>Distribution networks<br>Refineries<br>Skid manufacturers | • Loading/unloading of hydrocarbons (e.g. crude oil, bitumen) from/to ship, road tanker, rail car<br>• High-pressure chemical injection<br>• High-pressure low flow gas<br>• Net oil computing<br>• Gas void fraction<br>• Filling of gas bottles<br>• Furnace control<br>• Test separators<br>• LPG, natural gas hydration<br>• Well-head water-cut monitoring<br>• All hydrocarbon fluids in refineries<br>• Metrology, custody transfer<br>• Drilling mud<br>• Oil well cementing and hydrofracturing |

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## Application (continued)

| Industry sector | Application |
|---|---|
| **Life sciences**<br>Pharmaceutical<br>Bio | • High-accuracy flow and batching of bioreactor feeds<br>• Solvent flow rate, density and batching<br>• Flow of demineralized and deionized water<br>• Solvents and fish oils used in high grade omega 3 oils<br>• Precision coatings<br>• Vacuum thin film coating |
| **Household and personal care**<br>Detergents<br>Cosmetics | • Blending and batching of detergent ingredients<br>• Tanker loading and unloading<br>• Salt concentration<br>• Reliable measurement of aerated liquids |
| **Automotive and aeronautical**<br>Vehicle manufacturing<br>Paint<br>Engine testing<br>OEM | • Fuel injection nozzle and pump testing<br>• Filling of under bonnet fluid reservoirs, air conditioning, coolant<br>• Fuel flow and density measurement in engine test beds<br>• Checking for air in oil using high-accuracy density measurement<br>• Paint spray robots – requires accurate and fast measurements<br>• Aircraft fuel loading (kerosene)<br>• High pressure flow used in turbine blade manufacture |
| **Power and energy**<br>Renewable<br>Hydrogen | • Boiler fuel flow and burner control<br>• Turbine fuel flow<br>• Glycol flow and concentration<br>• Bioethanol |
| **Marine**<br>OEM<br>Shipbuilders | • Fuel consumption management<br>• Boiler control<br>• Bunkering management<br>• Density used to indicate fuel quality |
| **Pulp, paper and textiles** | • Accurate dosing of dyes and chemicals |
| **Water and environmental** | • Dosing of chemicals for water treatment<br>• Chemical concentration for water quality control |

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## Design

Each SITRANS FC Coriolis mass flowmeter is built from one SITRANS FCS sensor and one SITRANS FCT transmitter. FCS sensors have a common twin tube U-shaped design.

The four available sensor types are defined by size, wetted part materials, pressure and temperature rating, and process connection type. Generally, sensors can be combined with compact or remote mounted transmitters.

Two transmitter versions, FCT020 standard and FCT040 advanced, provide a choice of performance, measurement functions, housing material and output types.

***Examples***

Compact mount

FCS600 resistant sensor with FCT020 standard transmitter becomes a complete FC620 Coriolis flowmeter. Specification of sensor size, transmitter and process connections is required.



FC620 Coriolis flowmeter

Remote mount

FCS600 resistant sensor with FCT040 advanced transmitter becomes a complete FC640 Coriolis flowmeter.

Specification of sensor size, terminal housing design, transmitter, process connections and cable are required.



FCS600 sensor



FCT040 transmitter

FCS100 precision sensors (sizes DN 1 to DN 8) are compatible with remote mounted transmitters only.

Other example

FCS100 precision sensor with remote FCT020 standard transmitter becomes a complete FC120 Coriolis flowmeter.



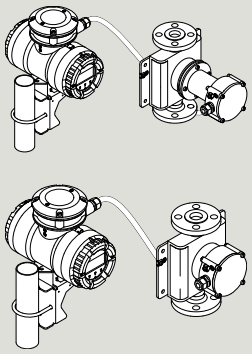
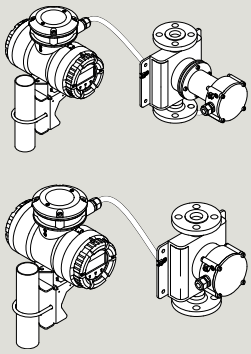
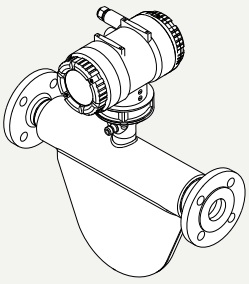
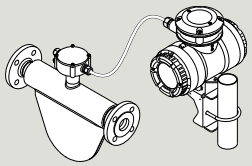
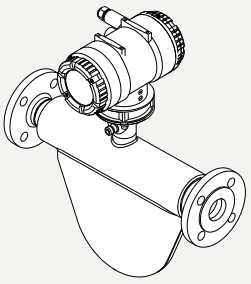
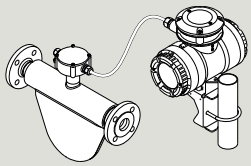
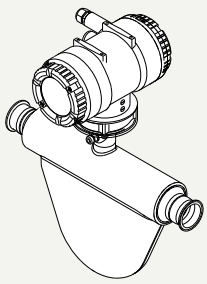
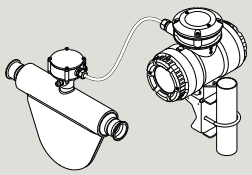
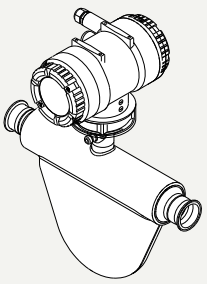
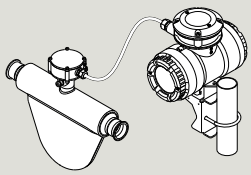
The following table shows a more complete interpretation of available combinations and the compatibility between sensors and transmitters.

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## Design (continued)

**Overview of the available combinations and compatibility between sensors and transmitters**

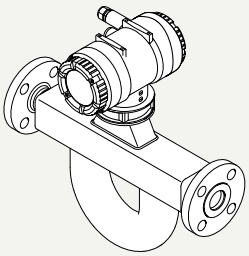
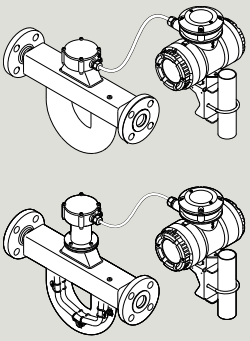
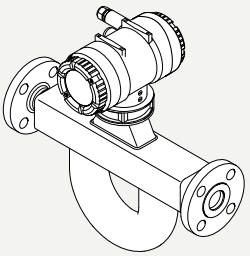
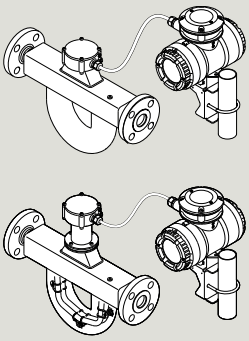
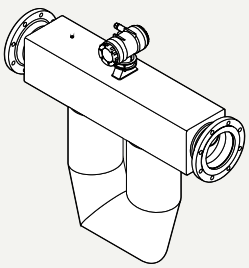
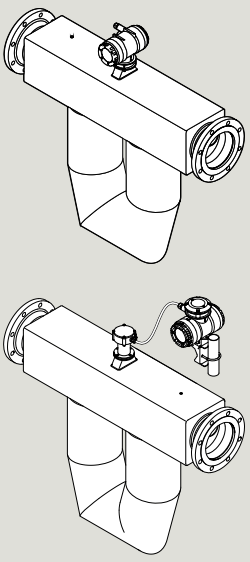
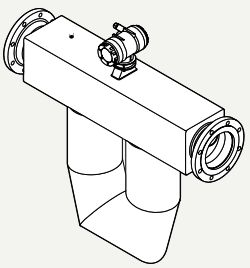
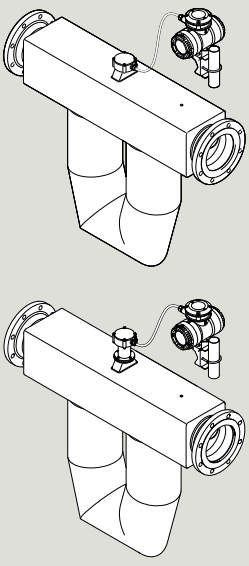
| | **Transmitter FCT020 Standard**<br>• Accuracy 0.2%<br>• Easy setup wizard, microSD card, tube health check, up to 4 × I/O<br>• HART, Modbus<br>• Mass, density, temperature, volume | | **Transmitter FCT040 Advanced**<br>• Accuracy 0.1%<br>• Easy setup wizard, microSD card, tube health check, up to 4 × I/O<br>• HART, Modbus, PROFIBUS PA, PROFINET<br>• Mass, density, temperature, volume<br>• Fraction, batch, viscosity, net oil | |
|---|---|---|---|---|
| **Sensors** | **Compact**<br>Aluminum alloy | **Remote**<br>Aluminum alloy or CF 8M | **Compact**<br>Aluminum alloy | **Remote**<br>Aluminum alloy or CF 8M |
| **FCS100**<br>• DN 1 to DN 8<br>• Alloy 22 or 316L ss<br>• max. 260 °C (500 °F) (long neck)<br>• max. 285 bar (4 134 psi)<br>• Ex, PED, SIL2/3<br>• NACE, Marine, CT | Not available | FC120<br>  | Not available | FC140<br>  |
| **FCS500 non hygienic**<br>• DN 10 to DN 80<br>• 316L ss<br>• max. 200 °C (392 °F) (remote)<br>• max. 100 bar (1450 psi)<br>• Ex. PED. SIL2/3<br>• NACE, Marine, CT | FC520<br>  | FC520<br>  | FC540<br>  | FC540<br>  |
| **FCS500 hygienic**<br>• DN 10 to DN 50<br>• 316L ss, polished<br>• max. 140 °C (284 °F)<br>• max. 40 bar (580 psi)<br>• Ex. PED. SIL2/3<br>• EHEDG, 3A | FC520<br>  | FC520<br>  | FC540<br>  | FC540<br>  |

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## Design (continued)

**Overview of the available combinations and compatibility between sensors and transmitters**

| | | | | |
|---|---|---|---|---|
| **FCS600**<br>• DN 15 to DN 80<br>• Alloy 22 or 316L ss<br>• -196 °C ... +350 °C (-321 ... +662 °F)<br>• Max. 700 bar (10 153 psi)<br>• Ex, PED, SIL2/3<br>• NACE, Marine, CT<br>• EHEDG, 3A | FC620<br>  | FC620<br>  | FC640<br>  | FC640<br>  |
| **FCS700**<br>• DN 100 to DN 200<br>• Alloy 22 or 316L ss<br>• Max. 350 °C (662 °F)<br>• Max. 100 bar (1 450 psi)<br>• Ex, PED, SIL2/3<br>• NACE, Marine, CT | FC720<br>  | FC720<br>  | FC740<br>  | FC740<br>  |

***Selection Guide***

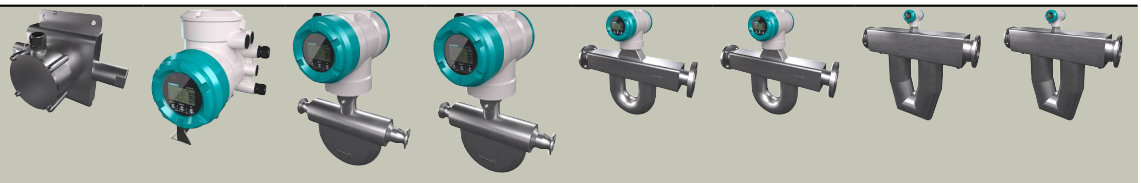


| | FCS100 sensors | | FCS500 sensors | | FCS600 sensors | | FCS700 sensors | |
|---|---|---|---|---|---|---|---|---|
| | FC120<br>7ME4412 | FC140<br>7ME4414 | FC520<br>7ME4452 | FC540<br>7ME4454 | FC620<br>7ME4462 | FC640<br>7ME4464 | FC720<br>7ME4472 | FC740<br>7ME4474 |
| **Design** | | | | | | | | |
| Compact | | | ● | ● | ● | ● | ● | ● |
| Remote | ● | ● | ● | ● | ● | ● | ● | ● |
| **Flow accuracy (liquids)** | | | | | | | | |
| Mass flow 0.1% | | ●[1] | | ● | | ● | | ● |
| Mass flow 0.2% | ● | | ● | | ● | | ● | |
| **Density accuracy (liquids)** | | | | | | | | |
| Density 0.5 kg/m³ | | ●[2] | | ●[2] | | ●[2] | | |
| Density 2 kg/m³ | | | | | | | | ● |

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## Design (continued)

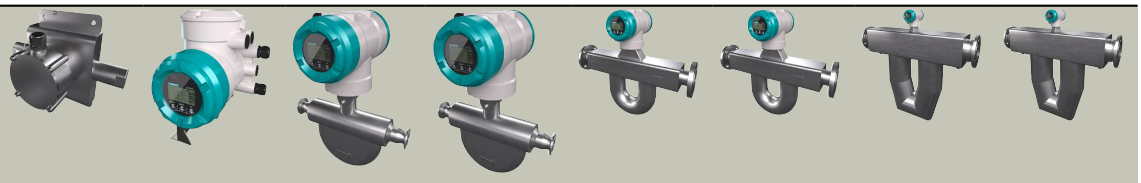


| | FCS100 sensors | | FCS500 sensors | | FCS600 sensors | | FCS700 sensors | |
|---|---|---|---|---|---|---|---|---|
| | FC120 7ME4412 | FC140 7ME4414 | FC520 7ME4452 | FC540 7ME4454 | FC620 7ME4462 | FC640 7ME4464 | FC720 7ME4472 | FC740 7ME4474 |
| Density 4 kg/m³ | ●[3] | | ● | | ●[3] | | ● | |
| **Flow accuracy (gases)** | | | | | | | | |
| Mass flow: 0.35% | | | | ● | | ●[4] | | ●[4] |
| Mass flow: 0.5% | | ● | | | | | | |
| Mass flow: 0.75% | ● | | ● | | ● | | ● | |
| **Transmitter enclosure** | | | | | | | | |
| IP66/IP67 | ● | ● | ● | ● | ● | ● | ● | ● |
| Cast aluminum Standard coating | ● | ● | ● | ● | ● | ● | ● | ● |
| Cast aluminum Corrosion protection coating | ● | ● | ● | ● | ● | ● | ● | ● |
| Stainless steel (remote only) | ● | ● | ● | ● | ● | ● | ● | ● |
| **Inputs and outputs** | | | | | | | | |
| Up to 4 input and output channels (passive or active) | ● | ● | ● | ● | ● | ● | ● | ● |
| Analog output | ● | ● | ● | ● | ● | ● | ● | ● |
| Pulse or status output | ● | ● | ● | ● | ● | ● | ● | ● |
| Pulse or status input | ● | ● | ● | ● | ● | ● | ● | ● |
| Analog input | | ● | | ● | | ● | | ● |
| **Communication** | | | | | | | | |
| HART | ● | ● | ● | ● | ● | ● | ● | ● |
| PROFIBUS PA | | ● | | ● | | ● | | ● |
| MODBUS | ● | ● | ● | ● | ● | ● | ● | ● |
| PROFINET | | ● | | ● | | ● | | ● |
| **Supply voltage** | | | | | | | | |
| 24 V DC | ● | ● | ● | ● | ● | ● | ● | ● |
| 115/230 V AC | ● | ● | ● | ● | ● | ● | ● | ● |
| **Sensor size** | | | | | | | | |
| DN 1 | ● | ● | | | | | | |
| DN 2 | ● | ● | | | ● | ● | | |
| DN 4 | ● | ● | | | ● | ● | | |
| DN 6 | ● | ● | | | | | | |
| DN 8 | ● | ● | | | | | | |
| DN 10 | | | ● | ● | | | | |
| DN 15 | | | ● | ● | ● | ● | | |
| DN 25 | | | ● | ● | ● | ● | | |
| DN 40 | | | | | ● | ● | | |
| DN 50 | | | ● | ● | | | | |
| DN 65 | | | | | ● | ● | | |
| DN 80 | | | ● | ● | | | | |
| DN 100 | | | | | | | ● | ● |
| DN 150 | | | | | | | ● | ● |
| DN 200 | | | | | | | ● | ● |
| **Pipe thread connections** | | | | | | | | |
| Internal G (BSPP) | ● | ● | ● DN 10/15 only | ● DN 10/15 only | ● DN 15 only | ● DN 15 only | | |
| Internal NPT | ● | ● | ● DN 10/15 only | ● DN 10/15 only | ● DN 15 only | ● DN 15 only | | |
| **Flange connections** | | | | | | | | |
| ASME B15.5 | ● | ● | ● | ● | ● | ● | ● | ● |
| EN 1092-1 | ● | ● | ● | ● | ● | ● | ● | ● |

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## Design (continued)

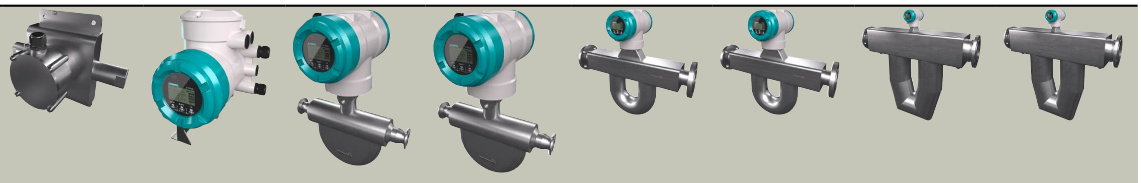


| | FCS100 sensors | | FCS500 sensors | | FCS600 sensors | | FCS700 sensors | |
|---|---|---|---|---|---|---|---|---|
| | FC120<br>7ME4412 | FC140<br>7ME4414 | FC520<br>7ME4452 | FC540<br>7ME4454 | FC620<br>7ME4462 | FC640<br>7ME4464 | FC720<br>7ME4472 | FC740<br>7ME4474 |
| JIS B 2220 | ● | ● | ● | ● | ● | ● | ● DN 100 only | ● DN 100 only |
| **Hygienic connections** | | | | | | | | |
| DIN 32676 clamp | ● | ● | ● | ● | ● | ● | | |
| ISO 2852 clamp | | | ● | ● | ● not DN 65 | ● not DN 65 | | |
| DIN 11851 thread | | | ● | ● | | | | |
| SMS 1145 thread | | | ● | ● | | | | |
| **Wetted part materials** | | | | | | | | |
| Alloy 22/2.4602 and 316L/1.4404 | ● | ● | | | | | | |
| 316L ss/1.4404 | | | ● | ● | ● | ● | ● | ● |
| Alloy 22/2.4602 | | | | | ● | ● | ● DN 100 only | ● DN 100 only |
| **Maximum pressure** | | | | | | | | |
| 100 bar g [5] | | | ● | ● | | | ● | ● |
| 260 bar g [5] | | | | | ● | ● | | |
| 285 bar g [5] | ● | ● | | | | | | |
| 700 bar g [5] | | | | | ● | | | |
| **Temperature range compact** | | | | | | | | |
| Standard<br>-50 ... +150 °C<br>(-58 ... +302 °F) | | | ● [6], [7] | ● [6], [7] | ● [6], [7] | ● [6], [7] | ● | ● |
| **Temperature range remote** | | | | | | | | |
| Standard<br>-50 ... +150 °C<br>(-58 ... +302 °F) | ● [7] | ● [7] | | | | | | |
| Standard<br>-70 ... +200 °C<br>(-94 ... +392 °F) | | | ● [6], [7] | ● [6], [7] | | | | |
| Standard<br>-70 ... +150 °C<br>(-94 ... +302 °F) | | | | | ● [6], [7] | ● [8], [9] | ● | ● |
| Medium<br>-50 ... +260 °C<br>(-58 ...+500 °F) | ● [8], [9] | ● [8], [9] | | | | | | |
| Medium<br>-70 ... +230 °C<br>(-94 ... +446 °F) | | | | | ● [8], [9] | ● [8], [9] | ● [8] | ● [8] |
| High<br>0 ... 350 °C (32 ... 662 °F) | | | | | ● [8], [9] | ● [8], [9] | ● [8] | ● [8] |
| Low<br>-196 ... +150 °C<br>(-321 ... +302 °F) | | | | | ● [8], [9] | ● [8], [9] | | |
| **Sensor features** | | | | | | | | |
| Cleaning for oxygen service | ● | ● | ● | ● | ● | ● | ● | ● |
| Insulation and heat tracing | ● | ● | | | ● | ● | ● | ● |
| Polished surface<br>Ra ≤ 0.8 µm | | | ● | ● | ● | ● | | |
| Rupture disk | | | | | ● | ● | ● | ● |
| Customer defined built-in length | ● | ● | ● | ● | ● | ● | ● | ● |
| Namur NE132 built-in length | ● | ● | ● | ● | ● | ● | ● | ● |

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## Design (continued)



| | FCS100 sensors | | FCS500 sensors | | FCS600 sensors | | FCS700 sensors | |
|---|---|---|---|---|---|---|---|---|
| | FC120 7ME4412 | FC140 7ME4414 | FC520 7ME4452 | FC540 7ME4454 | FC620 7ME4462 | FC640 7ME4464 | FC720 7ME4472 | FC740 7ME4474 |
| **Software functions** | | | | | | | | |
| Thermal energy | | ● | | ● | | ● | | ● |
| Fraction | | ● | | ● | | ● | | ● |
| Viscosity | | ● | | ● | | ● | | ● |
| Batching | | ● | | ● | | ● | | ● |
| Net oil computing | | ● | | ● | | ● | | ● |
| Tube health check | ● | ● | ● | ● | ● | ● | ● | ● |
| **Hazardous area (Ex) approvals** | | | | | | | | |
| ATEX | ● | ● | ● | ● | ● | ● | ● | ● |
| IECEx | ● | ● | ● | ● | ● | ● | ● | ● |
| FM | ● | ● | ● | ● | ● | ● | ● | ● |
| EAC Ex | ● | ● | ● | ● | ● | ● | ● | ● |
| NEPSI | ● | ● | ● | ● | ● | ● | ● | ● |
| Korea Ex | ● | ● | ● | ● | ● | ● | ● | ● |
| **Hygienic approvals** | | | | | | | | |
| 3-A certificate Ra ≤ 0.8 µm | | | ● | ● | ● | ● | | |
| EHEDG certificate Ra ≤ 0.8 µm | | | ● | ● | ● | ● | | |
| **Marine approvals (Classes 2 and 3)** | | | | | | | | |
| Det Norske Veritas | ● | ● | ● | ● | ● | ● | ● | ● |
| Lloyds Register | ● | ● | ● | ● | ● | ● | ● | ● |
| Bureaux Veritas | ● | ● | ● | ● | ● | ● | ● | ● |
| American Bureaux of Shipping | ● | ● | ● | ● | ● | ● | ● | ● |
| Korean Register | ● | ● | ● | ● | ● | ● | ● | ● |
| **Additional approvals** | | | | | | | | |
| NACE MR0175, MR0103 | ● | ● | ● | ● | ● | ● | ● | ● |
| Pressure Equipment Directive | ● | ● | ● | ● | ● | ● | ● | ● |
| Functional Safety SIL 2/3 | ● | ● | ● | ● | ● | ● | ● | ● |
| Custody Transfer (NTEP accuracy class 0.3) | ● | ● | ● | ● | ● | ● | ● | ● |
| NAMUR NE 21, NE 95 | ● | ● | ● | ● | ● | ● | ● | ● |
| EMC | ● | ● | ● | ● | ● | ● | ● | ● |
| Low voltage | ● | ● | ● | ● | ● | ● | ● | ● |
| RoHS | ● | ● | ● | ● | ● | ● | ● | ● |

● = Available

1) FC140 meters in sizes DN 1 and DN 2 have 0.2% liquid mass flow accuracy.
2) Some sensor sizes do not have 0.5 kg/m³ (0,03 lb/ft³) density accuracy with FCT040 transmitters. Refer to technical specifications for more details.
3) Some sensor sizes do not have 4 kg/m³ (0,25 lb/ft³) density accuracy with FCT020 transmitters. Refer to technical specifications for more details.
4) Some sensor sizes do not have 0.35% gas mass flow accuracy with FCT040 transmitters. Refer to technical specifications for more details.
5) Maximum pressure ratings may be lower than shown, depending on the type of process connection (fitting) selected. Refer to the technical specifications for more details.
6) With hygienic thread fittings temperature range is -50 ... +140 °C (-58 ... +284 °F).
7) With hygienic clamp fittings temperature range is -10 ... +140 °C (14 ... 284 °F).
8) Long neck sensor option is mandatory for low (cryogenic), medium and high temperature ranges.
9) Hygienic fittings cannot be selected with low (cryogenic), medium and high temperature ranges.

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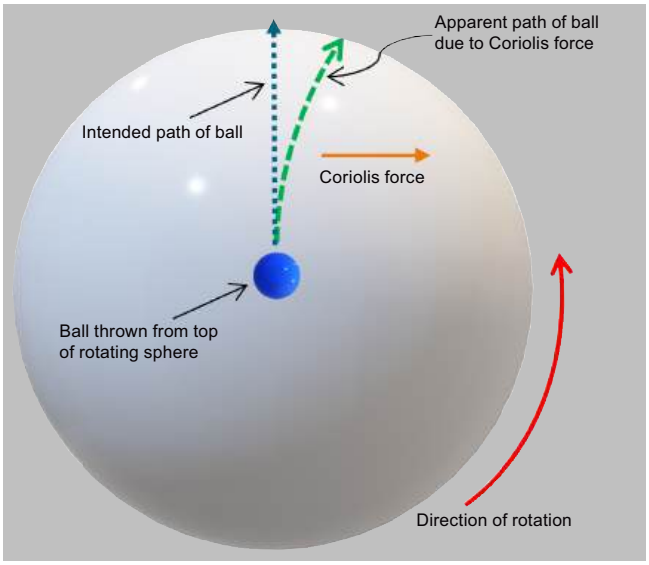


## Mode of operation

***The Coriolis Effect***

Gaspar-Gustave de Coriolis (1792–1843) was a French mathematician, mechanical engineer and scientist. His work explained the supplementary forces detected in a rotating frame of reference, one of which would eventually bear his name.

Imagine that the rotating sphere in the sketch below is the earth, with the viewer looking down from above. When a ball is thrown from the top of the sphere (north pole) several forces act upon it including centrifugal force and gravity. Our focus is on the Coriolis force which acts perpendicular to the flight of the ball and opposite to the direction of rotation. The path of the ball is shifted to the right, away from its intended path due to the Coriolis effect.

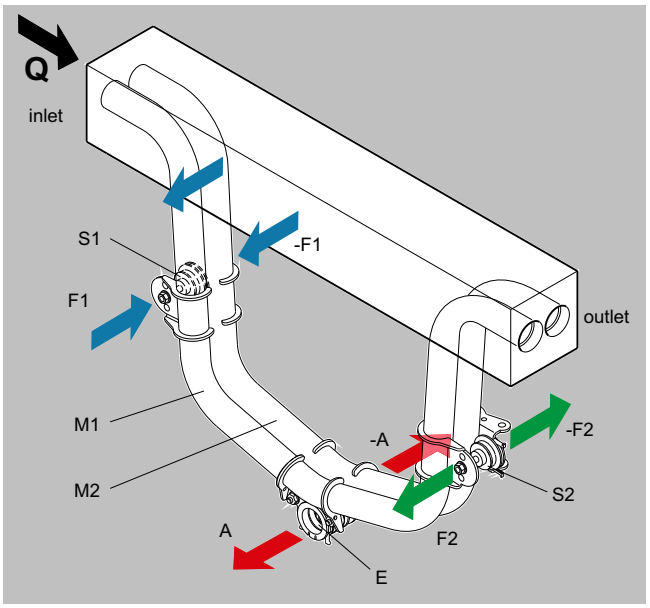



Coriolis force: effect on the direction of rotation

Inside the Coriolis flowmeter an oscillating system is used in place of continuous rotation.

SITRANS FC sensors are energized by an electromagnetic driver which causes the twin measuring tubes to oscillate at their resonant frequency. The oscillation generates back and forth rotation at the tube ends, close to the electromagnetic pickups S1 and S2.

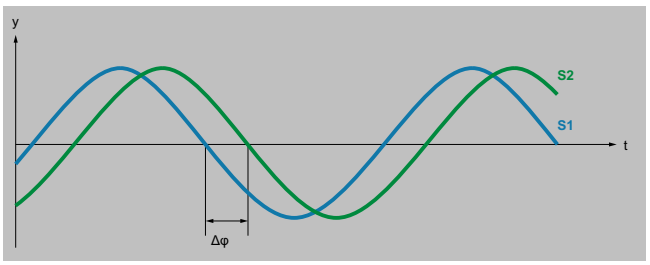
## Mode of operation (continued)




| | |
|---|---|
| M1, M2 | Measuring tubes |
| S1, S2 | Pick-offs |
| F1, F2 | Coriolis forces |
| E | Driver system |
| A | Direction of measuring tube vibration |
| Q | Direction of fluid flow |

When the fluid in the rotating system is not flowing, there is no Coriolis force. As fluid starts to flow, Coriolis forces are generated (*F1* and *F2*), together with a phase shift (time difference) between the output of pickups.

The phase shift is directly proportional to the **mass flow rate** of the flowing fluid, and it can be measured with high accuracy.




Mass flow rate proportional to phase shift

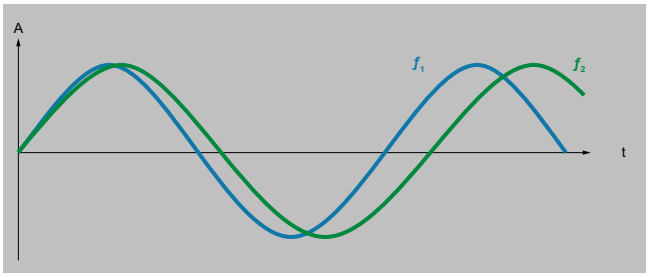
| | |
|---|---|
| Δφ | Phase shift |
| t | Time |
| S1, S2 | Pick-offs |

**Fluid density** becomes the second primary measurement, achieved using the inverse relationship between fluid density and tube resonant frequency. Fluid 2 frequency $f_2$ is lower than fluid 1 frequency $f_1$, therefore fluid 2 has a greater density than fluid 1.

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## Mode of operation (continued)




Density inversely proportional to frequency

| | |
|---|---|
| A | Measuring tube displacement |
| t | Time |
| $f_1$ | Resonance frequency with fluid 1 |
| $f_2$ | Resonance frequency with fluid 2 |

The third primary measurement, **temperature**, is made using a PT1000 temperature sensor.

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## Function

Before making out your order for Coriolis flowmeters, why not let Siemens measurement experts help with the planning and specification of your new plant or existing process upgrade. Coriolis meters can be expensive, but not when you use the proven multi-measurement power to get real value from your investment by loading all the potential functionality into a single device.

Primary measurements

Make use of the three independent primary process variables, measured simultaneously and continuously.

Mass flow rate with liquid accuracy up to 0.1% of actual flow

Directly proportional to the phase shift measured between the two pickups mounted at either end of the oscillating tubes – the shift is created by the naturally occurring Coriolis forces acting on the tubes whenever fluid flows through.

In-line fluid density with choice of accuracies to suit your application

Inversely proportional to the oscillating system's resonant frequency. The tubes are driven to resonance with an electromagnetic driver circuit flexible enough to allow the tubes to find their natural resonant frequency, defined by the density of the fluid passing through.

Process temperature

Provided by the process industries' go to high resolution device, a PT1000 resistance temperature detector (RTD).

Secondary measurement possibilities

No need to stop at three measurements, but instead take advantage of the computing ability of the SITRANS FCT020 or FCT040 transmitters to make secondary measurements.

Volume flow rate

Both transmitters, FCT020 standard and FCT040 advanced, calculate volume flow from mass flow and density using the simple school physics formula: density = mass / volume.

FCT040 secondary measurements

Measurements below are available only with the SITRANS FCT040 advanced transmitter.

Standard concentration

Used for concentration measurements of emulsions or suspensions when fluid density depends largely on temperature.

The standard concentration measurement can be used for many low-concentration solutions if there is only minor interaction between the liquids or if the miscibility is negligible.

Fraction (advanced concentration)

Up to four pre-configured fraction ranges can be selected using the SITRANS FC option order codes from the table below.

| Order code | Fraction description | Type | Range | Unit | Temperature range |
|---|---|---|---|---|---|
| **G01** | Sugar / water (sucrose solution) | Mass fraction | 0 ... 85 | °Bx | 0 ... 80 °C (32 ... 176 °F) |
| **G02** | NaOH / water (sodium hydroxide solution) | Mass fraction | 2 ... 50 | % | 0 ... 100 °C (32 ... 212 °F) |
| **G03** | KOH / water (potassium hydroxide solution) | Mass fraction | 0 ... 60 | % | 54 ... 100 °C (129 ... 212 °F) |
| **G04** | $NH_4NO_3$ / water (ammonium nitrate solution) | Mass fraction | 1 ... 50 | % | 0 ... 80 °C (32 ... 176 °F) |
| **G05** | $NH_4NO_3$ / water (ammonium nitrate solution) | Mass fraction | 20 ... 70 | % | 20 ... 100 °C (68 ... 212 °F) |
| **G06** | HCl / water (hydrochloric acid) | Mass fraction | 22 ... 34 | % | 20 ... 40 °C (68 ... 104 °F) |
| **G07** | $HNO_3$ / water (nitric acid) | Mass fraction | 50 ... 67 | % | 10 ... 60 °C (50 ... 140 °F) |
| **G09** | $H_2O_2$ / water (hydrogen peroxide) | Mass fraction | 30 ... 75 | % | 4 ... 44 °C (39 ... 111 °F) |
| **G10** | Ethylene glycol / water (homogenous mixture) | Mass fraction | 10 ... 50 | % | -20 ... +40 °C (-4 ... +104 °F) |
| **G11** | Amylum (starch) / water (paste-like suspension) | Mass fraction | 33 ... 43 | % | 35 ... 45 °C (95 ... 113 °F) |
| **G12** | Methanol / water (homogenous mixture) | Mass fraction | 35 ... 60 | % | 0 ... 40 °C (32 ... 104 °F) |
| **G20** | Alcohol / water (homogenous mixture) | Volume fraction | 55 ... 100 | % | 10 ... 40 °C (50 ... 104 °F) |
| **G21** | Sugar / water (sucrose solution) | Mass fraction | 40 ... 80 | °Bx | 75 ... 100 °C (167 ... 212 °F) |
| **G30** | Alcohol / water (homogenous mixture) | Mass fraction | 66 ... 100 | % | 15 ... 40 °C (59 ... 104 °F) |
| **G37** | Alcohol / water (homogenous mixture) | Mass fraction | 66 ... 100 | % | 10 ... 40 °C (50 ... 104 °F) |

Fraction A & B volume flow rate (net flow computing)

Example: In an alcohol application the net volume flow rate of each component of the mixture can be displayed and transmitted. So, volume flow of ethanol (fraction A) and volume flow of water (fraction B) are both available.

Fraction A & B mass flow rate (net flow computing)

Like the volume example but with mass flow units for each fraction.

Petroleum measurement function / Net oil computing (NOC)

The NOC function provides real-time measurements of water cut and includes American Petroleum Institute (API) correction according to API MPMS Chapter 11.1.

Oil sometimes contains entrained gas. SITRANS FC meters measure the density of the combined emulsion oil and gas, which is lower than the oil density. The NOC function includes a Gas Void Fraction (GVF) parameter to be set.

Viscosity measurement

Viscosity is sometimes used as reference value to activate other processes like fluid heating systems.

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## Function (continued)

The viscosity estimation is calculated based on a comparison between measured pressure loss and a calculated value between two points of the pipe. A differential pressure transmitter is required to use this function. Its output is connected to the analog input of the FCT040. Based on an iteration process, a viscosity value is determined.

Thermal energy calculation (heat quantity measurement)

Either a constant value of the calorific value of the fluid can be used, or an additional device like a gas chromatograph can provide the instantaneous calorific value via the analog input of the FCT040 transmitter.

Based on the fluid flow, the total calorific energy of the fluid is calculated.

***Additional functions available with SITRANS FC Coriolis flowmeters***

Tube health check

This feature is available in both transmitters, FCT020 and FCT040.

Tube health check monitors key diagnostics, including tube stiffness, driver and pickups. Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout, or solid deposits building up in the tubes. The user defines verification frequency and alarm behavior. Verification results indicate whether preventive maintenance action is required.

Six totalizers

A maximum of six totalizers can be used on the device to provide accumulation of process flow variables, including:

- Mass flow
- Volume flow
- Corrected volume flow
- Energy

When a concentration option has been selected in the order code, additional variables can be assigned to the totalizers:

- Net mass flow, component A or B
- Net volume flow, component A or B
- Net corrected volume flow

Universal power supply

Single power supply compatible with DC and AC supply voltage

Easy Setup Wizard

For the most important functions, there is a wizard menu to help set up common parameters used in many applications, such as date, installation, display, outputs and totalizers.

Event Management

According to NAMUR NE107

Batch control

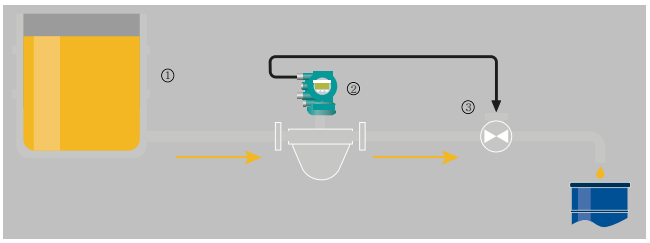
Batching and filling processes are found in many industries: food and beverage, cosmetic, pharmaceutical, oil and gas, and chemical.

SITRANS FCT040 transmitters offer an integrated batching function to carry out the task. A self-learning algorithm optimizes the process to provide accurate and reliable results.

The function supports two filling modes:

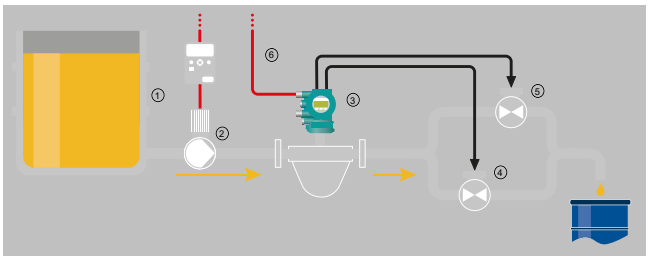
- Single-stage batch control with single valve
- Two-stage batching to control two valves for more accurate filling

The error management function allows the user to set alarms and warnings according to the application.



Example diagram for 1-stage batching

| | |
|---|---|
| 1 | Storage tank |
| 2 | SITRANS FC |
| 3 | Valve |



Example diagram for 2-stage batching

| | |
|---|---|
| 1 | Storage tank |
| 2 | Pump |
| 3 | SITRANS FC |
| 4 | Valve A |
| 5 | Valve B |
| 6 | HART |

For questions regarding a specific application, contact your regional Siemens Measurement Intelligence team.

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## Technical specifications

***Mass flow rate of liquids***

The mass flow rate characteristics of SITRANS FC meters are defined by the values of zero stability, $Q_{flat}$, $Q_{nom}$ and $Q_{max}$.

Zero stability is the maximum allowable flow rate value that can be displayed at zero flow under reference conditions. It is a good indicator of the meter performance as flow rates reduce, and approach zero.

$Q_{flat}$ is the mass flow rate above which the base accuracy is maintained (0.1% when using FCT040 transmitters).

$Q_{nom}$ is the nominal mass flow rate of water at reference conditions that would result in a pressure drop of 1 bar (15 psi).

$Q_{max}$ is the recommended maximum mass flow rate for each sensor size.

FCS100: the precision sensor for low flow rates

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| DN 1 | 0.003 | 0.007 | 2.52 | 0.092 | 21.0 | 0.0771 | 40.0 | 1.47 |
| DN 2 | 0.005 | 0.011 | 4.50 | 0.165 | 45.0 | 1.65 | 94.0 | 3.45 |
| DN 4 | 0.009 | 0.020 | 14.0 | 0.514 | 170 | 6.24 | 300 | 11.0 |
| DN 6 | 0.019 | 0.042 | 30.0 | 1.10 | 370 | 13.6 | 600 | 22.0 |
| DN 8 | 0.048 | 0.106 | 79.0 | 2.90 | 950 | 34.9 | 1 500 | 55.1 |

FCS500: the universal sensor for standard and hygienic applications

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| DN 10 | 0.032 | 0.070 | 80.0 | 2.94 | 1 600 | 58.7 | 2 300 | 84.4 |
| DN 15 | 0.090 | 0.198 | 235 | 8.62 | 4 700 | 172 | 7 000 | 257 |
| DN 25 | 0.400 | 0.880 | 1 000 | 36.7 | 20 000 | 734 | 29 000 | 1 064 |
| DN 50 | 2.55 | 5.61 | 2 550 | 93.6 | 51 000 | 1872 | 76 000 | 2 789 |
| DN 80 | 8.50 | 18.7 | 8 500 | 312 | 170 000 | 6239 | 255 000 | 9 359 |

FCS600: the resistant sensor for high pressure, high temperature, cryogenic and corrosive liquids

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| DN 2 | 0.005 | 0.011 | 4.00 | 0.147 | 45.0 | 1.65 | 94.0 | 3.45 |
| DN 4 | 0.018 | 0.040 | 14.0 | 0.514 | 170 | 6.24 | 300 | 11.0 |
| DN 15 | 0.150 | 0.330 | 250 | 9.18 | 3 000 | 110 | 5 000 | 184 |
| DN 25 | 0.500 | 1.10 | 830 | 30.5 | 10 000 | 367 | 17 000 | 624 |
| DN 40 | 1.60 | 3.52 | 2 670 | 98.0 | 32 000 | 1 174 | 50 000 | 1 835 |
| DN 65 | 5.00 | 11.0 | 8 330 | 306 | 100 000 | 3 670 | 170 000 | 6 239 |

FCS700: the grande sensor for high flow rates

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| DN 100 | 13.0 | 28.6 | 20 000 | 734 | 250 000 | 9 175 | 300 000 | 11 010 |
| DN 150 | 25.0 | 55.0 | 38 000 | 1 395 | 500 000 | 18 350 | 600 000 | 22 020 |
| DN 200 | 27.0 | 59.4 | 45 000 | 1 652 | 900 000 | 33 030 | 1 100 000 | 40 370 |

Volumetric liquid flow characteristics and gas flow capability

When measuring volume flow rate and gas flow rates, fluid properties will influence the selection of sensor type and size. Please contact your regional Siemens Measurement Intelligence team for further assistance. Based on your application details, they will be able to provide suitable sizing and selection advice.

Mass flow calibration and density adjustment for liquids

Siemens SITRANS FC Coriolis meters are calibrated in rigs accredited according to the international standard DIN EN ISO/IEC 17025:2018. Each flowmeter comes with a standard calibration certificate.

Mass flow calibration takes place at reference conditions. Specific values are listed in the standard calibration certificate.

| Mass flow calibration reference conditions | |
|---|---|
| Fluid | Water |
| Density | 900 ... 1 100 kg/m³ (56 ... 69 lb/ft³) |
| Fluid temperature | 10 ... 35 °C (50 ... 95 °F), average temperature: 22.5 °C (72.5 °F) |
| Ambient temperature | 10 ... 35 °C (50 ... 95 °F) |
| Process pressure | 1 ... 5 bar (15 ... 73 psi) |

Liquid density calibration is performed when density accuracy of 0.5 kg/m³ (0.03 lb/ft³) is selected in the model code.

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## Technical specifications (continued)

| Density calibration reference conditions | |
|---|---|
| **Flow condition** | Fully developed flow profile |
| **Fluid densities used to obtain density calibration constants** | 700 kg/m³ (44 lb/ft³)<br>1 000 kg/m³ (62 lb/ft³)<br>1 650 kg/m³ (103 lb/ft³) |
| **Fluid temperature** | 20 °C (68 °F) |
| **Determination of temperature compensation coefficients** | 20 ... 80 °C (68 ... 176 °F) |

***Performance specifications***

SITRANS FCS100: the precision sensor for low flow applications

| Sensor size | | | DN 1 | DN 2 | DN 4 | DN 6 | DN 8 |
|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.2 | ±0.2 | ±0.2 | ±0.2 | ±0.2 |
| | % (of rate) | FCT040 | ±0.2 | ±0.2 | ±0.1 | ±0.1 | ±0.1 |
| Zero stability | kg/h (lb/h) | | ±0.003 (0.007) | ±0.005 (0.011) | ±0.009 (0.02) | ±0.019 (0.042) | ±0.048 (0.106) |
| **Density (liquids)** | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ±20 (1.25) | ±8 (0.5) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) |
| | kg/m3 (lb/ft³) | FCT040 | ±20 (1.25) | ±8 (0.5) | ±1 (0.06) | ±0.5 (0.03) | ±0.5 (0.03) |
| **Mass flow (gases)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.75 | ±0.75 | ±0.75 | ±0.75 | ±0.75 |
| | % (of rate) | FCT040 | ±0.5 | ±0.5 | ±0.5 | ±0.5 | ±0.5 |
| **Temperature** | | | | | | | |
| Accuracy | °C (°F) | | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) |

SITRANS FCS500: the universal sensor for routine and hygienic applications

| Sensor size | | | DN 10 | DN 15 | DN 25 | DN 50 | DN 80 |
|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.2 | ±0.2 | ±0.2 | ±0.2 | ±0.2 |
| | % (of rate) | FCT040 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Zero stability | kg/h (lb/h) | | ±0.032 (0.07) | ±0.09 (0.198) | ±0.4 (0.88) | ±2.55 (5.61) | ±8.5 (18.7) |
| **Density (liquids)** | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) |
| | kg/m³ (lb/ft³) | FCT040 | ±0.5 (0.03) | ±0.5 (0.03) | ±0.5 (0.03) | ±0.5 (0.03) | ±1 (0.06) |
| **Mass flow (gases)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.75 | ±0.75 | ±0.75 | ±0.75 | ±0.75 |
| | % (of rate) | FCT040 | ±0.35 | ±0.35 | ±0.35 | ±0.35 | ±0.35 |
| **Temperature** | | | | | | | |
| Accuracy | °C (°F) | | ±1 (1.8) | ±1 (1.8) | ±1 (1.8) | ±1 (1.8) | ±1 (1.8) |

SITRANS FCS600: the resistant sensor for high pressure, high temperature, cryogenic and corrosive liquids

| Sensor size | | | DN2 | DN4 | DN15 | DN25 | DN40 | DN65 |
|---|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.2 | ±0.2 | ±0.2 | ±0.2 | ±0.2 | ±0.2 |
| | % (of rate) | FCT040 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Zero stability | kg/h (lb/h) | | ±0.005 (0.011) | ±0.018 (0.44) | ±0.15 (0.33) | ±0.5 (1.1) | ±1.6 (3.52) | ±5 (11) |
| **Density (liquids)** | | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ±8 (0.5) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) |
| | kg/m3 (lb/ft³) | FCT040 | ±8 (0.5) | ±1 (0.06) | ±0.5 (0.03) | ±0.5 (0.03) | ±0.5 (0.03) | ±0.5 (0.03) |
| **Mass flow (gases)** | | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.75 | ±0.75 | ±0.75 | ±0.75 | ±0.75 | ±0.75 |
| | % (of rate) | FCT040 | ±0.5 | ±0.5 | ±0.35 | ±0.35 | ±0.35 | ±0.35 |
| **Temperature** | | | | | | | | |
| Accuracy | °C (°F) | | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) | ±0.5 (0.9) |

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## Technical specifications (continued)

FCS700: the grande sensor for high flow rates

| Sensor size | | | DN100 | DN150 | DN200 |
|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.2 | ±0.2 | ±0.2 |
| | % (of rate) | FCT040 | ±0.1 | ±0.1 | ±0.1 |
| Zero stability | kg/h (lb/h) | | ±13 (28.6) | ±25 (55) | ±27 (59.4) |
| **Density (liquids)** | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ±4 (0.25) | ±4 (0.25) | ±4 (0.25) |
| | kg/m³ (lb/ft³) | FCT040 | ±2 (0.12) | ±2 (0.12) | ±2 (0.12) |
| **Mass flow (gases)** | | | | | |
| Accuracy | % (of rate) | FCT020 | ±0.75 | ±0.75 | ±0.75 |
| | % (of rate) | FCT040 | ±0.35 | ±0.35 | ±0.5 |
| **Temperature** | | | | | |
| Accuracy | °C (°F) | | ±1 (1.8) | ±1 (1.8) | ±1 (1.8) |

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## Overview

SITRANS FCS100 sensor is the precision Coriolis flow sensor for low flow applications.

Features:

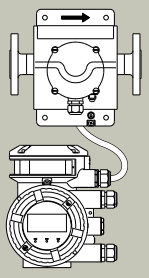
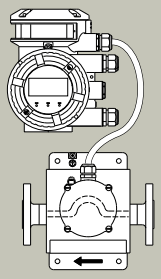
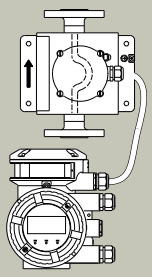
- Possibly the most compact dual curve Coriolis flow sensor
- Nominal sizes: DN 1 to DN 8
- Process connection: flange, thread, or hygienic clamp
- Install in tight spaces with no inlet and outlet restrictions
- Sizes to suit pilot plants, R & D labs, and high value fluid additives
- FCS100 sensors always combine with a remote transmitter via a connecting cable
- Installation of sensor and transmitter in different locations



FCS100 sensor

## Design

***Sensor installation position related to type of fluid***

| Installation position | Fluid | Description |
|---|---|---|
| **Position 1**  | Liquid | • Horizontal<br>• Measuring tubes below process pipe<br>• Avoids accumulation of entrained gas |
| **Position 2**  | Gas | • Horizontal<br>• Measuring tubes above process pipe<br>• Accumulation of liquid or condensate is less likely |
| **Position 3**  | Gas / Liquid | • Vertical<br>• Upwards direction of flow<br>• In liquid application accumulation of entrained gas is avoided<br>• This position allows self-draining in liquid flow |

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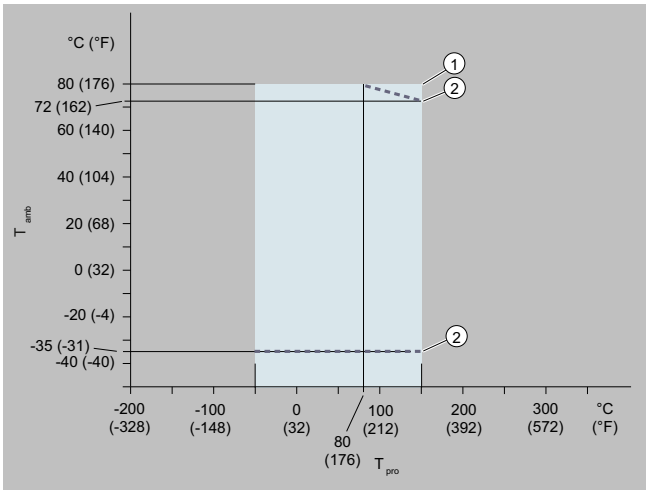
## Technical specifications

### *Allowed ambient temperature for FCS100 sensors*

The allowed combinations of process fluid and ambient temperature for the sensor are illustrated as light areas in the diagrams below.

Standard temperature specification, remote type

(except versions with hygienic clamp process connections)

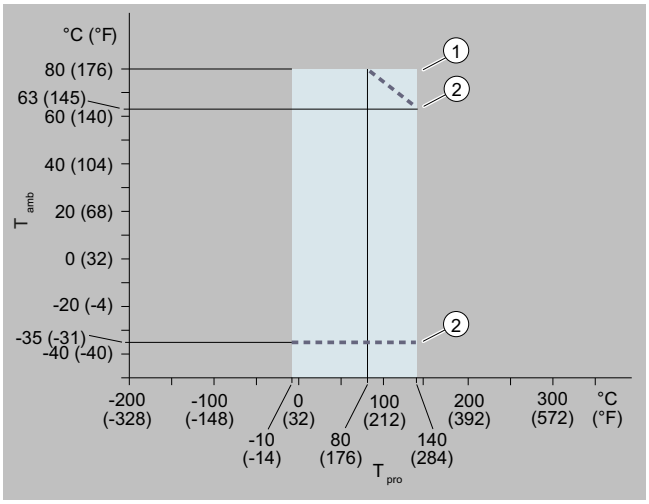



Allowed process fluid and ambient temperatures, remote type (except hygienic clamp process connections)

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

Standard temperature specification, remote type

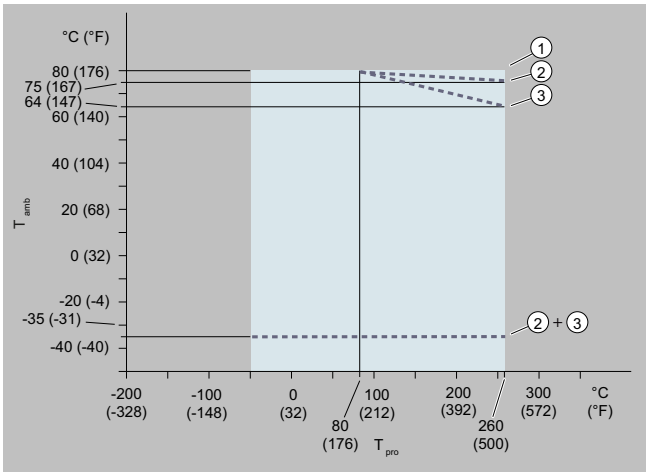
(versions with hygienic clamp process connection versions only)




Allowed process fluid and ambient temperatures, remote type (hygienic clamp process connections only)

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

Medium temperature specification, remote type



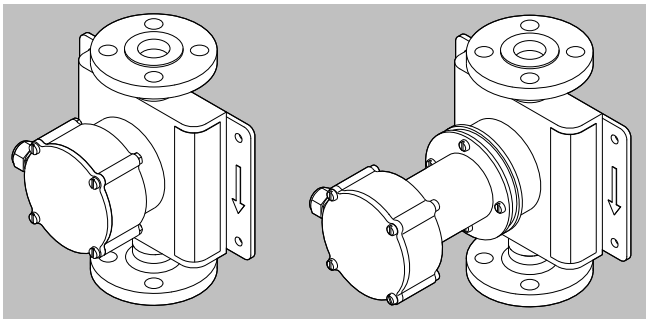

Allowed process fluid and ambient temperatures

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Fire retardant cable without insulation options |
| 3 | Fire retardant cable with insulation options *JXX* |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

### *Mechanical specifications of FCS100 sensors*

The FCS100 sensor is available in standard neck and long neck designs. The neck can also be described as the pedestal connecting the sensor body to the terminal housing.

When configuring FCS100 sensors with medium range temperature specification (up to 260 °C (500 °F)), it is compulsory to select long neck options. Order code position 14 (Mounting style, Transmitter housing and material) includes the neck options.



FCS100 sensor with standard neck and long neck designs

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## Technical specifications (continued)

Materials

| Material specifications | | |
|---|---|---|
| **Wetted parts**[1] | | |
| Process connections | AISI 316L stainless steel, W Nr. 1.4404 | |
| Measuring tubes | alloy 22/2.4602 | |
| **Sensor housing** | | |
| Junction box | AISI 316L stainless steel | W Nr. 1.4404 |
| Neck | similar to ASTM CF-8 cast stainless steel | W Nr. 1.4308 |
| Body | AISI 304 stainless steel | W Nr. 1.4301 (order code option B01) |
| | AISI 316L stainless steel | W Nr. 1.4404 (order code option B02) |
| **Nameplates**[2] | **Process temperature range** | **Material** |
| Sensor with AISI 304 stainless steel housing | Standard, up to 150 °C (302 °F) | Polyester film |
| Sensor with AISI 304 stainless steel housing | Medium, up to 260 °C (500 °F) | AISI 316L ss |
| Sensor with AISI 316L stainless steel housing | All | AISI 316L ss |

1) The user is responsible to ensure chemical compatibility of the material of the wetted parts with the measured process fluid.
2) Nameplate material depends on the materials selected for SITRANS FC sensors.

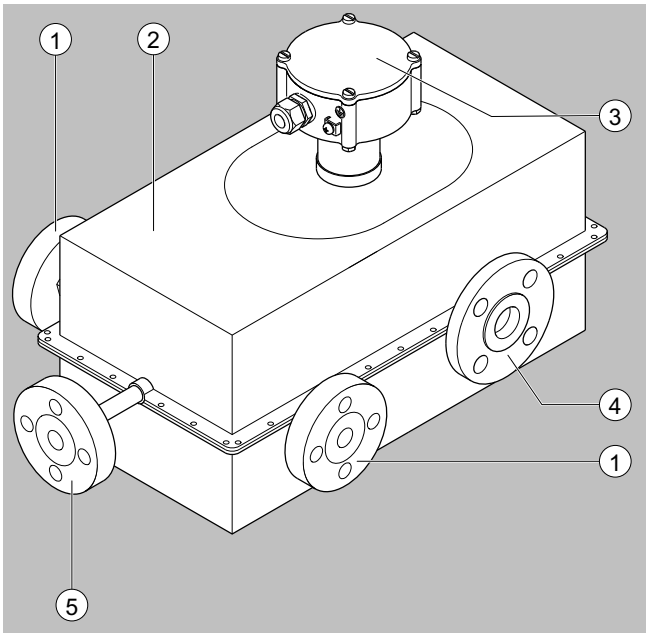
### *Secondary containment*

Some applications or environment conditions require secondary containment retaining the process pressure for increased safety. SITRANS FCS100 sensors have a secondary containment filled with inert gas.

| | |
|---|---|
| Typical burst pressure at room temperature for sizes | 65 bar (942 psi) |

### *Insulation and heat tracing*

In cases where fluid temperature deviates more than 80 °C from ambient temperature, sensor insulation is recommended to avoid negative effects from temperature fluctuations.




Configuration of FCS100 sensor with insulation and heat tracing

| | |
|---|---|
| 1 | Heating tracing connection |
| 2 | Insulation |
| 3 | Sensor terminal box |
| 4 | Process connection |
| 5 | Purging connection |

### *Maximum temperature of heat carrier*

| Order code position 12 | Process temperature range | Temperature range of heat carrier |
|---|---|---|
| 1 | Standard, up to 150 °C (302 °F) | 0 ... 150 °C (32 ... 302 °F) |
| 2 | Medium, up to 260 °C (500 °F) | 0 ... 200 °C (32 ... 392 °F) |

Insulation and heat tracing may be installed by the user but not in hazardous areas and the following must be noted:

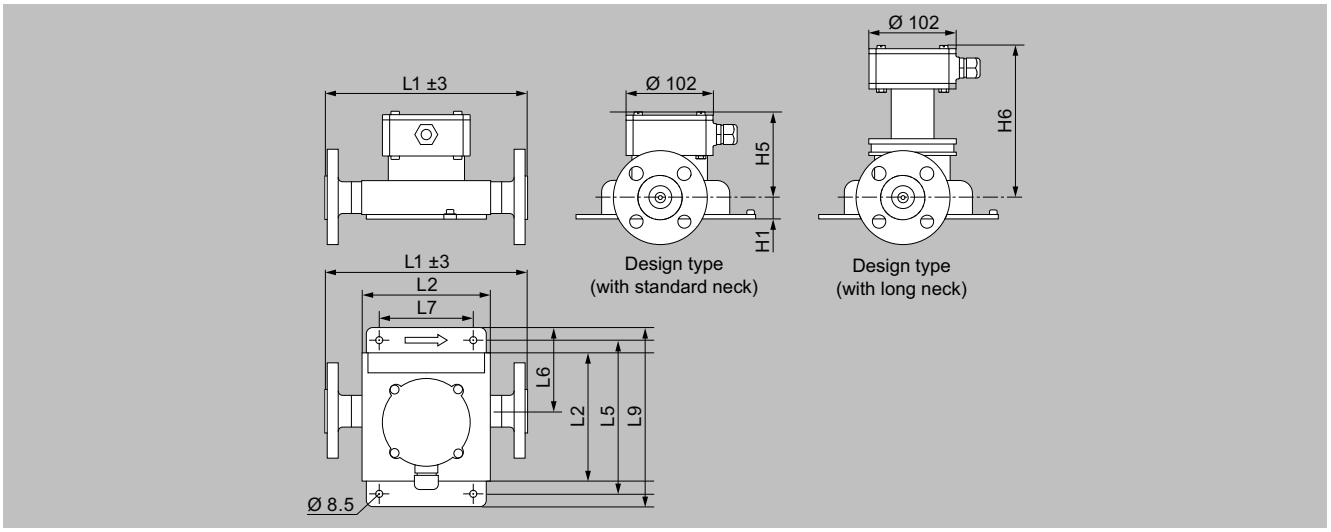
- Do not insulate sensor terminal box.
- Do not expose transmitters to ambient temperatures exceeding 60 °C (140 °F)
- The preferred insulation is 60 mm (2.36 inch) thick with a heat transfer coefficient of 0.4 W/m² K (0.07 Btu/ ft² °F)

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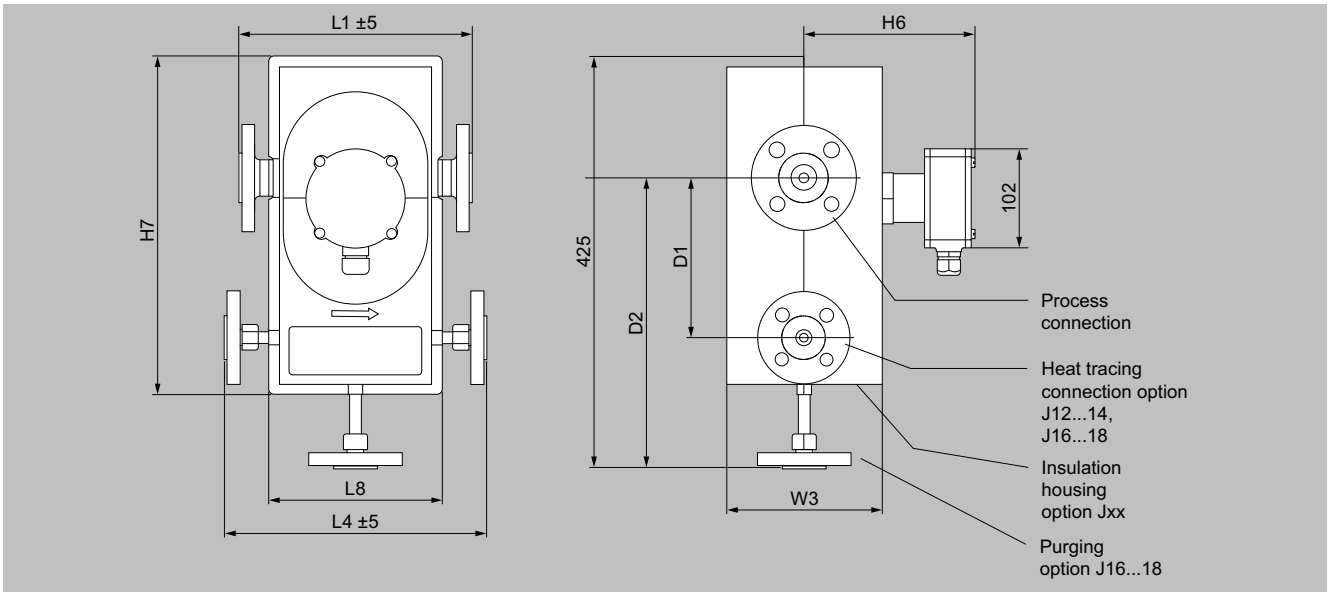


## Dimensional drawings

***Drawings, dimensions and weight for FCS100 sensors***




FCS100 sensor, dimensions in mm

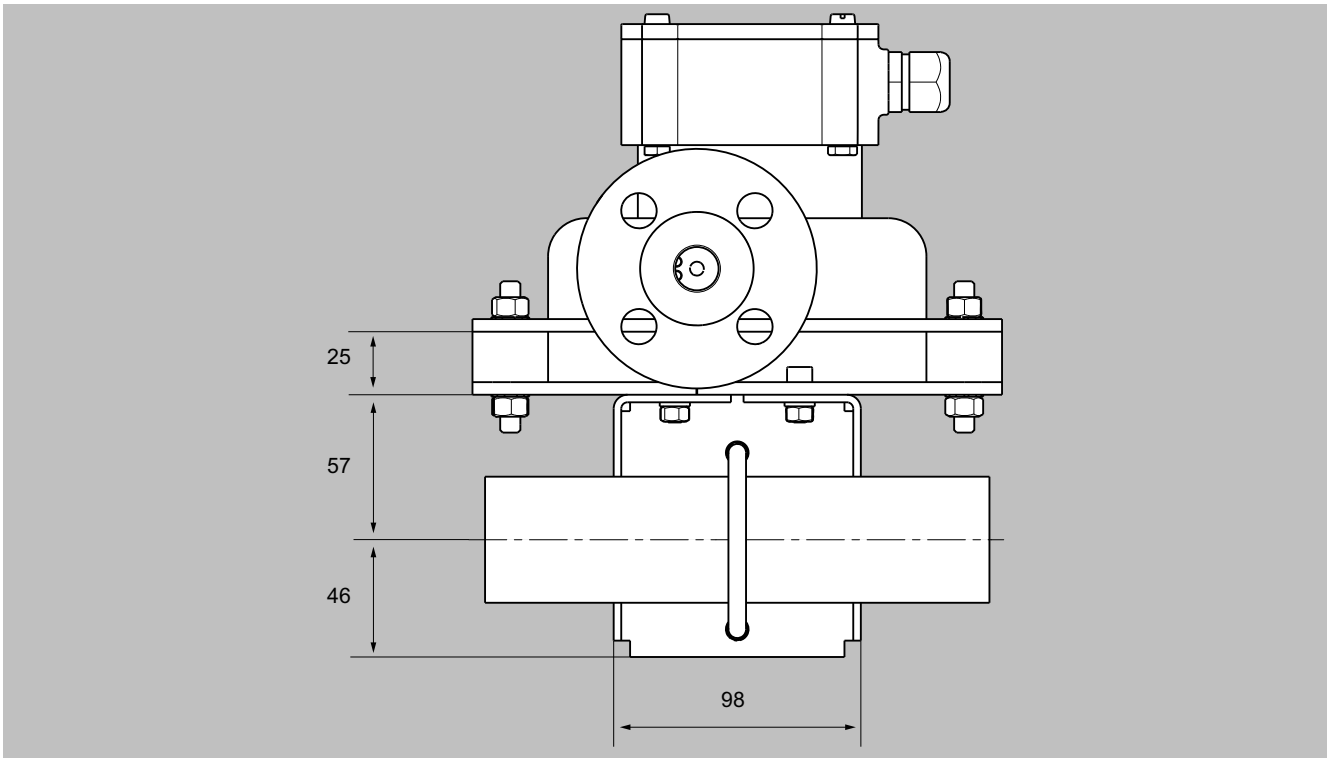



FCS100 with insulation housing, dimensions in mm

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## Dimensional drawings (continued)




FCS100 with optional pipe mounting bracket, dimensions in mm

***FCS100 sensor dimensions***

| Nominal size | L2 | L4 | L5 | L6 | L7 | L8 | L9 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 1 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 111 (4.4) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 2 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 111 (4.4) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 4 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 99 (3.9) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 6 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 89 (3.5) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 8 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 55 (2.2) | 110 (4.3) | 180 (7.1) | 210 (8.3) |

| Nominal size | H1 | H3 | H5 | H6 | H7 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 1 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 2 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 4 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 6 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 8 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |

***L1 dimension and weight with process connections according to ASME B16.5 (ISI 216 / AISI 316L)***

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) |
| ASME ½" class 300, raised face (RF) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) |
| ASME ½" class 600, raised face (RF) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 600, ring joint (RJ) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) |
| ASME ½" class 900, raised face (RF) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) |
| ASME ½" class 900, ring joint (RJ) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) |
| ASME ½" class 1500, raised face (RF) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) |
| ASME ½" class 1500, ring joint (RJ) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) |
| ASME 1" class 150, raised face (RF) | n/a | n/a | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) |
| ASME 1" class 300, raised face (RF) | n/a | n/a | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) |
| ASME 1" class 600, raised face (RF) | n/a | n/a | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) |
| ASME 1" class 600, ring joint (RJ) | n/a | n/a | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) |
| ASME 1" class 900, raised face (RF) | n/a | n/a | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) |
| ASME 1" class 900, ring joint (RJ) | n/a | n/a | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) |
| ASME 1" class 1500, raised face (RF) | n/a | n/a | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) |
| ASME 1" class 1500, ring joint (RJ) | n/a | n/a | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) |
| ASME 1½" class 150, raised face (RF) | n/a | n/a | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) |
| ASME 1½" class 300, raised face (RF) | n/a | n/a | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) |
| ASME 1½" class 600, raised face (RF) | n/a | n/a | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) |
| ASME 1½" class 600, ring joint (RJ) | n/a | n/a | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) |
| ASME 1½" class 900, raised face (RF) | n/a | n/a | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) |
| ASME 1½" class 900, ring joint (RJ) | n/a | n/a | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) |
| ASME 1½" class 1500, raised face (RF) | n/a | n/a | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) |
| ASME 1½" class 1500, ring joint (RJ) | n/a | n/a | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) |

***L1 dimension and weight with process connections according to EN 1092-1 (AISI 316L)***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 40 type B1, raised face (RF) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) |
| EN DN 15 PN 40 type D, with groove | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) |
| EN DN 15 PN 40 type E, with spigot | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) |
| EN DN 15 PN 40 type F, with recess | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) |
| EN DN 15 PN 100 type B1, raised face (RF) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) |
| EN DN 15 PN 100 type D, with groove | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) |
| EN DN 15 PN 100 type E, with spigot | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) |
| EN DN 15 PN 100 type F, with recess | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) |
| EN DN 25 PN 40 type B1, raised face (RF) | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 25 PN 40 type D, with groove | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |
| EN DN 25 PN 40 type E, with spigot | n/a | n/a | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) |
| EN DN 25 PN 40 type F, with recess | n/a | n/a | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) |
| EN DN 25 PN 100 type B1, raised face (RF) | n/a | n/a | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) |
| EN DN 25 PN 100 type D, with groove | n/a | n/a | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) |
| EN DN 25 PN 100 type E, with spigot | n/a | n/a | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) |
| EN DN 25 PN 100 type F, with recess | n/a | n/a | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) |
| EN DN 40 PN 40 type B1, raised face (RF) | n/a | n/a | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) |
| EN DN 40 PN 40 type D, with groove | n/a | n/a | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) |
| EN DN 40 PN 40 type E, with spigot | n/a | n/a | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) |
| EN DN 40 PN 40 type F, with recess | n/a | n/a | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) |
| EN DN 40 PN 100 type B1, raised face (RF) | n/a | n/a | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) |
| EN DN 40 PN 100 type D, with groove | n/a | n/a | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) |
| EN DN 40 PN 100 type E, with spigot | n/a | n/a | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) |
| EN DN 40 PN 100 type F, with recess | n/a | n/a | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) |

***L1 dimension and weight with process connections according to JIS B 2220 (AISI 316 / AISI 316L)***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10K | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) |
| JIS DN 15 20K | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) |
| JIS DN 25 10K | n/a | n/a | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) |
| JIS DN 25 20K | n/a | n/a | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) |
| JIS DN 40 10K | n/a | n/a | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) |
| JIS DN 40 20K | n/a | n/a | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) |

***L1 dimension and weight with process connections according to NPT internal thread***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ¼" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ⅜" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ½" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ¾" NPT | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) |

***L1 dimension and weight with process connections according to G internal thread***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ¼ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ⅜ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ½ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ¾ inch | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) |

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## Dimensional drawings (continued)

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 series A***

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A DN 15 | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) |
| DIN 32676 series A DN 25 | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |
| DIN 32676 series A DN 40 | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 series C (Tri-clamp)***

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C ½ inch | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) |
| DIN 32676 series C 1 inch | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |
| DIN 32676 series C 1½ inch | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |

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## Overview

SITRANS FCS500 sensor is the universal Coriolis flow sensor for routine and hygienic applications.

Features:

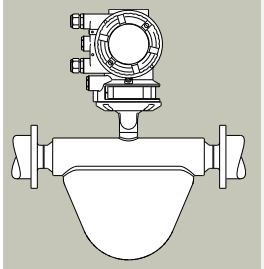
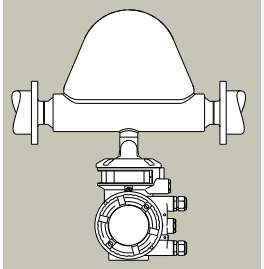
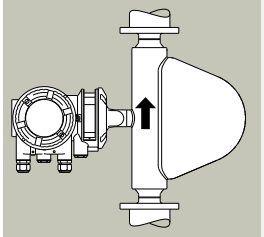
- Dual curved AISI 316L stainless steel tubes with polished option
- Nominal sizes: DN 10 to DN 80
- Process connection: flange, thread, or a selection of hygienic fittings
- Hygienic approvals for food, beverage, and pharmaceutical sectors
- Versatile solution with superior turndown and low pressure loss
- Combination with compact or remote transmitters



FCS500 sensor

## Design

***Sensor installation position related to type of fluid***

| Installation position | Fluid | Description |
|---|---|---|
| **Position 1**  | Liquid | • Horizontal<br>• Measuring tubes below process pipe<br>• Avoids accumulation of entrained gas |
| **Position 2**  | Gas | • Horizontal<br>• Measuring tubes above process pipe<br>• Accumulation of liquid or condensate is less likely |
| **Position 3**  | Gas / Liquid | • Vertical<br>• Upwards direction of flow<br>• In liquid application accumulation of entrained gas is avoided<br>• This position allows self-draining in liquid flow |

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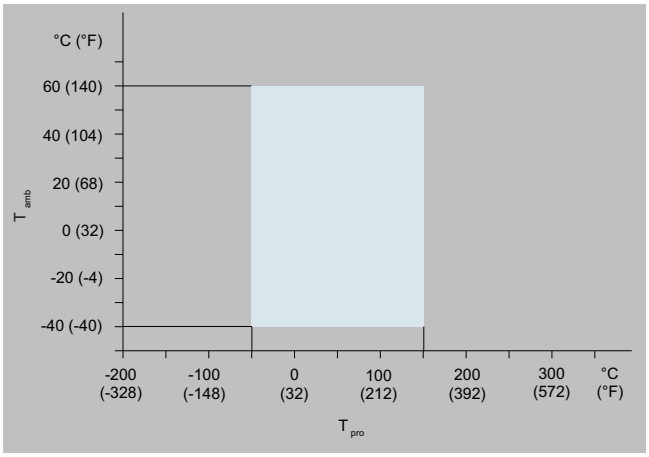


## Technical specifications

***Allowed ambient temperature for FCS500 sensors***

The allowed combinations of process fluid and ambient temperature for the sensor are illustrated as light areas in the diagrams below.

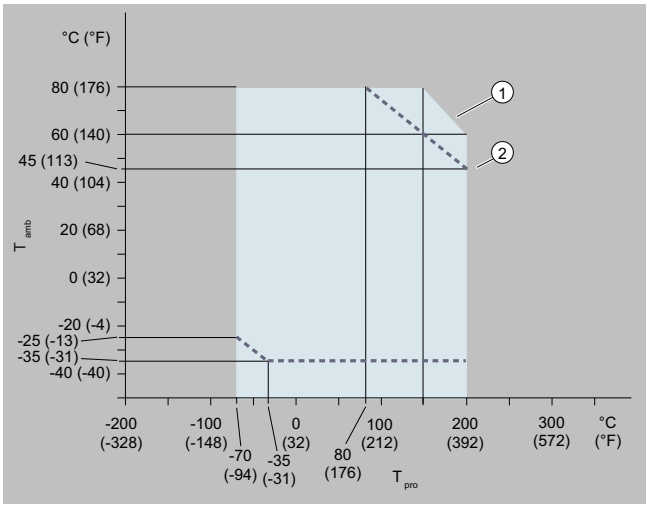
Standard temperature specification, non-hygienic version, compact transmitter




Allowed process fluid and ambient temperatures, compact type

| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

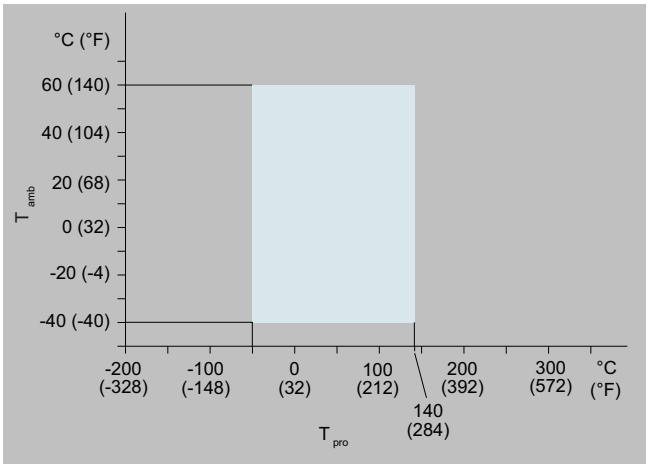
Standard temperature specification, non-hygienic version, remote transmitter




Allowed process fluid and ambient temperatures, non-hygienic, remote transmitter style

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

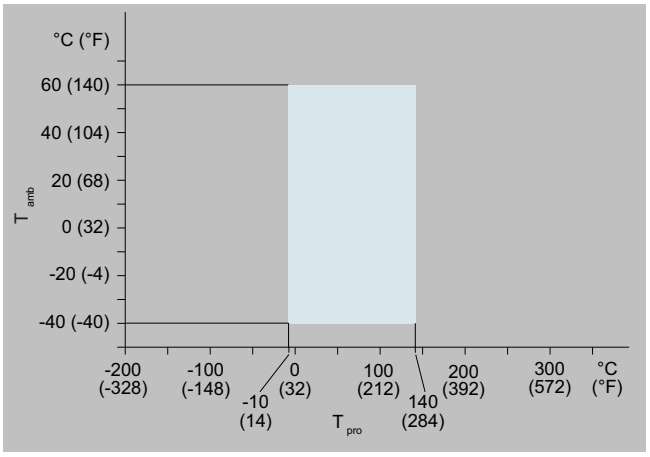
Standard temperature specification, hygienic version with threaded connections, compact transmitter




Allowed process fluid and ambient temperatures, threaded hygienic connections, compact transmitter

| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

Standard temperature specification, hygienic version with clamp connections, compact transmitter




Allowed process fluid and ambient temperatures, clamp hygienic connections, compact transmitter

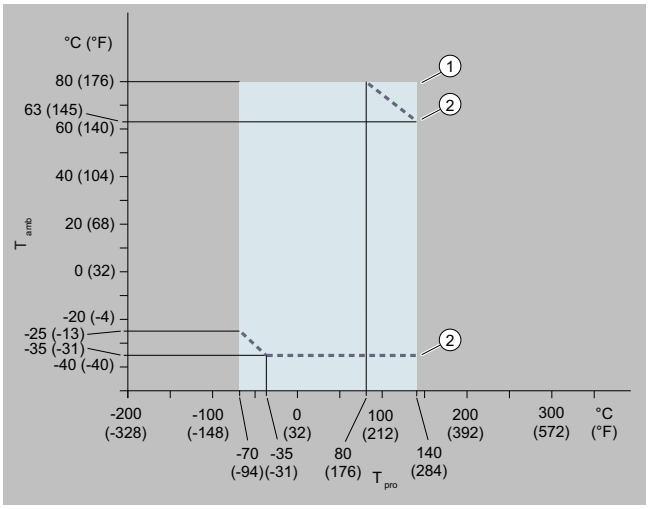
| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

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## Technical specifications (continued)

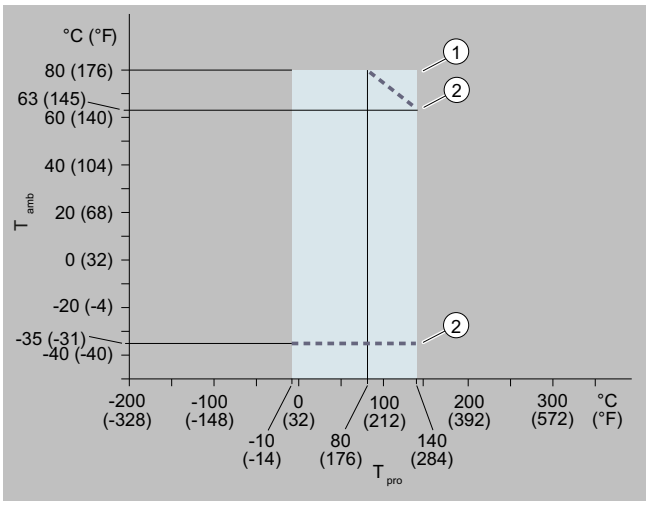
Standard temperature specification, hygienic version with threaded connections, remote transmitter




Allowed process fluid and ambient temperatures, threaded hygienic connections, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

Standard temperature specification, hygienic version with clamp connections, remote transmitter

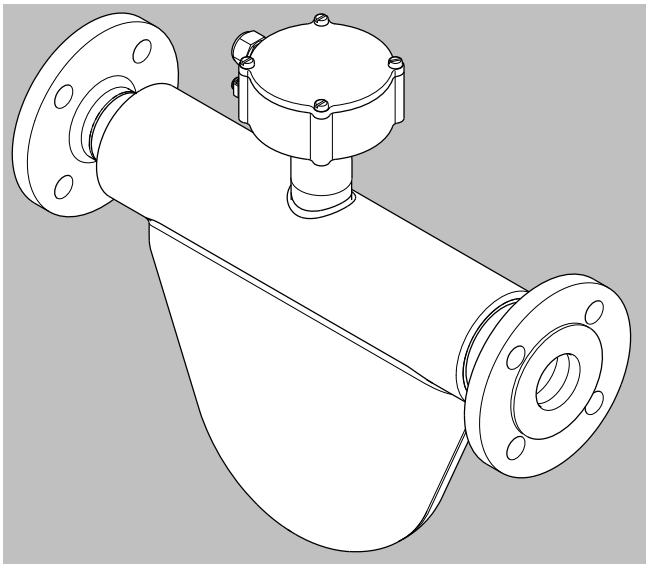



Allowed process fluid and ambient temperatures, hygienic clamp connections, remote transmitter

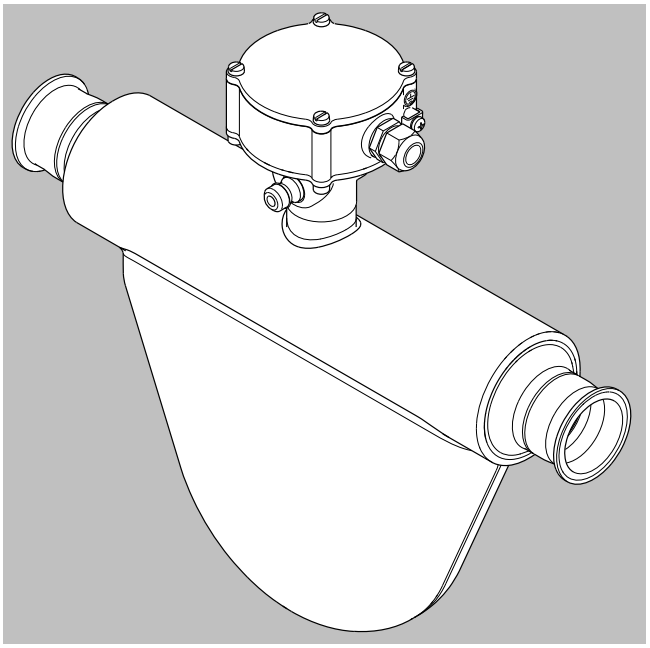
| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

***Mechanical specifications of FCS500 sensors***

FCS500 sensors are available only with the standard neck design and can be combined with compact or remote transmitters. The neck can also be described as the pedestal connecting the sensor body to the transmitter or terminal housing.



FCS500 sensor (for remote transmitter) with standard neck, non hygienic version



FCS500 sensor (for remote transmitter) with standard neck, hygienic version

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## Technical specifications (continued)

| Material specifications | | |
|---|---|---|
| **Wetted parts**[3] | | |
| Measuring tubes (for sensors with hygienic process connections) | Surface roughness Ra ≤ 0.8 µm[1] | |
| Process connections | AISI 316L stainless steel, W Nr. 1.4404 | |
| **Sensor housing** | | |
| Junction box | AISI 316L stainless steel | W Nr. 1.4404 |
| Neck | similar to ASTM CF-8 cast stainless steel | W Nr. 1.4308 |
| Body | AISI 304 stainless steel | W Nr. 1.4301 |
| **Nameplates**[2] | **Process temperature range** | **Material** |
| Sensor with AISI 304 stainless steel housing | Standard, up to 150 °C (302 °F) | Polyester film |

1) Other parts including the flow divider and process connections exhibit the same roughness.
2) Nameplate material depends on the materials selected for SITRANS FC sensors.
3) The user is responsible to ensure chemical compatibility of the material of the wetted parts with the measured process fluid.

### *Secondary containment*

Some applications or environment conditions require secondary containment retaining the process pressure for increased safety. SITRANS FCS500 sensors have a secondary containment filled with inert gas.

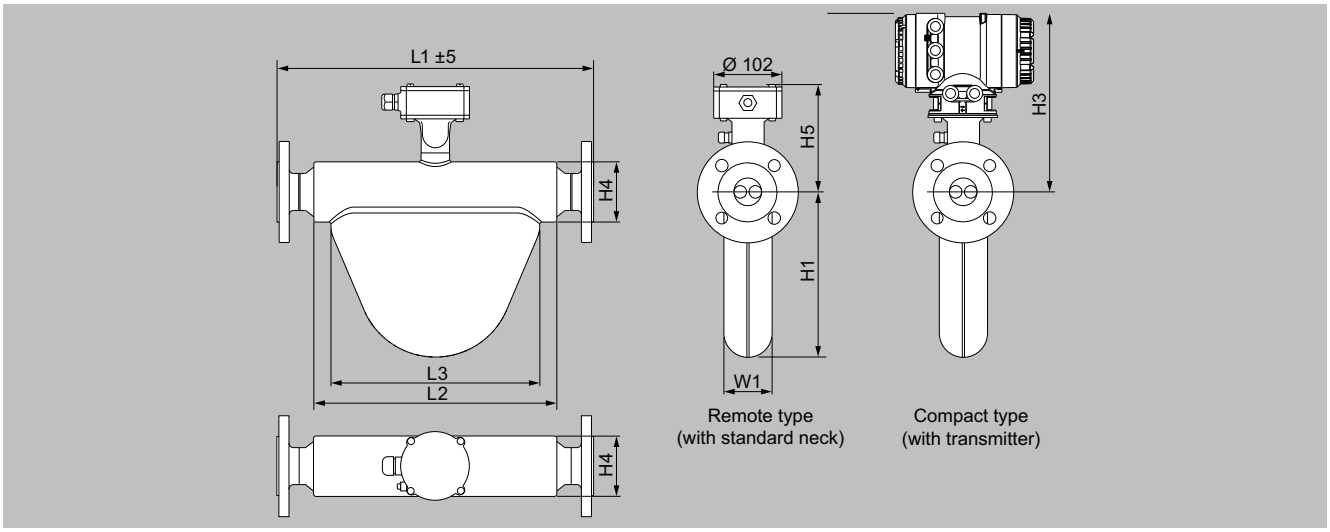
| | |
|---|---|
| Typical burst pressure at room temperature for sizes DN 10, DN 15, DN 25, and DN 50 | 49 bar (710 psi) |
| Typical burst pressure at room temperature for size DN 80 | 30 bar (435 psi) |

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## Dimensional drawings

***Drawings, dimensions and weight for FCS500 sensors (non-hygienic versions)***




FCS500 sensor non hygienic, dimensions in mm

***FCS500 sensor dimensions (non-hygienic versions)***

| Nominal size | L2 | L3 | H1 | H3 | H4 | H5 | W1 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 10 | 190 (7.5) | 165 (6.5) | 117 (4.6) | 268 (10.6) | 56 (2.2) | 138 (5.4) | 42 (1.7) |
| DN 15 | 227 (8.9) | 195 (7.7) | 145 (5.7) | 277 (10.9) | 71 (2.8) | 148 (5.8) | 50 (2) |
| DN 25 | 361 (14.2) | 310 (12.2) | 245 (9.6) | 289 (11.4) | 90 (3.5) | 159 (6.3) | 72 (2.8) |
| DN 50 | 455 (17.9) | 400 (15.7) | 333 (13.1) | 296 (11.7) | 102 (4) | 167 (6.6) | 96 (3.8) |
| DN 80 | 682 (26.9) | 620 (24.4) | 482 (19) | 330 (13) | 168 (6.6) | 201 (7.9) | 150 (5.9) |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb)

***L1 dimension and weight with process connections according to ASME B16.5 (AISI 316/AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 280 (11) | 6 (13) | 320 (12.6) | 8 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 300, raised face (RF) | 280 (11) | 6.4 (14) | 320 (12.6) | 8.4 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, raised face (RF) | 290 (11.4) | 6.7 (15) | 330 (13) | 8.7 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, ring joint (RJ) | 290 (11.4) | 6.6 (15) | 330 (13) | 8.6 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME 1" class 150, raised face (RF) | 280 (11) | 6.9 (15) | 320 (12.6) | 8.9 (20) | 490 (19.3) | 15.7 (35) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 280 (11) | 7.9 (17) | 320 (12.6) | 9.9 (22) | 490 (19.3) | 16.7 (37) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 300 (11.8) | 8.3 (18) | 340 (13.4) | 10.3 (23) | 500 (19.7) | 17 (38) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, ring joint (RJ) | 300 (11.8) | 8.4 (19) | 340 (13.4) | 10.4 (23) | 500 (19.7) | 17.2 (38) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 290 (11.4) | 7.8 (17) | 330 (13) | 9.8 (22) | 470 (18.5) | 16.5 (36) | 620 (24.4) | 25.7 (57) | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 1½" class 300, raised face (RF) | 290 (11.4) | 10.1 (22) | 330 (13) | 12.1 (27) | 480 (18.9) | 19 (42) | 620 (24.4) | 28.1 (62) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 310 (12.2) | 11.5 (25) | 350 (13.8) | 13.5 (30) | 500 (19.7) | 20 (44) | 630 (24.8) | 28.9 (64) | n/a | n/a |
| ASME 1½" class 600, ring joint (RJ) | 310 (12.2) | 11.4 (25) | 350 (13.8) | 13.4 (30) | 500 (19.7) | 20 (44) | 630 (24.8) | 29.1 (64) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 480 (18,9) | 18.1 (40) | 580 (22.8) | 26.8 (59) | n/a | n/a |
| ASME 2" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 480 (18,9) | 19.7 (43) | 580 (22.8) | 28.3 (62) | n/a | n/a |
| ASME 2" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 510 (20.1) | 21.3 (47) | 610 (24) | 30.5 (67) | n/a | n/a |
| ASME 2" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 510 (20.1) | 21.8 (48) | 610 (24) | 30.3 (67) | n/a | n/a |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 29.8 (66) | n/a | n/a |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 31.3 (69) | n/a | n/a |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 33.4 (74) | n/a | n/a |
| ASME 2½" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 33.8 (74) | n/a | n/a |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (23.3) | 30.9 (68) | 870 (34.3) | 71.2 (157) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 590 (22.8) | 34.5 (76) | 880 (34.6) | 75 (165) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 630 (24.8) | 37.8 (83) | 900 (35.4) | 77.7 (171) |
| ASME 3" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 38.4 (85) | 900 (35.4) | 78.3 (173) |
| ASME 4" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 74.4 (164) |
| ASME 4" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 81.8 (180) |
| ASME 4" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 94 (207) |
| ASME 4" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 94.6 (209) |
| ASME 5" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 77 (170) |
| ASME 5" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 890 (35) | 89.4 (197) |
| ASME 5" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 114.2 (252) |
| ASME 5" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 114.9 (253) |

***L1 dimension and weight with process connections according to EN 1092-1 (AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 40 type B1, raised face (RF) | 280 (11) | 6.6 (14) | 320 (12.6) | 8.6 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type D, with groove | 280 (11) | 6.4 (14) | 320 (12.6) | 8.4 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type E, with spigot | 280 (11) | 6.3 (14) | 320 (12.6) | 8.3 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type F, with recess | 280 (11) | 6.5 (14) | 320 (12.6) | 8.5 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type B1, raised face (RF) | 290 (11.4) | 7.4 (16) | 330 (13) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN15 PN100 type D, with groove | 290 (11.4) | 7.4 (16) | 330 (13) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 100 type E, with spigot | 290 (11.4) | 7.1 (16) | 330 (13) | 9.1 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type F, with recess | 290 (11.4) | 7.3 (16) | 330 (13) | 9.3 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type B1, raised face (RF) | 280 (11) | 7.5 (17) | 320 (12.6) | 9.5 (21) | 490 (19.3) | 16.4 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type D, with groove | 280 (11) | 7.5 (17) | 320 (12.6) | 9.5 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type E, with spigot | 280 (11) | 7.2 (16) | 320 (12.6) | 9.2 (20) | 490 (19.3) | 16.1 (35) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type F, with recess | 280 (11) | 7.4 (67) | 320 (12.6) | 9.4 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type B1, raised face (RF) | 300 (10.1) | 10.1 (22) | 340 (13.4) | 12.1 (27) | 490 (19.3) | 18.8 (41) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type D, with groove | 300 (10.1) | 10 (22) | 340 (13.4) | 12 (26) | 490 (19.3) | 18.7 (41) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type E, with spigot | 300 (10.1) | 9.5 (21) | 340 (13.4) | 11.5 (25) | 490 (19.3) | 18.3 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN100 type F, with recess | 300 (10.1) | 9.9 (22) | 340 (13.4) | 11.9 (26) | 490 (19.3) | 18.7 (41) | n/a | n/a | n/a | n/a |
| EN DN 40 PN40 type B1, raised face (RF) | 280 (11) | 9.1 (20) | 320 (12.6) | 11.1 (24) | 470 (18.5) | 17.7 (39) | 610 (24) | 26.9 (59) | n/a | n/a |
| EN DN 40 PN 40 type D, with groove | 280 (11) | 8.9 (20) | 320 (12.6) | 10.9 (24) | 470 (18.5) | 17.6 (39) | 610 (24) | 26.8 (59) | n/a | n/a |
| EN DN 40 PN 40 type E, with spigot | 280 (11) | 8.6 (19) | 320 (12.6) | 10.6 (23) | 470 (18.5) | 17.4 (38) | 610 (24) | 26.5 (58) | n/a | n/a |
| EN DN 40 PN 40 type F, with recess | 280 (11) | 8.8 (19) | 320 (12.6) | 10.8 (24) | 470 (18.5) | 17.5 (39) | 610 (24) | 26.7 (59) | n/a | n/a |
| EN DN 40 PN 100 type B1, raised face (RF) | 360 (14.2) | 13.5 (30) | 400 (15.7) | 15.5 (34) | 500 (19.7) | 21.5 (47) | 610 (24) | 30.5 (67) | n/a | n/a |
| EN DN 40 PN 100 type D, with groove | 360 (14.2) | 13.4 (30) | 400 (15.7) | 15.4 (34) | 500 (19.7) | 21.4 (47) | 610 (24) | 30.4 (67) | n/a | n/a |
| EN DN 40 PN 100 type E, with spigot | 360 (14.2) | 13 (29) | 400 (15.7) | 15 (33) | 500 (19.7) | 21.1 (46) | 610 (24) | 30 (66) | n/a | n/a |
| EN DN 40 PN 100 type F, with recess | 360 (14.2) | 13.3 (29) | 400 (15.7) | 15.3 (34) | 500 (19.7) | 21.3 (47) | 610 (24) | 30.3 (67) | n/a | n/a |
| EN DN 50 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 470 (18.5) | 19.1 (42) | 580 (22.8) | 27.8 (61) | n/a | n/a |
| EN DN 50 PN 40 type D, with groove | n/a | n/a | n/a | n/a | 470 (18.5) | 18.9 (42) | 580 (22.8) | 27.7 (61) | n/a | n/a |
| EN DN 50 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | 470 (18.5) | 18.6 (41) | 580 (22.8) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN 40 type F, with recess | n/a | n/a | n/a | n/a | 470 (18.5) | 18.8 (41) | 580 (22.8) | 27.6 (61) | n/a | n/a |
| EN DN 50 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 540 (21.3) | 25.4 (56) | 610 (24) | 33.5 (74) | n/a | n/a |
| EN DN 50 PN 100 type D, with groove | n/a | n/a | n/a | n/a | 540 (21.3) | 25.3 (56) | 610 (24) | 33.4 (74) | n/a | n/a |
| EN DN 50 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | 540 (21.3) | 24.8 (55) | 610 (24) | 32.9 (72) | n/a | n/a |
| EN DN 50 PN 100 type F, with recess | n/a | n/a | n/a | n/a | 540 (21.3) | 25.2 (56) | 610 (24) | 33.2 (73) | n/a | n/a |
| EN DN 80 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.5 (69) | 870 (34.2) | 71.6 (158) |
| EN DN 80 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.3 (69) | 870 (34.2) | 71.1 (157) |
| EN DN 80 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 30.9 (68) | 870 (34.2) | 70.7 (156) |
| EN DN 80 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.1 (69) | 870 (34.2) | 70.9 (156) |
| EN DN 80 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 40 (88) | 890 (35) | 79.1 (174) |
| EN DN 80 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.8 (88) | 890 (35) | 78.9 (174) |
| EN DN 80 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.2 (86) | 890 (35) | 78.3 (173) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 80 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.6 (87) | 890 (35) | 78.7 (173) |
| EN DN 100 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.8 (163) |
| EN DN 100 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.6 (162) |
| EN DN 100 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73 (161) |
| EN DN 100 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.3 (162) |
| EN DN 100 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 85.2 (188) |
| EN DN 100 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84.8 (187) |
| EN DN 100 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84 (185) |
| EN DN 100 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84.5 (186) |
| EN DN125 PN40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 78.5 (173) |
| EN DN 135 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 78.1 (172) |
| EN DN 125 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 77.4 (171) |
| EN DN 125 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 77.7 (171) |
| EN DN 125 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 98 (216) |
| EN DN 125 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 97.6 (215) |
| EN DN 125 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 96.3 (212) |
| EN DN 125 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 97.1 (214) |

***L1 dimension and weight with process connections according to JIS B 2220 (AISI 316/AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10 K | 280 (11) | 6.3 (14) | 320 (12.6) | 8.3 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 15 20 K | 280 (11) | 6.5 (14) | 320 (12.6) | 8.5 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 25 10 K | 280 (11) | 7.4 (16) | 320 (12.6) | 9.4 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 280 (11) | 7.8 (17) | 320 (12.6) | 9.8 (22) | 490 (19.3) | 16.6 (37) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 280 (11) | 8.2 (18) | 320 (12.6) | 10.2 (23) | 470 (18.5) | 16.9 (37) | 620 (24.4) | 26.1 (58) | n/a | n/a |
| JIS DN 40 20 K | 280 (11) | 8.6 (19) | 320 (12.6) | 10.6 (23) | 470 (18.5) | 17.3 (38) | 620 (24.4) | 26.5 (58) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | n/a | n/a | 470 (18.5) | 17.5 (39) | 600 (23.6) | 26.6 (59) | n/a | n/a |
| JIS DN 50 20 K | n/a | n/a | n/a | n/a | 470 (18.5) | 17.7 (39) | 600 (23.6) | 26.7 (59) | n/a | n/a |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 570 (22.4) | 27.9 (62) | 880 (34.6) | 68.7 (151) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 30.4 (67) | 880 (34.6) | 71 (156) |
| JIS DN 100 10 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 69.8 (154) |
| JIS DN 100 20 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.4 (162) |
| JIS DN 125 10 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.5 (162) |
| JIS DN 125 20 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 79.7 (176) |

***L1 dimension and weight with process connections according to NPT internal thread***

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ⅜" NPT | 300 (11.8) | 5.4 (12) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| ½" NPT | 300 (11.8) | 5.4 (12) | 340 (13.4) | 7.4 (16) | n/a | n/a | n/a | n/a | n/a | n/a |
| ¾" NPT | 300 (11.8) | 5.3 (12) | 340 (13.4) | 7.3 (16) | n/a | n/a | n/a | n/a | n/a | n/a |

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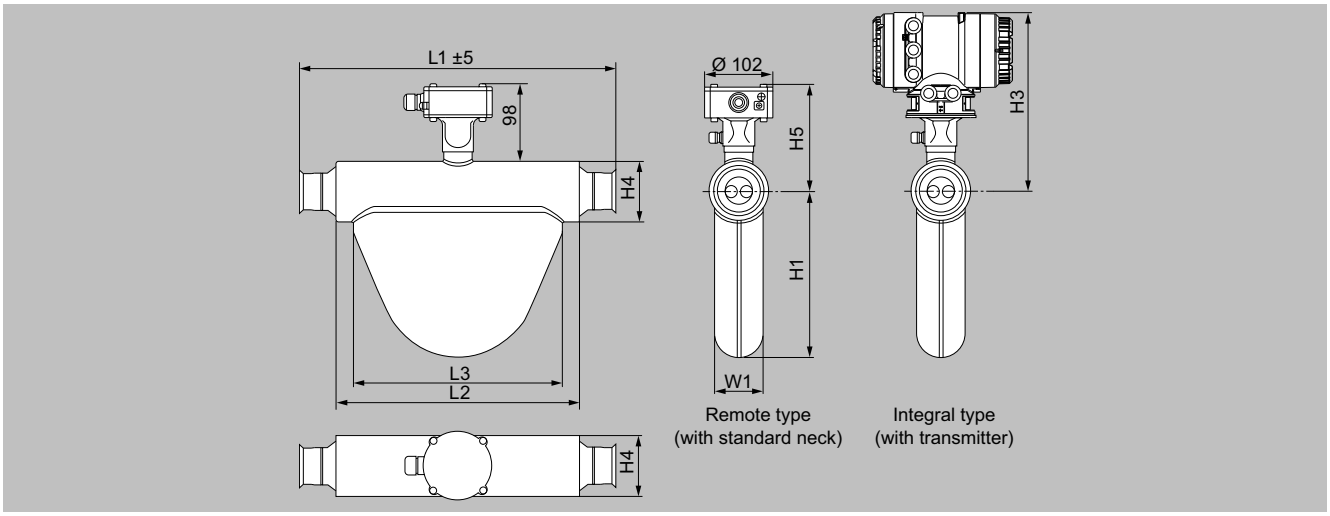


## Dimensional drawings (continued)

### *L1 dimension and weight with process connections according to G internal thread*

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ⅜" | 300 (11.8) | 5.4 (12) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| G ½" | 300 (11.8) | 5.4 (12) | 340 (13.4) | 7.4 (16) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ¾" | 300 (11.8) | 5.3 (12) | 340 (13.4) | 7.3 (16) | n/a | n/a | n/a | n/a | n/a | n/a |

### *Drawings, dimensions and weight for FCS500 sensors (hygienic versions)*




Dimensions in mm

### *FCS500 sensor dimensions (hygienic versions)*

| Nominal size | L2 | L3 | H1 | H3 | H4 | H5 | W1 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 10 | 190 (7.5) | 165 (6.5) | 117 (4.6) | 268 (10.6) | 56 (2.2) | 138 (5.4) | 42 (1.7) |
| DN 15 | 227 (8.9) | 195 (7.7) | 145 (5.7) | 277 (10.9) | 71 (2.8) | 148 (5.8) | 50 (2) |
| DN 25 | 361 (14.2) | 310 (12.2) | 245 (9.6) | 289 (11.4) | 90 (3.5) | 159 (6.3) | 72 (2.8) |
| DN 50 | 455 (17.9) | 400 (15.7) | 333 (13.1) | 296 (11.7) | 102 (4) | 167 (6.6) | 96 (3.8) |

### *Overall length L1 and weight*

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb)

### *L1 dimension and weight with threaded hygienic process connections according to DIN 11851*

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 11851, DN 25 | 280 (11) | 5.4 (12) | 320 (12.6) | 7.4 (16) | n/a | n/a | n/a | n/a |
| DIN 11851, DN 40 | 290 (11.4) | 5.5 (12) | 330 (13) | 7.5 (17) | 490 (19.3) | 14.3 (32) | n/a | n/a |
| DIN 11851, DN 50 | n/a | n/a | n/a | n/a | 480 (18.9) | 14.4 (32) | 610 (24) | 23.4 (52) |
| DIN 11851, DN 65 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.4 (52) |
| DIN 11851, DN 80 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.8 (52) |

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## Dimensional drawings (continued)

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 Series A***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A, DN 25 | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 40 | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 470 (18.5) | 14 (31) | n/a | n/a |
| DIN 32676 series A, DN 50 | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| DIN 32676 series A, DN 65 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23 (51) |
| DIN 32676 series A, DN 80 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.1 (51) |

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 Series C (Tri-clamp)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C, 1" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 1½" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 480 (18.9) | 14 (31) | n/a | n/a |
| DIN 32676 series C, 2" | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| DIN 32676 series C, 2½" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.8 (50) |
| DIN 32676 series C, 3" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.9 (50) |

***L1 dimension and weight with hygienic clamp process connections according to JIS/ISO 2852***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS/ISO 2852, 1" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 1½" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 480 (18.9) | 14 (31) | n/a | n/a |
| JIS/ISO 2852, 2" | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| JIS/ISO 2852, 2½" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.8 (50) |
| JIS/ISO 2852, 3" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.9 (50) |

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## Overview

SITRANS FCS600 sensor is the resistant Coriolis flow sensor for extreme conditions and corrosive fluids.
Features:

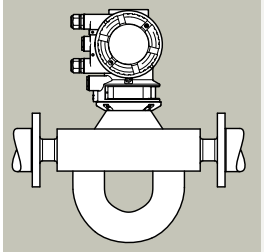
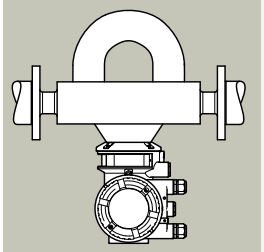
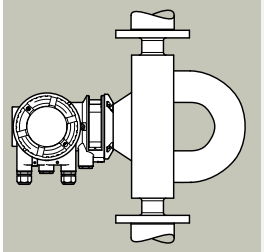
- Dual curved AISI 316L or alloy 22 tubes with optimum decoupling from external influences
- Nominal sizes from DN 2 to DN 65
- Process connection: flange, thread, or high pressure autoclave
- Temperatures from -196 °C (for cryogenic fluids), up to +350 °C
- Insulation and heat tracing options for viscous and molten liquids
- Combination with compact or remote transmitters.



FCS600 sensor

## Design

***Sensor installation position related to type of fluid***

| Installation position | Fluid | Description |
|---|---|---|
| **Position 1**  | Liquid | • Horizontal<br>• Measuring tubes below process pipe<br>• Avoids accumulation of entrained gas |
| **Position 2**  | Gas | • Horizontal<br>• Measuring tubes above process pipe<br>• Accumulation of liquid or condensate is less likely |
| **Position 3**  | Gas / Liquid | • Vertical<br>• Upwards direction of flow<br>• In liquid application accumulation of entrained gas is avoided<br>• This position allows self-draining in liquid flow |

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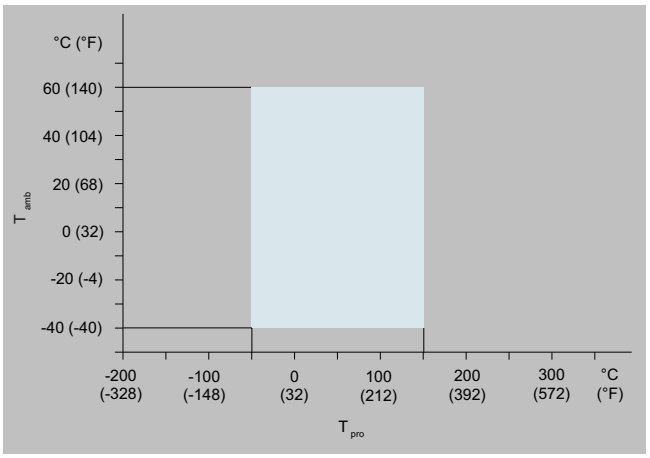


## Technical specifications

***Allowed ambient temperature for FCS600 sensors***

The allowed combinations of process fluid and ambient temperature for the sensor are illustrated as light areas in the diagrams below.

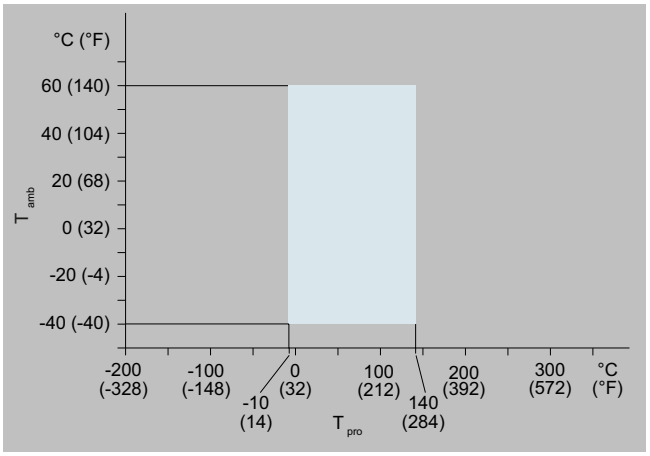
Standard temperature specification, compact transmitter




Allowed process fluid and ambient temperatures, compact transmitter

| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

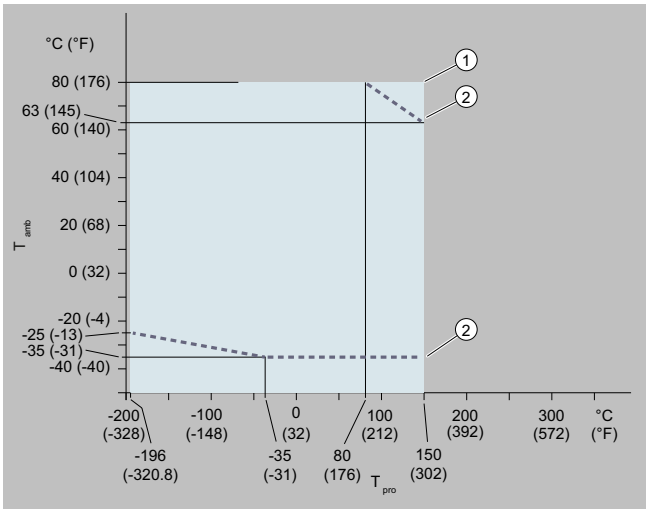
Standard temperature specification with hygienic clamp connections, compact transmitter




Allowed process fluid and ambient temperatures, hygienic clamp connections, compact transmitter

| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

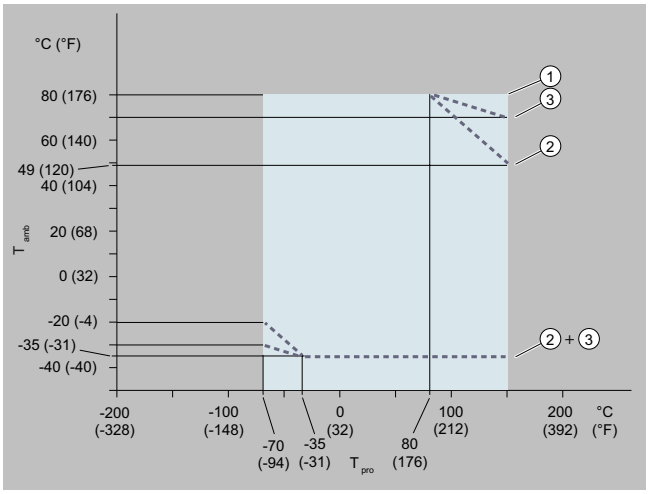
Low temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

Standard temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, remote transmitter

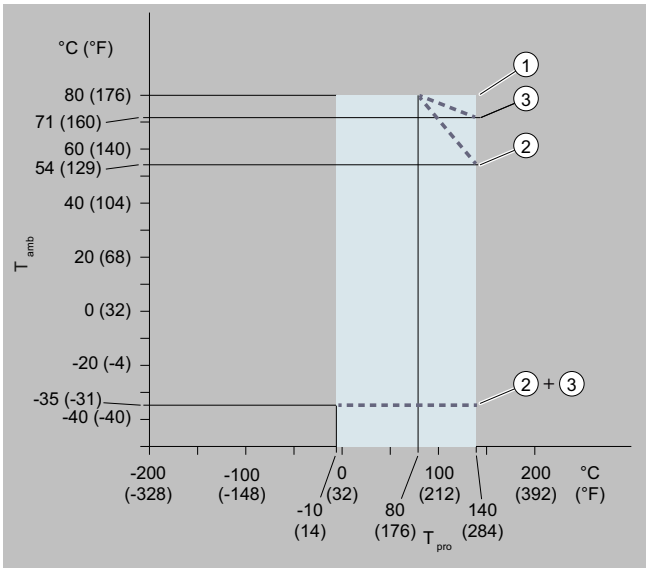
| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option and standard neck |
| 3 | Limitation for fire retardant cable option and long neck |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

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## Technical specifications (continued)

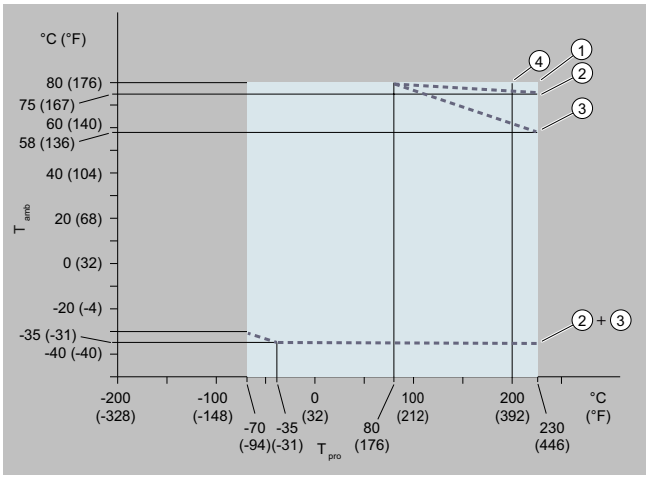
Standard temperature specification with hygienic clamp connections, remote transmitter




Allowed process fluid and ambient temperatures, hygienic clamp connections, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option and standard neck |
| 3 | Limitation for fire retardant cable option and long neck |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

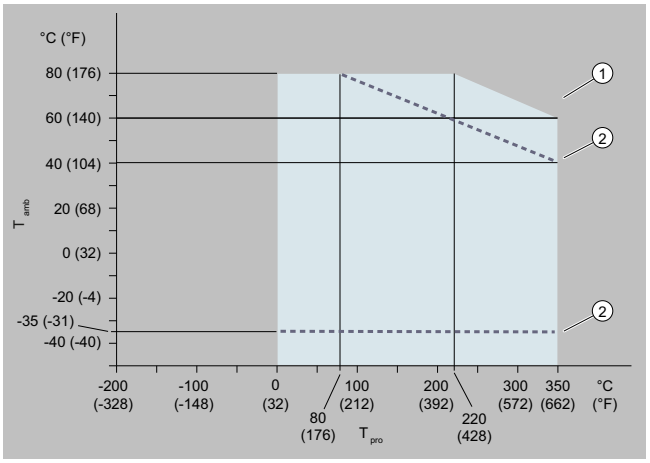
Medium temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable without insulation/tracing option |
| 3 | Limitation for fire retardant cable option with insulation/tracing option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

High temperature specification, remote transmitter

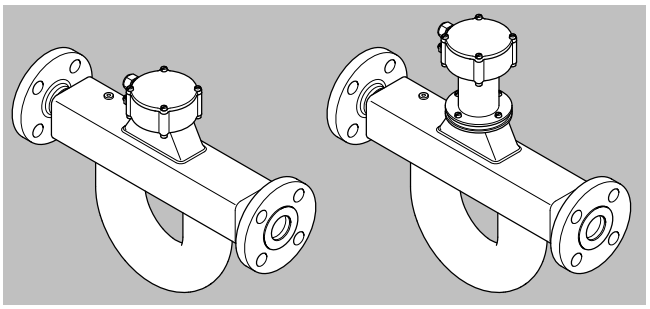



Allowed process fluid and ambient temperatures, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Limitation for fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

### *Mechanical specifications of FCS600 sensors*

FCS600 sensors are available with standard neck or long neck design and can be combined with compact or remote transmitters. The neck can also be described as the pedestal connecting the sensor body to the transmitter or terminal housing.

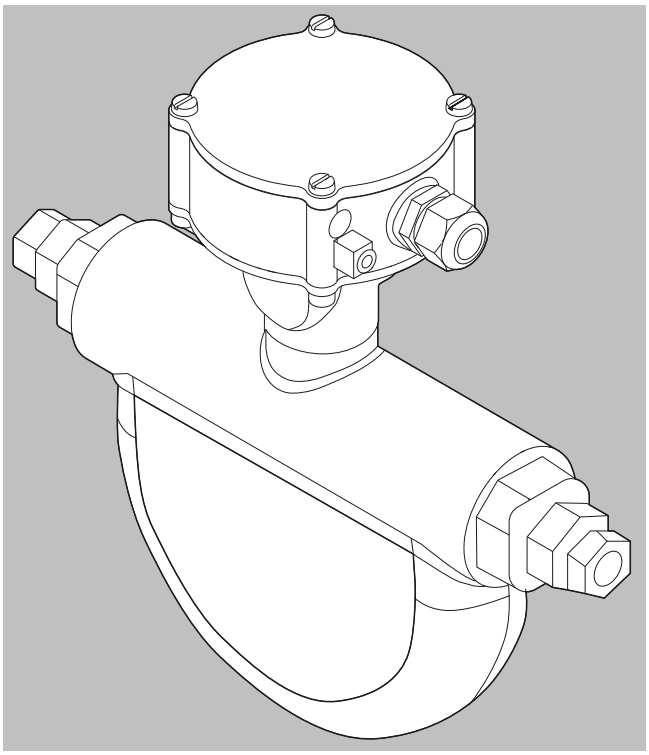


FCS600 sensors (for remote transmitter) in sizes DN 15, DN 25, DN 40 and DN 65, standard neck and long neck

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## Technical specifications (continued)



FCS600 sensors (for remote transmitter) in sizes DN 2 and DN 4 standard neck

| Material specifications | | |
|---|---|---|
| **Wetted parts**[1] | | |
| Sensor size DN 2 | Alloy 22 dual measuring tubes with AISI 316L stainless steel process connections | |
| Sensor size DN 4 | Alloy 22 dual measuring tubes with AISI 316L stainless steel process connections | |
| Sensor size DN 15 | AISI 316L stainless steel or alloy 22 | |
| Sensor size DN 25 | AISI 316L stainless steel or alloy 22 | |
| Sensor size DN 40 | AISI 316L stainless steel or alloy 22 | |
| Sensor size DN 65 | AISI 316L stainless steel | |
| **Sensor housing** | | |
| Junction box | AISI 316L stainless steel | All sensors with remote transmitters |
| Neck (pedestal) | ASTM A351 CF3M stainless steel | DN 2 and DN 4 sensors only (short neck) |
| Neck (pedestal) | AISI 316L stainless steel | All sensors, except sizes DN 2 and DN 4 |
| Body (outer casing) | AISI 304 stainless steel | All versions, except sizes DN 2 and DN 4 |
| Body (outer casing) | AISI 316L stainless steel | All versions |
| **Nameplates**[2] | **Process temperature range** | **Material** |
| Sensor with AISI 304 stainless steel housing | Standard, up to 150 °C (302 °F) | Polyester film |
| Sensor with AISI 304 stainless steel housing | Low, medium or high | AISI 316L ss |
| Sensor with AISI 316L stainless steel housing | All versions | AISI 316L ss |

1) The user is responsible to ensure chemical compatibility of the material of the wetted parts with the measured process fluid.
2) Nameplate material depends on the materials selected for SITRANS FC sensors.

### *Secondary containment*

Some applications or environment conditions require secondary containment retaining the process pressure for increased safety.
SITRANS FCS600 sensors have a secondary containment filled with inert gas.

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## Technical specifications (continued)

| | |
|---|---|
| Typical burst pressure at room temperature for sizes DN 2 and DN 4 | 49 bar (710 psi) |
| Typical burst pressure at room temperature for sizes DN 15, DN 25 and DN 40: 120 bar (1 740 psi) | 120 bar (1 740 psi) |
| Typical burst pressure at room temperature for size DN 65 | 80 bar (1 160 psi) |

***Insulation and heat tracing (not available for sizes DN 2 and DN 4)***

In cases where fluid temperature deviates more than 80 °C (176 °F) from ambient temperature, sensor insulation is recommended to avoid negative effects from temperature fluctuations.

***Maximum temperature of heat carrier***

| Process temperature range | Temperature range of heat carrier |
|---|---|
| Standard, up to 150 °C (302 °F) | 0 ... 150 °C (32 ... 302 °F) |
| Medium, up to 260 °C (500 °F) | 0 ... 230 °C (32 ... 446 °F)[1)] |
| High, up to 350 °C (662 °F) | 0 ... 350 °C (32 ... 662 °F) |

1) With Ex Approval 0 ... 220 °C (32 ... 428 °F)

Insulation and heat tracing may be installed by the user but not in hazardous areas and the following must be noted:

- Do not insulate sensor terminal box.
- Do not expose transmitters to ambient temperatures exceeding 60 °C (140 °F).
- The preferred insulation is 60 mm (2.36") thick with a heat transfer coefficient of 0.4 W/m² K (0.07 Btu/ft² °F).

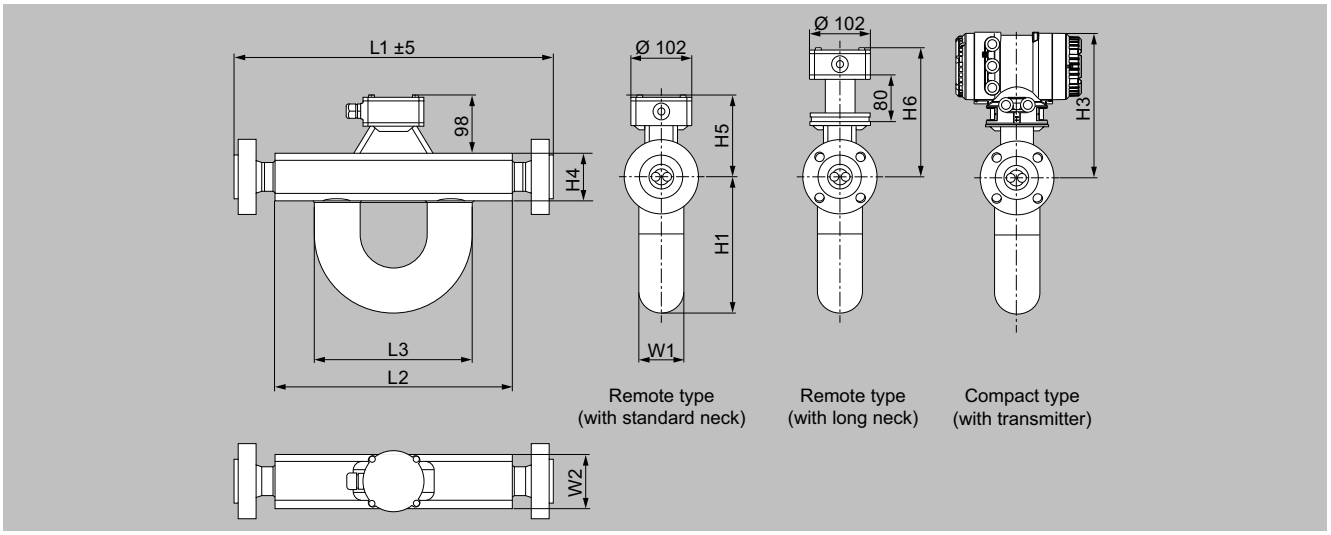
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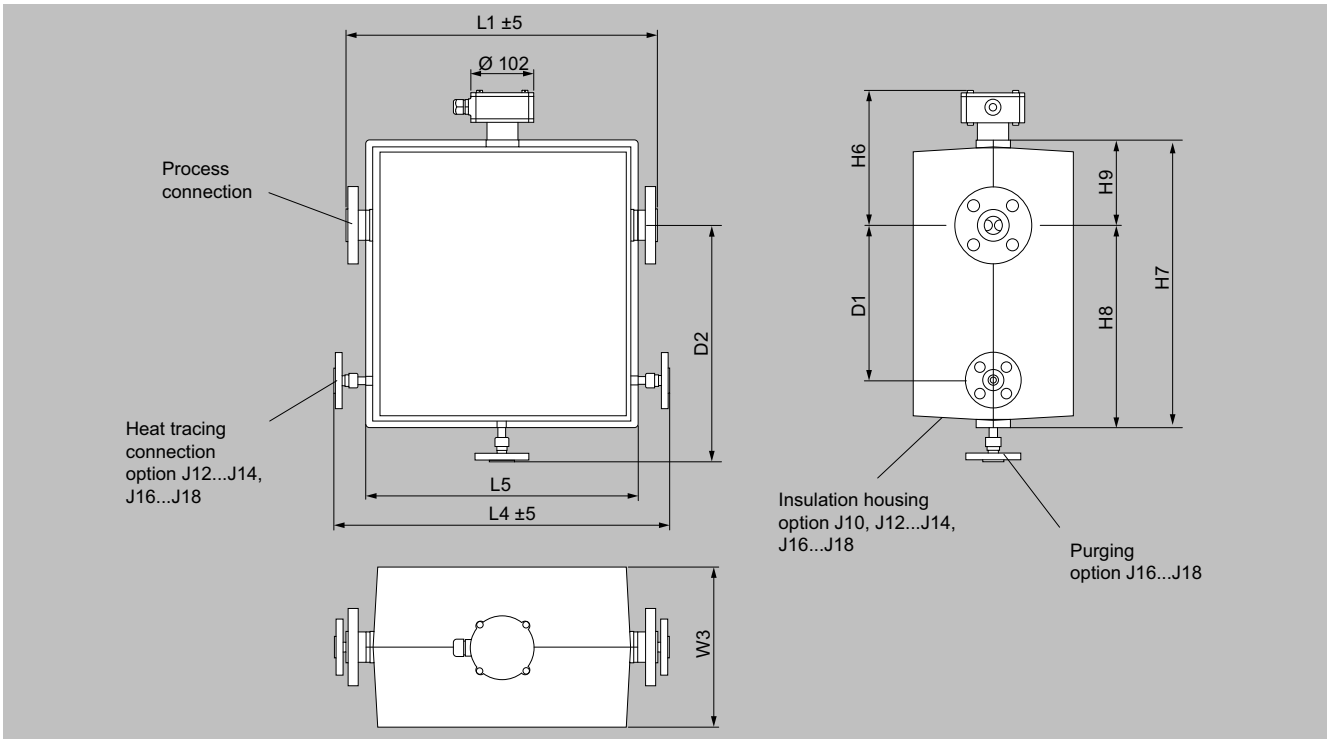
## Dimensional drawings

***Drawings, dimensions and weight for FCS600 sensors***

***FCS dimensions and weight (excluding high pressure versions)***




Dimensions in mm




Dimensions in mm (with insulation and heating options)

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## Dimensional drawings (continued)

### *FCS600 sensor dimensions without L1*

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 15 | 272 (10.7) | 212 (8.3) | 420 (16.5) | 310 (12.2) | 60 (2.4) | 80 (3.1) | 240 (9.4) | 200 (7.9) | 330 (13) |
| DN 25 | 400 (15.7) | 266 (10.5) | 540 (21.3) | 439 (17.3) | 76 (3) | 90 (3.5) | 260 (10.2) | 250 (9.8) | 380 (15) |
| DN 40 | 490 (19.3) | 267 (10.5) | 640 (25.2) | 530 (20.9) | 89 (3.5) | 110 (4.3) | 260 (10.2) | 250 (9.8) | 430 (16.9) |
| DN 65 | 850 (33.5) | 379 (14.9) | 1000 (39.4) | 894 (35.2) | 129 (5.1) | 160 (6.3) | 302 (11.9) | 350 (13.8) | 545 (21.5) |

| Nominal size | H1 | H3 | H4 | H5 | H6 | H7 | H8 | H9 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 15 | 177 (7) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 411 (16.2) | 273 (10.7) | 138 (5.4) |
| DN 25 | 230 (9.1) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 464 (18.3) | 326 (12.8) | 138 (5.4) |
| DN 40 | 268 (10.6) | 277 (10.9) | 100 (3.9) | 148 (5.8) | 228 (9) | 524 (20.6) | 376 (14.8) | 148 (5.8) |
| DN 65 | 370 (14.6) | 294.5 (11.6) | 135 (5.3) | 165 (6.5) | 246 (9.7) | 668 (26.3) | 503 (19.8) | 165 (6.5) |

### *Overall length L1 and weight*

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb).

### *L1 dimension and weight with process connections according to ASME B16.5, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 370 (14.6) | 10 (22) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 300, raised face (RF) | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, raised face (RF) | 380 (15) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, ring joint (RJ) | 380 (15) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME 1" class 150, raised face (RF) | 370 (14.6) | 10.8 (24) | 500 (19.7) | 14.8 (33) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 370 (14.6) | 11.8 (26) | 500 (19.7) | 15.8 (35) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 390 (15.4) | 12.2 (27) | 520 (20.5) | 16.2 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, ring joint (RJ) | 390 (15.4) | 12.4 (27) | 520 (20.5) | 16.2 (36) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 380 (15) | 11.8 (26) | 500 (19.7) | 15.8 (35) | 600 (23.6) | 25 (56) | n/a | n/a |
| ASME 1½" class 300, raised face (RF) | 380 (15) | 14.2 (31) | 510 (20.1) | 18.2 (40) | 600 (23.6) | 27.2 (60) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 400 (15.7) | 15.4 (34) | 530 (20.9) | 19.2 (42) | 620 (24.4) | 28.2 (62) | n/a | n/a |
| ASME 1½" class 600, ring joint (RJ) | 400 (15.7) | 15.4 (34) | 530 (20.9) | 19.4 (43) | 620 (24.4) | 28.2 (62) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | n/a | n/a | 510 (20.1) | 17.4 (38) | 600 (23.6) | 26.4 (58) | n/a | n/a |
| ASME 2" class 300, raised face (RF) | n/a | n/a | 510 (20.1) | 19 (42) | 600 (23.6) | 28 (62) | n/a | n/a |
| ASME 2" class 600, raised face (RF) | n/a | n/a | 540 (21.3) | 20.8 (46) | 630 (24.8) | 29.8 (66) | n/a | n/a |
| ASME 2" class 600, ring joint (RJ) | n/a | n/a | 540 (21.3) | 21.2 (47) | 630 (24.8) | 29.8 (66) | n/a | n/a |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 29.6 (65) | n/a | n/a |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 31 (68) | n/a | n/a |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 33.4 (74) | n/a | n/a |
| ASME 2½" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 640 (25.2) | 34.4 (76) | n/a | n/a |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 30.6 (67) | 1 000 (39.4) | 60.2 (133) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 34.6 (76) | 1 000 (39.4) | 63.4 (140) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 38 (84) | 1 000 (39.4) | 65.8 (145) |
| ASME 3" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 640 (25.2) | 38.6 (85) | 1 000 (39.4) | 65.8 (145) |
| ASME 4" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 64 (141) |
| ASME 4" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 71.4 (157) |
| ASME 4" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 82.6 (182) |
| ASME 4" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 82.8 (183) |
| ASME 5" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66 (146) |
| ASME 5" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 78.4 (173) |
| ASME 5" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 102.8 (227) |
| ASME 5" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 103.6 (228) |

***L1 dimension and weight with process connections according to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 1" class 150, raised face (RF) | 390 (15.4) | 11.4 (25) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 390 (15.4) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 390 (15.4) | 12.4 (27) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 390 (15.4) | 12.6 (28) | 520 (20.5) | 16.5 (35) | n/a | n/a |
| ASME 1½" class 300, raised face (RF) | 390 (15.4) | 15.4 (34) | 520 (20.5) | 19.1 (42) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 400 (15.7) | 15.6 (34) | 530 (20.9) | 19.6 (43) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | 390 (15.4) | 14.8 (33) | 520 (20.5) | 18.5 (41) | 620 (24.4) | 27.3 (60) |
| ASME 2" class 300, raised face (RF) | 390 (15.4) | 16 (35) | 520 (20.5) | 20.5 (45) | 620 (24.4) | 29.1 (64) |
| ASME 2" class 600, raised face (RF) | 410 (16.1) | 17.6 (39) | 540 (21.3) | 21.6 (48) | 630 (24.8) | 29.7 (66) |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 30.9 (68) |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.5 (72) |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 33.9 (75) |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.8 (72) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 36.6 (81) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 38.9 (86) |

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## Dimensional drawings (continued)

***L1 dimension and weight with process connections according to EN 1092-1, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 40 type B1, raised face (RF) | 370 (14.6) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type D, with groove | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type E, with spigot | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type F, with recess | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type B1, raised face (RF) | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type D, with groove | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type E, with spigot | 380 (15) | 11.2 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type F, with recess | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type B1, raised face (RF) | 370 (14.6) | 11.6 (26) | 500 (19.7) | 15.6 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type D, with groove | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.4 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type E, with spigot | 370 (14.6) | 11.2 (25) | 500 (19.7) | 15.2 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type F, with recess | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.4 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type B1, raised face (RF) | 390 (15.4) | 14 (31) | 520 (20.5) | 18.2 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type D, with groove | 390 (15.4) | 14 (31) | 520 (20.5) | 18 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type E, with spigot | 390 (15.4) | 13.6 (30) | 520 (20.5) | 17.6 (39) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type F, with recess | 390 (15.4) | 14 (31) | 520 (20.5) | 18 (40) | n/a | n/a | n/a | n/a |
| EN DN 40 PN 40 type B1, raised face (RF) | 370 (14.6) | 13 (29) | 500 (19.7) | 17 (37) | 600 (23.6) | 26.2 (58) | n/a | n/a |
| EN DN 40 PN 40 type D, with groove | 370 (14.6) | 13 (29) | 500 (19.7) | 17 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| EN DN 40 PN 40 type E, with spigot | 370 (14.6) | 12.6 (28) | 500 (19.7) | 16.6 (37) | 600 (23.6) | 25.8 (57) | n/a | n/a |
| EN DN 40 PN 40 type F, with recess | 370 (14.6) | 12.8 (29) | 500 (19.7) | 16.8 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| EN DN 40 PN 100 type B1, raised face (RF) | 450 (17.7) | 17.6 (39) | 560 (22) | 21.2 (47) | 620 (24.4) | 29.8 (66) | n/a | n/a |
| EN DN 40 PN 100 type D, with groove | 450 (17.7) | 17.4 (38) | 560 (22) | 21.2 (47) | 620 (24.4) | 29.6 (65) | n/a | n/a |
| EN DN 40 PN 100 type E, with spigot | 450 (17.7) | 17 (37) | 560 (22) | 20.8 (46) | 620 (24.4) | 29.2 (64) | n/a | n/a |
| EN DN 40 PN 100 type F, with recess | 450 (17.7) | 17.4 (38) | 560 (22) | 21 (46) | 620 (24.4) | 29.6 (65) | n/a | n/a |
| EN DN 50 PN 40 type B1, raised face (RF) | n/a | n/a | 500 (19.7) | 18.4 (41) | 600 (23.6) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN40 type D, with groove | n/a | n/a | 500 (19.7) | 18.2 (40) | 600 (23.6) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN 40 type E, with spigot | n/a | n/a | 500 (19.7) | 18 (40) | 600 (23.6) | 27 (60) | n/a | n/a |
| EN DN 50 PN 40 type F, with recess | n/a | n/a | 500 (19.7) | 18.2 (40) | 600 (23.6) | 27.2 (60) | n/a | n/a |
| EN DN 50 PN 63 type B1, raised face (RF) | n/a | n/a | 520 (20.5) | 21.6 (48) | 620 (24.4) | 30.6 (67) | n/a | n/a |
| EN DN 50 PN 63 type D, with groove | n/a | n/a | 520 (20.5) | 21.4 (47) | 620 (24.4) | 30.4 (67) | n/a | n/a |
| EN DN 50 PN 63 type E, with spigot | n/a | n/a | 520 (20.5) | 21 (46) | 620 (24.4) | 30 (66) | n/a | n/a |
| EN DN 50 PN 63 type F, with recess | n/a | n/a | 520 (20.5) | 21.2 (47) | 620 (24.4) | 30.2 (67) | n/a | n/a |
| EN DN 50 PN 100 type B1, raised face (RF) | n/a | n/a | 590 (23.2) | 25.2 (56) | 660 (26) | 33.6 (74) | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 50 PN 100 type D, with groove | n/a | n/a | 590 (23.2) | 25 (55) | 660 (26) | 33.4 (74) | n/a | n/a |
| EN DN 50 PN 100 type E, with spigot | n/a | n/a | 590 (23.2) | 24.4 (54) | 660 (26) | 33 (73) | n/a | n/a |
| EN DN 50 PN 100 type F, with recess | n/a | n/a | 590 (23.2) | 24.8 (56) | 660 (26) | 33.4 (74) | n/a | n/a |
| EN DN 80 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 31 (68) | 1 000 (39.4) | 60.4 (133) |
| EN DN 80 PN 40 type D, with groove | n/a | n/a | n/a | n/a | 610 (24) | 30.8 (68) | 1 000 (39.4) | 60.2 (133) |
| EN DN 80 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | 610 (24) | 30.4 (67) | 1 000 (39.4) | 59.8 (132) |
| EN DN 80 PN 40 type F, with recess | n/a | n/a | n/a | n/a | 610 (24) | 30.6 (67) | 1 000 (39.4) | 60 (132) |
| EN DN 80 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 34.4 (76) | 1 000 (39.4) | 63.4 (140) |
| EN DN 80 PN 63 type D, with groove | n/a | n/a | n/a | n/a | 620 (24.4) | 34.2 (75) | 1 000 (39.4) | 63.2 (139) |
| EN DN 80 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | 620 (24.4) | 33.6 (74) | 1 000 (39.4) | 62.8 (138) |
| EN DN 80 PN 63 type F, with recess | n/a | n/a | n/a | n/a | 620 (24.4) | 33.8 (75) | 1 000 (39.4) | 63 (139) |
| EN DN 80 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 730 (28.7) | 41.8 (92) | 1 000 (39.4) | 67.2 (148) |
| EN DN 80 PN 100 type D, with groove | n/a | n/a | n/a | n/a | 730 (28.7) | 41.6 (92) | 1 000 (39.4) | 67 (148) |
| EN DN 80 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | 730 (28.7) | 41 (90) | 1 000 (39.4) | 66.4 (146) |
| EN DN 80 PN 100 type F, with recess | n/a | n/a | n/a | n/a | 730 (28.7) | 41.4 (91) | 1 000 (39.4) | 66.6 (147) |
| EN DN 100 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 63.6 (140) |
| EN DN 100 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 63.2 (139) |
| EN DN 100 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 62.4 (138) |
| EN DN 100 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 62.6 (138) |
| EN DN 100 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 68 (150) |
| EN DN 100 PN 63 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.8 (149) |
| EN DN 100 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67 (148) |
| EN DN 100 PN 63 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.4 (149) |
| EN DN 100 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 76.6 (169) |
| EN DN 100 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 76.2 (168) |
| EN DN 100 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 75.4 (166) |
| EN DN 100 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 75.8 (167) |
| EN DN 125 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.6 (149) |
| EN DN 125 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.2 (148) |
| EN DN 125 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66.4 (146) |
| EN DN 125 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66.6 (147) |
| EN DN 125 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 77.8 (172) |
| EN DN 125 PN 63 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 77.4 (171) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 125 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 76.4 (168) |
| EN DN 125 PN 63 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 76.8 (169) |
| EN DN 125 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 93.2 (205) |
| EN DN 125 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 92.8 (205) |
| EN DN 125 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 91.4 (202) |
| EN DN 125 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 92.4 (204) |

***L1 dimension and weight with process connections according to EN 1092-1, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 25 PN 40, type B1, raised face (RF) | 390 (15.4) | 11.7 (26) | 520 (20.5) | 15.7 (35) | n/a | n/a |
| EN DN 40 PN 40, type B1, raised face (RF) | 390 (15.4) | 13.7 (30) | 520 (20.5) | 17.5 (39) | n/a | n/a |
| EN DN 50 PN 40, type B1, raised face (RF) | n/a | n/a | 520 (20.5) | 19.3 (43) | 620 (24.4) | 28 (62) |
| EN DN 80 PN 40, type B1, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.6 (72) |

***L1 dimension and weight with process connections according to JIS B 2220, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10 K | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 15 20 K | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 25 10 K | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.6 (34) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 370 (14.6) | 11.8 (26) | 500 (19.7) | 15.8 (35) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 370 (14.6) | 12.2 (27) | 500 (19.7) | 16.2 (36) | 600 (23.6) | 25.4 (56) | n/a | n/a |
| JIS DN 40 20 K | 370 (14.6) | 12.6 (28) | 500 (19.7) | 16.6 (37) | 600 (23.6) | 25.8 (57) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | 500 (19.7) | 17 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| JIS DN 50 20 K | n/a | n/a | 500 (19.7) | 17.2 (38) | 600 (23.6) | 26.2 (58) | n/a | n/a |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | 600 (23.6) | 27.8 (61) | 1 000 (40.2) | 57.8 (127) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | 610 (24) | 30.4 (67) | 1 000 (40.2) | 60 (132) |
| JIS DN 100 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 59 (130) |
| JIS DN 100 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 63 (139) |
| JIS DN 125 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 62.8 (138) |
| JIS DN 125 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 69 (152) |

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## Dimensional drawings (continued)

### *L1 dimension and weight with process connections according to JIS B 2220, alloy 22 wetted parts*

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 25 10 K | 390 (15.4) | 12.1 (27) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 390 (15.4) | 12.5 (28) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 390 (15.4) | 13.6 (30) | 520 (20.5) | 17.4 (38) | n/a | n/a |
| JIS DN 40 20 K | 390 (15.4) | 14 (31) | 520 (20.5) | 17.6 (39) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | 520 (20.5) | 18.6 (41) | 620 (24.4) | 27.3 (60) |
| JIS DN 50 20 K | n/a | n/a | 520 (20.5) | 18.8 (41) | 620 (24.4) | 27.3 (60) |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | 620 (24.4) | 30.8 (68) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | 620 (24.4) | 33.3 (73) |

### *L1 dimension and weight with G threaded process connections, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ⅜" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ½" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ¾" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

### *L1 dimension and weight with NPT threaded process connections, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ⅜" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| ½" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| ¾" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

### *L1 dimension and weight with hygienic clamp process connections to DIN 32676 Series A, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A, DN 25 | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 40 | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 50 | n/a | n/a | 500 (19.7) | 13.2 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| DIN 32676 series A, DN 65 | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |
| DIN 32676 series A, DN 100 | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 52.1 (115) |

### *L1 dimension and weight with hygienic clamp process connections to DIN 32676 Series C (Tri-clamp), AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C, 1" | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 1½" | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 2" | n/a | n/a | 500 (19.7) | 13.2 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| DIN 32676 series C, 3" | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |
| DIN 32676 series C, 4" | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 52.2 (115) |

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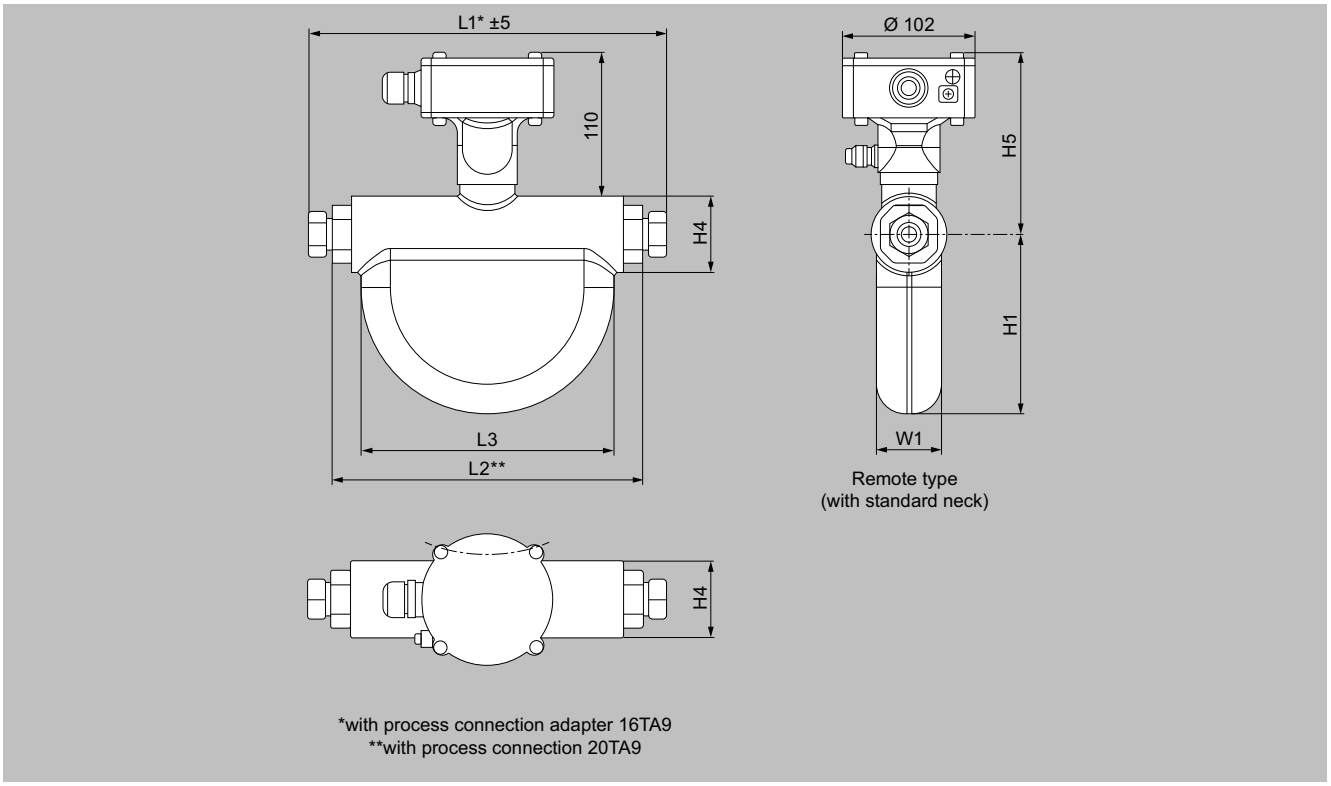


## Dimensional drawings (continued)

***L1 dimension and weight with hygienic clamp process connections to JIS/ISO 2852, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS/ISO 2852, 1" | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 1½" | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 2" | n/a | n/a | 500 (19.7) | 13.3 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| JIS/ISO 2852, 3" | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |

***FCS600 dimensions and weight (high pressure versions)***

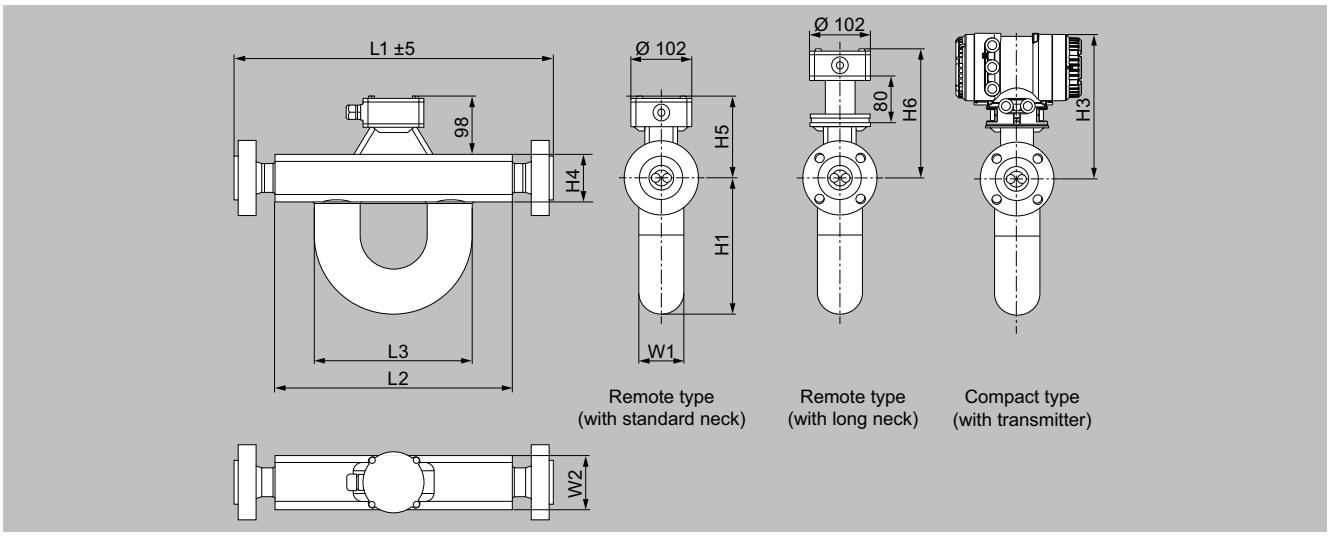



Dimensions in mm for sizes DN 2 and DN 4

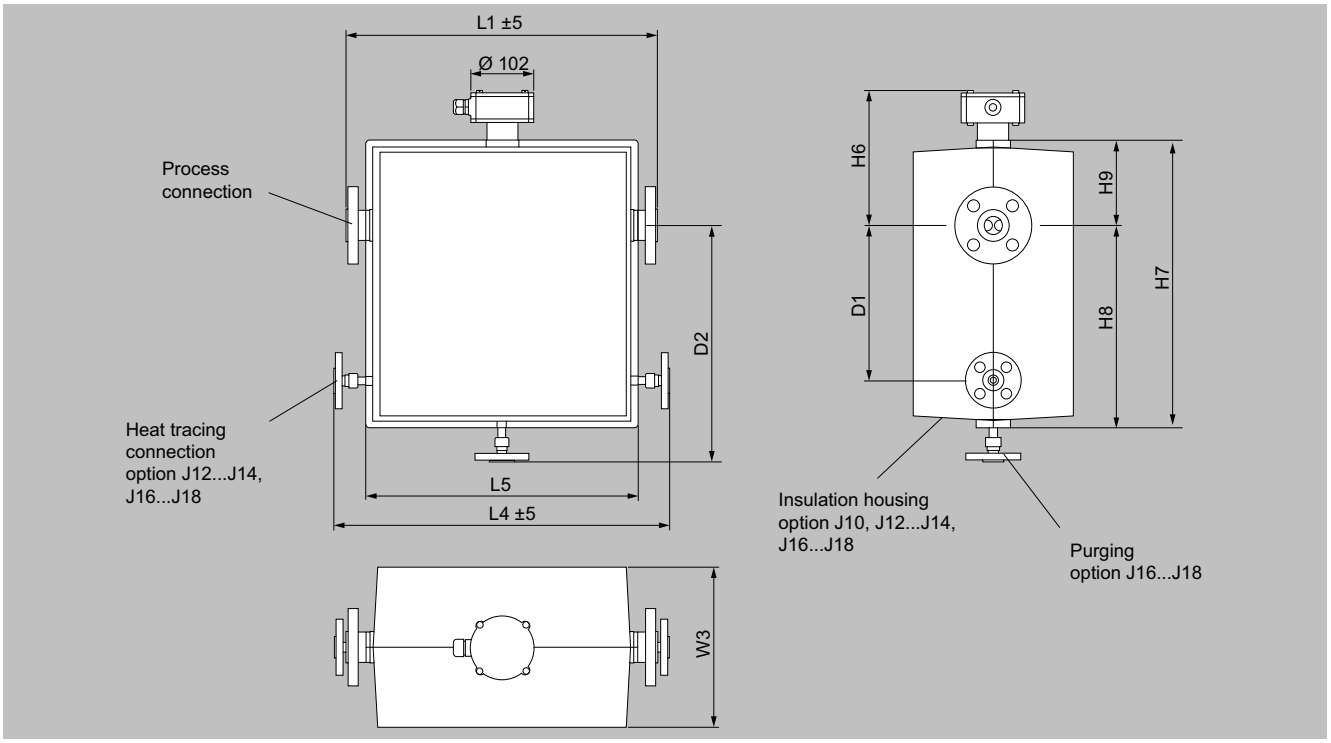
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## Dimensional drawings (continued)




Dimensions in mm for sizes DN 15, DN 25 and DN 40




Dimensions in mm, version with insulation housing for sizes DN 15, DN 25 and DN 40 only

***Dimensions without length L1***

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 2 | 240 (9.5) | 195 (7.7) | | | 50 (2.0) | | | | |
| DN 4 | 240 (9.5) | 195 (7.7) | | | 50 (2.0) | | | | |
| DN 15 | 272 (10.7) | 212 (8.3) | 420 (16.5) | 310 (12.2) | 60 (2.4) | 80 (3.1) | 240 (9.4) | 200 (7.9) | 330 (13) |
| DN 25 | 400 (15.7) | 266 (10.5) | 540 (21.3) | 439 (17.3) | 76 (3) | 90 (3.5) | 260 (10.2) | 250 (9.8) | 380 (15) |
| DN 40 | 490 (19.3) | 267 (10.5) | 640 (25.2) | 530 (20.9) | 89 (3.5) | 110 (4.3) | 260 (10.2) | 250 (9.8) | 430 (16.9) |

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## Dimensional drawings (continued)

| Nominal size | H1 | H3 | H4 | H5 | H6 | H7 | H8 | H9 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 2 | 138 (5.4) | | 59 (2.3) | 140 (5.5) | | | | |
| DN 4 | 138 (5.4) | | 59 (2.3) | 140 (5.5) | | | | |
| DN 15 | 177 (7) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 411 (16.2) | 273 (10.7) | 138 (5.4) |
| DN 25 | 230 (9.1) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 464 (18.3) | 326 (12.8) | 138 (5.4) |
| DN 40 | 268 (10.6) | 277 (10.9) | 100 (3.9) | 148 (5.8) | 228 (9) | 524 (20.6) | 376 (14.8) | 148 (5.8) |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb).

***L1 dimension and weight for medium pressure autoclave process connections***

Wetted parts AISI 316L stainless steel and alloy 22

| Process connection size and type | FCS600 sensor nominal size DN 2 | | DN 4 | |
|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| Autoclave 9/16" adapter | 275 (10.8) | 7 (15.4) | 275 (10.8) | 7 (15.4) |
| Autoclave ¾" | 240 (9.5) | 7 (15.4) | 240 (9.5) | 7 (15.4) |

***L1 dimension and weight for process connections compatible to ASME B16.5, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 900, raised face (RF) | 400 (15.7) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME ½" class 900, ring joint (RJ) | 400 (15.7) | 13 (29) | n/a | n/a | n/a | n/a |
| ASME ½" class 1 500, raised face (RF) | 400 (15.7) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME ½" class 1 500, ring joint (RJ) | 400 (15.7) | 13 (29) | n/a | n/a | n/a | n/a |
| ASME 1" class 900, raised face (RF) | 450 (17.7) | 16.4 (36) | 540 (21.3) | 20.6 (45) | n/a | n/a |
| ASME 1" class 900, ring joint (RJ) | 450 (17.7) | 16.6 (37) | 540 (21.3) | 20.4 (45) | n/a | n/a |
| ASME 1" class 1500, raised face (RF) | 450 (17.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 1500, ring joint (RJ) | 450 (17.7) | 16.6 (37) | n/a | n/a | n/a | n/a |
| ASME 2" class 900, raised face (RF) | n/a | n/a | 660 (26) | 35.2 (78) | 720 (28.3) | 43 (95) |
| ASME 2" class 900, ring joint (RJ) | n/a | n/a | 660 (26) | 35.6 (78) | 720 (28.3) | 43.4 (96) |

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## Dimensional drawings (continued)

***L1 dimension and weight for process connections compatible to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| ASME 1" class 900, raised face (RF) | 400 (15.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 900, ring joint (RJ) | n/a | n/a | 580 (23) | 21 (46) | n/a | n/a |
| ASME 1" class 1 500, raised face (RF) | 400 (15.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 1 500, ring joint (RJ) | n/a | n/a | 580 (23) | 21 (46) | n/a | n/a |
| ASME 2" class 900, raised face (RF) | n/a | n/a | 580 (23) | 34 (75) | 710 (28) | 44 (97) |
| ASME 2" class 900, ring joint (RJ) | n/a | n/a | 580 (23) | 36 (80) | 710 (28) | 44 (97) |
| ASME 2" class 1 500, ring joint (RJ) | n/a | n/a | 580 (23) | 36 (80) | 710 (28) | 44 (97) |
| ASME 3" class 900, raised face (RF) | n/a | n/a | n/a | n/a | 710 (28) | 50 (110) |
| ASME 3" class 900, ring joint (RJ) | n/a | n/a | n/a | n/a | 710 (28) | 52 (115) |

***L1 dimension and weight for process connections with internal thread G***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| G ⅜" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| G ½" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| G ¾" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |

***L1 dimension and weight for process connections with internal thread NPT***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| ⅜" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| ½" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| ¾" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |

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## Overview

SITRANS FCS700 sensor is the grande Coriolis flow sensor for large pipes and high flows.

Features:

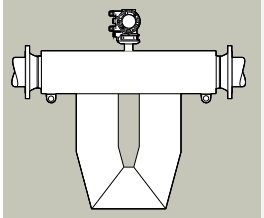
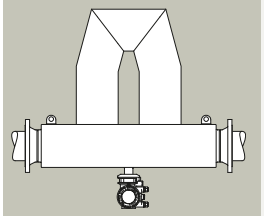
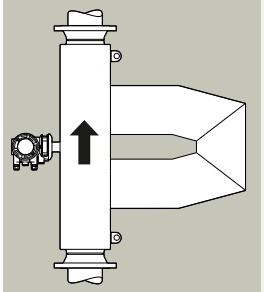
- Dual curved AISI 316L stainless steel or alloy 22 tubes with optimum decoupling from external influences
- Nominal sizes: DN 100 to DN 200
- Process connection: flanges
- Energy efficient low pressure loss design with short tube paths and large tube diameter
- High power tube driver for dependable measurements in high damping applications
- Combination with compact or remote transmitters



FCS700 sensor

## Design

***Sensor installation position related to type of fluid***

| Installation position | Fluid | Description |
|---|---|---|
| **Position 1**  | Liquid | • Horizontal<br>• Measuring tubes below process pipe<br>• Avoids accumulation of entrained gas |
| **Position 2**  | Gas | • Horizontal<br>• Measuring tubes above process pipe<br>• Accumulation of liquid or condensate is less likely |
| **Position 3**  | Gas / liquid | • Vertical<br>• Upwards direction of flow<br>• In liquid application accumulation of entrained gas is avoided<br>• This position allows self-draining in liquid flow |

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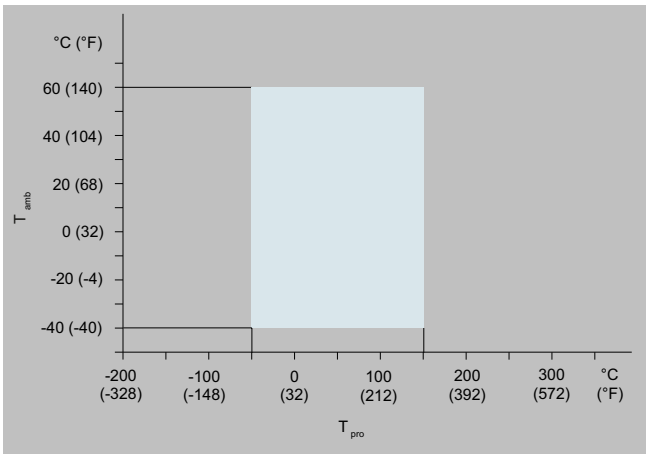


## Technical specifications

### *Allowed ambient temperature for FCS700 sensors*

The allowed combinations of process fluid and ambient temperature for the sensor are illustrated as light areas in the diagrams below.

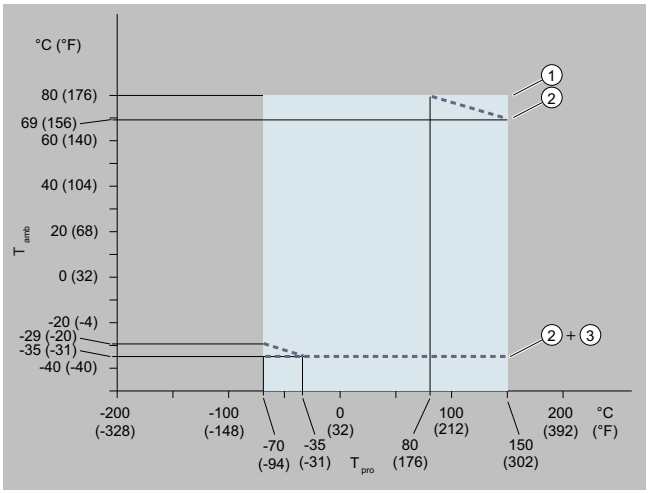
Standard temperature specification, compact transmitter




Allowed process fluid and ambient temperatures, compact transmitter

| | |
|---|---|
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

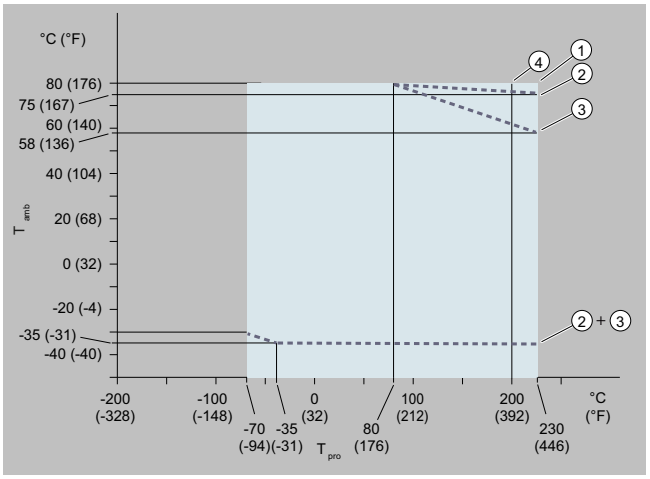
Standard temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Fire retardant cable standard neck or long neck with insulation and heating options |
| 3 | Fire retardant cable long neck without insulation and heating options |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

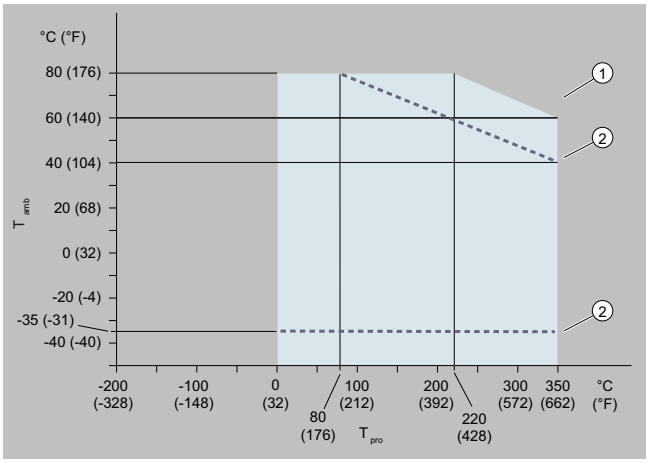
Medium temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, compact transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Fire retardant cable without insulation and heating options |
| 3 | Fire retardant cable with insulation and heating options |
| 4 | For FCS700 DN 200 medium temperature range is limited to 200 °C (392 °F) |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

High temperature specification, remote transmitter




Allowed process fluid and ambient temperatures, remote transmitter

| | |
|---|---|
| 1 | Standard cable option |
| 2 | Fire retardant cable option |
| $T_{amb}$ | Ambient temperature |
| $T_{pro}$ | Process fluid temperature |

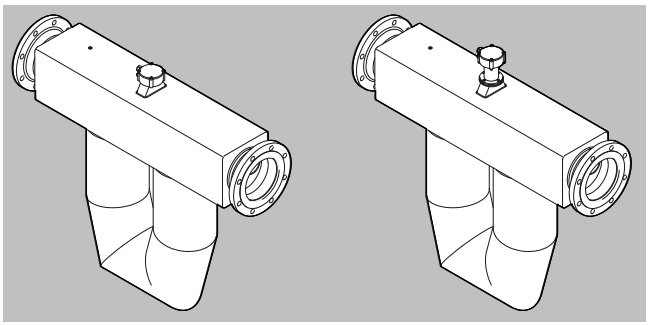
### *Mechanical specifications of FCS700 sensors*

FCS700 sensors are available in standard neck and long neck designs and can be combined with compact or remote transmitters. The neck can also be described as the pedestal connecting the sensor body to the transmitter or terminal housing.

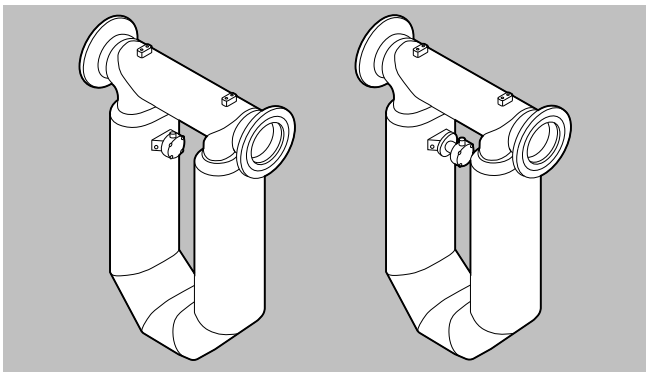
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## Technical specifications (continued)



FCS700 sensors DN 100 and DN 150 (for remote transmitter) with standard neck, and long neck version shown to the right



FCS700 sensors DN 200 (for remote transmitter) with standard neck, and long neck version shown to the right

| Material specifications | | |
|---|---|---|
| **Wetted parts**[1] | | |
| Sensor size DN 100 | AISI 316L stainless steel or alloy 22 | |
| Sensor size DN 150 | AISI 316L stainless steel or alloy 22 | |
| Sensor size DN 200 | AISI 316L stainless steel with ASTM A351 CF3M stainless steel flow separator | |
| **Sensor housing** | | |
| Junction box | AISI 316L stainless steel | All sensors with remote transmitters |
| Neck (pedestal) | AISI 316L stainless steel | All versions |
| Body (outer casing) | AISI 304 stainless steel | Versions with housing code B01 |
| Body (outer casing) | AISI 316L stainless steel | Versions with housing codes B02, B03 and B04 |
| **Nameplates**[2] | **Process temperature range** | **Material** |
| Sensor with AISI 304 stainless steel housing | Standard, up to 150 °C (302 °F) | Polyester film |
| Sensor with AISI 304 stainless steel housing | Medium or high | AISI 316L ss |
| Sensor with AISI 316L stainless steel housing | All versions | AISI 316L ss |

1) The user is responsible to ensure chemical compatibility of the material of the wetted parts with the measured process fluid.
2) Nameplate material depends on the materials selected for SITRANS FC sensors.

### *Secondary containment*

Some applications or environment conditions require secondary containment retaining the process pressure for increased safety.
SITRANS FCS700 sensors have a secondary containment filled with inert gas.

| | |
|---|---|
| Typical burst pressure at room temperature for size DN 100 | 65 bar (942 psi) |
| Typical burst pressure at room temperature for size DN 150 | 50 bar (725 psi) |
| Typical burst pressure at room temperature for size DN 200 | 30 bar (435 psi) |

### *Insulation and heat tracing (not available for sizes DN 150 and DN 200)*

In cases where fluid temperature deviates more than 80 °C (176 °F) from ambient temperature, sensor insulation is recommended to avoid negative effects from temperature fluctuations.

### *Maximum temperature of heat carrier*

| Process temperature range | Temperature range of heat carrier |
|---|---|
| Standard, up to 150 °C (302 °F) | 0 ... 150 °C (32 ... 302 °F) |
| Medium, up to 260 °C (500 °F) | 0 ... 230 °C (32 ... 446 °F)[1] |
| High, up to 350 °C (662 °F) | 0 ... 350 °C (32 ... 662 °F) |

1) With Ex Approval 0 ... 220 °C (32 ... 428 °F)

Insulation and heat tracing may be installed by the user but not in hazardous areas, and the following must be noted:

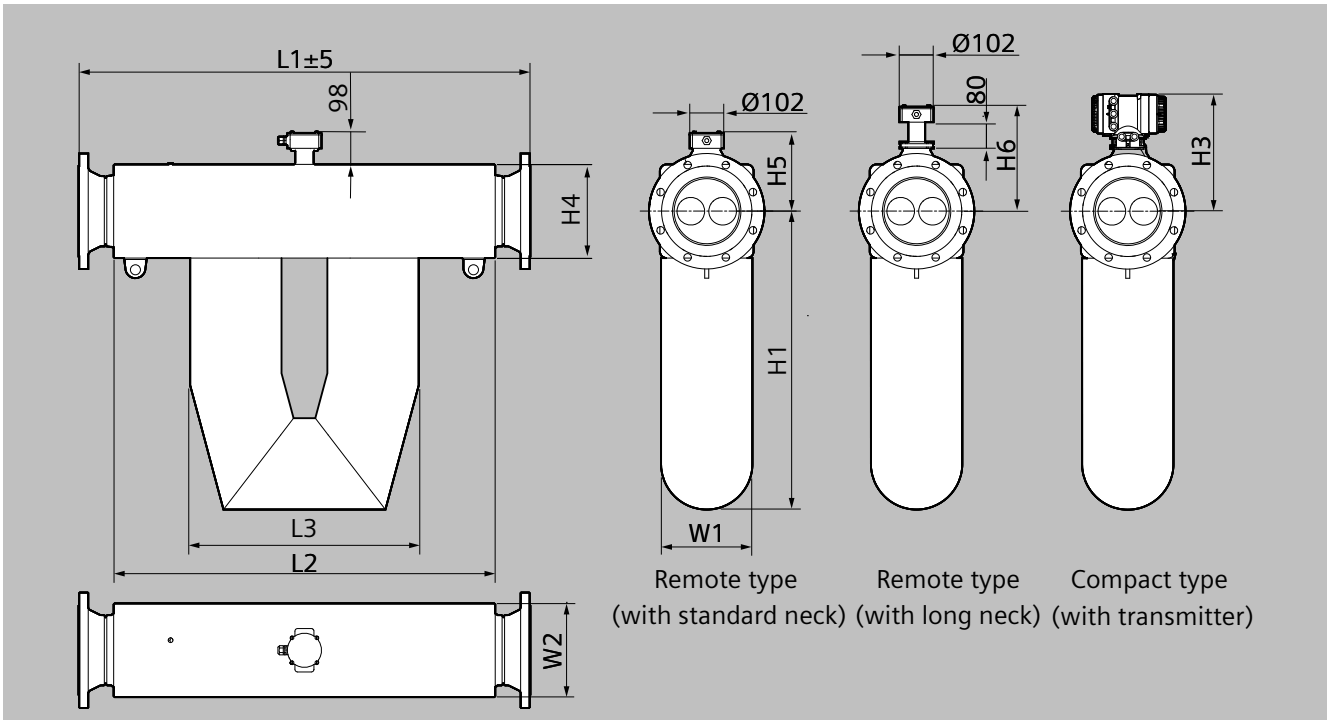
- Do not insulate sensor terminal box.
- Do not expose transmitters to ambient temperatures exceeding 60 °C (140 °F).
- The preferred insulation is 60 mm (2.36") thick with a heat transfer coefficient of 0.4 W/m² K (0.07 Btu/ ft² °F).

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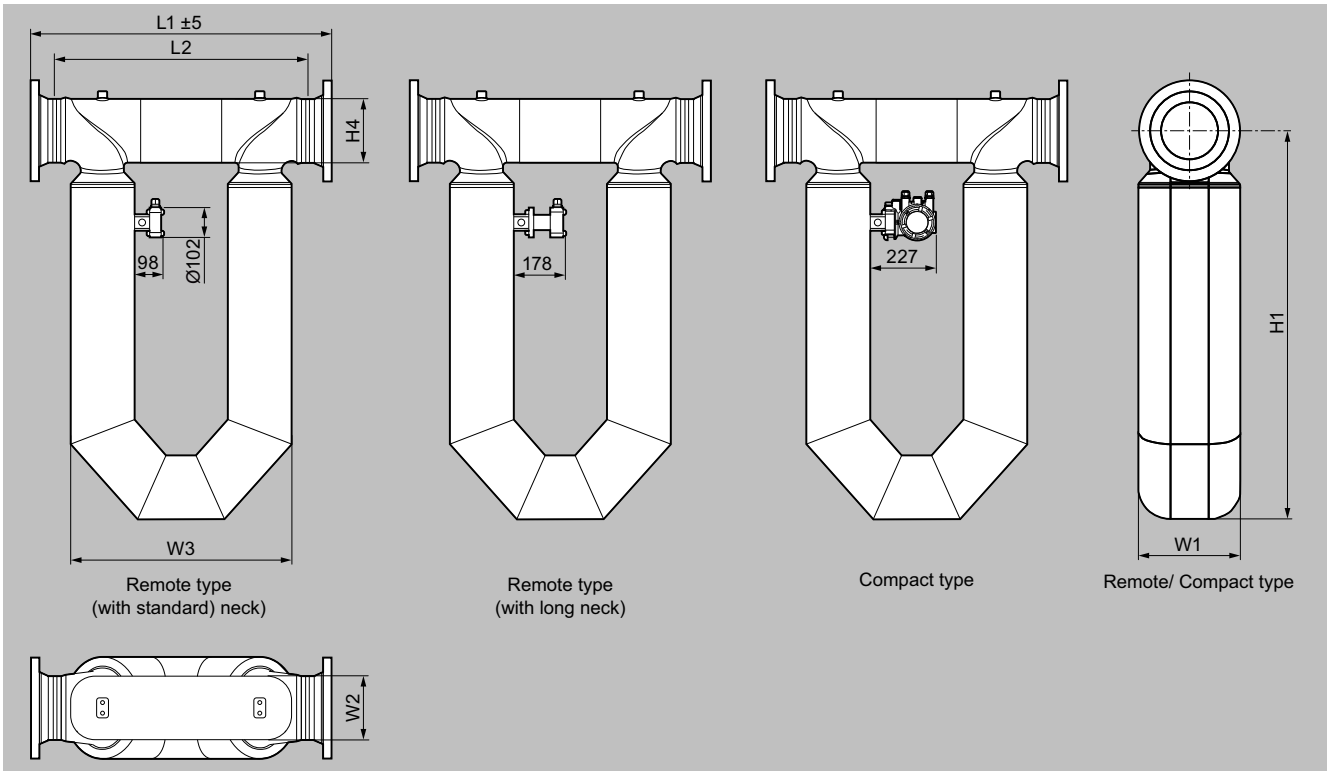


## Dimensional drawings

***Drawings, dimensions and weight for FCS700 sensors***




Dimensions in mm, sizes DN 100 and DN 150

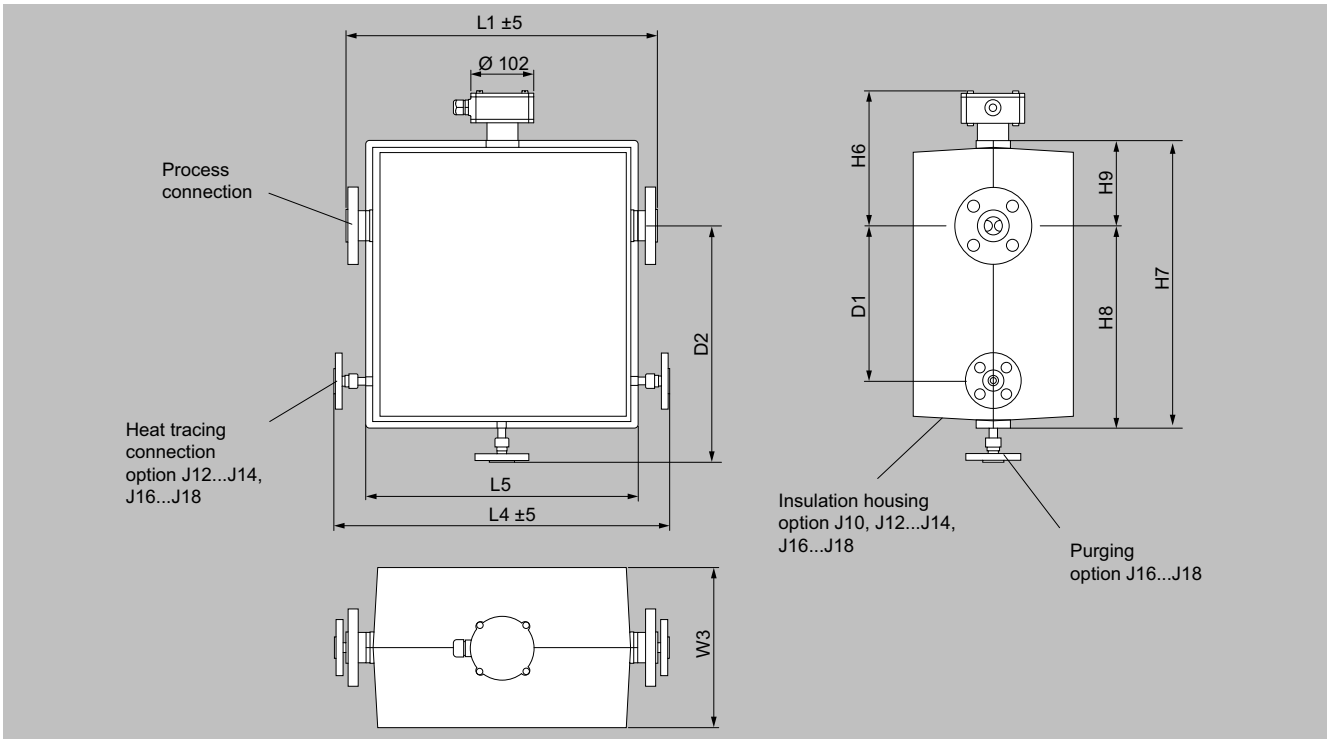



Dimensions in mm, sizes DN 200

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## Dimensional drawings (continued)




Dimensions in mm (with insulation and heating options)

***FCS700 sensor dimensions without L1***

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 100 | 892 (35.1) | 691 (27.2) | 1050 (41.3) | 944 (37.2) | 168 (6.6) | 176 (6.9) | 342 (13.5) | 350 (13.8) | 677 (26.7) |
| DN 150 | 1 140 (44.9) | 683 (26.9) | n/a | n/a | 273 (10.7) | 280 (11) | n/a | n/a | n/a |
| DN 200 | 870 (34.3) | 759 (29.9) | n/a | n/a | 350 (13.8) | 350 (13.8) | n/a | n/a | n/a |

| Nominal size | H1 | H3 | H4 | H5 | H6 | H7 | H8 | H9 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 100 | 556 (21.9) | 315 (12.4) | 176 (6.9) | 186 (7.3) | 266 (10.5) | 824 (32.4) | 628 (24.7) | 196 (7.7) |
| DN 150 | 891 (35.1) | 367 (14.5) | 280 (11) | 238 (9.4) | 320 (12.6) | n/a | n/a | n/a |
| DN 200 | 1 335 (52.6) | n/a | 219 (8.6) | n/a | n/a | n/a | n/a | n/a |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 b).

***L1 dimension and weight with process connections according to ASME B16.5, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 4" class 150, raised face (RF) | 1 100 (43.3) | 95 (210) | n/a | n/a | n/a | n/a |
| ASME 4" class 300, raised face (RF) | 1 100 (43.3) | 103 (227) | n/a | n/a | n/a | n/a |
| ASME 4" class 600, raised face (RF) | 1 100 (43.3) | 112 (246) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 4" class 600, ring joint (RJ) | 1 100 (43.3) | 112 (246) | n/a | n/a | n/a | n/a |
| ASME 5" class 150, raised face (RF) | 1 100 (43.3) | 97 (214) | n/a | n/a | n/a | n/a |
| ASME 5" class 300, raised face (RF) | 1 100 (43.3) | 109 (239) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, raised face (RF) | 1 160 (45.7) | 136 (299) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, ring joint (RJ) | 1 160 (45.7) | 136 (299) | n/a | n/a | n/a | n/a |
| ASME 6" class 150, raised face (RF) | 1 100 (43.3) | 101 (223) | 1 350 (53.1) | 290 (639) | n/a | n/a |
| ASME 6" class 300, raised face (RF) | 1 100 (43.3) | 118 (259) | 1 350 (53.1) | 307 (677) | n/a | n/a |
| ASME 6" class 600, raised face (RF) | 1 200 (47.2) | 149 (329) | 1 390 (54.7) | 332 (732) | n/a | n/a |
| ASME 6" class 600, ring joint (RJ) | 1 200 (47.2) | 150 (331) | 1 390 (54.7) | 333 (733) | n/a | n/a |
| ASME 8" class 150, raised face (RF) | n/a | n/a | 1 350 (53.1) | 302 (666) | 1 030 (40.6) | 299 (659) |
| ASME 8" class 300, raised face (RF) | n/a | n/a | 1 350 (53.1) | 324 (714) | 1 050 (41.3) | 323 (712) |
| ASME 8" class 600, raised face (RF) | n/a | n/a | 1 440 (56.7) | 371 (818) | 1 120 (44.1) | 368 (811) |
| ASME 8" class 600, ring joint (RJ) | n/a | n/a | 1 440 (56.7) | 372 (821) | 1 120 (44.1) | 369 (814) |
| ASME 10" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 1 090 (42.9) | 318 (701) |
| ASME 10" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 1 140 (44.9) | 363 (800) |
| ASME 10" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 1 220 (48) | 451 (994) |
| ASME 10" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 1 220 (48) | 453 (999) |

***L1 dimension and weight with process connections according to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 5" class 150, raised face (RF) | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| ASME 5" class 300, raised face (RF) | 1 100 (43.3) | 111 (245) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, raised face (RF) | 1 110 (43.7) | 133 (293) | n/a | n/a | n/a | n/a |
| ASME 6" class 150, raised face (RF) | 1 100 (43.3) | 106 (235) | n/a | n/a | n/a | n/a |
| ASME 6" class 300, raised face (RF) | 1 100 (43.3) | 123 (270) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to EN 1092-1, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 100 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 92 (202) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 16 type D, with groove | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 16 type E, with spigot | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 100 PN 16 type F, with recess | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 95 (210) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type D, with groove | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type E, with spigot | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type F, with recess | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type B1, raised face (RF) | 1 100 (43.3) | 100 (220) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type D, with groove | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type E, with spigot | 1 100 (43.3) | 98 (217) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type F, with recess | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type B1, raised face (RF) | 1 100 (43.3) | 106 (233) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type D, with groove | 1 100 (43.3) | 105 (232) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type E, with spigot | 1 100 (43.3) | 104 (230) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type F, with recess | 1 100 (43.3) | 105 (232) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 95 (209) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type D, with groove | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type E, with spigot | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type F, with recess | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 99 (218) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type D, with groove | 1 100 (43.3) | 99 (218) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type E, with spigot | 1 100 (43.3) | 98 (216) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type F, with recess | 1 100 (43.3) | 98 (216) | n/a | n/a | n/a | n/a |
| EN DN125 PN63 type B1, raised face (RF) | 1 100 (43.3) | 109 (240) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type D, with groove | 1 100 (43.3) | 108 (239) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type E, with spigot | 1 100 (43.3) | 107 (237) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type F, with recess | 1 100 (43.3) | 108 (239) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type B1, raised face (RF) | 1 140 (44.9) | 121 (267) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type D, with groove | 1 140 (44.9) | 121 (267) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 125 PN 100 type E, with spigot | 1 140 (44.9) | 119 (263) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type F, with recess | 1 140 (44.9) | 120 (265) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 98 (216) | 1 350 (53.1) | 288 (634) | n/a | n/a |
| EN DN 150 PN 16 type D, with groove | 1 100 (43.3) | 98 (216) | 1 350 (53.1) | 287 (632) | n/a | n/a |
| EN DN150 PN16 type E, with spigot | 1 100 (43.3) | 97 (214) | 1 350 (53.1) | 286 (631) | n/a | n/a |
| EN DN 150 PN 16 type F, with recess | 1 100 (43.3) | 97 (214) | 1 350 (53.1) | 287 (632) | n/a | n/a |
| EN DN 150 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 105 (231) | 1 350 (53.1) | 294 (648) | n/a | n/a |
| EN DN 150 PN 40 type D, with groove | 1 100 (43.3) | 104 (230) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 40 type E, with spigot | 1 100 (43.3) | 103 (228) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 40 type F, with recess | 1 100 (43.3) | 104 (230) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 63 type B1, raised face (RF) | 1 140 (44.9) | 124 (274) | 1 350 (53.1) | 311 (685) | n/a | n/a |
| EN DN 150 PN 63 type D, with groove | 1 140 (44.9) | 124 (274) | 1 350 (53.1) | 310 (684) | n/a | n/a |
| EN DN 150 PN 63 type E, with spigot | 1 140 (44.9) | 122 (269) | 1 350 (53.1) | 309 (681) | n/a | n/a |
| EN DN 150 PN 63 type F, with recess | 1 140 (44.9) | 123 (272) | 1 350 (53.1) | 310 (684) | n/a | n/a |
| EN DN 150 PN 100 type B1, raised face (RF) | 1 180 (46.5) | 138 (303) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type D, with groove | 1 180 (46.5) | 137 (302) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type E, with spigot | 1 180 (46.5) | 136 (299) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type F, with recess | 1 180 (46.5) | 137 (301) | n/a | n/a | n/a | n/a |
| EN DN 200 PN 16 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 294 (649) | 1 010 (39.8) | 290 (639) |
| EN DN 200 PN 16 type D, with groove | n/a | n/a | 1 350 (53.1) | 294 (649) | n/a | n/a |
| EN DN 200 PN 16 type E, with spigot | n/a | n/a | 1 350 (53.1) | 293 (646) | n/a | n/a |
| EN DN 200 PN 16 type F, with recess | n/a | n/a | 1 350 (53.1) | 293 (646) | n/a | n/a |
| EN DN200 PN40 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 311 (685) | 1 030 (40.6) | 308 (679) |
| EN DN 200 PN 40 type D, with groove | n/a | n/a | 1 350 (53.1) | 310 (683) | n/a | n/a |
| EN DN 200 PN 40 type E, with spigot | n/a | n/a | 1 350 (53.1) | 308 (680) | n/a | n/a |
| EN DN 200 PN 40 type F, with recess | n/a | n/a | 1 350 (53.1) | 309 (682) | n/a | n/a |
| EN DN 200 PN 63 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 333 (733) | 1 060 (41.7) | 332 (732) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 200 PN 63 type D, with groove | n/a | n/a | 1 350 (53.1) | 332 (732) | n/a | n/a |
| EN DN 200 PN 63 type E, with spigot | n/a | n/a | 1 350 (53.1) | 330 (728) | n/a | n/a |
| EN DN 200 PN 63 type F, with recess | n/a | n/a | 1 350 (53.1) | 331 (730) | n/a | n/a |
| EN DN 200 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 100 (43.3) | 362 (798) |
| EN DN 250 PN 16 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 080 (42.5) | 306 (675) |
| EN DN 250 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 130 (44.5) | 343 (756) |
| EN DN 250 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 150 (45.3) | 370 (816) |
| EN DN 250 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 150 (45.3) | 433 (955) |

***L1 dimension and weight with process connections according to EN 1092-1, alloy 22 wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 125 PN 16, type B1, raised face (RF) | 1 100 (43.3) | 96 (212) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40, type B1, raised face (RF) | 1 100 (43.3) | 101 (222) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 16, type B1, raised face (RF) | 1 100 (43.3) | 103 (227) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 40, type B1, raised face (RF) | 1 100 (43.3) | 110 (241) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to JIS B 2220, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 100 10 K | 1 100 (43.3) | 91 (200) | n/a | n/a | n/a | n/a |
| JIS DN 100 20 K | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| JIS DN 125 10 K | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| JIS DN 125 20 K | 1 100 (43.3) | 101 (222) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to JIS B 2220, alloy 22 wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 125 10 K | 1 100 (43.3) | 97 (213) | n/a | n/a | n/a | n/a |
| JIS DN 125 20 K | 1 100 (43.3) | 103 (228) | n/a | n/a | n/a | n/a |

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## Overview

FCT020 is the standard transmitter, suitable for general purpose applications. It delivers accurate and precise measurements of mass flow rate, density, temperature and volume flow rate.

The FCT020 transmitter is available in compact or remote design and can be combined with all SITRANS FC sensors. The selection is made within the complete SITRANS FC ordering code.

Spare transmitters are selected using the SITRANS FC ordering code, but with no sensor selected.



Example of SITRANS FCT transmitter mounted on SITRANS FCS600



FCT transmitter and SITRANS FCS100

Following features are available in the FCT020 transmitter:

- Tube health check

Tube health check

(software functions option code: S12)

Tube health check monitors key diagnostics, including tube stiffness, driver and pickups. Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout, or solid deposits building up in the tubes. The user defines verification frequency and alarm behavior. Verification results indicate whether preventive maintenance action is required.

## Overview (continued)

| Specification overview of SITRANS FCT020 | |
|---|---|
| **Typical measurement performance** | • Mass flow accuracy: ± 0.2% (of rate)<br>• Density accuracy: ± 4 kg/m³ (0.25 lb/ft³) |
| **Features and functions** | • Easy setup wizard<br>• microSD card<br>• Tube health check<br>• Self-verification |
| **Available measurements** | • Mass flow<br>• Density<br>• Temperature<br>• Volume flow |
| **Digital communication options** | • HART<br>• MODBUS |

## Function

### *Tube health check*

- Order code: **S12**

Tube health check monitors key diagnostics, including tube stiffness, driver and pickups. Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout, or solid deposits building up in the tubes. The user defines verification frequency and alarm behavior. Verification results indicate whether preventive maintenance action is required.

### *Overview of functions and features*

| Overview of the main functions and features of FCT020 transmitter | |
|---|---|
| **Primary measurements** | • Mass flow rate liquids (0.2% accuracy)<br>• Mass flow rate gases (0.75% accuracy)<br>• Density (accuracy 4 kg/m³ (0.25 lb/ft³))<br>• Temperature |
| **Secondary measurements** | • Volume flow rate liquids<br>• Actual volume flow rate gases<br>• Normal (standard) volume flow rate gases |
| **Configuration and diagnostics** | • microSD card (transmitter with display)<br>• Easy setup wizard<br>• Tube health check (self-verification)<br>• Event management to NAMUR NE107 |
| **Inputs and outputs** | • Up to 4 combined inputs and outputs |
| **Inputs** | • Status input |
| **Outputs** | • Analog output<br>• Pulse (frequency) or status output<br>• Status output<br>• Option for internal pull-up resistor |
| **Digital communications** | • HART<br>• MODBUS (in preparation) |
| **Enclosure options** | • Aluminum alloy with standard powder coating<br>• Aluminum alloy with corrosion resistant coating<br>• Stainless steel CF-8M (remote only) |
| **Power supply** | • Universal (AC and DC) |

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## Configuration

***Overview of available inputs, outputs and digital communications***

The table below provides a matrix of all available combinations for FCT020 transmitters.

Each combination is defined by a blend of two order code options:

- Ch 1 codes in the form "**E..**" define the required type of digital communication.
- Ch 2-4 codes in the form "**F..**" define the required combination of conventional inputs and outputs.

Abbreviations used in the table:

- Pulse or status output is abbreviated to "P/S output".
- Status only output is abbreviated to "S output".
- Status input is abbreviated to "S input".

| Ch 1 code | Ch 2-4 code | I/O 1 (Channel 1) | I/O 2 (Channel 2) | I/O 3 (Channel 3) | I/O 4 (Channel 4) |
|---|---|---|---|---|---|
| **E00** | **F00** | none | none | none | none |
| **E07** [1] | **F01** | passive mA HART output | passive P/S output | passive mA output | none |
| **E07** [1] | **F02** | passive mA HART output | passive P/S output | passive mA output | passive P/S output |
| **E07** [1] | **F03** | passive mA HART output | passive P/S output NAMUR | passive mA output | none |
| **E07** [1] | **F04** | passive mA HART output | passive P/S output NAMUR | passive mA output | passive P/S output NAMUR |
| **E06** | **F11** | active mA HART output | passive P/S output | none | none |
| **E06** | **F12** | active mA HART output | passive P/S output | passive S output | passive P/S output |
| **E06** | **F13** | active mA HART output | passive P/S output | volt free S input | passive P/S output |
| **E06** | **F20** | active mA HART output | passive P/S output | volt free S input | active P/S output |
| **E06** | **F21** | active mA HART output | passive P/S output | volt free S input | active P/S output and pull-up |
| **E06** | **F22** | active mA HART output | passive P/S output | passive P/S output | active mA output |
| **E06** | **F23** | active mA HART output | passive P/S output | volt free S input | active mA output |
| **E14** | **F31** | none | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F32** | passive P/S output | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F35** | active P/S output | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F36** | active P/S output and pull-up | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F37** | active mA output | passive P/S output | MODBUS C | MODBUS A & B |

[1] Any combinations with passive mA HART output on Channel are only possible with Ex approval. All outputs in these combinations are intrinsically safe.

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## Technical specifications

### *Mechanical specifications*

| Material specifications | | | |
|---|---|---|---|
| **Housing material options** | **Coating** | **Design** | **Order code position 14** |
| Cast aluminum alloy Al-Si10Mg(Fe) | Standard coating[1)] | Remote transmitter | C or D |
| Cast aluminum alloy Al-Si10Mg(Fe) | Corrosion resistant coating[2)] | Remote transmitter | E or F |
| ASTM CF8M stainless steel | None | Remote transmitter | G or H |
| **Display** | | | |
| Material of the lid window | Glass | | |
| **Mounting bracket[3)]** | | | |
| Material | AISI 316L stainless steel | W Nr. 1.4404 | |
| **Nameplates[4)]** | **Process temperature range** | **Nameplate material** | |
| Transmitter with cast aluminum housing | Not applicable | Foil | |
| Transmitter with ASTM CF8M stainless steel housing | Not applicable | AISI 316L ss | |

1) Standard coating is urethane cured polyester powder coating.
2) Corrosion protection coating is a three-layer coating with high chemical resistance (polyurethane coating on two layers of epoxy).
3) Only the remote transmitters are supplied with a mounting bracket.
4) Nameplate material depends on the materials selected for SITRANS FC sensors.

### *Electrical specifications*

| Power supply | |
|---|---|
| Alternating current voltage (rms) | nominal 24 V AC (-15% ... +10%), or 100 ... 240 V AC (-20% ... +10%) |
| Frequency | 47 ... 63 Hz |
| Direct current voltage | nominal 24 V DC (-15% ... +20%) or 100 ... 120 V DC (-10% ... +8.3%) |
| **Power consumption** | P ≤ 10 W (including sensor) |

Notes:

- For DNV approval option supply voltage is limited to 24 V.
- NAMUR NE21 testing specifies the range 24 V DC ±20% under NE21 test conditions.

Power supply failure

In the event of a power failure, the flowmeter data are backed up on a non-volatile internal memory. In case of devices with display, the characteristic sensor values, such as nominal diameter, serial number, calibration constants, zero point and the error history are also stored on a microSD card.

Galvanic isolation

All circuits for inputs, outputs and power supply are galvanically isolated from each other.

### *Analog inputs and outputs*

Analog input

FCT020 transmitters cannot be specified with analog current input.

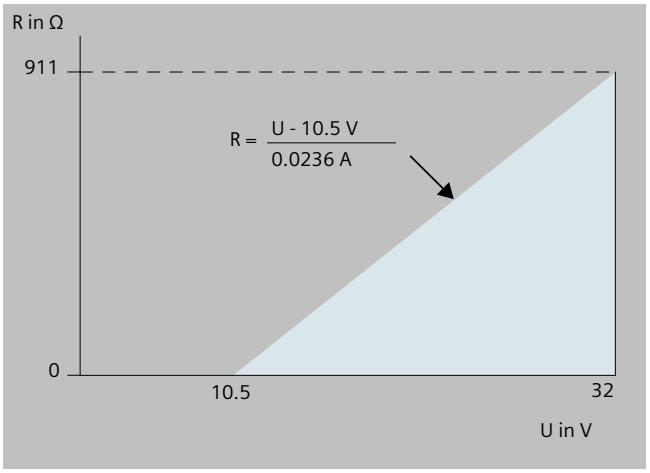
Analog output

Up to 2 analog outputs can be selected at time of ordering. The analog outputs can be configured to represent the following measured values:

- Flow rate (mass, volume, net partial component flow of a mixture)
- Density
- Temperature
- Pressure
- Concentration

HART communication, when selected, is supplied on channel 1 (I/O 1). The current output may be operated in compliance with the NAMUR NE43 standard.

| Analog outputs | |
|---|---|
| **Active output** | |
| Nominal output current range | 4 ... 20 mA |
| Maximum output current range | 2.4 ... 21.6 mA |
| Load resistance | ≤ 750 Ω |
| Load resistance for secure HART communication | 230 ... 600 Ω |
| **Passive output** | |
| Nominal output current range | 4 ... 20 mA |
| Maximum output current range | 2.4 ... 21.6 mA |
| External power supply | 10.5 ... 32 VDC |
| Load resistance for secure HART communication | 230 ... 600 Ω |
| Load resistance at current output | ≤ 911 Ω |




Maximum load resistance as a function of an external power supply voltage

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## Technical specifications (continued)

### *Digital inputs and outputs*

Digital inputs (status)

Do not connect a signal source with electric voltage.

The status input is provided for use of voltage-free contacts with the following specification:

| | |
|---|---|
| **Resistance when closed** | < 200 Ω |
| **Resistance when open** | > 100 kΩ |

Digital outputs

| **Digital outputs** | |
|---|---|
| **Active pulse output available on Pulse/Status output, connection of an electronic counter[1)]** | |
| Load resistance | > 1 kΩ |
| Internal power supply | 24 V DC ±20% |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 ... 12.5 kHz |
| **Active pulse output available on Pulse/Status output, connection of an electromechanical counter** | |
| Maximum current | 150 mA |
| Average current | ≤ 30 mA |
| Internal power supply | 24 V DC ±20% |
| Maximum pulse rate | 2 pulses/s |
| Pulse width | 20, 33, 50, or 100 ms |
| **Active pulse output available on Pulse/Status output, with internal pull-up resistor** | |
| Internal power supply | 24 V DC ±20% |
| Internal pull-up resistor | 2.2 kΩ |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 ... 12.5 kHz |
| **Passive pulse output available on Pulse/Status output[1)]** | |
| Maximum load current | ≤ 200 mA |
| External power supply | ≤ 30 V DC |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 to 12.5 kHz |
| **Active status output available on Pulse/Status output[2)]** | |
| Load resistance | > 1 kΩ |
| Internal power supply | 24 V DC ±20% |
| **Active status output available on Pulse/Status output, with internal pull-up resistor[3)]** | |
| Internal pull-up resistor | 2.2 kΩ |
| Internal power supply | 24 V DC ±20% |
| **Passive status output available on Pulse/Status output, or Status output** | |
| Output current | ≤ 200 mA |
| External power supply | ≤ 30 V DC |
| **Passive pulse or status output available on Pulse/Status output (NAMUR)** | Output signals according to EN 60947-5-6 (previously NAMUR, worksheet NA001) |

1) Maximum voltage and correct polarity must be observed for wiring.
2) Since this is a transistor contact, maximum allowed current as well as polarity and level of output voltage must be observed during wiring.
3) A relay must be connected in series to switch alternating voltage.

### *Digital communications*

Each transmitter is configured with one default digital communication interface, selectable in the SITRANS FC order code.

HART

- When selected, HART communication is supplied on the output terminal pair I/O 1.
- Up to 3 further input/output options can be configured for output terminal pairs I/O 2, I/O 3, and I/O 4.
- HART is available with either non-intrinsically safe or intrinsically safe outputs.

PROFIBUS PA

- When selected, PROFIBUS PA communication is supplied on the output terminal pair I/O 1.
- PROFIBUS PA interface is available with and without intrinsic safety.
- PROFIBUS PA digital communication signal is in accordance with IEC 61158/61784.
- Maximum voltage and correct polarity must be observed for wiring.
- Power supply: 9 ... 32 V DC
- Current draw: 15 mA (maximum)
- Compliance with PA profile revision 3.02 supporting: Condensed Status (NE107)
- Device identification number (IDENT_NUMBER) adaption

***Summary of available function blocks – PROFIBUS PA***

| Function block | Code | Description |
|---|---|---|
| **Transducer block** | FTB | Flow |
| | CTB | Concentration |
| | LTB | LCD Indicator |
| | MTB | Maintenance |
| | SDBT | Advanced diagnostics |
| **Analog input block [1)]** | AI1 | Mass flow |
| | AI2 | Density |
| | AI3 | Temperature |
| | AI4 | Volume flow |
| | AI5 | Reference density |
| | AI6 | Corrected (normal/standard) volume flow |
| **Totalizer block [1)]** | TOT1 | Mass |
| | TOT2 | Volume |
| | TOT3 | Corrected (normal/standard) volume |
| **Analog output block [1)]** | AO | Pressure |

1) Factory default setting. Assignment can be changed by parameter "channel".

Available function blocks are also influenced by the type of device description file (GSD) being used. For further details, please contact your regional Siemens Measurement Intelligence team.

MODBUS

(in preparation for later release)

- The MODBUS interface is available with up to two additional input/output options.
- When selected, MODBUS communication is supplied on the terminal pairs I/O 3 and I/O 4.
- The digital MODBUS communication signal is in accordance with EIA-485 standard (RS 485).

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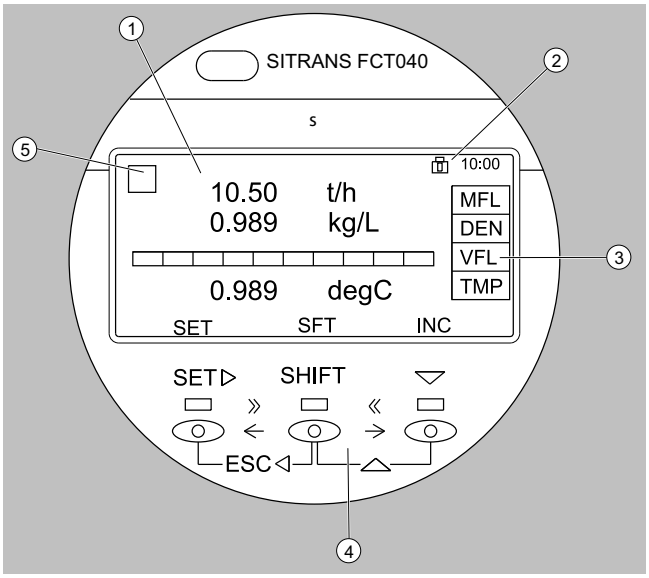


## Technical specifications (continued)

PROFINET over Ethernet-APL
(in preparation for later release)

| Display attributes | |
|---|---|
| Type | 4-line dot-matrix display |
| Resolution | 128 × 64 (W × H) dots |
| Size | 64.6 × 31.2 mm (2.54" × 1.23") |
| Control | via IR switches |

Numerical values entered via the display are limited to six digits for process variables and eight digits for totalizer.




Display layout

| | |
|---|---|
| 1 | Measured quantities and units |
| 2 | Status icon and time |
| 3 | Measured quantity abbreviation |
| 4 | IR switches |
| 5 | Alarm symbol |

The controls on the display are IR switches. They respond as soon as an object, such as a finger, is in proximity. It is not necessary to apply pressure to the display surface.

The display unit includes a slot for the microSD card.

| microSD card specifications | |
|---|---|
| Type | Industrial Grade microSD card, compliant with SD specification version 2.0 |
| Physical dimension | 15 × 11 × 1.0 mm (± 0.1 mm) (0.6 × 0.4 × 0.04 inch (± 0.004 inch)) |
| Capacity | 1 GB |
| Sequential throughput (read) | 24.01 MB/s |
| Sequential throughput (write) | 17.96 MB/s |

It is recommended to use the microSD card included with the SITRANS FCT transmitter. Functionality of the device cannot be guaranteed if other cards are used.

Cable specifications

For remote type devices, an interconnecting cable must be used to connect the sensor to the transmitter. The device specifications, stated in this document, are valid only if one of the original SITRANS FC interconnecting cables is used.

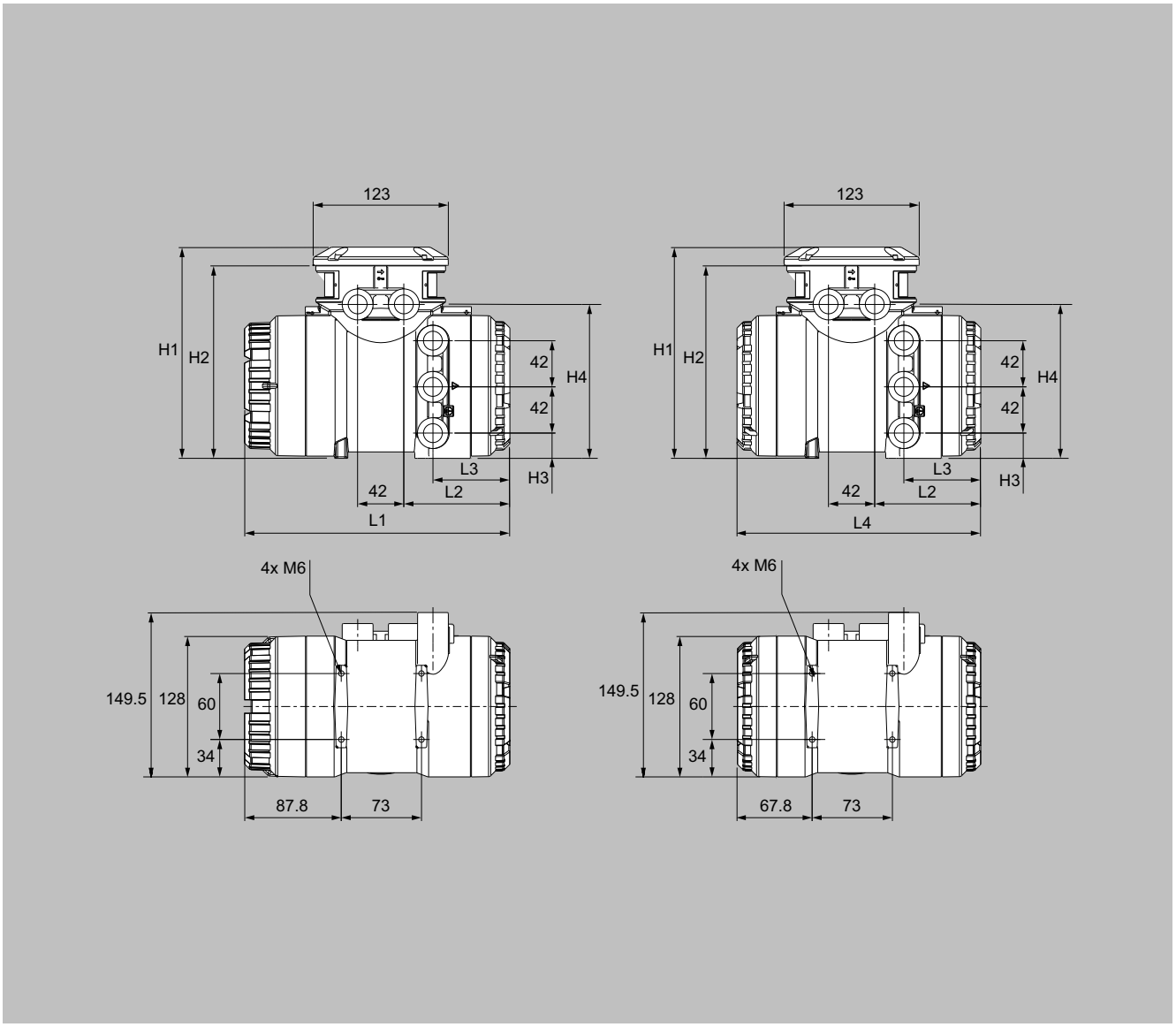
Standard cable length options are specified up to 30 m are specified in the order code to maintain the stated specifications. Cables longer than 30 m (98 ft) are available but must be ordered as separate items. For further details, please contact your regional Siemens Measurement Intelligence team.

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## Dimensional drawings

***SITRANS FCT020 transmitter dimensions***




Dimensions of FCT020 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

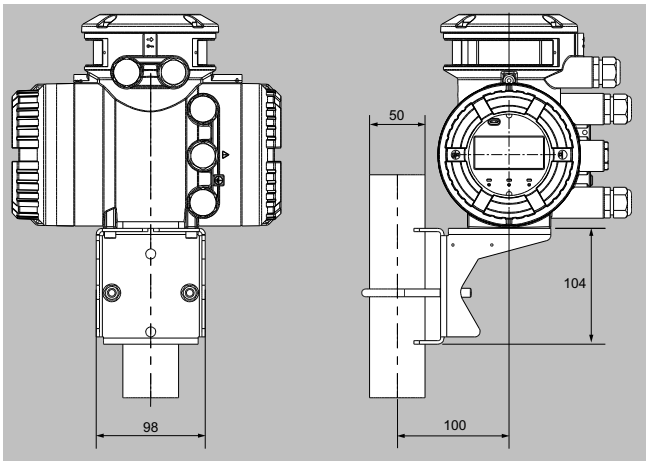
Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| Aluminum | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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## Dimensional drawings (continued)




Dimensions of transmitter in mm, attached to mounting bracket

Transmitter weights

| Design type | Transmitter enclosure material | Weight in kg (lb) |
|---|---|---|
| Remote | Cast aluminum | 4.2 (9.3) |
| | CF-8M stainless steel | 12.5 (27.6) |

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## Overview

FCT040 is the advanced transmitter, offering a wider range of application solutions with improved performance. The user can select additional measurements and functions at time of ordering to include concentration (fraction), viscosity, batch control and heat calculation.

The FCT040 transmitter is available in compact or remote design and can be combined with all SITRANS FC sensors. The selection is made within the complete SITRANS FC ordering code.

Spare transmitters are selected using the SITRANS FC ordering code, but with no sensor selected.



Example of SITRANS FCT transmitter mounted on SITRANS FCS600



FCT transmitter and SITRANS FCS100

Following features are available in the FCT040 transmitter:

- Tube health check
- Standard concentration measurement
- Petroleum measurement function
- Fraction (advanced concentration) measurement
- Viscosity function
- Batching function

## Overview (continued)

| Specification overview of SITRANS FCT040 | |
|---|---|
| **Typical measurement performance** | • Mass flow accuracy: ± 0.1% (of rate)<br>• Density accuracy: ± 0.5 kg/m³ (0.03 lb/ft³) |
| **Features and functions** | • Easy setup wizard<br>• microSD card<br>• Tube health check<br>• Self-verification<br>• Batch control |
| **Available measurements** | • Mass flow<br>• Density<br>• Temperature<br>• Volume flow<br>• Concentration (fraction)<br>• Viscosity<br>• Heat (thermal) energy |
| **Digital communication options** | • HART<br>• MODBUS<br>• PROFIBUS PA<br>• PROFINET |

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## Function

***Measurement of heat quantity***

• Order code: **S11**

This function calculates the total fuel calorific value of the measured fluid. Either a constant value of the calorific value of the fluid can be used, or an additional device like a gas chromatograph can provide the instantaneous calorific value via the analog input of the FCT040 transmitter. Based on the fluid flow, the total calorific energy of the fluid is calculated.

For questions regarding a specific application, contact your regional Siemens Measurement Intelligence team.

***Tube health check***

• Order code: **S12**

Tube health check monitors key diagnostics, including tube stiffness, driver and pickups. Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout, or solid deposits building up in the tubes. The user defines verification frequency and alarm behavior. Verification results indicate whether preventive maintenance action is required.

***Petroleum measurement function***

• Order code: **S14**

The Net Oil Computing (NOC) function provides real-time measurements of water cut and includes American Petroleum Institute (API) correction according to API MPMS Chapter 11.1.

Oil sometimes contains entrained gas. SITRANS FC flowmeters measure the density of the combined emulsion oil and gas, which is lower than the oil density. The NOC function includes a Gas Void Fraction (GVF) parameter to be set.

***Viscosity function***

• Order code: **S15**

Viscosity is sometimes used as reference value to activate other processes like fluid heating systems.

The viscosity estimation is calculated based on a comparison between measured pressure loss and a calculated value between two points of the pipe. A differential pressure transmitter is required to use this function. Its output is connected to the analog input of the FCT040. Based on an iteration process, a viscosity value is determined.

***Standard concentration measurement***

• Order code: **S16**

Used for concentration measurements of emulsions or suspensions when density of the fluid involved depends only on temperature.

The standard concentration measurement can be used for many low-concentration solutions if there is only minor interaction between the liquids, or if the miscibility is negligible.

***Fraction measurement (advanced concentration)***

Up to four pre-configured fraction ranges can be selected using the SITRANS FC option order codes from the table below.

| Order code | Fraction description | Type | Range | Units | Temperature range |
|---|---|---|---|---|---|
| **G01** | Sugar / water (sucrose solution) | Mass fraction | 0 ... 85 | °Bx | 0 ... 80 °C (32 ... 176 °F) |
| **G02** | NaOH / water (sodium hydroxide solution) | Mass fraction | 2 ... 50 | % | 0 ... 100 °C (32 ... 212 °F) |
| **G03** | KOH / water (potassium hydroxide solution) | Mass fraction | 0 ... 60 | % | 54 ... 100 °C (129 ... 212 °F) |
| **G04** | $NH_4NO_3$ / water (ammonium nitrate solution) | Mass fraction | 1 ... 50 | % | 0 ... 80 °C (32 ... 176 °F) |
| **G05** | $NH_4NO_3$ / water (ammonium nitrate solution) | Mass fraction | 20 ... 70 | % | 20 ... 100 °C (68 ... 212 °F) |
| **G06** | HCl / water (hydrochloric acid) | Mass fraction | 22 ... 34 | % | 20 ... 40 °C (68 ... 104 °F) |
| **G07** | $HNO_3$ / water (nitric acid) | Mass fraction | 50 ... 67 | % | 10 ... 60 °C (50 ... 140 °F) |
| **G09** | $H_2O_2$ / water (hydrogen peroxide) | Mass fraction | 30 ... 75 | % | 4 ... 44 °C (39 ... 111 °F) |
| **G10** | Ethylene glycol / water (homogenous mixture) | Mass fraction | 10 ... 50 | % | -20 ... +40 °C (-4 ... +104 °F) |
| **G11** | Amylum (starch) / water (paste-like suspension) | Mass fraction | 33  43 | % | 35 ... 45 °C (95 ... 113 °F) |
| **G12** | Methanol / water (homogenous mixture) | Mass fraction | 35 ... 60 | % | 0 ... 40 °C (32 ... 104 °F) |
| **G20** | Alcohol / water (homogenous mixture) | Volume fraction | 55 ... 100 | % | 10 ... 40 °C (50 ... 104 °F) |
| **G21** | Sugar / water (sucrose solution) | Mass fraction | 40 ... 80 | °Bx | 75 ... 100 °C (167 ... 212 °F) |
| **G30** | Alcohol / water (homogenous mixture) | Mass fraction | 66 ... 100 | % | 15 ... 40 °C (59 ... 104 °F) |
| **G37** | Alcohol / water (homogenous mixture) | Mass fraction | 66 ... 100 | % | 10 ... 40 °C (50 ... 104 °F) |

The user is responsible to ensure chemical compatibility of the wetted parts material in combination with the measured chemicals. For strong acids or oxidizers, a variant with wetted parts made of alloy 22/2.4602 is advised.

***Batching function***

Batching and filling processes are found in many industries: food and beverage, cosmetic, pharmaceutical, oil and gas and chemical.

SITRANS FCT040 transmitters offer an integrated batching function to carry out the task. A self-learning algorithm optimizes the process to provide accurate and reliable results.

The function supports two filling modes:

• Single-stage batch control with single valve

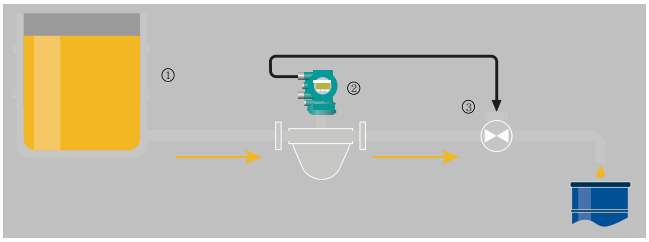
• Two-stage batching to control two valves for more accurate filling

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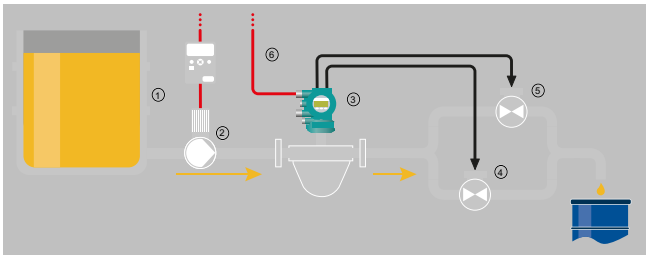
## Function (continued)

The error management function allows the user to set alarms and warnings according to the application.



Example diagram for 1-stage batching

| | |
|---|---|
| 1 | Storage tank |
| 2 | SITRANS FC |
| 3 | Valve |



Example diagram for 2-stage batching

| | |
|---|---|
| 1 | Storage tank |
| 2 | Pump |
| 3 | SITRANS FC |
| 4 | Valve A |
| 5 | Valve B |
| 6 | HART |

### *Overview of functions and features*

| Overview of the main functions and features of FCT040 transmitter | |
|---|---|
| **Primary measurements** | • Mass flow rate liquids (0.1% accuracy)<br>• Mass flow rate gases (0.5% accuracy)<br>• Density (accuracy 0.5 kg/m³(0.03 lb/ft³))<br>• Temperature |
| **Secondary measurements** | • Volume flow rate liquids<br>• Actual volume flow rate gases<br>• Normal (standard) volume flow rate gases<br>• Standard concentration<br>• Net oil computing<br>• Fraction (up to 4 default ranges)<br>• Fraction (customer specified)<br>• Fraction A & B net mass flow rate<br>• Fraction A & B net volume flow rate |
| **Additional functions** | • Heat (thermal energy) calculation<br>• Viscosity calculation (liquids)<br>• Batching and filling<br>• NTEP custody transfer |
| **Configuration and diagnostics** | • microSD card (transmitter with display)<br>• Easy setup wizard<br>• Tube health check (self-verification)<br>• Event management to NAMUR NE107 |
| **Inputs and outputs** | • Up to 4 combined inputs and outputs |
| **Inputs** | • Analog input<br>• Status input |
| **Outputs** | • Analog output<br>• Pulse (frequency) or status output<br>• Status output<br>• Option for internal pull-up resistor |
| **Digital communications** | • HART<br>• MODBUS (in preparation)<br>• PROFIBUS PA<br>• PROFINET (in preparation) |
| **Enclosure options** | • Aluminum alloy with standard powder coating<br>• Aluminum alloy with corrosion resistant coating<br>• Stainless steel CF-8M (remote only) |
| **Power supply** | • Universal (AC and DC) |

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## Configuration

***Overview of available inputs, outputs and digital communications***

The table below provides a matrix of all available combinations for the FCT040 transmitter.

Each combination is defined by a blend of two order code options:

- Ch 1 codes in the form "**E..**" define the required type of digital communication.
- Ch 2-4 codes in the form "**F..**" define the required combination of conventional inputs and outputs.

Abbreviations used in the table:

- Pulse or status output is abbreviated to "P/S output".
- Status only output is abbreviated to "S output".
- Status input is abbreviated to "S input".

| Ch 1 code | Ch 2-4 code | I/O 1 (Channel 1) | I/O 2 (Channel 2) | I/O 3 (Channel 3) | I/O 4 (Channel 4) |
|---|---|---|---|---|---|
| **E00** | **F00** | none | none | none | none |
| **E07** [1] | **F01** | passive mA HART output | passive P/S output | passive mA output | none |
| **E07** [1] | **F02** | passive mA HART output | passive P/S output | passive mA output | passive P/S output |
| **E07** [1] | **F03** | passive mA HART output | passive P/S output NAMUR | passive mA output | none |
| **E07** [1] | **F04** | passive mA HART output | passive P/S output NAMUR | passive mA output | passive P/S output NAMUR |
| **E06** | **F11** | active mA HART output | passive P/S output | none | none |
| **E06** | **F12** | active mA HART output | passive P/S output | passive S output | passive P/S output |
| **E06** | **F13** | active mA HART output | passive P/S output | volt free S input | passive P/S output |
| **E06** | **F14** | active mA HART output | passive P/S output | passive P/S output | active mA input |
| **E06** | **F15** | active mA HART output | passive P/S output | passive P/S output | passive mA input |
| **E06** | **F16** | active mA HART output | passive P/S output | passive mA output | active mA input |
| **E06** | **F17** | active mA HART output | passive P/S output | passive mA output | passive mA input |
| **E06** | **F18** | active mA HART output | passive P/S output | volt free S input | active mA input |
| **E06** | **F19** | active mA HART output | passive P/S output | volt free S input | passive mA input |
| **E06** | **F20** | active mA HART output | passive P/S output | volt free S input | active P/S output |
| **E06** | **F21** | active mA HART output | passive P/S output | volt free S input | active P/S output and pull-up |
| **E06** | **F22** | active mA HART output | passive P/S output | passive P/S output | active mA output |
| **E06** | **F23** | active mA HART output | passive P/S output | volt free S input | active mA output |
| **E14** | **F31** | none | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F32** | passive P/S output | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F33** | active mA input | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F34** | passive mA input | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F35** | active P/S output | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F36** | active P/S output and pull-up | passive P/S output | MODBUS C | MODBUS A & B |
| **E14** | **F37** | active mA output | passive P/S output | MODBUS C | MODBUS A & B |
| **E10** | **F41** | PROFIBUS PA | passive pulse output | none | none |
| **E10** | **F42** | PROFIBUS PA (IS) | passive pulse output (IS) | none | none |

[1] Any combinations with passive mA HART output on Channel are only possible with Ex approval. All outputs in these combinations are intrinsically safe.

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## Technical specifications

### *Mechanical specifications*

| Material specifications | | | |
|---|---|---|---|
| **Housing material options** | **Coating** | **Design** | **Order code position 14** |
| Cast aluminum alloy Al-Si10Mg(Fe) | Standard coating[1)] | Remote transmitter | C or D |
| Cast aluminum alloy Al-Si10Mg(Fe) | Corrosion resistant coating[2)] | Remote transmitter | E or F |
| ASTM CF8M stainless steel | None | Remote transmitter | G or H |
| **Display** | | | |
| Material of the lid window | Glass | | |
| **Mounting bracket[3)]** | | | |
| Material | AISI 316L stainless steel | W Nr. 1.4404 | |
| **Nameplates[4)]** | **Process temperature range** | **Nameplate material** | |
| Transmitter with cast aluminum housing | Not applicable | Foil | |
| Transmitter with ASTM CF8M stainless steel housing | Not applicable | AISI 316L ss | |

1) Standard coating is urethane cured polyester powder coating.
2) Corrosion protection coating is a three-layer coating with high chemical resistance (polyurethane coating on two layers of epoxy).
3) Only the remote transmitters are supplied with a mounting bracket.
4) Nameplate material depends on the materials selected for SITRANS FC sensors.

### *Electrical specifications*

| Power supply | |
|---|---|
| Alternating current voltage (rms) | nominal 24 V AC (-15% ... +10%), or<br>100 ... 240 V AC (-20% ... +10%) |
| Frequency | 47 ... 63 Hz |
| Direct current voltage | nominal 24 V DC (-15% ... +20%) or<br>100 ... 120 V DC (-10% ... +8.3%) |
| **Power consumption** | P ≤ 10 W (including sensor) |

Notes:

- For DNV approval option supply voltage is limited to 24 V.
- NAMUR NE21 testing specifies the range 24 V DC ±20% under NE21 test conditions.

Power supply failure

In the event of a power failure, the flowmeter data are backed up on a non-volatile internal memory. In case of devices with display, the characteristic sensor values, such as nominal diameter, serial number, calibration constants, zero point and the error history are also stored on a microSD card.

Galvanic isolation

All circuits for inputs, outputs and power supply are galvanically isolated from each other.

### *Analog inputs and outputs*

Analog input

| Analog inputs | |
|---|---|
| **Active current input[1)]** | |
| Nominal input current range | 4 ... 20 mA |
| Maximum input current range | 2.4 ... 21.6 mA |
| Internal power supply | 24 V DC ±20% |
| Internal load resistance | ≤ 160 Ω |
| **Passive current input[2)]** | |
| Nominal input current range | 4 ... 20 mA |
| Maximum input current range | 2.4 ... 21.6 mA |
| External power supply | 10.5 ... 32 V DC |
| Internal load resistance | ≤ 160 Ω |

1) The active current input is provided for connecting a two-wire transmitter with an output signal of 4 ... 20 mA.

2) The passive current input is provided for connecting a four-wire transmitter with an active current output signal.

Note: One analog current input is available for external analog devices.

Analog output

Up to two analog outputs can be selected at time of ordering. The analog outputs can be configured to represent the following measured values:

- Flow rate (mass, volume, net partial component flow of a mixture)
- Density
- Temperature
- Pressure
- Concentration

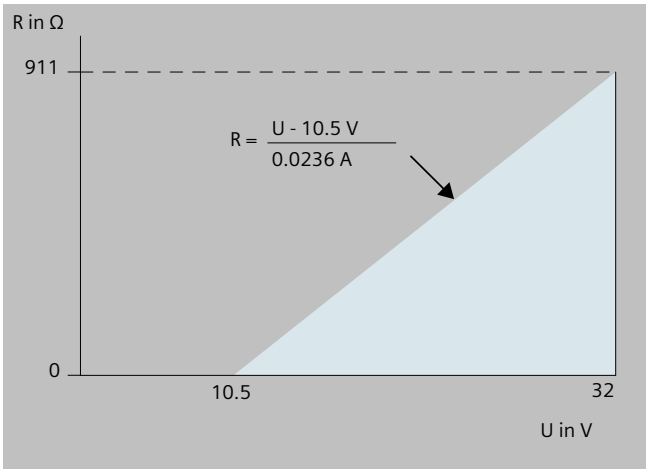
HART communication, when selected, is supplied on channel 1 (I/O 1). The current output may be operated in compliance with the NAMUR NE43 standard.

| Analog outputs | |
|---|---|
| **Active current output** | |
| Nominal output current range | 4 ... 20 mA |
| Maximum output current range | 2.4 ... 21.6 mA |
| Load resistance | ≤ 750 Ω |
| Load resistance for secure HART communication | 230 ... 600 Ω |
| **Passive current output** | |
| Nominal output current range | 4 ... 20 mA |
| Maximum output current range | 2.4 ... 21.6 mA |
| External power supply | 10.5 ... 32 VDC |
| Load resistance for secure HART communication | 230 ... 600 Ω |
| Load resistance at current output | ≤ 911 Ω |

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## Technical specifications (continued)




Maximum load resistance as a function of an external power supply voltage

1) The active current input is provided for connecting a two-wire transmitter with an output signal of 4 ... 20 mA.
2) The passive current input is provided for connecting a four-wire transmitter with an active current output signal.

### *Digital inputs and outputs*

Digital inputs (status)

Do not connect a signal source with electric voltage.

The status input is provided for use of voltage-free contacts with the following specification:

| | |
|---|---|
| **Resistance when closed** | < 200 Ω |
| **Resistance when open** | > 100 kΩ |

### *Digital communications*

Each transmitter is configured with one default digital communication interface, selectable in the SITRANS FC order code.

HART

When selected, HART communication is supplied on the output terminal pair I/O 1.

Up to three further Input/Output options can be configured for output terminal pairs I/O 2, I/O 3, and I/O 4.

HART is available with either non-intrinsically safe or intrinsically safe outputs.

PROFIBUS PA

- When selected, PROFIBUS PA communication is supplied on the output terminal pair I/O 1.
- PROFIBUS PA interface is available with and without intrinsic safety.
- PROFIBUS PA digital communication signal is in accordance with IEC 61158/61784.
- Maximum voltage and correct polarity must be observed for wiring.
- Power supply: 9 ... 32 V DC
- Current draw: 15 mA (maximum)
- Compliance with PA profile revision 3.02 supporting: Condensed Status (NE107)
- Device identification number (IDENT_NUMBER) adaption

Digital output

| **Digital outputs** | |
|---|---|
| **Active pulse output available on Pulse/Status output, connection of an electronic counter[1)]** | |
| Load resistance | > 1 kΩ |
| Internal power supply | 24 V DC ±20% |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 ... 12.5 kHz |
| **Active pulse output available on Pulse/Status output, connection of an electromechanical counter** | |
| Maximum current | 150 mA |
| Average current | ≤ 30 mA |
| Internal power supply | 24 V DC ±20% |
| Maximum pulse rate | 2 pulses/s |
| Pulse width | 20, 33, 50, or 100 ms |
| **Active pulse output available on Pulse/Status output, with internal pull-up resistor** | |
| Internal power supply | 24 V DC ±20% |
| Internal pull-up resistor | 2.2 kΩ |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 ... 12.5 kHz |
| **Passive pulse output available on Pulse/Status output[1)]** | |
| Maximum load current | ≤ 200 mA |
| External power supply | ≤ 30 V DC |
| Maximum pulse rate | 10 000 pulses/s |
| Frequency range | 0 to 12.5 kHz |
| **Active status output available on Pulse/Status output[2)]** | |
| Load resistance | > 1 kΩ |
| Internal power supply | 24 V DC ±20% |
| **Active status output available on Pulse/Status output, with internal pull-up resistor[3)]** | |
| Internal pull-up resistor | 2.2 kΩ |
| Internal power supply | 24 V DC ±20% |
| **Passive status output available on Pulse/Status output, or Status output** | |
| Output current | ≤ 200 mA |
| External power supply | ≤ 30 V DC |
| **Passive pulse or status output available on Pulse/Status output (NAMUR)** | Output signals according to EN 60947-5-6 (previously NAMUR, worksheet NA001) |

1) Maximum voltage and correct polarity must be observed for wiring.
2) Since this is a transistor contact, maximum allowed current as well as polarity and level of output voltage must be observed during wiring.
3) A relay must be connected in series to switch alternating voltage.

### *Summary of available function blocks – PROFIBUS PA*

| Function block | Code | Description |
|---|---|---|
| **Transducer block** | FTB | Flow |
| | CTB | Concentration |
| | LTB | LCD Indicator |
| | MTB | Maintenance |
| | SDBT | Advanced diagnostics |
| **Analog input block [1)]** | AI1 | Mass flow |
| | AI2 | Density |
| | AI3 | Temperature |
| | AI4 | Volume flow |
| | AI5 | Reference density |
| | AI6 | Corrected (normal/standard) volume flow |

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## Technical specifications (continued)

| Function block | Code | Description |
|---|---|---|
| **Totalizer block** [1] | TOT1 | Mass |
| | TOT2 | Volume |
| | TOT3 | Corrected (normal/standard) volume |
| **Analog output block** [1] | AO | Pressure |

[1] Factory default setting. Assignment can be changed by parameter "channel".

Available function blocks are also influenced by the type of device description file (GSD) being used. For further details, please contact your regional Siemens Measurement Intelligence team.

MODBUS

(in preparation for later release)

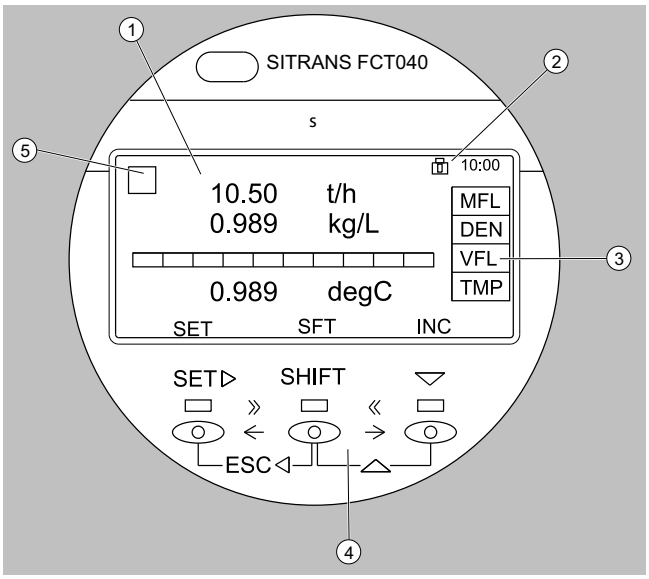
- The MODBUS interface is available with up to two additional Input/Output options.
- When selected, MODBUS communication is supplied on the terminal pairs I/O 3 and I/O 4.
- The digital MODBUS communication signal is in accordance with EIA-485 standard (RS 485).

PROFINET over Ethernet-APL

(in preparation for later release)

| Display attributes | |
|---|---|
| Type | 4-line dot-matrix display |
| Resolution | 128 (W) x 64 (H) dots |
| Size | 64.6 mm x 31.2 mm (2.54" x 1.23") |
| Control | via IR switches |

Numerical values entered via the display are limited to six digits for process variables and eight digits for totalizer.




Display layout

| | |
|---|---|
| 1 | Measured quantities and units |
| 2 | Status icon and time |
| 3 | Measured quantity abbreviation |
| 4 | IR switches |
| 5 | Alarm symbol |

The controls on the display are IR switches. They respond as soon as an object, such as a finger, is in proximity. It is not necessary to apply pressure to the display surface.

The display unit includes a slot for the microSD card.

| microSD card specifications | |
|---|---|
| Type | Industrial Grade microSD card, compliant with SD specification version 2.0 |
| Physical dimension | 15 mm x 11 mm x 1.0 mm (± 0.1 mm) (0.6" x 0.4" x 0.04" (± 0.004")) |
| Capacity | 1 GB |
| Sequential throughput (read) | 24.01 MB/s |
| Sequential throughput (write) | 17.96 MB/s |

It is recommended to use the microSD card included with the SITRANS FCT transmitter. Functionality of the device cannot be guaranteed if other cards are used.

Cable specifications

For remote type devices, an interconnecting cable must be used to connect the sensor to the transmitter. The device specifications, stated in this document, are valid only if one of the original SITRANS FC interconnecting cables is used.

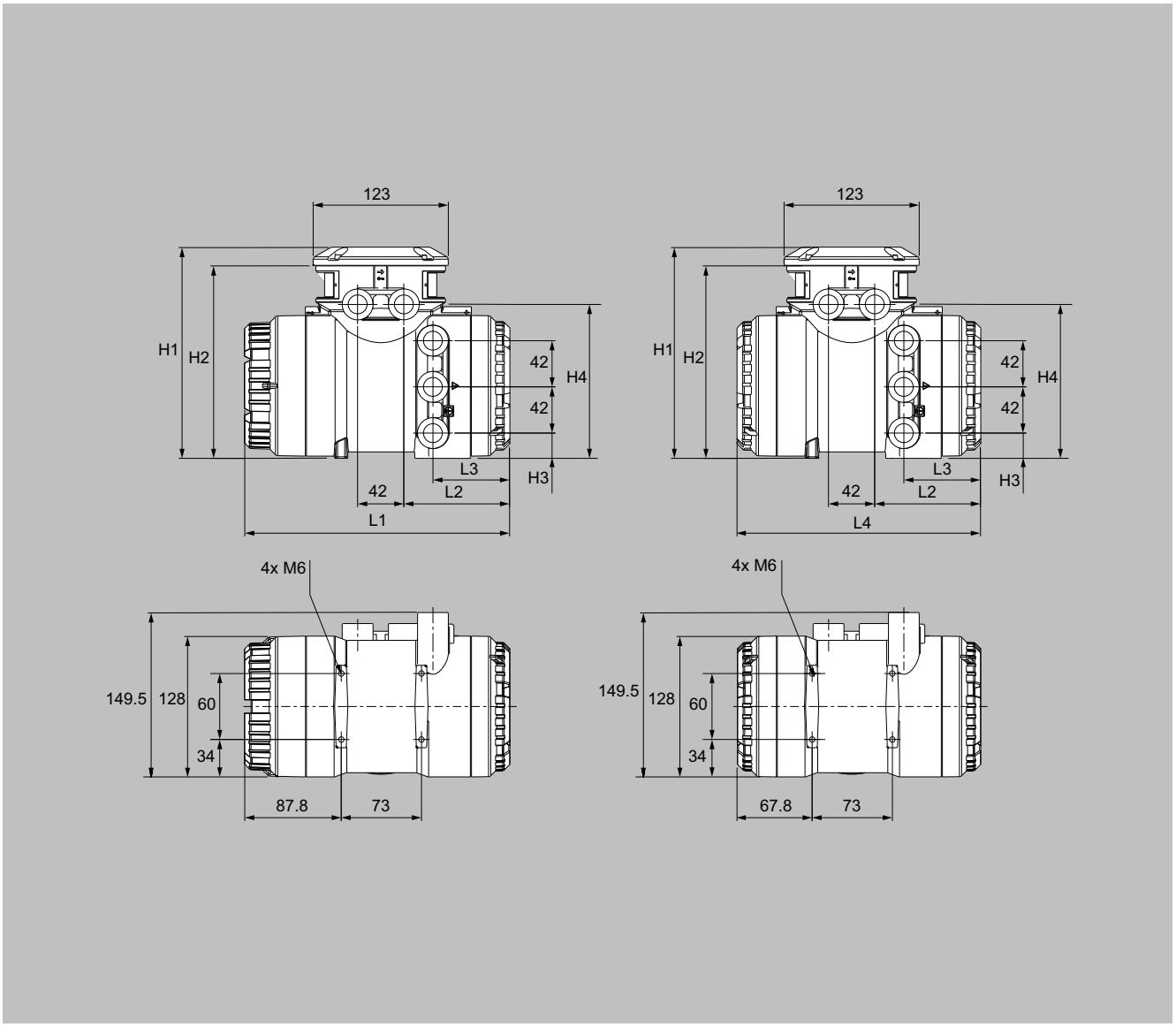
Standard cable length options are specified up to 30 m are specified in the order code to maintain the stated specifications. Cables longer than 30 m (98 ft) are available but must be ordered as separate items. For further details, please contact your regional Siemens Measurement Intelligence team.

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## Dimensional drawings

***SITRANS FCT040 transmitter dimensions***




Dimensions of FCT040 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

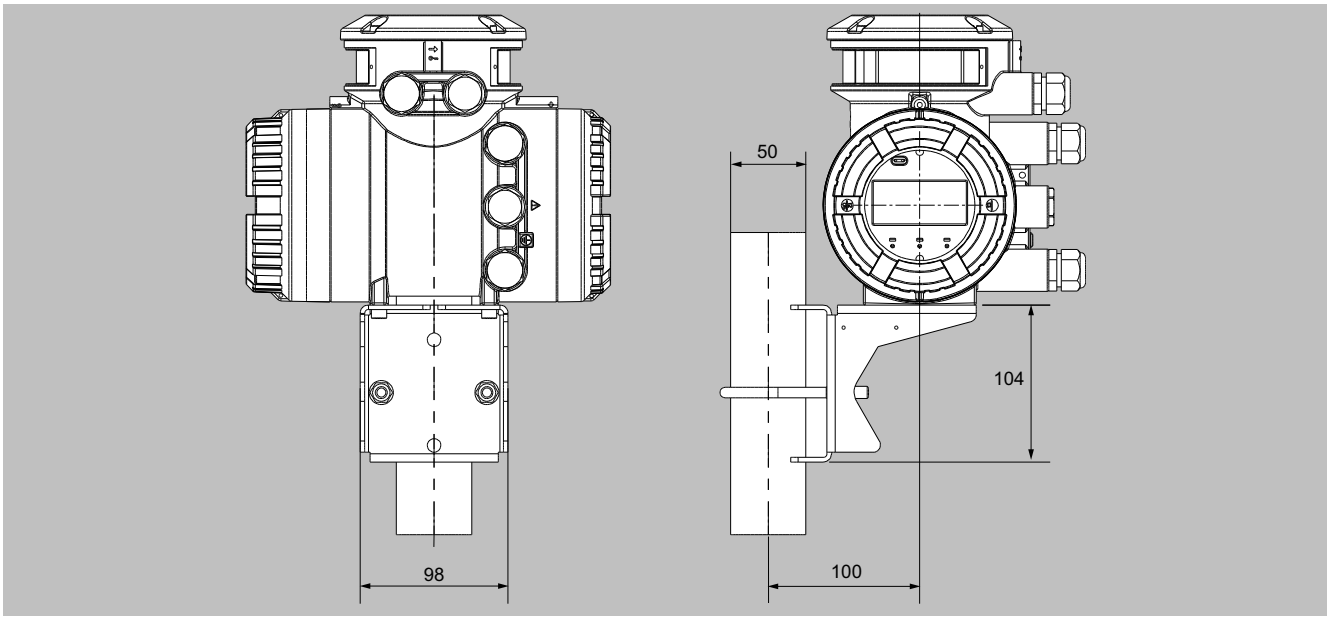
Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| Aluminum | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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## Dimensional drawings (continued)




Dimensions of transmitter in mm, attached to mounting bracket

Transmitter weights

| Design type | Transmitter enclosure material | Weight in kg (lb) |
|---|---|---|
| Remote | Cast aluminum | 4.2 (9.3) |
| | CF-8M stainless steel | 12.5 (27.6) |

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## Overview

The flowmeter systems of the SITRANS FC100 series are the precision Coriolis multi-parameter flowmeter for low flow applications.

They are formed by one FCS100 sensor and one FCT transmitter:

- SITRANS FC120 is the combination of the FCS100 sensor and the FCT020 transmitter
- SITRANS FC140 is the combination of the FCS100 sensor and the FCT040 transmitter

Features:

- Compact dual curved alloy 22 measuring tubes
- Process connection: flange, thread or hygienic clamp
- Nominal sizes: DN 1 to DN 8
- Connection sizes: DN 6 to DN 40 (¼" to 1½")
- Nominal flow rates: 21 kg/h to 950 kg/h (46 lb/h to 2 094 lb/h)
- FCS100 sensors always combine with a remote transmitter via a connecting cable
- Installation of sensor and transmitter in different locations



FCS100 sensor and FCT020/040 transmitter

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## Benefits

***Product features aligned to user value targets***

| | User value targets | SITRANS FC features and solutions |
|---|---|---|
| **Engineering and project management** | • Reduce engineering investment<br>• Cut specification effort<br>• Minimize project expenditure<br>• Decrease the spending on each measurement point<br>• Eliminate function duplication<br>• Reduce number of suppliers | • Siemens project teams offer complimentary evaluation of customer specifications, provided by regional and HQ experts<br>• Simple product selection using intuitive sizing software<br>• One SITRANS FC device can typically provide three to six individual measurements, all transmitted via digital communication, when planned during pre-project design<br>• Added value functions: batch control, viscosity, thermal energy, concentration measurement (Fraction) of two-component solutions and pressure compensation |
| **Installation** | • Reduce footprint and transport outlay of OEM machinery<br>• Lower installation complexity<br>• Avoid costly modifications of existing plant | • Can be installed in horizontal or vertical (self-draining) pipes<br>• Twin tube bend design delivers strong signal to noise characteristic resistant to external influence, so install in tight spaces with no inlet and outlet restrictions<br>• Adaptable to existing pipes: typically, three or four connection sizes for each sensor size<br>• Flexible selection of traditional inputs, outputs and digital communications |
| **Configuration and commissioning** | • Shorter commissioning schedules with lower costs<br>• Faster start-up with reduced outgoings | • Easy setup wizard delivers working meters straight after start-up<br>• microSD card stores sensor calibration data and default setup<br>• Simple configuration using Process Device Manager (PDM)<br>• Siemens device-specific faceplates simplify operation in plantwide control systems |
| **Efficient plant operation** | • Improve finished product consistency to reduce waste<br>• Keep process performance when scaling production up or down<br>• Optimize process control<br>• Improve finished product quality enabling higher levels of profit<br>• Reduce downtime with fast resolution of process upsets<br>• Improve asset performance | • SITRANS FC meters are calibrated in rigs accredited to EN/ISO 17025 to ensure consistently high performance of flow, density, and concentration measurements<br>• First-class zero-point quality maintains high accuracy into the low flow region<br>• High sensitivity and intelligent dynamic range keeps the measurement active in demanding high fluid damping cases<br>• Designed-in resilience to process extremes<br>• Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout or solid deposits building up in the tubes<br>• Diagnostic data via local menu or PDM is backed by Siemens applications experts<br>• Intelligent Siemens SITRANS IQ apps for continuing asset evaluation |
| **Maintenance and asset management** | • Optimize technician training<br>• Reduce cost of spare parts<br>• Increase predictive maintenance<br>• Reduce production downtime and associated costs<br>• Decrease unplanned maintenance<br>• Maximize asset value | • Simple product design with interchangeable modular parts<br>• microSD card loads sensor-specific data to deliver fast service exchange<br>• Self-verification: tube health check monitors key diagnostics, including tube stiffness, driver and pickups; the user defines verification frequency and alarm behavior<br>• Verification results indicate whether preventive maintenance action is required<br>• Siemens SIMATIC Maintenance Station uses cyclical acquisition to provide life cycle reports and intelligent preventive maintenance strategies |
| **Industry compliance** | • Cut effort required to comply with Industry-specific demands<br>• Reduce resource needed to maintain regulatory compliance | • Food and beverage sector covered with EHEDG and 3-A approvals, polished tubes<br>• Global hazardous area approvals for international plant duplications<br>• Common and emerging digital networks covered: HART, PROFIBUS PA, PROFINET<br>• Class-leading safety: SIL2/SIL3, secondary containment, PED, NAMUR NE95 |

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## Application

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Chemical and petrochemical**<br>Bulk chemicals<br>Industrial gases<br>Polymers<br>Agrochemicals<br>Fine chemicals<br>Aroma chemicals | • Transfer, loading and unloading of bulk chemicals<br>• Concentration control of acids and alkalis (process optimization)<br>• Accurate mass or volume flow of feed chemicals to in-line blending systems<br>• Accurate mass flow and density (quality) of reactor fluid feeds catalyst<br>• Chemical recovery<br>• Mass balance optimization<br>• Compressed and cryogenic gases<br>• Lubricating oil blending and dosing<br>• High accuracy measurement of critical fluid components<br>• Low flow control in pilot plants and R&D facilities |
| **Food and beverage**<br>Food processing<br>Dairies<br>Breweries<br>Distilleries<br>Confectionary<br>Soft drinks<br>Animal feed plants<br>OEM | • Accurate bulk transfer (mass or volume) of all dairy products: milk, cream, whey and yoghurt<br>• Fat concentration in cream<br>• Flow, density, temperature and concentration (Plato) during all fermentation processes<br>• Flow, density, temperature and sugar concentration (Brix) in soft drink processing<br>• Distilled spirits – % alcohol by volume (ABV), liters of pure alcohol, volume transfer, blending, batch and column still optimization and energy management, cask filling, tanker loading<br>• Flow and density of fruit juices and pulps<br>• Mixing and inventory control of confectionary ingredients, e.g. chocolate, syrup, oils, flavors<br>• Metering pump control<br>• Oils, fats enzymes dosing in animal feed plants<br>• $CO_2$ dosing<br>• CIP liquids<br>• Bottling of beer, spirits, wine, soft drinks, etc.<br>• Bulk sugar processing – molasses, sugar slurries, density, Brix of finished product |
| **Oil and gas**<br>Offshore/onshore<br>Upstream/downstream<br>Pipelines<br>Distribution networks<br>Refineries<br>Skid manufacturers | • Loading/unloading of hydrocarbons (e.g. crude oil, bitumen) from/to ship, road tanker, rail car<br>• High pressure chemical injection<br>• High pressure low flow gas<br>• Net oil computing<br>• Gas void fraction<br>• Filling of gas bottles<br>• Furnace control<br>• Test separators<br>• LPG, natural gas hydration<br>• Well-head water-cut monitoring<br>• All hydrocarbon fluids in refineries<br>• Metrology, custody transfer<br>• Drilling mud<br>• Oil well cementing and hydrofracturing |

## Application (continued)

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Life sciences**<br>Pharmaceutical<br>Bio | • High accuracy flow and batching of bioreactor feeds<br>• Solvent flow rate, density and batching<br>• Flow of demineralized and deionized water<br>• Solvents and fish oils used in high grade omega 3 oils<br>• Precision coatings<br>• Vacuum thin film coating |
| **Household and personal care**<br>Detergents<br>Cosmetics | • Blending and batching of detergent ingredients<br>• Tanker loading and unloading<br>• Salt concentration<br>• Reliable measurement of aerated liquids |
| **Automotive and aeronautical**<br>Vehicle manufacturing<br>Paint<br>Engine testing<br>OEM | • Fuel injection nozzle and pump testing<br>• Filling of under bonnet fluid reservoirs, air conditioning, coolant<br>• Fuel flow and density measurement in engine test beds<br>• Checking for air in oil using high accuracy density measurement<br>• Paint spray robots – requires accurate and fast measurements<br>• Aircraft fuel loading (kerosene)<br>• High pressure flow used in turbine blade manufacture |
| **Power and energy**<br>Renewable<br>Hydrogen | • Boiler fuel flow and burner control<br>• Turbine fuel flow<br>• Glycol flow and concentration<br>• Bioethanol |
| **Marine**<br>OEM<br>Shipbuilders | • Fuel consumption management<br>• Boiler control<br>• Bunkering management<br>• Density used to indicate fuel quality |
| **Pulp, paper and textiles** | • Accurate dosing of dyes and chemicals |
| **Water and environmental** | • Dosing of chemicals for water treatment<br>• Chemical concentration for water quality control |

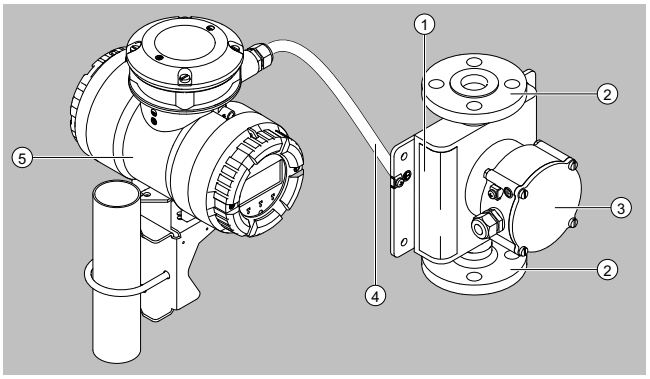
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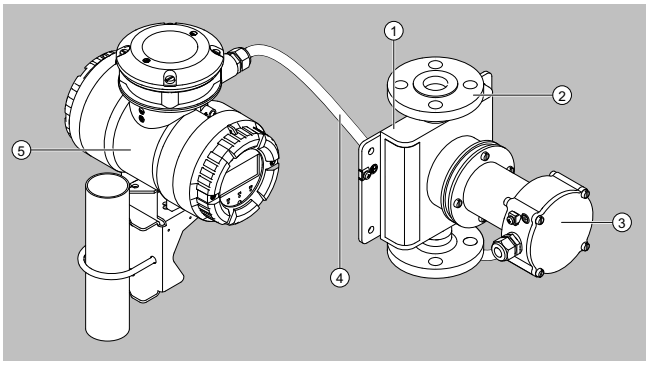
## Design

***Design options and related temperature range for FC100 series***

| Design version | Process temperature range |
|---|---|
| **Standard neck** | Standard [-50 ... 150 °C (-58 ... 302 °F)] |
| **Long neck** | Standard [-50 ... 150 °C (-58 ... 302 °F)] |
| | Medium [-50 ... 260 °C (-58 ... 302 °F)] |




FCS100 sensor (standard neck version) and remote transmitter




FCS100 sensor (long neck version) and remote transmitter

| | |
|---|---|
| 1 | FCS100 sensor |
| 2 | Process connection |
| 3 | Sensor terminal box |
| 4 | Connecting cable |
| 5 | Transmitter |

Compatible fluids

- Liquids
- Gases
- Mixtures, solutions, emulsions, suspensions and slurries

Primary measured variables

- Mass flow
- Density
- Temperature

Based on the primary measured quantities, the transmitter also calculates

- Volume flow

## Design (continued)

- Percent concentration (fraction) of a two-component mixture (FCT040 only)
- Partial component flow rate (net flow) of a mixture consisting of two components (FCT040 only)

The mass flow, volume flow, net flow measurements can be bi-directional.

Measurement variables for NTEP approval

- Mass flow uni-directional
- Volume flow uni-directional

Feature summary

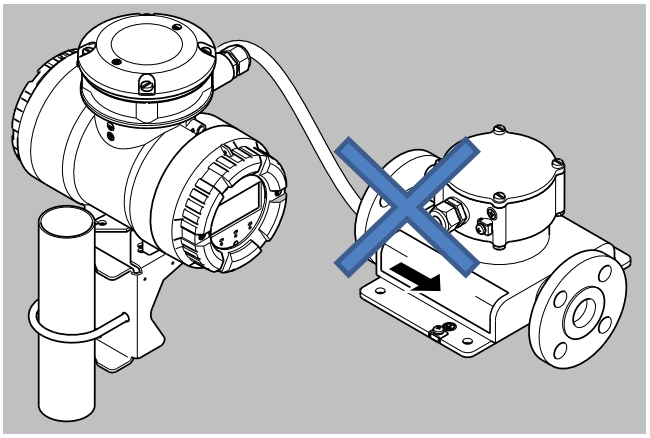
- Possibly the most compact dual curve Coriolis flowmeter for precision measurement, starting at DN 1 nominal size
- Batching function with batch leakage detection and batch control by transmitter for precise dosing
- Accurate density measurement and up to four advanced concentration measurement data sets
- Sizes to suit pilot plants, R&D labs and high value fluid additives
- Wide choice of process connections, starting with DN 6 (¼ inch) for reduced installation efforts

***Installation guidelines***

FC100 series flow meters can be mounted horizontally, vertically and at an incline. The measuring tubes should be filled with the fluid during flow measurement as entrained gas may result in errors in measurement. Straight pipe runs at inlet or outlet are usually not required.

Avoid the following installation locations and positions:

- Measuring tubes as highest point in piping when measuring liquids
- Measuring tubes as lowest point in piping when measuring gases
- Immediately in front of a free pipe outlet in a downpipe
- Lateral positions



Avoid measuring tubes in sideways position resulting in possible non-homogeneous fluid separation

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## Function

***Compatible fluids***

- Liquids
- Gases
- Mixtures, solutions, emulsions, suspensions and slurries

***Primary measured variables***

- Mass flow
- Density
- Temperature

***Based on the primary measured quantities, the transmitter also calculates***

- Volume flow
- Percent concentration (fraction) of a two-component mixture (FCT040 only)
- Partial component flow rate (net flow) of a mixture consisting of two components (FCT040 only)

The mass flow, volume flow, net flow measurements can be bi-directional.

***Measurement variables for NTEP approval***

- Mass flow uni-directional
- Volume flow uni-directional

***Feature overview***

- Possibly the most compact dual curve Coriolis flowmeter for precision measurement, starting at DN 1 nominal size
- Batching function with batch leakage detection and batch control by transmitter for precise dosing
- Accurate density measurement and up to four advanced concentration measurement data sets
- Sizes to suit pilot plants, R&D labs and high value fluid additives
- Wide choice of process connections, starting with DN 6 (¼ inch) for reduced installation efforts

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## Selection and ordering data

| SITRANS FC120/140 (Low flow) | Article No. 7ME441 | ● - | ● ● | ● ● ● - | ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Transmitter variant** | | | | | | |
| None (spare sensor) | | 0 | | | | |
| Coriolis sensor FCS100 with transmitter FCT020 | | 2 | | | | |
| Coriolis sensor FCS100 with transmitter FCT040 | | 4 | | | | |
| SITRANS FC spare part transmitter, no sensor included | | 9 | | | | G 3 Y |
| **Sensor size / Connector size** | | | | | | |
| No sensor (SITRANS FCT transmitter as spare part) | | | 0 A | | | |
| Sensor size DN 1 with connection size 1/4" | | | 1 A | | | |
| Sensor size DN 1 with connection size 3/8" | | | 1 B | | | |
| Sensor size DN 1 with connection size 1/2" DN 15 | | | 1 C | | | |
| Sensor size DN 1 with connection size 3/4" | | | 1 D | | | |
| Sensor size DN 2 with connection size 1/4" | | | 2 A | | | |
| Sensor size DN 2 with connection size 3/8" | | | 2 B | | | |
| Sensor size DN 2 with connection size 1/2" DN 15 | | | 2 C | | | |
| Sensor size DN 2 with connection size 3/4" | | | 2 D | | | |
| Sensor size DN 2 with connection size 1" DN 25 | | | 2 E | | | |
| Sensor size DN 2 with connection size 1 1/2" DN 40 | | | 2 F | | | |
| Sensor size DN 4 with connection size 1/4" | | | 3 A | | | |
| Sensor size DN 4 with connection size 3/8" | | | 3 B | | | |
| Sensor size DN 4 with connection size 1/2" DN 15 | | | 3 C | | | |
| Sensor size DN 4 with connection size 3/4" | | | 3 D | | | |
| Sensor size DN 4with connection size 1" DN 25 | | | 3 E | | | |
| Sensor size DN 4 with connection size 1 1/2" DN 40 | | | 3 F | | | |
| Sensor size DN 6 with connection size 1/4" | | | 4 A | | | |
| Sensor size DN 6 with connection size 3/8" | | | 4 B | | | |
| Sensor size DN 6 with connection size 1/2" DN 15 | | | 4 C | | | |
| Sensor size DN 6 with connection size 3/4" | | | 4 D | | | |
| Sensor size DN 6 with connection size 1" DN 25 | | | 4 E | | | |
| Sensor size DN 6 with connection size 1 1/2" DN 40 | | | 4 F | | | |
| Sensor size DN 8 with connection size 1/4" | | | 5 A | | | |
| Sensor size DN 8 with connection size 3/8" | | | 5 B | | | |
| Sensor size DN 8 with connection size 1/2" DN 15 | | | 5 C | | | |
| Sensor size DN 8 with connection size 3/4" | | | 5 D | | | |
| Sensor size DN 8 with connection size 1" DN 25 | | | 5 E | | | |
| Sensor size DN 8 with connection size 1 1/2" DN 40 | | | 5 F | | | |
| **Process connection** | | | | | | |
| No connection (SITRANS FCT transmitter as spare part) | | | | A 0 | | |
| EN flange PN 40, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 1 | | |
| EN flange PN 100, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type D, groove | | | | A 5 | | |
| EN flange PN 100, suitable for EN 1092-1 type D, groove | | | | A 7 | | |
| EN flange PN 40, suitable for EN 1092-1 type E, spigot | | | | B 1 | | |
| EN flange PN 100, suitable for EN 1092-1 type E, spigot | | | | B 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type F, recess | | | | B 5 | | |
| EN flange PN 100, suitable for EN 1092-1 type F, recess | | | | B 7 | | |
| ASME flange class 600, suitable for ASME B16.5, ring joint (RJ) | | | | C 3 | | |
| ASME flange class 900, suitable for ASME B16.5, ring joint (RJ) | | | | C 4 | | |
| ASME flange class 1500, suitable for ASME B16.5, ring joint (RJ) | | | | C 5 | | |
| ASME flange class 150, suitable for ASME B16.5, raised face (RF) | | | | D 1 | | |
| ASME flange class 300, suitable for ASME B16.5, raised face (RF) | | | | D 2 | | |
| ASME flange class 600, suitable for ASME B16.5, raised face (RF) | | | | D 3 | | |
| ASME flange class 900, suitable for ASME B16.5, raised face (RF) | | | | D 4 | | |
| ASME flange class 1500, suitable for ASME B16.5, raised face (RF) | | | | D 5 | | |
| Process connection with internal thread G | | | | E 1 | | |
| Process connection with internal thread NPT | | | | E 3 | | |
| Clamp process connection according to DIN 32676 series A | | | | G 2 | | |

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## Selection and ordering data (continued)

| SITRANS FC120/140 (Low flow) | Article No. 7ME441 | ● - ● ● ● ● ● - ● ● ● ● - ● ● ● | Order code |
|---|---|---|---|
| Clamp process connection according to DIN 32676 series C (Tri-Clamp) | | G 6 | |
| JIS flange 10K, JIS B 2220 | | L 2 | |
| JIS flange 20K, JIS B 2220 | | L 4 | |
| Special design request | | Z 1 | K 1 Y |
| **Tube material (wetted)<br>Process connection material and operational temperature range** | | | |
| None (SITRANS FCT transmitter as spare part) | | 0 | |
| Tube material C22, process connection material 316L, standard: -50 ... 150 °C (-58 ... 302 °F) | | 1 | |
| Tube material C22, process connection material 316L, mid-range: -50 ... 260 °C (-58 ... 500 °F) | | 2 | |
| **Calibration** | | | |
| No calibration | | 0 | |
| Massflow 0.1%, density 0.5 g/l | | 1 | |
| Massflow 0.1%, density 1 g/l | | 2 | |
| Massflow 0.1%, density 4 g/l | | 3 | |
| Massflow 0.1%, density 8 g/l | | 4 | |
| Massflow 0.15% density 20 g/l | | 5 | |
| Massflow 0.2%, density 4 g/l | | 6 | |
| Massflow 0.2%, density 8 g/l | | 7 | |
| Massflow 0.2%, density 20 g/l | | 8 | |
| Accuracy for gas please select below | | 9 | |
| Massflow gas 0.75% | | | N 1 A |
| Massflow gas 0.5% | | | N 2 A |
| **Mounting style, transmitter housing and material** | | | |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and standard neck sensor | | C | |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and long neck sensor | | D | |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and standard neck sensor | | E | |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and long neck sensor | | F | |
| Remote type stainless steel transmitter and standard neck sensor | | G | |
| Remote type stainless steel transmitter and long neck sensor | | H | |
| **Ex approvals** | | | |
| None | | A | |
| ATEX, explosion group IIC and IIIC | | B | |
| ATEX, explosion group IIB and IIIC | | C | |
| IECEx, explosion group IIC and IIIC | | D | |
| IECEx, explosion group IIB and IIIC | | E | |
| FM, groups A B C D E F G | | H | |
| FM, groups C D E F G | | J | |
| NEPSI, explosion group IIC and IIIC | | M | |
| NEPSI, explosion group IIB and IIIC | | N | |
| **Local user interface** | | | |
| Spare sensor without transmitter, no display applied | | 0 | |
| No display | | 1 | |
| With display | | 3 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify order code(s). | |
| **Cable entries<br>(for customer cable gland holes - no cable glands supplied)** | |
| Metric, no glands (M20) | **A10** |
| NPT, no glands (1/2") | **A11** |
| Metric, no glands (M20) steel armored cable | **A20** |
| NPT, no glands (1/2") steel armored cable | **A21** |

| | Order code |
|---|---|
| **Sensor housing material** | |
| None (SITRANS FCT transmitter as spare part) | **B00** |
| Stainless steel 1.4301/304, 1.4404/316L | **B01** |
| Stainless steel 1.4404/316L | **B02** |
| **I/O Configuration Ch1** | |
| None (SITRANS FCT transmitter as spare part) | **E00** |
| 4-20 mA HART active | **E06** |
| 4-20 mA HART passive | **E07** |
| PROFIBUS PA | **E10** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **I/O Configuration Ch2, Ch3 and Ch4** | |
| Spare sensor without transmitter, all communication types and I/Os apply | **F00** |
| 1 passive current output, 1 passive pulse or status output | **F01** |
| 1 passive current output, 2 passive pulse or status outputs | **F02** |
| 1 passive current output, 1 passive pulse or status outputs, 1 passive NAMUR pulse or status output | **F03** |
| 1 passive current output, 2 passive NAMUR pulse or status outputs | **F04** |
| 1 passive pulse or status output | **F11** |
| 2 passive pulse or status outputs, 1 passive status output | **F12** |
| 2 passive pulse or status outputs, 1 voltage-free status input | **F13** |
| 2 passive pulse or status outputs, 1 active current input | **F14** |
| 2 passive pulse or status outputs, 1 passive current input | **F15** |
| 1 passive pulse or status output, 1 passive current output, 1 active current input | **F16** |
| 1 passive pulse or status output, 1 passive current output, 1 passive current input | **F17** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 active current input | **F18** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 passive current input | **F19** |
| 1 passive pulse or status output, 1 active pulse or status output, 1 voltage-free status input | **F20** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor, 1 voltage-free status input | **F21** |
| 1 active current output, 2 passive pulse or status outputs | **F22** |
| 1 active current output, 1 passive pulse or status output,1 voltage-free status input | **F23** |
| 1 passive pulse or status output | **F31** |
| 2 passive pulse or status outputs | **F32** |
| 1 passive pulse or status output, 1 active current input | **F33** |
| 1 passive pulse or status output, 1 passive current input | **F34** |
| 1 passive pulse or status output, 1 active pulse or status output | **F35** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor | **F36** |
| 1 passive pulse or status output, 1 active current output | **F37** |
| 1 passive pulse output | **F41** |
| Output CH1 intrinsically safe, 1 passive pulse output | **F42** |
| **Certificates** | |
| Declaration of compliance with the order 2.1 according to EN 10204 | **C11** |
| Quality Inspection Certificate (Inspection Certificate 3.1 according to EN 10204) | **C40** |
| Certificate of Marking Transfer and Raw Material Certificates (Inspection Certificate 3.1 according to EN 10204), including IGC and conform to NACE MR0175 and MR0103 | **C13** |
| Hydrostatic Pressure Test Certificate (Inspection Certificate 3.1 according to EN 10204) | **C18** |
| Degreasing of wetted surfaces according to ASTM G93-03 (Level C), including test report | **C54** |

| | Order code |
|---|---|
| WPS according to DIN EN ISO 15809-1; WPQR according to DIN EN ISO 15814-1; WQC according to DIN EN 287-1 or DIN EN ISO 8908-4 | **C36** |
| Welding procedures and certificate according to ASME IX | **C37** |
| X-ray inspection of flange weld seam according to DIN EN ISO 17636-1/B, evaluation according to AD 2000 HP 5/3 and DIN EN ISO 5817/C, including certificate | **C33** |
| X-ray test according to ASME V | **C34** |
| Dye penetrant test of process connection weld seams according to DIN EN ISO 3452-1, including certificate | **C38** |
| Dye penetrant test of flange welding according to ASME V, including certificate | **C39** |
| Positive Material Identification of wetted parts, including certificate (Inspection Certificate 3.1 according to EN 10204) | **C15** |
| NTEP approval accuracy class 0.3 acc. NIST | **C16** |
| **Connecting cable type and length** | |
| without standard connecting cable | **L50** |
| 5 meter (16.4 ft) remote connecting cable terminated standard gray / Ex blue | **L51** |
| 10 meter (32.8 ft) remote connecting cable terminated standard gray / Ex blue | **L54** |
| 15 meter (49.2 ft) remote connecting cable terminated standard gray / Ex blue | **L57** |
| 20 meter (65.6 ft) remote connecting cable terminated standard gray / Ex blue | **L60** |
| 30 meter (98.4 ft) remote connecting cable terminated standard gray / Ex blue | **L63** |
| without fire retardant connecting cable | **L70** |
| 5 meter (16.4 ft) remote fire retardant connecting cable not terminated | **L71** |
| 10 meter (32.8 ft) remote fire retardant connecting cable not terminated | **L74** |
| 15 meter (49.2 ft) remote fire retardant connecting cable not terminated | **L77** |
| 20 meter (65.6 ft) remote fire retardant connecting cable not terminated | **L80** |
| 30 meter (98.4 ft) remote fire retardant connecting cable not terminated | **L83** |
| **SW functions** | |
| Heat measurement | **S11** |
| Tube health check | **S12** |
| Batching and filling function | **S13** |
| Netoil computing | **S14** |
| Viscosity computing function for liquids | **S15** |
| Standard concentration measurement | **S16** |
| **Marine approval** | |
| Marine approved DNV, ABS, KR piping class 2 | **S22** |
| Marine approved DNV, ABS, KR piping class 3 | **S23** |
| Marine approved LR, MR, TAC piping class 2 | **S24** |
| Marine approved LR, MR, TAC piping class 3 | **S25** |
| Marine approved BV piping class 2 | **S26** |
| Marine approved BV piping class 3 | **S27** |
| **Mounting** | |
| 2" pipe mounting bracket for sensor | **S30** |
| Namur built-in length according to NE132 | **S31** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Insulation** | |
| Insulation | **J10** |
| Insulation and heat tracing, ½" ASME class 150, raised face (RF) | **J12** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J13** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J14** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J16** |
| Insulation heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J17** |
| Insulation heat tracing with ventilation, EN DN 15, PN 40 | **J18** |
| **Country specific delivery** | |
| Delivery to China including China RoHS mark | **W21** |
| Delivery to Korea including KC mark | **W22** |
| Delivery to UK | **W27** |
| **Customer selected fraction**<br>PIA: Please select four options | |
| Sugar / Water 0 ... 85 °Bx, 0 ... 80 °C (32 ... 176 °F) | **G01** |
| NaOH / Water 2 ... 50 WT%, 0 ... 100 °C (32 ... 212 °F) | **G02** |
| KOH / Water 0 ... 60 WT%, 54 ... 100 °C (129 ... 212 °F) | **G03** |
| $NH_4NO_3$ / Water 1 ... 50 WT%, 0 ... 80 °C (32 ... 176 °F) | **G04** |
| $NH_4NO_3$ / Water 20 ... 70 WT%, 20 ... 100 °C (68 ... 212 °F) | **G05** |
| HCl / Water 22 ... 34 WT%, 20 ... 40 °C (68 ... 104 °F) | **G06** |
| $HNO_3$ / Water 50 ... 67 WT%, 10 ... 60 °C (50 ... 140 °F) | **G07** |
| $H_2O_2$ / Water 30 ... 75 WT%, 4 ... 44 °C (39 ... 111 °F) | **G09** |

| | Order code |
|---|---|
| Ethylene Glycol / Water 10 ... 50 WT%, -20 ... +40 °C (-4 ... 104 °F) | **G10** |
| Amylum = Starch / Water 33 ... 43 WT%, 35 ... 45 °C (95 ... 113 °F) | **G11** |
| Methanol / Water 35 ... 60 WT%, 0 ... 40 °C (32 ... 104 °F) | **G12** |
| Alcohol / Water 55 ... 100 VOL%, 10 ... 40 °C (50 ... 104 °F) | **G20** |
| Sugar / Water 40 ... 80 °Bx, 75 ... 100 °C (167 ... 212 °F) | **G21** |
| Alcohol / Water 66 ... 100 WT%, 15 ... 40 °C (59 ... 104 °F) | **G30** |
| Alcohol / Water 66 ... 100 WT%, 10 ... 40 °C (50 ... 104 °F) | **G37** |
| **Tag name** | |
| Tag name plate, SS (max. 16 characters) | **Y11** |
| HART software tag No. (max. 8 characters) | **Y25** |
| HART software tag No. (max. 32 characters) | **Y26** |
| PROFIBUS PA NODE ADDRESS (4 characters HEX) | **Y28** |
| PROFIBUS PA SOFTWARE TAG (max. 32 characters) | **Y29** |
| **Customer installation length** | |
| Customer installation length (mm) | **Y30** |
| **Special versions** | |
| ID-number of special design | **Y99** |

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## Technical specifications

### *Mass flow rate of liquids*

The mass flow rate characteristics of SITRANS FC meters are defined by the values of zero stability, $Q_{flat}$, $Q_{nom}$ and $Q_{max}$.

Zero stability is the maximum allowable flow rate value that can be displayed at zero flow under reference conditions. It is a good indicator of the meter performance as flow rates reduce and approach zero.

- $Q_{flat}$ is the mass flow rate above which the base accuracy is maintained (0.1% when using FCT040 transmitters).
- $Q_{nom}$ is the nominal mass flow rate of water at reference conditions that would result in a pressure drop of 1 bar (15 psi).
- $Q_{max}$ is the recommended maximum mass flow rate for each sensor size.

For questions regarding expected performance in specific applications, please contact your regional Siemens Measurement Intelligence team.

### *Flow rate summary by FCS100 sensor size*

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| **DN 1** | 0.003 | 0.007 | 2.52 | 0.092 | 21.0 | 0.0771 | 40.0 | 1.47 |
| **DN 2** | 0.005 | 0.011 | 4.50 | 0.165 | 45.0 | 1.65 | 94.0 | 3.45 |
| **DN 4** | 0.009 | 0.020 | 14.0 | 0.514 | 170 | 6.24 | 300 | 11.0 |
| **DN 6** | 0.019 | 0.042 | 30.0 | 1.10 | 370 | 13.6 | 600 | 22.0 |
| **DN 8** | 0.048 | 0.106 | 79.0 | 2.90 | 950 | 34.9 | 1 500 | 55.1 |

### *Performance summary by FCS100 sensor size and transmitter type*

| Sensor size | | | DN 1 | DN 2 | DN 4 | DN 6 | DN 8 |
|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 |
| | % (of rate) | FCT040 | ± 0.2 | ± 0.2 | ± 0.1 | ± 0.1 | ± 0.1 |
| Zero stability | kg/h (lb/h) | | ± 0.003 (0.007) | ± 0.005 (0.011) | ± 0.009 (0.02) | ± 0.019 (0.042) | ± 0.048 (0.106) |
| **Density (liquids)** | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ± 20 (1.25) | ± 8 (0.5) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) |
| | kg/m3 (lb/ft³) | FCT040 | ± 20 (1.25) | ± 8 (0.5) | ± 1 (0.06) | ± 0.5 (0.03) | ± 0.5 (0.03) |
| **Mass flow (gases)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 |
| | % (of rate) | FCT040 | ± 0.5 | ± 0.5 | ± 0.5 | ± 0.5 | ± 0.5 |
| **Temperature** | | | | | | | |
| Accuracy | °C (°F) | | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) |

The accuracy values in the table above are based on reference conditions at the time of calibration and represent the combined measurement uncertainties including sensor, electronic and pulse output interface.

Liquid density calibration is performed when density accuracy of 0.5 kg/m³ (0.03 lb/ft³) is selected in the model code.

### *Mass flow calibration and density adjustment for liquids*

Siemens SITRANS FC Coriolis meters are calibrated in rigs accredited according to the international standard DIN EN ISO/IEC 17025:2018. Each flowmeter comes with a standard calibration certificate.

Mass flow calibration takes place at reference conditions. Specific values are listed in the standard calibration certificate.

| Mass flow calibration reference conditions | |
|---|---|
| **Fluid** | Water |
| **Density** | 900 ... 1 100 kg/m³ (56 ... 69 lb/ft³) |
| **Fluid temperature** | 10 ... 35 °C (50 ... 95 °F), average temperature: 22.5 °C (72.5 °F) |
| **Ambient temperature** | 10 ... 35 °C (50 ... 95 °F) |
| **Process pressure** | 1 ... 5 bar (15 ... 73 psi) |

| Density calibration reference conditions | |
|---|---|
| **Flow condition** | Fully developed flow profile |
| **Fluid densities used to obtain density calibration constants** | 700 kg/m³ (44 lb/ft³)<br>1 000 kg/m³ (62 lb/ft³)<br>1 650 kg/m³ (103 lb/ft³) |
| **Fluid temperature** | 20 °C (68 °F) |
| **Determination of temperature compensation coefficients** | 20 ... 80 °C (68 ... 176 °F) |

### *Analog output performance specification*

Typical additional uncertainty when using the analog current output:

± 0.04% at a nominal mid-range current output of 12 mA, which includes the effects of:

Output adjustment, linearity, power supply variation, load resistance variation, short-term and long-term drift for one year and ambient temperature effect on the transmitter in the range 20 °C ± 30 °C (14 ... 122 °F).

### *Process pressure effect on flow measurement performance*

Changes in operating pressure have a small effect on the mass flow measurement performance. When the pressure changes are very large this effect can be corrected by a dynamic pressure input or a fixed process pressure.

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## Technical specifications (continued)

| Sensor size | Additional flow measurement errors due to change in operating pressure from reference pressure | |
|---|---|---|
| | in % of rate per 1 bar variation | in % of rate per 1 psi variation |
| DN 1 | none | none |
| DN 2 | none | none |
| DN 4 | none | none |
| DN 6 | -0.0011 | -0.00008 |
| DN 8 | -0.0010 | -0.00007 |

***Process temperature effect***

For mass flow measurement, process fluid temperature effect is defined as the change in sensor flow accuracy due to process fluid temperature change, away from the 20 °C (68 °F) reference condition. Variation in process temperature influences the measuring tube characteristics and this is compensated for using the built-in PT 1000 temperature sensor.

A small flow uncertainty remains in the compensation circuit defined below.

Uncertainty due to process temperature change: ± 0.001% of mass flow rate per °C (± 0.00056% of mass flow rate per °F)

***Temperature effect on zero***

Temperature effect on the mass flow zero-point quality can be corrected by zeroing at the process fluid temperature.

***Process conditions***

***Process fluid temperature range***

| Process fluid temperature range | Nominal temperature | Design versions |
|---|---|---|
| -50 ... +150 °C (-58 ... +302 °F) | Standard | All process connections except DIN 32676 Class A and C hygienic clamps |
| -10 ... +140 °C (14 ... 284 °F) | Standard | For process connections DIN 32676 Class A and C hygienic clamps |
| -50 ... +260 °C (-58 ... +302 °F) | Medium | Only selectable for remote transmitters with long neck sensor: selections D, F, and H in position 14 of the order code |

***Operating pressure***

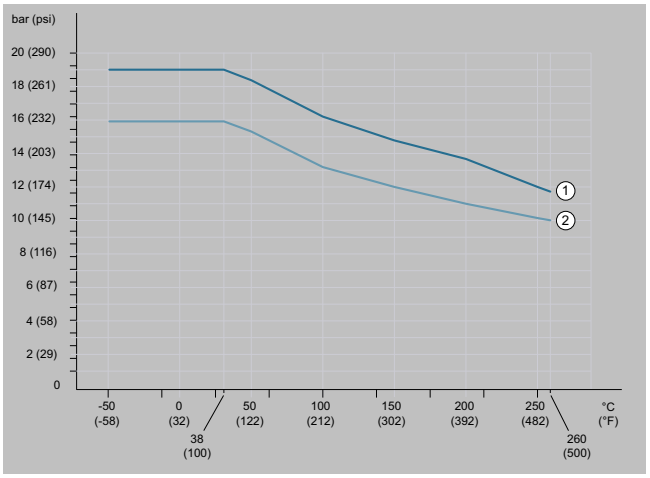
The maximum allowed process pressure depends on the selected process connection and process temperature.

The given process temperature and process pressure ranges are calculated and approved without corrosion or erosion effects.

The following diagrams show the process pressure as a function of process temperature as well as the process connection used (type and size of process connection).

Calculations for ASME flanges are based on ASME B16.5 Material group 2.2 (316/316L dual certified).

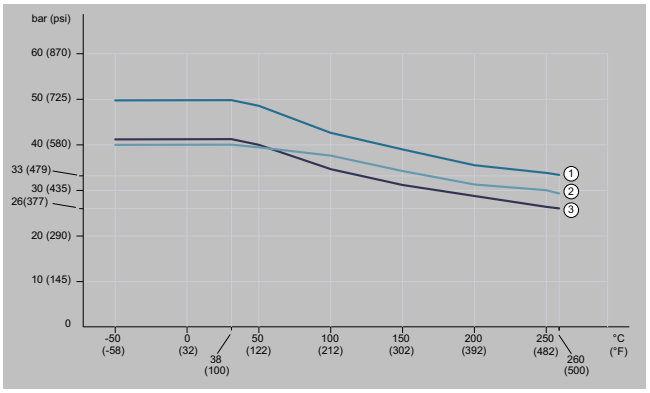
ASME class 150




Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 150 |
| 2 | Heat tracing connection compatible to ASME B16.5 class 150 |

ASME class 300, EN PN 40




Allowed process pressure as a function of process fluid temperature

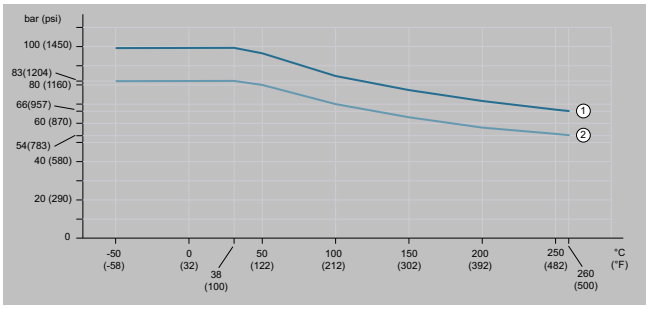
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 300 |
| 2 | Process and heat tracing connection compatible to EN 1092-1 PN 40 |
| 3 | Heat tracing connection compatible to ASME B16.5 class 300 |

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## Technical specifications (continued)

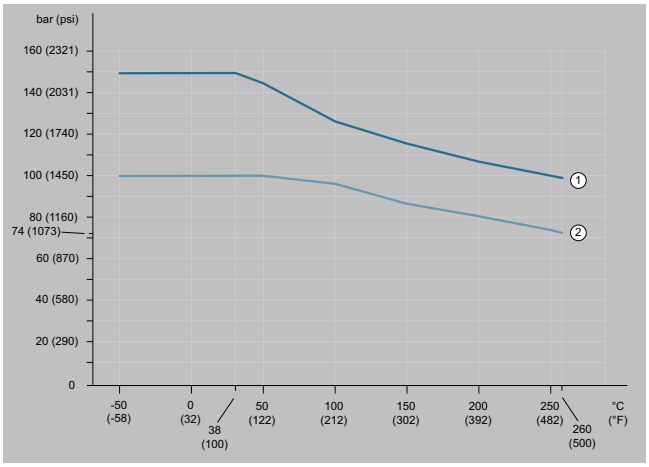
### ASME class 600




Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 600 |
| 2 | Not used for this product |

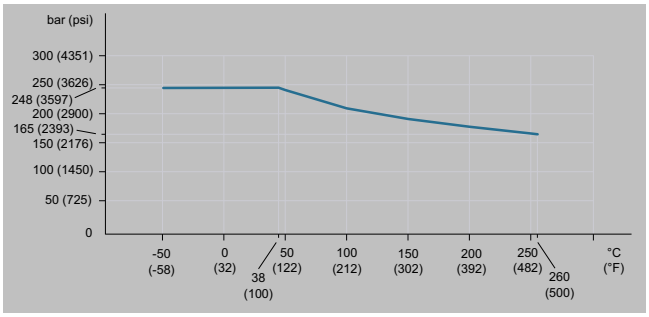
### ASME class 900, EN PN100




Allowed process pressure as a function of process connection temperature

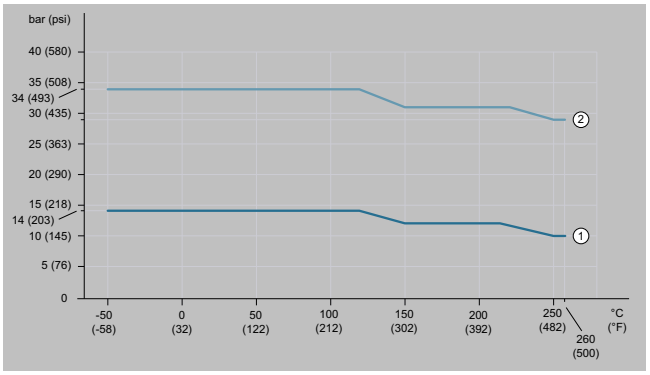
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 900 |
| 2 | Process connection compatible to EN 1092-1 PN100 |

### ASME class 1500 compatible to flange ASME B16.5




Allowed process pressure as a function of process connection temperature

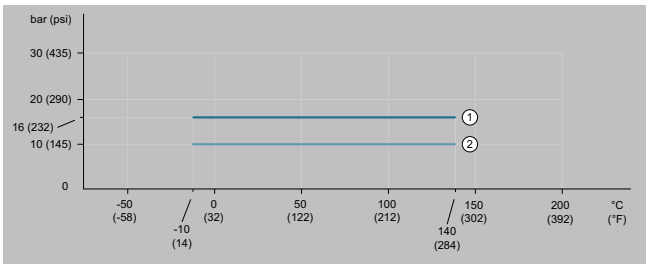
### JIS 10K, JIS 20K




Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to JIS B 2220 10K |
| 2 | Process connection compatible to JIS B 2220 20K |

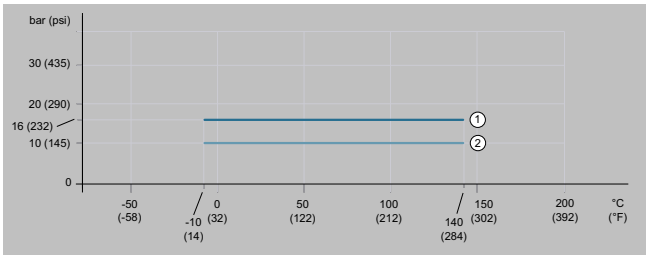
### Clamp process connection according to DIN 32676 series A




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series A up to DN 50 |
| 2 | Clamp connection compatible to DIN 32676 series A above DN 50 |

### Clamp process connection according to DIN 32676 series C (Tri-Clamp)




Allowed process pressure as a function of process fluid temperature

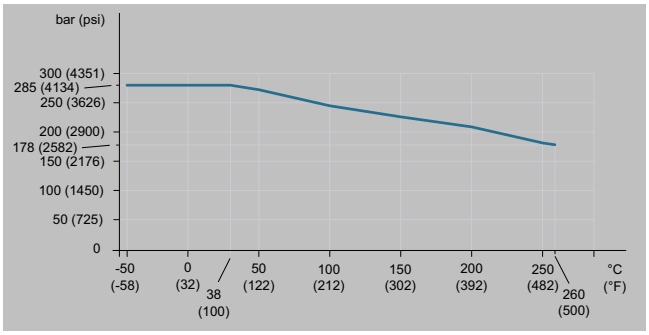
| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series C up to 2" |
| 2 | Clamp connection compatible to DIN 32676 series C above 2" |

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## Technical specifications (continued)

Process connection with internal thread G and NPT




Allowed process pressure as a function of process fluid temperature

***Ambient conditions***

Allowed ambient and storage temperature of SITRANS FC100 series is influenced by the temperature specification of FCS100 sensor, FCT0X0 transmitter and the interconnecting cable.

***Ambient temperature***

Device-surrounding air temperature is considered as ambient temperature. If the device is operating outdoors make sure that the solar irradiation does not increase the surface temperature of the device higher than the allowed maximum ambient temperature. Transmitter display has limited legibility below -20 °C (-4 °F).

The sensor ambient temperature limits may also be influenced by the process fluid temperature, details shown in the chapter “Sensors” (Technical specifications).

Maximum ambient temperature ranges for FC100 series

| Cable type | Device | Ambient temperature range |
|---|---|---|
| **Standard cable** | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Fire retardant cable** | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

Ambient temperature range for NTEP custody transfer approval

| Cable type | Device | Ambient temperature range |
|---|---|---|
| **Standard cable** | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | Transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| **Fire retardant cable** | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | Transmitter | -35 ... +50 °C (-31 ... +122 °F) |

Maximum storage temperature ranges for FC100 series

| Cable type | Device | Ambient temperature range |
|---|---|---|
| **Standard cable** | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Fire retardant cable** | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

***Temperature specification of FC100 series Ex versions located in hazardous areas***

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

The maximum ambient and process fluid temperatures depending on explosion groups and temperature classes can be determined via the SITRANS FC order code together with the Ex code (see the corresponding explosion proof type manual).

Note: The maximum process fluid temperature could be further restricted due to process connection type, refer to curves above under the heading “Allowed ambient temperature for FCS100 sensors”.

***FCS100 with standard process temperature***

Ex approvals:

ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) |
| T5 | 90 °C (194 °F) | 75 °C (167 °F) | 75 °C (167 °F) |
| T4 | 130 °C (266 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 72 °C (161 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 72 °C (161 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 72 °C (161 °F) |

Ex approvals:

FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) |
| T5 | 90 °C (194 °F) | 75 °C (167 °F) | 70 °C (158 °F) |
| T4 | 130 °C (266 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

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## Technical specifications (continued)

***FCS100 with medium process temperature, long neck***

Ex approvals:

ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | | |
|---|---|---|---|---|
| | | Standard cable | Fire retardant cable without sensor insulation | Fire retardant cable with all sensor insulation and heating options |
| T6 | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) |
| T5 | 90 °C (194 °F) | 75 °C (167 °F) | 75 °C (167 °F) | 75 °C (167 °F) |
| T4 | 130 °C (266 °F) | 80 °C (176 °F) | 76 °C (168 °F) | 75 °C (167 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 75 °C (167 °F) | 71 °C (159 °F) |
| T2 | 260 °C (500 °F) | 80 °C (176 °F) | 73 °C (163 °F) | 64 °C (147 °F) |
| T1 | 260 °C (500 °F) | 80 °C (176 °F) | 73 °C (163 °F) | 64 °C (147 °F) |

Ex approvals:

FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | | |
|---|---|---|---|---|
| | | Standard cable | Fire retardant cable without sensor insulation | Fire retardant cable with all sensor insulation and heating options |
| T6 | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) | 65 °C (149 °F) |
| T5 | 90 °C (194 °F) | 75 °C (167 °F) | 70 °C (158 °F) | 70 °C (158 °F) |
| T4 | 130 °C (266 °F) | 80 °C (176 °F) | 70 °C (158 °F) | 70 °C (158 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 70 °C (158 °F) | 70 °C (158 °F) |
| T2 | 260 °C (500 °F) | 80 °C (176 °F) | 70 °C (158 °F) | 64 °C (147 °F) |
| T1 | 260 °C (500 °F) | 80 °C (176 °F) | 70 °C (158 °F) | 64 °C (147 °F) |

***Additional ambient and environmental specifications***

| Specification | Rating/level of compliance |
|---|---|
| **Relative humidity** | 0 ... 95% |
| **Ingress protection** | IP66 or IP67 with suitable cable glands |
| **Environmental pollution** | Pollution degree 4 in accordance with EN 61010-1 whilst in operation |
| **Maximum altitude** | 2 000 m (6 600 ft) above mean sea level (MSL) |
| **Mechanical load** | Transmitter: 10 ... 500 Hz, 1g acc. to IEC 60068-2-6 |
| **Electromagnetic (EMC) Immunity** | • EN IEC 61326-1, Table 2<br>• EN IEC 61326-2-3<br>• EN IEC 61326-2-5<br>• NAMUR NE 21 recommendation<br>• DNV-CG-0339 section 3, chapter 14 |
| **Surge Immunity Emission** | • EN 61000-4-5 for lightning protection<br>• EN IEC 61000-3-2, Class A (harmonic current emissions)<br>• EN IEC 61000-3-3, Class A (voltage fluctuations)<br>Immunity assessment criterion: output signal fluctuation is within ±1% of the output span |
| **Overvoltage** | Category II according to EN IEC 61010-1 |

***Approvals and certificates – summary***

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | B | ATEX, explosion group IIC and IIIC |
| 15, Ex approval | C | ATEX, explosion group IIB and IIIC |
| 15, Ex approval | D | IECEx, explosion group IIC and IIIC |

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | E | IECEx, explosion group IIB and IIIC |
| 15, Ex approval | H | FM, groups A, B, C, D, E, F, G |
| 15, Ex approval | J | FM, groups C, D, E, F, G |
| 15, Ex approval | M | NEPSI, explosion group IIC and dust proof |
| 15, Ex approval | N | NEPSI, explosion group IIB and dust proof |
| 15, Ex approval | F | EAC Ex, explosion group IIC and IIIC |
| 15, Ex approval | G | EAC Ex, explosion group IIB and IIIC |
| 15, Ex approval | P | Korea Ex, explosion group IIC and IIIC |
| 15, Ex approval | Q | Korea Ex, explosion group IIB and IIIC |
| 15, Ex approval | U | UKEx, explosion group IIC and IIIC |
| 15, Ex approval | V | UKEx, explosion group IIB and IIIC |
| ZS2, Marine approval | S22 | Marine approval according DNV, ABS and KR piping class 2 |
| ZS2, Marine approval | S23 | Marine approval according DNV, ABS and KR piping class 3 |
| ZS2, Marine approval | S24 | Marine approval according LR MR TAC piping class 2 |
| ZS2, Marine approval | S25 | Marine approval according LR MR TAC piping class 3 |
| ZS2, Marine approval | S26 | Marine approved BV piping class 2 |
| ZS2, Marine approval | S27 | Marine approved BV piping class 3 |
| ZC1, Certificate | C16 | NTEP approval, accuracy class 0.3 acc. NIST Handbook 44 |
| ZC1, Certificate | C11 | Compliance with the order 2.1 EN 10204 |
| ZC1, Certificate | C40 | Quality Inspection Certificate 3.1 EN 10204 |
| ZC1, Certificate | C13 | 3.1 EN 10204 + IGC + NACE MR0175, MR0103 |
| ZC1, Certificate | C18 | Pressure Test Certificate 3.1 EN 10204 |
| ZC1, Certificate | C54 | Degreasing ASTM G93-03, including report |
| ZC1, Certificate | C36 | WPS; WPQR; WQC |

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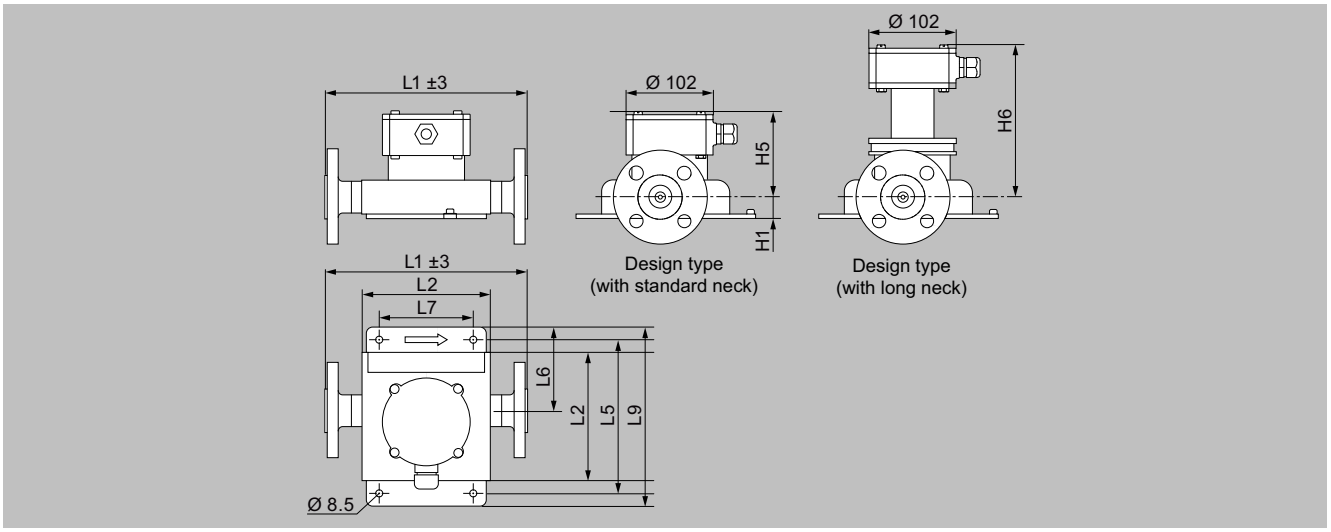
## Technical specifications (continued)

| Position in code, type | Order code | Description |
|---|---|---|
| ZC1, Certificate | C37 | Welding procedures and Certificate ASME IX |
| ZC1, Certificate | C33 | X-ray DIN EN ISO 17636-1/B |
| ZC1, Certificate | C34 | X-ray test according to ASME V |

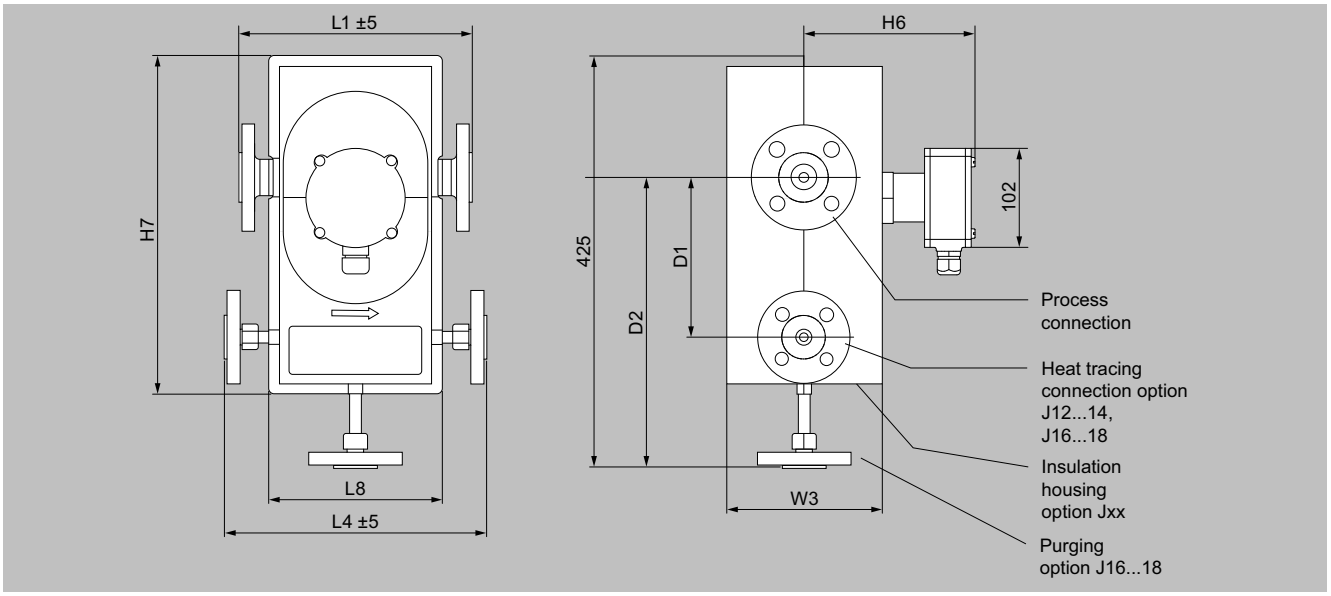
| Position in code, type | Order code | Description |
|---|---|---|
| ZC1, Certificate | C38 | Dye penetration DIN EN ISO 3452-1 |
| ZC1, Certificate | C39 | Dye penetration ASME V |
| ZC1, Certificate | C20 | Functional Safety (IEC 61508) - SIL2/3 |
| ZC1, Certificate | C15 | PMI 3.1 according to EN 10204 |

## Dimensional drawings

***Drawings, dimensions and weight for FCS100 sensors***




FCS100 sensor, dimensions in mm

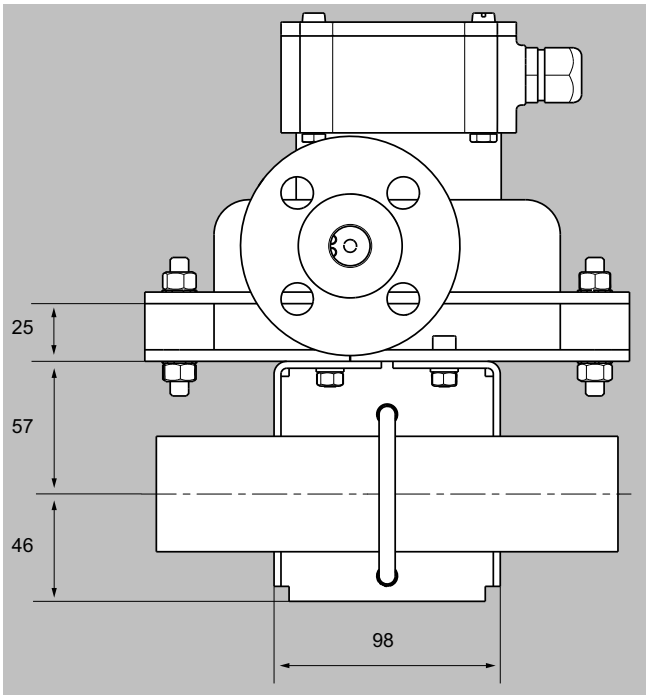



FCS100 with insulation housing, dimensions in mm

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## Dimensional drawings (continued)




FCS100 with optional pipe mounting bracket, dimensions in mm

### *FCS100 sensor dimensions*

| Nominal size | L2 | L4 | L5 | L6 | L7 | L8 | L9 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 1 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 111 (4.4) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 2 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 111 (4.4) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 4 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 99 (3.9) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 6 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 89 (3.5) | 110 (4.3) | 180 (7.1) | 210 (8.3) |
| DN 8 | 150 (5.9) | 270 (10.6) | 180 (7.1) | 55 (2.2) | 110 (4.3) | 180 (7.1) | 210 (8.3) |

| Nominal size | H1 | H3 | H5 | H6 | L7 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 1 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 2 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 4 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 6 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |
| DN 8 | 25 (1) | 81 (3.2) | 101 (4) | 176 (6.9) | 350 (13.8) | 160 (6.3) | 165 (6.5) | 299 (11.8) |

### *L1 dimension and weight with process connections according to ASME B16.5 (AISI 316 / AISI 316L)*

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) | 240 (9.4) | 6.2 (14) |
| ASME ½" class 300, raised face (RF) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) |
| ASME ½" class 600, raised face (RF) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) | 250 (9.8) | 6.9 (15) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 600, ring joint (RJ) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) | 250 (9.8) | 6.8 (15) |
| ASME ½" class 900, raised face (RF) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) |
| ASME ½" class 900, ring joint (RJ) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) |
| ASME ½" class 1500, raised face (RF) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) | 270 (10.6) | 8.8 (19) |
| ASME ½" class 1500, ring joint (RJ) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) | 270 (10.6) | 11.3 (25) |
| ASME 1" class 150, raised face (RF) | n/a | n/a | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) | 240 (9.4) | 7.1 (16) |
| ASME 1" class 300, raised face (RF) | n/a | n/a | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) | 240 (9.4) | 8.1 (18) |
| ASME 1" class 600, raised face (RF) | n/a | n/a | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) | 260 (10.2) | 8.5 (19) |
| ASME 1" class 600, ring joint (RJ) | n/a | n/a | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) | 260 (10.2) | 8.6 (19) |
| ASME 1" class 900, raised face (RF) | n/a | n/a | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) |
| ASME 1" class 900, ring joint (RJ) | n/a | n/a | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) |
| ASME 1" class 1500, raised face (RF) | n/a | n/a | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) | 320 (12.6) | 12.7 (28) |
| ASME 1" class 1500, ring joint (RJ) | n/a | n/a | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) | 320 (12.6) | 12.8 (28) |
| ASME 1½" class 150, raised face (RF) | n/a | n/a | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) | 250 (9.8) | 8 (18) |
| ASME 1½" class 300, raised face (RF) | n/a | n/a | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) | 250 (9.8) | 10.3 (23) |
| ASME 1½" class 600, raised face (RF) | n/a | n/a | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) | 270 (10.6) | 11.7 (26) |
| ASME 1½" class 600, ring joint (RJ) | n/a | n/a | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) | 270 (10.6) | 11.6 (26) |
| ASME 1½" class 900, raised face (RF) | n/a | n/a | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) |
| ASME 1½" class 900, ring joint (RJ) | n/a | n/a | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) |
| ASME 1½" class 1500, raised face (RF) | n/a | n/a | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) | 340 (13.4) | 17.5 (39) |
| ASME 1½" class 1500, ring joint (RJ) | n/a | n/a | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) | 340 (13.4) | 17.7 (39) |

***L1 dimension and weight with process connections according to EN 1092-1 (AISI 316L)***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 40 type B1, raised face (RF) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) | 240 (9.4) | 6.8 (15) |
| EN DN 15 PN 40 type D, with groove | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) | 240 (9.4) | 6.6 (15) |
| EN DN 15 PN 40 type E, with spigot | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) |
| EN DN 15 PN 40 type F, with recess | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) |
| EN DN 15 PN 100 type B1, raised face (RF) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) | 250 (9.8) | 7.6 (17) |
| EN DN 15 PN 100 type D, with groove | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) | 250 (9.8) | 13.6 (30) |
| EN DN 15 PN 100 type E, with spigot | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) | 250 (9.8) | 7.3 (16) |
| EN DN 15 PN 100 type F, with recess | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) | 250 (9.8) | 7.5 (17) |
| EN DN 25 PN 40 type B1, raised face (RF) | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 25 PN 40 type D, with groove | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |
| EN DN 25 PN 40 type E, with spigot | n/a | n/a | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) |
| EN DN 25 PN 40 type F, with recess | n/a | n/a | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) |
| EN DN 25 PN 40 type B1, raised face (RF) | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |
| EN DN 25 PN 40 type D, with groove | n/a | n/a | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) | 240 (9.4) | 7.7 (17) |
| EN DN 25 PN 40 type E, with spigot | n/a | n/a | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) | 240 (9.4) | 7.4 (16) |
| EN DN 25 PN 40 type F, with recess | n/a | n/a | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) |
| EN DN 25 PN 100 type B1, raised face (RF) | n/a | n/a | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) | 260 (10.2) | 10.3 (23) |
| EN DN 25 PN 100 type D, with groove | n/a | n/a | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) | 260 (10.2) | 10.2 (22) |
| EN DN 25 PN 100 type E, with spigot | n/a | n/a | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) | 260 (10.2) | 9.7 (21) |
| EN DN 25 PN 100 type F, with recess | n/a | n/a | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) | 260 (10.2) | 10.1 (22) |
| EN DN 40 PN 40 type B1, raised face (RF) | n/a | n/a | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) | 240 (9.4) | 9.2 (20) |
| EN DN 40 PN 40 type D, with groove | n/a | n/a | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) | 240 (9.4) | 9.1 (20) |
| EN DN 40 PN 40 type E, with spigot | n/a | n/a | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) |
| EN DN 40 PN 40 type F, with recess | n/a | n/a | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) | 240 (9.4) | 9.0 (20) |
| EN DN 40 PN 100 type B1, raised face (RF) | n/a | n/a | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) | 320 (12.6) | 13.7 (30) |
| EN DN 40 PN 100 type D, with groove | n/a | n/a | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) | 320 (12.6) | 13.6 (30) |
| EN DN 40 PN 100 type E, with spigot | n/a | n/a | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) | 320 (12.6) | 13.2 (29) |
| EN DN 40 PN 100 type F, with recess | n/a | n/a | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) | 320 (12.6) | 13.5 (30) |

***L1 dimension and weight with process connections according to JIS B 2220 (AISI 316 / AISI 316L)***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10K | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) | 240 (9.4) | 6.5 (14) |
| JIS DN 15 20K | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) | 240 (9.4) | 6.7 (15) |
| JIS DN 25 10K | n/a | n/a | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) | 240 (9.4) | 7.6 (17) |
| JIS DN 25 20K | n/a | n/a | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) | 240 (9.4) | 8 (18) |
| JIS DN 40 10K | n/a | n/a | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) | 240 (9.4) | 8.4 (19) |
| JIS DN 40 20K | n/a | n/a | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) | 240 (9.4) | 8.8 (19) |

***L1 dimension and weight with process connections according to NPT internal thread***

| Process connection size and type | FCS100 sensor nominal size DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ¼" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ⅜" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ½" NPT | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| ¾" NPT | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) |

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## Dimensional drawings (continued)

### *L1 dimension and weight with process connections according to G internal thread*

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ¼ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ⅜ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ½ inch | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) | 260 (10.2) | 5.6 (12) |
| G ¾ inch | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) | 260 (10.2) | 5.5 (12) |

### *L1 dimension and weight with hygienic clamp process connections according to DIN 32676 series A*

| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A DN 15 | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) |
| DIN 32676 series A DN 25 | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |
| DIN 32676 series A DN 40 | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |

### *L1 dimension and weight with hygienic clamp process connections according to DIN 32676 series C (Tri-clamp)*

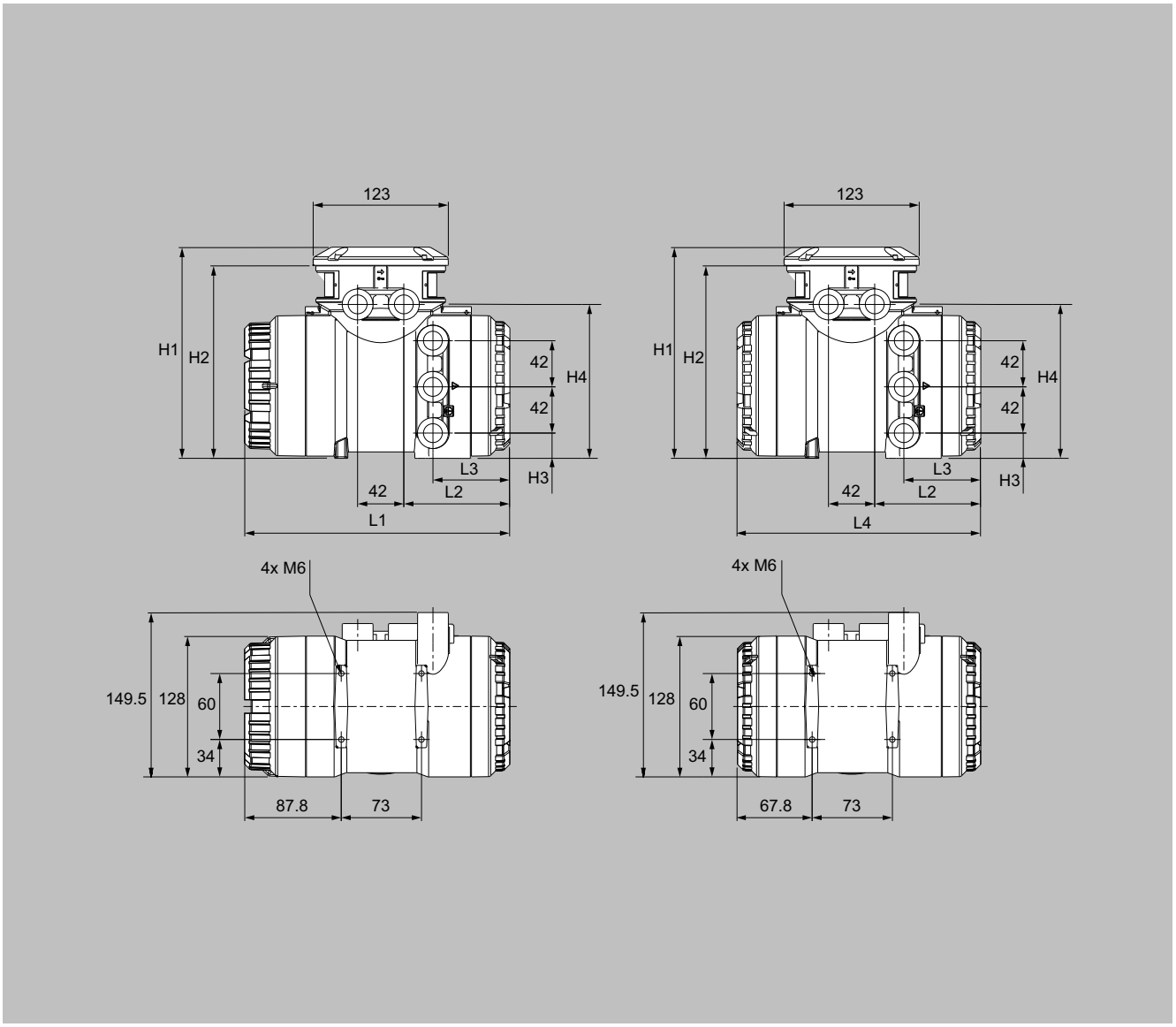
| Process connection size and type | FCS100 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 1 | | DN 2 | | DN 4 | | DN 6 | | DN 8 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C ½ inch | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) | 240 (9.4) | 5.3 (12) |
| DIN 32676 series C 1 inch | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |
| DIN 32676 series C 1½ inch | n/a | n/a | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) | 240 (9.4) | 5.4 (12) |

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## Dimensional drawings (continued)

***Drawings, dimensions and weight for FCT020 and FCT040 transmitters***




Dimensions of FCT020 or FCT040 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

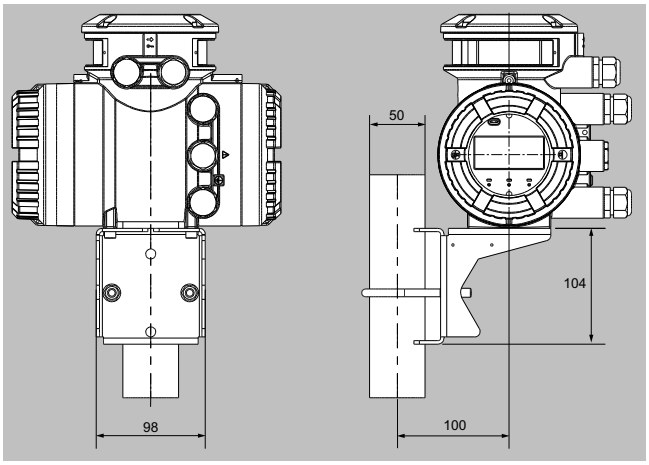
***Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)***

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| Aluminum | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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## Dimensional drawings (continued)



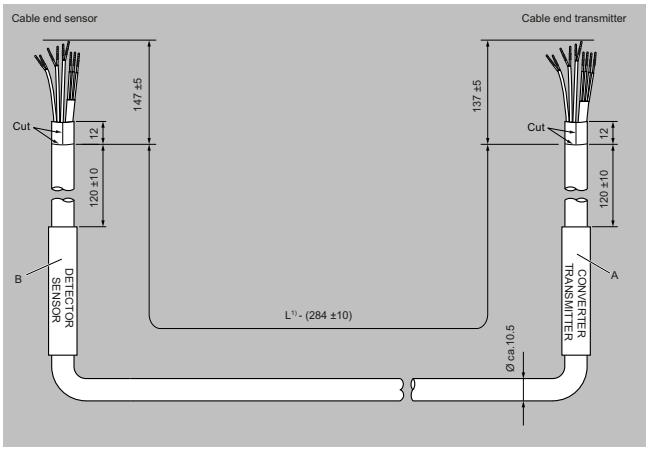

Dimensions of transmitter in mm, attached to mounting bracket.

### *Transmitter weights*

| Design type | Transmitter enclosure material | Weight in kg (lb) |
|---|---|---|
| Remote | Cast aluminum | 4.2 (9.3) |
| | CF-8M stainless steel | 12.5 (27.6) |

### *Connecting cable dimensions and weights*

### *Standard cable*

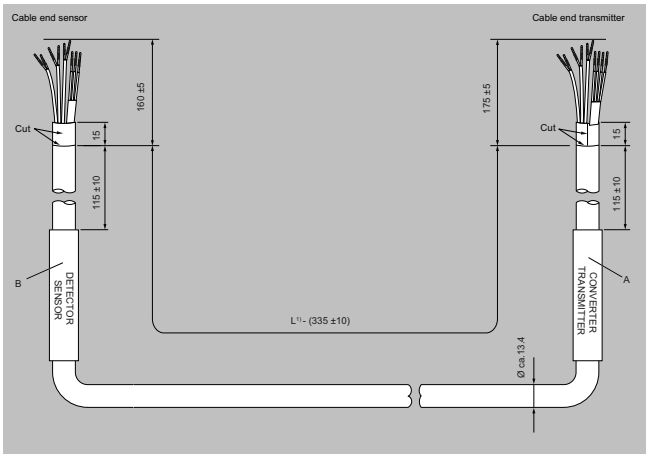



Dimensions in mm. Standard terminated cable. A and B are factory fitted labels.

| Option code | Cable length, L | Cable color |
|---|---|---|
| L51 | 5 m (16.4 ft) | Non-Ex: gray / Ex: blue |
| L54 | 10 m (32.8 ft) | |
| L57 | 15 m (49.2 ft) | |
| L60 | 20 m (65.6 ft) | |
| L63 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.200 kg/m (0.134 lb/ft)

### *Standard cable with steel armored option*

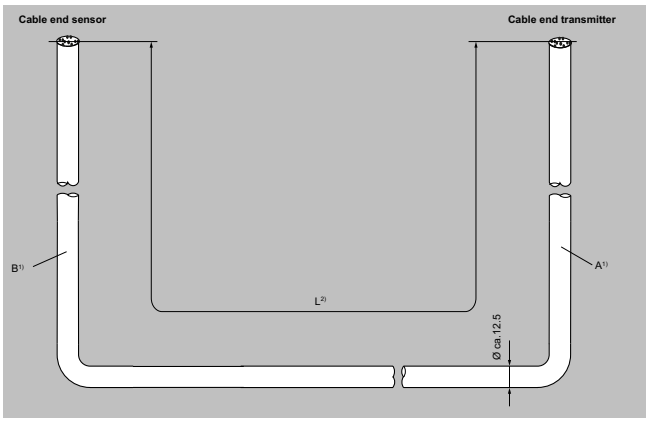



Dimensions in mm. Steel armored terminated cable. A and B are factory fitted labels.

| Option code | Cable length, L | Cable color |
|---|---|---|
| L51 + A20/A21 | 5 m (16.4 ft) | Blue |
| L54 + A20/A21 | 10 m (32.8 ft) | |
| L57 + A20/A21 | 15 m (49.2 ft) | |
| L60 + A20/A21 | 20 m (65.6 ft) | |
| L63 + A20/A21 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.300 kg/m (0.202 lb/ft)

### *Fire retardant cable*




Dimensions in mm. Fire retardant unterminated cable. Labels A and B are supplied loose with termination kit.

| Option code | Cable length, L | Cable color |
|---|---|---|
| L71 | 5 m (16.4 ft) | Gray |
| L74 | 10 m (32.8 ft) | |
| L77 | 15 m (49.2 ft) | |
| L80 | 20 m (65.6 ft) | |
| L83 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.270 kg/m (0.181 lb/ft)

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## Overview

The flowmeter systems of the SITRANS FC500 series are the universal Coriolis multi-parameter flowmeter for routine and hygienic applications.

They are formed by one FCS500 sensor and one FCT transmitter:

- SITRANS FC520 is the combination of the FCS500 sensor and the FCT020 transmitter
- SITRANS FC540 is the combination of the FCS500 sensor and the FCT040 transmitter

Features:

- Dual curved AISI 316L stainless steel measuring tubes
- Process connection: flange, thread, or a selection of hygienic fittings
- Nominal sizes: DN 10 to DN 80
- Connection sizes: DN 8 to DN 125 (⅜" to 5")
- Nominal flow rates: 1 600 to 170 000 kg/h (3 527 to 374 786 lb/h)
- FCS500 sensors can be combined with compact or remote transmitters
- Versatility with superior turndown and low pressure loss
- Hygienic specification for food and beverage, biotechnological and pharmaceutical applications



FC520/540 Coriolis flowmeter

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## Benefits

***Product features aligned to user value targets***

| | User value targets | SITRANS FC features and solutions |
|---|---|---|
| **Engineering and project management** | • Reduce engineering investment<br>• Cut specification effort<br>• Minimize project expenditure<br>• Decrease the spending on each measurement point<br>• Eliminate function duplication<br>• Reduce number of suppliers | • Siemens project teams offer complimentary evaluation of customer specifications, provided by regional and HQ experts<br>• Simple product selection using intuitive sizing software<br>• One SITRANS FC device can typically provide 3 to 6 individual measurements, all transmitted via digital communication, when planned during pre-project design<br>• Added value functions: batch control, viscosity, thermal energy, concentration measurement (Fraction) of two-component solutions, and pressure compensation |
| **Installation** | • Reduce footprint and transport outlay of OEM machinery<br>• Lower installation complexity<br>• Avoid costly modifications of existing plant | • Can be installed in horizontal or vertical (self-draining) pipes<br>• Twin tube bend design delivers strong signal to noise characteristic resistant to external influence, so install in tight spaces with no inlet and outlet restrictions<br>• Adaptable to existing pipes:typically, 3 or 4 connection sizes for each sensor size<br>• Flexible selection of traditional inputs, outputs, and digital communications |
| **Configuration and commissioning** | • Shorter commissioning schedules with lower costs<br>• Faster start-up with reduced outgoings | • Easy setup wizard delivers working meters straight after start-up<br>• microSD card stores sensor calibration data and default setup<br>• Simple configuration using Process Device Manager (PDM)<br>• Siemens device-specific faceplates simplify operation in plantwide control systems |
| **Efficient plant operation** | • Improve finished product consistency to reduce waste<br>• Keep process performance when scaling production up or down<br>• Optimize process control<br>• Improve finished product quality enabling higher levels of profit<br>• Reduce downtime with fast resolution of process upsets<br>• Improve asset performance | • SITRANS FC meters are calibrated in rigs accredited to EN/ISO 17025 to ensure consistently high performance of flow, density, and concentration measurements<br>• First-class zero-point quality maintains high accuracy into the low flow region<br>• High sensitivity and intelligent dynamic range keeps the measurement active in demanding high fluid damping cases<br>• Designed-in resilience to process extremes<br>• Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout or solid deposits building up in the tubes<br>• Diagnostic data via local menu or PDM is backed by Siemens application experts<br>• Intelligent Siemens SITRANS IQ apps for continuing asset evaluation |
| **Maintenance and asset management** | • Optimize technician training<br>• Reduce cost of spare parts<br>• Increase predictive maintenance<br>• Reduce production downtime and associated costs<br>• Decrease unplanned maintenance<br>• Maximize asset value | • Simple product design with interchangeable modular parts<br>• microSD card loads sensor-specific data to deliver fast service exchange<br>• Self-verification: tube health check monitors key diagnostics, including tube stiffness, driver and pickups; the user defines verification frequency and alarm behavior<br>• Verification results indicate whether preventive maintenance action is required<br>• Siemens SIMATIC Maintenance Station uses cyclical acquisition to provide life cycle reports and intelligent preventive maintenance strategies |
| **Industry compliance** | • Cut effort required to comply with Industry-specific demands<br>• Reduce resources needed to maintain regulatory compliance | • Food and beverage sector covered with EHEDG and 3-A approvals, polished tubes<br>• Global hazardous area approvals for international plant duplications<br>• Common and emerging digital networks covered: HART, PROFIBUS PA, PROFINET<br>• Class-leading safety: SIL2/SIL3, secondary containment, PED, NAMUR NE95 |

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## Application

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Chemical and petrochemical**<br>Bulk chemicals<br>Industrial gases<br>Polymers<br>Agrochemicals<br>Fine chemicals<br>Aroma chemicals | • Transfer, loading and unloading of bulk chemicals<br>• Concentration control of acids and alkalis (process optimization)<br>• Accurate mass or volume flow of feed chemicals to in-line blending systems<br>• Accurate mass flow and density (quality) of reactor fluid feeds catalyst<br>• Chemical recovery<br>• Mass balance optimization<br>• Compressed and cryogenic gases<br>• Lubricating oil blending and dosing<br>• High accuracy measurement of critical fluid components<br>• Low flow control in pilot plants and R&D facilities |
| **Food and beverage**<br>Food processing<br>Dairies<br>Breweries<br>Distilleries<br>Confectionary<br>Soft drinks<br>Animal feed plants<br>OEM | • Accurate bulk transfer (mass or volume) of all dairy products: milk, cream, whey and yoghurt<br>• Fat concentration in cream<br>• Flow, density, temperature and concentration (Plato) during all fermentation processes<br>• Flow, density, temperature and sugar concentration (Brix) in soft drink processing<br>• Distilled spirits – % alcohol by volume (ABV), liters of pure alcohol, volume transfer, blending, batch and column still optimization and energy management, cask filling, tanker loading<br>• Flow and density of fruit juices and pulps<br>• Mixing and inventory control of confectionary ingredients, e.g. chocolate, syrup, oils, flavors<br>• Metering pump control<br>• Oils, fats enzymes dosing in animal feed plants<br>• $CO_2$ dosing<br>• CIP liquids<br>• Bottling of beer, spirits, wine, soft drinks, etc.<br>• Bulk sugar processing – molasses, sugar slurries, density, Brix of finished product |
| **Oil and gas**<br>Offshore/onshore<br>Upstream/downstream<br>Pipelines<br>Distribution networks<br>Refineries<br>Skid manufacturers | • Loading/unloading of hydrocarbons (e.g. crude oil, bitumen) from/to ship, road tanker, rail car<br>• High pressure chemical injection<br>• High pressure low flow gas<br>• Net oil computing<br>• Gas void fraction<br>• Filling of gas bottles<br>• Furnace control<br>• Test separators<br>• LPG, natural gas hydration<br>• Well-head water-cut monitoring<br>• All hydrocarbon fluids in refineries<br>• Metrology, custody transfer<br>• Drilling mud<br>• Oil well cementing and hydrofracturing |

## Application (continued)

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Life sciences**<br>Pharmaceutical<br>Bio | • High accuracy flow and batching of bioreactor feeds<br>• Solvent flow rate, density and batching<br>• Flow of demineralized and deionized water<br>• Solvents and fish oils used in high grade omega 3 oils<br>• Precision coatings<br>• Vacuum thin film coating |
| **Household and personal care**<br>Detergents<br>Cosmetics | • Blending and batching of detergent ingredients<br>• Tanker loading and unloading<br>• Salt concentration<br>• Reliable measurement of aerated liquids |
| **Automotive and aeronautical**<br>Vehicle manufacturing<br>Paint<br>Engine testing<br>OEM | • Fuel injection nozzle and pump testing<br>• Filling of under bonnet fluid reservoirs, air conditioning, coolant<br>• Fuel flow and density measurement in engine test beds<br>• Checking for air in oil using high accuracy density measurement<br>• Paint spray robots – requires accurate and fast measurements<br>• Aircraft fuel loading (kerosene)<br>• High pressure flow used in turbine blade manufacture |
| **Power and energy**<br>Renewable<br>Hydrogen | • Boiler fuel flow and burner control<br>• Turbine fuel flow<br>• Glycol flow and concentration<br>• Bioethanol |
| **Marine**<br>OEM<br>Shipbuilders | • Fuel consumption management<br>• Boiler control<br>• Bunkering management<br>• Density used to indicate fuel quality |
| **Pulp, paper and textiles** | • Accurate dosing of dyes and chemicals |
| **Water and environmental** | • Dosing of chemicals for water treatment<br>• Chemical concentration for water quality control |

## Design

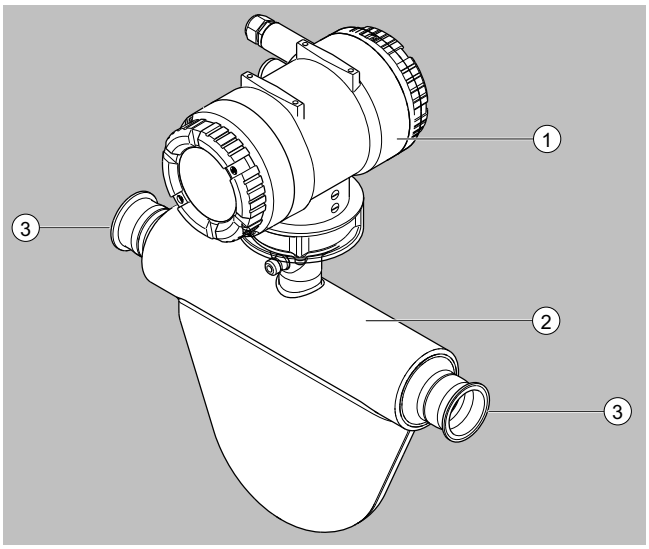
***Design options and related temperature range for FC500 series***

| Design version | Transmitter style | Process fluid temperature range |
|---|---|---|
| **Non-hygienic, flange or thread, standard neck** | Compact | Standard [-50 ... +150 °C (-58 ... +302 °F)] |
| | Remote | Standard [-70 ... +200 °C (-94 ... +392 °F)] |
| **Hygienic, thread, polished wetted parts, standard neck** | Compact | Standard [-40 ... +140 °C (-58 ... +284 °F)] |
| | Remote | Standard [-70 ... +140 °C (-94 ... +284 °F)] |
| **Hygienic, clamp, polished wetted parts, standard neck** | Compact | Standard [-10 ... +140 °C (14 ... 284 °F)] |
| | Remote | Standard [-10 ... +140 °C (14 ... 284 °F)] |

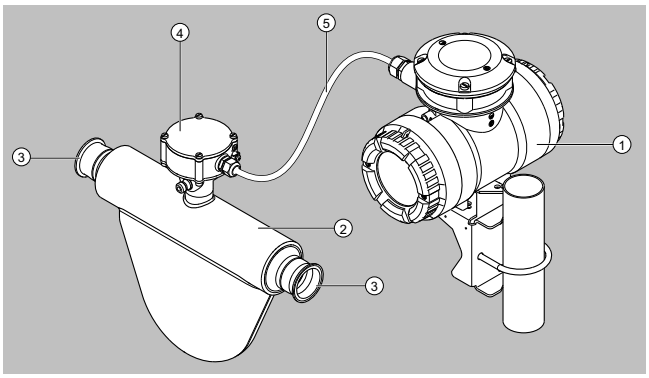
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## Design (continued)




FCS500 sensor with compact transmitter (hygienic version)




FCS500 sensor with remote transmitter (hygienic version)

| | |
|---|---|
| 1 | Transmitter |
| 2 | FCS500 sensor |
| 3 | Process connection |
| 4 | Sensor terminal box |
| 5 | Connecting cable |

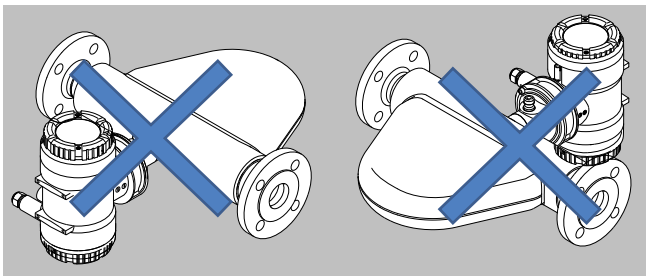
***Installation guidelines***

FC500 series flowmeters can be mounted horizontally, vertically and at an incline. The measuring tubes should be filled with the fluid during flow measurement as entrained gas may result in errors in measurement. Straight pipe runs at inlet or outlet are usually not required.

Avoid the following installation locations and positions:

- Measuring tubes as highest point in piping when measuring liquids
- Measuring tubes as lowest point in piping when measuring gases
- Immediately in front of a free pipe outlet in a downpipe
- Lateral positions

## Design (continued)



Avoid measuring tubes in sideways position resulting in possible non-homogeneous fluid separation

## Function

***Compatible fluids***

- Liquids
- Gases
- Mixtures, solutions, emulsions, suspensions, and slurries

***Primary measured variables***

- Mass flow
- Density
- Temperature

***Based on the primary measured quantities, the transmitter also calculates***

- Volume flow
- Percent concentration (fraction) of a two-component mixture (FCT040 only)
- Partial component flow rate (net flow) of a mixture consisting of two components (FCT040 only)

***Bi-directional operation***

The mass flow, volume flow, and net flow measurements can be bi-directional.

***Measurement variables for NTEP approval***

- Mass flow uni-directional
- Volume flow uni-directional

***Feature overview***

- Energy-efficient low pressure loss design with short tube paths and large tube diameter
- Cost-effective short face-to-face length or customized installation length options
- Batching function with batch leakage detection and batch control by transmitter for precise dosing
- Accurate density measurement and up to four advanced Concentration Measurement data sets
- Benefit from Viscosity function and capability to handle high viscous process fluids
- Hygienic design, self-draining in vertical installation, with hygienic approval options

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## Selection and ordering data

| SITRANS FC520/540 (Standard and Hygienic) | Article No. 7ME445 | ● - | ● ● | ● ● ● - | ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Transmitter variant** | | | | | | |
| None (spare sensor) | | 0 | | | | |
| Coriolis sensor FCS500 with transmitter FCT020 | | 2 | | | | |
| Coriolis sensor FCS500 with transmitter FCT040 | | 4 | | | | |
| SITRANS FC spare part transmitter, no sensor included | | 9 | | | | G 3 Y |
| **Sensor size / Connector size** | | | | | | |
| No sensor (SITRANS FCT transmitter as spare part) | | | 0 A | | | |
| Sensor size DN 10 with connection size 3/8" | | | 1 B | | | |
| Sensor size DN 10 with connection size 1/2" DN 15 | | | 1 C | | | |
| Sensor size DN 10 with connection size 3/4" | | | 1 D | | | |
| Sensor size DN 10 with connection size 1" DN 25 | | | 1 E | | | |
| Sensor sizeDN 10 with connection size 1 1/2" DN 40 | | | 1 F | | | |
| Sensor size DN 15 with connection size 1/2" DN 15 | | | 2 C | | | |
| Sensor size DN 15 with connection size 3/4" | | | 2 D | | | |
| Sensor size DN 15 with connection size 1" DN 25 | | | 2 E | | | |
| Sensor size DN 15 with connection size 1 1/2" DN 40 | | | 2 F | | | |
| Sensor size DN 25 with connection size 1" DN 25 | | | 3 E | | | |
| Sensor size DN 25 with connection size 1 1/2" DN 40 | | | 3 F | | | |
| Sensor size DN 25 with connection size 2" DN 50 | | | 3 G | | | |
| Sensor size DN 50 with connection size 1 1/2" DN 40 | | | 4 F | | | |
| Sensor size DN 50 with connection size 2" DN 50 | | | 4 G | | | |
| Sensor size DN 50 with connection size 2 1/2" DN 65 | | | 4 H | | | |
| Sensor size DN 50 with connection size 3" DN 80 | | | 4 J | | | |
| Sensor size DN 80 with connection size 3" DN 80 | | | 5 J | | | |
| Sensor size DN 80 with connection size 4" DN 100 | | | 5 K | | | |
| Sensor size DN 80 with connection size 5" DN 125 | | | 5 L | | | |
| **Process connection** | | | | | | |
| No connection (SITRANS FCT transmitter as spare part) | | | | A 0 | | |
| EN flange PN 40, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 1 | | |
| EN flange PN 100, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type D, groove | | | | A 5 | | |
| EN flange PN 100, suitable for EN 1092-1 type D, groove | | | | A 7 | | |
| EN flange PN 40, suitable for EN 1092-1 type E, spigot | | | | B 1 | | |
| EN flange PN 100, suitable for EN 1092-1 type E, spigot | | | | B 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type F, recess | | | | B 5 | | |
| EN flange PN 100, suitable for EN 1092-1 type F, recess | | | | B 7 | | |
| ASME flange class 150, suitable for ASME B16.5, raised face (RF) | | | | D 1 | | |
| ASME flange class 300, suitable for ASME B16.5, raised face (RF) | | | | D 2 | | |
| ASME flange class 600, suitable for ASME B16.5, raised face (RF) | | | | D 3 | | |
| ASME flange class 600, suitable for ASME B16.5, ring joint (RJ) | | | | C 3 | | |
| JIS flange 10K, JIS B 2220 | | | | L 2 | | |
| JIS flange 20K, JIS B 2220 | | | | L 4 | | |
| DIN 11851 threaded connection | | | | F 1 | | |
| DIN 11864-2 Form A | | | | H 2 | | |
| JIS G3447 and ISO 2852 clamp | | | | J 1 | | |
| Clamp process connection according to DIN 32676 series A | | | | G 2 | | |
| Clamp process connection according to DIN 32676 series C (Tri-clamp) | | | | G 6 | | |
| Process connection with internal thread G | | | | E 1 | | |
| Process connection with internal thread NPT | | | | E 3 | | |
| Special design | | | | Z 1 | | K 1 Y |
| **Tube material (wetted) and max operational temperature** | | | | | | |
| None (SITRANS FCT transmitter as spare part) | | | | | 0 | |
| 316L, 1.4404 media temperature -50 ... 150 °C (-58 ... 302 °F) | | | | | 1 | |
| 316L, 1.4404 media temperature -50 ... 140 °C (-58 ... 284 °F), polished Ra ≤ 0.8 µm | | | | | 2 | |
| 316L, 1.4404 media temperature -70 ... 200 °C (-94 ... 392 °F) | | | | | 3 | |
| 316L, 1.4404 media temperature -70 ... 140 °C (-94 ... 284 °F), polished Ra ≤ 0.8 µm | | | | | 4 | |

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## Selection and ordering data (continued)

| SITRANS FC520/540 (Standard and Hygienic) | Article No. 7ME445 | ● - ● ● ● ● ● - ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|
| **Calibration** | | | |
| No calibration | | 0 | |
| Massflow 0.1%, density 0.5 g/l | | 1 | |
| Massflow 0.1%, density 1 g/l | | 2 | |
| Massflow 0.1%, density 4 g/l | | 5 | |
| Massflow 0.2%, density 4 g/l | | 6 | |
| Accuracy for gas please select below | | 9 | |
| Massflow gas 0.75% | | | N 1 A |
| Massflow gas 0.5% | | | N 2 A |
| **Mounting style, transmitter housing and material** | | | |
| Compact type with "urethane-cured polyester powder coating" coated aluminum transmitter housing | | A | |
| Compact type with "corrosion protection coating" coated aluminum transmitter housing | | B | |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and standard neck sensor | | C | |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and standard neck sensor | | E | |
| Remote type stainless steel transmitter and standard neck sensor | | G | |
| **Ex approvals** | | | |
| None | | A | |
| ATEX, explosion group IIC and IIIC | | B | |
| ATEX, explosion group IIB and IIIC | | C | |
| IECEx, explosion group IIC and IIIC | | D | |
| IECEx, explosion group IIB and IIIC | | E | |
| FM, groups A B C D E F G | | H | |
| FM, groups C D E F G | | J | |
| NEPSI, explosion group IIC and IIIC | | M | |
| NEPSI, explosion group IIB and IIIC | | N | |
| **Local User Interface** | | | |
| Spare sensor without transmitter, no display applied | | 0 | |
| No display | | 1 | |
| With display | | 3 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify order code(s). | |
| **Cable glands** | |
| Metric, no glands (M20) | **A10** |
| NPT, no glands (1/2") | **A11** |
| Armored cable setup (NPT threads supplied) | **A20** |
| NPT, no glands (1/2") steel armored cable | **A21** |
| **Sensor housing material** | |
| None (SITRANS FCT transmitter as spare part) | **B00** |
| Stainless steel 1.4301/304, 1.4404/316L | **B01** |
| **I/O Configuration Ch1** | |
| None | **E00** |
| 4-20 mA HART active | **E06** |
| 4-20 mA HART passive | **E07** |
| PROFIBUS PA | **E10** |
| **I/O Configuration Ch2, Ch3 and Ch4** | |
| Spare sensor without transmitter, all communication types and I/Os apply | **F00** |
| 1 passive current output, 1 passive pulse or status output | **F01** |
| 1 passive current output, 2 passive pulse or status outputs | **F02** |
| 1 passive current output, 1 passive pulse or status outputs, 1 passive NAMUR pulse or status output | **F03** |
| 1 passive current output, 2 passive NAMUR pulse or status outputs | **F04** |
| 1 passive pulse or status output | **F11** |
| 2 passive pulse or status outputs, 1 passive status output | **F12** |
| 2 passive pulse or status outputs, 1 voltage-free status input | **F13** |
| 2 passive pulse or status outputs, 1 active current input | **F14** |
| 2 passive pulse or status outputs, 1 passive current input | **F15** |
| 1 passive pulse or status output, 1 passive current output, 1 active current input | **F16** |
| 1 passive pulse or status output, 1 passive current output, 1 passive current input | **F17** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 active current input | **F18** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 passive current input | **F19** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 1 passive pulse or status output, 1 active pulse or status output, 1 voltage-free status input | **F20** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor, 1 voltage-free status input | **F21** |
| 1 active current output, 2 passive pulse or status outputs | **F22** |
| 1 active current output, 1 passive pulse or status output,1 voltage-free status input | **F23** |
| 1 passive pulse or status output | **F31** |
| 2 passive pulse or status outputs | **F32** |
| 1 passive pulse or status output,1 active current input | **F33** |
| 1 passive pulse or status output,1 passive current input | **F34** |
| 1 passive pulse or status output,1 active pulse or status output | **F35** |
| 1 passive pulse or status output,1 active pulse or status output with pull-up resistor | **F36** |
| 1 passive pulse or status output,1 active current output | **F37** |
| 1 passive pulse output | **F41** |
| Output CH1 intrinsically safe, 1 passive pulse output | **F42** |
| **Certificates** | |
| Declaration of compliance with the order 2.1 according to EN 10204 | **C11** |
| Quality Inspection Certificate (Inspection Certificate 3.1 according to EN 10204) | **C40** |
| Certificate of Marking Transfer and Raw Material Certificates (Inspection Certificate 3.1 according to EN 10204), including IGC and conform to NACE MR0175 and MR0103 | **C13** |
| Hydrostatic Pressure Test Certificate (Inspection Certificate 3.1 according to EN 10204) | **C18** |
| Degreasing of wetted surfaces according to ASTM G93-03 (Level C), including test report | **C54** |
| WPS according to EN ISO 15809-1; WPQR according to EN ISO 15814-1; WQC according to DIN EN 287-1 or EN ISO 8908-4 | **C36** |
| Welding procedures and certificate ASME IX | **C37** |
| X-ray inspection of flange weld seam according to EN ISO 17636-1/B, evaluation according to AD 2000 HP 5/3 and EN ISO 5817/C, including certificate | **C33** |
| X-ray test according to ASME V | **C34** |
| Dye penetrant test of process connection weld seams according to EN ISO 3452-1, including certificate | **C38** |
| Dye penetrant test of flange welding according to ASME V, including certificate | **C39** |
| Positive Material Identification of wetted parts, including certificate (Inspection Certificate 3.1 according to EN 10204) | **C15** |
| 3-A product conformity with 3-A certificate and marking, including Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C62** |
| EHEDG product conformity with EHEDG Certificate and marking, including Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C63** |
| Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C61** |
| NTEP approval accuracy class 0.3 acc. NIST | **C16** |
| **Connecting cable type and length** | |
| without standard connecting cable | **L50** |
| 5 meter (16.4 ft) remote connecting cable terminated standard gray / Ex blue | **L51** |
| 10 meter (32.8 ft) remote connecting cable terminated standard gray / Ex blue | **L54** |
| 15 meter (49.2 ft) remote connecting cable terminated standard gray / Ex blue | **L57** |
| 20 meter (65.6 ft) remote connecting cable terminated standard gray / Ex blue | **L60** |
| 30 meter (98.4 ft) remote connecting cable terminated standard gray / Ex blue | **L63** |
| without fire retardant connecting cable | **L70** |
| 5 meter (16.4 ft) remote fire retardant connecting cable not terminated | **L71** |
| 10 meter (32.8 ft) remote fire retardant connecting cable not terminated | **L74** |
| 15 meter (49.2 ft) remote fire retardant connecting cable not terminated | **L77** |
| 20 meter (65.6 ft) remote fire retardant connecting cable not terminated | **L80** |
| 30 meter (98.4 ft) remote fire retardant connecting cable not terminated | **L83** |
| **SW functions** | |
| Heat measurement | **S11** |
| Tube health check | **S12** |
| Batching and filling function | **S13** |
| Netoil computing | **S14** |
| Viscosity computing function for liquids | **S15** |
| Standard concentration measurement | **S16** |
| **Marine approval** | |
| Marine approved DNV, ABS, KR piping class 2 | **S22** |
| Marine approved DNV, ABS, KR piping class 3 | **S23** |
| Marine approved LR, MR, TAC piping class 2 | **S24** |
| Marine approved LR, MR, TAC piping class 3 | **S25** |
| Marine approved BV piping class 2 | **S26** |
| Marine approved BV piping class 3 | **S27** |
| **Mounting** | |
| Namur built-in length according to NE132 | **S31** |
| **Country-specific delivery** | |
| Delivery to China including China RoHS mark | **W21** |
| Delivery to Korea including KC mark | **W22** |
| **Fraction setup**<br>PIA: Please select four options | |
| Sugar / Water 0 ... 85 °Bx, 0 ... 80 °C (32 ... 176 °F) | **G01** |
| NaOH / Water 2 ... 50 WT%, 0 ... 100 °C (32 ... 212 °F) | **G02** |
| KOH / Water 0 ... 60 WT%, 54 ... 100 °C (129 ... 212 °F) | **G03** |
| $NH_4NO_3$ / Water 1 ... 50 WT%, 0 ... 80 °C (32 ... 176 °F) | **G04** |
| $NH_4NO_3$ / Water 20 ... 70 WT%, 20 ... 100 °C (68 ... 212 °F) | **G05** |
| HCl / Water 22 ... 34 WT%, 20 ... 40 °C (68 ... 104 °F) | **G06** |
| $HNO_3$ / Water 50 ... 67 WT%, 10 ... 60 °C (50 ... 140 °F) | **G07** |
| $H_2O_2$ / Water 30 ... 75 WT%, 4 ... 44 °C (39 ... 111 °F) | **G09** |
| Ethylene Glycol / Water 10 ... 50 WT%, -20 ... 40 °C (-4 ... 104 °F) | **G10** |
| Amylum = Starch / Water 33 ... 43 WT%, 35 ... 45 °C (95 ... 113 °F) | **G11** |
| Methanol / Water 35 ... 60 WT%, 0 ... 40 °C (32 ... 104 °F) | **G12** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| Alcohol / Water 55 ... 100 VOL%, 10 ... 40 °C (50 ... 104 °F) | **G20** |
| Sugar / Water 40 ... 80 °Bx, 75 ... 100 °C (167 ... 212 °F) | **G21** |
| Alcohol / Water 66 ... 100 WT%, 15 ... 40 °C (59 ... 104 °F) | **G30** |
| Alcohol / Water 66 ... 100 WT%, 10 ... 40 °C (50 ... 104 °F) | **G37** |

| | Order code |
|---|---|
| **Tag name** | |
| Tag name plate, SS (max. 16 characters) | **Y11** |
| HART Tag No. (max. 8 characters) | **Y25** |
| HART Tag No. (max. 32 characters) | **Y26** |
| PROFIBUS PA NODE ADDRESS (4 characters HEX) | **Y28** |
| PROFIBUS PA SOFTWARE TAG (max. 32 characters) | **Y29** |
| **Customer installation length** | |
| Customer installation length (mm) | **Y30** |
| **Special versions** | |
| ID-Number of special design | **Y99** |

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## Technical specifications

### *Mass flow rate of liquids*

The mass flow rate characteristics of SITRANS FC meters are defined by the values of zero stability, $Q_{flat}$, $Q_{nom}$ and $Q_{max}$.

Zero stability is the maximum allowable flow rate value that can be displayed at zero flow under reference conditions. It is a good indicator of the meter performance as flow rates reduce, and approach zero.

- $Q_{flat}$ is the mass flow rate above which the base accuracy is maintained (0.1% when using FCT040 transmitters).
- $Q_{nom}$ is the nominal mass flow rate of water at reference conditions that would result in a pressure drop of 1 bar (15 psi).
- $Q_{max}$ is the recommended maximum mass flow rate for each sensor size.

For questions regarding expected performance in specific applications, please contact your regional Siemens Measurement Intelligence team.

### *Flow rate summary by FCS500 sensor size*

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| **DN 10** | 0.032 | 0.070 | 80.0 | 2.94 | 1 600 | 58.7 | 2 300 | 84.4 |
| **DN 15** | 0.090 | 0.198 | 235 | 8.62 | 4 700 | 172 | 7 000 | 257 |
| **DN 25** | 0.400 | 0.880 | 1 000 | 36.7 | 20 000 | 734 | 29 000 | 1 064 |
| **DN 50** | 2.55 | 5.61 | 2 550 | 93.6 | 51 000 | 1 872 | 76 000 | 2 789 |
| **DN 80** | 8.50 | 18.7 | 8 500 | 312 | 170 000 | 6 239 | 255 000 | 9 359 |

### *Performance summary by FCS500 sensor size and transmitter type*

| Sensor size | | | DN 10 | DN 15 | DN 25 | DN 50 | DN 80 |
|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 |
| | % (of rate) | FCT040 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 |
| Zero stability | kg/h (lb/h) | | ± 0.032 (0.07) | ± 0.09 (0.198) | ± 0.4 (0.88) | ± 2.55 (5.61) | ± 8.5 (18.7) |
| **Density (liquids)** | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) |
| | kg/m3 (lb/ft³) | FCT040 | ± 0.5 (0.03) | ± 0.5 (0.03) | ± 0.5 (0.03) | ± 0.5 (0.03) | ± 1 (0.06) |
| **Mass flow (gases)** | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 |
| | % (of rate) | FCT040 | ± 0.35 | ± 0.35 | ± 0.35 | ± 0.35 | ± 0.35 |
| **Temperature** | | | | | | | |
| Accuracy | °C (°F) | | ± 1 (1.8) | ± 1 (1.8) | ± 1 (1.8) | ± 1 (1.8) | ± 1 (1.8) |

Note:

The accuracy values in the table above are based on reference conditions at the time of calibration and represent the combined measurement uncertainties including sensor, electronic and pulse output interface.

Liquid density calibration is performed when density accuracy of 0.5 kg/m³ (0.03 lb/ft³) is selected in the model code.

### *Mass flow calibration and density adjustment for liquids*

Siemens SITRANS FC Coriolis meters are calibrated in rigs accredited according to the international standard DIN EN ISO/IEC 17025:2018. Each flowmeter comes with a standard calibration certificate.

Mass flow calibration takes place at reference conditions. Specific values are listed in the standard calibration certificate.

### *Mass flow calibration reference conditions*

| Fluid | Water |
|---|---|
| **Density** | 900 ... 1 100 kg/m³ (56 ... 69 lb/ft³) |
| **Fluid temperature** | 10 ... 35 °C (50 ... 95 °F), average temperature: 22.5 °C (72.5 °F) |
| **Ambient temperature** | 10 ... 35 °C (50 ... 95 °F) |
| **Process pressure** | 1 ... 5 bar (15 ... 73 psi) |

### *Density calibration reference conditions*

| Flow condition | Fully developed flow profile |
|---|---|
| **Fluid densities used to obtain density calibration constants** | 700 kg/m³ (44 lb/ft³)<br>1 000 kg/m³ (62 lb/ft³)<br>1 650 kg/m³ (103 lb/ft³) |
| **Fluid temperature** | 20 °C (68 °F) |
| **Determination of temperature compensation coefficients** | 20 ... 80 °C (68 ... 176 °F) |

### *Analog output performance specification*

Typical additional uncertainty when using the analog current output:

± 0.04% at a nominal mid-range current output of 12 mA, which includes the effects of: Output adjustment, linearity, power supply variation, load resistance variation, short-term and long-term drift for one year, and ambient temperature effect on the transmitter in the range 20 °C ± 30 °C (14 ... 122 °F).

### *Process pressure effect on flow measurement performance*

Changes in operating pressure have a small effect on the mass flow measurement performance. When the pressure changes are very large this effect can be corrected by a dynamic pressure input or a fixed process pressure.

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## Technical specifications (continued)

| Sensor size | Additional flow measurement errors due to change in operating pressure from reference pressure | |
|---|---|---|
| | in % of rate per 1 bar variation | in % of rate per 1 psi variation |
| DN 10 | -0.0020 | -0.00014 |
| DN 15 | -0.0084 | -0.00058 |
| DN 25 | -0.0109 | -0.00075 |
| DN 50 | -0.0130 | -0.0009 |
| DN 80 | -0.0233 | -0.0016 |

***Process temperature effect***

For mass flow measurement, process fluid temperature effect is defined as the change in sensor flow accuracy due to process fluid temperature change, away from the 20 °C (68 °F) reference condition. Variation in process temperature influences the measuring tube characteristics and this is compensated for using the built-in PT 1000 temperature sensor.

A small flow uncertainty remains in the compensation circuit, defined below.

Uncertainty due to process temperature change: ± 0.0009% of mass flow rate per °C (± 0.0005% of mass flow rate per °F)

***Temperature effect on zero***

Temperature effect on the mass flow zero-point quality can be corrected by zeroing at the process fluid temperature.

***Process conditions***

***Process fluid temperature range***

| Design version | Transmitter | Process fluid temperature range |
|---|---|---|
| Non-hygienic, flange or thread, standard neck | Compact | Standard [-50 ... +150 °C (-58 ... +302 °F)] |
| | Remote | Standard [-70 ... +200 °C (-94 ... +392 °F)] |
| Hygienic, thread, polished wetted parts, standard neck | Compact | Standard [-40 ... +140 °C (-58 ... +284 °F)] |
| | Remote | Standard [-70 ... +140 °C (-94 ... +284 °F)] |
| Hygienic, clamp, polished wetted parts, standard neck | Compact | Standard [-10 ... +140 °C (14 ... 284 °F)] |
| | Remote | Standard [-10 ... +140 °C (14 ... 284 °F)] |

***Operating pressure***

The maximum allowed process pressure depends on the selected process connection and process temperature.

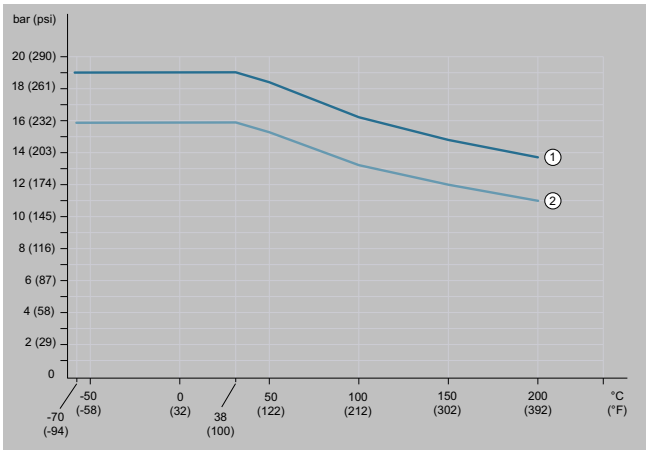
The given process temperature and process pressure ranges are calculated and approved without corrosion or erosion effects.

Pressure versus temperature relationship depending on selected process connection

The following diagrams show the process pressure as a function of process temperature as well as the process connection used (type and size of process connection).

Calculations for ASME flanges are based on ASME B16.5 Material group 2.2 (316/316L dual certified).

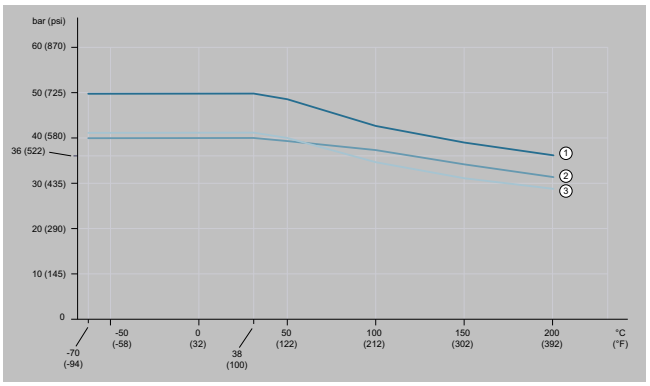
ASME class 150




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 150 |
| 2 | Not used for this product |

ASME class 300, EN PN 40




Allowed process pressure as a function of process fluid temperature

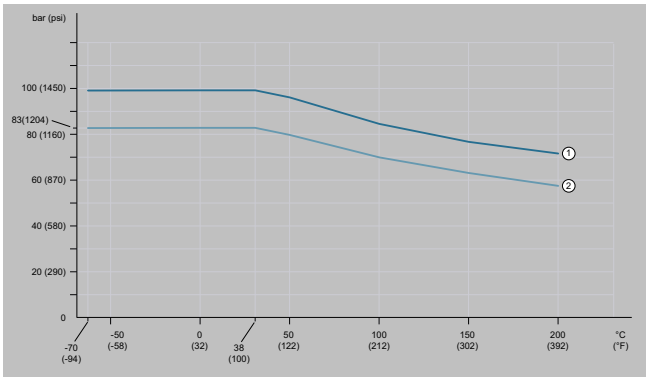
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 300 |
| 2 | Process and heat tracing connection compatible to EN 1092-1 PN 40 |
| 3 | Not used for this product |

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## Technical specifications (continued)

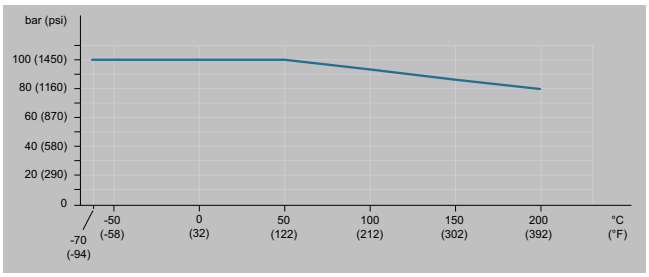
ASME class 600




Allowed process pressure as a function of process fluid temperature

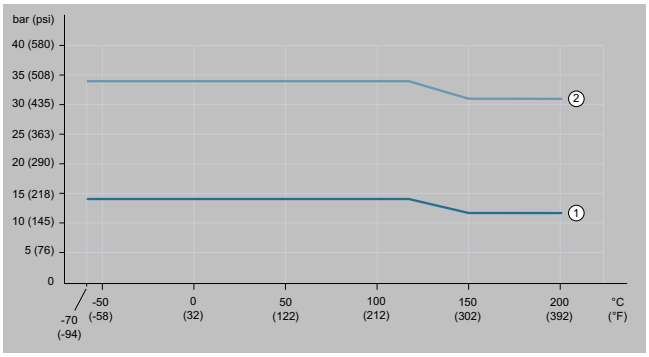
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 600 |
| 2 | Not used for this product |

EN PN100




Allowed process pressure as a function of process fluid temperature, compatible to EN 1092-1 PN 100

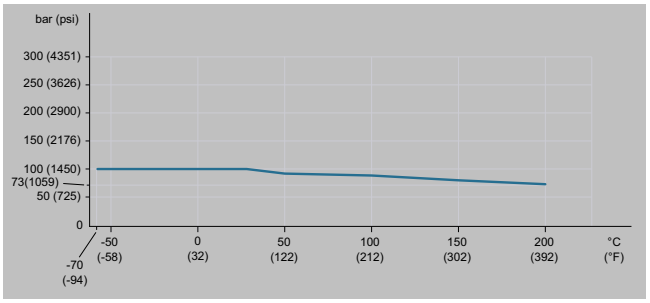
JIS 10K, JIS 20K




Allowed process pressure as a function of process connection temperature

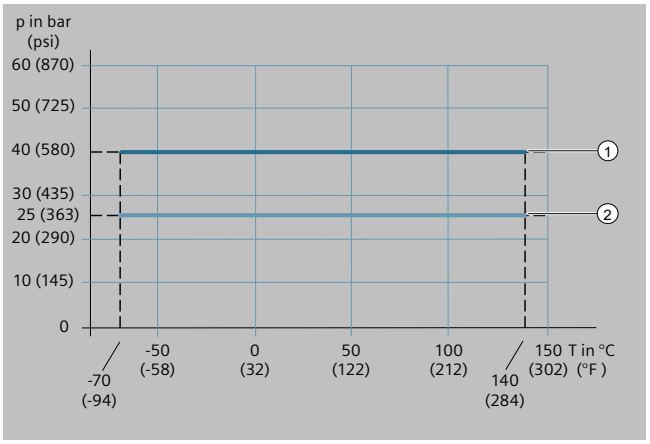
| | |
|---|---|
| 1 | Process connection compatible to JIS B 2220 10K |
| 2 | Process connection compatible to JIS B 2220 20K |

Process connection with internal thread G and NPT




Allowed process pressure as a function of process fluid temperature

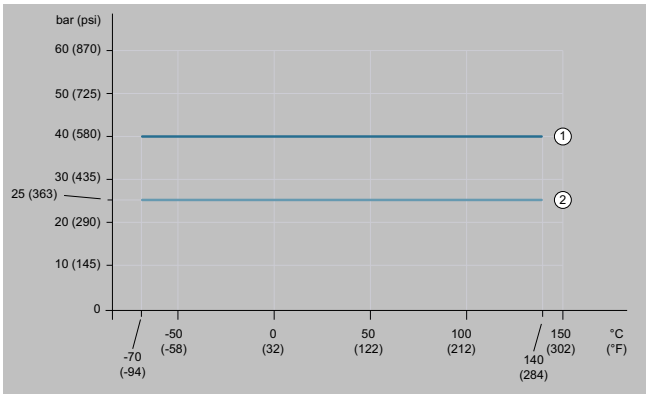
Threaded connection according to DIN 11851




Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Threaded connection compatible to DIN 11851 up to DN 40 |
| 2 | Threaded connection compatible to DIN 11851 from DN 50 to DN 100 |

Threaded connection according to SMS 1145




Allowed process pressure as a function of process connection temperature

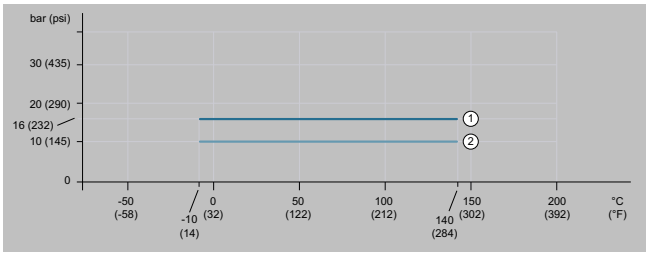
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## Technical specifications (continued)

| | |
|---|---|
| 1 | Threaded sanitary connection for SMS 1145 up to DN 40 |
| 2 | Threaded sanitary connection for SMS 1145 from DN 50 up to DN 80 |

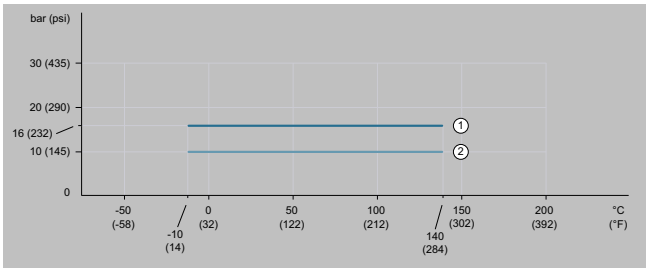
Clamp process connection according to DIN 32676 series A




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series A up to DN 50 |
| 2 | Clamp connection compatible to DIN 32676 series A above DN 50 |

Clamp process connection according to DIN 32676 series C (Tri-Clamp)




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series C up to 2" |
| 2 | Clamp connection compatible to DIN 32676 series C above 2" |

***Ambient conditions***

Allowed ambient and storage temperature of SITRANS FC500 series is influenced by the temperature specification of FCS500 sensor, FCT0X0 transmitter and the interconnecting cable.

***Ambient temperature***

Device surrounding air temperature is considered as ambient temperature. If the device is operating outdoors make sure that the solar irradiation does not increase the surface temperature of the device higher than the allowed maximum ambient temperature. Transmitter display has limited legibility below -20 °C (-4 °F).

The sensor ambient temperature limits may also be influenced by the process fluid temperature, details shown in the chapter “Sensors” (Technical specifications).

Maximum ambient temperature ranges for FC500 series

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| **None** | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Standard cable** | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Fire retardant cable** | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

Ambient temperature range for NTEP custody transfer approval

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| **None** | Compact | Sensor and transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| **Standard cable** | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| **Fire retardant cable** | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +50 °C (-31 ... +122 °F) |

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## Technical specifications (continued)

Maximum storage temperature ranges for FC500 series

| Cable type | Transmitter style | Device | Storage temperature range |
|---|---|---|---|
| **None** | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Standard cable** | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| **Fire retardant cable** | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

***Temperature specification of FC500 series Ex versions located in hazardous areas***

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

The maximum ambient and process fluid temperatures depending on explosion groups and temperature classes can be determined via the SITRANS FC order code together with the Ex code (see the corresponding explosion proof type manual).

Note:

The maximum process fluid temperature could be further restricted due to process connection type. Refer to curves above under the heading, “Allowed ambient temperature for FCS500 sensors”.

***FCS500 nominal sizes DN 10 and DN 15, compact transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, FM, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 47 °C (116 °F) | 43 °C (109 °F) |
| T5 | 62 °C (143 °F) | 58 °C (136 °F) |
| T4 | 99 °C (210 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS500 nominal size DN 25, compact transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, FM, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 54 °C (129 °F) | 54 °C (129 °F) |
| T5 | 68 °C (154 °F) | 60 °C (140 °F) |
| T4 | 107 °C (224 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS500 nominal size DN 50, compact transmitter***

Ex approvals:

- Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups A, B, C, D, E, F & G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 64 °C (147 °F) | 40 °C (104 °F) |
| T5 | 80 °C (176 °F) | 55 °C (131 °F) |
| T4 | 117 °C (224 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

Ex approvals:

- Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups C, D, E, F & G: FM

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## Technical specifications (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 64 °C (147 °F) | 44 °C (111 °F) |
| T5 | 80 °C (176 °F) | 59 °C (138 °F) |
| T4 | 117 °C (242 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS500 nominal size DN 80, compact transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, FM, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 68 °C (154 °F) | 39 °C (102 °F) |
| T5 | 83 °C (181 °F) | 54 °C (129 °F) |
| T4 | 119 °C (246 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS500 nominal sizes DN 10 and DN 15, remote transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 47 °C (116 °F) | 46 °C (114 °F) | 46 °C (114 °F) |
| T5 | 62 °C (143 °F) | 61 °C (141 °F) | 61 °C (141 °F) |
| T4 | 99 °C (210 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 162 °C (323 °F) | 74 °C (165 °F) | 56 °C (132 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

Ex approvals:

All gas groups: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 47 °C (116 °F) | 46 °C (114 °F) | 46 °C (114 °F) |
| T5 | 62 °C (143 °F) | 61 °C (141 °F) | 61 °C (141 °F) |
| T4 | 99 °C (210 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 162 °C (323 °F) | 74 °C (165 °F) | 56 °C (132 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

***FCS500 nominal size DN 25, remote transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, FM, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 54 °C (129 °F) | 54 °C (129 °F) | 54 °C (129 °F) |
| T5 | 68 °C (154 °F) | 68 °C (154 °F) | 68 °C (154 °F) |
| T4 | 107 °C (224 °F) | 80 °C (176 °F) | 66 °C (150 °F) |
| T3 | 176 °C (348 °F) | 68 °C (154 °F) | 51 °C (123 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

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## Technical specifications (continued)

***FCS500 nominal size DN 50, remote transmitter***

Ex approvals:

- Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups A, B, C, D, E, F & G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 64 °C (147 °F) | 42 °C (107 °F) | 42 °C (107 °F) |
| T5 | 80 °C (176 °F) | 57 °C (134 °F) | 57 °C (134 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 66 °C (150 °F) |
| T3 | 185 °C (365 °F) | 68 °C (154 °F) | 50 °C (122 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

Ex approvals:

- Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups C, D, E, F & G: F

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 64 °C (147 °F) | 46 °C (114 °F) | 46 °C (114 °F) |
| T5 | 80 °C (176 °F) | 61 °C (141 °F) | 61 °C (141 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 66 °C (150 °F) |
| T3 | 185 °C (365 °F) | 66 °C (150 °F) | 50 °C (122 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

***FCS500 nominal size DN 80, remote transmitter***

Ex approvals:

- All gas groups: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 68 °C (154 °F) | 40 °C (104 °F) | 40 °C (104 °F) |
| T5 | 83 °C (181 °F) | 55 °C (131 °F) | 55 °C (131 °F) |
| T4 | 119 °C (246 °F) | 80 °C (176 °F) | 66 °C (150 °F) |
| T3 | 185 °C (365 °F) | 66 °C (150 °F) | 50 °C (122 °F) |
| T2 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |
| T1 | 200 °C (392 °F) | 60 °C (140 °F) | 46 °C (114 °F) |

***Additional ambient and environmental specifications***

| Specification | Rating/level of compliance |
|---|---|
| **Relative humidity** | 0 ... 95% |
| **Ingress protection** | IP66 or IP67 with suitable cable glands |
| **Environmental pollution** | Pollution degree 4 in accordance with EN 61010-1 whilst in operation |
| **Maximum altitude** | 2 000 m (6 600 ft) above mean sea level (MSL) |
| **Mechanical load** | • Transmitter: 10 ... 500 Hz, 1g<br>• Sensor: 10 ... 500 Hz, 1g<br>according to IEC 60068-2-6 |
| **Electromagnetic (EMC) Immunity** | • EN IEC 61326-1, Table 2<br>• EN IEC61326-2-3<br>• EN IEC 61326-2-5<br>• NAMUR NE 21 recommendation<br>• DNV-CG-0339 section 3, chapter 14 |

| Specification | Rating/level of compliance |
|---|---|
| **Surge Immunity Emission** | • EN 61000-4-5 for lightning protection<br>• EN IEC 61000-3-2, Class A (harmonic current emissions)<br>• EN IEC 61000-3-3, Class A (voltage fluctuations)<br>• Immunity assessment criterion: output signal fluctuation is within ± 1% of the output span |
| **Overvoltage** | Category II according to EN IEC 61010-1 |

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## Technical specifications (continued)

### *Approvals and certificates – summary*

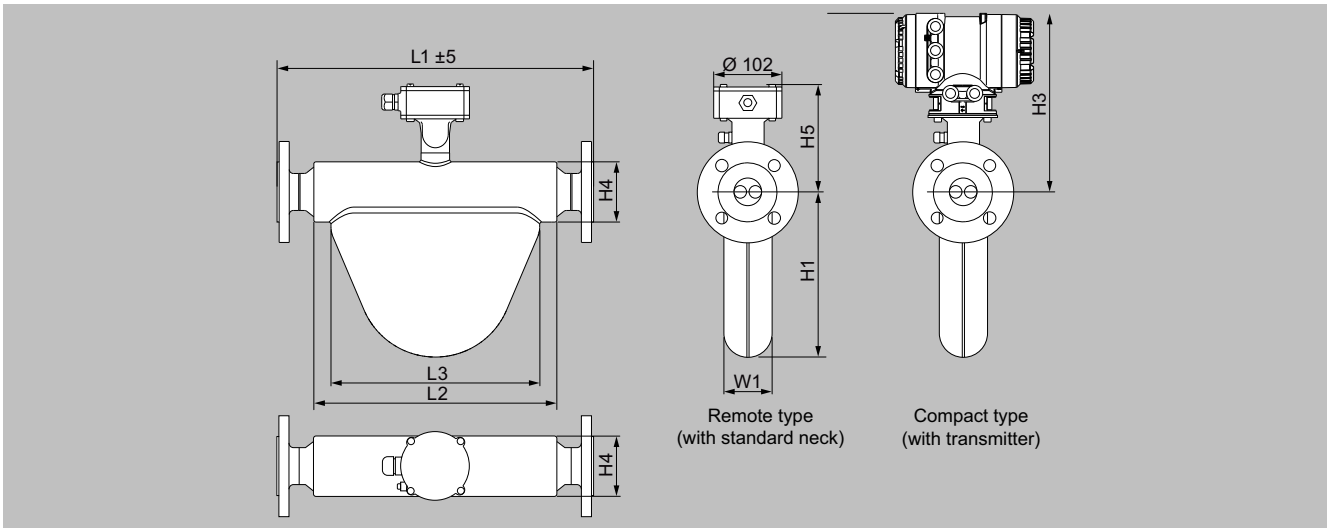
| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | B | ATEX, explosion group IIC and IIIC |
| 15, Ex approval | C | ATEX, explosion group IIB and IIIC |
| 15, Ex approval | D | IECEx, explosion group IIC and IIIC |
| 15, Ex approval | E | IECEx, explosion group IIB and IIIC |
| 15, Ex approval | H | FM, groups A, B, C, D, E, F, G |
| 15, Ex approval | J | FM, groups C, D, E, F, G |
| 15, Ex approval | M | NEPSI, explosion group IIC and dust proof |
| 15, Ex approval | N | NEPSI, explosion group IIB and dust proof |
| 15, Ex approval | F | EAC Ex, explosion group IIC and IIIC |
| 15, Ex approval | G | EAC Ex, explosion group IIB and IIIC |
| 15, Ex approval | P | Korea Ex, explosion group IIC and IIIC |
| 15, Ex approval | Q | Korea Ex, explosion group IIB and IIIC |
| 15, Ex approval | U | UKEx, explosion group IIC and IIIC |
| 15, Ex approval | V | UKEx, explosion group IIB and IIIC |
| ZS2, Marine approval | S22 | Marine approval according DNV, ABS and KR piping class 2 |
| ZS2, Marine approval | S23 | Marine approval according DNV, ABS and KR piping class 3 |
| ZS2, Marine approval | S24 | Marine approval according LR MR TAC piping class 2 |
| ZS2, Marine approval | S25 | Marine approval according LR MR TAC piping class 3 |
| ZS2, Marine approval | S26 | Marine approved BV piping class 2 |
| ZS2, Marine approval | S27 | Marine approved BV piping class 3 |
| ZC1, Certificate | C16 | NTEP approval, accuracy class 0.3 acc. NIST Handbook 44 |
| ZC1, Certificate | C11 | Compliance with the order 2.1 EN 10204 |
| ZC1, Certificate | C40 | Quality Inspection Certificate 3.1 EN 10204 |
| ZC1, Certificate | C13 | 3.1 EN 10204 + IGC + NACE MR0175, MR0103 |
| ZC1, Certificate | C18 | Pressure Test Certificate 3.1 EN 10204 |
| ZC1, Certificate | C54 | Degreasing ASTM G93-03, including report |
| ZC1, Certificate | C36 | WPS; WPQR; WQC |
| ZC1, Certificate | C37 | Welding procedures and Certificate ASME IX |
| ZC1, Certificate | C33 | X-ray DIN EN ISO 17636-1/B |
| ZC1, Certificate | C34 | X-ray test according to ASME V |
| ZC1, Certificate | C38 | Dye penetration DIN EN ISO 3452-1 |
| ZC1, Certificate | C39 | Dye penetration ASME V |
| ZC1, Certificate | C20 | Functional Safety (IEC 61508) - SIL2/3 |
| ZC1, Certificate | C61 | Surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C62 | 3A approval, surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C63 | EHEDG approval, surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C15 | PMI 3.1 according to EN 10204 |

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## Dimensional drawings

***Drawings, dimensions and weight for FCS500 sensors (non-hygienic versions)***




FCS500 sensor non hygienic, dimensions in mm

***FCS500 sensor dimensions (non-hygienic versions)***

| Nominal size | L2 | L3 | H1 | H3 | H4 | H5 | W1 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 10 | 190 (7.5) | 165 (6.5) | 117 (4.6) | 268 (10.6) | 56 (2.2) | 138 (5.4) | 42 (1.7) |
| DN 15 | 227 (8.9) | 195 (7.7) | 145 (5.7) | 277 (10.9) | 71 (2.8) | 148 (5.8) | 50 (2) |
| DN 25 | 361 (14.2) | 310 (12.2) | 245 (9.6) | 289 (11.4) | 90 (3.5) | 159 (6.3) | 72 (2.8) |
| DN 50 | 455 (17.9) | 400 (15.7) | 333 (13.1) | 296 (11.7) | 102 (4) | 167 (6.6) | 96 (3.8) |
| DN 80 | 682 (26.9) | 620 (24.4) | 482 (19) | 330 (13) | 168 (6.6) | 201 (7.9) | 150 (5.9) |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb)

***L1 dimension and weight with process connections according to ASME B16.5 (AISI 316/AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 280 (11) | 6 (13) | 320 (12.6) | 8 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 300, raised face (RF) | 280 (11) | 6.4 (14) | 320 (12.6) | 8.4 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, raised face (RF) | 290 (11.4) | 6.7 (15) | 330 (13) | 8.7 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, ring joint (RJ) | 290 (11.4) | 6.6 (15) | 330 (13) | 8.6 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME 1" class 150, raised face (RF) | 280 (11) | 6.9 (15) | 320 (12.6) | 8.9 (20) | 490 (19.3) | 15.7 (35) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 280 (11) | 7.9 (17) | 320 (12.6) | 9.9 (22) | 490 (19.3) | 16.7 (37) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 300 (11.8) | 8.3 (18) | 340 (13.4) | 10.3 (23) | 500 (19.7) | 17 (38) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, ring joint (RJ) | 300 (11.8) | 8.4 (19) | 340 (13.4) | 10.4 (23) | 500 (19.7) | 17.2 (38) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 290 (11.4) | 7.8 (17) | 330 (13) | 9.8 (22) | 470 (18.5) | 16.5 (36) | 620 (24.4) | 25.7 (57) | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 1½" class 300, raised face (RF) | 290 (11.4) | 10.1 (22) | 330 (13) | 12.1 (27) | 480 (18.9) | 19 (42) | 620 (24.4) | 28.1 (62) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 310 (12.2) | 11.5 (25) | 350 (13.8) | 13.5 (30) | 500 (19.7) | 20 (44) | 630 (24.8) | 28.9 (64) | n/a | n/a |
| ASME 1½" class 600, ring joint (RJ) | 310 (12.2) | 11.4 (25) | 350 (13.8) | 13.4 (30) | 500 (19.7) | 20 (44) | 630 (24.8) | 29.1 (64) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 480 (18,9) | 18.1 (40) | 580 (22.8) | 26.8 (59) | n/a | n/a |
| ASME 2" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 480 (18,9) | 19.7 (43) | 580 (22.8) | 28.3 (62) | n/a | n/a |
| ASME 2" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 510 (20.1) | 21.3 (47) | 610 (24) | 30.5 (67) | n/a | n/a |
| ASME 2" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 510 (20.1) | 21.8 (48) | 610 (24) | 30.3 (67) | n/a | n/a |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 29.8 (66) | n/a | n/a |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 31.3 (69) | n/a | n/a |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 33.4 (74) | n/a | n/a |
| ASME 2½" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 33.8 (74) | n/a | n/a |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 580 (23.3) | 30.9 (68) | 870 (34.3) | 71.2 (157) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 590 (22.8) | 34.5 (76) | 880 (34.6) | 75 (165) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 630 (24.8) | 37.8 (83) | 900 (35.4) | 77.7 (171) |
| ASME 3" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 610 (24) | 38.4 (85) | 900 (35.4) | 78.3 (173) |
| ASME 4" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 74.4 (164) |
| ASME 4" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 81.8 (180) |
| ASME 4" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 94 (207) |
| ASME 4" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 94.6 (209) |
| ASME 5" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 77 (170) |
| ASME 5" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 890 (35) | 89.4 (197) |
| ASME 5" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 114.2 (252) |
| ASME 5" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 920 (36.2) | 114.9 (253) |

***L1 dimension and weight with process connections according to EN 1092-1 (AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 40 type B1, raised face (RF) | 280 (11) | 6.6 (14) | 320 (12.6) | 8.6 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type D, with groove | 280 (11) | 6.4 (14) | 320 (12.6) | 8.4 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type E, with spigot | 280 (11) | 6.3 (14) | 320 (12.6) | 8.3 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type F, with recess | 280 (11) | 6.5 (14) | 320 (12.6) | 8.5 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type B1, raised face (RF) | 290 (11.4) | 7.4 (16) | 330 (13) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN15 PN100 type D, with groove | 290 (11.4) | 7.4 (16) | 330 (13) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 15 PN 100 type E, with spigot | 290 (11.4) | 7.1 (16) | 330 (13) | 9.1 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type F, with recess | 290 (11.4) | 7.3 (16) | 330 (13) | 9.3 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type B1, raised face (RF) | 280 (11) | 7.5 (17) | 320 (12.6) | 9.5 (21) | 490 (19.3) | 16.4 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type D, with groove | 280 (11) | 7.5 (17) | 320 (12.6) | 9.5 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type E, with spigot | 280 (11) | 7.2 (16) | 320 (12.6) | 9.2 (20) | 490 (19.3) | 16.1 (35) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type F, with recess | 280 (11) | 7.4 (67) | 320 (12.6) | 9.4 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type B1, raised face (RF) | 300 (10.1) | 10.1 (22) | 340 (13.4) | 12.1 (27) | 490 (19.3) | 18.8 (41) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type D, with groove | 300 (10.1) | 10 (22) | 340 (13.4) | 12 (26) | 490 (19.3) | 18.7 (41) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type E, with spigot | 300 (10.1) | 9.5 (21) | 340 (13.4) | 11.5 (25) | 490 (19.3) | 18.3 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN100 type F, with recess | 300 (10.1) | 9.9 (22) | 340 (13.4) | 11.9 (26) | 490 (19.3) | 18.7 (41) | n/a | n/a | n/a | n/a |
| EN DN 40 PN40 type B1, raised face (RF) | 280 (11) | 9.1 (20) | 320 (12.6) | 11.1 (24) | 470 (18.5) | 17.7 (39) | 610 (24) | 26.9 (59) | n/a | n/a |
| EN DN 40 PN 40 type D, with groove | 280 (11) | 8.9 (20) | 320 (12.6) | 10.9 (24) | 470 (18.5) | 17.6 (39) | 610 (24) | 26.8 (59) | n/a | n/a |
| EN DN 40 PN 40 type E, with spigot | 280 (11) | 8.6 (19) | 320 (12.6) | 10.6 (23) | 470 (18.5) | 17.4 (38) | 610 (24) | 26.5 (58) | n/a | n/a |
| EN DN 40 PN 40 type F, with recess | 280 (11) | 8.8 (19) | 320 (12.6) | 10.8 (24) | 470 (18.5) | 17.5 (39) | 610 (24) | 26.7 (59) | n/a | n/a |
| EN DN 40 PN 100 type B1, raised face (RF) | 360 (14.2) | 13.5 (30) | 400 (15.7) | 15.5 (34) | 500 (19.7) | 21.5 (47) | 610 (24) | 30.5 (67) | n/a | n/a |
| EN DN 40 PN 100 type D, with groove | 360 (14.2) | 13.4 (30) | 400 (15.7) | 15.4 (34) | 500 (19.7) | 21.4 (47) | 610 (24) | 30.4 (67) | n/a | n/a |
| EN DN 40 PN 100 type E, with spigot | 360 (14.2) | 13 (29) | 400 (15.7) | 15 (33) | 500 (19.7) | 21.1 (46) | 610 (24) | 30 (66) | n/a | n/a |
| EN DN 40 PN 100 type F, with recess | 360 (14.2) | 13.3 (29) | 400 (15.7) | 15.3 (34) | 500 (19.7) | 21.3 (47) | 610 (24) | 30.3 (67) | n/a | n/a |
| EN DN 50 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 470 (18.5) | 19.1 (42) | 580 (22.8) | 27.8 (61) | n/a | n/a |
| EN DN 50 PN 40 type D, with groove | n/a | n/a | n/a | n/a | 470 (18.5) | 18.9 (42) | 580 (22.8) | 27.7 (61) | n/a | n/a |
| EN DN 50 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | 470 (18.5) | 18.6 (41) | 580 (22.8) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN 40 type F, with recess | n/a | n/a | n/a | n/a | 470 (18.5) | 18.8 (41) | 580 (22.8) | 27.6 (61) | n/a | n/a |
| EN DN 50 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 540 (21.3) | 25.4 (56) | 610 (24) | 33.5 (74) | n/a | n/a |
| EN DN 50 PN 100 type D, with groove | n/a | n/a | n/a | n/a | 540 (21.3) | 25.3 (56) | 610 (24) | 33.4 (74) | n/a | n/a |
| EN DN 50 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | 540 (21.3) | 24.8 (55) | 610 (24) | 32.9 (72) | n/a | n/a |
| EN DN 50 PN 100 type F, with recess | n/a | n/a | n/a | n/a | 540 (21.3) | 25.2 (56) | 610 (24) | 33.2 (73) | n/a | n/a |
| EN DN 80 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.5 (69) | 870 (34.2) | 71.6 (158) |
| EN DN 80 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.3 (69) | 870 (34.2) | 71.1 (157) |
| EN DN 80 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 30.9 (68) | 870 (34.2) | 70.7 (156) |
| EN DN 80 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 31.1 (69) | 870 (34.2) | 70.9 (156) |
| EN DN 80 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 40 (88) | 890 (35) | 79.1 (174) |
| EN DN 80 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.8 (88) | 890 (35) | 78.9 (174) |
| EN DN 80 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.2 (86) | 890 (35) | 78.3 (173) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 80 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 650 (25.6) | 39.6 (87) | 890 (35) | 78.7 (173) |
| EN DN 100 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.8 (163) |
| EN DN 100 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.6 (162) |
| EN DN 100 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73 (161) |
| EN DN 100 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.3 (162) |
| EN DN 100 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 85.2 (188) |
| EN DN 100 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84.8 (187) |
| EN DN 100 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84 (185) |
| EN DN 100 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 870 (34.3) | 84.5 (186) |
| EN DN125 PN40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 78.5 (173) |
| EN DN 135 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 78.1 (172) |
| EN DN 125 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 77.4 (171) |
| EN DN 125 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 860 (33.9) | 77.7 (171) |
| EN DN 125 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 98 (216) |
| EN DN 125 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 97.6 (215) |
| EN DN 125 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 96.3 (212) |
| EN DN 125 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 880 (34.6) | 97.1 (214) |

***L1 dimension and weight with process connections according to JIS B 2220 (AISI 316/AISI 316L)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10 K | 280 (11) | 6.3 (14) | 320 (12.6) | 8.3 (18) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 15 20 K | 280 (11) | 6.5 (14) | 320 (12.6) | 8.5 (19) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 25 10 K | 280 (11) | 7.4 (16) | 320 (12.6) | 9.4 (21) | 490 (19.3) | 16.3 (36) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 280 (11) | 7.8 (17) | 320 (12.6) | 9.8 (22) | 490 (19.3) | 16.6 (37) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 280 (11) | 8.2 (18) | 320 (12.6) | 10.2 (23) | 470 (18.5) | 16.9 (37) | 620 (24.4) | 26.1 (58) | n/a | n/a |
| JIS DN 40 20 K | 280 (11) | 8.6 (19) | 320 (12.6) | 10.6 (23) | 470 (18.5) | 17.3 (38) | 620 (24.4) | 26.5 (58) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | n/a | n/a | 470 (18.5) | 17.5 (39) | 600 (23.6) | 26.6 (59) | n/a | n/a |
| JIS DN 50 20 K | n/a | n/a | n/a | n/a | 470 (18.5) | 17.7 (39) | 600 (23.6) | 26.7 (59) | n/a | n/a |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 570 (22.4) | 27.9 (62) | 880 (34.6) | 68.7 (151) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 30.4 (67) | 880 (34.6) | 71 (156) |
| JIS DN 100 10 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 69.8 (154) |
| JIS DN 100 20 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.4 (162) |
| JIS DN 125 10 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 73.5 (162) |
| JIS DN 125 20 K | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | 850 (33.5) | 79.7 (176) |

***L1 dimension and weight with process connections according to NPT internal thread***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ⅜" NPT | 300 (11.8) | 5.4 (12) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| ½" NPT | 300 (11.8) | 5.4 (12) | 340 (13.4) | 7.4 (16) | n/a | n/a | n/a | n/a | n/a | n/a |
| ¾" NPT | 300 (11.8) | 5.3 (12) | 340 (13.4) | 7.3 (16) | n/a | n/a | n/a | n/a | n/a | n/a |

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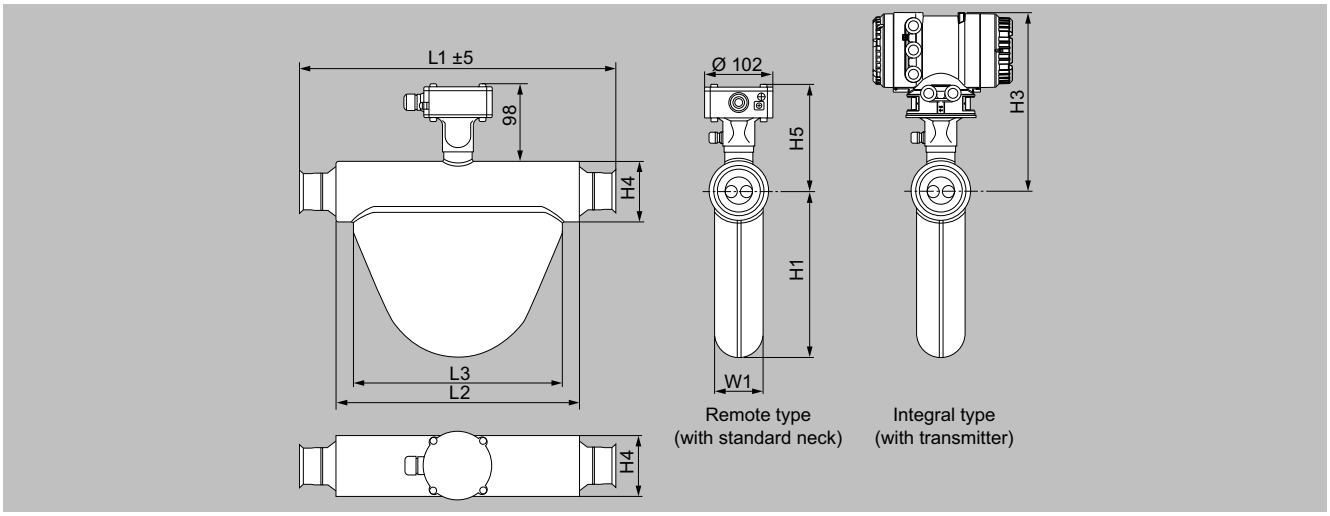


## Dimensional drawings (continued)

### *L1 dimension and weight with process connections according to G internal thread*

| Process connection size and type | FCS500 sensor nominal size | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | | DN 80 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ⅜" | 300 (11.8) | 5.4 (12) | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a |
| G ½" | 300 (11.8) | 5.4 (12) | 340 (13.4) | 7.4 (16) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ¾" | 300 (11.8) | 5.3 (12) | 340 (13.4) | 7.3 (16) | n/a | n/a | n/a | n/a | n/a | n/a |

### *Drawings, dimensions and weight for FCS500 sensors (hygienic versions)*




Dimensions in mm

### *FCS500 sensor dimensions (hygienic versions)*

| Nominal size | L2 | L3 | H1 | H3 | H4 | H5 | W1 |
|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | |
| DN 10 | 190 (7.5) | 165 (6.5) | 117 (4.6) | 268 (10.6) | 56 (2.2) | 138 (5.4) | 42 (1.7) |
| DN 15 | 227 (8.9) | 195 (7.7) | 145 (5.7) | 277 (10.9) | 71 (2.8) | 148 (5.8) | 50 (2) |
| DN 25 | 361 (14.2) | 310 (12.2) | 245 (9.6) | 289 (11.4) | 90 (3.5) | 159 (6.3) | 72 (2.8) |
| DN 50 | 455 (17.9) | 400 (15.7) | 333 (13.1) | 296 (11.7) | 102 (4) | 167 (6.6) | 96 (3.8) |

### *Overall length L1 and weight*

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb)

### *L1 dimension and weight with threaded hygienic process connections according to DIN 11851*

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 11851, DN 25 | 280 (11) | 5.4 (12) | 320 (12.6) | 7.4 (16) | n/a | n/a | n/a | n/a |
| DIN 11851, DN 40 | 290 (11.4) | 5.5 (12) | 330 (13) | 7.5 (17) | 490 (19.3) | 14.3 (32) | n/a | n/a |
| DIN 11851, DN 50 | n/a | n/a | n/a | n/a | 480 (18.9) | 14.4 (32) | 610 (24) | 23.4 (52) |
| DIN 11851, DN 65 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.4 (52) |
| DIN 11851, DN 80 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.8 (52) |

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## Dimensional drawings (continued)

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 Series A***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A, DN 25 | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 40 | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 470 (18.5) | 14 (31) | n/a | n/a |
| DIN 32676 series A, DN 50 | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| DIN 32676 series A, DN 65 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23 (51) |
| DIN 32676 series A, DN 80 | n/a | n/a | n/a | n/a | n/a | n/a | 590 (23.2) | 23.1 (51) |

***L1 dimension and weight with hygienic clamp process connections according to DIN 32676 Series C (Tri-clamp)***

| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C, 1" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 1½" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 480 (18.9) | 14 (31) | n/a | n/a |
| DIN 32676 series C, 2" | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| DIN 32676 series C, 2½" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.8 (50) |
| DIN 32676 series C, 3" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.9 (50) |

***L1 dimension and weight with hygienic clamp process connections according to JIS/ISO 2852***

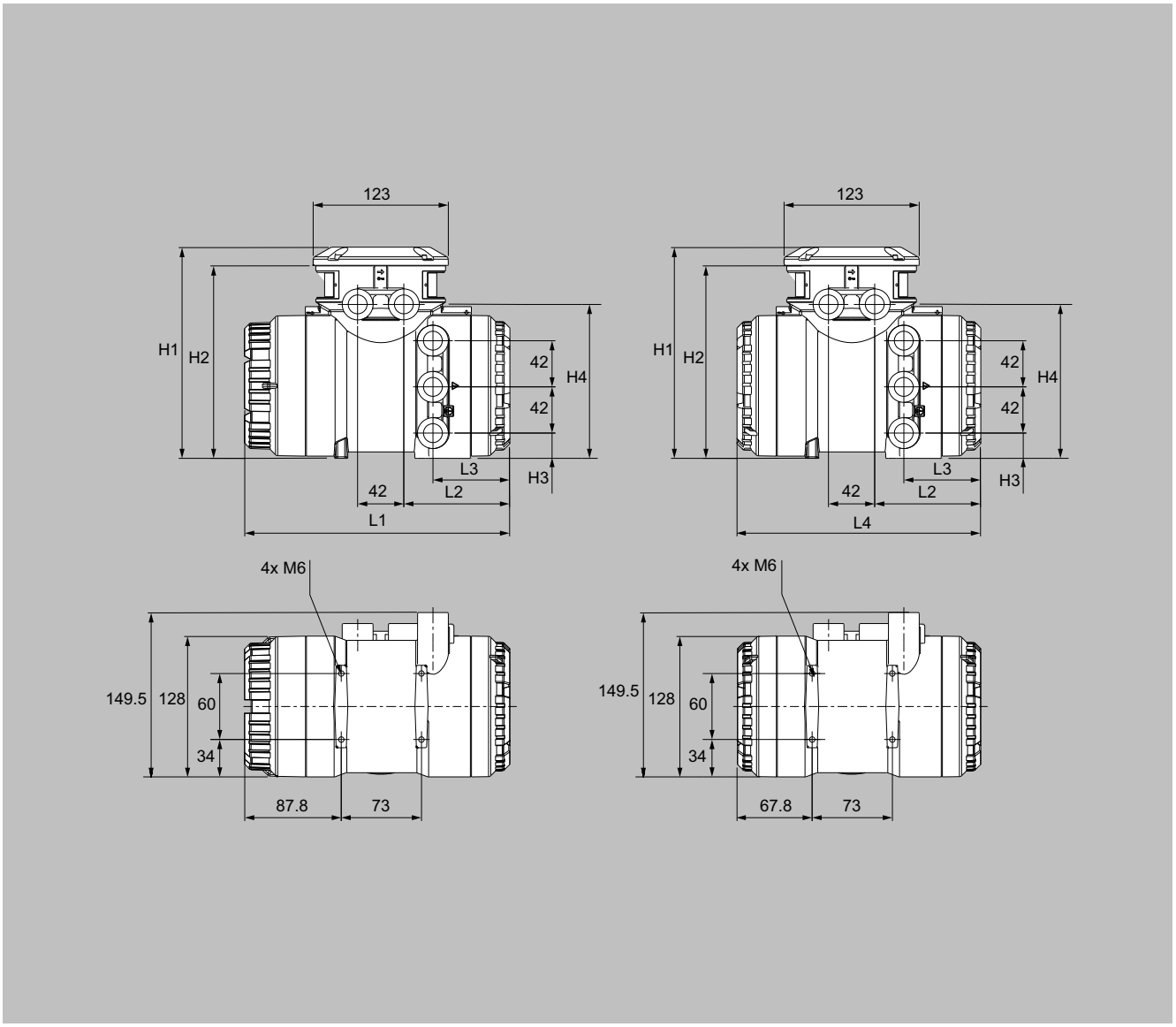
| Process connection size and type | FCS500 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 10 | | DN 15 | | DN 25 | | DN 50 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS/ISO 2852, 1" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 1½" | 280 (11) | 5.2 (11) | 320 (12.6) | 7.2 (16) | 480 (18.9) | 14 (31) | n/a | n/a |
| JIS/ISO 2852, 2" | n/a | n/a | n/a | n/a | 470 (18.5) | 14 (31) | 600 (23.6) | 22.9 (50) |
| JIS/ISO 2852, 2½" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.8 (50) |
| JIS/ISO 2852, 3" | n/a | n/a | n/a | n/a | n/a | n/a | 580 (22.8) | 22.9 (50) |

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## Dimensional drawings (continued)

***Drawings, dimensions and weight for FCT020 and FCT040 transmitters***




Dimensions of FCT020 or FCT040 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

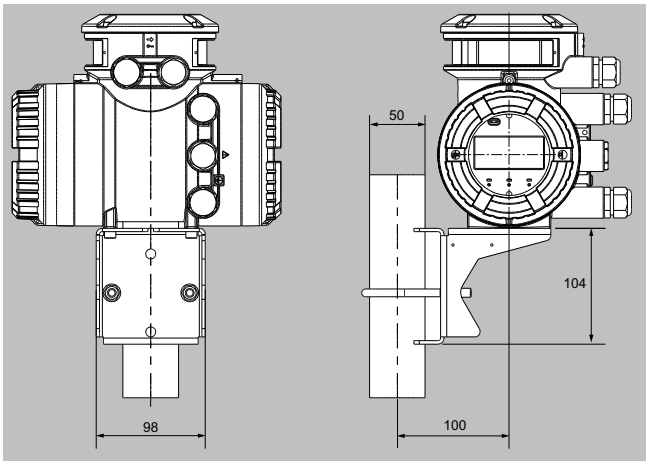
***Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)***

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| Aluminum | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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## Dimensional drawings (continued)



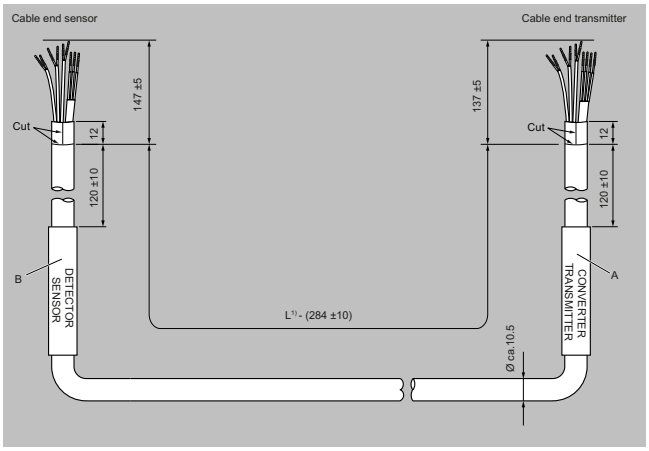

Dimensions of transmitter in mm, attached to mounting bracket.

### *Transmitter weights*

| Design type | Transmitter enclosure material | Weight in kg (lb) |
|---|---|---|
| Remote | Cast aluminum | 4.2 (9.3) |
| | CF-8M stainless steel | 12.5 (27.6) |

### *Connecting cable dimensions and weights*

Standard cable

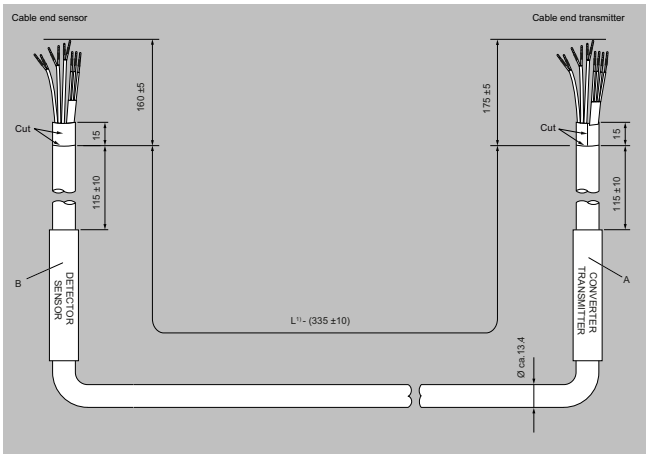



Dimensions in mm. Standard terminated cable. A and B are factory-fitted labels.

| Option code | Cable length, L | Cable color |
|---|---|---|
| L51 | 5 m (16.4 ft) | Non-Ex: gray / Ex: blue |
| L54 | 10 m (32.8 ft) | |
| L57 | 15 m (49.2 ft) | |
| L60 | 20 m (65.6 ft) | |
| L63 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.200 kg/m (0.134 lb/ft)

Standard cable with steel armored option

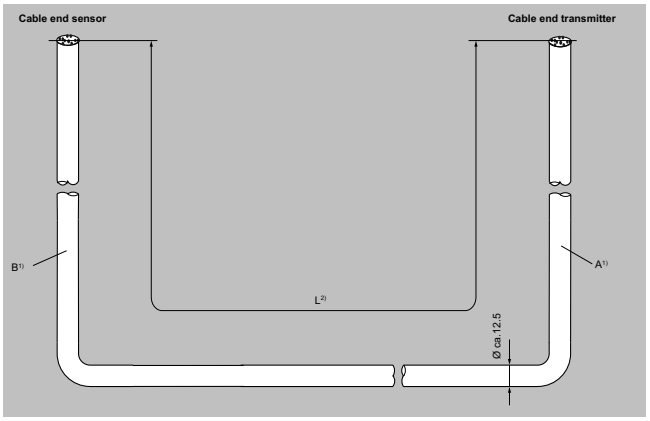



Dimensions in mm. Steel armored terminated cable. A and B are factory-fitted labels.

| Option code | Cable length, L | Cable colour |
|---|---|---|
| L51 + A20/A21 | 5 m (16.4 ft) | Blue |
| L54 + A20/A21 | 10 m (32.8 ft) | |
| L57 + A20/A21 | 15 m (49.2 ft) | |
| L60 + A20/A21 | 20 m (65.6 ft) | |
| L63 + A20/A21 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.300 kg/m (0.202 lb/ft)

Fire retardant cable




Dimensions in mm. Fire retardant unterminated cable. Labels A and B are supplied loose with termination kit.

| Option code | Cable length, L | Cable colour |
|---|---|---|
| L71 | 5 m (16.4 ft) | Gray |
| L74 | 10 m (32.8 ft) | |
| L77 | 15 m (49.2 ft) | |
| L80 | 20 m (65.6 ft) | |
| L83 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.270 kg/m (0.181 lb/ft)

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## Overview

The flowmeter systems of the SITRANS FC600 series are the resistant Coriolis multi-parameter flowmeter for extreme conditions.

The Coriolis flowmeters of this serie are rugged with superior performance under very tough operating conditions.

They are formed by one FCS600 sensor and one FCT transmitter:

- SITRANS FC620 is the combination of the FCS600 sensor and the FCT020 transmitter
- SITRANS FC640 is the combination of the FCS600 sensor and the FCT040 transmitter

Features:

- Resistant to high temperature up to 350 °C (662 °F)
- Resistant to high pressure up to 700 bar (10 153 psi) (gauge)
- Resistant to corrosive fluids
- Dual curved measuring tubes with optimum decoupling from external stresses and vibrations
- Wetted parts: stainless steel 316L or alloy 22
- Process connection: flange or thread
- Nominal sizes: DN 2, DN 4, DN 15, DN 25, DN 40, DN 65
- Connection sizes: DN 8 to DN 125 (⅜" to 5")
- Nominal flow: 45 to 100 000 kg/h (99 to 220 462 lb/h)
- FCS600 sensors can be combined with compact or remote transmitters
- Thick measuring tubes and optional alloy 22 wetted parts for long-term durability
- Superior aeration handling and advanced diagnostic functionality

Note: FC600 sizes DN 2 and DN 4 are only available with standard neck and remote transmitter



FC620/640 Coriolis flowmeter

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## Benefits

***Product features aligned to user value targets***

| | User value targets | SITRANS FC features and solutions |
|---|---|---|
| **Engineering and project management** | • Reduce engineering investment<br>• Cut specification effort<br>• Minimize project expenditure<br>• Decrease the spending on each measurement point<br>• Eliminate function duplication<br>• Reduce number of suppliers | • Siemens project teams offer complimentary evaluation of customer specifications, provided by regional and HQ experts<br>• Simple product selection using intuitive sizing software<br>• One SITRANS FC device can typically provide three to six individual measurements, all transmitted via digital communication, when planned during pre-project design<br>• Added value functions: batch control, viscosity, thermal energy, concentration measurement (Fraction) of two component solutions and pressure compensation |
| **Installation** | • Reduce footprint and transport outlay of OEM machinery<br>• Lower installation complexity<br>• Avoid costly modifications of existing plant | • Can be installed in horizontal or vertical (self-draining) pipes<br>• Twin tube bend design delivers strong signal to noise characteristic resistant to external influence, so install in tight spaces with no inlet and outlet restrictions<br>• Adaptable to existing pipes:typically, three or four connection sizes for each sensor size<br>• Flexible selection of traditional inputs, outputs, and digital communications |
| **Configuration and commissioning** | • Shorter commissioning schedules with lower costs<br>• Faster start-up with reduced outgoings | • Easy setup wizard delivers working meters straight after start-up<br>• microSD card stores sensor calibration data and default setup<br>• Simple configuration using Process Device Manager (PDM)<br>• Siemens device-specific faceplates simplify operation in plantwide control systems |
| **Efficient plant operation** | • Improve finished product consistency to reduce waste<br>• Keep process performance when scaling production up or down<br>• Optimize process control<br>• Improve finished product quality enabling higher levels of profit<br>• Reduce downtime with fast resolution of process upsets<br>• Improve asset performance | • SITRANS FC meters are calibrated in rigs accredited to EN/ISO 17025 to ensure consistently high performance of flow, density and concentration measurements<br>• First-class zero-point quality maintains high accuracy into the low flow region<br>• High sensitivity and intelligent dynamic range keeps the measurement active in demanding high fluid damping cases<br>• Designed-in resilience to process extremes<br>• Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout or solid deposits building up in the tubes<br>• Diagnostic data via local menu or PDM is backed by Siemens applications experts<br>• Intelligent Siemens SITRANS IQ apps for continuing asset evaluation |
| **Maintenance and asset management** | • Optimize technician training<br>• Reduce cost of spare parts<br>• Increase predictive maintenance<br>• Reduce production downtime and associated costs<br>• Decrease unplanned maintenance<br>• Maximize asset value | • Simple product design with interchangeable modular parts<br>• microSD card loads sensor-specific data to deliver fast service exchange<br>• Self-verification: tube health check monitors key diagnostics, including tube stiffness, driver and pickups; the user defines verification frequency and alarm behavior<br>• Verification results indicate whether preventive maintenance action is required<br>• Siemens SIMATIC Maintenance Station uses cyclical acquisition to provide life cycle reports and intelligent preventive maintenance strategies |
| **Industry compliance** | • Cut effort required to comply with Industry-specific demands<br>• Reduce resource needed to maintain regulatory compliance | • Food and beverage sector covered with EHEDG and 3-A approvals, polished tubes<br>• Global hazardous area approvals for international plant duplications<br>• Common and emerging digital networks covered: HART, PROFIBUS PA, PROFINET<br>• Class-leading safety: SIL2/SIL3, secondary containment, PED, NAMUR NE95 |

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## Application

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Chemical and petrochemical**<br>Bulk chemicals<br>Industrial gases<br>Polymers<br>Agrochemicals<br>Fine chemicals<br>Aroma chemicals | • Transfer, loading and unloading of bulk chemicals<br>• Concentration control of acids and alkalis (process optimization)<br>• Accurate mass or volume flow of feed chemicals to in-line blending systems<br>• Accurate mass flow and density (quality) of reactor fluid feeds catalyst<br>• Chemical recovery<br>• Mass balance optimization<br>• Compressed and cryogenic gases<br>• Lubricating oil blending and dosing<br>• High accuracy measurement of critical fluid components<br>• Low flow control in pilot plants and R&D facilities |
| **Food and beverage**<br>Food processing<br>Dairies<br>Breweries<br>Distilleries<br>Confectionary<br>Soft drinks<br>Animal feed plants<br>OEM | • Accurate bulk transfer (mass or volume) of all dairy products: milk, cream, whey and yoghurt<br>• Fat concentration in cream<br>• Flow, density, temperature and concentration (Plato) during all fermentation processes<br>• Flow, density, temperature and sugar concentration (Brix) in soft drink processing<br>• Distilled spirits – % alcohol by volume (ABV), liters of pure alcohol, volume transfer, blending, batch and column still optimization and energy management, cask filling, tanker loading<br>• Flow and density of fruit juices and pulps<br>• Mixing and inventory control of confectionary ingredients, e.g. chocolate, syrup, oils, flavors<br>• Metering pump control<br>• Oils, fat enzymes dosing in animal feed plants<br>• $CO_2$ dosing<br>• CIP liquids<br>• Bottling of beer, spirits, wine, soft drinks, etc.<br>• Bulk sugar processing – molasses, sugar slurries, density, Brix of finished product |
| **Oil and gas**<br>Offshore/onshore<br>Upstream/downstream<br>Pipelines<br>Distribution networks<br>Refineries<br>Skid manufacturers | • Loading/unloading of hydrocarbons (e.g. crude oil, bitumen) from/to ship, road tanker, rail car<br>• High pressure chemical injection<br>• High pressure low flow gas<br>• Net oil computing<br>• Gas void fraction<br>• Filling of gas bottles<br>• Furnace control<br>• Test separators<br>• LPG, natural gas hydration<br>• Well-head water-cut monitoring<br>• All hydrocarbon fluids in refineries<br>• Metrology, custody transfer<br>• Drilling mud<br>• Oil well cementing and hydrofracturing |

## Application (continued)

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Life sciences**<br>Pharmaceutical<br>Bio | • High accuracy flow and batching of bioreactor feeds<br>• Solvent flow rate, density and batching<br>• Flow of demineralized and deionized water<br>• Solvents and fish oils used in high grade omega 3 oils<br>• Precision coatings<br>• Vacuum thin film coating |
| **Household and personal care**<br>Detergents<br>Cosmetics | • Blending and batching of detergent ingredients<br>• Tanker loading and unloading<br>• Salt concentration<br>• Reliable measurement of aerated liquids |
| **Automotive and aeronautical**<br>Vehicle manufacturing<br>Paint<br>Engine testing<br>OEM | • Fuel injection nozzle and pump testing<br>• Filling of under bonnet fluid reservoirs, air conditioning, coolant<br>• Fuel flow and density measurement in engine test beds<br>• Checking for air in oil using high accuracy density measurement<br>• Paint spray robots – requires accurate and fast measurements<br>• Aircraft fuel loading (kerosene)<br>• High pressure flow used in turbine blade manufacture |
| **Power and energy**<br>Renewable<br>Hydrogen | • Boiler fuel flow and burner control<br>• Turbine fuel flow<br>• Glycol flow and concentration<br>• Bioethanol |
| **Marine**<br>OEM<br>Shipbuilders | • Fuel consumption management<br>• Boiler control<br>• Bunkering management<br>• Density used to indicate fuel quality |
| **Pulp, paper and textiles** | • Accurate dosing of dyes and chemicals |
| **Water and environmental** | • Dosing of chemicals for water treatment<br>• Chemical concentration for water quality control |

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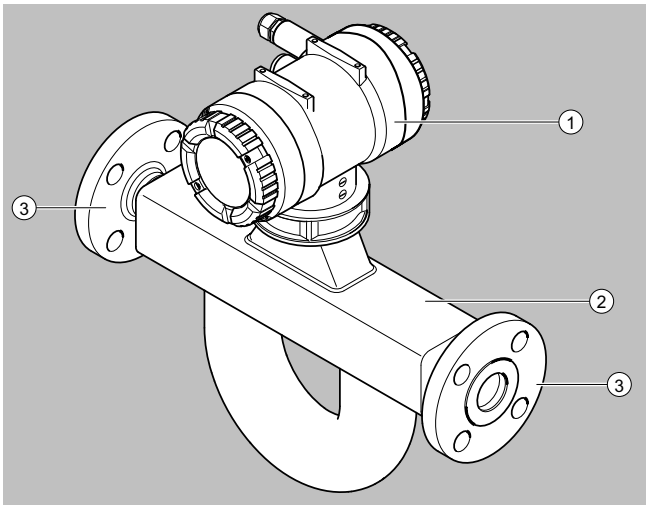
## Design

***Design options and related temperature range for FC600 series***

| Design version | Transmitter | Process fluid temperature range |
|---|---|---|
| **Compact, standard neck** | Aluminum | Standard [-50 ... +150 °C (-58 ... +302 °F)] |
| **Compact, standard neck, hygienic clamps** | Aluminum | Standard [-10 ... +140 °C (-14 ... +284 °F)] |
| **Remote, standard neck or long neck** | Aluminum or stainless steel | Standard [-70 ... +150 °C (-94 ... +302 °F)] |
| **Remote, standard neck or long neck, hygienic clamps** | Aluminum or stainless steel | Standard [-10 ... +140 °C (-14 ... +284 °F)] |
| **Remote only, long neck only** | Aluminum or stainless steel | Low [-196 ... +150 °C (-321 ... +302 °F)]<br>Medium [-70 ... +230 °C (-94 ... +446 °F)]<br>High [0 ... 350 °C (32 ... 662 °F)] |

FCS600 in sizes DN 2 and DN 4 only available with:

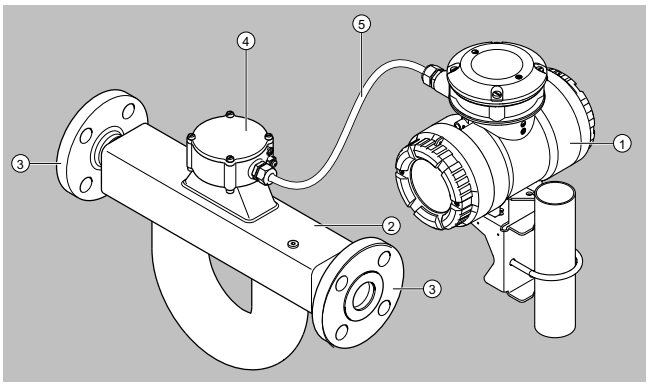
- High pressure autoclave adaptors
- Standard temperature range
- Standard sensor neck (pedestal)
- Remote mounted transmitters



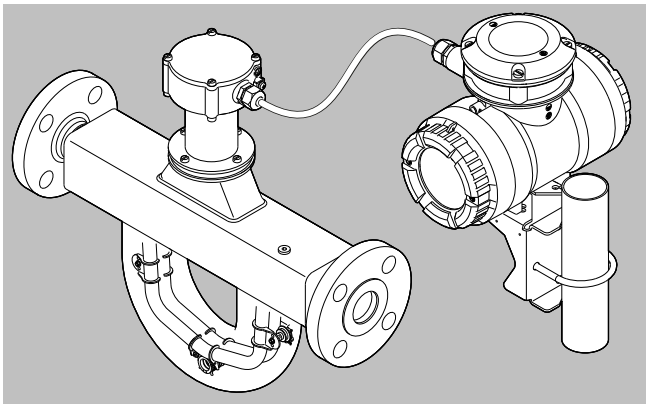

FCS600 sensor with compact, close mounted transmitter. Only sizes DN 15, DN 25, DN 40, and DN 65.

| | |
|---|---|
| 1 | Transmitter |
| 2 | FCS600 sensor |
| 3 | Process connection |

## Design (continued)




FCS600 sensor with remote transmitter, standard sensor neck



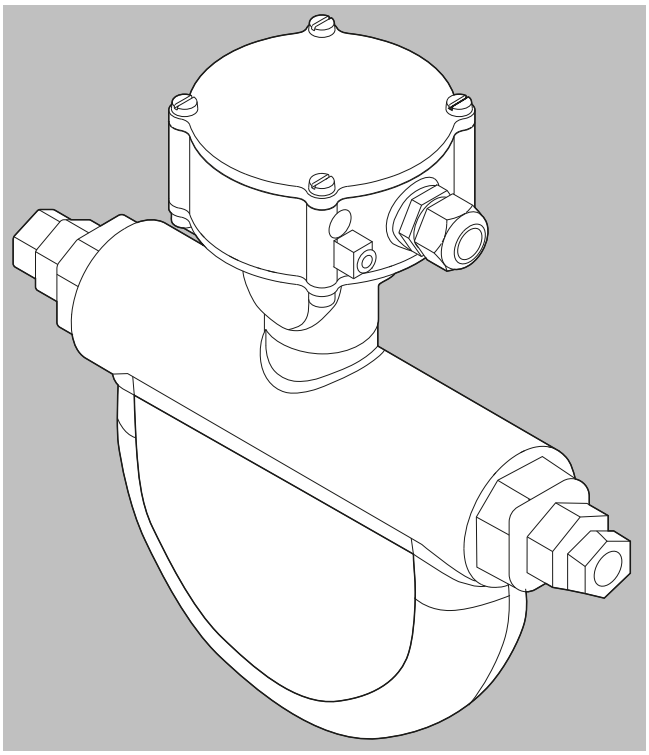
FCS600 sensor with remote transmitter, long sensor neck

| | |
|---|---|
| 1 | Transmitter |
| 2 | FCS600 sensor |
| 3 | Process connection |
| 4 | Sensor terminal box |
| 5 | Connecting cable |

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## Design (continued)



FCS600 sensors (remote transmitter only) in sizes DN 2 and DN 4 standard neck

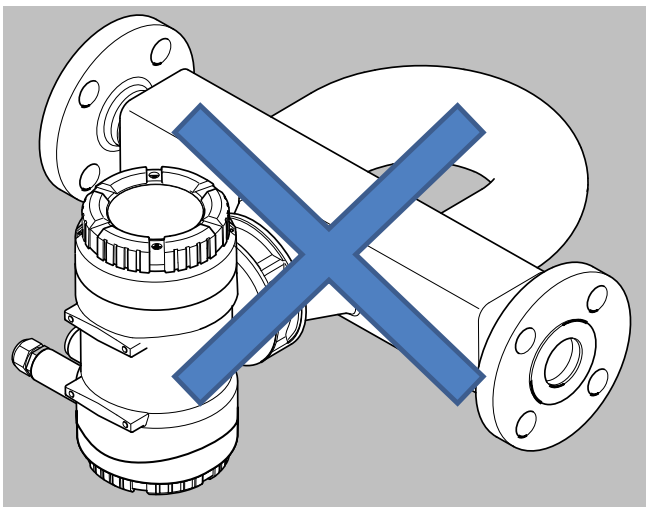
***Installation guidelines***

FCS600 series flowmeters can be mounted horizontally, vertically and at an incline. The measuring tubes should be filled with the fluid during flow measurement as entrained gas may result in errors in measurement. Straight pipe runs at inlet or outlet are usually not required.

Avoid the following installation locations and positions:

- Measuring tubes as highest point in piping when measuring liquids
- Measuring tubes as lowest point in piping when measuring gases
- Immediately in front of a free pipe outlet in a downpipe
- Lateral positions

## Design (continued)



Avoid measuring tubes in sideways position resulting in possible non-homogeneous fluid separation

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## Function

***Compatible fluids***

FC600 series flowmeters can be used to measure the following liquids:

- Liquids
- Gases
- Mixtures, solutions, emulsions, suspensions and slurries

***Primary measured variables***

- Mass flow
- Density
- Temperature

***Based on the primary measured quantities, the transmitter also calculates***

- Volume flow
- Percent concentration (fraction) of a two-component mixture (FCT040 only)
- Partial component flow rate (net flow) of a mixture consisting of two components (FCT040 only)

***Bi-directional operation***

The mass flow, volume flow, and net flow measurements can be bi-directional.

***Measurement variables for NTEP approval***

- Mass flow uni-directional
- Volume flow uni-directional

***Feature overview***

- Designed to meet the highest safety requirements when operating at high pressures
- Temperatures from -196 °C (-321 °F), for cryogenic fluids, up to +350 °C (+662 °F)
- Insulation and heat tracing options for viscous and molten liquids
- Gas Void Fraction and Net Oil Computing functions combine to deliver in multi-phase applications
- Dynamic pressure compensation for accurate measurement under changing process pressure
- Accurate density measurement and up to four advanced concentration measurement data sets

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## Selection and ordering data

| SITRANS FC620/640 (High pressure and temperature) | Article No. 7ME446 | ● - | ● ● | ● ● ● ● - | ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Transmitter variant** | | | | | | |
| None (spare sensor) | | 0 | | | | |
| Coriolis sensor FCS600 with transmitter FCT020 | | 2 | | | | |
| Coriolis sensor FCS600 with transmitter FCT040 | | 4 | | | | |
| SITRANS FC spare part transmitte, no sensor included | | 9 | | | | G 3 Y |
| **Sensor size, tube material (wetted), process connection material and size** | | | | | | |
| Sensor size DN 2 tube material C22, process connection 316L, connection size 9/16" | | | 0 A | | | |
| Sensor size DN 2 tube material C22, process connection 316L, connection size 3/4" | | | 0 D | | | |
| Sensor size DN 4 tube material C22, process connection 316L, connection size 9/16" | | | 1 A | | | |
| Sensor size DN 4 tube material C22, process connection 316L, connection size 3/4" | | | 1 D | | | |
| Sensor size DN 15 tube material 316L, process connection 316L, connection size 3/8" | | | 2 B | | | |
| Sensor size DN 15 tube material 316L, process connection 316L, connection size 1/2" DN 15 | | | 2 C | | | |
| Sensor size DN 15 tube material 316L, process connection 316L, connection size 3/4" | | | 2 D | | | |
| Sensor size DN 15 tube material 316L, process connection 316L, connection size 1" DN 25 | | | 2 E | | | |
| Sensor size DN 15 tube material 316L, process connection 316L, connection size 1 1/2" DN 40 | | | 2 F | | | |
| Sensor size DN 25 tube material 316L, process connection 316L, connection size 1" DN 25 | | | 3 E | | | |
| Sensor size DN 25 tube material 316L, process connection 316L, connection size 1 1/2" DN 40 | | | 3 F | | | |
| Sensor size DN 25 tube material 316L, process connection 316L, connection size 2" DN 50 | | | 3 G | | | |
| Sensor size DN 40 tube material 316L, process connection 316L, connection size 1 1/2" DN 40 | | | 4 F | | | |
| Sensor size DN 40 tube material 316L, process connection 316L, connection size 2" DN 50 | | | 4 G | | | |
| Sensor size DN 40 tube material 316L, process connection 316L, connection size 2 1/2" DN 65 | | | 4 H | | | |
| Sensor size DN 40 tube material 316L, process connection 316L, connection size 3" DN 80 | | | 4 J | | | |
| Sensor size DN 65 tube material 316L, process connection 316L, connection size 3" DN 80 | | | 5 J | | | |
| Sensor size DN 65 tube material 316L, process connection 316L, connection size 4" DN 100 | | | 5 K | | | |
| Sensor size DN 65 tube material 316L, process connection 316L, connection size 5" DN 125 | | | 5 L | | | |
| Sensor size DN 15 tube material C22, process connection C22, connection size 1" DN 25 | | | 6 E | | | |
| Sensor size DN 15 tube material C22, process connection C22, connection size 1 1/2" DN 40 | | | 6 F | | | |
| Sensor size DN 15 tube material C22, process connection C22, connection size 2" DN 50 | | | 6 G | | | |
| Sensor size DN 25 tube material C22, process connection C22, connection size 1" DN 25 | | | 7 E | | | |
| Sensor size DN 25 tube material C22, process connection C22, connection size 1 1/2" DN 40 | | | 7 F | | | |
| Sensor size DN 25 tube material C22, process connection C22, connection size 2" DN 50 | | | 7 G | | | |
| Sensor size DN 40 tube material C22, process connection C22, connection size 2" DN 50 | | | 8 G | | | |
| Sensor size DN 40 tube material C22, process connection C22, connection size 2 1/2" DN 65 | | | 8 H | | | |
| Sensor size DN 40 tube material C22, process connection C22, connection size 3" DN 80 | | | 8 J | | | |
| No sensor (SITRANS FCT transmitter as spare part) | | | 9 A | | | H 1 A |
| **Process connection** | | | | | | |
| No connections (SITRANS FCT transmitter as spare part) | | | | A 0 | | |
| EN flange PN 40, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 1 | | |
| EN flange PN 63, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 2 | | |
| EN flange PN 100, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type D, groove | | | | A 5 | | |
| EN flange PN 63, suitable for EN 1092-1 type D, groove | | | | A 6 | | |
| EN flange PN 100, suitable for EN 1092-1 type D, groove | | | | A 7 | | |
| EN flange PN 40, suitable for EN 1092-1 type E, spigot | | | | B 1 | | |
| EN flange PN 63, suitable for EN 1092-1 type E, spigot | | | | B 2 | | |
| EN flange PN 100, suitable for EN 1092-1 type E, spigot | | | | B 3 | | |
| EN flange PN 40, suitable for EN 1092-1 type F, recess | | | | B 5 | | |
| EN flange PN 63, suitable for EN 1092-1 type F, recess | | | | B 6 | | |
| EN flange PN 100, suitable for EN 1092-1 type F, recess | | | | B 7 | | |
| ASME flange class 150, suitable for ASME B16.5, raised face (RF) | | | | D 1 | | |
| ASME flange class 300, suitable for ASME B16.5, raised face (RF) | | | | D 2 | | |
| ASME flange class 600, suitable for ASME B16.5, raised face (RF) | | | | D 3 | | |
| ASME flange class 900, suitable for ASME B16.5, raised face (RF) | | | | D 4 | | |
| ASME flange class 1500, suitable for ASME B16.5, raised face (RF) | | | | D 5 | | |
| ASME flange class 600, suitable for ASME B16.5, ring joint (RJ) | | | | C 3 | | |
| ASME flange class 900, suitable for ASME B16.5, ring joint (RJ) | | | | C 4 | | |

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## Selection and ordering data (continued)

| SITRANS FC620/640 (High pressure and temperature) | Article No. 7ME446 | ● - ●● ● ● ● - ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|
| ASME flange class 1500, suitable for ASME B16.5, ring joint (RJ) | | C 5 | |
| JIS flange 10K, JIS B 2220 | | L 2 | |
| JIS flange 20K, JIS B 2220 | | L 4 | |
| JIS G3447 / ISO2852 Clamp | | J 1 | |
| Clamp process connection according to DIN 32676 series A | | G 2 | |
| Clamp process connection according to DIN 32676 series C (Tri-Clamp) | | G 6 | |
| Autoclave adapter | | K 1 | |
| Process connection with internal thread G | | E 1 | |
| Process connection with internal thread NPT | | E 3 | |
| Special design | | Z 1 | K 1 Y |
| **Max operational temperature** | | | |
| None (SITRANS FCT transmitter as spare part) | | 0 | |
| Media temperature -70 °C (-94 °F) Remote, -50 °C (-58 °F) Compact, max temperature 150 °C (302 °F) | | 1 | |
| Media temperature -196 ... 150 °C (-321 ... 302 °F) | | 2 | |
| Media temperature -70 ... 230 °C (-94 ... 446 °F) | | 3 | |
| Media temperature 0 ... 350 °C (32 ... 662 °F) | | 4 | |
| Media temperature -70 °C (-94 °F) Remote, -50 °C (-58 °F) Compact, max. temperature 150 °C (302 °F), high pressure | | 6 | |
| Media temperature -70 ... 230 °C (-94 ... 446 °F), high pressure | | 7 | |
| Media temperature 0 ... 350 °C (32 ... 662 °F), high pressure | | 8 | |
| **Calibration** | | | |
| No calibration | | 0 | |
| Massflow 0.1%, density 0.5 g/l | | 1 | |
| Massflow 0.1%, density 1 g/l | | 2 | |
| Massflow 0.1%, density 2 g/l | | 3 | |
| Massflow 0.1%, density 3 g/l | | 4 | |
| Massflow 0.1%, density 4 g/l | | 5 | |
| Massflow 0.1%, density 8 g/l | | 6 | |
| Massflow 0.2%, density 4 g/l | | 7 | |
| Massflow 0.2%, density 8 g/l | | 8 | |
| Accuracy for gas please select below | | 9 | |
| Massflow gas 0.75% | | | N 1 A |
| Massflow gas 0.5% | | | N 2 A |
| **Mounting style, transmitter housing and material** | | | |
| Compact type with "urethane-cured polyester powder coating" coated aluminum transmitter housing | | A | |
| Compact type with "corrosion protection coating" coated aluminum transmitter housing | | B | |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and standard neck sensor | | C | |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and long neck sensor | | D | |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and standard neck sensor | | E | |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and long neck sensor | | F | |
| Remote type stainless steel transmitter and standard neck sensor | | G | |
| Remote type stainless steel transmitter and long neck sensor | | H | |
| **Ex approvals** | | | |
| None | | A | |
| ATEX, explosion group IIC and IIIC | | B | |
| ATEX, explosion group IIB and IIIC | | C | |
| IECEx, explosion group IIC and IIIC | | D | |
| IECEx, explosion group IIB and IIIC | | E | |
| FM, groups A B C D E F G | | H | |
| FM, groups C D E F G | | J | |
| NEPSI, explosion group IIC and IIIC | | M | |
| NEPSI, explosion group IIB and IIIC | | N | |
| **Local user interface** | | | |
| Spare sensor without transmitter, no display applied | | 0 | |
| No display | | 1 | |
| With display | | 3 | |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify order code(s). | |
| **Cable glands** | |
| Metric, no glands (M20) | **A10** |
| NPT, no glands (1/2") | **A11** |
| Metric, no glands (M20) steel armored cable | **A20** |
| NPT, no glands (1/2") steel armored cable | **A21** |
| **Sensor housing material** | |
| None (SITRANS FCT transmitter as spare part) | **B00** |
| Stainless steel 1.4301/304, 1.4404/316L | **B01** |
| Stainless steel 1.4404/316L DN 15 | **B02** |
| Stainless steel 1.4404/316L DN 25 | **B03** |
| Stainless steel 1.4404/316L DN 40 | **B04** |
| Stainless steel 1.4404/316L DN 65 | **B05** |
| Stainless steel 1.4404/316L DN 2/DN 4 | **B06** |
| **I/O Configuration Ch1** | |
| None | **E00** |
| 4-20 mA HART active | **E06** |
| 4-20 mA HART passive | **E07** |
| PROFIBUS PA | **E10** |
| **I/O Configuration Ch2, Ch3 and Ch4** | |
| Spare sensor without transmitter, all communication types and I/Os apply | **F00** |
| 1 passive current output, 1 passive pulse or status output | **F01** |
| 1 passive current output, 2 passive pulse or status outputs | **F02** |
| 1 passive current output, 1 passive pulse or status outputs, 1 passive NAMUR pulse or status output | **F03** |
| 1 passive current output, 2 passive NAMUR pulse or status outputs | **F04** |
| 1 passive pulse or status output | **F11** |
| 2 passive pulse or status outputs, 1 passive status output | **F12** |
| 2 passive pulse or status outputs, 1 voltage-free status input | **F13** |
| 2 passive pulse or status outputs, 1 active current input | **F14** |
| 2 passive pulse or status outputs, 1 passive current input | **F15** |
| 1 passive pulse or status output, 1 passive current output, 1 active current input | **F16** |
| 1 passive pulse or status output, 1 passive current output, 1 passive current input | **F17** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 active current input | **F18** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 passive current input | **F19** |
| 1 passive pulse or status output, 1 active pulse or status output, 1 voltage-free status input | **F20** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor, 1 voltage-free status input | **F21** |
| 1 active current output, 2 passive pulse or status outputs | **F22** |
| 1 active current output, 1 passive pulse or status output,1 voltage-free status input | **F23** |
| 1 passive pulse or status output | **F31** |
| 2 passive pulse or status outputs | **F32** |
| 1 passive pulse or status output, 1 active current input | **F33** |
| 1 passive pulse or status output, 1 passive current input | **F34** |
| 1 passive pulse or status output, 1 active pulse or status output | **F35** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor | **F36** |
| 1 passive pulse or status output, 1 active current output | **F37** |
| 1 passive pulse output | **F41** |
| Output CH1 intrinsically safe, 1 passive pulse output | **F42** |
| **Certificates** | |
| Declaration of compliance with the order 2.1 according to EN 10204 | **C11** |
| Quality Inspection Certificate (Inspection Certificate 3.1 according to EN 10204) | **C40** |
| Certificate of Marking Transfer and Raw Material Certificates (Inspection Certificate 3.1 according to EN 10204), including IGC and conform to NACE MR0175 and MR0103 | **C13** |
| Hydrostatic Pressure Test Certificate (Inspection Certificate 3.1 according to EN 10204) | **C18** |
| Degreasing of wetted surfaces according to ASTM G93-03 (Level C), including test report | **C54** |
| WPS according to DIN EN ISO 15809-1; WPQR according to DIN EN ISO 15814-1; WQC according to DIN EN 287-1 or DIN EN ISO 8908-4 | **C36** |
| Welding procedures and certificate according to ASME IX | **C37** |
| X-ray inspection of flange weld seam according to DIN EN ISO 17636-1/B, evaluation according to AD 2000 HP 5/3 and DIN EN ISO 5817/C, including certificate | **C33** |
| X-ray test according to ASME V | **C34** |
| Dye penetrant test of process connection weld seams according to DIN EN ISO 3452-1, including certificate | **C38** |
| Dye penetrant test of flange welding according to ASME V, including certificate | **C39** |
| Ferrite test for flange welding according to DIN EN ISO 8249 | **C50** |
| Positive Material Identification of wetted parts, including certificate (Inspection Certificate 3.1 according to EN 10204) | **C15** |
| 3-A product conformity with 3-A certificate and marking, including Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C62** |
| EHEDG product conformity with EHEDG certificate and marking, including Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C63** |
| Surface Roughness wetted parts Ra ≤ 0.8 µm | **C60** |
| Surface Roughness wetted parts Ra ≤ 0.8 µm and Surface Roughness Inspection Certificate | **C61** |
| ASME B31.3 compliance NORMAL FLUID SERVICE | **C70** |
| **Connecting cable type and length** | |
| without standard connecting cable | **L50** |
| 5 meter (16.4 ft) remote connecting cable terminated standard gray / Ex blue | **L51** |
| 10 meter (32.8 ft) remote connecting cable terminated standard gray / Ex blue | **L54** |
| 15 meter (49.2 ft) remote connecting cable terminated standard gray / Ex blue | **L57** |
| 20 meter (65.6 ft) remote connecting cable terminated standard gray / Ex blue | **L60** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 30 meter (98.4 ft) remote connecting cable terminated standard gray / Ex blue | **L63** |
| without fire retardant connecting cable | **L70** |
| 5 meter (16.4 ft) remote fire retardant connecting cable not terminated | **L71** |
| 10 meter (32.8 ft) remote fire retardant connecting cable not terminated | **L74** |
| 15 meter (49.2 ft) remote fire retardant connecting cable not terminated | **L77** |
| 20 meter (65.6 ft) remote fire retardant connecting cable not terminated | **L80** |
| 30 meter (98.4 ft) remote fire retardant connecting cable not terminated | **L83** |
| **SW functions** | |
| Heat measurement | **S11** |
| Tube health check | **S12** |
| Batching and filling function | **S13** |
| Netoil computing | **S14** |
| Viscosity computing function for liquids | **S15** |
| Standard concentration measurement | **S16** |
| **Marine approval** | |
| Marine approved DNV, ABS, KR piping class 2 | **S22** |
| Marine approved DNV, ABS, KR piping class 3 | **S23** |
| Marine approved LR, MR, TAC piping class 2 | **S24** |
| Marine approved LR, MR, TAC piping class 3 | **S25** |
| Marine approved BV piping class 2 | **S26** |
| Marine approved BV piping class 3 | **S27** |
| **Mounting** | |
| Namur built-in length according to NE132 | **S31** |
| Rupture Disk | **S32** |
| **Insulation DN 15** | |
| Insulation | **J10** |
| Insulation and heat tracing, ½"ASME class 150, raised face (RF) | **J12** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J13** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J14** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J16** |
| Insulation, heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J17** |
| Insulation, heat tracing with ventilation, EN DN 15, PN 40 | **J18** |
| **Insulation DN 25** | |
| Insulation | **J20** |
| Insulation and heat tracing, ½"ASME class 150, raised face (RF) | **J22** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J23** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J24** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J26** |
| Insulation, heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J27** |
| Insulation, heat tracing with ventilation, EN DN 15, PN 40 | **J28** |

| | Order code |
|---|---|
| **Insulation DN 40** | |
| Insulation | **J30** |
| Insulation and heat tracing, ½"ASME class 150, raised face (RF) | **J32** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J33** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J34** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J36** |
| Insulation, heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J37** |
| Insulation, heat tracing with ventilation, EN DN 15, PN 40 | **J38** |
| **Insulation DN 65** | |
| Insulation | **J40** |
| Insulation and heat tracing, ½"ASME class 150, raised face (RF) | **J42** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J43** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J44** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J46** |
| Insulation, heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J47** |
| Insulation, heat tracing with ventilation, EN DN 15, PN 40 | **J48** |
| **Country specific delivery** | |
| Delivery to China including China RoHS mark | **W21** |
| Delivery to Korea including KC mark | **W22** |
| **Fraction setup**<br>PIA: Please select four options | |
| Sugar / Water 0 ... 85 °Bx, 0 ... 80 °C (32 ... 176 °F) | **G01** |
| NaOH / Water 2 ... 50 WT%, 0 ... 100 °C (32 ... 212 °F) | **G02** |
| KOH / Water 0 ... 60 WT%, 54 ... 100 °C (129 ... 212 °F) | **G03** |
| $NH_4NO_3$ / Water 1 ... 50 WT%, 0 ... 80 °C (32 ... 176 °F) | **G04** |
| $NH_4NO_3$ / Water 20 ... 70 WT%, 20 ... 100 °C (68 ... 212 °F) | **G05** |
| HCl / Water 22 ... 34 WT%, 20 ... 40 °C (68 ... 104 °F) | **G06** |
| $HNO_3$ / Water 50 ... 67 WT%, 10 ... 60 °C (50 ... 140 °F) | **G07** |
| $H_2O_2$ / Water 30 ... 75 WT%, 4 ... 44 °C (39 ... 111 °F) | **G09** |
| Ethylene Glycol / Water 10 ... 50 WT%, -20 ... 40 °C (-4 ... 104 °F) | **G10** |
| Amylum = Starch / Water 33 ... 43 WT%, 35 ... 45 °C (95 ... 113 °F) | **G11** |
| Methanol / Water 35 ... 60 WT%, 0 ... 40 °C (32 ... 104 °F) | **G12** |
| Alcohol / Water 55 ... 100 VOL%, 10 ... 40 °C (50 ... 104 °F) | **G20** |
| Sugar / Water 40 ... 80 °Bx, 75 ... 100 °C (167 ... 212 °F) | **G21** |
| Alcohol / Water 66 ... 100 WT%, 15 ... 40 °C (59 ... 104 °F) | **G30** |
| Alcohol / Water 66 ... 100 WT%, 10 ... 40 °C (50 ... 104 °F) | **G37** |
| **Tag name** | |
| Tag name plate, SS (max. 16 characters) | **Y11** |
| HART Tag No. (max. 8 characters) | **Y25** |
| HART Tag No. (max. 32 characters) | **Y26** |
| PROFIBUS PA NODE ADDRESS (4 characters HEX) | **Y28** |
| PROFIBUS PA SOFTWARE TAG (max. 32 characters) | **Y29** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Customer installation length** | |
| Customer installation length (mm) | **Y30** |

| | Order code |
|---|---|
| **Calibration** | |
| Customer 5-point mass flow calibration | **D61** |
| Customer 10-point mass flow calibration | **D62** |
| **Special versions** | |
| ID-Number of special design | **Y99** |

## Technical specifications

### *Mass flow rate of liquids*

The mass flow rate characteristics of SITRANS FC meters are defined by the values of zero stability, $Q_{flat}$, $Q_{nom}$ and $Q_{max}$.

Zero stability is the maximum allowable flow rate value that can be displayed at zero flow under reference conditions. It is a good indicator of the meter performance as flow rates reduce and approach zero.

- $Q_{flat}$ is the mass flow rate above which the base accuracy is maintained (0.1% when using FCT040 transmitters).
- $Q_{nom}$ is the nominal mass flow rate of water at reference conditions that would result in a pressure drop of 1 bar (15 psi).
- $Q_{max}$ is the recommended maximum mass flow rate for each sensor size.

For questions regarding expected performance in specific applications, please contact your regional Siemens Measurement Intelligence team.

### *Flow rate summary by FCS600 sensor size*

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| **DN 2** | 0.005 | 0.011 | 4.00 | 0.147 | 45.0 | 1.65 | 94.0 | 3.45 |
| **DN 4** | 0.018 | 0.040 | 14.0 | 0.514 | 170 | 6.24 | 300 | 11.0 |
| **DN 15** | 0.150 | 0.330 | 250 | 9.18 | 3 000 | 110 | 5 000 | 184 |
| **DN 25** | 0.500 | 1.10 | 830 | 30.5 | 10 000 | 367 | 17 000 | 624 |
| **DN 40** | 1.60 | 3.52 | 2 670 | 98.0 | 32 000 | 1 174 | 50 000 | 1 835 |
| **DN 65** | 5.00 | 11.0 | 8 330 | 306 | 100 000 | 3 670 | 170 000 | 6 239 |

### *Performance summary by FCS600 sensor size and transmitter type*

| Sensor size | | | DN 2 | DN 4 | DN 15 | DN 25 | DN 40 | DN 65 |
|---|---|---|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 |
| | % (of rate) | FCT040 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 |
| Zero stability | kg/h (lb/h) | | ± 0.005 (0.011) | ± 0.018 (0.44) | ± 0.15 (0.33) | ± 0.5 (1.1) | ± 1.6 (3.52) | ± 5 (11) |
| **Density (liquids)** | | | | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ± 8 (0.5) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) |
| | kg/m3 (lb/ft³) | FCT040 | ± 8 (0.5) | ± 1 (0.06) | ± 0.5 (0.03) | ± 0.5 (0.03) | ± 0.5 (0.03) | ± 0.5 (0.03) |
| **Mass flow (gases)** | | | | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 | ± 0.75 |
| | % (of rate) | FCT040 | ± 0.5 | ± 0.5 | ± 0.35 | ± 0.35 | ± 0.35 | ± 0.35 |
| **Temperature** | | | | | | | | |
| Accuracy | °C (°F) | | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) | ± 0.5 (0.9) |

Note:

The accuracy values in the table above are based on reference conditions at the time of calibration and represent the combined measurement uncertainties including sensor, electronic and pulse output interface.

Liquid density calibration is performed when density accuracy of 0.5 kg/m³ (0.03 lb/ft³) is selected in the model code.

### *Mass flow calibration and density adjustment for liquids*

Siemens SITRANS FC Coriolis meters are calibrated in rigs accredited according to the international standard EN ISO/IEC 17025:2018. Each flowmeter comes with a standard calibration certificate.

Mass flow calibration takes place at reference conditions. Specific values are listed in the standard calibration certificate.

### *Mass flow calibration reference conditions*

| Fluid | Water |
|---|---|
| **Density** | 900 ... 1 100 kg/m³ (56 ... 69 lb/ft³) |
| **Fluid temperature** | 10 ... 35 °C (50 ... 95 °F), average temperature: 22.5 °C (72.5 °F) |
| **Ambient temperature** | 10 ... 35 °C (50 ... 95 °F) |
| **Process pressure** | 1 ... 5 bar (15 ... 73 psi) |

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## Technical specifications (continued)

### *Density calibration reference conditions*

| Flow condition | Fully developed flow profile |
|---|---|
| Fluid densities used to obtain density calibration constants | 700 kg/m³ (44 lb/ft³)<br>1 000 kg/m³ (62 lb/ft³)<br>1 650 kg/m³ (103 lb/ft³) |
| Fluid temperature | 20 °C (68 °F) |
| Determination of temperature compensation coefficients | 20 ... 80 °C (68 ... 176 °F) |

### *Analog output performance specification*

Typical additional uncertainty when using the analog current output:

± 0.04% at a nominal mid-range current output of 12 mA, which includes the effects of: output adjustment, linearity, power supply variation, load resistance variation, short-term and long-term drift for one year and ambient temperature effect on the transmitter in the range 20 °C ± 30 °C (14 ... 122 °F).

### *Process pressure effect on flow measurement performance*

Changes in operating pressure have a small effect on the mass flow measurement performance. When the pressure changes are very large this effect can be corrected by a dynamic pressure input or a fixed process pressure.

| Sensor size | Sensor wetted parts | Additional flow measurement errors due to change in operating pressure from reference pressure<br>in % of rate per 1 bar variation | <br>in % of rate per 1 psi variation |
|---|---|---|---|
| **DN 2** | Alloy 22 / AISI 316L stainless steel | -0.0001 | -0.000007 |
| **DN 4** | Alloy 22 / AISI 316L stainless steel | -0.0001 | -0.000007 |
| **DN 15** | AISI 316L stainless steel or alloy 22 | -0.0005 | -0.00003 |
| **DN 25** | AISI 316L stainless steel | -0.0024 | -0.00017 |
| | Alloy 22 | -0.0023 | -0.00016 |
| **DN 40** | AISI 316L stainless steel | -0.0034 | -0.00023 |
| | Alloy 22 | -0.0035 | -0.00024 |
| **DN 65** | AISI 316L stainless steel | -0.0084 | -0.00058 |
| | Alloy 22 | -0.0074 | -0.00051 |

### *Process temperature effect*

For mass flow measurement, process fluid temperature effect is defined as the change in sensor flow accuracy due to process fluid temperature change, away from the 20 °C (68 °F) reference condition. Variation in process temperature influences the measuring tube characteristics and this is compensated for using the built-in PT 1000 temperature sensor.

A small flow uncertainty remains in the compensation circuit defined below.

Uncertainty due to process temperature change: ± 0.001% of mass flow rate per °C (± 0.0006% of mass flow rate per °F)

### *Temperature effect on zero*

Temperature effect on the mass flow zero-point quality can be corrected by zeroing at the process fluid temperature.

### *Process conditions*

### *Process fluid temperature range*

Note: Some design combinations may not be available in all sizes.

| Design version | Transmitter | Process fluid temperature range |
|---|---|---|
| Compact, standard neck | Aluminum | Standard [-50 ... +50 °C (-58 ... +302 °F)] |
| Compact, standard neck, hygienic clamps | Aluminum | Standard [-10 ... +140 °C (-14 ... +284 °F)] |
| Remote, standard neck or long neck | Aluminum or stainless steel | Standard [-70 ... +150 °C (-94 ... +302 °F)] |
| Remote, standard neck or long neck, hygienic clamps | | Standard [-10 ... +140 °C (-14 ... +284 °F)] |
| Remote only, long neck only | Aluminum or stainless steel | Low [-196 ... +150 °C (-321 ... +302 °F)] |
| Remote only, long neck only | | Medium [-70 ... +230 °C (-94 ... +446 °F)] |
| Remote only, long neck only | | High [0 ... 350 °C (32 ... 662 °F)] |

### *Operating pressure*

The maximum allowed process pressure depends on the selected process connection and process temperature.

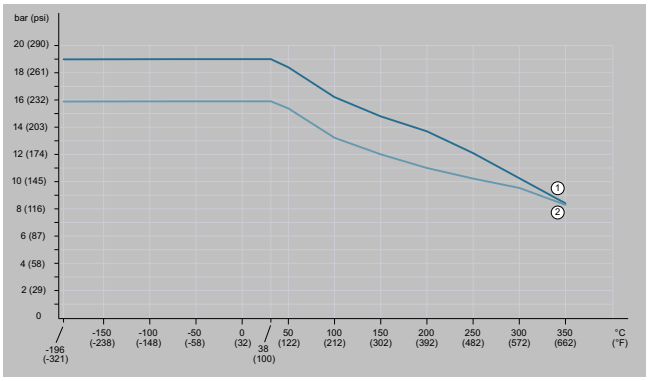
The given process temperature and process pressure ranges are calculated and approved without corrosion or erosion effects.

Pressure versus temperature relationship depending on selected process connection

The following diagrams show the process pressure as a function of process temperature as well as the process connection used (type and size of process connection).

Calculations for ASME flanges are based on ASME B16.5 Material group 2.2 (316/316L dual certified).

ASME class 150




Allowed process pressure as a function of process fluid temperature

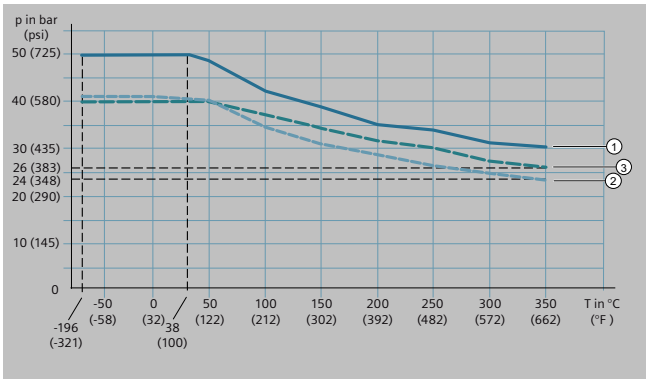
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 150 |
| 2 | Heat tracing connection compatible to ASME B16.5 class 150 |

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## Technical specifications (continued)

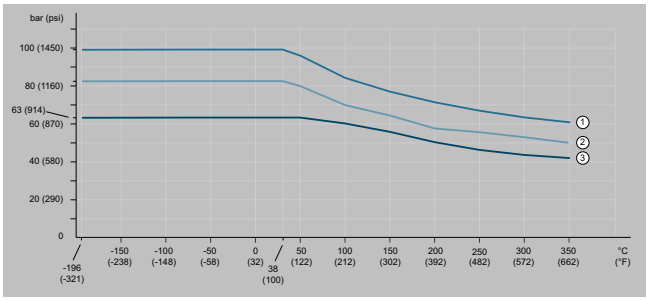
### ASME class 300, EN PN 40




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 300 |
| 2 | Process and heat tracing connection compatible to EN 1092-1 PN 40 |
| 3 | Process and heat tracing connection for ASME B16.5 class 300 |

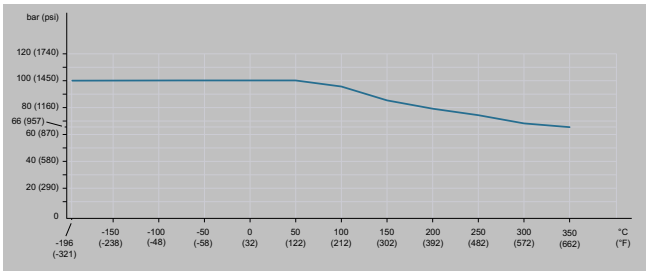
### ASME class 600, EN PN63




Allowed process pressure as a function of process fluid temperature

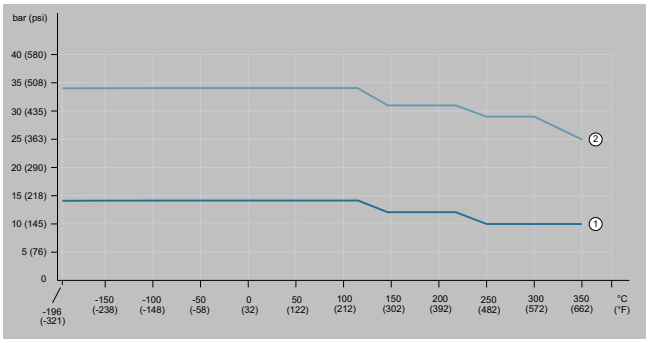
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 600 |
| 2 | Not used for this product |
| 3 | Process connection compatible to EN 1092-1 PN 63 |

### EN PN 100




Allowed process pressure as a function of process fluid temperature, compatible to EN 1092-1 PN 100

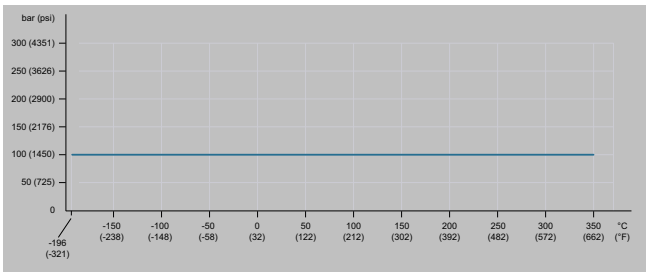
### JIS 10K, JIS 20K



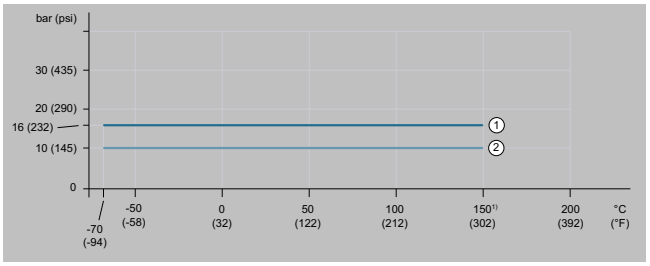

Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to JIS B 2220 10K |
| 2 | Process connection compatible to JIS B 2220 20K |

### Process connection with internal thread G and NPT (standard pressure)




### Clamp process connection according to JIS/ISO 2852




Allowed process pressure as a function of process connection temperature

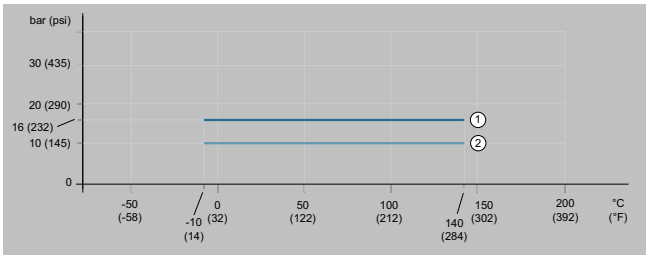
| | |
|---|---|
| 1 | Clamp connection for JIS/ISO 2852 up to 2" |
| 2 | Clamp connection for JIS/ISO 2852 above 2" |

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## Technical specifications (continued)

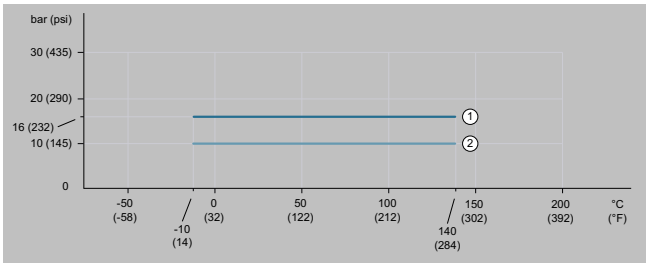
Clamp process connection according to DIN 32676 series A




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series A up to DN 50 |
| 2 | Clamp connection compatible to DIN 32676 series A above DN 50 |

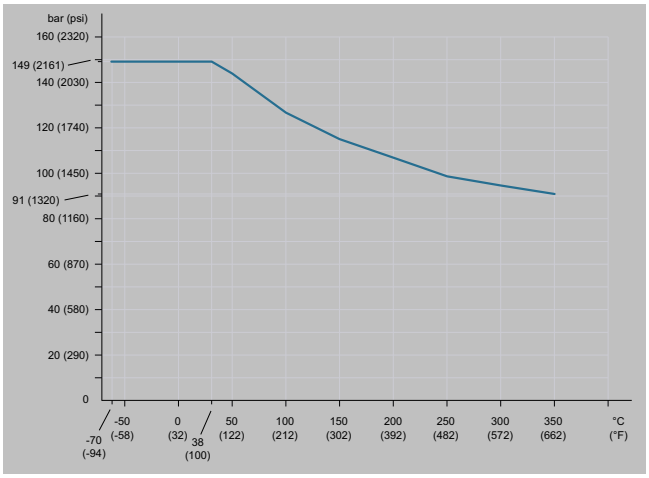
Clamp process connection according to DIN 32676 series C (Tri-Clamp)




Allowed process pressure as a function of process fluid temperature

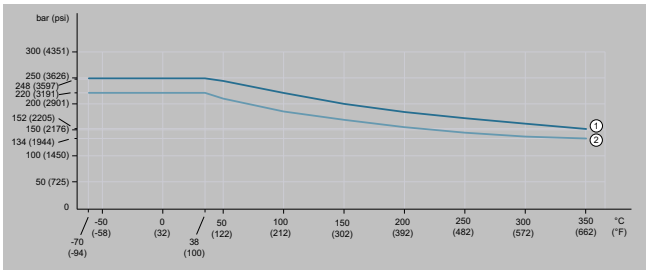
| | |
|---|---|
| 1 | Clamp connection compatible to DIN 32676 series C up to 2" |
| 2 | Clamp connection compatible to DIN 32676 series C above 2" |

ASME class 900




Allowed process pressure as a function of process fluid temperature, compatible to ASME B16.5 class 900

ASME class 1500

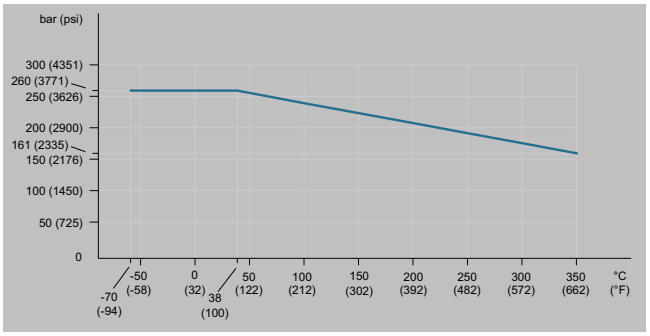



Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 1500:<br>• With alloy 22 wetted parts (without ASME compliance)<br>• With 316L wetted parts in size DN 15 (without ASME compliance)<br>• With alloy 22 wetted parts in size DN 15 (requires option code C70, compliant with ASME B31.3 normal fluid service) |
| 2 | Process connection compatible to ASME B16.5 class 1500:<br>• With 316L wetted parts in size DN 25 (without ASME compliance)<br>• With 316L wetted parts in size DN 15 (requires option code C70, compliant with ASME B31.3 normal fluid service)<br>• With alloy 22 wetted parts in size DN 25 (requires option code C70, compliant with ASME B31.3 normal fluid service) |

Process connection with internal thread G and NPT (high pressure)

Note: Only available with FCS600 size DN 15 with 316L wetted parts




Allowed process pressure as a function of process connection temperature

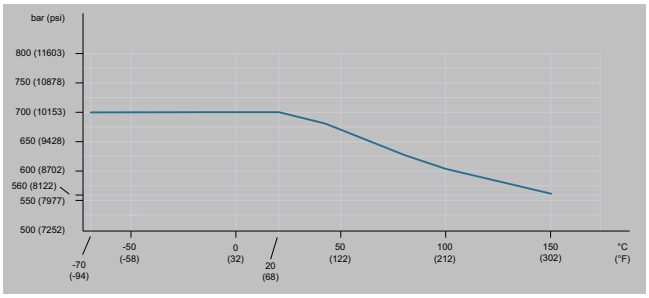
Process connection compatible to medium pressure autoclave

Note: Only available with FCS600 sizes DN 2 and DN 4

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## Technical specifications (continued)




Allowed process pressure as a function of process connection temperature

***Rupture disc***

The rupture disc is located on the sensor housing. It is available with some FC600 specification combinations (selectable using order option code S32).

Its bursting pressure is 20 bar (291 psi), the nominal diameter is 8 mm (0.315 in.). In the case of larger nominal diameters and high pressures, the entire process pressure may not be released across the rupture disc. In such case it is possible to request a customized design from your local Siemens sales organization.

In the event of a burst pipe, the rupture disc provides an acoustic signal in applications with gases.

***Ambient conditions***

Allowed ambient and storage temperature of SITRANS FC600 series is influenced by the temperature specification of FCS600 sensor, FCT0X0 transmitter and the interconnecting cable.

***Ambient temperature***

Device surrounding air temperature is considered as ambient temperature. If the device is operating outdoors make sure that the solar irradiation does not increase the surface temperature of the device higher than the allowed maximum ambient temperature. Transmitter display has limited legibility below -20 °C (-4 °F).

The sensor ambient temperature limits may also be influenced by the process fluid temperature, details shown in the chapter "Sensors" (Technical specifications).

Maximum ambient temperature ranges for FC600 series

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... 140 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

Ambient temperature range for NTEP custody transfer approval

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +50 °C (-31 ... +122 °F) |

Maximum storage temperature ranges for FC600 series

| Cable type | Transmitter style | Device | Storage temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

***Temperature specification of FC600 series Ex versions located in hazardous areas***

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region when it is used in a location where explosive atmospheres may be present.

The maximum ambient and process fluid temperatures depending on explosion groups and temperature classes can be determined via the SITRANS FC order code together with the Ex code (see the corresponding explosion proof type manual).

Note**:** The maximum process fluid temperature could be further restricted due to process connection type, refer to curves above under the heading "Allowed ambient temperature for FCS600 sensors".

***FCS600 nominal sizes DN 2 and DN 4, remote transmitter***

Ex approvals:

All gas groups: ATEX, IEC Ex, FM, EAC Ex, NEPSI, Korea Ex, UK Ex

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## Technical specifications (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 75 °C (167 °F) | 43 °C (109 °F) | 43 °C (109 °F) |
| T5 | 90 °C (194 °F) | 58 °C (136 °F) | 58 °C (136 °F) |
| T4 | 125 °C (257 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 60 °C (140 °F) |

***FCS600 nominal sizes DN 15, DN 25, DN 40 and DN 65, compact transmitter***

***Standard temperature***

Ex approvals:

- Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups A, B, C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 66 °C (150 °F) | 43 °C (109 °F) |
| T5 | 82 °C (179 °F) | 58 °C (136 °F) |
| T4 | 118 °C (244 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

Ex approvals:

- Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 60 °C (140 °F) |
| T4 | 112 °C (233 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS600 nominal sizes DN 15, DN 25, DN 40 and DN 65, remote transmitter***

***Standard temperature, standard neck***

Ex approvals:

- Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas groups A, B, C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 66 °C (150 °F) | 41 °C (105 °F) | 41 °C (105 °F) |
| T5 | 82 °C (179 °F) | 56 °C (132 °F) | 56 °C (132 °F) |
| T4 | 118 °C (244 °F) | 80 °C (176 °F) | 62 °C (143 °F) |
| T3 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T2 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T1 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |

Ex approvals:

Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

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**Technical specifications** (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 75 °C (167 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T3 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T2 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T1 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |

Ex approvals:
Gas groups C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 70 °C (158 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T3 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T2 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T1 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |

***Standard temperature, long neck***

Ex approvals:
Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 66 °C (150 °F) | 47 °C (116 °F) | 47 °C (116 °F) |
| T5 | 82 °C (179 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T4 | 118 °C (244 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas groups A, B, C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 66 °C (150 °F) | 47 °C (116 °F) | 47 °C (116 °F) |
| T5 | 82 °C (179 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T4 | 118 °C (244 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 75 °C (167 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

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## Technical specifications (continued)

Ex approvals:
Gas groups C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 70 °C (158 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

***Low temperature, long neck***

Ex approvals:
Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 60 °C (140 °F) | 60 °C (140 °F) | 60 °C (140 °F) |
| T5 | 76 °C (168 °F) | 76 °C (168 °F) | 76 °C (168 °F) |
| T4 | 113 °C (235 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas groups A, B, C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 60 °C (140 °F) | 60 °C (140 °F) | 60 °C (140 °F) |
| T5 | 76 °C 168 °F) | 76 °C (168 °F) | 70 °C (158 °F) |
| T4 | 113 °C (235 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 58 °C (136 °F) | 58 °C (136 °F) | 58 °C (136 °F) |
| T5 | 74 °C (165 °F) | 74 °C (165 °F) | 74 °C (165 °F) |
| T4 | 111 °C (232 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas groups C, D, E, F and G: FM

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## Technical specifications (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 58 °C (136 °F) | 58 °C (136 °F) | 58 °C (136 °F) |
| T5 | 74 °C (165 °F) | 74 °C (165 °F) | 70 °C (158 °F) |
| T4 | 111 °C (232 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

***Medium temperature, long neck***

Ex approvals:

Gas groups IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 66 °C (150 °F) | 47 °C (116 °F) | 47 °C (116 °F) |
| T5 | 82 °C (179 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T4 | 118 °C (244 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 185 °C (365 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

Ex approvals:

Gas groups A, B, C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 66 °C (150 °F) | 47 °C (116 °F) | 47 °C (116 °F) |
| T5 | 82 °C (179 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T4 | 118 °C (244 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 185 °C (365 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

Ex approvals:

Gas groups IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 75 °C (167 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 181 °C (357 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

Ex approvals:

Gas groups C, D, E, F and G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 59 °C (138 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T5 | 75 °C (167 °F) | 75 °C (167 °F) | 70 °C (158 °F) |
| T4 | 112 °C (233 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 181 °C (357 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

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## Technical specifications (continued)

***High temperature, long neck***

Ex approvals:

All gas groups: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 65 °C (149 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T5 | 80 °C (176 °F) | 77 °C (170 °F) | 77 °C (170 °F) |
| T4 | 115 °C (239 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T2 | 275 °C (527 °F) | 73 °C (163 °F) | 50 °C (122 °F) |
| T1 | 350 °C (662 °F) | 60 °C (140 °F) | 40 °C (104 °F) |

Ex approvals:

All gas groups: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 65 °C (149 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T5 | 80 °C (176 °F) | 77 °C (170 °F) | 70 °C (158 °F) |
| T4 | 115 °C (239 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T2 | 275 °C (527 °F) | 73 °C (163 °F) | 50 °C (122 °F) |
| T1 | 350 °C (662 °F) | 60 °C (140 °F) | 40 °C (104 °F) |

***Additional ambient and environmental specifications***

| Specification | Rating/level of compliance |
|---|---|
| **Relative humidity** | 0 ... 95% |
| **Ingress protection** | IP66 or IP67 with suitable cable glands |
| **Environmental pollution** | Pollution degree 4 in accordance with EN 61010-1 whilst in operation |
| **Maximum altitude** | 2 000 m (6 600 ft) above mean sea level (MSL) |
| **Mechanical load** | • Transmitter: 10 ... 500 Hz, 1g<br>• Sensor: 10 ... 500 Hz, 1g<br>according to IEC 60068-2-6 |
| **Electromagnetic (EMC) Immunity** | • EN IEC 61326-1, Table 2<br>• EN IEC 61326-2-3<br>• EN IEC 61326-2-5<br>• NAMUR NE 21 recommendation<br>• DNV-CG-0339 section 3, chapter 14 |
| **Surge Immunity Emission** | • EN 61000-4-5 for lightning protection<br>• EN IEC 61000-3-2, Class A (harmonic current emissions)<br>• EN IEC 61000-3-3, Class A (voltage fluctuations)<br>• Immunity assessment criterion: output signal fluctuation is within ± 1% of the output span |
| **Overvoltage** | Category II according to EN IEC 61010-1 |

***Approvals and certificates – summary***

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | B | ATEX, explosion group IIC and IIIC |
| 15, Ex approval | C | ATEX, explosion group IIB and IIIC |
| 15, Ex approval | D | IECEx, explosion group IIC and IIIC |

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | E | IECEx, explosion group IIB and IIIC |
| 15, Ex approval | H | FM, groups A, B, C, D, E, F, G |
| 15, Ex approval | J | FM, groups C, D, E, F, G |
| 15, Ex approval | M | NEPSI, explosion group IIC and dust proof |
| 15, Ex approval | N | NEPSI, explosion group IIB and dust proof |
| 15, Ex approval | F | EAC Ex, explosion group IIC and IIIC |
| 15, Ex approval | G | EAC Ex, explosion group IIB and IIIC |
| 15, Ex approval | P | Korea Ex, explosion group IIC and IIIC |
| 15, Ex approval | Q | Korea Ex, explosion group IIB and IIIC |
| 15, Ex approval | U | UKEx, explosion group IIC and IIIC |
| 15, Ex approval | V | UKEx, explosion group IIB and IIIC |
| ZS2, Marine approval | S22 | Marine approval according DNV, ABS and KR piping class 2 |
| ZS2, Marine approval | S23 | Marine approval according DNV, ABS and KR piping class 3 |
| ZS2, Marine approval | S24 | Marine approval according LR MR TAC piping class 2 |
| ZS2, Marine approval | S25 | Marine approval according LR MR TAC piping class 3 |
| ZS2, Marine approval | S26 | Marine approved BV piping class 2 |
| ZS2, Marine approval | S27 | Marine approved BV piping class 3 |
| ZC1, Certificate | C16 | NTEP approval, accuracy class 0.3 acc. NIST Handbook 44 |
| ZC1, Certificate | C11 | Compliance with the order 2.1 EN 10204 |
| ZC1, Certificate | C40 | Quality Inspection Certificate 3.1 EN 10204 |
| ZC1, Certificate | C13 | 3.1 EN 10204 + IGC + NACE MR0175, MR0103 |
| ZC1, Certificate | C18 | Pressure Test Certificate 3.1 EN 10204 |
| ZC1, Certificate | C54 | Degreasing ASTM G93-03, including report |
| ZC1, Certificate | C36 | WPS; WPQR; WQC |
| ZC1, Certificate | C37 | Welding procedures and Certificate ASME IX |
| ZC1, Certificate | C33 | X-ray EN ISO 17636-1/B |
| ZC1, Certificate | C34 | X-ray test according to ASME V |

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## Technical specifications (continued)

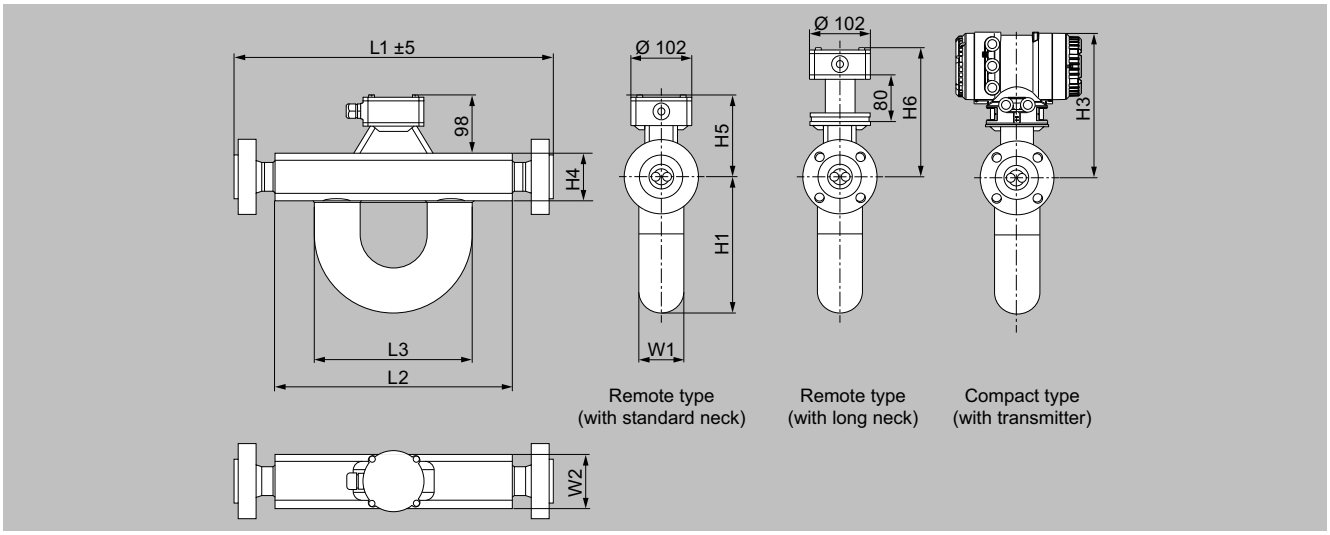
| Position in code, type | Order code | Description |
|---|---|---|
| ZC1, Certificate | C38 | Dye penetration EN ISO 3452-1 |
| ZC1, Certificate | C39 | Dye penetration ASME V |
| ZC1, Certificate | C20 | Functional Safety (IEC 61508) - SIL2/3 |

| Position in code, type | Order code | Description |
|---|---|---|
| ZC1, Certificate | C60 | Surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C61 | Surface wetted parts Ra ≤ 0.8 µm, with certificate |
| ZC1, Certificate | C62 | 3A approval, surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C63 | EHEDG approval, surface wetted parts Ra ≤ 0.8 µm |
| ZC1, Certificate | C15 | PMI 3.1 according to EN 10204 |
| ZC1, Certificate | C50 | Ferrite test EN ISO 8249 for flange |

## Dimensional drawings

***Drawings, dimensions and weight for FCS600 sensors***

***FCS dimensions and weight (excluding high pressure versions)***

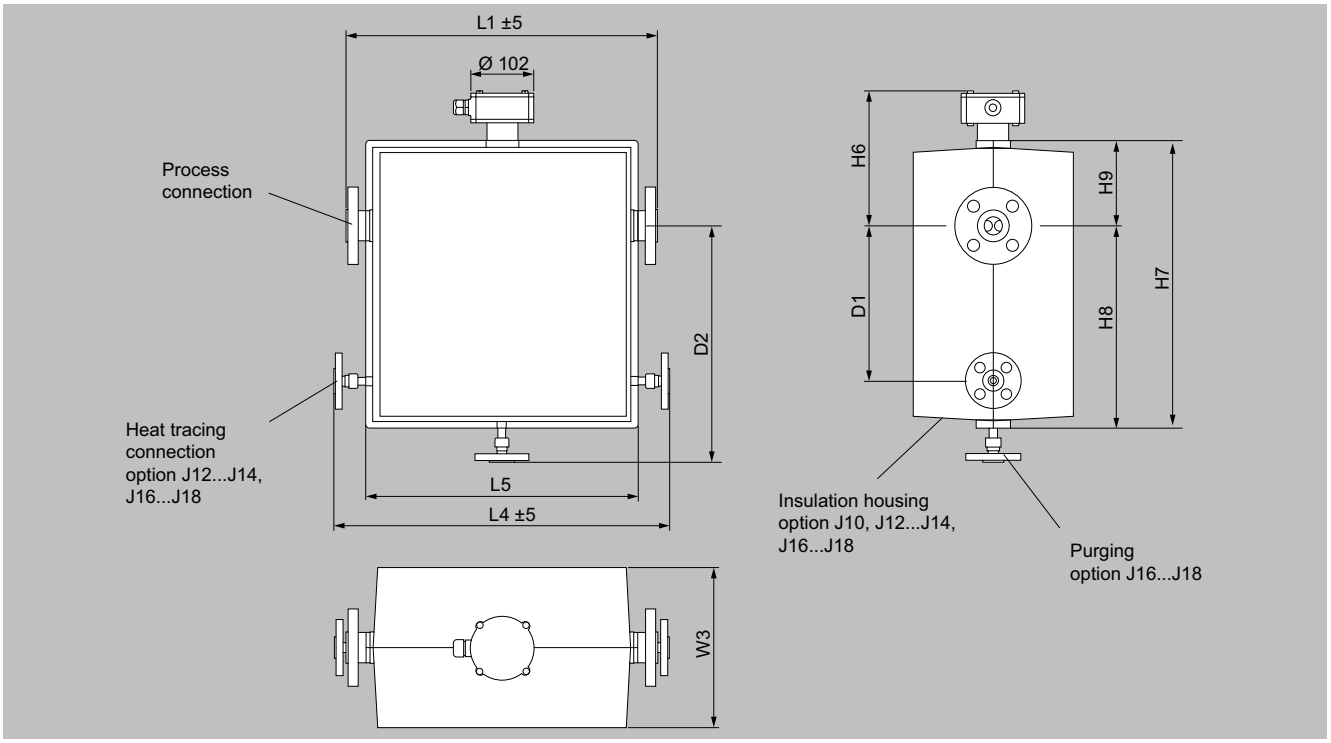



DImensions in mm

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## Dimensional drawings (continued)




Dimensions in mm (with insulation and heating options)

***FCS600 sensor dimensions without L1***

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 15 | 272 (10.7) | 212 (8.3) | 420 (16.5) | 310 (12.2) | 60 (2.4) | 80 (3.1) | 240 (9.4) | 200 (7.9) | 330 (13) |
| DN 25 | 400 (15.7) | 266 (10.5) | 540 (21.3) | 439 (17.3) | 76 (3) | 90 (3.5) | 260 (10.2) | 250 (9.8) | 380 (15) |
| DN 40 | 490 (19.3) | 267 (10.5) | 640 (25.2) | 530 (20.9) | 89 (3.5) | 110 (4.3) | 260 (10.2) | 250 (9.8) | 430 (16.9) |
| DN 65 | 850 (33.5) | 379 (14.9) | 1000 (39.4) | 894 (35.2) | 129 (5.1) | 160 (6.3) | 302 (11.9) | 350 (13.8) | 545 (21.5) |

| Nominal size | H1 | H3 | H4 | H5 | H6 | H7 | H8 | H9 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 15 | 177 (7) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 411 (16.2) | 273 (10.7) | 138 (5.4) |
| DN 25 | 230 (9.1) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 464 (18.3) | 326 (12.8) | 138 (5.4) |
| DN 40 | 268 (10.6) | 277 (10.9) | 100 (3.9) | 148 (5.8) | 228 (9) | 524 (20.6) | 376 (14.8) | 148 (5.8) |
| DN 65 | 370 (14.6) | 294.5 (11.6) | 135 (5.3) | 165 (6.5) | 246 (9.7) | 668 (26.3) | 503 (19.8) | 165 (6.5) |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb).

***L1 dimension and weight with process connections according to ASME B16.5, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 150, raised face (RF) | 370 (14.6) | 10 (22) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 300, raised face (RF) | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME ½" class 600, raised face (RF) | 380 (15) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME ½" class 600, ring joint (RJ) | 380 (15) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| ASME 1" class 150, raised face (RF) | 370 (14.6) | 10.8 (24) | 500 (19.7) | 14.8 (33) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 370 (14.6) | 11.8 (26) | 500 (19.7) | 15.8 (35) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 390 (15.4) | 12.2 (27) | 520 (20.5) | 16.2 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, ring joint (RJ) | 390 (15.4) | 12.4 (27) | 520 (20.5) | 16.2 (36) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 380 (15) | 11.8 (26) | 500 (19.7) | 15.8 (35) | 600 (23.6) | 25 (56) | n/a | n/a |
| ASME 1½" class 300, raised face (RF) | 380 (15) | 14.2 (31) | 510 (20.1) | 18.2 (40) | 600 (23.6) | 27.2 (60) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 400 (15.7) | 15.4 (34) | 530 (20.9) | 19.2 (42) | 620 (24.4) | 28.2 (62) | n/a | n/a |
| ASME 1½" class 600, ring joint (RJ) | 400 (15.7) | 15.4 (34) | 530 (20.9) | 19.4 (43) | 620 (24.4) | 28.2 (62) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | n/a | n/a | 510 (20.1) | 17.4 (38) | 600 (23.6) | 26.4 (58) | n/a | n/a |
| ASME 2" class 300, raised face (RF) | n/a | n/a | 510 (20.1) | 19 (42) | 600 (23.6) | 28 (62) | n/a | n/a |
| ASME 2" class 600, raised face (RF) | n/a | n/a | 540 (21.3) | 20.8 (46) | 630 (24.8) | 29.8 (66) | n/a | n/a |
| ASME 2" class 600, ring joint (RJ) | n/a | n/a | 540 (21.3) | 21.2 (47) | 630 (24.8) | 29.8 (66) | n/a | n/a |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 29.6 (65) | n/a | n/a |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 31 (68) | n/a | n/a |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 33.4 (74) | n/a | n/a |
| ASME 2½" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 640 (25.2) | 34.4 (76) | n/a | n/a |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 30.6 (67) | 1 000 (39.4) | 60.2 (133) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 34.6 (76) | 1 000 (39.4) | 63.4 (140) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 38 (84) | 1 000 (39.4) | 65.8 (145) |
| ASME 3" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 640 (25.2) | 38.6 (85) | 1 000 (39.4) | 65.8 (145) |
| ASME 4" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 64 (141) |
| ASME 4" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 71.4 (157) |
| ASME 4" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 82.6 (182) |
| ASME 4" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 82.8 (183) |
| ASME 5" class 150, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66 (146) |
| ASME 5" class 300, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 78.4 (173) |
| ASME 5" class 600, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 102.8 (227) |
| ASME 5" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | n/a | n/a | 1 030 (40.6) | 103.6 (228) |

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## Dimensional drawings (continued)

***L1 dimension and weight with process connections according to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| ASME 1" class 150, raised face (RF) | 390 (15.4) | 11.4 (25) | n/a | n/a | n/a | n/a |
| ASME 1" class 300, raised face (RF) | 390 (15.4) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME 1" class 600, raised face (RF) | 390 (15.4) | 12.4 (27) | n/a | n/a | n/a | n/a |
| ASME 1½" class 150, raised face (RF) | 390 (15.4) | 12.6 (28) | 520 (20.5) | 16.5 (35) | n/a | n/a |
| ASME 1½" class 300, raised face (RF) | 390 (15.4) | 15.4 (34) | 520 (20.5) | 19.1 (42) | n/a | n/a |
| ASME 1½" class 600, raised face (RF) | 400 (15.7) | 15.6 (34) | 530 (20.9) | 19.6 (43) | n/a | n/a |
| ASME 2" class 150, raised face (RF) | 390 (15.4) | 14.8 (33) | 520 (20.5) | 18.5 (41) | 620 (24.4) | 27.3 (60) |
| ASME 2" class 300, raised face (RF) | 390 (15.4) | 16 (35) | 520 (20.5) | 20.5 (45) | 620 (24.4) | 29.1 (64) |
| ASME 2" class 600, raised face (RF) | 410 (16.1) | 17.6 (39) | 540 (21.3) | 21.6 (48) | 630 (24.8) | 29.7 (66) |
| ASME 2½" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 30.9 (68) |
| ASME 2½" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.5 (72) |
| ASME 2½" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 33.9 (75) |
| ASME 3" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.8 (72) |
| ASME 3" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 36.6 (81) |
| ASME 3" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 640 (25.2) | 38.9 (86) |

***L1 dimension and weight with process connections according to EN 1092-1, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) | DN 65 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|---|---|
| EN DN 15 PN 40 type B1, raised face (RF) | 370 (14.6) | 10.6 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type D, with groove | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type E, with spigot | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 40 type F, with recess | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type B1, raised face (RF) | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type D, with groove | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type E, with spigot | 380 (15) | 11.2 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 15 PN 100 type F, with recess | 380 (15) | 11.4 (25) | n/a | n/a | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type B1, raised face (RF) | 370 (14.6) | 11.6 (26) | 500 (19.7) | 15.6 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type D, with groove | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.4 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type E, with spigot | 370 (14.6) | 11.2 (25) | 500 (19.7) | 15.2 (34) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 40 type F, with recess | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.4 (34) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 25 PN 100 type B1, raised face (RF) | 390 (15.4) | 14 (31) | 520 (20.5) | 18.2 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type D, with groove | 390 (15.4) | 14 (31) | 520 (20.5) | 18 (40) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type E, with spigot | 390 (15.4) | 13.6 (30) | 520 (20.5) | 17.6 (39) | n/a | n/a | n/a | n/a |
| EN DN 25 PN 100 type F, with recess | 390 (15.4) | 14 (31) | 520 (20.5) | 18 (40) | n/a | n/a | n/a | n/a |
| EN DN 40 PN 40 type B1, raised face (RF) | 370 (14.6) | 13 (29) | 500 (19.7) | 17 (37) | 600 (23.6) | 26.2 (58) | n/a | n/a |
| EN DN 40 PN 40 type D, with groove | 370 (14.6) | 13 (29) | 500 (19.7) | 17 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| EN DN 40 PN 40 type E, with spigot | 370 (14.6) | 12.6 (28) | 500 (19.7) | 16.6 (37) | 600 (23.6) | 25.8 (57) | n/a | n/a |
| EN DN 40 PN 40 type F, with recess | 370 (14.6) | 12.8 (29) | 500 (19.7) | 16.8 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| EN DN 40 PN 100 type B1, raised face (RF) | 450 (17.7) | 17.6 (39) | 560 (22) | 21.2 (47) | 620 (24.4) | 29.8 (66) | n/a | n/a |
| EN DN 40 PN 100 type D, with groove | 450 (17.7) | 17.4 (38) | 560 (22) | 21.2 (47) | 620 (24.4) | 29.6 (65) | n/a | n/a |
| EN DN 40 PN 100 type E, with spigot | 450 (17.7) | 17 (37) | 560 (22) | 20.8 (46) | 620 (24.4) | 29.2 (64) | n/a | n/a |
| EN DN 40 PN 100 type F, with recess | 450 (17.7) | 17.4 (38) | 560 (22) | 21 (46) | 620 (24.4) | 29.6 (65) | n/a | n/a |
| EN DN 50 PN 40 type B1, raised face (RF) | n/a | n/a | 500 (19.7) | 18.4 (41) | 600 (23.6) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN40 type D, with groove | n/a | n/a | 500 (19.7) | 18.2 (40) | 600 (23.6) | 27.4 (60) | n/a | n/a |
| EN DN 50 PN 40 type E, with spigot | n/a | n/a | 500 (19.7) | 18 (40) | 600 (23.6) | 27 (60) | n/a | n/a |
| EN DN 50 PN 40 type F, with recess | n/a | n/a | 500 (19.7) | 18.2 (40) | 600 (23.6) | 27.2 (60) | n/a | n/a |
| EN DN 50 PN 63 type B1, raised face (RF) | n/a | n/a | 520 (20.5) | 21.6 (48) | 620 (24.4) | 30.6 (67) | n/a | n/a |
| EN DN 50 PN 63 type D, with groove | n/a | n/a | 520 (20.5) | 21.4 (47) | 620 (24.4) | 30.4 (67) | n/a | n/a |
| EN DN 50 PN 63 type E, with spigot | n/a | n/a | 520 (20.5) | 21 (46) | 620 (24.4) | 30 (66) | n/a | n/a |
| EN DN 50 PN 63 type F, with recess | n/a | n/a | 520 (20.5) | 21.2 (47) | 620 (24.4) | 30.2 (67) | n/a | n/a |
| EN DN 50 PN 100 type B1, raised face (RF) | n/a | n/a | 590 (23.2) | 25.2 (56) | 660 (26) | 33.6 (74) | n/a | n/a |
| EN DN 50 PN 100 type D, with groove | n/a | n/a | 590 (23.2) | 25 (55) | 660 (26) | 33.4 (74) | n/a | n/a |
| EN DN 50 PN 100 type E, with spigot | n/a | n/a | 590 (23.2) | 24.4 (54) | 660 (26) | 33 (73) | n/a | n/a |
| EN DN 50 PN 100 type F, with recess | n/a | n/a | 590 (23.2) | 24.8 (56) | 660 (26) | 33.4 (74) | n/a | n/a |
| EN DN 80 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 610 (24) | 31 (68) | 1 000 (39.4) | 60.4 (133) |
| EN DN 80 PN 40 type D, with groove | n/a | n/a | n/a | n/a | 610 (24) | 30.8 (68) | 1 000 (39.4) | 60.2 (133) |
| EN DN 80 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | 610 (24) | 30.4 (67) | 1 000 (39.4) | 59.8 (132) |
| EN DN 80 PN 40 type F, with recess | n/a | n/a | n/a | n/a | 610 (24) | 30.6 (67) | 1 000 (39.4) | 60 (132) |
| EN DN 80 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 34.4 (76) | 1 000 (39.4) | 63.4 (140) |
| EN DN 80 PN 63 type D, with groove | n/a | n/a | n/a | n/a | 620 (24.4) | 34.2 (75) | 1 000 (39.4) | 63.2 (139) |
| EN DN 80 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | 620 (24.4) | 33.6 (74) | 1 000 (39.4) | 62.8 (138) |
| EN DN 80 PN 63 type F, with recess | n/a | n/a | n/a | n/a | 620 (24.4) | 33.8 (75) | 1 000 (39.4) | 63 (139) |
| EN DN 80 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 730 (28.7) | 41.8 (92) | 1 000 (39.4) | 67.2 (148) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 80 PN 100 type D, with groove | n/a | n/a | n/a | n/a | 730 (28.7) | 41.6 (92) | 1 000 (39.4) | 67 (148) |
| EN DN 80 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | 730 (28.7) | 41 (90) | 1 000 (39.4) | 66.4 (146) |
| EN DN 80 PN 100 type F, with recess | n/a | n/a | n/a | n/a | 730 (28.7) | 41.4 (91) | 1 000 (39.4) | 66.6 (147) |
| EN DN 100 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 63.6 (140) |
| EN DN 100 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 63.2 (139) |
| EN DN 100 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 62.4 (138) |
| EN DN 100 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 62.6 (138) |
| EN DN 100 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 68 (150) |
| EN DN 100 PN 63 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.8 (149) |
| EN DN 100 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67 (148) |
| EN DN 100 PN 63 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.4 (149) |
| EN DN 100 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 76.6 (169) |
| EN DN 100 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 76.2 (168) |
| EN DN 100 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 75.4 (166) |
| EN DN 100 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 050 (41.3) | 75.8 (167) |
| EN DN 125 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.6 (149) |
| EN DN 125 PN 40 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 67.2 (148) |
| EN DN 125 PN 40 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66.4 (146) |
| EN DN 125 PN 40 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 66.6 (147) |
| EN DN 125 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 77.8 (172) |
| EN DN 125 PN 63 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 77.4 (171) |
| EN DN 125 PN 63 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 76.4 (168) |
| EN DN 125 PN 63 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 76.8 (169) |
| EN DN 125 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 93.2 (205) |
| EN DN 125 PN 100 type D, with groove | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 92.8 (205) |
| EN DN 125 PN 100 type E, with spigot | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 91.4 (202) |
| EN DN 125 PN 100 type F, with recess | n/a | n/a | n/a | n/a | n/a | n/a | 1 100 (43.3) | 92.4 (204) |

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## Dimensional drawings (continued)

***L1 dimension and weight with process connections according to EN 1092-1, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 25 PN 40, type B1, raised face (RF) | 390 (15.4) | 11.7 (26) | 520 (20.5) | 15.7 (35) | n/a | n/a |
| EN DN 40 PN 40, type B1, raised face (RF) | 390 (15.4) | 13.7 (30) | 520 (20.5) | 17.5 (39) | n/a | n/a |
| EN DN 50 PN 40, type B1, raised face (RF) | n/a | n/a | 520 (20.5) | 19.3 (43) | 620 (24.4) | 28 (62) |
| EN DN 80 PN 40, type B1, raised face (RF) | n/a | n/a | n/a | n/a | 620 (24.4) | 32.6 (72) |

***L1 dimension and weight with process connections according to JIS B 2220, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 15 10 K | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 15 20 K | 370 (14.6) | 10.4 (23) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS DN 25 10 K | 370 (14.6) | 11.4 (25) | 500 (19.7) | 15.6 (34) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 370 (14.6) | 11.8 (26) | 500 (19.7) | 15.8 (35) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 370 (14.6) | 12.2 (27) | 500 (19.7) | 16.2 (36) | 600 (23.6) | 25.4 (56) | n/a | n/a |
| JIS DN 40 20 K | 370 (14.6) | 12.6 (28) | 500 (19.7) | 16.6 (37) | 600 (23.6) | 25.8 (57) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | 500 (19.7) | 17 (37) | 600 (23.6) | 26 (57) | n/a | n/a |
| JIS DN 50 20 K | n/a | n/a | 500 (19.7) | 17.2 (38) | 600 (23.6) | 26.2 (58) | n/a | n/a |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | 600 (23.6) | 27.8 (61) | 1 000 (40.2) | 57.8 (127) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | 610 (24) | 30.4 (67) | 1 000 (40.2) | 60 (132) |
| JIS DN 100 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 59 (130) |
| JIS DN 100 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 63 (139) |
| JIS DN 125 10 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 62.8 (138) |
| JIS DN 125 20 K | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (40.2) | 69 (152) |

***L1 dimension and weight with process connections according to JIS B 2220, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS DN 25 10 K | 390 (15.4) | 12.1 (27) | n/a | n/a | n/a | n/a |
| JIS DN 25 20 K | 390 (15.4) | 12.5 (28) | n/a | n/a | n/a | n/a |
| JIS DN 40 10 K | 390 (15.4) | 13.6 (30) | 520 (20.5) | 17.4 (38) | n/a | n/a |
| JIS DN 40 20 K | 390 (15.4) | 14 (31) | 520 (20.5) | 17.6 (39) | n/a | n/a |
| JIS DN 50 10 K | n/a | n/a | 520 (20.5) | 18.6 (41) | 620 (24.4) | 27.3 (60) |
| JIS DN 50 20 K | n/a | n/a | 520 (20.5) | 18.8 (41) | 620 (24.4) | 27.3 (60) |
| JIS DN 80 10 K | n/a | n/a | n/a | n/a | 620 (24.4) | 30.8 (68) |
| JIS DN 80 20 K | n/a | n/a | n/a | n/a | 620 (24.4) | 33.3 (73) |

***L1 dimension and weight with G threaded process connections, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | | DN 65 | |
|---|---|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ⅜" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ½" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| G ¾" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

### *L1 dimension and weight with NPT threaded process connections, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ⅜" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| ½" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |
| ¾" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a | n/a | n/a |

### *L1 dimension and weight with hygienic clamp process connections to DIN 32676 Series A, AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series A, DN 25 | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 40 | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| DIN 32676 series A, DN 50 | n/a | n/a | 500 (19.7) | 13.2 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| DIN 32676 series A, DN 65 | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |
| DIN 32676 series A, DN 100 | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 52.1 (115) |

### *L1 dimension and weight with hygienic clamp process connections to DIN 32676 Series C (Tri-clamp), AISI 316L wetted parts*

| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| DIN 32676 series C, 1" | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 1½" | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| DIN 32676 series C, 2" | n/a | n/a | 500 (19.7) | 13.2 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| DIN 32676 series C, 3" | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |
| DIN 32676 series C, 4" | n/a | n/a | n/a | n/a | n/a | n/a | 1 000 (39.4) | 52.2 (115) |

### *L1 dimension and weight with hygienic clamp process connections to JIS/ISO 2852, AISI 316L wetted parts*

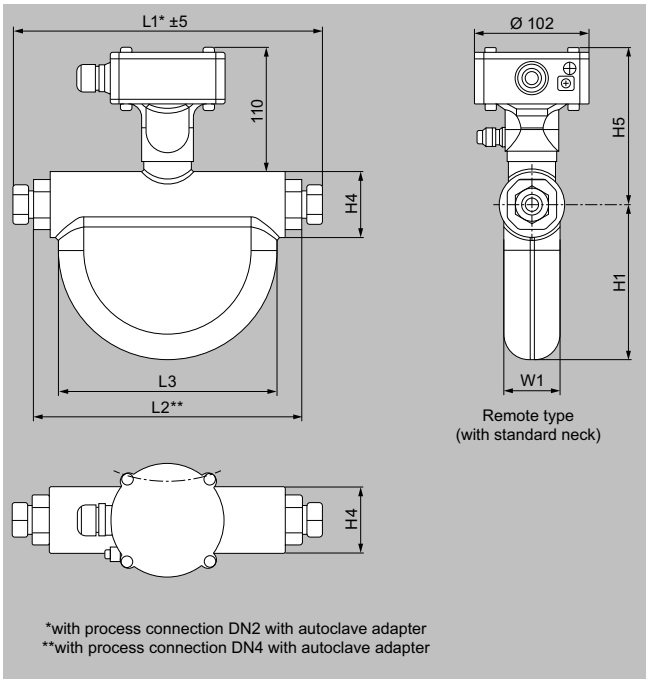
| Process connection size and type | FCS600 sensor nominal size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DN 15 | | DN 25 | | DN 40 | | DN 65 | |
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| JIS/ISO 2852, 1" | 370 (14.8) | 9.2 (20) | n/a | n/a | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 1½" | 370 (14.8) | 9.2 (20) | 500 (19.7) | 13.2 (29) | n/a | n/a | n/a | n/a |
| JIS/ISO 2852, 2" | n/a | n/a | 500 (19.7) | 13.3 (29) | 600 (23.6) | 22.4 (49) | n/a | n/a |
| JIS/ISO 2852, 3" | n/a | n/a | n/a | n/a | 600 (23.6) | 22.5 (50) | n/a | n/a |

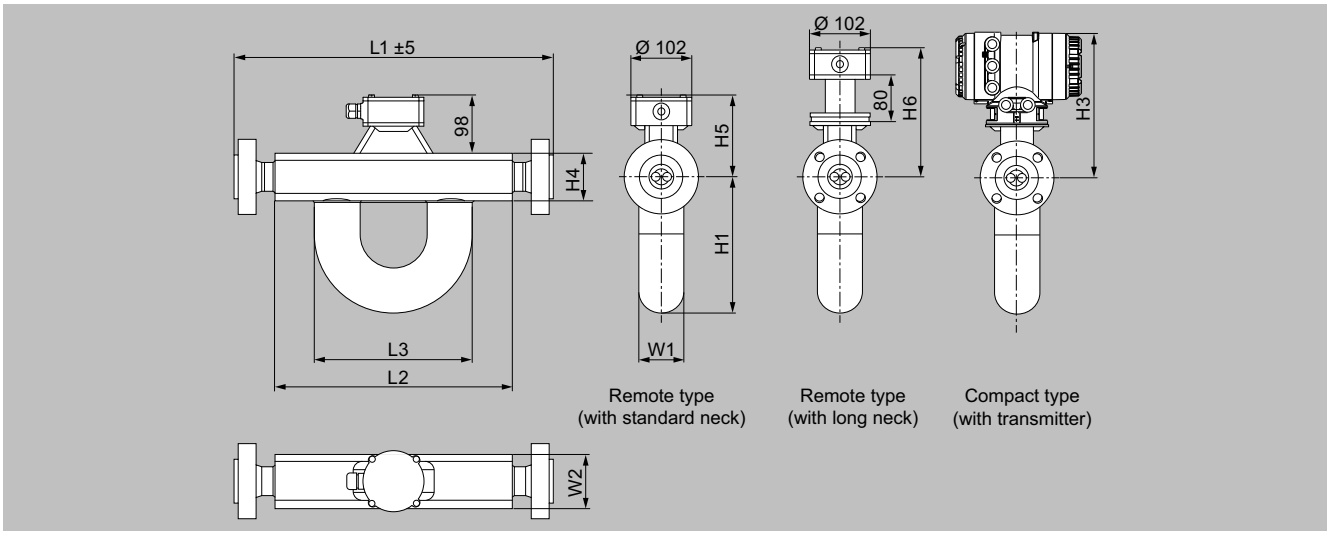
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## Dimensional drawings (continued)

***FCS600 dimensions and weight (high pressure versions)***



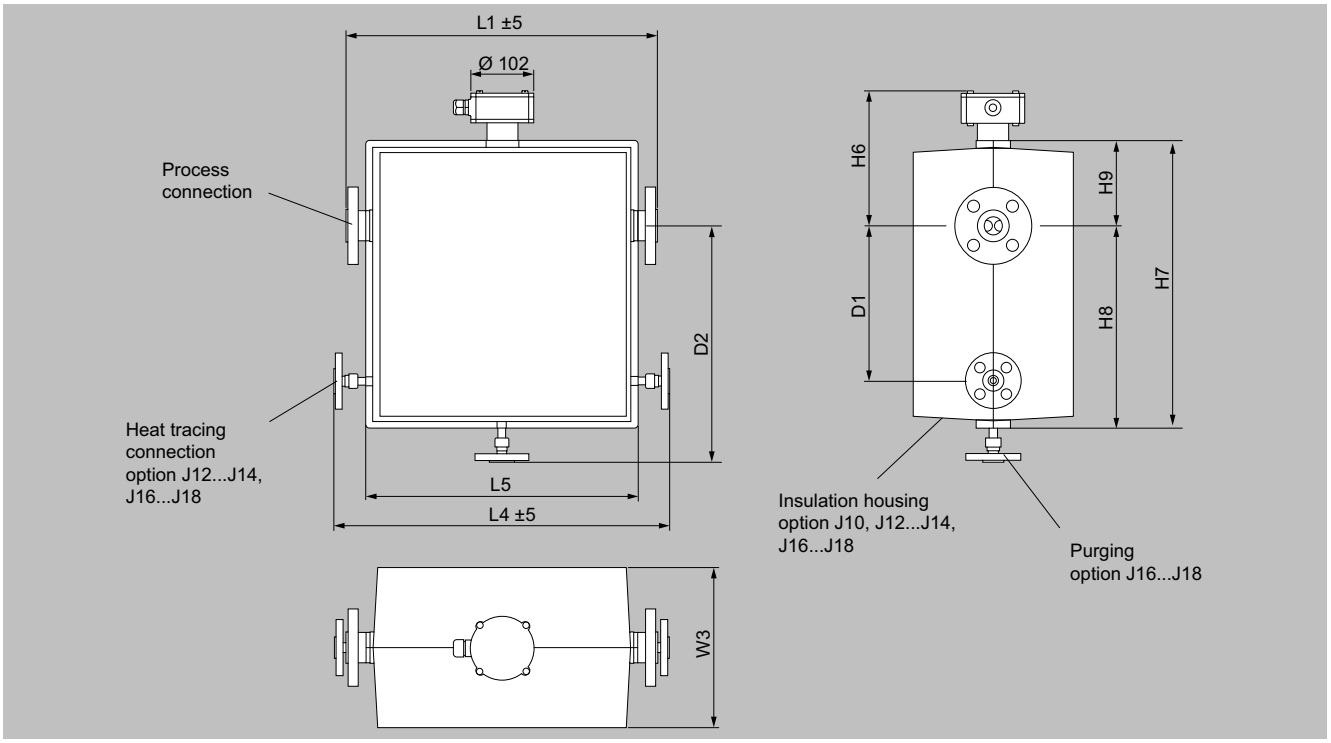




Dimensions in mm for sizes DN 15, DN 25 and DN 40

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## Dimensional drawings (continued)




Dimensions in mm, version with insulation housing for sizes DN 15, DN 25 and DN 40 only

***Dimensions without length L1***

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 2 | 240 (9.5) | 195 (7.7) | | | 50 (2.0) | | | | |
| DN 4 | 240 (9.5) | 195 (7.7) | | | 50 (2.0) | | | | |
| DN 15 | 272 (10.7) | 212 (8.3) | 420 (16.5) | 310 (12.2) | 60 (2.4) | 80 (3.1) | 240 (9.4) | 200 (7.9) | 330 (13) |
| DN 25 | 400 (15.7) | 266 (10.5) | 540 (21.3) | 439 (17.3) | 76 (3) | 90 (3.5) | 260 (10.2) | 250 (9.8) | 380 (15) |
| DN 40 | 490 (19.3) | 267 (10.5) | 640 (25.2) | 530 (20.9) | 89 (3.5) | 110 (4.3) | 260 (10.2) | 250 (9.8) | 430 (16.9) |

| Nominal size | H1 | H3 | H4 | H5 | H6 | H7 | H8 | H9 |
|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | |
| DN 2 | 138 (5.4) | | 59 (2.3) | 140 (5.5) | | | | |
| DN 4 | 138 (5.4) | | 59 (2.3) | 140 (5.5) | | | | |
| DN 15 | 177 (7) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 411 (16.2) | 273 (10.7) | 138 (5.4) |
| DN 25 | 230 (9.1) | 267 (10.5) | 80 (3.1) | 138 (5.4) | 218 (8.6) | 464 (18.3) | 326 (12.8) | 138 (5.4) |
| DN 40 | 268 (10.6) | 277 (10.9) | 100 (3.9) | 148 (5.8) | 228 (9) | 524 (20.6) | 376 (14.8) | 148 (5.8) |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the compact type: up to 3.2 kg (7.1 lb).

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## Dimensional drawings (continued)

***L1 dimension and weight for medium pressure autoclave process connections***

Wetted parts AISI 316L stainless steel and alloy 22

| Process connection size and type | FCS600 sensor nominal size DN 2 L1 in mm (inch) | Weight in kg (lb) | DN 4 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|
| Autoclave 9/16" adapter | 275 (10.8) | 7 (15.4) | 275 (10.8) | 7 (15.4) |
| Autoclave ¾" | 240 (9.5) | 7 (15.4) | 240 (9.5) | 7 (15.4) |

***L1 dimension and weight for process connections compatible to ASME B16.5, AISI 316L wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| ASME ½" class 900, raised face (RF) | 400 (15.7) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME ½" class 900, ring joint (RJ) | 400 (15.7) | 13 (29) | n/a | n/a | n/a | n/a |
| ASME ½" class 1 500, raised face (RF) | 400 (15.7) | 12.6 (28) | n/a | n/a | n/a | n/a |
| ASME ½" class 1 500, ring joint (RJ) | 400 (15.7) | 13 (29) | n/a | n/a | n/a | n/a |
| ASME 1" class 900, raised face (RF) | 450 (17.7) | 16.4 (36) | 540 (21.3) | 20.6 (45) | n/a | n/a |
| ASME 1" class 900, ring joint (RJ) | 450 (17.7) | 16.6 (37) | 540 (21.3) | 20.4 (45) | n/a | n/a |
| ASME 1" class 1500, raised face (RF) | 450 (17.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 1500, ring joint (RJ) | 450 (17.7) | 16.6 (37) | n/a | n/a | n/a | n/a |
| ASME 2" class 900, raised face (RF) | n/a | n/a | 660 (26) | 35.2 (78) | 720 (28.3) | 43 (95) |
| ASME 2" class 900, ring joint (RJ) | n/a | n/a | 660 (26) | 35.6 (78) | 720 (28.3) | 43.4 (96) |

***L1 dimension and weight for process connections compatible to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS600 sensor nominal size DN 15 L1 in mm (inch) | Weight in kg (lb) | DN 25 L1 in mm (inch) | Weight in kg (lb) | DN 40 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| ASME 1" class 900, raised face (RF) | 400 (15.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 900, ring joint (RJ) | n/a | n/a | 580 (23) | 21 (46) | n/a | n/a |
| ASME 1" class 1 500, raised face (RF) | 400 (15.7) | 16.4 (36) | n/a | n/a | n/a | n/a |
| ASME 1" class 1 500, ring joint (RJ) | n/a | n/a | 580 (23) | 21 (46) | n/a | n/a |
| ASME 2" class 900, raised face (RF) | n/a | n/a | 580 (23) | 34 (75) | 710 (28) | 44 (97) |
| ASME 2" class 900, ring joint (RJ) | n/a | n/a | 580 (23) | 36 (80) | 710 (28) | 44 (97) |
| ASME 2" class 1 500, ring joint (RJ) | n/a | n/a | 580 (23) | 36 (80) | 710 (28) | 44 (97) |
| ASME 3" class 900, raised face (RF) | n/a | n/a | n/a | n/a | 710 (28) | 50 (110) |
| ASME 3" class 900, ring joint (RJ) | n/a | n/a | n/a | n/a | 710 (28) | 52 (115) |

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## Dimensional drawings (continued)

***L1 dimension and weight for process connections with internal thread G***

| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| G ⅜" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| G ½" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| G ¾" | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |

***L1 dimension and weight for process connections with internal thread NPT***

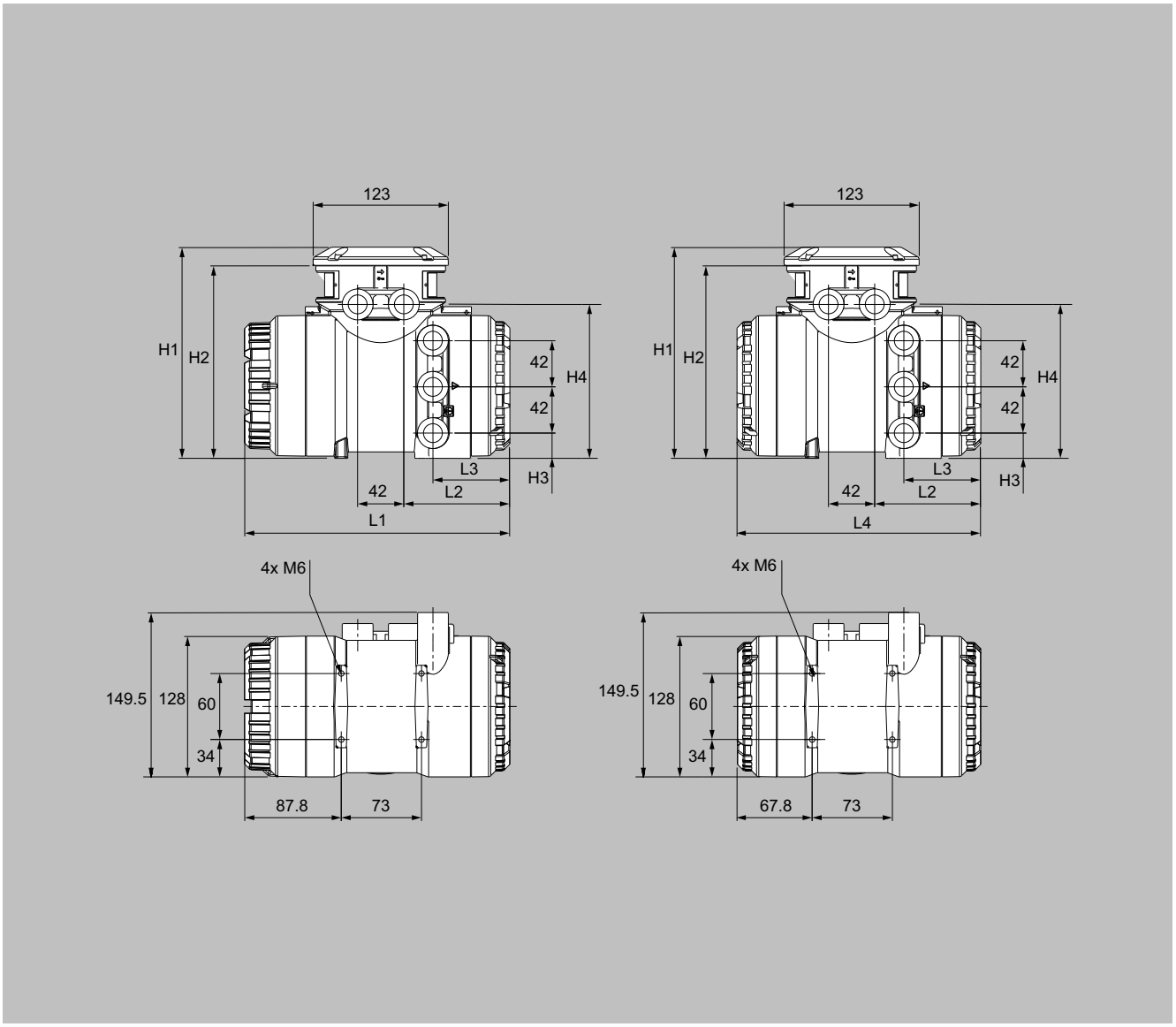
| Process connection size and type | FCS600 sensor nominal size DN 15 | | DN 25 | | DN 40 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ⅜" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| ½" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |
| ¾" NPT | 390 (15.4) | 9.4 (21) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

***Drawings, dimensions and weight for FCT020 and FCT040 transmitters***




Dimensions of FCT020 or FCT040 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

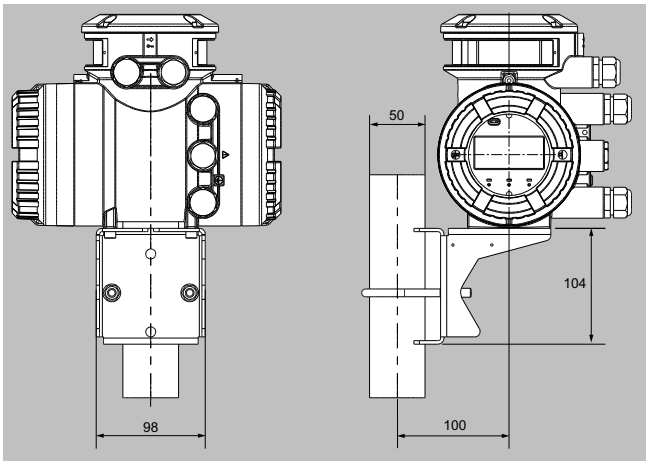
***Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)***

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| Aluminum | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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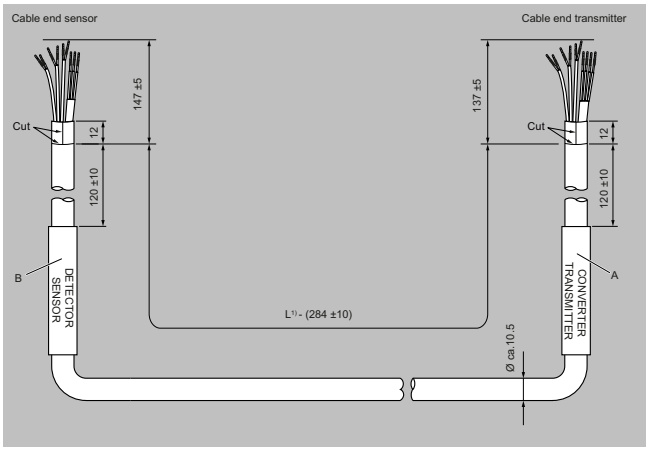


## Dimensional drawings (continued)




### *Connecting cable dimensions and weights*

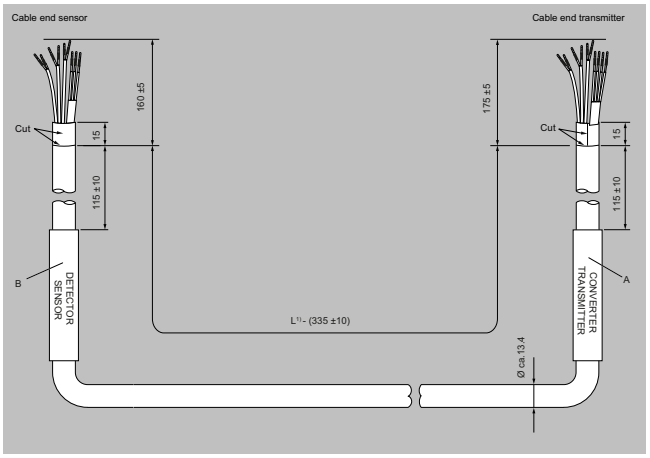
Standard cable




Dimensions in mm. Standard terminated cable. A and B are factory-fitted labels.

| Option code | Cable length, L | Cable colour |
|---|---|---|
| L51 | 5 m (16.4 ft) | Non-Ex: gray / Ex: blue |
| L54 | 10 m (32.8 ft) | |
| L57 | 15 m (49.2 ft) | |
| L60 | 20 m (65.6 ft) | |
| L63 | 30 m (98.4 ft) | |

Standard cable with steel-armored option

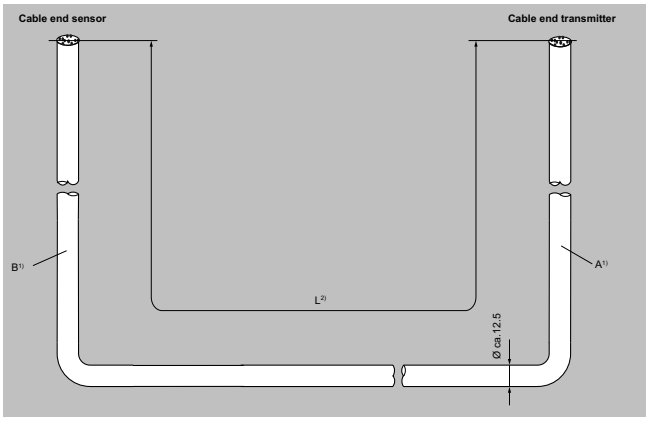



Dimensions in mm. Steel-armored terminated cable. A and B are factory-fitted labels.

| Option code | Cable length, L | Cable colour |
|---|---|---|
| L51 + A20/A21 | 5 m (16.4 ft) | Blue |
| L54 + A20/A21 | 10 m (32.8 ft) | |
| L57 + A20/A21 | 15 m (49.2 ft) | |
| L60 + A20/A21 | 20 m (65.6 ft) | |
| L63 + A20/A21 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.300 kg/m (0.202 lb/ft)

Fire retardant cable




Dimensions in mm. Fire retardant unterminated cable. Labels A and B are supplied loose with termination kit.

| Option code | Cable length, L | Cable colour |
|---|---|---|
| L71 | 5 m (16.4 ft) | Gray |
| L74 | 10 m (32.8 ft) | |
| L77 | 15 m (49.2 ft) | |
| L80 | 20 m (65.6 ft) | |
| L83 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.270 kg/m (0.181 lb/ft)

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## Overview

The flowmeter systems of the SITRANS FC500 series are the grande Coriolis multi-parameter flowmeter for large pipes and high flows.

They are formed by one FCS700 sensor and one FCT transmitter:

- SITRANS FC720 is the combination of the FCS700 sensor and the FCT020 transmitter
- SITRANS FC740 is the combination of the FCS700 sensor and the FCT040 transmitter

Features:

- Dual curved AISI 316L stainless steel or alloy 22 measuring tubes
- Process connection: flanges
- Nominal sizes: DN 100 to DN 200
- Connection sizes DN 100 to DN 250 (4" to 10")
- Nominal flow rates: 250 000 kg/h to 900 000 kg/h (551 156 to 1 984 160 lb/h)
- FCS700 sensors can be combined with compact or remote transmitters
- Versatility with superior turndown and modest pressure loss
- Durability and the performance required in large-scale processes



FC720/740 Coriolis flowmeter

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## Benefits

***Product features aligned to user value targets***

| | Customer value targets | SITRANS FC features and solutions |
|---|---|---|
| **Engineering and project management** | • Reduce engineering investment<br>• Cut specification effort<br>• Minimize project expenditure<br>• Decrease the spending on each measurement point<br>• Eliminate function duplication<br>• Reduce number of suppliers | • Siemens project teams offer complimentary evaluation of customer specifications, provided by regional and HQ experts<br>• Simple product selection using intuitive sizing software<br>• One SITRANS FC device can typically provide 3 to 6 individual measurements, all transmitted via digital communication, when planned during pre-project design<br>• Added value functions: batch control, viscosity, thermal energy, concentration measurement (Fraction) of two-component solutions, and pressure compensation |
| **Installation** | • Reduce footprint and transport outlay of OEM machinery<br>• Lower installation complexity<br>• Avoid costly modifications of existing plant | • Can be installed in horizontal or vertical (self-draining) pipes<br>• Twin tube bend design delivers strong signal to noise characteristic resistant to external influence, so install in tight spaces with no inlet and outlet restrictions<br>• Adaptable to existing pipes: typically, 3 or 4 connection sizes for each sensor size<br>• Flexible selection of traditional inputs, outputs, and digital communications |
| **Configuration and commissioning** | • Shorter commissioning schedules with lower costs<br>• Faster start-up with reduced outgoings | • Easy setup wizard delivers working meters straight after start-up<br>• microSD card stores sensor calibration data and default setup<br>• Simple configuration using Process Device Manager (PDM)<br>• Siemens device-specific faceplates simplify operation in plantwide control systems |
| **Efficient plant operation** | • Improve finished product consistency to reduce waste<br>• Keep process performance when scaling production up or down<br>• Optimize process control<br>• Improve finished product quality enabling higher levels of profit<br>• Reduce downtime with fast resolution of process upsets<br>• Improve asset performance | • SITRANS FC meters are calibrated in rigs accredited to EN/ISO 17025 to ensure consistently high performance of flow, density, and concentration measurements<br>• First-class zero-point quality maintains high accuracy into the low flow region<br>• High sensitivity and intelligent dynamic range keeps the measurement active in demanding high fluid damping cases<br>• Designed-in resilience to process extremes<br>• Self-verification alerts to potential performance issues due to unplanned process events, for example gas or vapor breakout or solid deposits building up in the tubes<br>• Diagnostic data via local menu or PDM is backed by Siemens applications experts<br>• Intelligent Siemens SITRANS IQ apps for continuing asset evaluation |
| **Maintenance and asset management** | • Optimize technician training<br>• Reduce cost of spare parts<br>• Increase predictive maintenance<br>• Reduce production downtime and associated costs<br>• Decrease unplanned maintenance<br>• Maximize asset value | • Simple product design with interchangeable modular parts<br>• Micro SD card loads sensor specific data to deliver fast service exchange<br>• Self-verification: tube health check monitors key diagnostics, including tube stiffness, driver and pickups; the user defines verification frequency and alarm behavior<br>• Verification results indicate whether preventive maintenance action is required<br>• Siemens SIMATIC Maintenance Station uses cyclical acquisition to provide life cycle reports and intelligent preventive maintenance strategies |
| **Industry compliance** | • Cut effort required to comply with Industry-specific demands<br>• Reduce resource needed to maintain regulatory compliance | • Food and beverage sector covered with EHEDG and 3-A approvals, polished tubes<br>• Global hazardous area approvals for international plant duplications<br>• Common and emerging digital networks covered: HART, PROFIBUS PA, PROFINET<br>• Class leading safety: SIL2/SIL3, secondary containment, PED, NAMUR NE95 |

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## Application

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Chemical and petrochemical**<br>Bulk chemicals<br>Industrial gases<br>Polymers<br>Agrochemicals<br>Fine chemicals<br>Aroma chemicals | • Transfer, loading and unloading of bulk chemicals<br>• Concentration control of acids and alkalis (process optimization)<br>• Accurate mass or volume flow of feed chemicals to in-line blending systems<br>• Accurate mass flow and density (quality) of reactor fluid feeds catalyst<br>• Chemical recovery<br>• Mass balance optimization<br>• Compressed and cryogenic gases<br>• Lubricating oil blending and dosing<br>• High accuracy measurement of critical fluid components<br>• Low flow control in pilot plants and R&D facilities |
| **Food and beverage**<br>Food processing<br>Dairies<br>Breweries<br>Distilleries<br>Confectionary<br>Soft drinks<br>Animal feed plants<br>OEM | • Accurate bulk transfer (mass or volume) of all dairy products: milk, cream, whey and yoghurt<br>• Fat concentration in cream<br>• Flow, density, temperature, and concentration (Plato) during all fermentation processes<br>• Flow, density, temperature, and sugar concentration (Brix) in soft drink processing<br>• Distilled spirits: % alcohol by volume (ABV), liters of pure alcohol, volume transfer, blending, batch and column still optimization and energy management, cask filling, tanker loading<br>• Flow and density of fruit juices and pulps<br>• Mixing and inventory control of confectionary ingredients, e.g., chocolate, syrup, oils, flavors<br>• Metering pump control<br>• Oils, Fats enzymes dosing in animal feed plants<br>• $CO_2$ dosing<br>• CIP liquids<br>• Bottling of beer, spirits, wine, soft drinks, etc.<br>• Bulk sugar processing: molasses, sugar slurries, density, Brix of finished product |
| **Oil and gas**<br>Offshore/onshore<br>Upstream/downstream<br>Pipelines<br>Distribution networks<br>Refineries<br>Skid manufacturers | • Loading/unloading of hydrocarbons (e.g., crude oil, bitumen) from/to ship, road tanker, rail car<br>• High pressure chemical injection<br>• High pressure low flow gas<br>• Net oil computing<br>• Gas void fraction<br>• Filling of gas bottles<br>• Furnace control<br>• Test separators<br>• LPG, natural gas hydration<br>• Well-head water-cut monitoring<br>• All hydrocarbon fluids in refineries<br>• Metrology, custody transfer<br>• Drilling mud<br>• Oil well cementing and hydrofracturing |

## Application (continued)

| Application examples for SITRANS FC multi-parameter meters across diverse industry sectors | |
|---|---|
| **Life sciences**<br>Pharmaceutical<br>Bio | • High accuracy flow and batching of bioreactor feeds<br>• Solvent flow rate, density and batching<br>• Flow of demineralized and deionized water<br>• Solvents and fish oils used in high grade omega 3 oils<br>• Precision coatings<br>• Vacuum thin film coating |
| **Household and personal care**<br>Detergents<br>Cosmetics | • Blending and batching of detergent ingredients<br>• Tanker loading and unloading<br>• Salt concentration<br>• Reliable measurement of aerated liquids |
| **Automotive and aeronautical**<br>Vehicle manufacturing<br>Paint<br>Engine testing<br>OEM | • Fuel injection nozzle and pump testing<br>• Filling of under bonnet fluid reservoirs, air conditioning, coolant<br>• Fuel flow and density measurement in engine test beds<br>• Checking for air in oil using high accuracy density measurement<br>• Paint spray robots – requires accurate and fast measurements<br>• Aircraft fuel loading (kerosene)<br>• High pressure flow used in turbine blade manufacture |
| **Power and energy**<br>Renewable<br>Hydrogen | • Boiler fuel flow and burner control<br>• Turbine fuel flow<br>• Glycol flow and concentration<br>• Bioethanol |
| **Marine**<br>OEM<br>Shipbuilders | • Fuel consumption management<br>• Boiler control<br>• Bunkering management<br>• Density used to indicate fuel quality |
| **Pulp, paper and textiles** | • Accurate dosing of dyes and chemicals |
| **Water and environmental** | • Dosing of chemicals for water treatment<br>• Chemical concentration for water quality control |

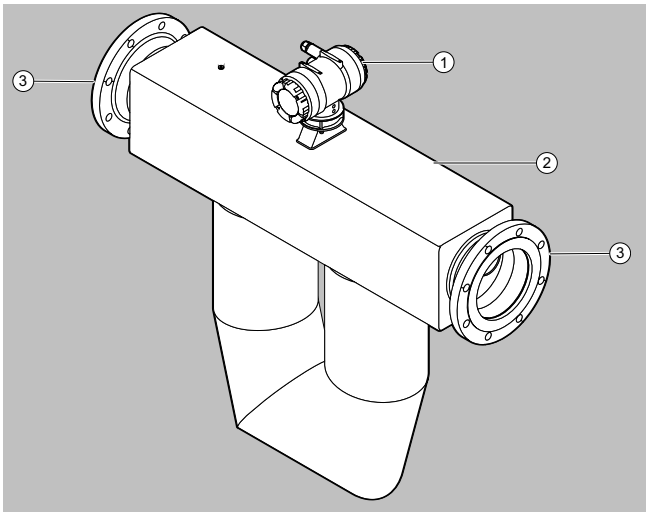
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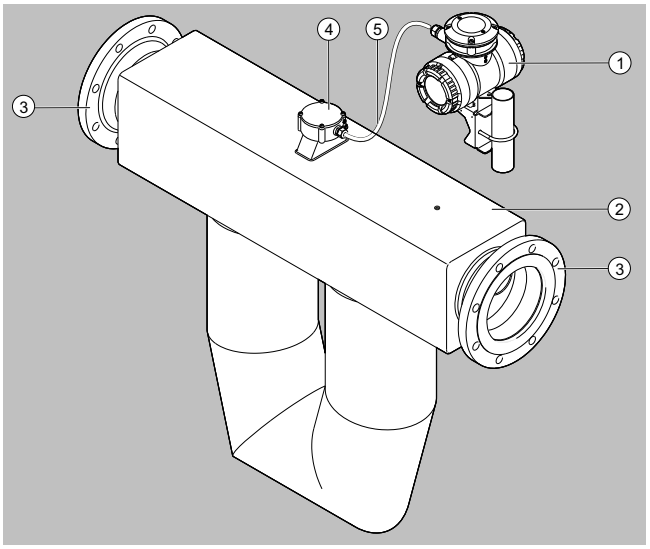
## Design

***Design options and related temperature range for FC700 series***

| Design version | Transmitter | Process fluid temperature range |
|---|---|---|
| **Compact, standard neck** | Aluminum | Standard [-50 ... 150 °C (-58 ... 302 °F)] |
| **Remote, standard neck, or long neck** | Aluminum or stainless steel | Standard [-70 ... 150 °C (-94 ... 302 °F)] |
| **Remote only, long neck only** | Aluminum or stainless steel | Medium [-70 ... 230 °C (-94 ... 446 °F)]<br>High [0 ... 350 °C (32 ... 662 °F)] |



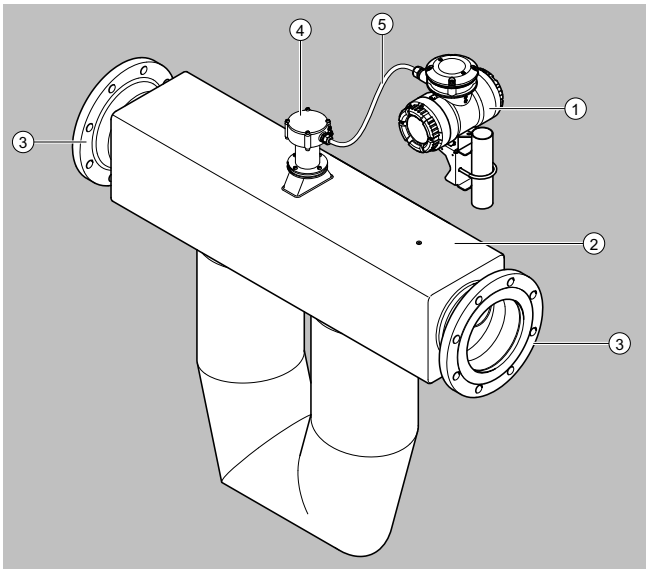

FCS700 sensor with compact transmitter




FCS700 sensor with remote transmitter

## Design (continued)

| | |
|---|---|
| 1 | Transmitter |
| 2 | FCS700 sensor |
| 3 | Process connection |
| 4 | Sensor terminal box |
| 5 | Connecting cable |




FCS700 sensor with long neck (pedestal) and remote transmitter.

| | |
|---|---|
| 1 | Transmitter |
| 2 | FCS700 sensor |
| 3 | Process connection |
| 4 | Sensor terminal box |
| 5 | Connecting cable |

***Installation guidelines***

FCS700 series flowmeters can be mounted horizontally, vertically and at an incline. The measuring tubes should be filled with the fluid during flow measurement as entrained gas may result in errors in measurement. Straight pipe runs at inlet or outlet are usually not required.

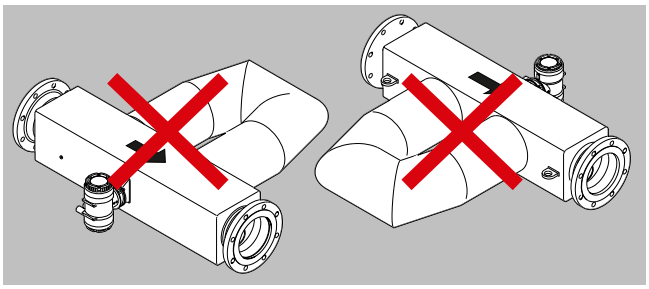
Avoid the following installation locations and positions:

- Measuring tubes as highest point in piping when measuring liquids
- Measuring tubes as lowest point in piping when measuring gases
- Immediately in front of a free pipe outlet in a downpipe
- Lateral positions

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## Design (continued)



Avoid installation position above: measuring tubes in sideways position resulting in possible non-homogeneous fluid separation

## Function

***Compatible fluids***

FC700 series flowmeters can be used to measure the following fluids:

- Liquids
- Gases
- Mixtures, solutions, emulsions, suspensions, and slurries

***Primary measured variables***

- Mass flow
- Density
- Temperature

***Based on the primary measured quantities, the transmitter also calculates:***

- Volume flow
- Percent concentration (fraction) of a two-component mixture (FCT040 only)
- Partial component flow rate (net flow) of a mixture consisting of two components (FCT040 only)

***Bi-directional operation***

The mass flow, volume flow, and net flow measurements can be bi-directional.

***Measurement variables for NTEP approval***

- Mass flow uni-directional
- Volume flow uni-directional

***Feature overview***

- Energy-efficient low pressure loss design with short tube paths and large tube diameter
- Optimal decoupling of the dual tube measuring element from external stress and vibration
- Accurate density measurement and up to four advanced concentration measurement data sets
- Benefit from viscosity function and capability to handle high viscous process fluids
- High power tube driver to detect gas content to maintain dependable measurements with entrained gas

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## Selection and ordering data

| SITRANS FC720/740 (High flow) | Article No. 7ME447 | ● - | ● ● | ● ● | ● - | ● ● ● ● - | Order code ● ● ● |
|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | |
| **Transmitter variant** | | | | | | | |
| None (spare sensor) | | 0 | | | | | |
| Coriolis sensor FCS700 with transmitter FCT020 | | 2 | | | | | |
| Coriolis sensor FCS700 with transmitter FCT040 | | 4 | | | | | |
| SITRANS FC spare part transmitter, no sensor included | | 9 | | | | | G 3 Y |
| **Sensor size / Connector size** | | | | | | | |
| No sensor (SITRANS FCT transmitter as spare part) | | | 0 A | | | | |
| Sensor size DN 100 with connection size 4" DN 100 | | | 1 B | | | | |
| Sensor size DN 100 with connection size 5" DN 125 | | | 1 C | | | | |
| Sensor size DN 100 with connection size 6" DN 150 | | | 1 D | | | | |
| Sensor size DN 150 with connection size 6" DN 150 | | | 2 D | | | | |
| Sensor size DN 150 with connection size 8" DN 200 | | | 2 E | | | | |
| Sensor size DN 200 with connection size 8" DN 200 | | | 3 E | | | | |
| Sensor size DN 200 with connection size 10" DN 250 | | | 3 F | | | | |
| **Process connection** | | | | | | | |
| No connection (SITRANS FCT transmitter as spare part) | | | | A 0 | | | |
| EN flange PN 16, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 8 | | | |
| EN flange PN 40, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 1 | | | |
| EN flange PN 63, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 2 | | | |
| EN flange PN 100, suitable for EN 1092-1 type B1, raised face (RF) | | | | A 3 | | | |
| EN flange PN 16, suitable for EN 1092-1 type D, groove | | | | A 4 | | | |
| EN flange PN 40, suitable for EN 1092-1 type D, groove | | | | A 5 | | | |
| EN flange PN 63, suitable for EN 1092-1 type D, groove | | | | A 6 | | | |
| EN flange PN 100, suitable for EN 1092-1 type D, groove | | | | A 7 | | | |
| EN flange PN 16, suitable for EN 1092-1 type E, spigot | | | | B 0 | | | |
| EN flange PN 40, suitable for EN 1092-1 type E, spigot | | | | B 1 | | | |
| EN flange PN 63, suitable for EN 1092-1 type E, spigot | | | | B 2 | | | |
| EN flange PN 100, suitable for EN 1092-1 type E, spigot | | | | B 3 | | | |
| EN flange PN 16, suitable for EN 1092-1 type F, recess | | | | B 4 | | | |
| EN flange PN 40, suitable for EN 1092-1 type F, recess | | | | B 5 | | | |
| EN flange PN 63, suitable for EN 1092-1 type F, recess | | | | B 6 | | | |
| EN flange PN 100, suitable for EN 1092-1 type F, recess | | | | B 7 | | | |
| ASME flange class 600, suitable for ASME B16.5, ring joint (RJ) | | | | C 3 | | | |
| ASME flange class 150, suitable for ASME B16.5, raised face (RF) | | | | D 1 | | | |
| ASME flange class 300, suitable for ASME B16.5, raised face (RF) | | | | D 2 | | | |
| ASME flange class 600, suitable for ASME B16.5, raised face (RF) | | | | D 3 | | | |
| JIS flange 10K, JIS B 2220 | | | | L 2 | | | |
| JIS flange 20K, JIS B 2220 | | | | L 4 | | | |
| Special design | | | | Z 1 | | | K 1 Y |
| **Tube material (wetted)**<br>**Process connection material and max operational temperature** | | | | | | | |
| None (SITRANS FCT transmitter as spare part) | | | | | 0 | | |
| 316L, 316L, max. temperature 150 °C (302 °F) | | | | | 1 | | |
| 316L, 316L, max. temperature 230 °C (446 °F) | | | | | 2 | | |
| 316L, 316L, max. temperature 350 °C (662 °F) | | | | | 3 | | |
| C22, C22, max. temperature 150 °C (302 °F) | | | | | 4 | | |
| C22, C22, max. temperature 230 °C (446 °F) | | | | | 5 | | |
| C22, C22, max. temperature 350 °C (662 °F) | | | | | 6 | | |
| **Calibration** | | | | | | | |
| No calibration | | | | | | 0 | |
| Massflow 0.1%, density 2 g/l | | | | | | 3 | |
| Massflow 0.2%, density 4 g/l | | | | | | 6 | |
| Accuracy for gas please select below | | | | | | 9 | |
| Massflow gas 0.75% | | | | | | | N 1 A |
| Massflow gas 0.5% | | | | | | | N 2 A |
| **Mounting style, transmitter housing and material** | | | | | | | |
| Compact type with "urethane-cured polyester powder coating" coated aluminum transmitter housing | | | | | | A | |
| Compact type with "corrosion protection coating" coated aluminum transmitter housing | | | | | | B | |

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## Selection and ordering data (continued)

| SITRANS FC720/740 (High flow) | Article No. 7ME447 | Order code |
|---|---|---|
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and standard neck sensor | | C |
| Remote type with "urethane-cured polyester powder coating" coated aluminum transmitter housing and long neck sensor | | D |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and standard neck sensor | | E |
| Remote type with "corrosion protection coating" coated aluminum transmitter housing and long neck sensor | | F |
| Remote type stainless steel transmitter and standard neck sensor | | G |
| Remote type stainless steel transmitter and long neck sensor | | H |
| **Ex approvals** | | |
| None | | A |
| ATEX, explosion group IIC and IIIC | | B |
| ATEX, explosion group IIB and IIIC | | C |
| IECEx, explosion group IIC and IIIC | | D |
| IECEx, explosion group IIB and IIIC | | E |
| FM, groups A B C D E F G | | H |
| FM, groups C D E F G | | J |
| NEPSI, explosion group IIC and IIIC | | M |
| NEPSI, explosion group IIB and IIIC | | N |
| **Local user interface** | | |
| Spare sensor without transmitter, no display applied | | 0 |
| No display | | 1 |
| With display | | 3 |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify order code(s). | |
| **Cable glands** | |
| Metric, no glands (M20) | **A10** |
| NPT, no glands (1/2") | **A11** |
| Metric, no glands (M20) steel armored cable | **A20** |
| NPT, no glands (1/2") steel armored cable | **A21** |
| **Sensor housing material** | |
| None (SITRANS FCT transmitter as spare part) | **B00** |
| Stainless steel 1, 4301/304, 1.4404/316L | **B01** |
| Stainless steel 1, 4404/316L DN 100 | **B02** |
| Stainless steel 1, 4404/316L DN 150 | **B03** |
| Stainless steel 1, 4404/316L DN 200 | **B04** |
| **I/O Configuration Ch1** | |
| None | **E00** |
| 4-20 mA HART active | **E06** |
| 4-20 mA HART passive | **E07** |
| PROFIBUS PA | **E10** |
| **I/O Configuration Ch2, Ch3 and Ch4** | |
| Spare sensor without transmitter, all communication types and I/Os apply | **F00** |
| 1 passive current output, 1 passive pulse or status output | **F01** |
| 1 passive current output, 2 passive pulse or status outputs | **F02** |
| 1 passive current output, 1 passive pulse or status outputs, 1 passive NAMUR pulse or status output | **F03** |
| 1 passive current output, 2 passive NAMUR pulse or status outputs | **F04** |

| | Order code |
|---|---|
| 1 passive pulse or status output | **F11** |
| 2 passive pulse or status outputs, 1 passive status output | **F12** |
| 2 passive pulse or status outputs, 1 voltage-free status input | **F13** |
| 2 passive pulse or status outputs, 1 active current input | **F14** |
| 2 passive pulse or status outputs, 1 passive current input | **F15** |
| 1 passive pulse or status output, 1 passive current output, 1 active current input | **F16** |
| 1 passive pulse or status output, 1 passive current output, 1 passive current input | **F17** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 active current input | **F18** |
| 1 passive pulse or status output, 1 voltage-free status input, 1 passive current input | **F19** |
| 1 passive pulse or status output, 1 active pulse or status output, 1 voltage-free status input | **F20** |
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor, 1 voltage-free status input | **F21** |
| 1 active current output, 2 passive pulse or status outputs | **F22** |
| 1 active current output, 1 passive pulse or status output,1 voltage-free status input | **F23** |
| 1 passive pulse or status output | **F31** |
| 2 passive pulse or status outputs | **F32** |
| 1 passive pulse or status output, 1 active current input | **F33** |
| 1 passive pulse or status output, 1 passive current input | **F34** |
| 1 passive pulse or status output, 1 active pulse or status output | **F35** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 1 passive pulse or status output, 1 active pulse or status output with pull-up resistor | **F36** |
| 1 passive pulse or status output, 1 active current output | **F37** |
| 1 passive pulse output | **F41** |
| Output CH1 intrinsically safe, 1 passive pulse output | **F42** |
| **Certificates** | |
| Declaration of compliance with the order 2.1 according to EN 10204 | **C11** |
| Quality Inspection Certificate (Inspection Certificate 3.1 according to EN 10204) | **C40** |
| Certificate of Marking Transfer and Raw Material Certificates (Inspection Certificate 3.1 according to EN 10204), including IGC and conform to NACE MR0175 and MR0103 | **C13** |
| Hydrostatic Pressure Test Certificate (Inspection Certificate 3.1 according to EN 10204) | **C18** |
| Degreasing of wetted surfaces according to ASTM G93-03 (Level C), including test report | **C54** |
| WPS according to DIN EN ISO 15809-1; WPQR according to DIN EN ISO 15814-1; WQC according to DIN EN 287-1 or DIN EN ISO 8908-4 | **C36** |
| Welding procedures and certificate according to ASME IX | **C37** |
| Traceable calibration to national standards, including a list of working standards used for calibration. Language: English/Japanese | **C41** |
| Traceable calibration to national standards, including a list of primary standards to which the delivered product is traceable. Language: English/Japanese | **C42** |
| X-ray inspection of flange weld seam according to DIN EN ISO 17636-1/B, evaluation according to AD 2000 HP 5/3 and DIN EN ISO 5817/C, including certificate | **C33** |
| X-ray test according to ASME V | **C34** |
| Dye penetrant test of process connection weld seams according to DIN EN ISO 3452-1, including certificate | **C38** |
| Dye penetrant test of flange welding according to ASME V, including certificate | **C39** |
| Ferrite test for flange welding according to DIN EN ISO 8249 | **C50** |
| Positive Material Identification of wetted parts, including certificate (Inspection Certificate 3.1 according to EN 10204) | **C15** |
| Functional Safety (IEC 61508) - SIL2/3 | **C20** |
| ASME B31.3 compliance NORMAL FLUID SERVICE | **C70** |
| NTEP accuracy class 0.3 acc. NIST for heated products | **C17** |
| **Connecting cable type and length** | |
| without standard connecting cable | **L50** |
| 5 meter (16.4 ft) remote connecting cable terminated standard gray / Ex blue | **L51** |
| 10 meter (32.8 ft) remote connecting cable terminated standard gray / Ex blue | **L54** |
| 15 meter (49.2 ft) remote connecting cable terminated standard gray / Ex blue | **L57** |
| 20 meter (65.6 ft) remote connecting cable terminated standard gray / Ex blue | **L60** |
| 30 meter (98.4 ft) remote connecting cable terminated standard gray / Ex blue | **L63** |
| without fire retardant connecting cable | **L70** |
| 5 meter (16.4 ft) remote fire retardant connecting cable not terminated | **L71** |
| 10 meter (32.8 ft) remote fire retardant connecting cable not terminated | **L74** |
| 15 meter (49.2 ft) remote fire retardant connecting cable not terminated | **L77** |
| 20 meter (65.6 ft) remote fire retardant connecting cable not terminated | **L80** |
| 30 meter (98.4 ft) remote fire retardant connecting cable not terminated | **L83** |
| **SW functions** | |
| Heat measurement | **S11** |
| Tube health check | **S12** |
| Batching and filling function | **S13** |
| Netoil computing | **S14** |
| Viscosity computing function for liquids | **S15** |
| Standard concentration measurement | **S16** |
| **Marine approval** | |
| Marine approved DNV, ABS, KR piping class 2 | **S22** |
| Marine approved DNV, ABS, KR piping class 3 | **S23** |
| Marine approved LR, MR, TAC piping class 2 | **S24** |
| Marine approved LR, MR, TAC piping class 3 | **S25** |
| Marine approved BV piping class 2 | **S26** |
| Marine approved BV piping class 3 | **S27** |
| **Rupture Disk** | |
| Namur built-in length according to NE132 | **S31** |
| Rupture Disk | **S32** |
| **Insulation** | |
| Insulation | **J10** |
| Insulation and heat tracing, ½"ASME class 150, raised face (RF) | **J12** |
| Insulation and heat tracing, ½" ASME class 300, raised face (RF) | **J13** |
| Insulation and heat tracing, EN DN 15, PN 40 | **J14** |
| Insulation, heat tracing with ventilation, ½" ASME class 150, raised face (RF) | **J16** |
| Insulation, heat tracing with ventilation, ½" ASME class 300, raised face (RF) | **J17** |
| Insulation, heat tracing with ventilation, EN DN 15, PN 40 | **J18** |
| **Country specific delivery** | |
| Delivery to China including China RoHS mark | **W21** |
| Delivery to Korea including KC mark | **W22** |
| **Fraction setup** PIA: Please select four options | |
| Sugar / Water 0 ... 85 °Bx, 0 ... 80 °C (32 ... 176 °F) | **G01** |
| NaOH / Water 2 ... 50 WT%, 0 ... 100 °C (32 ... 212 °F) | **G02** |
| KOH / Water 0 ... 60 WT%, 54 ... 100 °C (129 ... 212 °F) | **G03** |
| $NH_4NO_3$ / Water 1 ... 50 WT%, 0 ... 80 °C (32 ... 176 °F) | **G04** |
| $NH_4NO_3$ / Water 20 ... 70 WT%, 20 ... 100 °C (68 ... 212 °F) | **G05** |
| HCl / Water 22 ... 34 WT%, 20 ... 40 °C (68 ... 104 °F) | **G06** |
| $HNO_3$ / Water 50 ... 67 WT%, 10 ... 60 °C (50 ... 140 °F) | **G07** |
| $H_2O_2$ / Water 30 ... 75 WT%, 4 ... 44 °C (39 ... 111 °F) | **G09** |
| Ethylene Glycol / Water 10 ... 50 WT%, -20 ... 40 °C (-4 ... 104 °F) | **G10** |
| Amylum = Starch / Water 33 ... 43 WT%, 35 ... 45 °C (95 ... 113 °F) | **G11** |
| Methanol / Water 35 ... 60 WT%, 0 ... 40 °C (32 ... 104 °F) | **G12** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| Alcohol / Water 55 ... 100 VOL%, 10 ... 40 °C (50 ... 104 °F) | **G20** |
| Sugar / Water 40 ... 80 °Bx, 75 ... 100 °C (167 ... 212 °F) | **G21** |
| Alcohol / Water 66 ... 100 WT%, 15 ... 40 °C (59 ... 104 °F) | **G30** |
| Alcohol / Water 66 ... 100 WT%, 10 ... 40 °C (50 ... 104 °F) | **G37** |

| | Order code |
|---|---|
| **Tag name** | |
| Tag name plate, SS (max. 16 characters) | **Y11** |
| HART Tag No. (max. 8 characters) | **Y25** |
| HART Tag No. (max. 32 characters) | **Y26** |
| PROFIBUS PA NODE ADDRESS (4 characters HEX) | **Y28** |
| PROFIBUS PA SOFTWARE TAG (max. 32 characters) | **Y29** |
| **Customer installation length** | |
| Customer installation length (mm) | **Y30** |
| **Special versions** | |
| ID-Number of special design | **Y99** |

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## Technical specifications

### *Mass flow rate of liquids*

The mass flow rate characteristics of SITRANS FC meters are defined by the values of zero stability, $Q_{flat}$, $Q_{nom}$ and $Q_{max}$.

Zero stability is the maximum allowable flow rate value that can be displayed at zero flow under reference conditions. It is a good indicator of the meter performance as flow rates reduce, and approach zero.

- $Q_{flat}$ is the mass flow rate above which the base accuracy is maintained (0.1% when using FCT040 transmitters).
- $Q_{nom}$ is the nominal mass flow rate of water at reference conditions that would result in a pressure drop of 1 bar (15 psi).
- $Q_{max}$ is the recommended maximum mass flow rate for each sensor size.

For questions regarding expected performance in specific applications, please contact your regional Siemens Measurement Intelligence team.

### *Flow rate summary by FCS700 sensor size*

| Nominal size | Zero stability | | $Q_{flat}$ | | $Q_{nom}$ | | $Q_{max}$ | |
|---|---|---|---|---|---|---|---|---|
| | kg/h | lb/h | kg/h | lb/min | kg/h | lb/min | kg/h | lb/min |
| DN 100 | 13.0 | 28.6 | 20 000 | 734 | 250 000 | 9 175 | 300 000 | 11 010 |
| DN 150 | 25.0 | 55.0 | 38 000 | 1395 | 500 000 | 18 350 | 600 000 | 22 020 |
| DN 200 | 27.0 | 59.4 | 45 000 | 1652 | 900 000 | 33 030 | 1 100 000 | 40 370 |

### *Performance summary by FCS700 sensor size and transmitter type*

| Sensor size | | | DN 100 | DN 150 | DN 200 |
|---|---|---|---|---|---|
| **Mass flow (liquids)** | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.2 | ± 0.2 | ± 0.2 |
| | % (of rate) | FCT040 | ± 0.1 | ± 0.1 | ± 0.1 |
| Zero stability | kg/h (lb/h) | | ± 13 (28.6) | ± 25 (55) | ± 27 (59.4) |
| **Density (liquids)** | | | | | |
| Accuracy | kg/m³ (lb/ft³) | FCT020 | ± 4 (0.25) | ± 4 (0.25) | ± 4 (0.25) |
| | kg/m3 (lb/ft) | FCT040 | ± 2 (0.12) | ± 2 (0.12) | ± 2 (0.12) |
| **Mass flow (gases)** | | | | | |
| Accuracy | % (of rate) | FCT020 | ± 0.75 | ± 0.75 | ± 0.75 |
| | % (of rate) | FCT040 | ± 0.35 | ± 0.35 | ± 0.5 |
| **Temperature** | | | | | |
| Accuracy | °C (°F) | | ± 1 (1.8) | ± 1 (1.8) | ± 1 (1.8) |

***Note:***

The accuracy values in the table above are based on reference conditions at the time of calibration and represent the combined measurement uncertainties including sensor, electronic and pulse output interface.

Liquid density calibration is performed when density accuracy of 0.5 kg/m³ (0.03 lb/ft³) is selected in the model code.

### *Mass flow calibration and density adjustment for liquids*

Siemens SITRANS FC Coriolis meters are calibrated in rigs accredited according to the international standard DIN EN ISO/IEC 17025:2018. Each flowmeter comes with a standard calibration certificate.

Mass flow calibration takes place at reference conditions. Specific values are listed in the standard calibration certificate.

### *Mass flow calibration reference conditions*

| Fluid | Water |
|---|---|
| Density | 900 ... 1 100 kg/m³ (56 ... 69 lb/ft³) |
| Fluid temperature | 10 ... 35 °C (50 ... 95 °F), average temperature: 22.5 °C (72.5 °F) |
| Ambient temperature | 10 ... 35 °C (50 ... 95 °F) |
| Process pressure | 1 ... 5 bar (15 ... 73 psi) |

### *Density calibration reference conditions*

| Flow condition | Fully developed flow profile |
|---|---|
| Fluid densities used to obtain density calibration constants | 700 kg/m³ (44 lb/ft³)<br>1 000 kg/m³ (62 lb/ft³)<br>1 650 kg/m³ (103 lb/ft³) |
| Fluid temperature | 20 °C (68 °F) |
| Determination of temperature compensation coefficients | 20 ... 80 °C (68 ... 176 °F) |

### *Analog output performance specification*

Typical additional uncertainty when using the analog current output:

± 0.04 % at a nominal mid-range current output of 12 mA, which includes the effects of: output adjustment, linearity, power supply variation, load resistance variation, short-term and long-term drift for one year, and ambient temperature effect on the transmitter in the range 20 °C ± 30 °C (14 ... 122 °F).

### *Process pressure effect on flow measurement performance*

Changes in operating pressure have a small effect on the mass flow measurement performance. When the pressure changes are very large, this effect can be corrected by a dynamic pressure input or a fixed process pressure.

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## Technical specifications (continued)

| Sensor size, material | Additional flow measurement errors due to change in operating pressure from reference pressure | |
|---|---|---|
| | in % of rate per 1 bar variation | in % of rate per 1 psi variation |
| DN 100, AISI 316L | -0.0298 | -0.00199 |
| DN 100, alloy 22 | -0.0313 | -0.00216 |
| DN 150, AISI 316L | -0.0484 | -0.00334 |
| DN 200, AISI 316L | -0.0183 | -0.00126 |

***Process temperature effect***

For mass flow measurement, process fluid temperature effect is defined as the change in sensor flow accuracy due to process fluid temperature change, away from the 20 °C (68 °F) reference condition. Variation in process temperature influences the measuring tube characteristics and this is compensated for using the built-in PT 1000 temperature sensor.

A small flow uncertainty remains in the compensation circuit, defined below.

Uncertainty due to process temperature change: ± 0.001% of mass flow rate per °C (± 0.0006% of mass flow rate per °F)

***Temperature effect on zero***

Temperature effect on the mass flow zero-point quality can be corrected by zeroing at the process fluid temperature.

***Process conditions***

***Process fluid temperature range***

| Design version | Transmitter | Process fluid temperature range |
|---|---|---|
| Compact, standard neck | Aluminum | Standard [-50 ... +150 °C (-58 ... +302 °F)] |
| Remote, standard neck, or long neck | Aluminum or stainless steel | Standard [-70 ... +150 °C (-94 ... +302 °F)] |
| Remote only, long neck only | Aluminum or stainless steel | Medium [-70 ... +230 °C (-94 ... +446 °F)] |
| | | High [0 ... 350 °C (32 ... 662 °F)] |

***Operating pressure***

The maximum allowed process pressure depends on the selected process connection and process temperature.

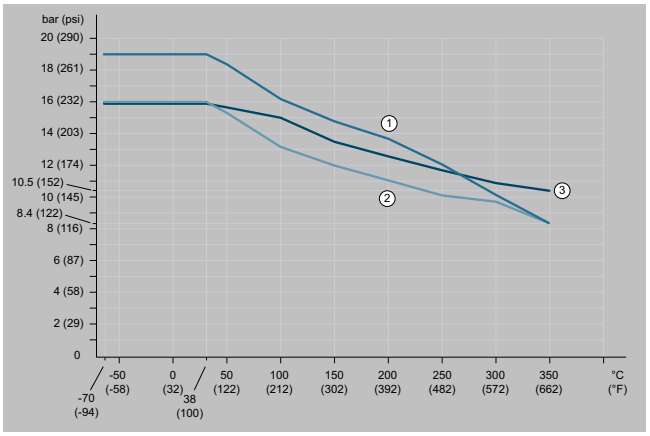
The given process temperature and process pressure ranges are calculated and approved without corrosion or erosion effects.

Pressure versus temperature relationship depending on selected process connection

The following diagrams show the process pressure as a function of process temperature, as well as the process connection used (type and size of process connection).

Calculations for ASME flanges are based on ASME B16.5 Material group 2.2 (316/316L dual certified).

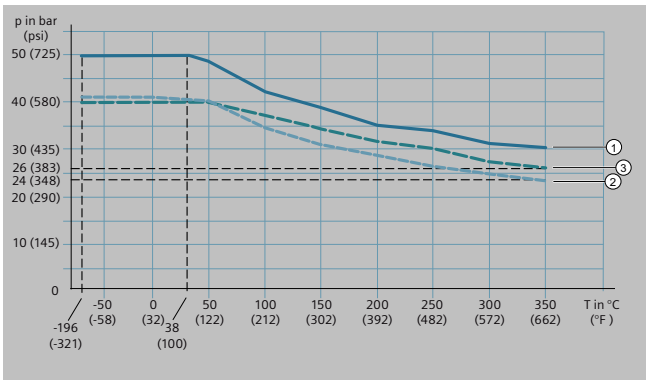
ASME class 150, EN PN 16




Allowed process pressure as a function of process fluid temperature

| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 150 |
| 2 | Heat tracing connection compatible to ASME B16.5 class 150 |
| 3 | Process connection compatible to EN 1092-1 PN 16 |

ASME class 300, EN PN 40




Allowed process pressure as a function of process fluid temperature

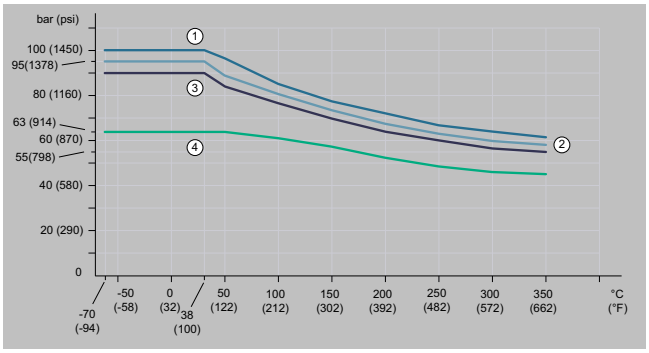
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 300 |
| 2 | Heat tracing connection for ASME B16.5 class 300 |
| 3 | Process and heat tracing connection compatible to EN 1092-1 PN 40 |

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## Technical specifications (continued)

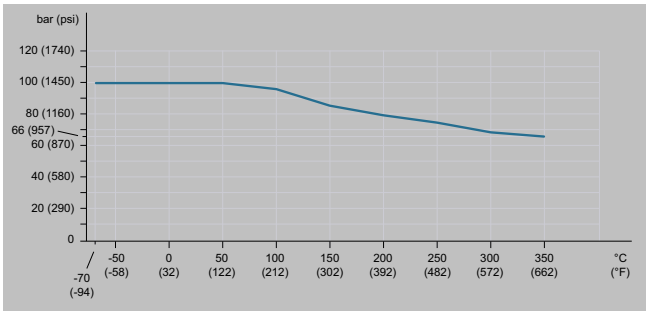
ASME class 600, EN PN63




Allowed process pressure as a function of process fluid temperature

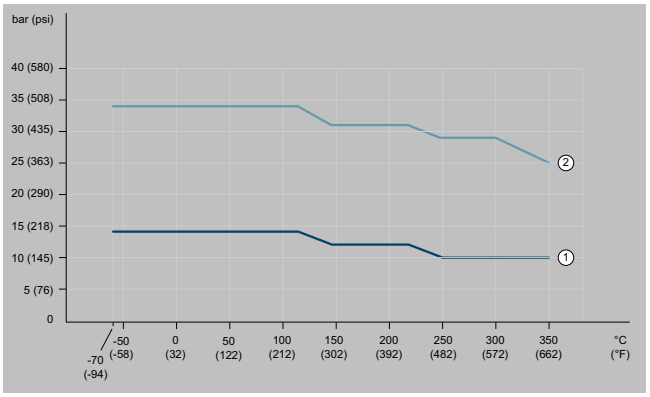
| | |
|---|---|
| 1 | Process connection compatible to ASME B16.5 class 600:<br>• FCS700 size DN 100, AISI 316L or alloy 22 wetted parts (without ASME B31.3 compliance)<br>• FCS700 size DN 100, alloy 22 wetted parts and ASME B31.3 compliance (requires option C70)<br>• FCS700 size DN 200, AISI 316L wetted parts (without ASME B31.3 compliance) |
| 2 | Process connection compatible to ASME B16.5 class 600:<br>• FCS700 size DN 100, AISI 316L wetted parts and ASME B31.3 compliance (requires option C70)<br>• FCS700 size DN 200, AISI 316L wetted parts and ASME B31.3 compliance (requires option C70) |
| 3 | Process connection compatible to ASME B16.5 class 600: FCS700 size DN 150 |
| 4 | Process connection compatible to EN 1092-1 PN 63 |

EN PN 100




Allowed process pressure as a function of process fluid temperature, compatible to EN 1092-1 PN 100

JIS 10 K, JIS 20 K




Allowed process pressure as a function of process connection temperature

| | |
|---|---|
| 1 | Process connection compatible to JIS B 2220 10 K |
| 2 | Process connection compatible to JIS B 2220 20 K |

***Rupture disc***

The rupture disc is located on the sensor housing. It is available with some FC700 specification combinations (selectable using order option code S32).

Its bursting pressure is 20 bar (291 psi), the nominal diameter is 8 mm (0.315"). In the case of larger nominal diameters and high pressures, the entire process pressure may not be released across the rupture disc. In such case it is possible to request a customized design from your local Siemens sales organization.

In the event of a burst pipe, the rupture disc provides an acoustic signal in applications with gases.

***Ambient conditions***

Allowed ambient and storage temperature of SITRANS FC700 series is influenced by the temperature specification of FCS700 sensor, FCT0X0 transmitter and the interconnecting cable.

***Ambient temperature***

Device-surrounding air temperature is considered as ambient temperature. If the device is operating outdoors make sure that the solar irradiation does not increase the surface temperature of the device higher than the allowed maximum ambient temperature. Transmitter display has limited legibility below -20 °C (-4 °F).

The sensor ambient temperature limits may also be influenced by the process fluid temperature, details shown in the chapter “Sensors” (Technical specifications).

Maximum ambient temperature ranges for FC700 series

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

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## Technical specifications (continued)

Ambient temperature range for NTEP custody transfer approval

| Cable type | Transmitter style | Device | Ambient temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +50 °C (-40 ... +122 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +50 °C (-31 ... +122 °F) |

Maximum storage temperature ranges for FC700 series

| Cable type | Transmitter style | Device | Storage temperature range |
|---|---|---|---|
| None | Compact | Sensor and transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Standard cable | Remote | Sensor | -50 ... +80 °C (-58 ... +176 °F) |
| | | Transmitter | -40 ... +60 °C (-40 ... +140 °F) |
| Fire retardant cable | Remote | Sensor | -35 ... +80 °C (-31 ... +176 °F) |
| | | Transmitter | -35 ... +60 °C (-31 ... +140 °F) |

***Temperature specification of FC700 series Ex versions located in hazardous areas***

Please select appropriate equipment in accordance with the laws and regulations of the relevant country/region, when it is used in a location where explosive atmospheres may be present.

The maximum ambient and process fluid temperatures depending on explosion groups and temperature classes can be determined via the SITRANS FC order code together with the Ex code (see the corresponding explosion proof type manual).

Note: The maximum process fluid temperature could be further restricted due to process connection type. Refer to curves above under the heading, “Allowed ambient temperature for FCS700 sensors”.

***FCS700 all sizes, compact transmitter***

***Standard temperature specification***

Ex approvals:

- Gas group IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas group A to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 70 °C (158 °F) | 39 °C (102 °F) |
| T5 | 85 °C (185 °F) | 54 °C (129 °F) |
| T4 | 121 °C (249 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

Ex approvals:

- Gas group IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas group C to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature |
|---|---|---|
| T6 | 65 °C (149 °F) | 41 °C (105 °F) |
| T5 | 80 °C (176 °F) | 56 °C (132 °F) |
| T4 | 117 °C (242 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 60 °C (140 °F) |
| T2 | 150 °C (302 °F) | 60 °C (140 °F) |
| T1 | 150 °C (302 °F) | 60 °C (140 °F) |

***FCS700 all sizes, remote transmitter***

***Standard temperature, standard neck***

Ex approvals:

- Gas group IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas group A to G: FM

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## Technical specifications (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 70 °C (158 °F) | 37 °C (98 °F) | 37 °C (98 °F) |
| T5 | 85 °C (185 °F) | 52 °C (125 °F) | 52 °C (125 °F) |
| T4 | 121 °C (249 °F) | 80 °C (176 °F) | 60 °C (140 °F) |
| T3 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T2 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T1 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |

Ex approvals:

- Gas group IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex
- Gas group C to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 39 °C (54 °F) | 39 °C (54 °F) |
| T5 | 80 °C (176 °F) | 54 °C (129 °F) | 54 °C (129 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 49 °C (120 °F) |
| T3 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T2 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |
| T1 | 150 °C (302 °F) | 78 °C (172 °F) | 49 °C (120 °F) |

***Standard temperature, long neck***

Ex approvals:

Gas group IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 70 °C (158 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 85 °C (185 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 121 °C (249 °F) | 80 °C (176 °F) | 73 °C (163 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:

Gas group A to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 70 °C (158 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 85 °C (185 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 121 °C (249 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:

Gas group IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

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**Technical specifications** (continued)

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 80 °C (176 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

Ex approvals:
Gas group C to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 80 °C (176 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T2 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T1 | 150 °C (302 °F) | 80 °C (176 °F) | 70 °C (158 °F) |

***Medium temperature, long neck***

Ex approvals:
Gas group IIC and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 70 °C (158 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 85 °C (185 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 121 °C (249 °F) | 80 °C (176 °F) | 73 °C (163 °F) |
| T3 | 186 °C (366 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

Ex approvals:
Gas group A to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 70 °C (158 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 85 °C (185 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 121 °C (249 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 186 °C (366 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

Ex approvals:
Gas group IIB and IIIC: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature Standard cable | Fire retardant cable |
|---|---|---|---|
| T6 | 65 °C (149 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 80 °C (176 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 183 °C (361 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

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## Technical specifications (continued)

Ex approvals:
Gas group C to G: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 65 °C (149 °F) | 44 °C (111 °F) | 44 °C (111 °F) |
| T5 | 80 °C (176 °F) | 59 °C (138 °F) | 59 °C (138 °F) |
| T4 | 117 °C (242 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 183 °C (361 °F) | 80 °C (176 °F) | 64 °C (147 °F) |
| T2 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |
| T1 | 220 °C (428 °F) | 80 °C (176 °F) | 59 °C (138 °F) |

***High temperature, long neck***

Ex approvals:

- All gas groups: ATEX, IEC Ex, EAC Ex, NEPSI, Korea Ex, UK Ex

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 65 °C (149 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T5 | 80 °C (176 °F) | 77 °C (170 °F) | 77 °C (170 °F) |
| T4 | 115 °C (239 °F) | 80 °C (176 °F) | 74 °C (165 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T2 | 275 °C (527 °F) | 73 °C (163 °F) | 50 °C (122 °F) |
| T1 | 350 °C (662 °F) | 60 °C (140 °F) | 40 °C (104 °F) |

Ex approvals:

- All gas groups: FM

| Temperature class | Maximum process temperature | Maximum ambient temperature | |
|---|---|---|---|
| | | Standard cable | Fire retardant cable |
| T6 | 65 °C (149 °F) | 62 °C (143 °F) | 62 °C (143 °F) |
| T5 | 80 °C (176 °F) | 77 °C (170 °F) | 70 °C (158 °F) |
| T4 | 115 °C (239 °F) | 80 °C (176 °F) | 70 °C (158 °F) |
| T3 | 180 °C (356 °F) | 80 °C (176 °F) | 65 °C (149 °F) |
| T2 | 275 °C (527 °F) | 73 °C (163 °F) | 50 °C (122 °F) |
| T1 | 350 °C (662 °F) | 60 °C (140 °F) | 40 °C (104 °F) |

***Additional ambient and environmental specifications***

| Specification | Rating/level of compliance |
|---|---|
| **Relative humidity** | 0 ... 95 |
| **Ingress protection** | IP66 or IP67 with suitable cable glands |
| **Environmental pollution** | Pollution degree 4 in accordance with EN 61010-1 whilst in operation |
| **Maximum altitude** | 2 000 m (6 600 ft) above mean sea level (MSL) |
| **Mechanical load** | • Transmitter: 10 ... 500 Hz, 1g<br>• Sensor: 10 ... 500 Hz, 1g<br>according to IEC 60068-2-6 |
| **Electromagnetic (EMC) Immunity** | • EN IEC 61326-1, Table 2<br>• EN IEC 61326-2-3<br>• EN IEC 61326-2-5<br>• NAMUR NE21 recommendation<br>• DNV-CG-0339 section 3, chapter 14 |
| **Surge Immunity Emission** | • EN 61000-4-5 for lightning protection<br>• EN IEC 61000-3-2, Class A (harmonic current emissions)<br>• EN IEC 61000-3-3, Class A (voltage fluctuations)<br>• Immunity assessment criterion: output signal fluctuation is within ± 1% of the output span. |
| **Overvoltage** | Category II according to EN IEC 61010-1 |

***Approvals and certificates – summary***

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | B | ATEX, explosion group IIC and IIIC |
| 15, Ex approval | C | ATEX, explosion group IIB and IIIC |
| 15, Ex approval | D | IECEx, explosion group IIC and IIIC |
| 15, Ex approval | E | IECEx, explosion group IIB and IIIC |
| 15, Ex approval | H | FM, groups A, B, C, D, E, F, G |
| 15, Ex approval | J | FM, groups C, D, E, F, G |

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## Technical specifications (continued)

| Position in code, type | Order code | Description |
|---|---|---|
| 15, Ex approval | M | NEPSI, explosion group IIC and dust proof |
| 15, Ex approval | N | NEPSI, explosion group IIB and dust proof |
| 15, Ex approval | F | EAC Ex, explosion group IIC and IIIC |
| 15, Ex approval | G | EAC Ex, explosion group IIB and IIIC |
| 15, Ex approval | P | Korea Ex, explosion group IIC and IIIC |
| 15, Ex approval | Q | Korea Ex, explosion group IIB and IIIC |
| 15, Ex approval | U | UKEx, explosion group IIC and IIIC |
| 15, Ex approval | V | UKEx, explosion group IIB and IIIC |
| ZS2, Marine approval | S22 | Marine approval according DNV, ABS and KR piping class 2 |
| ZS2, Marine approval | S23 | Marine approval according DNV, ABS and KR piping class 3 |
| ZS2, Marine approval | S24 | Marine approval according LR MR TAC piping class 2 |
| ZS2, Marine approval | S25 | Marine approval according LR MR TAC piping class 3 |

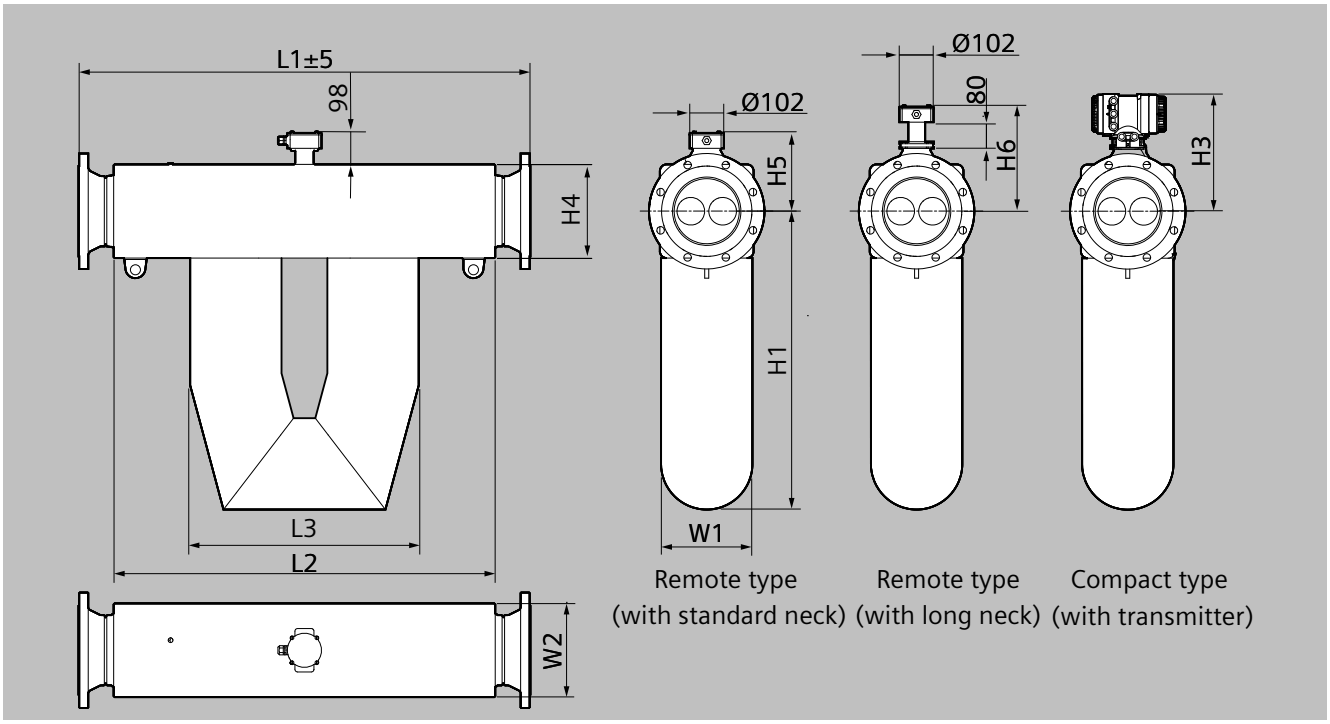
| Position in code, type | Order code | Description |
|---|---|---|
| ZS2, Marine approval | S26 | Marine approved BV piping class 2 |
| ZS2, Marine approval | S27 | Marine approved BV piping class 3 |
| ZC1, Certificate | C17 | NTEP approval, accuracy class 0.3 acc. NIST Handbook 44, heated products |
| ZC1, Certificate | C11 | Compliance with the order 2.1 EN 10204 |
| ZC1, Certificate | C40 | Quality Inspection Certificate 3.1 EN 10204 |
| ZC1, Certificate | C13 | 3.1 EN 10204 + IGC + NACE MR0175, MR0103 |
| ZC1, Certificate | C18 | Pressure Test Certificate 3.1 EN 10204 |
| ZC1, Certificate | C54 | Degreasing ASTM G93-03, including report |
| ZC1, Certificate | C36 | WPS; WPQR; WQC |
| ZC1, Certificate | C37 | Welding procedures and Certificate ASME IX |
| ZC1, Certificate | C33 | X-ray DIN EN ISO 17636-1/B |
| ZC1, Certificate | C34 | X-ray test according to ASME V |
| ZC1, Certificate | C38 | Dye penetration DIN EN ISO 3452-1 |
| ZC1, Certificate | C39 | Dye penetration ASME V |
| ZC1, Certificate | C20 | Functional Safety (IEC 61508) – SIL2/3 |
| ZC1, Certificate | C15 | PMI 3.1 according to EN 10204 |

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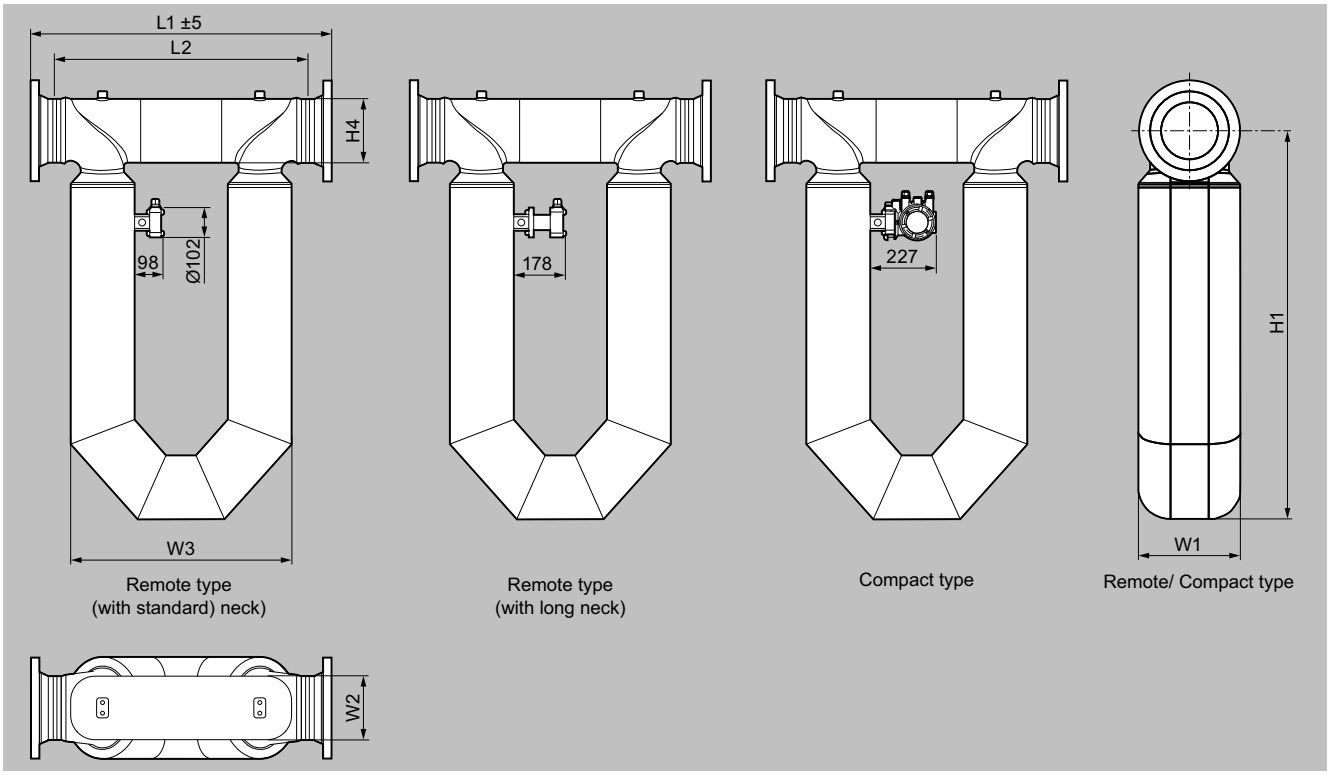


## Dimensional drawings

***Drawings, dimensions and weight for FCS700 sensors***




Dimensions in mm, sizes DN 100 and DN 150

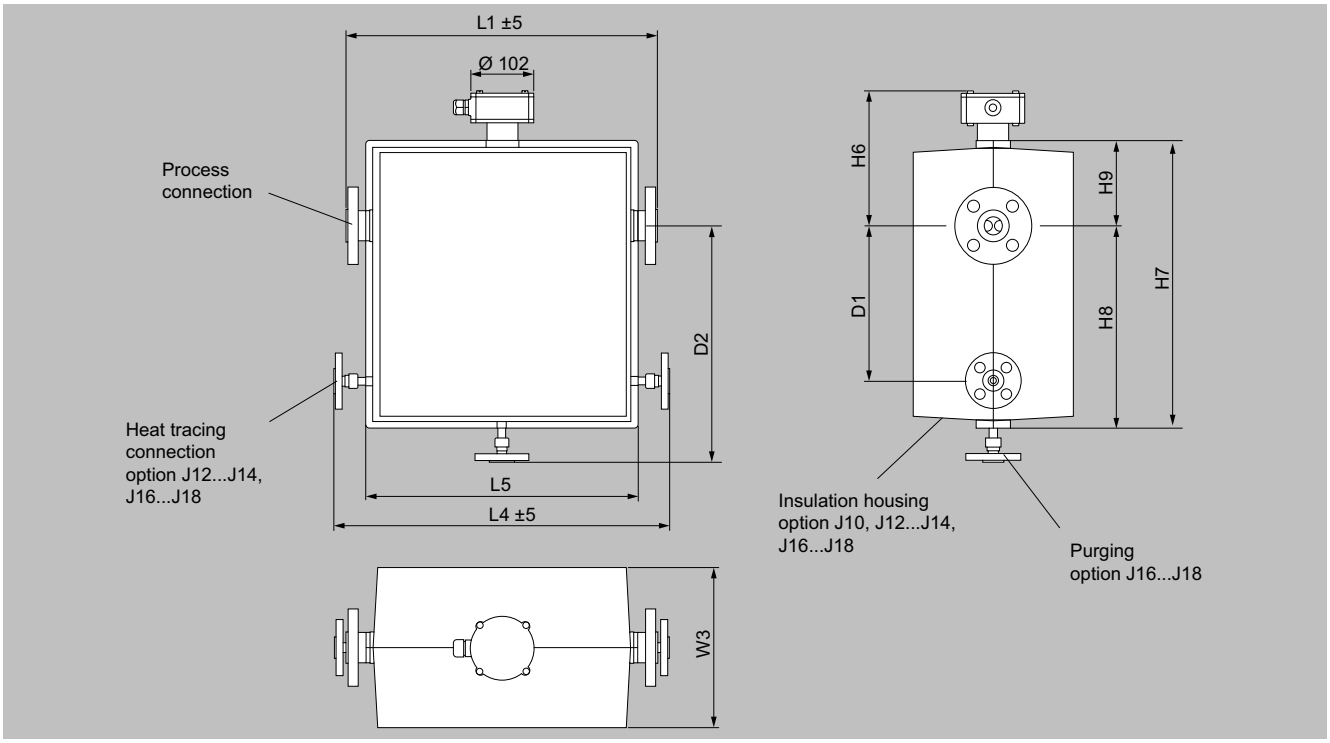



Dimensions in mm, sizes DN 200

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## Dimensional drawings (continued)




Dimensions in mm (with insulation and heating options)

***FCS700 sensor dimensions without L1***

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 100 | 892 (35.1) | 691 (27.2) | 1050 (41.3) | 944 (37.2) | 168 (6.6) | 176 (6.9) | 342 (13.5) | 350 (13.8) | 677 (26.7) |
| DN 150 | 1 140 (44.9) | 683 (26.9) | n/a | n/a | 273 (10.7) | 280 (11) | n/a | n/a | n/a |
| DN 200 | 870 (34.3) | 759 (29.9) | n/a | n/a | 350 (13.8) | 350 (13.8) | n/a | n/a | n/a |

| Nominal size | L2 | L3 | L4 | L5 | W1 | W2 | W3 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|
| | Dimensions in mm (inch) | | | | | | | | |
| DN 100 | 556 (21.9) | 315 (12.4) | 176 (6.9) | 186 (7.3) | 266 (10.5) | 824 (32.4) | 628 (24.7) | 196 (7.7) | 677 (26.7) |
| DN 150 | 891 (35.1) | 367 (14.5) | 280 (11) | 238 (9.4) | 320 (12.6) | n/a | n/a | n/a | n/a |
| DN 200 | 1 335 (52.6) | n/a | 219 (8.6) | n/a | n/a | n/a | n/a | n/a | n/a |

***Overall length L1 and weight***

The overall length of the sensor depends on the selected process connection (type and size). The following tables list the overall length and weight as functions of the individual process connection.

The weights in the tables are for the remote type. Additional weight for the integral type: up to 3.2 kg (7.1 b).

***L1 dimension and weight with process connections according to ASME B16.5, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 4" class 150, raised face (RF) | 1 100 (43.3) | 95 (210) | n/a | n/a | n/a | n/a |
| ASME 4" class 300, raised face (RF) | 1 100 (43.3) | 103 (227) | n/a | n/a | n/a | n/a |
| ASME 4" class 600, raised face (RF) | 1 100 (43.3) | 112 (246) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 4" class 600, ring joint (RJ) | 1 100 (43.3) | 112 (246) | n/a | n/a | n/a | n/a |
| ASME 5" class 150, raised face (RF) | 1 100 (43.3) | 97 (214) | n/a | n/a | n/a | n/a |
| ASME 5" class 300, raised face (RF) | 1 100 (43.3) | 109 (239) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, raised face (RF) | 1 160 (45.7) | 136 (299) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, ring joint (RJ) | 1 160 (45.7) | 136 (299) | n/a | n/a | n/a | n/a |
| ASME 6" class 150, raised face (RF) | 1 100 (43.3) | 101 (223) | 1 350 (53.1) | 290 (639) | n/a | n/a |
| ASME 6" class 300, raised face (RF) | 1 100 (43.3) | 118 (259) | 1 350 (53.1) | 307 (677) | n/a | n/a |
| ASME 6" class 600, raised face (RF) | 1 200 (47.2) | 149 (329) | 1 390 (54.7) | 332 (732) | n/a | n/a |
| ASME 6" class 600, ring joint (RJ) | 1 200 (47.2) | 150 (331) | 1 390 (54.7) | 333 (733) | n/a | n/a |
| ASME 8" class 150, raised face (RF) | n/a | n/a | 1 350 (53.1) | 302 (666) | 1 030 (40.6) | 299 (659) |
| ASME 8" class 300, raised face (RF) | n/a | n/a | 1 350 (53.1) | 324 (714) | 1 050 (41.3) | 323 (712) |
| ASME 8" class 600, raised face (RF) | n/a | n/a | 1 440 (56.7) | 371 (818) | 1 120 (44.1) | 368 (811) |
| ASME 8" class 600, ring joint (RJ) | n/a | n/a | 1 440 (56.7) | 372 (821) | 1 120 (44.1) | 369 (814) |
| ASME 10" class 150, raised face (RF) | n/a | n/a | n/a | n/a | 1 090 (42.9) | 318 (701) |
| ASME 10" class 300, raised face (RF) | n/a | n/a | n/a | n/a | 1 140 (44.9) | 363 (800) |
| ASME 10" class 600, raised face (RF) | n/a | n/a | n/a | n/a | 1 220 (48) | 451 (994) |
| ASME 10" class 600, ring joint (RJ) | n/a | n/a | n/a | n/a | 1 220 (48) | 453 (999) |

***L1 dimension and weight with process connections according to ASME B16.5, alloy 22 wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| ASME 5" class 150, raised face (RF) | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| ASME 5" class 300, raised face (RF) | 1 100 (43.3) | 111 (245) | n/a | n/a | n/a | n/a |
| ASME 5" class 600, raised face (RF) | 1 110 (43.7) | 133 (293) | n/a | n/a | n/a | n/a |
| ASME 6" class 150, raised face (RF) | 1 100 (43.3) | 106 (235) | n/a | n/a | n/a | n/a |
| ASME 6" class 300, raised face (RF) | 1 100 (43.3) | 123 (270) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to EN 1092-1, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 100 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 92 (202) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 16 type D, with groove | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 16 type E, with spigot | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 100 PN 16 type F, with recess | 1 100 (43.3) | 91 (201) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 95 (210) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type D, with groove | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type E, with spigot | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 40 type F, with recess | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type B1, raised face (RF) | 1 100 (43.3) | 100 (220) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type D, with groove | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type E, with spigot | 1 100 (43.3) | 98 (217) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 63 type F, with recess | 1 100 (43.3) | 99 (219) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type B1, raised face (RF) | 1 100 (43.3) | 106 (233) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type D, with groove | 1 100 (43.3) | 105 (232) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type E, with spigot | 1 100 (43.3) | 104 (230) | n/a | n/a | n/a | n/a |
| EN DN 100 PN 100 type F, with recess | 1 100 (43.3) | 105 (232) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 95 (209) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type D, with groove | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type E, with spigot | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 16 type F, with recess | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 99 (218) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type D, with groove | 1 100 (43.3) | 99 (218) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type E, with spigot | 1 100 (43.3) | 98 (216) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40 type F, with recess | 1 100 (43.3) | 98 (216) | n/a | n/a | n/a | n/a |
| EN DN125 PN63 type B1, raised face (RF) | 1 100 (43.3) | 109 (240) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type D, with groove | 1 100 (43.3) | 108 (239) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type E, with spigot | 1 100 (43.3) | 107 (237) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 63 type F, with recess | 1 100 (43.3) | 108 (239) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type B1, raised face (RF) | 1 140 (44.9) | 121 (267) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type D, with groove | 1 140 (44.9) | 121 (267) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 | | DN 150 | | DN 200 | |
|---|---|---|---|---|---|---|
| | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) | L1 in mm (inch) | Weight in kg (lb) |
| EN DN 125 PN 100 type E, with spigot | 1 140 (44.9) | 119 (263) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 100 type F, with recess | 1 140 (44.9) | 120 (265) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 16 type B1, raised face (RF) | 1 100 (43.3) | 98 (216) | 1 350 (53.1) | 288 (634) | n/a | n/a |
| EN DN 150 PN 16 type D, with groove | 1 100 (43.3) | 98 (216) | 1 350 (53.1) | 287 (632) | n/a | n/a |
| EN DN150 PN16 type E, with spigot | 1 100 (43.3) | 97 (214) | 1 350 (53.1) | 286 (631) | n/a | n/a |
| EN DN 150 PN 16 type F, with recess | 1 100 (43.3) | 97 (214) | 1 350 (53.1) | 287 (632) | n/a | n/a |
| EN DN 150 PN 40 type B1, raised face (RF) | 1 100 (43.3) | 105 (231) | 1 350 (53.1) | 294 (648) | n/a | n/a |
| EN DN 150 PN 40 type D, with groove | 1 100 (43.3) | 104 (230) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 40 type E, with spigot | 1 100 (43.3) | 103 (228) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 40 type F, with recess | 1 100 (43.3) | 104 (230) | 1 350 (53.1) | 293 (647) | n/a | n/a |
| EN DN 150 PN 63 type B1, raised face (RF) | 1 140 (44.9) | 124 (274) | 1 350 (53.1) | 311 (685) | n/a | n/a |
| EN DN 150 PN 63 type D, with groove | 1 140 (44.9) | 124 (274) | 1 350 (53.1) | 310 (684) | n/a | n/a |
| EN DN 150 PN 63 type E, with spigot | 1 140 (44.9) | 122 (269) | 1 350 (53.1) | 309 (681) | n/a | n/a |
| EN DN 150 PN 63 type F, with recess | 1 140 (44.9) | 123 (272) | 1 350 (53.1) | 310 (684) | n/a | n/a |
| EN DN 150 PN 100 type B1, raised face (RF) | 1 180 (46.5) | 138 (303) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type D, with groove | 1 180 (46.5) | 137 (302) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type E, with spigot | 1 180 (46.5) | 136 (299) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 100 type F, with recess | 1 180 (46.5) | 137 (301) | n/a | n/a | n/a | n/a |
| EN DN 200 PN 16 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 294 (649) | 1 010 (39.8) | 290 (639) |
| EN DN 200 PN 16 type D, with groove | n/a | n/a | 1 350 (53.1) | 294 (649) | n/a | n/a |
| EN DN 200 PN 16 type E, with spigot | n/a | n/a | 1 350 (53.1) | 293 (646) | n/a | n/a |
| EN DN 200 PN 16 type F, with recess | n/a | n/a | 1 350 (53.1) | 293 (646) | n/a | n/a |
| EN DN200 PN40 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 311 (685) | 1 030 (40.6) | 308 (679) |
| EN DN 200 PN 40 type D, with groove | n/a | n/a | 1 350 (53.1) | 310 (683) | n/a | n/a |
| EN DN 200 PN 40 type E, with spigot | n/a | n/a | 1 350 (53.1) | 308 (680) | n/a | n/a |
| EN DN 200 PN 40 type F, with recess | n/a | n/a | 1 350 (53.1) | 309 (682) | n/a | n/a |
| EN DN 200 PN 63 type B1, raised face (RF) | n/a | n/a | 1 350 (53.1) | 333 (733) | 1 060 (41.7) | 332 (732) |

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## Dimensional drawings (continued)

| Process connection size and type | FCS700 sensor nominal size DN 100 L1 in mm (inch) | Weight in kg (lb) | DN 150 L1 in mm (inch) | Weight in kg (lb) | DN 200 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| EN DN 200 PN 63 type D, with groove | n/a | n/a | 1 350 (53.1) | 332 (732) | n/a | n/a |
| EN DN 200 PN 63 type E, with spigot | n/a | n/a | 1 350 (53.1) | 330 (728) | n/a | n/a |
| EN DN 200 PN 63 type F, with recess | n/a | n/a | 1 350 (53.1) | 331 (730) | n/a | n/a |
| EN DN 200 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 100 (43.3) | 362 (798) |
| EN DN 250 PN 16 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 080 (42.5) | 306 (675) |
| EN DN 250 PN 40 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 130 (44.5) | 343 (756) |
| EN DN 250 PN 63 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 150 (45.3) | 370 (816) |
| EN DN 250 PN 100 type B1, raised face (RF) | n/a | n/a | n/a | n/a | 1 150 (45.3) | 433 (955) |

***L1 dimension and weight with process connections according to EN 1092-1, alloy 22 wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 L1 in mm (inch) | Weight in kg (lb) | DN 150 L1 in mm (inch) | Weight in kg (lb) | DN 200 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| EN DN 125 PN 16, type B1, raised face (RF) | 1 100 (43.3) | 96 (212) | n/a | n/a | n/a | n/a |
| EN DN 125 PN 40, type B1, raised face (RF) | 1 100 (43.3) | 101 (222) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 16, type B1, raised face (RF) | 1 100 (43.3) | 103 (227) | n/a | n/a | n/a | n/a |
| EN DN 150 PN 40, type B1, raised face (RF) | 1 100 (43.3) | 110 (241) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to JIS B 2220, AISI 316L wetted parts***

| Process connection size and type | FCS700 sensor nominal size DN 100 L1 in mm (inch) | Weight in kg (lb) | DN 150 L1 in mm (inch) | Weight in kg (lb) | DN 200 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| JIS DN 100 10 K | 1 100 (43.3) | 91 (200) | n/a | n/a | n/a | n/a |
| JIS DN 100 20 K | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| JIS DN 125 10 K | 1 100 (43.3) | 94 (208) | n/a | n/a | n/a | n/a |
| JIS DN 125 20 K | 1 100 (43.3) | 101 (222) | n/a | n/a | n/a | n/a |

***L1 dimension and weight with process connections according to JIS B 2220, alloy 22 wetted parts***

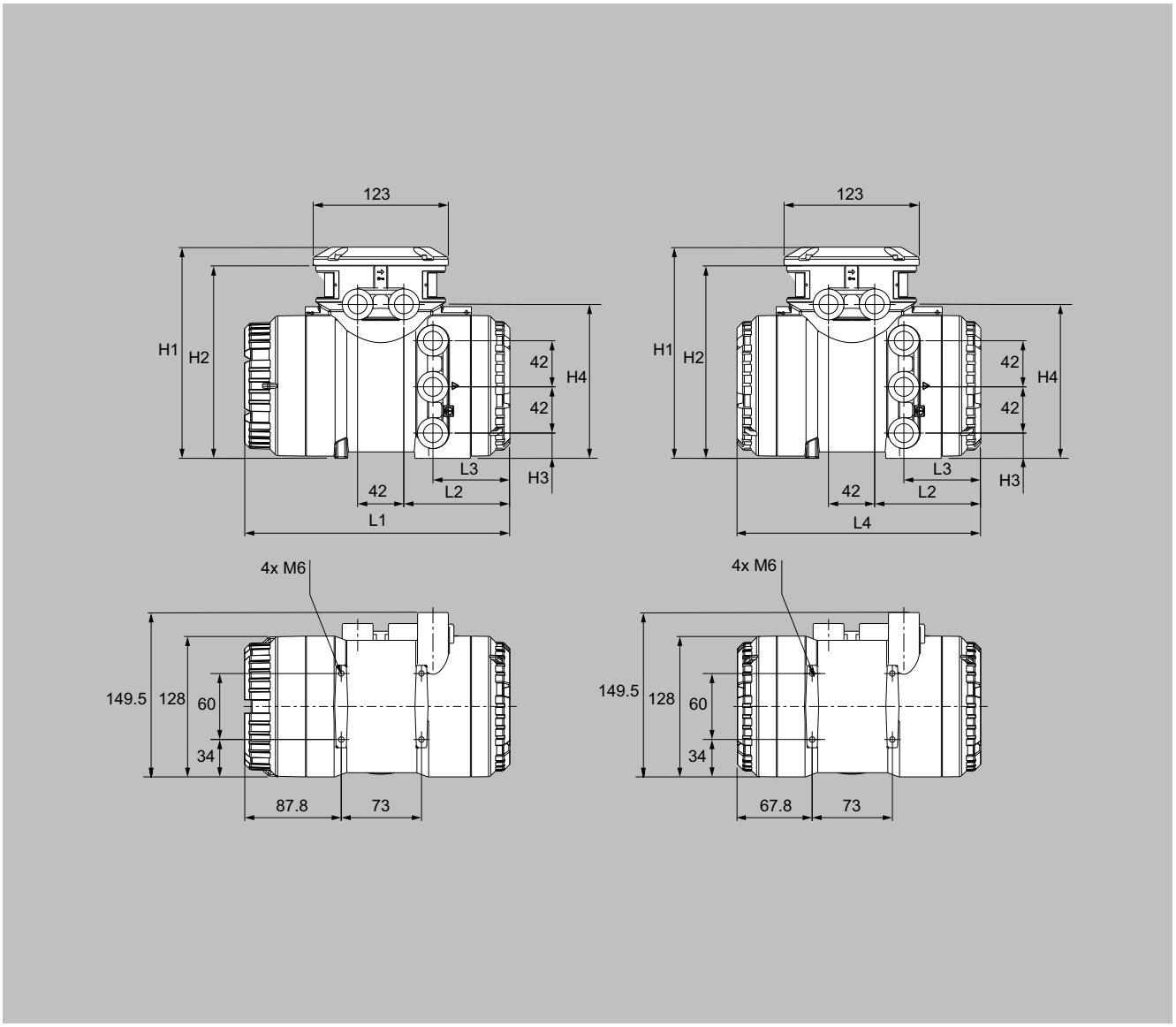
| Process connection size and type | FCS700 sensor nominal size DN 100 L1 in mm (inch) | Weight in kg (lb) | DN 150 L1 in mm (inch) | Weight in kg (lb) | DN 200 L1 in mm (inch) | Weight in kg (lb) |
|---|---|---|---|---|---|---|
| JIS DN 125 10 K | 1 100 (43.3) | 97 (213) | n/a | n/a | n/a | n/a |
| JIS DN 125 20 K | 1 100 (43.3) | 103 (228) | n/a | n/a | n/a | n/a |

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## Dimensional drawings (continued)

***Drawings, dimensions and weight for FCT020 and FCT040 transmitters***




Dimensions of FCT020 or FCT040 transmitter in mm. Transmitter with display shown on the left. Transmitter without display shown on the right.

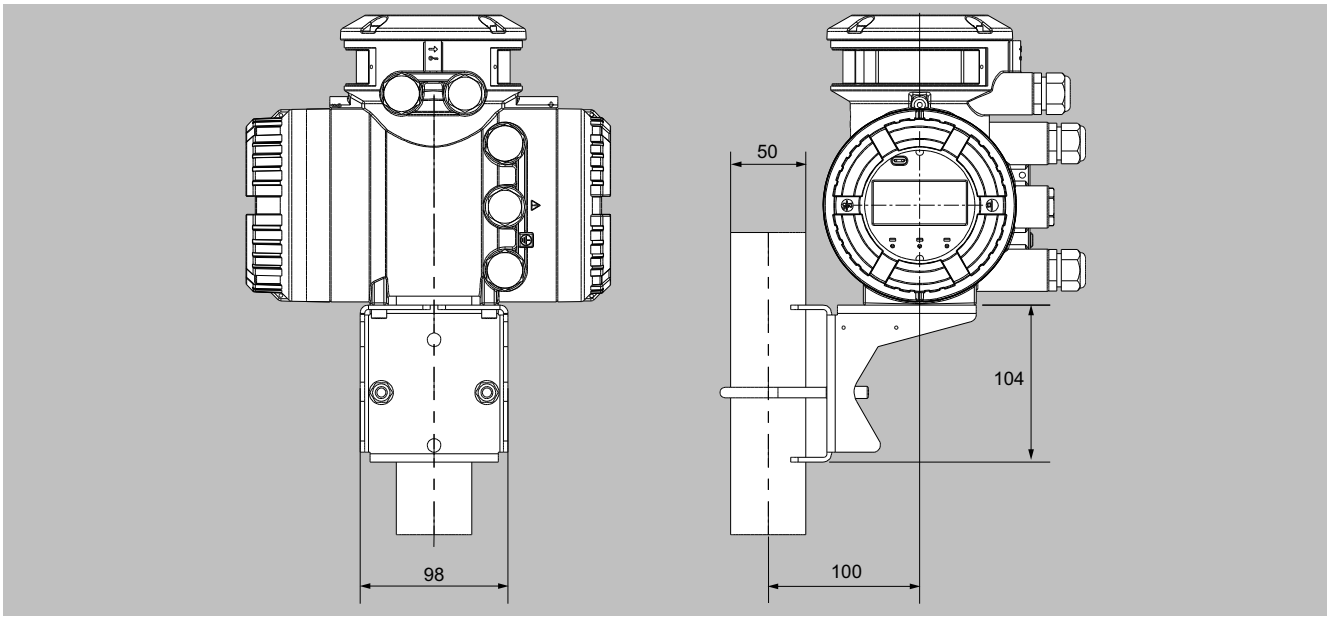
***Dimensions L1 to L4 and H1 to H4 (material options: stainless steel, aluminum)***

| Material | L1 in mm (inch) | L2 in mm (inch) | L3 in mm (inch) | L4 in mm (inch) | H1 in mm (inch) | H2 in mm (inch) | H3 in mm (inch) | H4 in mm (inch) |
|---|---|---|---|---|---|---|---|---|
| **Stainless steel** | 255.5 (10.06) | 110.5 (4.35) | 69 (2.72) | 235 (9.25) | 201 (7.91) | 184 (7.24) | 24 (0.94) | 150.5 (5.93) |
| **Aluminum** | 241.5 (9.51) | 96.5 (3.8) | 70 (2.76) | 221 (8.7) | 192 (7.56) | 175 (6.89) | 23 (0.91) | 140 (5.51) |

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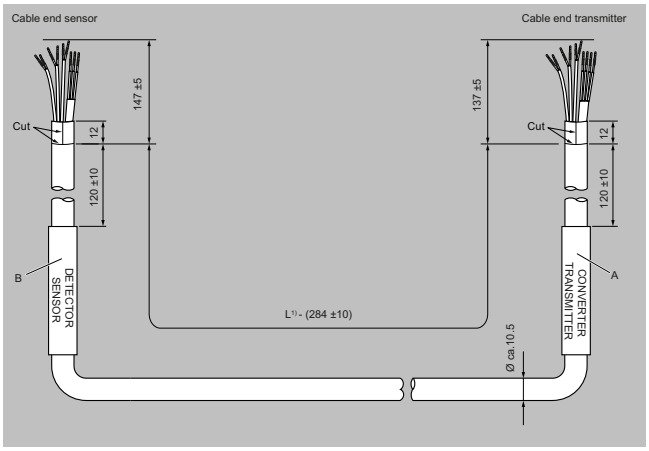


## Dimensional drawings (continued)




***Connecting cable dimensions and weights***

Standard cable

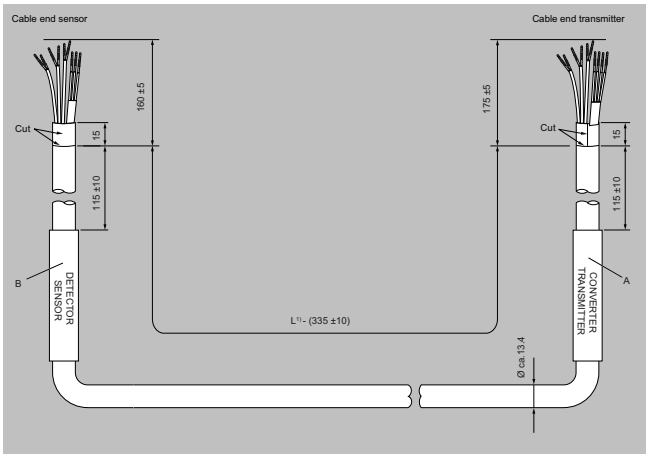



Dimensions in mm. Standard terminated cable. A and B are factory-fitted labels.

| Option code | Cable length, L | Cable color |
|---|---|---|
| L51 | 5 m (16.4 ft) | Non-Ex: gray / Ex: blue |
| L54 | 10 m (32.8 ft) | |
| L57 | 15 m (49.2 ft) | |
| L60 | 20 m (65.6 ft) | |
| L63 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.200 kg/m (0.134 lb/ft)

Standard cable with steel-armored option




Dimensions in mm. Steel-armored terminated cable. A and B are factory-fitted labels.

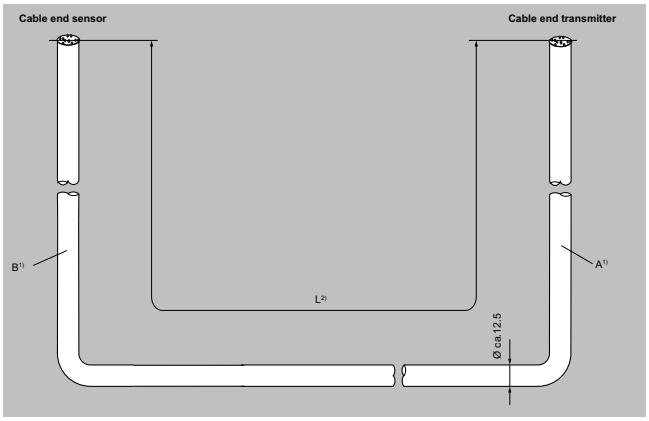
| Option code | Cable length, L | Cable color |
|---|---|---|
| L51 + A20/A21 | 5 m (16.4 ft) | Blue |
| L54 + A20/A21 | 10 m (32.8 ft) | |
| L57 + A20/A21 | 15 m (49.2 ft) | |
| L60 + A20/A21 | 20 m (65.6 ft) | |
| L63 + A20/A21 | 30 m (98.4 ft) | |

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## Dimensional drawings (continued)

Fire retardant cable




Dimensions in mm. Fire retardant unterminated cable. Labels A and B are supplied loose with termination kit.

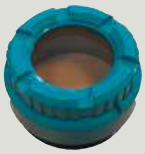
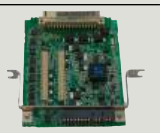
| Option code | Cable length, L | Cable color |
|---|---|---|
| L71 | 5 m (16.4 ft) | Gray |
| L74 | 10 m (32.8 ft) | |
| L77 | 15 m (49.2 ft) | |
| L80 | 20 m (65.6 ft) | |
| L83 | 30 m (98.4 ft) | |

Weight of cable ≤ 0.270 kg/m (0.181 lb/ft)

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## Selection and ordering data

| Description | Article No. | |
|---|---|---|
| **Cover** | | |
| Back cover, aluminum PU coating | **SAG:M3889JB-01** |  |
| Back cover, aluminum high corrosion protection coating | **SAG:M3889JC-01** | |
| Back cover, stainless steel | **SAG:M3830YB-01** |  |
| Front cover, aluminum PU coating, with glass | **SAG:M3889JD-01** |  |
| Front cover, aluminum high corrosion protection coating, with glass | **SAG:M3889JE-01** | |
| Front cover, stainless steel, with glass | **SAG:M3829RC-01** |  |
| Neck cover, aluminum PU coating | **SAG:M3889JF-01** |  |
| Neck cover, aluminum high corrosion protection coating | **SAG:M3889JG-01** | |
| Neck cover, stainless steel | **SAG:M3830YC-01** |  |
| **Base board** | | |
| Base board HART | **SAG:M3829ND-01** |  |
| Base board for PROFIBUS Fieldbus | **SAG:M3829JQ-01** | |
| Base board Modbus | **SAG:M3829ZR-01** | |
| **Amplifier for sensor incl. specific SN setting and customer set-up** | |  |
| Transmitter cassette, FCT040, HART, Non-Ex, including serial number setting, without option board (please provide serial number) | **SAG:M3889JH-01** | |
| Transmitter cassette, FCT020, HART, Non-Ex, including serial number setting, without option board | **SAG:M3889JJ-01** | |
| Transmitter cassette, FCT040, Modbus, Non-Ex, including serial number setting, without option board | **SAG:M3889JK-01** | |
| Transmitter cassette, FCT020, Modbus, Non-Ex, including serial number setting, without option board | **SAG:M3889JL-01** | |
| Transmitter cassette, FCT040, PROFIBUS PA, Non-Ex, including SN setting | **SAG:M3889JL-01** | |
| **Display (serial number mandatory)** | | |
| Display, HART FCT020 aluminum housing | **SAG:M3889JN-01** | |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| Display, HART FCT040 aluminum housing | **SAG:M3889JP-01** |  |
| Display, Modbus FCT020 aluminum housing | **SAG:M3889JY-01** | |
| Display, Modbus FCT040 aluminum housing | **SAG:M3889JZ-01** | |
| Display, PROFIBUS FCT040 aluminum housing | **SAG:M3889KA-01** | |
| Display, HART FCT020 SST housing | **SAG:M3889JN-01** | |
| Display, HART FCT040 SST housing | **SAG:M3889JP-01** | |
| Display, Modbus FCT020 SST housing | **SAG:M3889JY-01** | |
| Display, Modbus FCT040 SST housing | **SAG:M3889JZ-01** | |
| Display, PROFIBUS FCT040 SST housing | **SAG:M3889KA-01** | |
| **Accessories** | | |
| Cable cover | **SAG:M3829NE-01** |  |
| Safety cover | **SAG:M3829QC-01** |  |
| MicroSD card with mini case | **SAG:M3829QR-01** |  |
| Complete O-Ring set transmitter/sensor | **SAG:M3829QW-01** |  |
| O-Ring set 114,4x3,1 NBR/HNBR -40 ... 100 °C (-40 ... 212 °F) | **SAG:M3827XJ-01** | |
| O-Ring set 83x4 NBR [-50 ... +100 °C (-58 ... 212 °F)] | **SAG:M3827XK-01** | |
| O-Ring set 84x3 NBR [-50 ... +100 °C (-58 ... 212 °F)] | **SAG:M3827XL-01** | |
| Adapter NPT 1/2" ==> G1/2" | **SAG:M3810EM-01** |  |
| Terminal box housing part | **SAG:M3889KB-01** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| Terminal box cover and O-ring part | SAG:M3889KC-01 |  |
| Mounting bracket and bracket mounting set | SAG:M3810DR-01 |  |
| 2" pipe mounting set | SAG:M3806JA-01 |  |
| **Remote sensor cable standard** | | |
| 5 meter sensor cable std terminated | SAG:M3889KJ-01 |  |
| 10 meter sensor cable std terminated | SAG:M3889KK-01 | |
| 15 meter sensor cable std terminated | SAG:M3889KL-01 | |
| 20 meter sensor cable std terminated | SAG:M3889KM-01 | |
| 30 meter sensor cable std terminated | SAG:M3889KN-01 | |
| 50 meter sensor cable std not terminated | SAG:M3889KP-01 | |
| 100 meter sensor cable std not terminated | SAG:M3889KQ-01 | |
| 150 meter sensor cable std not terminated | SAG:M3889KR-01 | |
| 200 meter sensor cable std not terminated | SAG:M3889KS-01 | |
| 250 meter sensor cable std not terminated | SAG:M3889KT-01 | |
| 300 meter sensor cable std not terminated | SAG:M3889KW-01 | |
| Cable termination set standard and Ex | SAG:M3889KX-01 | |
| **Remote sensor cable Ex** | | |
| 5 meter sensor cable Ex terminated | SAG:M3889KY-01 |  |
| 10 meter sensor cable Ex terminated | SAG:M3889KZ-01 | |
| 15 meter sensor cable Ex terminated | SAG:M3889LA-01 | |
| 20 meter sensor cable Ex terminated | SAG:M3889LB-01 | |
| 30 meter sensor cable Ex terminated | SAG:M3889LC-01 | |
| 50 meter sensor cable Ex not terminated | SAG:M3889LD-01 | |
| 100 meter sensor cable Ex not terminated | SAG:M3889LE-01 | |
| 150 meter sensor cable Ex not terminated | SAG:M3889LF-01 | |
| 200 meter sensor cable Ex not terminated | SAG:M3889LG-01 | |
| 250 meter sensor cable Ex not terminated | SAG:M3889LH-01 | |
| 300 meter sensor cable Ex not terminated | SAG:M3889LJ-01 | |
| Cable termination set standard and Ex | SAG:M3889KX-01 | |
| **Marine and fire retardant remote sensor cable** | | |
| 5 meter marine sensor cable terminated | SAG:M3889LK-01 | |
| 10 meter marine sensor cable terminated | SAG:M3889LL-01 | |
| 15 meter marine sensor cable terminated | SAG:M3889LM-01 | |
| 20 meter marine sensor cable terminated | SAG:M3889LN-01 | |
| 30 meter marine sensor cable terminated | SAG:M3889LP-01 | |
| 50 meter marine sensor cable | SAG:M3889LQ-01 | |
| 100 meter marine sensor cable | SAG:M3889LR-01 | |
| 150 meter marine sensor cable | SAG:M3889LS-01 | |
| 300 meter marine sensor cable | SAG:M3889LT-01 | |
| 1000 meter marine sensor cable roll | SAG:M3889LW-01 | |
| Cable termination set > 50+ meter marine | SAG:M3889LX-01 | |

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## Overview



SITRANS FC Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

Compatibility between transmitters and sensors

| Transmitter | Compact | Remote | Ex-Approval | Sensor |
|---|---|---|---|---|
| **FCT030** | Yes | Yes | Yes | FCS300, DN 15 ... 150 |
| | Yes | Yes | Yes | FCS400, DN 15 ... 50 |
| | No | Yes | Yes | MASS 2100, DI 1.5 |
| | Yes | Yes | Yes | MASS 2100, DI 3, DI 6, DI 15 |
| | No | Yes | Yes | FC300, DN 4 |
| **FCT010** | Yes | No | Yes | FCS300, DN 15 ... 150 |
| | Yes | No | Yes | FCS400, DN 15 ... 50 |
| | No | Yes | Yes | MASS 2100, DI 1.5 |
| | Yes | Yes | Yes | MASS 2100, DI 3, DI 6, DI 15 |
| | No | Yes | Yes | FC300, DN 4 |
| **FCT070** | No | Yes | Yes | FCS300, DN 15 ... 150 |
| | No | Yes | Yes | FCS400, DN 15 ... 50 |
| | No | Yes | Yes | MASS 2100, DI 1.5 |
| | No | Yes | Yes | MASS 2100, DI 3, DI 6, DI 15 |
| | No | Yes | Yes | FC300, DN 4 |

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## Benefits

Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series
- Full integration in SIMATIC solutions

Easier commissioning

All SITRANS FC Coriolis flowmeters feature a sensor related memory unit SensorFlash which stores calibration data and transmitter settings for the lifetime of the product as well as all product documentation and certificates.

At commissioning the flowmeter commences measurement without any initial programming.

Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SensorFlash data updates all settings after initialization.

Room for growth

- FC330/FC310:

  Digital platform allows for any sensor in the range DN 15 to DN 150 to be matched in compact or remote installation.
- FC430/FC410:

  Robust and compact sensor dedicated for OEM and skid manufacturer in sizes DN 15 to DN 50. Also available in a true sanitary version.
- MASS 2100/FC300 DN 4 sensors with FCT digital platform transmitters allows all sensors from DI 1.5 to DI 15 to be matched with the FCT010, FCT030 and FCT070 transmitters.
- FCT070 transmitter solution as a fully integrated technology module in SIMATIC ET 200SP. Seamless communicating with all SIMATIC solutions by very fast PROFINET communication. Advanced batch function blocks are available.

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## Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is to a large extend independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio and its ability to be a true multi parameter devise.

The main applications of the Coriolis flowmeter can be found in all industries, such as:

| Industries | |
|---|---|
| **Chemical** | Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing |
| **Food and beverage** | Dairy products, beer, wine, softdrinks, °Plato/°Brix, fruit juices and pulps, bottling, CO2 dosing, CIP liquids |
| **Automotive** | Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots |
| **Oil and gas** | Filling of gas bottles, furnace control, test separators, LPG, well-head water-cut monitoring. All hydrocarbon fluids in refineries |
| **Marine** | Fuel consumption management, boiler control, bunkering management |
| **Water & waste water** | Dosing of chemicals for water treatment |

**Please see Product selector** https://www.pia-portal.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**








| | FC310<br>7ME4631 | FC330<br>7ME4633 | FCS300 with FCT070<br>7ME4637 | FC410<br>7ME4611 | FC430<br>7ME4613 | FCS400 with FCT070<br>7ME4617 |
|---|---|---|---|---|---|---|
| **Design** | | | | | | |
| Compact | ● | ● | | ● | ● | |
| Remote | | ● | ● | | ● | ● |
| **Transmitter enclosure** | | | | | | |
| Aluminium IP67 Field mounting enclosure | ● | ● | | ● | ● | |
| Aluminum IP67 Wall mounting enclosure | | ● | | | ● | |
| Noryl (FCT070), IP20/NEMA 2 | | | ● | | | ● |
| **Communication** | | | | | | |
| HART | | ● | | | ● | |
| PROFIBUS PA | | ● | | | ● | |
| PROFIBUS DP | | ● | | | ● | |
| MODBUS RTU/RS 485 | ● | ● | | ● | ● | |
| SIMATIC integration ET200SP ST & HF (PROFINET) | | | ● | | | ● |
| **Supply voltage** | | | | | | |
| 24 V DC | ● | ● | ● | ● | ● | ● |
| 115/230 V AC | | ● | | | ● | |
| **Pipe size** | | | | | | |
| DI 1.5 (1/16") | | | | | | |
| DI 3 (1/8") | | | | | | |
| DN 4 (1/6") | | | | | | |
| DI 6 (¼") | | | | | | |
| DI 15 (½") | | | | | | |

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## Application (continued)

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| | FC310<br>7ME4631 | FC330<br>7ME4633 | FCS300 with FCT070<br>7ME4637 | FC410<br>7ME4611 | FC430<br>7ME4613 | FCS400 with FCT070<br>7ME4617 |
|---|---|---|---|---|---|---|
| DN 15 (½") | ● | ● | ● | ● | ● | ● |
| DN 25 (1") | ● | ● | ● | ● | ● | ● |
| DN 50 (2") | ● | ● | ● | ● | ● | ● |
| DN 80 (3") | ● | ● | ● | | | |
| DN 100 (4") | ● | ● | ● | | | |
| DN 150 (6") | ● | ● | ● | | | |
| **Process connection norms and pressure** | | | | | | |
| **Pipe thread** | | | | | | |
| NPT ANSI/ASME B.20.1; PN 100 | ● | ● | ● | ● | ● | ● |
| ISO 228/1; PN 100 | ● | ● | ● | ● | ● | ● |
| **Flange** | | | | | | |
| EN 1092-1 PN 16 | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 40 | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 63 | ● | ● | ● | ● | ● | ● |
| EN 1092-1 PN 100 | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 Class 150 | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 Class 300 | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 Class 600 | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 Class 900[1)] | ● | ● | ● | ● | ● | ● |
| ANSI B 16.5 Class 1500[1)] | ● | ● | ● | | | |
| JIS B2220 10K | ● | ● | ● | ● | ● | ● |
| JIS B220 20K | ● | ● | ● | ● | ● | ● |
| JIS B220 40K | ● | ● | ● | | | |
| JIS B220 63K | ● | ● | ● | | | |
| **Hygenic** | | | | | | |
| DIN 11851 | ● | ● | ● | ● | ● | ● |
| DIN 32676 Clamp Form C Triclamp | | | | ● | ● | ● |
| DIN 32676 Clamp Row A | ● | ● | ● | | | |
| DIN 11864-1 GS Form A Row A | | | | ● | ● | ● |
| DIN 11864-2 BF Form A Row A | | | | ● | ● | ● |
| DIN 11864-3 BKS Form A Row A | | | | ● | ● | ● |
| ISO 2852 Clamp | | | | ● | ● | ● |
| ISO 2853 Threat | | | | ● | ● | ● |
| SMS 1145 | ● | ● | ● | ● | ● | ● |
| Others on request | ● | ● | ● | ● | ● | ● |

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## Application (continued)

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| | FC310<br>7ME4631 | FC330<br>7ME4633 | FCS300 with FCT070<br>7ME4637 | FC410<br>7ME4611 | FC430<br>7ME4613 | FCS400 with FCT070<br>7ME4617 |
|---|---|---|---|---|---|---|
| **Pipe material** | | | | | | |
| Stainless steel AISI 316L/1.4435/1.4404 | ● | ● | ● | ● | ● | ● |
| Nickel-Alloy C4 | ● | ● | ● | | | |
| Hastelloy C22/2.4602 | | | | | | |
| With heating jacket | | | | | | |
| Internal U-Tube | | | | | | |
| Heating jacket electrical (optional) | | | | ● | ● | ● |
| **Pressure rating** | | | | | | |
| PN 16 | ● | ● | | | | |
| PN 40 | ● | ● | ● | ● | ● | ● |
| PN 63 | ● | ● | ● | ● | ● | ● |
| PN 100 | ● | ● | ● | ● | ● | ● |
| PN 130 | | | | | | |
| PN 160 | | | | | ●[5] | ●[5] |
| PN 230 | | | | | | |
| PN 265 | | | | | | |
| PN 350 | | | | | | |
| PN 365 | | | | | | |
| PN 410 | | | | | | |
| High-pressure version[2] | | | | | | |
| **Accuracy (liquids)** | | | | | | |
| Flow error ≤ 0.1 % of rate[3] | ● | ● | ● | ● | ● | ● |
| Flow error ≤ 0.2 % of rate[3] | ● | ● | ● | | | |
| Density error ≤ 0.0005 g/cm³ | | | | ● | ● | ● |
| Density error ≤ 0.005 g/cm³ | | | | ● | ● | ● |
| Density error ≤ 0.001 g/cm³ | | | | | | |
| Density error ≤ 0.002 g/cm³ | ● | ● | ● | | | |
| Density error ≤ 0.010 g/cm³ | ● | ● | ● | | | |
| **Cable glands** | | | | | | |
| ½" NPT | ● | ● | ● | ● | ● | ● |
| M20 | ● | ● | ● | ● | ● | ● |
| **Approvals** | | | | | | |
| **Hazardous locations** | | | | | | |
| ATEX zone 1 | ● | ● | ● | ●[6] | ●[6] | ●[6] |
| IECEx zone 1 | ● | ● | ● | ●[6] | ●[6] | ●[6] |

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## Application (continued)

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| | FC310<br>7ME4631 | FC330<br>7ME4633 | FCS300 with FCT070<br>7ME4637 | FC410<br>7ME4611 | FC430<br>7ME4613 | FCS400 with FCT070<br>7ME4617 |
|---|---|---|---|---|---|---|
| EAC Ex zone 1 | ● | ● | ● | ● | ● | ● |
| US /CSA) Div 1 | ● | ● | ● | ● | ● | ● |
| Canada (CSA) zone 1 | ● | ● | ● | ● | ● | ● |
| NEPSI | ● | ● | ● | ● | ● | ● |
| INMETRO | ● | ● | ● | ● | ● | ● |
| KCs | | | | | | ● |
| **PED** | | | | | | |
| Fluid group 1 Category III, gas PED Directive 2014/68/EU | ● | ● | ● | ● | ● | ● |
| **CRN** | | | | | | |
| Category F OF10769.5C CRN | ● | ● | ● | ● | ● | ● |
| **F&B/Pharma** | | | | | | |
| EHEDG (in preparation) | | | | ● | ● | ● |
| 3A (in preparation) | | | | ● | ● | ● |
| **Marine** | | | | | | |
| Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA, CCS | ● | ● | | ● | ● | |

**Please see Product selector** http://www.pia-portal.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**















| | MASS 2100 DI 1.5 FC300 DN 4 with FCT010<br>7ME4811 | MASS 2100 DI 1.5 FC300 DN 4 with FCT030<br>7ME4813 | MASS 2100 DI 1.5 FC300 DN 4 with FCT070<br>7ME4817 | MASS 2100 with FCT010<br>7ME4811 | MASS 2100 with FCT030<br>7ME4813 | MASS 2100 with FCT070<br>7ME4817 |
|---|---|---|---|---|---|---|
| **Design** | | | | | | |
| Compact | | | | ● | ● | |
| Remote | ● | ● | ● | ● | ● | ● |

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## Application (continued)

**Please see Product selector** http://www.pia-portal.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**















| | MASS 2100 DI 1.5 FC300 DN 4 with FCT010<br>7ME4811 | MASS 2100 DI 1.5 FC300 DN 4 with FCT030<br>7ME4813 | MASS 2100 DI 1.5 FC300 DN 4 with FCT070<br>7ME4817 | MASS 2100 with FCT010<br>7ME4811 | MASS 2100 with FCT030<br>7ME4813 | MASS 2100 with FCT070<br>7ME4817 |
|---|---|---|---|---|---|---|
| **Transmitter enclosure** | | | | | | |
| Aluminium IP67 Field mounting enclosure | ● | ● | | ● | ● | |
| Aluminum IP67 Wall mounting enclosure | | ● | | | ● | |
| Noryl (FCT070), IP20/NEMA 2 | | | ● | | | ● |
| **Communication** | | | | | | |
| HART | | ● | | | ● | |
| PROFIBUS PA | | ● | | | ● | |
| PROFIBUS DP | | ● | | | ● | |
| MODBUS RTU/RS 485 | ● | ● | | ● | ● | |
| SIMATIC integration ET200SP ST & HF (PROFINET) | | | ● | | | ● |
| **Supply voltage** | | | | | | |
| 24 V DC | ● | ● | ● | ● | ● | ● |
| 115/230 V AC | | ● | | | ● | |
| **Pipe size** | | | | | | |
| DI 1.5 (1/16″) | ● | ● | ● | | | |
| DI 3 (1/8″) | | | | ● | ● | ● |
| DN 4 (1/6″) | ● | ● | ● | | | |
| DI 6 (¼″) | | | | ● | ● | ● |
| DI 15 (½″) | | | | ● | ● | ● |
| DN 15 (½″) | | | | | | |
| DN 25 (1″) | | | | | | |
| DN 50 (2″) | | | | | | |
| DN 80 (3″) | | | | | | |
| DN 100 (4″) | | | | | | |
| DN 150 (6″) | | | | | | |
| **Process connection norms and pressure** | | | | | | |
| **Pipe thread** | | | | | | |
| NPT ANSI/ASME B.20.1; PN 100 | ● | ● | ● | ● | ● | ● |
| ISO 228/1; PN 100 | ● | ● | ● | ● | ● | ● |
| **Flange** | | | | | | |
| EN 1092-1 PN 16 | | | | | | |
| EN 1092-1 PN 40 | | | | ● | ● | ● |
| EN 1092-1 PN 63 | | | | | | |
| EN 1092-1 PN 100 | | | | ● | ● | ● |
| ANSI B 16.5 Class 150 | | | | ● | ● | ● |

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## Application (continued)

**Please see Product selector http://www.pia-portal.automation.siemens.com on the Internet, since some constrains might be related to some of the features**















| | MASS 2100 DI 1.5 FC300 DN 4 with FCT010<br>7ME4811 | MASS 2100 DI 1.5 FC300 DN 4 with FCT030<br>7ME4813 | MASS 2100 DI 1.5 FC300 DN 4 with FCT070<br>7ME4817 | MASS 2100 with FCT010<br>7ME4811 | MASS 2100 with FCT030<br>7ME4813 | MASS 2100 with FCT070<br>7ME4817 |
|---|---|---|---|---|---|---|
| ANSI B 16.5 Class 300 | | | | | | |
| ANSI B 16.5 Class 600 | | | | ● | ● | ● |
| ANSI B 16.5 Class 900[1)] | | | | | | |
| ANSI B 16.5 Class 1500[1)] | | | | | | |
| JIS B2220 10K | | | | | | |
| JIS B220 20K | | | | | | |
| JIS B220 40K | | | | | | |
| JIS B220 63K | | | | | | |
| **Hygenic** | | | | | | |
| DIN 11851 | | | | ● | ● | ● |
| DIN 32676 Clamp Form C Triclamp | | | | | | |
| DIN 32676 Clamp Row A | | | | | | |
| DIN 11864-1 GS Form A Row A | | | | | | |
| DIN 11864-2 BF Form A Row A | | | | | | |
| DIN 11864-3 BKS Form A Row A | | | | | | |
| ISO 2852 Clamp | | | | ● | ● | ● |
| ISO 2853 Threat | | | | ● | ● | ● |
| SMS 1145 | | | | | | |
| Others on request | | | | ● | ● | ● |
| **Pipe material** | | | | | | |
| Stainless steel AISI 316L/1.4435/1.4404 | ● | ● | ● | ● | ● | ● |
| Nickel-Alloy C4 | | | | | | |
| Hastelloy C22/2.4602 | ● | ● | ● | ● | ● | ● |
| With heating jacket | | | | | | |
| Internal U-Tube | | | | ● | ● | ● |
| Heating jacket electrical (optional) | | | | | | |
| **Pressure rating** | | | | | | |
| PN 16 | | | | | | |
| PN 40 | | | | ● | ● | ● |
| PN 63 | | | | | | |
| PN 100 | ● | ● | ● | ● | ● | ● |
| PN 130 | ● | ● | ● | ● | ● | ● |
| PN 160 | | | | | | |
| PN 230 | ● | ● | ● | ● | ● | ● |
| PN 265 | | | | ● | ● | ● |

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## Application (continued)

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| | MASS 2100 DI 1.5 FC300 DN 4 with FCT010<br>7ME4811 | MASS 2100 DI 1.5 FC300 DN 4 with FCT030<br>7ME4813 | MASS 2100 DI 1.5 FC300 DN 4 with FCT070<br>7ME4817 | MASS 2100 with FCT010<br>7ME4811 | MASS 2100 with FCT030<br>7ME4813 | MASS 2100 with FCT070<br>7ME4817 |
|---|---|---|---|---|---|---|
| PN 350 | | | | ● | ● | ● |
| PN 365 | ● | ● | ● | ● | ● | ● |
| PN 410 | | | | ● | ● | ● |
| High-pressure version[2] | ● | ● | ● | ● | ● | ● |
| **Accuracy (liquids)** | | | | | | |
| Flow error ≤ 0.1 % of rate[3] | ● | ● | ● | ● | ● | ● |
| Flow error ≤ 0.2 % of rate[3] | | | | | | |
| Density error ≤ 0.0005 g/cm³ | | | | ● | ● | ● |
| Density error ≤ 0.005 g/cm³ | | | | ● | ● | ● |
| Density error ≤ 0.001 g/cm³ | ● | ● | ● | | | |
| Density error ≤ 0.002 g/cm³ | | | | | | |
| Density error ≤ 0.010 g/cm³ | | | | | | |
| **Cable glands** | | | | | | |
| ½" NPT | ● | ● | ● | ● | ● | ● |
| M20 | ● | ● | ● | ● | ● | ● |
| **Approvals** | | | | | | |
| **Hazardous locations** | | | | | | |
| ATEX zone 1 | ● | ● | ● | ● | ● | ● |
| IECEx zone 1 | ● | ● | ● | ● | ● | ● |
| EAC Ex zone 1 | ● | ● | ● | ● | ● | ● |
| US /CSA) Div 1 | ● | ● | ● | ● | ● | ● |
| Canada (CSA) zone 1 | ● | ● | ● | ● | ● | ● |
| NEPSI | | | | | | |
| INMETRO | | | | | | |
| KCs | ● | ● | | | | |
| **PED** | | | | | | |
| Fluid group 1 Category III, gas PED Directive 2014/68/EU | ● | ● | ● | ● | ● | ● |
| **CRN** | | | | | | |
| Category F OF10769.5C CRN | ● | ● | ● | ●[4] | ●[4] | ●[4] |
| **F&B/Pharma** | | | | | | |
| EHEDG (in preparation) | | | | | | |
| 3A (in preparation) | | | | | | |

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## Application (continued)

**Please see Product selector** http://www.pia-portal.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**















| | MASS 2100 DI 1.5 FC300 DN 4 with FCT010<br>7ME4811 | MASS 2100 DI 1.5 FC300 DN 4 with FCT030<br>7ME4813 | MASS 2100 DI 1.5 FC300 DN 4 with FCT070<br>7ME4817 | MASS 2100 with FCT010<br>7ME4811 | MASS 2100 with FCT030<br>7ME4813 | MASS 2100 with FCT070<br>7ME4817 |
|---|---|---|---|---|---|---|
| **Marine**<br>Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA, CCS | | | | | | |

● = Available
1) Sensor pressure and temperature limited to ANSI class 600 rating.
2) See technical specifications.
3) Increased error for gas mass flow measurement.
4) Only DI 6 is CRN.
5) Max. 100 bar.
6) Also for dust zone 21.

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## Function

The SITRANS FC flow measuring principle is based on the Coriolis effect. The flowmeter consists of a sensor and a transmitter. The sensor can be digital with an integrated frontend DSL or for low flow sensors also analogue sensors directly connected to the transmitter.

There are following sensors available:

- SITRANS FC MASS 2100 DI 1.5 to DI 15 mm in a single loop design
- SITRANS FC300 DN 4 in a single loop design
- SITRANS FCS300 DN 15 to DN 150 mm in bended dual tube design
- SITRANS FCS400 DN 15 to DN 50 mm in a compact bended dual tube design for OEM and other specific applications.

All sensors can be freely combined with three different transmitters in various configurations and protection style.

- SITRANS FCT010 transmitter: single channel Modbus
- SITRANS FCT030 transmitter: multi channel transmitter with full graphical display and full feature loaded.
- FCT070 transmitter: for full integration in the Siemens SIMATIC TIA and PCS7 world by the ET 200SP ST & HF. Full functionality including advanced functions blocks for easy integration . Functions block in TIA and APL library

The SITRANS FC sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups. The temperature of the tubes is measured by a Pt1000. The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS FC transmitter for calculations of mass, volume, fraction, temperature and density.The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has built-in noise filters, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves and aerated flowconditions can be reduced considerably.




SensorFlash flow memory units

FCT010 flow transmitters communicate via Modbus RTU and FCT030 via HART/Modbus/PROFIBUS DP / PROFIBUS PA beside up to 4 individual I/O free programmable as analogue , frequency, pulse or relay outputs. As well as static inputs can be set up.

The FCT070 transmitter is a technology module for the SIMATIC ET 200SP ST & HF system with directly connection from the digital sensor. Full transmitter functionality available to be set up directly in the SIMATIC system. The ET 200SP is very often connected to other SIMATIC systems like PCS7; S7 1200 and S7 1500 via the direct connection by PROFINET. Fast and simple signal transfer and controlling.

## Integration

***General installation requirements / System design information***

The SITRANS FC mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 4x or IP65. The flowmeter is bidirectional and can be installed in almost any orientation, however, the sensor is not self-emptying in all positions.

It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapors, aerated liquids or slush are not recommended.

The corrosion and erosion resistance of the fluid-wetted materials must be evaluated to secure long lifetime of the sensor. The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The Sizing Program (download from www.siemens.com) can be used to calculate the pressure drop and the accuracy over the full flowrange in use for the application.

Sizing

Liquids: The correct sensor size is determent by the allowable pressure drop at the maximum flowrate the meter is used with. After selecting the sensor size the accuracy throughout the flowrate range for the application can be checked by using the Sizing Program.

Gases: The correct size is very often determent by the calculation of the Mach number at maximum flowrate for the application. After that the accuracy throughout the flowrange should be checked.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

**Note:** For some sensor types, specific installation requirement has be taken into account. Please also see under the specific sensor type chapter.

Generel installation orientation

- FCS300 and FCS400 – sensors.

  The optimal installation orientation is vertical with flow upwards (liquids). This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain . To secure selfdraining a up to 10° off vertical installation could be required.

- MASS 2100/FC300 DN4 – sensors.

  The optimal installation orientation is horizontal.

Supports

- In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections.

Shut-off devices

- To conduct a system zero adjustment, shut-off devices are ideally required in the pipeline before and after the sensor:
- A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

Installation: straight run requirements

- The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore, the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest.

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**Integration** (continued)

- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.
- When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

Zero adjustment

- In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to „ZERO“ while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

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## Technical specifications

***Flowmeter uncertainty/specifications***

To ensure continuous accurate measurement, flowmeters must be calibrated.

The Siemens flowmeter calibration process is ISO 9001-certified, ensuring the entire calibration procedure is controlled to the highest quality standards. All primary measuring instrumentation used by the Flow Laboratory during the performance of its calibrations, has been calibrated with international standards traceability referring directly to the physical unit of measurement according to the International System of Units (SI). Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SD Memory card . The sensors has the calibration data written to the frontend section DSL. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

Sensor flow capacity

***FCS300 sensors for liquids :***

| | $Q_{min}$ at 1 % accuracy water[3] | | $Q_{nom}$[1] | | 100 % ($Q_{max}$)[2] | |
|---|---|---|---|---|---|---|
| | kg/h | (lb/min) | kg/h | (lb/min) | kg/h | (lb/min) |
| **DN 15 (½")** | 70 | (2.57) | 4 500 | (165) | 8 000 | (294) |
| **DN 25 (1")** | 240 | (8.92) | 20 500 | (753) | 35 000 | (1 286) |
| **DN 50 (2")** | 800 | (29.4) | 49 000 | (1 800) | 90 000 | (3 307) |
| **DN 80 (3")** | 2 000 | (73.5) | 122 000 | (4 483) | 250 000 | (9 186) |
| **DN 100 (4")** | 4 000 | (147) | 273 000 | (10 031) | 520 000 | (19 108) |
| **DN 150 (6")** | 6 900 | (253) | 459 200 | (16 873) | 860 000 | (31 600) |

***FCS400 sensors for liquids:***

| | $Q_{min}$ at 1 % accuracy water | | $Q_{nom}$[1] | | 100 % ($Q_{max}$)[2] | |
|---|---|---|---|---|---|---|
| | kg/h | (lb/min) | kg/h | (lb/min) | kg/h | (lb/min) |
| **DN 15 (½")** | 20 | (0.73) | 3 700 | (135) | 6 400 | (234) |
| **DN 25 (1")** | 200 | (7.32) | 11 500 | (421) | 17 700 | (648) |
| **DN 50 (2")** | 750 | (27.4) | 50 000 | (1 831) | 70 700 | (2 590) |

***MASS 2100 and FC300 sensors for liquids:***

| | $Q_{min}$ at 1 % accuracy water | | $Q_{nom}$[1] | | 100 % ($Q_{max}$)[2] | |
|---|---|---|---|---|---|---|
| | kg/h | (lb/h) | kg/h | (lb/h) | kg/h | (lb/h) |
| **DI 1.5 (1/16")** | 0.1 | (0.22) | 19 | (42) | 30 | (66) |
| **DI 3 (1/8")** | 1.0 | (2.2) | 90 | (198) | 250 | (550) |
| **DN 4 (1/6")** | 1 | (2.2) | 140 | (308) | 350 | (770) |
| **DI 6 (¼")** | 5 | (11) | 500 | (1 102) | 1 000 | (2 200) |
| **DI 15 (½")** | 20 | (44) | 3 800 | (8 370) | 5 600 | (12 345) |

1) $Q_{nom}$ = Δ 1 barg @ water 20 °C.
2) $Q_{max}$ = 10 m/sec @ water 20 °C at inlet (up to 25 m/s in the flowtubes).
3) For 0,1% sensor.

For gas applications the massflow rate is depending on the gas type. The max. flowrate is calculated with the Mach-Number to be Ma = 0.3.

- For flow > 5% of the sensors max. flow rate, the error can be read directly from the curve below.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.

The error curve is plotted from the formula:

$$E = \pm\sqrt{(Cal.)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

E = Error [%]

Z = Zero point error [kg/h][1)]

qm = Mass flow [kg/h]

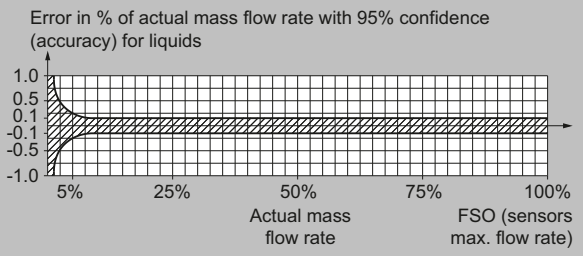
Cal. = Calibrated flow accuracy: 0.10, 0.15 or 0.20

1) Zero point error for each sensor is shown in the tables below.

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## Technical specifications (continued)




For gas applications: typical additional 0.4 % + zero point

| Reference conditions for flow calibration | |
|---|---|
| Flow conditions | Fully developed flow profile |
| Temperature, medium | 25 °C (77 °F) ± 5 K |
| Temperature, ambient | 25 °C (77 °F) +10/-5 K |
| Liquid pressure | 2 ± 1 bar |
| Density | 0.997 g/cm³ |
| Brix | 40 °Brix |
| Supply voltage | $U_n$ ±1 % |
| Warming-up time | 30 min. |
| Cable length | 5 m between transmitter and sensor |

| Additions in the event of deviations from reference conditions | |
|---|---|
| Current output | As pulse output ± (0.1 % of actual current +0.05 % FS current) |
| Effect of ambient temperature | • Display/actual current/frequency/pulse output: < ± 0.003 % / K act.<br>• Current output: < ± 0.005 % / K act. |
| Effect of supply voltage | < 0.005 % of measuring value on 1 % alteration |

| Sensor type | FC300 | MASS 2100 | | | |
|---|---|---|---|---|---|
| Sensor size | DN 4 (1/6") | DI 1.5 (1/16") | DI 3 (1/8") | DI 6 (¼") | DI 15 (½") |
| **Number of measuring pipes** | 1 | 1 | 1 | 1 | 1 |
| **Mass flow (liquids)** | | | | | |
| Linearity error[1] [% of rate] | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Repeatability of flowrate at rates > 5 % of $Q_{max}$ [% of rate] | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| Max. zero point error [kg/h] | 0.010 | 0.001 | 0.010 | 0.050 | 0.200 |
| **Density (liquids)** | | | | | |
| Density error standard [g/cm³] | n.a. | 0.008 | 0.008 | 0.008 | 0.0008 |
| Density error extended [g/cm³] | 0.007[2] | 0.001 | 0.0015 | 0.0015 | 0.0005 |
| Repeatability error [g/cm³] | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 |
| Range [g/cm³] | 0.3 ... 2.9 | 0.3 ... 2.9 | 0.3 ... 2.9 | 0.3 ... 2.9 | 0.3 ... 2.9 |
| **Temperature** | | | | | |
| Error [°K] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

1) Increased error can be expected for gas mass flow measurement (for gas measurement typically additional +0.40 % error).
2) For Hastelloy tubes: 0.0025 g/cm³.

| Sensor type | FCS300 | | | | | |
|---|---|---|---|---|---|---|
| Sensor size | DN 15 (½") | DN 25 (1") | DN 50 (2") | DN 80 (3") | DN 100 (4") | DN 150 (6") |
| **Number of measuring pipes** | 2 | 2 | 2 | 2 | 2 | 2 |
| **Mass flow (liquids)** | | | | | | |
| Linearity error[1]: 0.1% sensor % of rate | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Linearity error[1]: 0.2% sensor % of rate | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Repeatability of flowrate at rates > 5 % of $Q_{max}$ [% of rate] | 0.05 | 0.05 | 0.05 | 0.05 | 0.1 | 0.1 |
| Max. zero point error [kg/h] | 0.6 | 2.16 | 7.2 | 20.0 | 41.6 | 68.8 |
| **Density (liquids)** | | | | | | |
| Density error: 0,1% Massflow Sensor [g/cm³] | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| Density error: 0,2% Massflow Sensor [g/cm³] | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| Range [kg/dm³] | 0.001 ... 5.0 | 0.001 ... 5.0 | 0.001 ... 5.0 | 0.001 ... 5.0 | 0.001 ... 5.0 | 0.001 ... 5.0 |
| Repeatability error [kg/m³] | ± 0.25 | ± 0.25 | ± 0.25 | ± 0.25 | ± 0.25 | ± 0.25 |
| **Temperature** | | | | | | |
| Error [°K] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

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## Technical specifications (continued)

1) Increased error can be expected for gas mass flow measurement (for gas measurement typically additional +0.4 % error).

| Sensor type | FCS400 | | |
|---|---|---|---|
| **Sensor size** | **DN 15 (½")** | **DN 25 (1")** | **DN 50 (2")** |
| **Number of measuring pipes** | 2 | 2 | 2 |
| **Mass flow (liquids)** | | | |
| Linearity error[1] [% of rate] | 0.1 | 0.1 | 0.1 |
| Repeatability of flowrate at rates > 5 % of $Q_{max}$ [% of rate] | 0.05 | 0.05 | 0.05 |
| Max. zero point error [kg/h] | 0.2 | 2.0 | 7.5 |
| **Density (liquids)** | | | |
| Density error: Standard [g/cm³] | 0.005 | 0.005 | 0.005 |
| Density error: Extended [g/cm³] | 0.0005 | 0.0005 | 0.0005 |
| Range [kg/dm³] | 0.001 ... 5.0 | 0.001 ... 5.0 | 0.001 ... 5.0 |
| Repeatability error [kg/m³] | ± 0.25 | ± 0.25 | ± 0.25 |
| **Temperature** | | | |
| Error [°K] | 0.5 | 0.5 | 0.5 |

1) Increased error can be expected for gas mass flow measurement (for gas measurement typically additional up to +0.4 % error).

| Technical specifications PROFIBUS PA/DP for FCT030 | |
|---|---|
| **General specifications** | |
| PROFIBUS device profile | Profile V 4.0 and compatible to V 3.x |

| Electrical specification DP | |
|---|---|
| **Physical layer specifications** | |
| Applicable standard | IEC 61158/EN 50170 |
| Physical Layer (transmission technology) | RS 485 |
| Transmission speed | ≤ 12 Mbits/s |
| Number of stations | Up to 32 per line segment (maximum total of 126) |
| **Cable specifications (Type A)** | |
| Cable design | Two wire twisted pair |
| Shielding | CU shielding braid or shielding braid and shielding foil |
| Impedance | 35 up to 165 Ω at frequencies from 3 ... 20 MHz |
| Cable capacity | < 30 pF per meter |
| Core diameter | > 0.34 mm², corresponds to AWG 22 |
| Resistance | < 110 Ω per km |
| Signal attenuation | Max. 9 dB over total length of line section |
| Max. bus length | 100 m at 12 Mbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters |

| Electrical specification PA | |
|---|---|
| **Physical layer specifications** | |
| Applicable standard | IEC 61158/EN 50170 |
| Physical Layer (transmission technology) | IEC 61158-2 |
| Transmission speed | 31.25 Kbits/s |
| Number of stations | Up to 32 per line segment (maximum total of 126) |
| Max. basic current [$I_B$] | 14 mA |
| Fault current [$I_{FDE}$] | 0 mA |
| Bus voltage | 9 ... 32 V (non Ex) |
| **Preferred cable specifications (Type A)** | |
| Cable design | Two wire twisted pair |
| Conductor area (nominal) | 0.8 mm² (AWG 18) |
| Loop resistance | 44 Ω/km |
| Impedance | 100 Ω ± 20 % |
| Wave attenuation at 39 kHz | 3 dB/km |

| Electrical specification PA | |
|---|---|
| Capacitive asymmetry | 2 nF/km |
| Bus termination | Passive line terminated on both ends |
| Max. bus length | Up to 1.9 km. Extendable by repeaters |

| IS (Intrinsic Safety) data | |
|---|---|
| **General specifications** | |
| Required sensor electronics | Compact mounted SITRANS FCT030 |
| FISCO | Yes |
| Max. $U_I$ | 17.5 V |
| Max. $I_I$ | 380 mA |
| Max. $P_I$ | 5.32 V |
| Max. $L_I$ | 10 µH |
| Max. $C_I$ | 5 nF |
| Max. $U_O$ | 1.3 V |
| Max. $I_O$ | 50 µA |
| **FISCO cable requirements** | |
| Loop resistance $R_C$ | 15 ... 150 Ω/km |
| Loop inductance $L_C$ | 0.4 ... 1 mH/km |
| Capacitance $C_C$ | 80 ... 200 nF/km |
| Max. Spur length in IIC and IIB | 30 m |
| Max. Trunk length in IIC | 1 km |
| Max. Trunk length in IIB | 5 km |

***PROFIBUS parameter support***

The following parameters are accessible using a Class 1 Master.

| Cyclic services | | |
|---|---|---|
| **Input (Master view)** | **Parameter** | **FCT030** |
| | Mass flow | ✓ |
| | Volume flow | ✓ |
| | Media temperature | ✓ |
| | Frame temperature | ✓ |
| | Standard volume flow | ✓ |
| | Density | ✓ |
| | Fraction A[1] | ✓ |
| | Fraction B[1] | ✓ |
| | Pct Fraction A[1] | ✓ |
| | Pct Fraction B[1] | ✓ |
| | Totalizer 1 | ✓ |

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## Technical specifications (continued)

| Cyclic services | | |
|---|---|---|
| | Totalizer 2 | ✓ |
| | Totalizer 3 | ✓ |
| | Digital dosing control | ✓ |
| | Analog dosing control | ✓ |
| | Dosing status | ✓ |

| Cyclic services | | |
|---|---|---|
| **Output (Master view)** | Control totalizer 1+2+3 | ✓ |
| | Control commands as zero point adjustment | ✓ |

1) Requires a flowmeter ordered with fraction option.

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## Overview





FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS300 sizes DN 15 to DN 150, FCS400 sizes DN 15 to DN 50, MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and FC300 DN 4.

***Fraction***

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available.

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- API number
- Balling
- °Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé

## Overview (continued)

- Plato
- Specific Gravity
- Twaddell
- %HFCS42
- %HFCS55
- %HFCS90
- Ethanol-Water (ABM)[1] 0 % to 20 %
- Ethanol-Water (ABM)[1] 15 % to 35 %
- Ethanol-Water (ABM)[1] 30 % to 55 %
- Ethanol-Water (ABM)[1] 50 % to 100 %

[1] ABM: Alcohol by Mass; ABV: Alohol by volume on request

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## Benefits

***Flow calculation and measurement***

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- Empty pipe monitoring

***Operation and display***

- User-configurable operation display
  - Full graphical display 240 × 160 pixels with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
  - Keypad can be used for controlling dosing as start/stop/hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates
  - Pressure and material test certificates (as ordered)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters
  - Alarm history log
  - Parameter change log
  - Logging of min and max process values
  - Data logging of process values and parameter (including diagnostic parameters)

***Alarms and safety***

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

***Outputs and control***

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for massflow, volumeflow, standard volumeflow, density, temperature or fraction flow such as °Brix or °Plato

Up to four I/O channels are configured as follows:

***Channel 1***

Channel 1 is 4 to 20 mA analog output with HART 7.5, PROFIBUS PA, PROFIBUS DP or Modbus RS 485 RTU. The current signal can be configured for massflow, volumeflow or density, standard volume flow, medium temperature, Fraction A and B and Fraction A% and B%.

## Benefits (continued)

***Channel 2***

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Digital one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

***Channels 3 and 4***

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

***Signal***

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- Digital one or two-valve dosing control
- Operational and alarm status

***Relay***

Relay output(s) can be user configured to:

- Digital one or two-valve dosing control
- Operation status including flow direction
- Alarm status

***Signal input***

Signal input can be user configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Inititate automatic zero point adjustment

Signal outputs and inputs for non hazardous areas can be changed for active or passive operations by dip switch.

For hazardous areas Signal outputs and inputs can't be changed by dip switch, and has to selected individually by ordering.

During service and maintenance all outputs can be forced to a preset value for simulation, verification or calibration purposes.

***Approvals and certificates***

The FCT030 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

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## Application

SITRANS FCT030 transmitters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO2 dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

## Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with the following sensors:

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100, DN 150
- FCS400 DN 15, DN 25 and DN 50
- MASS 2100 DI 1.5, DI 3, DI 6, DI 15
- FC300 DN 4

FCT030 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

***SensorFlash***

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent memory of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the Siemens internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded
- Storing of alarm history log
- Storing of parameter change log
- Storing of process peak values log

***Dataloggin on SensorFlash***

The following functions are available:

- Logging of process values and diagnostic values simultaneous
- Logging of parameter settings
- Selectable logging interval

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## Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, frame temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count forward, backward or forward and backward
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for custody transfer requirements to OIML R 117 and NTEP
- Display of operating time with real-time clock. Daylight saving time is not implemented
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow
- Fraction flow computation is based on a 5th-order algorithm matching known applications.
- Audit trail information, stores parameters changes with time stamp information
- Simulation of process values, status information and alarms
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Datalogging of process values and parameter changes on SensorFlash

## Technical specifications

| SITRANS FCT030 | |
|---|---|
| **Number of process variables** | 7 |
| **Measurement of** | • Mass flow<br>• Volume flow<br>• Density<br>• Process media temperature<br>• Standard volume flow<br>• Reference density<br>• Fraction A flow<br>• Fraction B flow<br>• Fraction A %<br>• Fraction B % |
| **Current output** | |
| Current | 0 ... 20 mA or 4 ... 20 mA (Channel 1 only 4 ... 20 mA) |
| Load | Ex i: < 470 Ω (HART ≥ 230 Ω)<br>Non-Ex: < 770 Ω (HART ≥ 230 Ω) |
| Time constant | 0 ... 100 s adjustable |
| **Digital output**[1)] | |
| Pulse | 41.6 µs ... 5 s pulse duration |
| Frequency | 0 ... 12.5 kHz, 50 % duty cycle, 120 % overscale provision |
| Time constant | 0 ... 100 s adjustable |
| Active | 0 ... 24 V DC, 87 mA, short-circuit-protected |
| Passive | 3 ... 30 V DC, max. 110 mA |
| **Relay** | Only for channel 3 and 4 |
| Type | Change-over voltage-free relay contact |
| Load | 30 V AC/100 mA |
| Functions | Alarm level, alarm number, limit, flow direction |
| **Digital input**[1)] | Only for channel 3 and 4 |
| Voltage | 15 ... 30 V DC (2 ... 15 mA) |
| Functionality | Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output |
| **Galvanic isolation** | All inputs and outputs are galvanically isolated, isolation voltage 500 V |
| **Cut-off** | |
| Low-flow | 0 ... 9.9 % of maximum flow |
| **Limit function** | Mass flow, volume flow, fraction, density, sensor temperature |
| **Totalizer** | Three eight-digit counters for forward, net or reverse flow |
| **Display** | • Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults<br>• Time constant as current output 1<br>• Reverse flow indicated by negative sign |
| **Zero point adjustment** | Via keypad or remote via digital input |
| **Ambient temperature** | |
| Operation | |
| • Transmitter | -40 ... +60 °C (-40 ... +140 °F) (humidity max. 95 %) |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| Storage | |
| • Transmitter | -40 ... +70 °C (-40 ... +158 °F) (humidity max. 95 %) |
| • Display | -20 ... +70 °C (-4 ... +158 °F) |
| **Communication Ch1** | HART 7.5<br>PROFIBUS PA<br>PROFIBUS DP<br>Modbus RS 485 RTU |

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## Technical specifications (continued)

| SITRANS FCT030 | |
|---|---|
| **Enclosure** | |
| Material | Aluminum, corrosion Class C4 |
| Rating | IP67/NEMA 4X to EN/IEC 60529 (1 $mH_2O$ for 30 min.) |
| Mechanical load | 18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-02-36 |
| **Supply voltage** | |
| Supply | 20 ... 90 V DC ± 10 %<br>100 ... 240 V AC ± 10 %<br>47 ... 63 Hz |
| Fluctuation | No limit |
| Power consumption | 11 W/30 VA |
| **EMC performance** | |
| Emission | EN 55011/CISPR-11 (Class A) |
| Immunity | EN/IEC 61236-1 (Industry) |
| **NAMUR** | Within the value limits according to "General requirements" with error criteria A in accordance with NE 21 |
| **Environment** | |
| Environmental conditions acc. to IEC/EN/UL 61010-1 | • Altitude up to 2000 m<br>• Pollution degree 2 |
| **Maintenance** | The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis |
| **Cable glands** | Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions:<br>• 1 × M25, 2 × M20<br>• 3 × ½" NPT |
| **Digital cable connection (remote version)** | Standard industrial signal cable up to 75 m long with 2 × screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection. |
| **Analog cable connection (MASS 2100/FC300)** | Standard industrial cable up to 15 m distance between sensor and transmitter. PVC insulated 5 × 2 × Ø 0.34 mm, twisted and screened in pairs, temperature range -20 ... +105 °C<br>Siemens offers cables in a selection of precut lengths. |
| **Approvals FCT030** | |
| Hazardous area (fieldmouint housing only) [2] | • ATEX zone 1, IECEx zone 1, cCSAus (Class 1 Div 1), EAC Ex zone 1, cCSAus Zone 1, NEPSI, INMETRO (depending on version and configuration)<br>- ATEX/IECEx Zone 1:<br>Ex db eb ia [ia Ga] IIC T6 Gb<br>- ATEX/IECEx Zone 21 (depending on sensor type):<br>Ex tb [ia Da] IIIC T85°C Db<br>- Canada:<br>Ex db eb ia [ia Ga] IIC T6 Gb<br>Ex tb [ia Da] IIIC T85°C (depending on sensor type)<br>- USA:<br>Class I, II, III, Division 1, Groups A, B, C, D, E, F,<br>Class I Zone 1: AEx db eb ia [ia Ga] IIC T6 Gb<br>Zone 21: AEx tb [ia Da] IIIC T85°C |

## Technical specifications (continued)

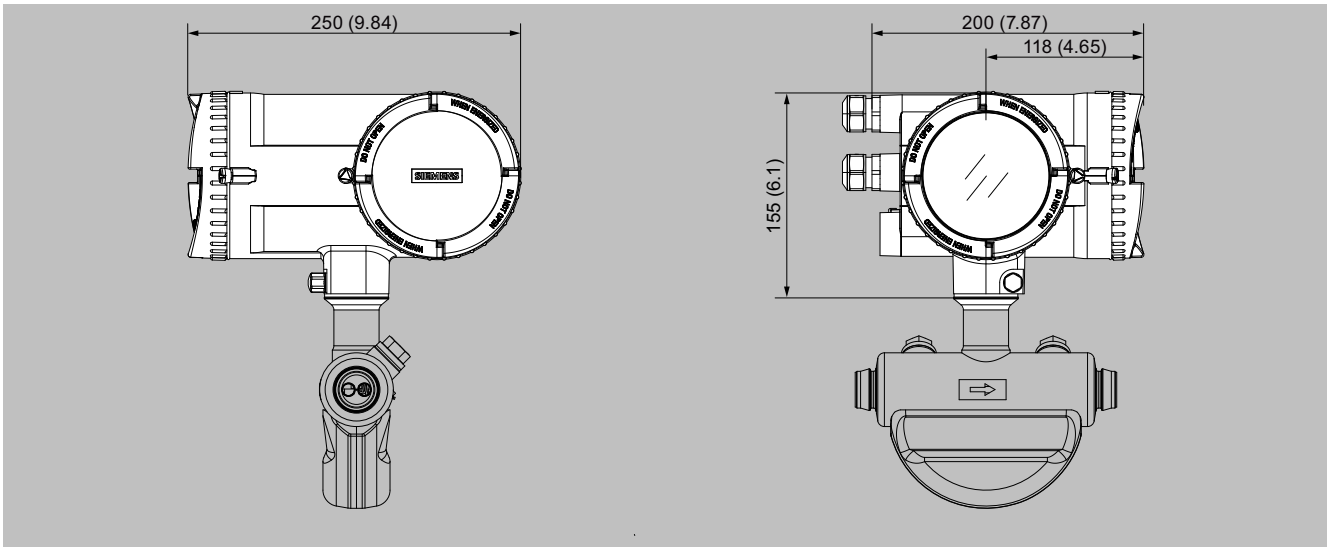
| SITRANS FCT030 | |
|---|---|
| **Certificates** | |
| CE mark | • Pressure equipment<br>• Low voltage directive<br>• WEEE<br>• RoHS |
| Regional certifications | • C-TICK (Australia and New Zealand EMC)<br>• EAC (Belarus, Armenia, Kazakhstan, Russia)<br>• KCC (South Korea) (in preparation) |

[1] With 300 Ω internal impedance. For coil switching use the passive output option.
[2] Dust certification depending on sensor type.

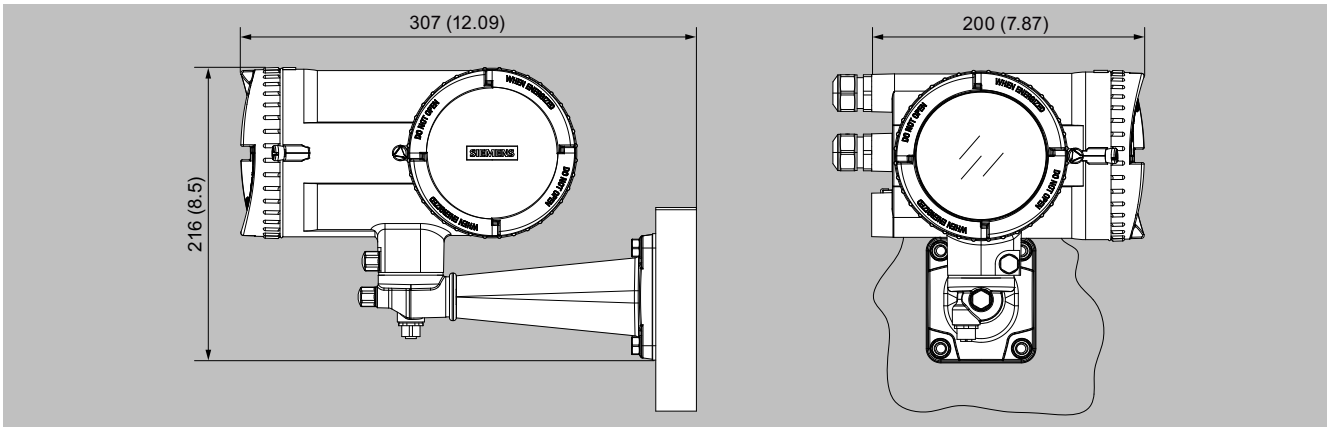
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## Dimensional drawings




SITRANS FCT030, compact version, dimensions in mm (inch)

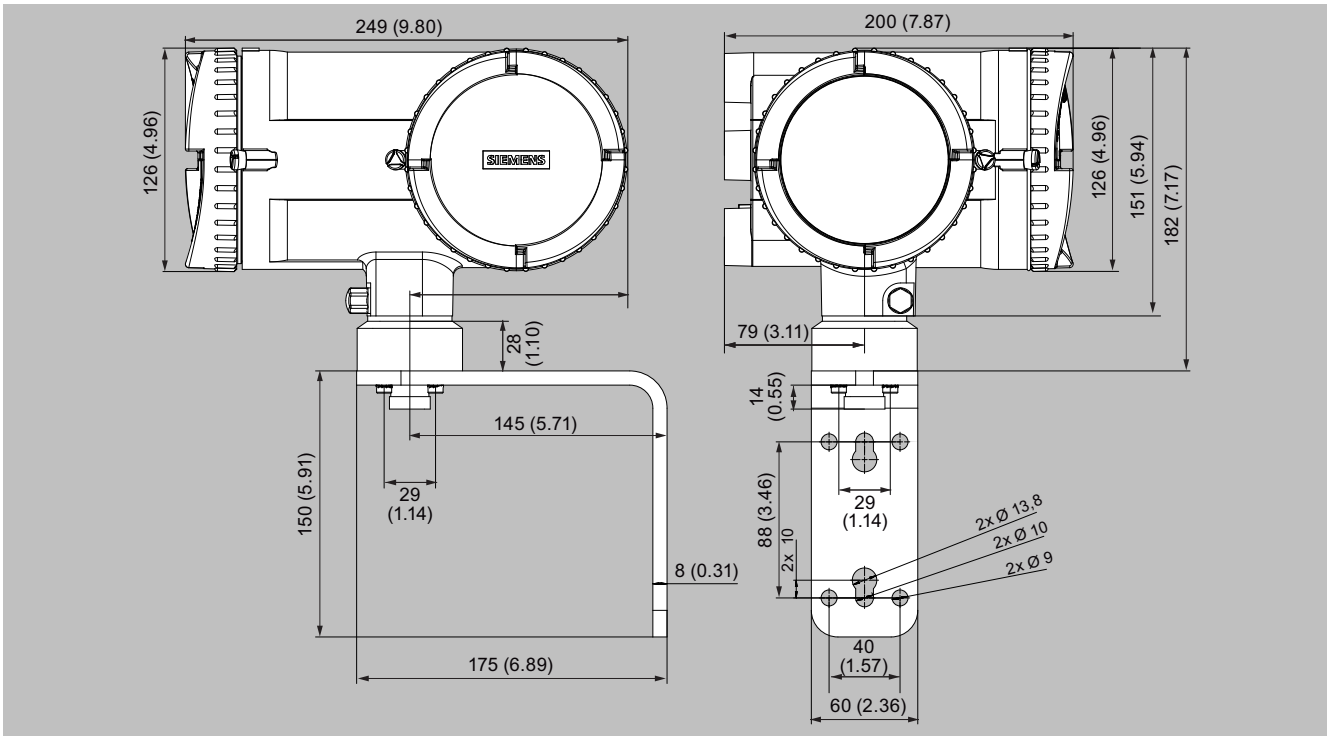



SITRANS FCT030, field mount version for sensors with digital cable and M12 plug connection, dimensions in mm (inch)

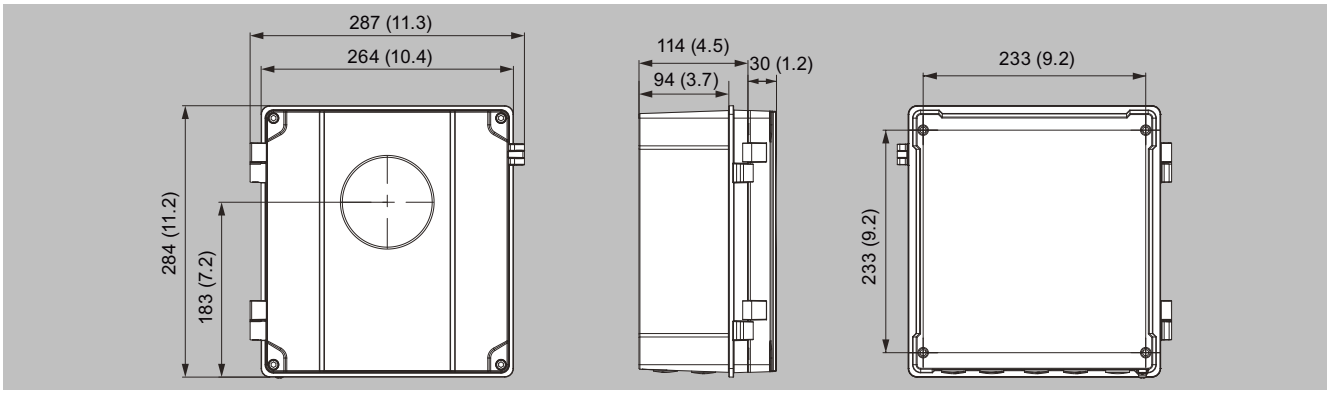
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## Dimensional drawings (continued)




SITRANS FCT030, field mount version for low flow MASS 2100 / FC300 sensors with analog cable, dimensions in mm (inch)




SITRANS FCT030, wall mount version, dimensions in mm (inch)

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## Overview



FCT010 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, standard volumeflow, density, temperature . All with a single Modbus connection.

The FCT010 IP67 transmitter is compact mounted with all sensors of type FCS300, FCS400 , MASS 2100 DI 3, DI 6, DI 15.

For MASS 2100 DI 1.5 to DI 15 and FC300 DN 4 an analogue connection is available for a remote FCT010 solution.

## Benefits

***Flow calculation and measurement***

Dedicated mass flow calculation with DSP technology

- Fast dosing and flow step response with maximum 10 ms response time
- 100 Hz update rate to all outputs
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system

***Operation***

- User-configurable settings over SIMATIC PDM

***Alarms and safety***

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

***Outputs and control***

- Single channel Modbus RTU output
- Individually configurable for massflow, volumeflow, standard volumeflow, density, temperature
- One Totalizer (data not secured by power failure )

***Approvals and certificates***

The FCT010 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

## Application

SITRANS FCT010 transmitters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, paint mixing systems, solvents and resins, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, CO2 dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas applications e.g. test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The Modbus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

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## Design

The transmitter SITRANS FCT010 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating.

It is compact mounted with the following sensors:

- FCS300 DN 15, DN 25, DN 50, DN 80, DN 100, DN 150
- FCS400 DN 15, DN 25 and DN 50
- MASS 2100 DI 3, DI 6, DI 15

It can be remote mounted with the following sensors:

- MASS 2100 DI 1.5, DI 3, DI 6, DI 15
- FC300 DN 4

FCT010 is available with Modbus RS 485 RTU as standard.

SensorFlash

SensorFlash is a standard, 4 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit for the FCT010 only has the function of documentation including a parameter backup and a FW bundle. The Sensor Flash is not mounted into the FCT010 and will not have the extra features as the FCT030 transmitter has.

- Storing of alarm history log
- Storing of parameter change log

## Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature
- Single Modbus RTU I/O
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full service menu for effective and straight forward application and meter troubleshooting
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles

## Technical specifications

| SITRANS FCT010 | |
|---|---|
| **Number of process variables** | 5 |
| **Measurement of** | • Mass flow<br>• Volume flow<br>• Density<br>• Process media temperature<br>• Standard volume flow |
| **I/O** | Modbus RTU |
| Galvanic isolation | All inputs and outputs are galvanically isolated, isolation voltage 500 V |
| **Cut-off** | |
| Low-flow | 0 ... 9.9 % of maximum flow |
| **Limit function** | Mass flow, volume flow, density, sensor temperature |
| **Totalizer** | One eight-digit counters for forward, or reverse flow - data recovery not protected at power loss |
| **Zero point adjustment** | Via SIMATIC PDM |
| **Ambient temperature** | |
| Operation | |
| • Transmitter | -40 ... +60 °C (-40 ... +140 °F) (humidity max. 95 %) |
| Storage | |
| • Transmitter | -40 ... +70 °C (-40 ... +158 °F) (humidity max. 95 %) |
| **Communication Ch1** | Modbus RS 485 RTU |
| **Enclosure** | |
| Material | Aluminum corrosion Class C4 |
| Rating | IP67/NEMA 4X to EN/IEC 60529 (1 mH2O for 30 min.) |
| Mechanical load | 18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-02-36 |
| **Supply voltage** | |
| Supply | 12 ... 27 V DC<br>Ex d: 12-24 V DC<br>Intrisic safe: Ui: 20 V, Ii: 484 mA, Pi: 2.3 W, Li: 0.6 uH, Ci: 1.9 nF |
| Fluctuation | No limit |
| Power consumption | 1.1 W |
| **EMC performance** | |
| Emission | EN 55011/CISPR-11 (Class A) |
| Immunity | EN/IEC 61236-1 (Industry) |
| **NAMUR** | Within the value limits according to "General requirements" with error criteria A in accordance with NE 21 |
| **Environment** | |
| Environmental conditions acc. to IEC/EN/UL 61010-1 | • Altitude up to 2000 m<br>• Pollution degree 2 |
| **Maintenance** | The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis. |
| **Cable glands** | M12 connector<br>Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions:<br>• 1 × M20<br>• 1 × ½" NPT |
| **Digital cable connection** | Standard industrial signal cable up to 75 m long with 2 × screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection. |

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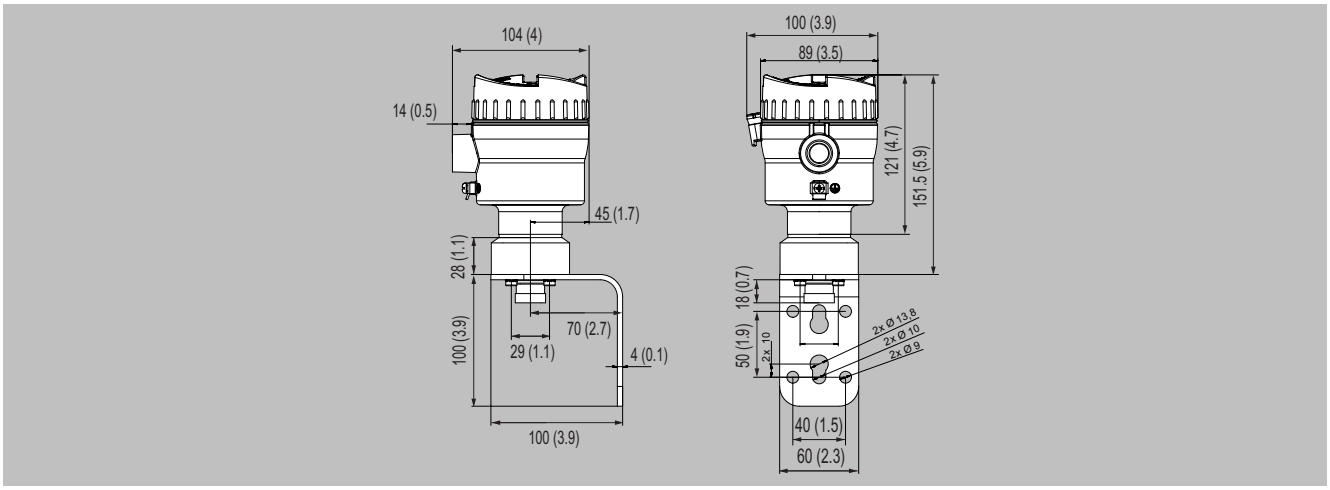


## Technical specifications (continued)

| SITRANS FCT010 | |
|---|---|
| **Analog cable connection (MASS 2100/FC300)** | Standard industrial cable up to 15 m distance between sensor and transmitter. PVC insulated 5 × 2 × Ø 0.34 mm, twisted and screened in pairs, temperature range -20 ... +105 °C |
| **Approvals** | |
| Hazardous area | FCT010 can be installed in zone 1 for gas and zone 21 for dust (dust: depending on sensor type ) and Class 1 Div 1/ Zone 1<br>• ATEX, IECEx, cCSAus (Class 1 Div 1), EAC Ex, cCSAus Zone 1, NEPSI Zone 1 |
| **Certificates** | |
| CE mark | • Pressure equipment<br>• Low voltage directive<br>• WEEE<br>• RoHS |
| Regional certifications | • C-TICK (Australia and New Zealand EMC)<br>• EAC (Belarus, Armenia, Kazakhstan, Russia)<br>• KCC (South Korea) (in preparation) |

## Dimensional drawings

Dimension for the FCT010 remote mounted (for analog cable connections for MASS 2100 / FC300 DN4)




SITRANS FCT010, dimensions in mm (inch)

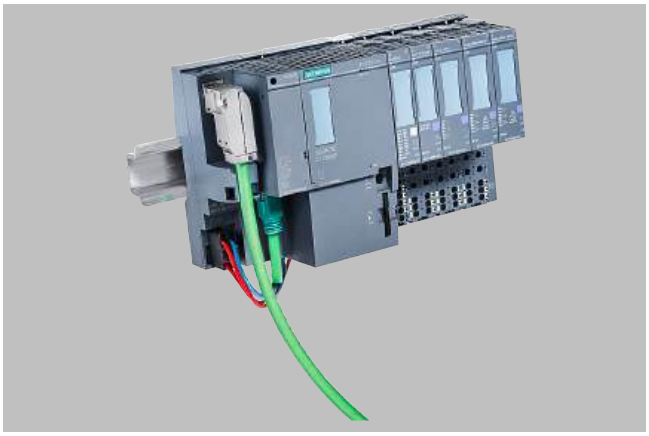
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## Overview



SITRANS FCT070 trasnmitter



Mounting on the SIMATIC ET 200SP ST & HF

The technology module SITRANS FCT070 is a Coriolis flow meter transmitter for the SIMATIC ET200SP ST, HF & HA.

The TM SITRANS FCT070 flow transmitter can be operated directly in the SIMATIC PCS7 or in TIA Portal with the FCT070 Faceplates.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

The TM FCT070 can work with all Siemens Coriolis flowmeters. It can be directly connected to the SITRANS FCS300, SITRANS FCS400 and SITRANS FC MASS 2100 / FC300 DN 4.

## Benefits

- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- No transmitter between automation and flowmeter required
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 is a ET 200SP technology module and can combined with all other SIMATIC ET200SP ST, HF & HA modules
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FCT070 and ET 200SP have the ATEX Zone 2 Class 1 Div 2 approvals. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1 & Class 1 Div 1 approval
- Included advanced batch functionality without additional modules. I/Os are onboard

## Application

SITRANS FCT070 can be used for machine builders and in the process industry plants. The meters are suitable for measuring on liquid and gas. With ET 200SP ST & HF the SITRANS FCT070 can be installed decentralized in small stations, with fast communication to the control room.

The faceplates for TIA-Portal and PCS 7 offer the direct full remote access to the flowmeter.

The main industries for the SITRANS FCT070 transmitter:

- Chemical
- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

## Design

The SITRANS FCT070 is designed as ET200 SP ST, HF & HA module and can directly installed with other ET200 SP modules.

The sensor DSL cable is directly mounted to the ET 200SP ST, HF & HA base unit is providing the supply voltage and the data communication. The SITRANS FC sensors with DSL can be connected directly to the SITRANS FCT070.

For sensors in ATEX Zone 1, the SITRANS I300 barrier must be installed between FCT070 and the FC DSL.

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## Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Three built-in totalizers which can freely be set for counting mass flow, volume flow, standard volume flow and fraction
- Two-stage batch controller
- Two digital inputs
- Two digital outputs
- Low flow cut-off
- Zero point adjustment
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

## Selection and ordering data

| Description | Article No. | |
|---|---|---|
| **SITRANS FCT070 – Transmitter for ET 200SP** | **7ME4138-6AA00-0BB1** |  |
| **BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP** | **6ES7193-6BP20-0BB1**<br>**6ES7193-6BP20-0BB0** |  |
| **SITRANS I300 – Isolating power supply – Ex barrier** | **A5E39832532** |  |
| **Compatible Coriolis sensors** | | |
| **SITRANS FCS300** | **7ME4637-...** | |
| **SITRANS FCS400** | **7ME4617-...** | |
| **SITRANS MASS 2100** | **7ME4817-...** | |
| **SITRANS FC300 DN4** | **7ME4817-...** | |

| Description | Article No. |
|---|---|
| **SITRANS FCT070 system manual** | |
| • English | **A5E47701533-AA** |
| • German | |

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## Technical specifications

| SITRANS FCT070 | |
|---|---|
| **Measurement of** | Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B % |
| **Measurement functions** | |
| • Totalizer 1 | **Mass flow**, volume flow, standard volume flow, fraction A, fraction B |
| • Totalizer 2 | Mass flow, **volume flow**, standard volume flow, fraction A, fraction B |
| • Totalizer 3 | Mass flow, volume flow, **standard volume flow**, fraction A, fraction B |
| • Single and 2-stage batch function | Batching function with the use of one or two outputs for dosing at high and low speed |
| **General information** | |
| Product type designation | Technology module TM FCT070 |
| FW update possible | Yes |
| Usable BaseUnits | BU 20 type B1 |
| ET 200SP | Yes; from FW V4.2 or higher |
| ET 200SP ST & HF | Compatible and tested<br>ST: Standard<br>HF: High Feature |
| **Engineering with** | • STEP 7 TIA Portal configurable/integrated as of version V16 or higher<br>• STEP 7 configurable/integrated as of version V5.5 SP4 and higher<br>• PCS 7 V9.0 or higher<br>• PROFINET as of GSD version/GSD revision GSDML V2.34 |
| **Cable** | |
| Maximum cable length to FC DSL | 75 m (150 m) |
| **Supply voltage** | |
| Load voltage L+ | 24 V DC |
| Rated value (DC) | 24 V NEC-Class II |
| Permissible range, lower limit (DC) | 19.2 V |
| Permissible range, upper limit (DC) | 28.8 V |
| Short-circuit protection | Yes |
| Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption, max. | 500 mA |
| **Power loss** | |
| Typical power loss, max. | 1.7 W |
| **Protection class** | |
| IP protection | IP20 |
| **EMV** | • Electrostatic discharge according to IEC 61000-4-2: 2008<br>• Field-related interference according to IEC 61000-4-3: 2006<br>• Bursted interference due to Burst according to IEC 61000-4-4: 2012<br>• Conducted interference by surge according to IEC 61000-4-5: 2014<br>• Conducted interference by high-frequency radiation according to IEC 61000-4-6: 2013 |
| **Decentralized operation** | |
| • to SIMATIC S7-300 | Yes |
| • to SIMATIC S7-400 | Yes |
| • to SIMATIC S7-1200 | Yes |
| • to SIMATIC S7-1500 | Yes |
| • to standard PROFINET controller | Yes |

## Technical specifications (continued)

| SITRANS FCT070 | |
|---|---|
| **Usable with the following flowmeters** | • SITRANS FCS400<br>• SITRANS FCS300<br>• SITRANS FC MASS2100<br>• SITRANS FC300<br>For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FCT070 |
| **Digital inputs 1 and 2** | |
| Free usable inputs 1 and 2 | • Start dosing<br>• Stop dosing<br>• Pause/resume dosing<br>• Start/stop totalizer 1, 2 or 3<br>• Reset totalizer 1, 2 or 3<br>• Zero adjust<br>• Force outputs<br>• Freeze process values |
| High signal | • Nominal voltage: 24 V DC<br>• Upper limit: +30 V DC<br>• Lower limit: +11 V DC<br>• Current: max 35 mA |
| Low signal | • Nominal voltage: 0 V DC<br>• Lower limit: -30 V DC<br>• Upper limit: +5 V DC<br>• Current: max 35 mA |
| Potential separation | • Module and backplane bus<br>• Short circuit protection |
| Isolation test | 707 V DC |
| Cable length | • Max. 50 m shielded<br>• Max. 25 m unshielded |
| **Digital outputs 1 and 2** | |
| Free useable outputs 1 and 2 | • Alarm acknowledgment<br>• Out of specification<br>• Failure sensor measuring<br>• Function check<br>• Status force value<br>• Flow direction |
| Low signal | Max. 1 V |
| High signal | Min 23.2 V |
| Switching capacity | 300 mA signal high |
| On lamp load | 8 W |
| Load resistance | 80 ... 10 kΩ |
| Between diffrenet circuits | Electronic/thermal |
| Potential seperation | Module and backplane bus |
| Isolation test | 707 V DC |
| Cable length | • Max. 50 m shielded<br>• Max. 25 m unshielded |
| **Environment** | |
| **Ambient temperature during operation** | |
| Minimum installation | -25 °C |
| horizontal installation, max. | 60 °C; observe derating |
| vertical installation, max. | 50 °C; observe derating |
| **Ambient temperature during storage/transport** | |
| Storage, min. | -40 °C |
| Storage, max. | 70 °C |
| Transport, min. | -40 °C |
| Transport, max. | 70 °C |

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## Technical specifications (continued)

| SITRANS FCT070 | |
|---|---|
| **Relative humidity** | |
| Operation, min. | 5 % |
| Operation, max. | 95 %; no condensation |
| **Height in operation** | |
| Ambient air pressure altitude (relative to sea level) | $T_{min}$ ... $T_{max}$ at 1 080 hPa ... 795 hPa (-1 000 m ... +2 000 m) |
| **EMC performance** | |
| Emission | • EN 61000-6-4 |
| Electromagnetic compatibilty | • IEC 61000-6-2:2016<br>• IEC 61000-6-4:2018 |
| Emission of radio interference | Class A industrial environment:<br>• IEC 61000-6-4: 2018<br>• IEC/CISPR 16-2-3: 2008<br>• EN 55016-2-3: 2006 |
| Emission on power supply cables | Class A Industrial environment:<br>• IEC 61000-6-4: 2018<br>• IEC/CISPR 16-2-1: 2010<br>• EN 55016-2-1: 2009 |
| **Certification** | |
| CE mark | Low voltage directive RoHS |
| UL | ANSI / ISA 12.12.01 |
| CAN/CSA | CSA C22.2 No. 213-M1987<br>Class I, Div. 2 Group A.B.C.D T4 |
| ATEX | II 3 G Ex ec IIC T4 Gc |
| IECEx | Ex ec IIC T4 Gc |
| EAC | Yes |
| Tick | Yes |
| KCC | Yes |
| RoHS | Yes |
| FM | Class I, Div. 2, Group A.B.C.D T4 |
| **Communication** | |
| Digital Sensor Link | 460.8 kBits/s |
| Cable length FCT070 to FC DSL Sensor | 75 m (150 m) |
| Power supply FCS sensor | The operating voltage of the sensors is supplied via the sensor cable directly from the FCT070 |

## Circuit diagrams

| Naming | Con. | PIN | BU20 type D1 | PIN | Con. | Naming |
|---|---|---|---|---|---|---|
| Digital input | DI0 | 1 | | 2 | DQ0 | Digital output |
| Digital input | DI1 | 3 | | 4 | DQ1 | Digital output |
| +24 V DC supply voltage for digital inputs | DI_L+ | 5 | | 6 | nc | |
| Ground for digital outputs | M | 7 | | 8 | M | Ground for digital outputs |
| RS 485 data line A for SEN communication | SEN_A | 9 | | 10 | SEN_L+ | +24 V DC supply voltage for SEN |
| RS 485 data line B for SEN communication | SEN_B | 11 | | 12 | SEN_M | GND for SEN supply |
| +24 V DC supply voltage | L+ | 13 | | 14 | M | Ground for supply voltage |
| | L+ | 15 | | 16 | M | |

Pin assignment of the BaseUnit BU20-P12+A0+4B

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## Overview



The SITRANS FCS300 sensor is available in DN 15 to DN 150 mm sizes in stainless steel AISI 316 L or nickel allow wetted material. The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.

The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.

The compact sensor design with a split flow dual tube design with high driver frequency is suitable for high end applications in all industry segments e.g. Chemical, Oil & Gas , Refineries, F&B and Power.

A variety of process connections available to cover all common process connections and pressure ratings.

The sensor has a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the FCS300 comes in a number of common harzardous area approved like Atex, IECEx, cCSAus, EAC, and NEPSI.

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## Integration

The SITRANS FCS300 sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 and Div 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens internet site www.siemens.com.

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

## Configuration

***Installation guidelines***

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

***Remote system cabling***

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

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## Configuration (continued)

| Property | Unit | Value |
|---|---|---|
| Resistance | [Ω/km] | 59 |
| Characteristic impedance | [Ω] | 100 @ 1 MHz |
| Insulation resistance | [MΩ/km] | 200 |
| Maximum voltage | [V] | 300 |

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1 500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

***Insulation and heating***

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS300 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end transmitter housing.

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## Technical specifications

| Flow sensor FCS300 | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Parameter** | **Unit** | **Value** | | | | | |
| Process media | | • Fluid Group 1 (suitable for dangerous fluids)<br>• Aggregate state: Paste/light slurry, liquid and gas | | | | | |
| Process pressure range | [barg (psi)] | The maximum permissible operating pressure is determined by the respective process connection and the temperature of the medium<br>316L: 0 ... 100 (0 ... 1 450)<br>Nickel-alloy C4 (2.4610)[3]: 0 ... 100 (0 ... 1 450) | | | | | |
| Process temperature range | [°C (°F)] | The maximum permissible process temperature is determined by the respective process connection<br>-50 ... +205 (-58 ... +400) | | | | | |
| Ambient temperature range | [°C (°F)] | -40 ... +70 (-40 ... +158) | | | | | |
| Transport temperature range | [°C (°F)] | -40 ... +70 (-40 ... +158) | | | | | |
| Density range | [kg/m³ (lb/ft³)] | 1 ... 5 000 (0.062 ... 312.2) | | | | | |
| No. of process values | | | | | | | |
| • Primary process values | | • Mass flow<br>• Density<br>• Process medium temperature | | | | | |
| • Derieved process values | | • Volume flow<br>• Standard volume flow (with reference density)<br>• Fraction A:B<br>• Fraction % A:B | | | | | |
| **Performance specifications** | | **Sensor** | | | | | |
| **Parameter** | **Unit** | **DN 15** | **DN 25** | **DN 50** | **DN 80** | **DN 100** | **DN 150** |
| Max. zero point error | | 0.6 (0.0235) | 2.16 (0.0792) | 7.2 (0.264) | 20 (0.735) | 41.6 (1.628) | 68.8 (2.528) |
| $Q_{min}$ (1 % error)[4] | [kg/h (lb/min)] | 70 (2.57) | 240 (8.92) | 800 (29.4) | 2 000 (73.5) | 4 000 (146.9) | 6 900 (253.5) |
| $Q_{nom}$ (1 bar pressure) | [kg/h (lb/min)] | 4 500 (163.3) | 20 500 (753.2) | 49 000 (1 800) | 122 000 (4 483) | 273 000 (10 031) | 459 200 (16 873) |
| Qmax[2] | [kg/h (lb/min)] | 8 000 (293.9) | 35 000 (1 286) | 90 000 (3 307) | 250 000 (9 186) | 520 000 (19 107) | 860 000 (31 600) |
| Linearity error mass flow | | | | | | | |
| • for liquids[1] | 0.1% massflow sensor [%] | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 |
| | 0.2% massflow sensor [%] | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 |
| • for gases (additional) | [%] | ± 0.40 | ± 0.40 | ± 0.40 | ± 0.40 | ± 0.40 | ± 0.40 |
| Repeatability mass flow | [%] | ± 0.05 | ± 0.05 | ± 0.05 | ± 0.05 | ± 0.05 | ± 0.05 |
| Density accuracy with 0.1% | [kg/m³ (lb/ft³)] | ± 2 (± 0.124) | ± 2 (± 0.124) | ± 2 (± 0.124) | ± 2 (± 0.124) | ± 2 (± 0.124) | ± 2 (± 0.124) |
| Density accuracy with 0.2 % | [kg/m³ (lb/ft³)] | ± 10 (± 0.62) | ± 10 (± 0.62) | ± 10 (± 0.62) | ± 10 (± 0.62) | ± 10 (± 0.62) | ± 10 (± 0.62) |
| Temperature error | [°K] | ± 0.5 | ± 0.5 | ± 0.5 | ± 0.5 | ± 0.5 | ± 0.5 |

1) Increased error can be expected for gas mass flow measurement (for gas measurement typically + 0.40 % error).
2) For gas applications the max. flowrate is calculated at Mach-Number = 0.3.
3) Hastelloy C is a registered trademark of Haynes International. C4 nickel alloys are equivalent to Hastelloy C4.
4) Valid for the 0.1% sensor.

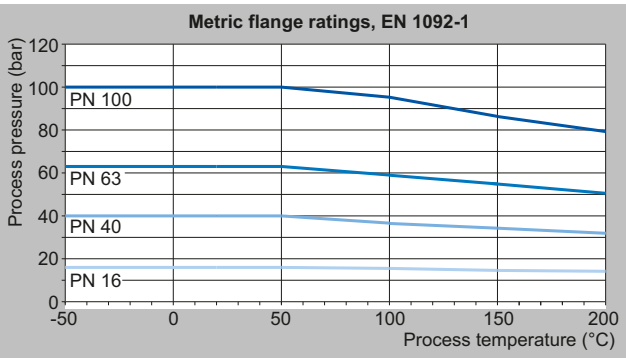
### *Pressure/temperature curves*

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN 1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS300 product program.

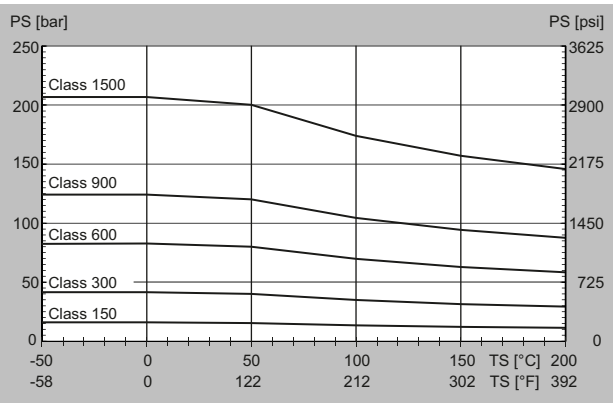
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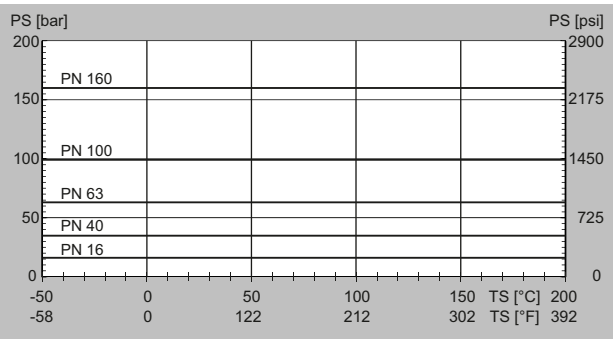
## Technical specifications (continued)




EN1092-1 flanged sensors in AISI 316L




Stainless steel ASME flange 1.4571/1.4404 (AISI 316Ti/316L) up to DN200 (8")

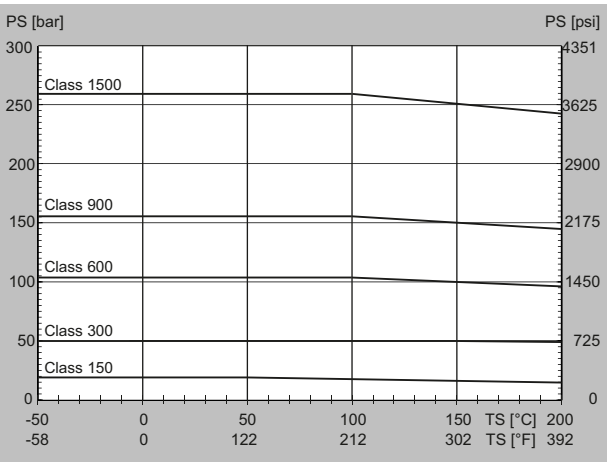



Nickel alloy DIN flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

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## Technical specifications (continued)




Nickel alloy ASME flange C4 (2.4610) or nickel alloy C22 (2.4602) up to DN200 (8")

***Sanitary connections***

| Design | Nominal size | $PS_{max}$ [bar] | [psi] | $TS_{max}$ [°C] | [°F] | $TS_{min}$ [°C] | [°F] |
|---|---|---|---|---|---|---|---|
| Pipe fitting DIN 11851 | DN 15 ... 40 (½ ... 1½") | 40 | 580 | 140 | 284 | -40 | -40 |
| | DN 50 ... 100 (2 ... 4") | 25 | 363 | 140 | 284 | -40 | -40 |
| Pipe fitting SMS 1145 | DN 25 ... 80 (1 ... 3") | 6 | 87 | 140 | 284 | -40 | -40 |
| Clamp DIN 32676 | DN 15 ... 50 (½ ... 2") | 16 | 232 | 120 | 248 | -40 | -40 |
| | DN 65 ... 100 (2½ ... 4") | 10 | 145 | 120 | 248 | -40 | -40 |

***Sensor variants***

SITRANS FCS300 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard variants

| Standard: 7ME463.-... Sensor | Connection | EN 1092-1 B1, PN 16 | EN 1092-1 B1, PN 40 | EN 1092-1 B2, PN 63 | EN 1092-1 B2, PN 100 | EN 1092-1 D, PN 40 | ANSI B16-.5-2009, class 150 | ANSI B16-.5-2009, class 300 | ANSI B16-.5-2009, class 600 | ANSI B16-.5-2009, class 900 | ANSI B16-.5-2009, class 1500 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DN 15 (½")** | DN 10 (3/8") | | ● | | | | | | | | |
| | DN 15 (½") | | ● | ● | ● | ● | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 20 (¾") | | ● | | | | ● | | | | |
| **DN 25 (1")** | DN 20 (¾") | | ● | | | | ● | | | | |
| | DN 25 (1") | | ● | ● | ● | ● | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 40 (1½") | | ● | ● | ● | | ● | ● | ● | | |
| **DN 50 (2")** | DN 40 (1½") | | ● | ● | ● | | ● | ● | ● | ● | ● |
| | DN 50 (2") | | ● | ● | ● | ● | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 65 (2½") | | ● | ● | | | ● | | ● | ●[1)] | ●[1)] |
| **DN 80 (3")** | DN 65 (2½") | | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 80 (3") | | ● | ● | ● | ● | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 100 (4") | ● | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |
| **DN 100 (4")** | DN 80 (3") | ● | ● | ● | ● | | ● | | ● | ●[1)] | ●[1)] |
| | DN 100 (4") | ● | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 150 (6") | ● | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |
| **DN 150 (6")** | DN 100 (4") | ● | ● | ● | ● | | ● | | ● | ●[1)] | ●[1)] |
| | DN 150 (6") | ● | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |
| | DN 200 (8") | ● | ● | ● | ● | | ● | ● | ● | ●[1)] | ●[1)] |

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## Technical specifications (continued)

| Standard: 7ME463.-... Sensor | Connection | ISO 228-1 G female pipe thread | ASME B1.20.1 NPT female pipe thread | DIN 11851 hygienic screwed | DIN 32676 clamp (ISO) Row A | SMS 1145 hygienic screwed | JIS B2220:200-4/10K | JIS B2220:200-4/20K | EN 1092-1 PN 16, NAMUR length | EN 1092-1 PN 40, NAMUR length |
|---|---|---|---|---|---|---|---|---|---|---|
| **DN 15 (½")** | DN 10 (3/8") | ● | | ● | ● | | ● | ● | | |
| | DN 15 (½") | ● | ● | ● | ● | | ● | ● | | ● |
| | DN 20 (¾") | | | ● | ● | | ● | ● | | |
| **DN 25 (1")** | DN 20 (¾") | | | ● | ● | | ● | ● | | |
| | DN 25 (1") | | | ● | ● | ● | ● | ● | | ● |
| | DN 40 (1½") | | | ● | ● | ● | ● | ● | | |
| **DN 50 (2")** | DN 40 (1½") | | | ● | ● | ● | ● | ● | | |
| | DN 50 (2") | | | ● | ● | ● | ● | ● | | ● |
| | DN 65 (2½") | | | ● | ● | ● | ● | ● | | |
| **DN 80 (3")** | DN 65 (2½") | | | ● | ● | ● | ● | ● | | |
| | DN 80 (3") | | | ● | ● | ● | ● | ● | | ● |
| | DN 100 (4") | | | ● | ● | | ● | ● | | |
| **DN 100 (4")** | DN 80 (3") | | | | | | ● | ● | | |
| | DN 100 (4") | | | | | | ● | ● | ● | |
| | DN 150 (6") | | | | | | ● | ● | | |
| **DN 150 (6")** | DN 100 (4") | | | | | | | ● | | |
| | DN 150 (6") | | | | | | | ● | ● | |
| | DN 200 (8") | | | | | | | ● | | |

[1] Apply class 600 p and t ratings for class 900 and class 1500 flanges.

Hygienic sensor variants

The hygienic sensors will have to be ordered with stainless steel tubes 316L/1.4435/1.4404 (polished). Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size.

NAMUR sensor variants

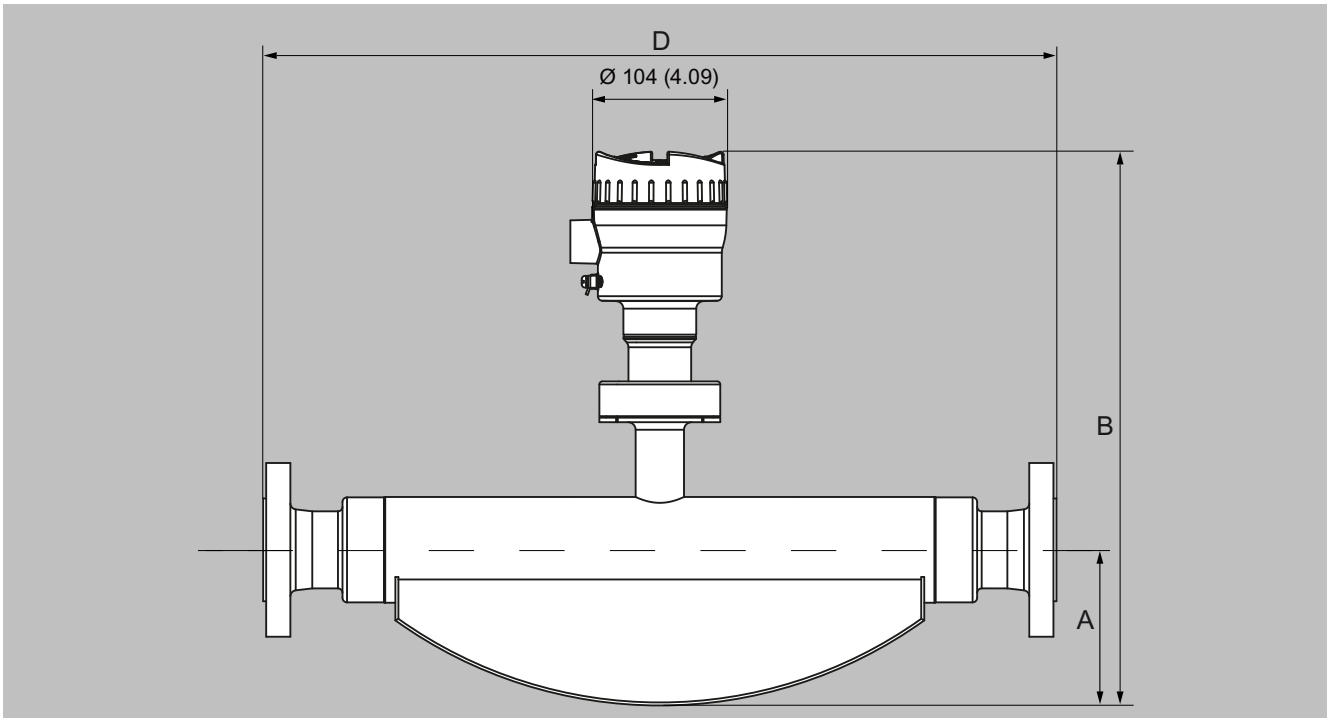
The NAMUR variants have built-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN 1092-1 PN 40 with B1 flange facing. For DN 100 and DN 150 flanges to PN 16.

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## Dimensional drawings

***Sensor dimensions***

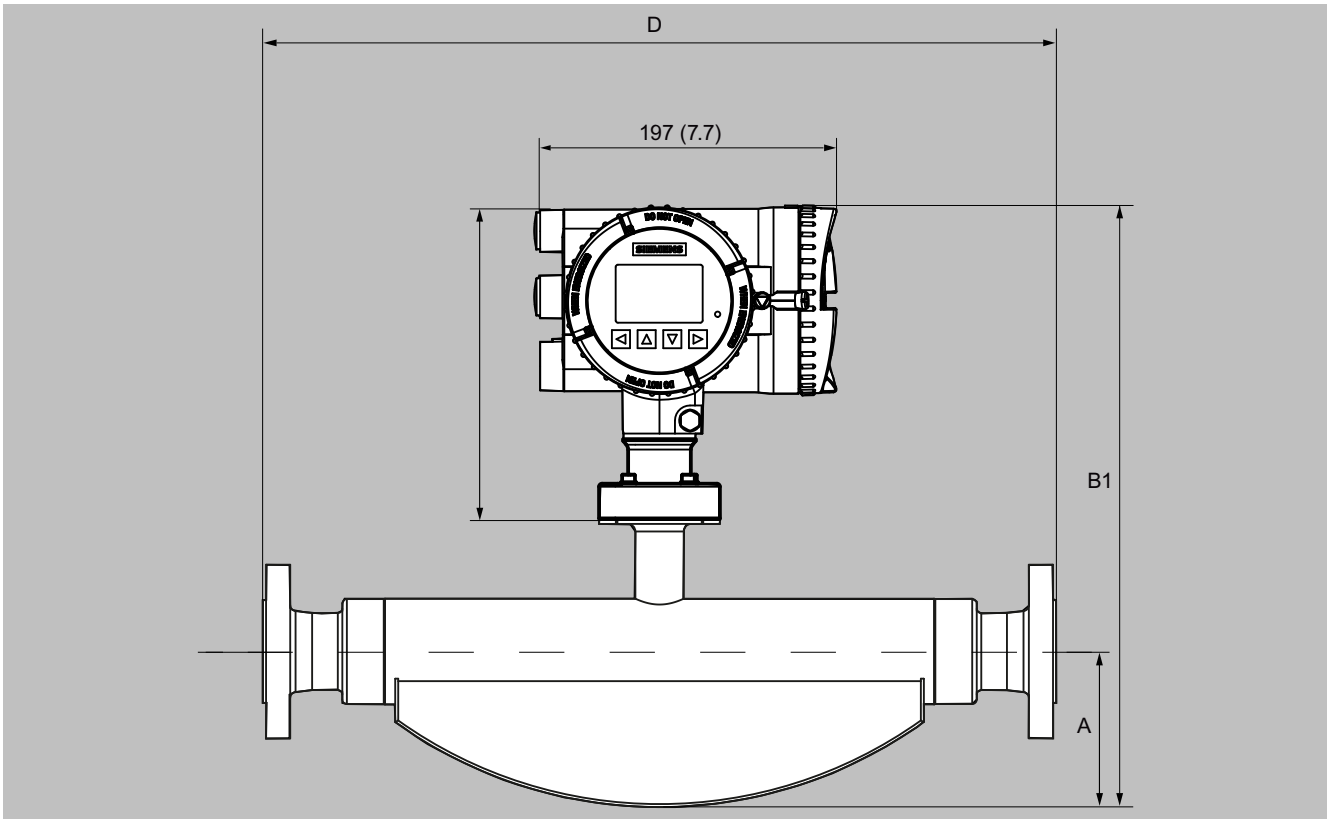



SITRANS FCS300 remote sensor

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## Dimensional drawings (continued)




SITRANS FCS300 compact

| Sensor DN | A [mm] | [inch] | B [mm] | [inch] | B1 [mm] | [inch] | Weight[1] [kg] | [lb] |
|---|---|---|---|---|---|---|---|---|
| 15 (½") | 80 | 3.15 | 358 | 14.09 | 387 | 15.19 | 4.6 | 10.1 |
| 25 (1") | 103 | 4.06 | 398 | 15.67 | 427 | 16.77 | 7.9 | 17.4 |
| 50 (2") | 126 | 4.96 | 435 | 17.13 | 464 | 18.23 | 25.7 | 56.7 |
| 80 (3") | 181 | 7.13 | 525 | 20.67 | 554 | 21.77 | 66.5 | 147 |
| 100 (4") | 262 | 10.31 | 622 | 24.49 | 651 | 25.59 | 128 | 282 |
| 150 (6") | 317 | 12.48 | 714 | 28.11 | 743 | 29.21 | 207 | 456 |

[1] For FCT030 compact add 4 kg (8.8 lb)

SITRANS FCS300, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The built-in length D depends on the flange.

***Overall length***

The overall length (**built-in length D**) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Sensor in AISI 316L: 7ME463.-...

| Sensor AISI 316L Connection | DN 15 (½") DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 25 (1") DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 50 (2") DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
|---|---|---|---|---|---|---|---|---|---|
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| EN 1092-1 B1, PN 16 | | | | | | | | | |
| EN 1092-1 B1, PN 40 | 385 | 385 | 421 | 576 | 525 | 576 | 763 | 715 | 763 |
| EN 1092-1 B2, PN 63 | | 403 | | | 564 | 572 | 745 | 745 | |
| EN 1092-1 B2, PN 100 | | 403 | | | 564 | 572 | 745 | 757 | |
| EN 1092-1 D, PN 40 | | 385 | | | 525 | | | 715 | |

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## Dimensional drawings (continued)

| Sensor AISI 316L | DN 15 (½") | | | DN 25 (1") | | | DN 50 (2") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
| ASME B16.5, class 150 | | 435 | 421 | 575 | 575 | 576 | 763 | 715 | 763 |
| ASME B16.5, class 300 | | 421 | | | 576 | 576 | 756 | 763 | |
| ASME B16.5, class 600 | | 421 | | | 576 | 576 | 756 | 773 | |
| ASME B16.5, class 900 | | 421 | | | 576 | | 780 | 790 | 800 |
| ASME B16.5, class 1500 | | 421 | | | 576 | | 780 | 790 | 800 |
| ISO 228-1 G female pipe thread | | 450 | | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | 450 | | | | | | | |
| DIN 11851 hygienic screwed | 413 | 413 | 413 | 590 | 590 | 590 | 763 | 740 | 740 |
| DIN 32676 (ISO) Row A hygienic clamp | 413 | 413 | 413 | 590 | 590 | 590 | 763 | 740 | 740 |
| SMS 1145 hygienic screwed | | | | | 590 | 590 | 763 | 740 | 740 |
| JIS B2220/10K | 385 | 385 | 421 | 576 | 525 | 576 | 763 | 715 | 763 |
| JIS B2220/20K | 385 | 385 | 421 | 576 | 525 | 576 | 763 | 715 | 763 |
| EN 1092-1 PN 16, NAMUR length | | | | | | | | | |
| EN 1092-1 PN 40, NAMUR length | | 510 | | | 600 | | | 715 | |

| Sensor | DN 80 (3") | | | DN 100 (4") | | | DN 150 (6") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 80 (3") | DN 100 (4") | DN 150 (6") | DN 100 (4") | DN 150 (6") | DN 200 (8") |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| EN 1092-1 B1, PN 16 | | | 875 | 1222 | 1122 | 1300 | 1569 | 1421 | 1587 |
| EN 1092-1 B1, PN 40 | 910 | 870 | 875 | 1222 | 1144 | 1300 | 1599 | 1461 | 1637 |
| EN 1092-1 B2, PN 63 | 910 | 910 | 1060 | 1234 | 1304 | | | | |
| EN 1092-1 B2, PN 100 | 910 | 910 | 1080 | 1234 | 1334 | | | | |
| EN 1092-1 D, PN 40 | | 870 | | | | | | | |
| ASME B16.5, class 150 | | 880 | 880 | 1244 | 1144 | 1330 | 1630 | 1485 | 1650 |
| ASME B16.5, class 300 | 920 | 895 | 1075 | | 1324 | 1350 | | 1505 | 1670 |
| ASME B16.5, class 600 | 920 | 920 | 1100 | 1244 | 1354 | 1435 | 1675 | 1555 | |
| ASME B16.5, class 900 | 965 | 1100 | 1130 | 1470 | 1380 | 1450 | 1705 | 1605 | |
| ASME B16.5, class 1500 | 965 | 1300 | 1150 | 1500 | 1400 | 1510 | 1725 | 1665 | |
| ISO 228-1 G female pipe thread | | | | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | | | | | | | |
| DIN 11851 hygienic screwed | 990 | 940 | 940 | | | | | | |
| DIN 32676 (ISO) Row A hygienic clamp | 950 | 910 | 910 | | | | | | |
| SMS 1145 hygienic screwed | 990 | 940 | | | | | | | |
| JIS B2220/10K | 910 | 870 | | 1275 | 1150 | 1300 | | | |
| JIS B2220/20K | 920 | 910 | | 1275 | 1150 | 1308 | 1485 | | |
| EN 1092-1 PN 16, NAMUR length | | | | | | | | | |
| EN 1092-1 PN 40, NAMUR length | | 915 | | | | | | | |

| Sensor | DN 15 (½") | | | DN 25 (1") | | | DN 50 (2") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
| | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| EN 1092-1 B1, PN 16 | | | | | | | | | |
| EN 1092-1 B1, PN 40 | 15.16 | 15.16 | 16.57 | 22.68 | 20.67 | 22.68 | 30.04 | 28.15 | 30.04 |
| EN 1092-1 B2, PN 63 | | 15.87 | | | 22.20 | 22.52 | 29.33 | 29.33 | |
| EN 1092-1 B2, PN 100 | | 15.87 | | | 22.20 | 22.68 | 29.33 | 29.33 | |
| EN 1092-1 D, PN 40 | | 15.16 | | | 20.67 | | | 28.15 | |
| ASME B16.5, class 150 | | 17.13 | 16.57 | 22.64 | 22.64 | 22.68 | 30.04 | 28.15 | 29.76 |
| ASME B16.5, class 300 | | 16.57 | | | 22.68 | 22.68 | 29.76 | 30.04 | |
| ASME B16.5, class 600 | | 16.57 | | | 22.68 | 22.68 | 29.76 | 30.43 | |
| ASME B16.5, class 900 | | 16.57 | | | 22.68 | | 30.71 | 31.10 | 31.50 |
| ASME B16.5, class 1500 | | 16.57 | | | 22.68 | | 30.71 | 31.10 | 31.50 |
| ISO 228-1 G female pipe thread | | 17.72 | | | | | | | |

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## Dimensional drawings (continued)

| Sensor | DN 15 (½") | | | DN 25 (1") | | | DN 50 (2") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
| ASME B1.20.1 NPT female pipe thread | | 17.72 | | | | | | | |
| DIN 11851 hygienic screwed | 16.26 | 16.26 | 16.26 | 23.23 | 23.23 | 23.23 | 30.04 | 29.13 | 29.13 |
| DIN 32676 (ISO) Row A hygienic clamp | 16.26 | 16.26 | 16.26 | 23.23 | 23.23 | 23.23 | 30.04 | 29.13 | 29.13 |
| SMS 1145 hygienic screwed | | | | | 23.23 | 23.23 | 30.04 | 29.13 | 29.13 |
| JIS B2220/10K | 15.16 | 15.16 | 16.57 | 22.68 | 20.67 | 22.68 | 30.04 | 28.15 | 30.04 |
| JIS B2220/20K | 15.16 | 15.16 | 16.57 | 22.68 | 20.67 | 22.68 | 30.04 | 28.15 | 30.04 |
| EN 1092-1 PN 16, NAMUR length | | | | | | | | | |
| EN 1092-1 PN 40, NAMUR length | | 20.08 | | | 23.62 | | | 28.15 | |

| Sensor | DN 80 (3") | | | DN 100 (4") | | | DN 150 (6") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 80 (3") | DN 100 (4") | DN 150 (6") | DN 100 (4") | DN 150 (6") | DN 200 (8") |
| | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| EN 1092-1 B1, PN 16 | | | 34.45 | 48.11 | 44.17 | 49.61 | 61.77 | 55.94 | 62.48 |
| EN 1092-1 B1, PN 40 | 35.83 | 34.25 | 34.45 | 48.11 | 45.04 | 49.61 | 62.95 | 57.52 | 64.96 |
| EN 1092-1 B2, PN 63 | 35.83 | 35.83 | 41.73 | 48.58 | 51.34 | | | | |
| EN 1092-1 B2, PN 100 | 35.83 | 35.83 | 42.52 | 48.58 | 52.52 | | | | |
| EN1092-1 D, PN 40 | | 34.25 | | | | | | | |
| ASME B16.5, class 150 | | 34.65 | 34.65 | 48.98 | 45.04 | 52.36 | 64.17 | 58.46 | 64.96 |
| ASME B16.5, class 300 | 36.22 | 35.24 | 42.32 | 48.98 | 52.13 | 55.12 | | 59.25 | 65.75 |
| ASME B16.5, class 600 | 36.22 | 36.22 | 43.31 | 48.98 | 53.31 | 57.14 | 65.94 | 61.22 | |
| ASME B16.5, class 900 | 37.99 | 43.31 | 44.49 | 57.87 | 54.33 | 57.09 | 67.13 | 63.19 | |
| ASME B16.5, class 1500 | 37.99 | 51.18 | 45.28 | 59.06 | 55.12 | 59.45 | 67.91 | 65.55 | |
| ISO 228-1 G female pipe thread | | | | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | | | | | | | |
| DIN 11851 hygienic screwed | 38.98 | 37.01 | 37.01 | | | | | | |
| DIN 32676 (ISO) Row A hygienic clamp | 37.40 | 35.83 | 35.83 | | | | | | |
| SMS 1145 hygienic screwed | 38.98 | 37.01 | | | | | | | |
| JIS B2220/10K | 35.83 | 34.25 | | 50.20 | 45.28 | 50.20 | | | |
| JIS B2220/20K | 35.83 | 34.25 | | 50.20 | 45.28 | 51.50 | | | |
| EN 1092-1 PN 16, NAMUR length | | | | | 55.12 | | | 66.93 | |
| EN 1092-1 PN 40, NAMUR length | | 36.02 | | | | | | | |

Sensor in nickel-alloy C4: 7ME463.-...

| Sensor nickel-alloy C4 | DN 15 (½") | | | DN 25 (1") | | | DN 50 (2") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| EN 1092-1 B1, PN 40 | 449 | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| EN 1092-1 B2, PN 63 | 449 | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| EN 1092-1 B2, PN 100 | 449 | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| ANSI B16.5, class 150 | | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| ANSI B16.5, class 300 | | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| ANSI B16.5, class 600 | | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |
| JIS B2220/10K | | 442 | 428 | 646 | 614 | 576 | 814 | 764 | 819 |

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## Dimensional drawings (continued)

| Sensor | DN 80 (3") | | | DN 100 (4") | | | DN 150 (6") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 80 (3") | DN 100 (4") | DN 150 (6") | DN 100 (4") | DN 150 (6") | DN 200 (8") |
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| EN 1092-1 B1, PN 16 | | | 971 | 1357 | 1280 | 1261 | 1592 | 1502 | |
| EN 1092-1 B1, PN 40 | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1592 | 1502 | |
| EN 1092-1 B2, PN 63 | 1021 | | 971 | 1357 | 1280 | 1261 | 1632 | 1542 | |
| EN 1092-1 B2, PN 100 | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1632 | 1542 | |
| ANSI B16.5, class 150 | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1592 | 1502 | |
| ANSI B16.5, class 300 | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1632 | 1542 | |
| ANSI B16.5, class 600 | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1632 | 1542 | |
| JIS B2220/10K | 1021 | 971 | 971 | 1357 | 1280 | 1261 | 1592 | 1502 | |

| Sensor | DN 15 (½") | | | DN 25 (1") | | | DN 50 (2") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 20 (¾") | DN 25 (1") | DN 40 (1½") | DN 40 (1½") | DN 50 (2") | DN 65 (2½") |
| | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| EN 1092-1 B1, PN 40 | 17.7 | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 32.2 |
| EN 1092-1 B2, PN 63 | 17.7 | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 32.2 |
| EN 1092-1 B2, PN 100 | 17.7 | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 32.2 |
| ANSI B16.5, class 150 | | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 31.2 |
| ANSI B16.5, class 300 | | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 31.2 |
| ANSI B16.5, class 600 | | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 31.2 |
| JIS B2220/10K | | 17.4 | 16.9 | 25.4 | 24.2 | 22.7 | 32.0 | 30.1 | 32.2 |

| Sensor | DN 80 (3") | | | DN 100 (4") | | | DN 150 (6") | | |
|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 65 (2½") | DN 80 (3") | DN 100 (4") | DN 80 (3") | DN 100 (4") | DN 150 (6") | DN 100 (4") | DN 150 (6") | DN 200 (8") |
| | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| EN 1092-1 B1, PN 16 | | | 38.2 | 53.4 | 50.4 | 49.6 | 62.7 | 59.1 | |
| EN 1092-1 B1, PN 40 | 40.2 | 38.2 | 38.2 | 53.4 | 50.4 | 49.6 | 62.7 | 59.1 | |
| EN 1092-1 B2, PN 63 | 40.2 | | 38.2 | 53.4 | 50.4 | 49.6 | 64.3 | 60.7 | |
| EN 1092-1 B2, PN 100 | 40.2 | 38.2 | 38.2 | 53.4 | 50.4 | 49.6 | 64.3 | 60.7 | |
| ANSI B16.5, class 150 | 40.2 | 38.2 | 38.2 | 53.4 | 50.4 | 49.6 | 62.7 | 59.1 | |
| ANSI B16.5, class 300 | 40.2 | 38.2 | 38.2 | 53.4 | 50.4 | 49.6 | 64.3 | 60.7 | |
| ANSI B16.5, class 600 | 40.2 | 38.2 | 38.2 | 53.4 | 50.4 | 49.6 | 64.3 | 60.7 | |
| JIS B2220/10K | 35.83 | 34.25 | 41.73 | 53.4 | 50.4 | 49.6 | 62.7 | 59.1 | |

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## Overview



The complete flowmeter system SITRANS FC330 can be ordered for standard, hygienic or NAMUR service. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC330 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.
FC330 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC330 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT030 transmitter.

## Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations

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## Selection and ordering data

| SITRANS FC330 digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter | Article No. 7ME4633- | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | ● | ● | ● | |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Sensor size, connector size** | | | | | | | | | | | | | | |
| DN 15, DN 10 (½", 3/8") | 3 | F | | | | | | | | | | | | |
| DN 15, DN 15 (½", ½") | 3 | G | | | | | | | | | | | | |
| DN 15, DN 20 (½", ¾") | 3 | H | | | | | | | | | | | | |
| DN 25, DN 20 (1", ¾") | 3 | K | | | | | | | | | | | | |
| DN 25, DN 25 (1", 1") | 3 | L | | | | | | | | | | | | |
| DN 25, DN 40 (1", 1½") | 3 | N | | | | | | | | | | | | |
| DN 50, DN 40 (2", 1½") | 4 | B | | | | | | | | | | | | |
| DN 50, DN 50 (2", 2") | 4 | C | | | | | | | | | | | | |
| DN 50, DN 65 (2", 2½") | 4 | D | | | | | | | | | | | | |
| DN 80, DN 65 (3", 2½") | 4 | J | | | | | | | | | | | | |
| DN 80, DN 80 (3", 3") | 4 | K | | | | | | | | | | | | |
| DN 80, DN 100 (3", 4") | 4 | L | | | | | | | | | | | | |
| DN 100, DN 80 (4", 3") | 5 | M | | | | | | | | | | | | |
| DN 100, DN 100 (4", 4") | 5 | N | | | | | | | | | | | | |
| DN 100, DN 150 (4", 6") | 5 | Q | | | | | | | | | | | | |
| DN 150, DN 100 (6", 4") | 6 | D | | | | | | | | | | | | |
| DN 150, DN 150 (6", 6") | 6 | F | | | | | | | | | | | | |
| DN 150, DN 200 (6", 8") | 6 | H | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | |
| EN 1092-1 B1, PN 16 | | | A | 0 | | | | | | | | | | |
| EN 1092-1 B1, PN 40 | | | A | 1 | | | | | | | | | | |
| EN 1092-1 B2, PN 63 | | | A | 2 | | | | | | | | | | |
| EN 1092-1 B2, PN 100 | | | A | 3 | | | | | | | | | | |
| EN 1092-1 D, PN 40 | | | A | 5 | | | | | | | | | | |
| ASME B16.5 RF, Class 150 | | | D | 1 | | | | | | | | | | |
| ASME B16.5 RF, Class 300 | | | D | 2 | | | | | | | | | | |
| ASME B16.5 RF, Class 600 | | | D | 3 | | | | | | | | | | |
| ASME B16.5 RF, Class 900 (p- and t-rating as Class 600) | | | D | 4 | | | | | | | | | | |
| ASME B16.5 RF, Class 1500 (p- and t-rating as Class 600) | | | D | 5 | | | | | | | | | | |
| ISO 228-1G female pipe thread | | | E | 1 | | | | | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | E | 3 | | | | | | | | | | |
| DIN 11851 hygienic screwed | | | F | 1 | | | | | | | | | | |
| DIN 32676 hygenic clamp (ISO) Row A | | | G | 2 | | | | | | | | | | |
| SMS 1145 hygienic screwed | | | K | 1 | | | | | | | | | | |
| JIS B2220/10K | | | L | 2 | | | | | | | | | | |
| JIS B2220/20K | | | L | 4 | | | | | | | | | | |
| EN 1092-1, PN 16, NAMUR length | | | N | 1 | | | | | | | | | | |
| EN 1092-1, PN 40, NAMUR length | | | N | 2 | | | | | | | | | | |
| **Wetted parts material** | | | | | | | | | | | | | | |
| AISI 316L/1.4435/1.4404 | | | | | 1 | | | | | | | | | |
| AISI 316L/1.4435/1.4404 (polished) | | | | | 2 | | | | | | | | | |
| Nickel alloy C4 | | | | | 3 | | | | | | | | | |
| **Calibration/Accuracy class** | | | | | | | | | | | | | | |
| 0.2 % flow, 10 kg/m³ density | | | | | | | 0 | | | | | | | |
| 0.1 % flow, 2 kg/m³ density | | | | | | | 1 | | | | | | | |
| 0.1 % Standard fraction (with density 2 kg/m³) | | | | | | | 8 | | | | | | | |
| 0.1 % Customer selected fraction | | | | | | | 9 | | | | N | 0 | Y | |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | | | | |
| None (replacement sensor) | | | | | | | | A | | | | | | |
| Compact, IP67 fieldmount, aluminum | | | | | | | | D | | | | | | |
| Remote, IP67 fieldmount, aluminum, M12 | | | | | | | | G | | | | | | |
| Remote, IP67 fieldmount, aluminum, T/Box | | | | | | | | K | | | | | | |
| Remote, IP67, wall mount, aluminium (in preparation) | | | | | | | | U | | | | | | |
| **Ex approval (depending on variant)** | | | | | | | | | | | | | | |
| Non-Ex | | | | | | | | | A | | | | | |
| ATEX (zone 1) | | | | | | | | | C | | | | | |

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## Selection and ordering data (continued)

| SITRANS FC330 digital Coriolis flowmeter with SITRANS FCS300 standard flow sensor compact or remote mounting with FCT030 transmitter | Article No. 7ME4633- | Order code |
|---|---|---|
| | ● ● ● ● ● - ● ● ● ● | ● ● ● |
| IECEx (zone 1) | F | |
| US (cCSAus), Div 1 | L | |
| Canada (cCSAus), zone 1 | M | |
| NEPSI | N | |
| INMETRO (in preparation) | P | |
| KCs | Q | |
| EAC Ex | U | |
| **Local User Interface** | | |
| None (replacement sensor, DSL only) | 0 | |
| Blind | 1 | |
| Graphical, 240 × 160 pxl | 3 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (replacement sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, nylon, limited to -20 °C/-4 °F | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, nylon, limited to -20 °C/-4 °F | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| None (replacement sensor) | **B10** |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| No output channel | **E00** |
| 4 ... 20 mA HART Active/Passive (non-Ex) | **E02** |
| Ca 4 ... 20 mA HART active (Ex) | **E06** |
| Ca 4 ... 20 mA HART passive (Ex) | **E07** |
| PROFIBUS PA | **E10** |
| PROFIBUS DP (non-Ex) | **E11** |
| Modbus RTU RS 485 | **E14** |
| **I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)** | |
| None | **F00** |
| • Non Ex: Sig O, None, None. Active/passive menu selected | **F01** |
| • Non Ex: Sig O, Sig I/O, None. Active/passive menu selected | **F02** |
| • Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected | **F03** |
| • Non Ex: Sig O, Sig I/O, R. Active/passive menu selected | **F04** |
| • Non Ex: Sig O, R, R. Active/passive menu selected | **F05** |
| • Non Ex: Sig O, R, None. Active/passive menu selected | **F06** |
| • Ex: pSig O, None, None | **F11** |
| • Ex: pSig O, pSig I/O, None | **F12** |
| • Ex: pSig O, pSig I/O, pSig I/O | **F13** |
| • Ex: pSig O, pSig I/O, R | **F14** |
| • Ex: pSig O, R, R | **F15** |
| • Ex: pSig O, R, None | **F16** |
| • Ex: aSig O, None, None | **F21** |
| • Ex: aSig O, aSig I/O, None | **F22** |
| • Ex: aSig O, aSig I/O, aSig I/O | **F23** |
| • Ex: aSig O, aSig I/O, R | **F24** |
| • Ex: aSig O, R, R | **F25** |
| • Ex: aSig O, R, None | **F26** |
| **Add-on options and accessories**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Certificate EN 10204-2.2 confirmation of pressure containing material | **C01** |
| Certificate EN 10204-3.1 material (wetted parts) | **C02** |
| Certificate NACE MR0175-2009 + MR0103-2012 | **C04** |
| Certificate EN 10204-2.1 Declaration of compliance with the order | **C05** |
| Insp. Certificate EN 10204-3.1 for visual, dimensional and functional test | **C06** |
| Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (confirmation only) | **C07** |
| Certificate EN 10204-3.1 P-test Pressure-test acc. AD2000 | **C08** |
| Test pack (pressure test, non-destructive welding test, welder & welding procedure certificate) | **C09** |
| Certificate EN10204-3.1welding X-ray / Dye-penetration test of weldings (pressure cont.) | **C10** |
| Certificate EN10204-2.1 Declaration of accuracy | **C11** |
| Certificate EN10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (including heat analysis) | **C12** |
| **Customer selected calibration** | |
| DN 15 ... 50: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D60** |
| DN 15 ... 50: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D61** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| DN 80: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D62** |
| DN 80: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D63** |
| DN 100: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D64** |
| DN 100: Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D65** |
| DN 150: Multi-point (5 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D66** |
| DN 150: Multi-point (8 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **D67** |
| **Cable** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L55** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L59** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L63** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L67** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| **Sensor options** | |
| FCS300 marine approval (in preparation) | **S22** |

| | Order code |
|---|---|
| **SD-Card accessibility via USB** (not allowed in USA by Patent) | |
| Mass storage enabled | **S30** |
| **Additional data** Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

Notes on I/O configurations:

**a or p suffix:** The I/O module is selected at ordering with either active or passive function.

**Signal:** The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.

**I:** Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer' (only CH3&4).

**R:** Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.

The MLFB structure for FC330 systems must be filled to **this level**, including "**-Z**" options A.., B.., E.. and F.

***Operating instructions for SITRANS FC330***

| Description | Article No. |
|---|---|
| English | |
| • for firmware V 4.0 and onwards | **A5E44030648** |
| German | |
| • for firmware V 4.0 and onwards | **TBD** |

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

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## Technical specifications

| SITRANS FC330 | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2")<br>DN 80 (3")<br>DN 100 (4")<br>DN 150 (6") |
| **Accuracy** | ± 0.10 % or 0.20 % for liquids additional ±0.40 for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range (liquids)**<br>(water @ 1 bar pressure loss) ($Q_{nom}$) | |
| • DN 15 | 4 500 kg/h (163.3 lb/min) |
| • DN 25 | 20 500 kg/h (753.2 lb/min) |
| • DN 50 | 49 000 kg/h (1 800 lb/min) |
| • DN 80 | 122 000 kg/h (4 483 lb/min) |
| • DN 100 | 273 000 kg (10 031 lb/min) |
| • DN 150 | 459 200 kg/h (16 873 lb/min) |
| **Architecture** | Compact or remote configuration |
| **Display** | Full graphical display, 240 × 160 pixels with selection of 6 languages |
| **Power supply** | 20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 % |
| **Material** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel or nickel alloy C4[1] |
| - Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | IP67[2] |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | 100 bar (1 450 psi) |
| - Nickel alloy C4 | 100 bar (1 450 psi) |
| • Sensor enclosure | No pressure containment |
| **Temperature ratings** | |
| • Process medium | -50 ... +205 °C (-58 ... +400 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F)[2] |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220 |
| • Pipe threads | ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP) |
| • Hygienic threads | DIN 11851, SMS 1145 |
| • Hygienic clamps | DIN 32676 (ISO) Row A |
| **Approvals** | |
| • Hazardous area (zone 1) | ATEX, IECEx, EAC Ex, CSA, cCSAus, NEPSI, EAC<br>No dust approval |
| • Pressure equipment | PED, CRN |
| • Marine<br>(in preparation for FC330 compact) | Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy) |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | Up to 4 channels combining analog, relay or digital outputs and binary input |
| **Communication** | • HART<br>• PROFIBUS PA<br>• PROFIBUS DP<br>• Modbus RTU (RS 485) |

## Technical specifications (continued)

| SITRANS FC330 | |
|---|---|
| **EMC performance** | |
| Emission | EN 55011/CISPR-11 (Class A) |
| Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 400 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

1) Flange wetted parts and raised face surface in nickel alloy and non wetted parts in AISI 316L.
2) If operating outdoors, avoid direct sunlight, paritcularly in warm climatic regions.

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## Overview



The compact flowmeter SITRANS FC310 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC310 is ideal for integration in ship fuel efficiency and environmental measurement systems as well as bunkering solutions.

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FC310 is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates. The SITRANS FC310 flowmeter system consists of a SITRANS FCS300 sensor and a SITRANS FCT010 transmitter always compact mounted.

## Benefits

- It is compact and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up
- Modbus RS 485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

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## Selection and ordering data

| SITRANS FC310 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter | Article No. 7ME4631- ● ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Sensor size, connector size** | | |
| DN 15, DN 10 (½", 3/8") | 3 F | |
| DN 15, DN 15 (½", ½") | 3 G | |
| DN 15, DN 20 (½", ¾") | 3 H | |
| DN 25, DN 20 (1", ¾") | 3 K | |
| DN 25, DN 25 (1", 1") | 3 L | |
| DN 25, DN 40 (1", 1½") | 3 N | |
| DN 50, DN 40 (2", 1½") | 4 B | |
| DN 50, DN 50 (2", 2") | 4 C | |
| DN 50, DN 65 (2", 2½") | 4 D | |
| DN 80, DN 65 (3", 2½") | 4 J | |
| DN 80, DN 80 (3", 3") | 4 K | |
| DN 80, DN 100 (3", 4") | 4 L | |
| DN 100, DN 80 (4", 3") | 5 M | |
| DN 100, DN 100 (4", 4") | 5 N | |
| DN 100, DN 150 (4", 6") | 5 Q | |
| DN 150, DN 100 (6", 4") | 6 D | |
| DN 150, DN 150 (6", 6") | 6 F | |
| DN 150, DN 200 (6", 8") | 6 H | |
| **Process connection** | | |
| EN 1092-1 B1, PN 16 | A 0 | |
| EN 1092-1 B1, PN 40 | A 1 | |
| EN 1092-1 B2, PN 63 | A 2 | |
| EN 1092-1 B2, PN 100 | A 3 | |
| EN 1092-1 D, PN 40 | A 5 | |
| ASME B16.5 RF, class 150 | D 1 | |
| ASME B16.5 RF, class 300 | D 2 | |
| ASME B16.5 RF, class 600 | D 3 | |
| ASME B16.5 RF, class 900 (p- and t-rating as class 600) | D 4 | |
| ANSI B16.5-2009, class 1500 (p- and t-rating as class 600) | D 5 | |
| ISO 228-1G female pipe thread | E 1 | |
| ASME B1.20.1 NPT female pipe thread | E 3 | |
| DIN 11851 hygienic screwed | F 1 | |
| DIN 32676 hygienic clamp Row A | G 1 | |
| SMS 1145 hygienic screwed | K 1 | |
| JIS B2220/10K | L 2 | |
| JIS B2220/20K | L 4 | |
| EN 1092-1, PN 16, NAMUR length | N 1 | |
| EN 1092-1, PN 40, NAMUR length | N 2 | |
| **Wetted parts material** | | |
| AISI 316L/1.4435/1.4404 | 1 | |
| AISI 316L/1.4435/1.4404 (polished) | 2 | |
| Nickel alloy C4 | 3 | |
| **Calibration/Accuracy class** | | |
| 0.2 % flow, 10 kg/m³ density | 0 | |
| 0.1 % flow, 2 kg/m³ density | 1 | |
| **Mounting style, transmitter housing and material** | | |
| Compact, IP67, aluminum | D | |
| **Ex approval** | | |
| Non-Ex | A | |
| ATEX II 2G zone 1 | C | |
| IECEx Gb (zone 1) | F | |
| US (cCSAus), Div 1 | L | |
| Canada (cCSAus), class I, zone 1 | M | |
| NEPSI | N | |
| INMETRO (in preparation) | P | |
| KCs | Q | |

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## Selection and ordering data (continued)

| | Article No. | Order code |
|---|---|---|
| **SITRANS FC310 Digital coriolis flowmeter with SITRANS FCS300 standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter** | **7ME4631-** ● ● ● ● ● - ● ● ● ● | ● ● ● |
| EAC Ex | U | |
| **Local User Interface** | | |
| Blind | 1 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (replacement sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| Modbus RTU RS 485 | **E14** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Add-on options and accessories**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Certificate EN 10204-2.2 confirmation of pressure containing material | **C01** |
| Certificate EN 10204-3.1 material (wetted parts) | **C02** |
| Certificate NACE MR0175-2009 + MR0103-2012 | **C04** |
| Certificate EN 10204-2.1 Declaration of compliance with the order | **C05** |
| Insp. Certificate EN 10204-3.1 for visual, dimensional and functional test | **C06** |
| Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (confirmation only) | **C07** |
| Certificate EN 10204-3.1 P-test Pressure-test acc. AD2000 | **C08** |
| Test pack (pressure test, non-destructive welding test, welder & welding procedure certificate) | **C09** |
| Certificate EN 10204-3.1 welding X-ray / Dye-penetration test of weldings (pressure cont.) | **C10** |
| Certificate EN 10204-2.1 Declaration of accuracy | **C11** |
| Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (including heat analysis) | **C12** |
| **Customer selected calibration** | |
| DN 15 ... 50, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D60** |
| DN 15 ... 50, multi-point, 10 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D61** |

| | Order code |
|---|---|
| DN 80, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D62** |
| DN 80, multi-point, 10 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D63** |
| DN 100, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D64** |
| DN 100, multi-point, 10 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D65** |
| DN 150, multi-point, 5 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D66** |
| DN 150, multi-point, 8 flows × 1 pass Flow 10 ... 100 % of $Q_{norm}$ | **D67** |
| **Cable** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted | **L53** |
| 10 m (32.8 ft) sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L55** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted | **L57** |
| 25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L59** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted | **L61** |
| 50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L63** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted | **L65** |
| 75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L67** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plug mounted | **L69** |
| **Sensor options** | |
| FCS300 marine approval | **S22** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

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## Selection and ordering data (continued)

***Operating instructions for SITRANS FC310***

| Description | Article No. |
|---|---|
| English | |
| • for firmware V 4.0 and onwards | **A5E44036384** |
| German | |
| • for firmware V 4.0 and onwards | **TBD** |

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

***Accessories***

| Description | Article No. | |
|---|---|---|
| **SITRANS I300 – Isolating power supply – Ex barrier** | **A5E39832532** |  |

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## Technical specifications

| SITRANS FC310 | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2")<br>DN 80 (3")<br>DN 100 (4")<br>DN 150 (6") |
| **Accuracy** | ± 0.10 % or ± 0.20 %<br>Addional ± 0.40 % for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range**<br>(water @ 1 bar pressure loss) | |
| • DN 15 | 4 500 kg/h (163.3 lb/min) |
| • DN 25 | 20 500 kg/h (753.2 lb/min) |
| • DN 50 | 49 000 kg/h (1 800 lb/min) |
| • DN 80 | 122 000 kg/h (4 483 lb/min) |
| • DN 100 | 273 000 kg/h (10 031 lb/min) |
| • DN 150 | 459 200 kg/h (16 873 lb/min) |
| **Power supply** | 12-27 V DC; 1.1 W |
| **Weight** | 4.6 ... 207 kg |
| **Material** | |
| • Sensor | |
| - Measuring tubes | 316L stainless steel or nickel alloy C4 |
| - Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | IP67 |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | 100 bar (1 450 psi) |
| - Nickel alloy C4 | 100 bar (1 450 psi) |
| • Sensor enclosure | No pressure containment |
| **Temperature ratings** | |
| • Process medium | -50 ... +205 °C (-58 ... +400 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F) |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220 |
| • Pipe threads | ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP) |
| • Hygienic threads | DIN 11851, SMS 1145 |
| • Hygienic clamps | DIN 32676 Hygenic Clamp Row A |
| **Approvals** | |
| • Hazardous area (zone 1) | ATEX, IECEx, EAC Ex, cCSAus, NEPSI, EAC Ex No dust approval |
| • Pressure equipment | PED, CRN (in preparation) |
| • Marine | Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping, RINA (Italy) |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41 and NE 132) |
| **Communication** | Modbus RS 485 RTU |
| **EMC performance** | |
| Emission | EN 55011/CISPR-11 (Class B) |
| Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 400 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

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## Overview






Full integration in the Siemens SIMATIC systems PCS 7 or in TIA portal with FCT070 faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets. The complete flowmeter system consists of a SITRANS FCS300 sensor and a SIMATIC ET200SP Coriolis module FCT070 transmitter.

The transmitter FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the FSC300 sensor can be placed in Ex Zone 1 or Class 1 Div 1 locations. Together with the SITRANS I300 power/barrier module the FCT070 transmitter can be place in Zone 2 or Div 2 areas.

## Benefits

- FCS300 sensor in sizes from DN 15 to 150 mm in a large verity of process connections and wetted materials
- Short overall length; easy drop-in replacement into most existing installations
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can combined with all other SIMATIC ET200 ST & HF modules
- The FCT070 has all high-end transmitter functionality integrated including the advanged fraction tables on bord
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced two-stage batch controller functionality without additional modules. I/Os are onboard

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## Selection and ordering data

| Coriolis sensor SITRANS FCS300 with DSL ready for FCT070 transmitter | Article No. 7ME4637- ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Sensor size, connector size** | |
| DN 15, DN 10 (½", 3/8") | 3 F |
| DN 15, DN 15 (½", ½") | 3 G |
| DN 15, DN 20 (½", ¾") | 3 H |
| DN 25, DN 20 (1", ¾") | 3 K |
| DN 25, DN 25 (1", 1") | 3 L |
| DN 25, DN 40 (1", 1½") | 3 N |
| DN 50, DN 40 (2", 1½") | 4 B |
| DN 50, DN 50 (2", 2") | 4 C |
| DN 50, DN 65 (2", 2½") | 4 D |
| DN 80, DN 65 (3", 2½") | 4 J |
| DN 80, DN 80 (3", 3") | 4 K |
| DN 80, DN 100 (3", 4") | 4 L |
| DN 100, DN 80 (4", 3") | 5 M |
| DN 100, DN 100 (4", 4") | 5 N |
| DN 100, DN 150 (4", 6") | 5 Q |
| DN 150, DN 100 (6", 4") | 6 D |
| DN 150, DN 150 (6", 6") | 6 F |
| DN 150, DN 200 (6", 8") | 6 H |
| **Process connection** | |
| EN 1092-1 B1, PN 16 | A 0 |
| EN 1092-1 B1, PN 40 | A 1 |
| EN 1092-1 B2, PN 63 | A 2 |
| EN 1092-1 B2, PN 100 | A 3 |
| EN 1092-1 D, PN 40 | A 5 |
| ASME B16.5 RF, Class 150 | D 1 |
| ASME B16.5 RF, Class 300 | D 2 |
| ASME B16.5 RF, Class 600 | D 3 |
| ASME B16.5 RF, Class 900 (p- and t-rating as Class 600) | D 4 |
| ANSI B16.5-2009, Class 1500 (p- and t-rating as Class 600) | D 5 |
| ISO 228-1G female pipe thread | E 1 |
| ASME B1.20.1 NPT female pipe thread | E 3 |
| DIN 11851 hygienic screwed | F 1 |
| DIN 32676 hygienic clamp Row A | G 1 |
| SMS 1145 hygienic screwed | K 1 |
| JIS B2220/10K | L 2 |
| JIS B2220/20K | L 4 |
| EN 1092-1, PN 16, NAMUR length | N 1 |
| EN 1092-1, PN 40, NAMUR length | N 2 |
| **Wetted parts material** | |
| AISI 316L/1.4435/1.4404 | 1 |
| AISI 316L/1.4435/1.4404 (polished) | 2 |
| Nickel alloy C4 | 3 |
| **Calibration/Accuracy class** | |
| 0.2 % flow, 10 kg/m³ density | 0 |
| 0.1 % flow, 2 kg/m³ density | 1 |
| **Mounting style, transmitter housing and material** | |
| Compac, IP67, aluminum | D |
| **Ex approval (sensor)** | |
| Non-Ex | A |
| ATEX II 2G zone 1 | C |
| IECEx Gb (zone 1) | F |
| US (cCSAus), Div 1 | L |
| Canada (cCSAus), class I, zone 1 | M |
| NEPSI | N |
| INMETRO | P |
| KCs | Q |

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## Selection and ordering data (continued)

| Coriolis sensor SITRANS FCS300 with DSL ready for FCT070 transmitter | Article No. 7ME4637- ● ● ● ● ● - ● ● ● ● |
|---|---|
| EAC Ex | U |
| **Local User Interface** | |
| Blind | 1 |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| Standard software DSL | **B10** |
| **I/O configuration Ch1** | |
| No output channel ( integration of FCT070) | **E00** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Add-on options and accessories**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Certificate EN 10204-2.2 confirmation of pressure containing material | **C01** |
| Certificate EN 10204-3.1 material (wetted parts) | **C02** |
| Certificate NACE MR0175-2009 + MR0103-2012 | **C04** |
| Certificate EN 10204-2.1 Declaration of compliance with the order | **C05** |
| Insp. Certificate EN 10204-3.1 for visual, dimensional and functional test | **C06** |
| Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (confirmation only) | **C07** |
| Certificate EN 10204-3.1 P-test Pressure-test acc. AD2000 | **C08** |
| Test pack (pressure test, non-destructive welding test, welder & welding procedure certificate) | **C09** |
| Certificate EN 10204-3.1 welding X-ray / Dye-penetration test of weldings (pressure cont.) | **C10** |
| Certificate EN 10204-2.1 Declaration of accuracy | **C11** |
| Certificate EN 10204-3.1 PMI Positive material ident. of pressure-cont./wetted parts (including heat analysis) | **C12** |

| | Order code |
|---|---|
| **Customer selected calibration** | |
| DN 15 ... 50, multi-point, 5 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D60** |
| DN 15 ... 50, multi-point, 10 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D61** |
| DN 80, multi-point, 5 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D62** |
| DN 80, multi-point, 10 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D63** |
| DN 100, multi-point, 5 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D64** |
| DN 100, multi-point, 10 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D65** |
| DN 150, multi-point, 5 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D66** |
| DN 150, multi-point, 8 flows × 1 pass Flow 10 ... 100% of $Q_{norm}$ | **D67** |
| **Cable** | |
| No sensor cable | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L53** |
| 10 m (32.8 ft), standard, without plugs | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L57** |
| 25 m (82 ft), standard, without plugs | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L61** |
| 50 m (164 ft), standard, without plugs | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L65** |
| 75 m (246 ft), standard, without plugs | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L69** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| SITRANS FCT070 – Transmitter for ET 200SP | 7ME4138-6AA00-0BB1 |  |
| BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP | 6ES7193-6BP20-0BB0<br>6ES7193-6BP20-0BB1 |  |
| SITRANS I300 – Isolating power supply – Ex barrier | A5E39832532 |  |

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## Technical specifications

| SITRANS FCS300 | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2")<br>DN 80 (3")<br>DN 100 (4")<br>DN 150 (6") |
| **Accuracy** | ± 0.10 % or 0.20 % for liquids additional<br>± 0.40 for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range (liquids)**<br>(water @ 1 bar pressure loss) ($Q_{nom}$) | |
| • DN 15 | 4 500 kg/h (163.3 lb/min) |
| • DN 25 | 20 500 kg/h (753.2 lb/min) |
| • DN 50 | 49 000 kg/h (1 800 lb/min) |
| • DN 80 | 122 000 kg/h (4 483 lb/min) |
| • DN 100 | 273 000 kg/h (10 031 lb/min) |
| • DN 150 | 459 200 kg/h (16 873 lb/min) |
| **Measurement of** | Mass flow, volume flow, density, temperature, fraction A flow, fraction A %, fraction B flow, fraction B % |
| **Architecture** | Remote configuration |
| **System integration** | PCS7 and TIA portal with faceplates |
| **Power supply** | 24 V DC, 19.2 ... 28.8 V |
| **Material** | |
| • Sensor | |
| • Wetted parts | 316L stainless steel or nickel alloy C4 |
| • Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | Sensor: IP67<br>FCT070 Transmitter: IP20 |
| **Pressure ratings** | |
| • Measuring tubes | |
| • 316L | 100 bar (1 450 psi) |
| • Nickel alloy C4 | 100 bar (1 450 psi) |
| • Sensor enclosure | No pressure containment |
| **Temperature ratings** | |
| • Process medium | -50 ... +205 °C (-58 ... +400 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F) |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 B2, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220 |
| • Pipe threads | ASME B1.20 (NPT) female pipe thread, ISO 228-1 G female pipe thread (BSPP) |
| • Hygienic threads | DIN 11851, SMS 1145 |
| • Hygienic clamps | DIN 32676 hygenic clamp Row A |
| **Approvals** | |
| • Hazardous area | Sensor FCS300: Zone 1 & Class 1 Div 1 ATEX, IECEx, EAC Ex, CSA, cCSAus, NEPSI, EAC No dust approval<br>FCT070 transmitter: Zone 2 & Class 1 Div 2 ATEX, IECEx, EAC Ex, CSA, cCSAus, FM, NEPSI, EAC Ex |
| • Pressure equipment | PED, CRN |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | 2 digital Input and 2 digital output<br>Single and 2 stage batch function |
| **Totalizer** | 3 totalizer |
| **Communication** | Integrated PROFINET for SIMATIC integration and other PROFINET Controllers |

## Technical specifications (continued)

| SITRANS FCS300 | |
|---|---|
| **EMC performance** | |
| Emission | EN 55011/CISPR-11 (Class A) |
| Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 1000 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

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## Overview



The SITRANS FCS400 sensor is available in DN 15, DN 25 and DN 50 mm sizes in stainless steel AISI 316 L. The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow.

The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.

The super compact sensor design with a split flow dual tube design with very high driver frequency is suitable for high end applications in all industry segments e.g. Chemical, F&B , O&G and Power.

A variety of process connections available to cover all common process connections and pressure ratings.

The sensor has a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the FCS400 comes in a number of common harzardous area approved like ATEX, IECEx, cCSAus, EAC Ex, KCs and NEPSI.

For sanitary applications the sensor is available with polished inside wetted parts and carry the EHEDG and 3A sanitary certifications (in preparation).

For the chemical industry the FCS400 sensors are available with standardized NAMUR inbuilding length (in preparation).

## Integration

The SITRANS FCS400 Massflow sensor is suitable for both in- door and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 + 21 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI) or Class I + II + III Div. 1 (cCSAus).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site
www.siemens.com/fc430/sizer

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

***Installation orientation***

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

***Supports***

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

***Shut-off devices***

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

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## Configuration

***Installation guidelines***

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.
- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also sup- ported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping de- vices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

***Remote system cabling***

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

Be aware of maximum sensor length cable depending on product selection, currently 75 m. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

## Configuration (continued)

| Property | Unit | Value |
|---|---|---|
| Resistance | [Ω/km] | 59 |
| Characteristic impedance | [Ω] | 100 @ 1 MHz |
| Insulation resistance | [MΩ/km] | 200 |
| Maximum voltage | [V] | 300 |

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1 500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 connectors into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings.
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

***Insulation and heating***

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS400 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Where trace heating is employed, an electric heating jacket can be ordered as an accessory. It is shaped to the sensor body and controlled from a weatherproof setpoint device.

The jacket can heat the sensor enclosure up to 200 °C (392 °F). However the maximum temperature increase is limited to 70 °C. Further insulation is also recommended for personnel protection or low loss temperature maintenance.

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## Technical specifications

| Flow sensor FCS400<br>Parameter | Unit | Value |
|---|---|---|
| Process media | | • Fluid Group 1 (suitable for dangerous fluids)<br>• Aggregate state: Paste/light slurry, liquid and gas |
| Process pressure range | [barg (psi)] | 316L: 0 ... 100 (0 ... 1 450) |
| Process temperature range | | |
| • DN 15 ... DN 50 | [°C (°F)] | -50 ... +200 (-58 ... +392) |
| Ambient temperature range | [°C (°F)] | -40 ... +60 (-40 ... +140) |
| Transport temperature range | [°C (°F)] | -40 ... +70 (-40 ... +158) |
| Density range | [kg/m³ (lb/ft³)] | 1 ... 5 000 (0.062 ... 312.2) |
| No. of process values | | |
| • Primary process values | | • Mass flow<br>• Density<br>• Process medium temperature |
| • Derieved process values | | • Volume flow<br>• Standard volume flow (with reference density)<br>• Fraction A:B<br>• Fraction % A:B |

| Performance specifications<br>Parameter | Unit | Sensor<br>DN 15 | DN 25 | DN 50 |
|---|---|---|---|---|
| Max. zero point error | [kg/h (lb/min)] | 0.2 (0.007) | 2 (0.073) | 7.5 (0.276) |
| $Q_{min}$ (1 % error)[1] | [kg/h (lb/min)] | 20 (0.735) | 200 (7.349) | 750 (27.558) |
| $Q_{nom}$ (1 bar pressure)[1] | [kg/h (lb/min)] | 3 700 (135.95) | 11 500 (422.55) | 50 000 (1 837.19) |
| $Q_{max}$[1] | [kg/h (lb/min)] | 6 400 (235.16) | 17 700 (650.36) | 70 700 (2 597.78) |
| Linearity error mass flow | | | | |
| • for liquids[2] | [%] | ± 0.1 | ± 0.1 | ± 0.1 |
| • for gases | [%] | ± 0.35 | ± 0.35 | ± 0.35 |
| Repeatability mass flow | [%] | ± 0.05 | ± 0.05 | ± 0.05 |
| Density accuracy standard calibration[3] | [kg/m³ (lb/ft³)] | ± 5 (± 0.31) | ± 5 (± 0.31) | ± 5 (± 0.31) |
| Density accuracy extended calibration[3] | [kg/m³ (lb/ft³)] | ± 0.5 (± 0.031) | ± 0.5 (± 0.031) | ± 0.5 (± 0.031) |
| Temperature error | [°C (°F)] | ± 0.5 (± 0.9) | ± 0.5 (± 0.9) | ± 0.5 (± 0.9) |

1) For gas applications the max. flowrate is calculated at Mach-Number = 03.
2) Increased error can be expected for gas mass flow measurement.
3) Liquid only.

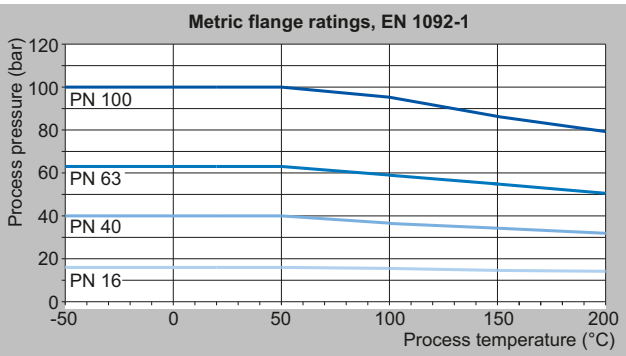
***Pressure/temperature curves***

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN 1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS400.

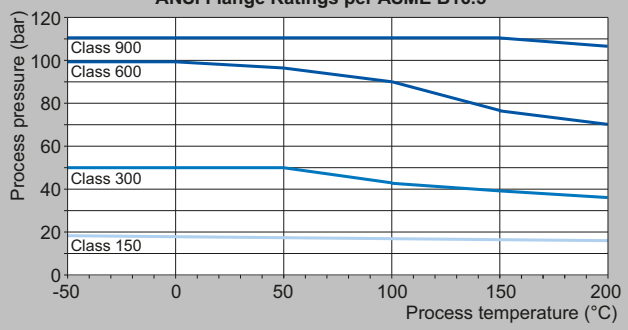
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## Technical specifications (continued)




EN 1092-1 flanged sensors




ASME B16.5 flanged sensors

***Sensor variants***

SITRANS FCS400 sensors are available in a wide range of process connections. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard sensors

| Standard: 7ME461.-.. Sensor | Connection | EN 1092-1 B1, PN 40 | EN 1092-1 B1, PN 63 | EN 1092-1 B1, PN 100 | EN 1092-1 B1, PN 160[2)] | EN 1092-1 D Nut, PN 40 | EN 1092-1 D Nut, PN 63 | EN 1092-1 D Nut, PN 100 | EN 1092-1 D Nut, PN 160[2)] | ANSI B16.-5-2009, class 150 |
|---|---|---|---|---|---|---|---|---|---|---|
| DN 15 (½") | DN 6 (¼") | | | | | | | | | |
| | DN 10 (3/8") | | | | | | | | | |
| | DN 15 (½") | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | DN 20 (¾") | ● | | | | | | | | ● |
| | DN 25 (1") | ● | | ● | | | | | | |
| DN 25 (1") | DN 15 (½") | | | | | | | | | |
| | DN 25 (1") | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | DN 32 (1¼") | ● | | | | | | | | |
| | DN 40 (1½") | ● | | ● | | | | | | ● |
| DN 50 (2") | DN 25 (1") | | | | | | | | | |
| | DN 40 (1½") | ● | ● | ● | ● | ● | ● | | | |
| | DN 50 (2") | ● | ● | ● | ● | ● | ● | ● | ● | ● |

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## Technical specifications (continued)

| Standard: 7ME461.-.. Sensor | Connection | ANSI B16.-5-2009, class 300 | ANSI B16.-5-2009, class 600 | ANSI B16.-5-2009, class 900[1] | ISO 228-1 G pipe thread | ASME B1.2-0.1 NPT pipe thread | DIN 11851 hygienic screwed | DIN 32676 hygienic tri-clamp | DIN 11864--1A aseptic screwed | DIN 11864--2A aseptic flanged |
|---|---|---|---|---|---|---|---|---|---|---|
| DN 15 (½") | DN 6 (¼") | | | | ● | ● | | | | |
| | DN 10 (3/8") | | | | | | ● | | | |
| | DN 15 (½") | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | DN 20 (¾") | ● | ● | | | | | ● | | |
| | DN 25 (1") | | | | | | ● | | | |
| DN 25 (1") | DN 15 (½") | | | | | | | | | |
| | DN 25 (1") | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | DN 32 (1¼") | | | | | | ● | | | |
| | DN 40 (1½") | ● | ● | | | | | ● | | |
| DN 50 (2") | DN 25 (1") | | | | | | | | | |
| | DN 40 (1½") | | | | | | ● | | ● | ● |
| | DN 50 (2") | ● | ● | ● | ● | ● | ● | ● | ● | ● |

| Standard: 7ME461.-.. Sensor | Connection | DIN 11864--3A aseptic clamp | ISO 2852 hygienic clamped | ISO 2853 hygienic screwed | SMS 1145 hygienic screwed | 12-VCO-4 quick connect | JIS B2220:200-4/10K | JIS B2220:200-4/20K | JIS B2220:200-4/40K | JIS B2220:200-4/63K |
|---|---|---|---|---|---|---|---|---|---|---|
| DN 15 (½") | DN 6 (¼") | | | | | | | | | |
| | DN 10 (3/8") | | | | | | | | | |
| | DN 15 (½") | ● | | | | ● | ● | ● | ● | ● |
| | DN 20 (¾") | | | | | | | | | |
| | DN 25 (1") | | ● | ● | ● | | | | | |
| DN 25 (1") | DN 15 (½") | | | | | | | | | |
| | DN 25 (1") | ● | ● | ● | ● | | ● | ● | ● | ● |
| | DN 32 (1¼") | | | | | | | | | |
| | DN 40 (1½") | | ● | ● | | | | | | |
| DN 50 (2") | DN 25 (1") | | | | | | | | | |
| | DN 40 (1½") | ● | ● | ● | ● | | | | | |
| | DN 50 (2") | ● | ● | ● | ● | | ● | ● | ● | ● |

[1] Apply class 600 p and t ratings for class 900 and class 1500 flanges.
[2] P and T rating as PN 100.

Hygienic sensor variants (in preparation)

The hygienic sensors all have polished internal wetted material and a maximum internal surface roughness Ra < 0.8 µm and are EHEDG and 3A approved.

Aseptic flanged process connections

The aseptic flanges offered for FCS400 conform with the standard DIN 11864-2A BF-A. The flange fitted to the sensor is therefore the back flange and the seal is an O-ring.

The flange dimensions in the FCS400 program are as follows:

| Size DN | Pipe | Bore $d_1$ | Ring OD $d_{11}$ | Bolt circle $d_5$ | Bolt holes | Flange diameter $d_{10}$ |
|---|---|---|---|---|---|---|
| 10 | 13 × 1.5 | 10 | 22.4 | 37 | 4 × Ø9 | 54 |
| 15 | 19 × 1.5 | 16 | 28.4 | 42 | 4 × Ø9 | 59 |
| 20 | 23 × 1.5 | 20 | 32.4 | 47 | 4 × Ø9 | 64 |
| 25 | 29 × 1.5 | 26 | 38.4 | 53 | 4 × Ø9 | 70 |
| 32 | 35 × 1.5 | 32 | 47.7 | 59 | 4 × Ø9 | 76 |
| 40 | 41 × 1.5 | 38 | 53.7 | 65 | 4 × Ø9 | 82 |
| 50 | 53 × 1.5 | 50 | 65.7 | 77 | 4 × Ø9 | 94 |
| 65 | 70 × 2.0 | 66 | 81.7 | 95 | 8 × Ø9 | 107 |
| 80 | 85 × 2.0 | 81 | 97.7 | 112 | 8 × Ø11 | 113 |

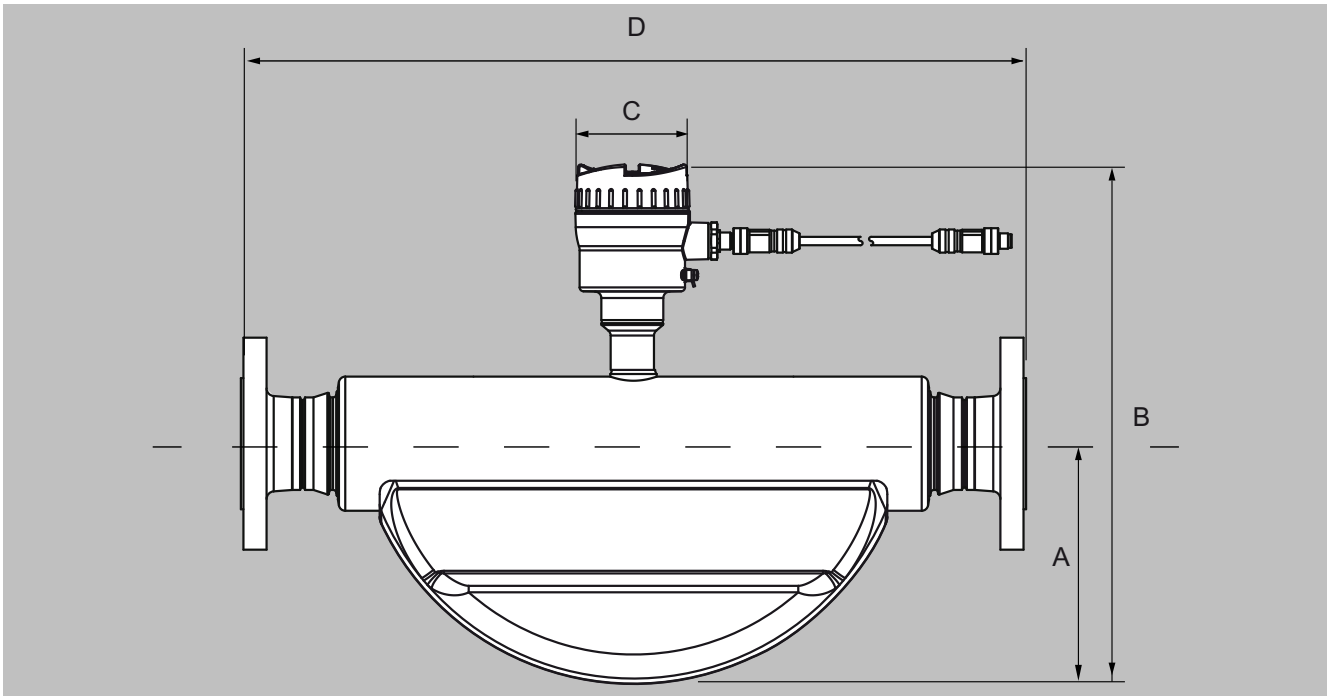
DIN 11864-2A BF-A flange dimensions

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## Dimensional drawings

***Sensor dimensions***




| Sensor<br>DN | A<br>[mm] | <br>[inch] | B<br>[mm] | <br>[inch] | B1<br>[mm] | <br>[inch] | Weight[1)]<br>[kg] | <br>[lb] |
|---|---|---|---|---|---|---|---|---|
| 15 (½") | 90 | 3.54 | 280 | 11.0 | 314 | 12.4 | 4.6 | 10.1 |
| 25 (1") | 123 | 4.84 | 315 | 12.4 | 349 | 13.8 | 7.9 | 17.4 |
| 50 (2") | 187 | 7.36 | 390 | 15.4 | 424 | 16.8 | 25.7 | 56.7 |

1) For FCT030 compact add 4 kg (8.8 lb)

SITRANS FCS400, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version. The built-in length D depends on the flange.

***Overall length***

The overall length (**built-in length D**) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

Standard: 7ME461.-...

| Sensor<br>Connection | DN 15 (½")<br>DN 6 (¼") | <br>DN 10 (3/8") | <br>DN 15 (½") | <br>DN 20 (¾") | <br>DN 25 (1") | DN 25 (1")<br>DN 25 (1") | <br>DN 32 (1¼") | <br>DN 40 (1½") | DN 50 (2")<br>DN 40 (1½") | <br>DN 50 (2") |
|---|---|---|---|---|---|---|---|---|---|---|
| | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] | [mm] |
| EN 1092-1 B1, PN 40 | | | 265 | 265 | 265 | 360 | 360 | 365 | 610 | 610 |
| EN 1092-1 B1, PN 63 | | | 265 | | | 360 | | | 610 | 610 |
| EN 1092-1 B1, PN 100 | | | 270 | | 275 | 360 | | 365 | 610 | 610 |
| EN 1092-1 B1, PN 160 | | | 270 | | | 360 | | | | 620 |
| ANSI B16.5, class 150 | | | 270 | 270 | | 360 | | 365 | | 620 |
| ANSI B16.5, class 300 | | | 270 | 270 | | 360 | | 380 | | 620 |
| ANSI B16.5, class 600 | | | 270 | 285 | | 360 | | 380 | | 620 |
| ANSI B16.5, class 900 | | | 290 | | | 385 | | | | 620 |
| ISO 228-1 GH pipe thread | 265 | | 265 | | | 365 | | | | 620 |
| ANSI B1.20.1 NPT pipe thread | 265 | | 270 | | | 365 | | | | 620 |
| DIN 11851 hygienic screwed[1)] | | 265 | 265 | | 193 | 360 | 360 | | 610 | 610 |

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## Dimensional drawings (continued)

| Sensor | DN 15 (½") | | | | | DN 25 (1") | | | DN 50 (2") | |
|---|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 6 (¼") | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 25 (1") | DN 25 (1") | DN 32 (1 ¼") | DN 40 (1 ½") | DN 40 (1 ½") | DN 50 (2") |
| DIN 32676-C hygienic tri-clamp | | | 265 | 265 | | 360 | | 360 | | 610 |
| DIN 11864-1 aseptic screwed[1)] | | | 265 | | | 360 | | | 610 | 610 |
| DIN 11864-2 aseptic flange[1)] | | | 265 | | | 360 | | | 620 | 610 |
| DIN 11864-3 aseptic clamp[1)] | | | 265 | | | 360 | | | 610 | 610 |
| ISO 2852 hygienic clamp[1)] | | | | | 265 | 360 | | 360 | 610 | 610 |
| ISO 2853 hygienic screwed[1)] | | | 265 | | | 360 | | 360 | | 610 |
| SMS 1145 hygienic screwed | | | 285 | | | 360 | | | 610 | 610 |
| 12-VCO-4 quick connect | | | 285 | | | | | | | |
| JIS B2220/10K | | | 265 | | | 360 | | | 620 | 610 |
| JIS B2220/20K | | | 265 | | | 360 | | | 620 | 610 |
| JIS B2220/40K | | | 270 | | | 360 | | | 620 | 610 |
| JIS B2220/63K | | | 275 | | | 370 | | | | 620 |

1) Available with 3A and EHEDG certification.

| Sensor | DN 15 (½") | | | | | DN 25 (1") | | | DN 50 (2") | |
|---|---|---|---|---|---|---|---|---|---|---|
| Connection | DN 6 (¼") | DN 10 (3/8") | DN 15 (½") | DN 20 (¾") | DN 25 (1") | DN 25 (1") | DN 32 (1 ¼") | DN 40 (1 ½") | DN 40 (1 ½") | DN 50 (2") |
| | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] | [inch] |
| EN 1092-1 B1, PN 40 | | | 10.43 | 10.43 | 10.43 | 14.17 | 14.17 | 14.37 | 24.02 | 24.02 |
| EN 1092-1 B1, PN 63 | | | 10.43 | | | 14.17 | | | 24.02 | 24.02 |
| EN 1092-1 B1, PN 100 | | | 10.63 | | 10.83 | 14.17 | | 14.17 | 24.02 | 24.02 |
| EN 1092-1 B1, PN 160 | | | 10.63 | | | 14.17 | | | | 24.41 |
| ANSI B16.5, class 150 | | | 10.63 | 10.63 | | 14.17 | | 14.37 | | 24.41 |
| ANSI B16.5, class 300 | | | 10.63 | 10.63 | | 14.17 | | 14.96 | | 24.41 |
| ANSI B16.5, class 600 | | | 10.63 | 11.22 | | 14.17 | | 14.96 | | 24.41 |
| ANSI B16.5, class 900 | | | 11.4 | | | 15.2 | | | | 24.41 |
| ISO 228-1 GH pipe thread | 10.43 | | 10.43 | | | 14.37 | | | | 24.41 |
| ANSI B1.20.1 NPT pipe thread | 10.43 | | 10.63 | | | 14.37 | | | | 24.41 |
| DIN 11851 hygienic screwed[1)] | | 10.43 | 10.43 | | 7.60 | 14.17 | 14.17 | | 24.02 | 24.02 |
| DIN 32676-C hygienic tri-clamp | | | 10.43 | 10.43 | | 14.17 | | 14.17 | | 24.02 |
| DIN 11864-1 aseptic screwed[1)] | | | 10.43 | 10.43 | | 14.17 | | | | 24.02 |
| DIN 11864-2 aseptic flange[1)] | | | 10.43 | 10.43 | | 14.17 | | 10.78 | 24.41 | 24.02 |
| DIN 11864-3 aseptic clamp[1)] | | | 10.43 | | | 14.17 | | | 24.02 | 24.02 |
| ISO 2852 hygienic clamp[1)] | | | | | 10.43 | 14.17 | | 14.17 | 24.02 | 24.02 |
| ISO 2853 hygienic screwed[1)] | | | 10.43 | | | 14.17 | | 14.17 | | 24.02 |
| SMS 1145 hygienic screwed | | | 10.43 | | | 14.17 | | | 24.02 | 24.02 |
| 12-VCO-4 quick connect | | | 11.2 | | | | | | | |
| JIS B2220/10K | | | 10.4 | | | 14.2 | | | 24.4 | 24.0 |
| JIS B2220/20K | | | 10.4 | | | 14.2 | | | 24.4 | 24.0 |
| JIS B2220/40K | | | 10.6 | | | 14.2 | | | 24.4 | 24.0 |
| JIS B2220/63K | | | 10.8 | | | 14.6 | | | | 24.4 |

1) Available with 3A and EHEDG certification.

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## Overview



The complete flowmeter system SITRANS FC consist of a new FCS400 sensor in sizes DN 15 to DN 50 mm and a FCT030 multichannel/multifunctional in compact or remote versions. The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain
- Aerated flow filtering system, for advanced filtering of fluids with gas or air bubbles
- Build in Data logger for all process variables and status messages (FCT030)
- Build in Batch functionality (FCT030)

The SITRANS FC430 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional I/O functions can be freely configured for analog, pulse, frequency, relay or status output, or binary input.

The transmitter comes with a user configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

## Benefits

- It is truely compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Shortest overall length; easy drop-in replacement into most existing installations
- Marine Application: fuel management & consumption; bunkering solutions; boiler control

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## Selection and ordering data

| SITRANS FC430 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT030 transmitter | Article No. 7ME4613- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Sensor size, connector size** | | | | | | | | | | | |
| DN 15, DN 6 (½", ¼") | | 3 | E | | | | | | | | |
| DN 15, DN 10 (½", 3/8") | | 3 | F | | | | | | | | |
| DN 15, DN 15 (½", ½") | | 3 | G | | | | | | | | |
| DN 15, DN 20 (½", ¾") | | 3 | H | | | | | | | | |
| DN 15, DN 25 (½", 1") | | 3 | J | | | | | | | | |
| DN 25, DN 25 (1", 1") | | 3 | L | | | | | | | | |
| DN 25, DN 32 (1", 1¼") | | 3 | M | | | | | | | | |
| DN 25, DN 40 (1", 1½") | | 3 | N | | | | | | | | |
| DN 50, DN 40 (2", 1½") | | 4 | B | | | | | | | | |
| DN 50, DN 50 (2", 2") | | 4 | C | | | | | | | | |
| DN 50, DN 65 (2", 2½") | | 4 | D | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| EN 1092-1 B1, PN 40 | | | | A | 1 | | | | | | |
| EN 1092-1 B1, PN 63 | | | | A | 2 | | | | | | |
| EN 1092-1 B1, PN 100 | | | | A | 3 | | | | | | |
| EN 1092-1 D, PN 40 | | | | A | 5 | | | | | | |
| EN 1092-1 D, PN 63 | | | | A | 6 | | | | | | |
| EN 1092-1 D, PN 100 | | | | A | 7 | | | | | | |
| EN 1092-1 D, PN 160 (max operation pressure 100 bar) | | | | A | 8 | | | | | | |
| ASME B16.5 RF, Class 150 | | | | D | 1 | | | | | | |
| ASME B16.5 RF, Class 300 | | | | D | 2 | | | | | | |
| ASME B16.5 RF, Class 600 | | | | D | 3 | | | | | | |
| ASME B16.5 RF, Class 900 (p- and t-rating as Class 600) | | | | D | 4 | | | | | | |
| ISO 228-1G female pipe thread | | | | E | 1 | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | | E | 3 | | | | | | |
| DIN 11851 hygienic screwed | | | | F | 1 | | | | | | |
| DIN 32676, ASME, Form C (inch) (tri-clamp) | | | | G | 1 | | | | | | |
| DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3 | | | | H | 1 | | | | | | |
| DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3 | | | | H | 2 | | | | | | |
| DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3 | | | | H | 3 | | | | | | |
| ISO 2852 hygienic clamp | | | | J | 1 | | | | | | |
| ISO 2853 hygienic thread | | | | J | 2 | | | | | | |
| SMS 1145 hygienic screwed | | | | K | 1 | | | | | | |
| Quick connect | | | | K | 5 | | | | | | |
| JIS B2220/10K | | | | L | 2 | | | | | | |
| JIS B2220/20K | | | | L | 4 | | | | | | |
| JIS B2220/40K | | | | L | 6 | | | | | | |
| JIS B2220/63K | | | | L | 7 | | | | | | |
| **Wetted parts material** | | | | | | | | | | | |
| AISI 316L/1.4435/1.4404 | | | | | | 1 | | | | | |
| AISI 316L/1.4435/1.4404 (polished; EHEDG; 3A) (in preparation) | | | | | | 2 | | | | | |
| **Calibration/Accuracy class** | | | | | | | | | | | |
| 0.1 % flow, 5 kg/m³ density | | | | | | | | 1 | | | |
| 0.1 % flow, 0.5 kg/m³ density | | | | | | | | 4 | | | |
| Standard fraction (with density 0.5 kg/m³) | | | | | | | | 8 | | | |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | |
| None (replacement sensor) | | | | | | | | | A | | |
| Compact, IP67 fieldmount, aluminum | | | | | | | | | D | | |
| Remote, IP67 fieldmount, aluminum, M12 | | | | | | | | | G | | |
| Remote, IP67 fieldmount, aluminum, T/Box | | | | | | | | | K | | |
| Remote, IP67, wall mount, aluminium | | | | | | | | | U | | |
| **Ex approval (depending on variant)** | | | | | | | | | | | |
| Non-Ex | | | | | | | | | | A | |
| ATEX (zone 1 / zone 21) | | | | | | | | | | C | |
| IECEx (zone 1 / zone 21) | | | | | | | | | | F | |
| US (cCSAus), Div 1 | | | | | | | | | | L | |
| Canada (cCSAus), zone 1 | | | | | | | | | | M | |

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## Selection and ordering data (continued)

| SITRANS FC430 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT030 transmitter | Article No. 7ME4613- | ● ● ● ● ● - ● ● ● ● |
|---|---|---|
| NEPSI | | N |
| INMETRO (in preparation) | | P |
| KCs | | Q |
| EAC Ex | | U |
| **Local User Interface** | | |
| None (replacement sensor, DSL only) | | 0 |
| Blind | | 1 |
| Graphical, 240 × 160 pxl | | 3 |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (replacement sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, nylon, limited to -20 °C/-4 °F | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, nylon, limited to -20 °C/-4 °F | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| None (replacement sensor) | **B10** |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| No output channel | **E00** |
| 4 ... 20 mA HART Active/Passive (non-Ex) | **E02** |
| Ca 4 ... 20 mA HART active (Ex) | **E06** |
| Ca 4 ... 20 mA HART passive (Ex) | **E07** |
| PROFIBUS PA | **E10** |
| PROFIBUS DP (non-Ex) | **E11** |
| Modbus RTU RS 485 | **E14** |
| **I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)** | |
| None | **F00** |
| • Non Ex: Sig O, None, None. Active/passive menu selected | **F01** |
| • Non Ex: Sig O, Sig I/O, None. Active/passive menu selected | **F02** |
| • Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected | **F03** |
| • Non Ex: Sig O, Sig I/O, R. Active/passive menu selected | **F04** |
| • Non Ex: Sig O, R, R. Active/passive menu selected | **F05** |
| • Non Ex: Sig O, R, None. Active/passive menu selected | **F06** |
| • Ex: pSig O, None, None | **F11** |
| • Ex: pSig O, pSig I/O, None | **F12** |
| • Ex: pSig O, pSig I/O, pSig I/O | **F13** |
| • Ex: pSig O, pSig I/O, R | **F14** |
| • Ex: pSig O, R, R | **F15** |
| • Ex: pSig O, R, None | **F16** |
| • Ex: aSig O, None, None | **F21** |
| • Ex: aSig O, aSig I/O, None | **F22** |
| • Ex: aSig O, aSig I/O, aSig I/O | **F23** |
| • Ex: aSig O, aSig I/O, R | **F24** |
| • Ex: aSig O, R, R | **F25** |
| • Ex: aSig O, R, None | **F26** |
| **Notes on I/O configurations:**<br>**a or p suffix:** The I/O module is selected at ordering with either active or passive function.<br>**Signal:** The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.<br>**I:** Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer' (only CH3&4).<br>**R:** Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.<br>The MLFB structure for FC330 systems must be filled to **this level**, including "**-Z**" options A.., B.., E.. and F. | |
| ***Add-on options and accessories***<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Pressure testing certificate CRN | **C01** |
| Pressure testing certificate PED | **C02** |
| Material certificate EN 10204-3.1 (wetted parts) | **C05** |
| Welding inspection certificate | **C07** |
| Factory certificate EN 10204 2.1 | **C10** |
| Factory certificate EN 10204 2.2 | **C11** |
| Cleaned for oil and grease | **C50** |
| **Customer selected calibration** | |
| Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y60** |
| Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y61** |
| Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y69** |
| Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of $Q_{norm}$ | **Y71** |
| Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y72** |
| Multi-point calibration (10 flows × 1 pass) Flow 5 ... 50 % of $Q_{norm}$ | **Y73** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Cable** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L55** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L59** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L63** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L67** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| **Sensor options** | |
| FCS400 marine approval | **S22** |

| | Order code |
|---|---|
| **SD-Card accessibility via USB** (not allowed in USA by Patent) | |
| Mass storage enabled | **S30** |
| **Region-specific approvals and certificates** | |
| South Korea (KCC) | **W28** |
| **Additional data** Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

### *Operating instructions for SITRANS FC430*

| Description | Article No. |
|---|---|
| English | |
| • for firmware V 4.0 and onwards | **A5E39789392** |
| German | |
| • for firmware V 4.0 and onwards | **TBD** |

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

### *Heating jacket for FCS400*

| Description | Article No. | |
|---|---|---|
| Heating jacket, indoor use, 0 ... 200 °C (32 ...392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to included controller | |  |
| • 230 V AC | | |
| - DN 15 electric | **A5E33035287** | |
| - DN 25 electric | **A5E33035324** | |
| - DN 50 electric | **A5E33035325** | |
| • 115 V AC | |  |
| - DN 15 electric | **A5E32877520** | |
| - DN 25 electric | **A5E32877556** | |
| - DN 50 electric | **A5E32877557** | |
| Heating jacket controller, IP65. Digital display for 0 ... 200 °C (32 ...392 °F) control setpoint | |  |
| • 230 V AC | **A5E03839193** | |
| • 115 V AC | **A5E03839194** | |

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## Technical specifications

| SITRANS FC430 | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2") |
| **Accuracy** | ± 0.10 % |
| **Repeatability** | ± 0.05 % |
| **Flow range (liquids)**<br>$Q_{nom}$ (water @ 1 bar pressure loss) | |
| • DN 15 (½") | 3 700 kg/h (8 157 lb/h) |
| • DN 25 (1") | 11 500 kg/h (25 353 lb/h) |
| • DN 50 (2") | 52 000 kg/h (114 640 lb/h) |
| **Architecture** | Compact or remote configuration |
| **Display** | Full graphical display, 240 × 160 pixels with selection of 6 languages |
| **Power supply** | 20 ... 90 V DC ± 10 %;<br>100 ... 240 V AC ± 10 %,<br>47 ... 63 Hz ± 10 % |
| **Materials** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel |
| - Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | IP67[1)] |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | 100 bar (1 450 psi) |
| - Sensore enclosure | 20 bar (DN 15, DN 25)<br>17 bar (DN 50) |
| • Sensor enclosure burst pressure | >160 bar (depending on size) |
| **Temperature ratings** | |
| • Process medium | |
| - DN 15 ... DN 50 | -50 ... +200 °C (-58 ... +392 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F)[1)] |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 D,<br>ANSI/ASME B16.5, JIS B 2220, DIN 11864-2 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect |
| • Hygienic threads | DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145 |
| • Hygienic clamps | DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852 |
| **Approvals** | |
| • Hazardous area | ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs |
| • Pressure equipment | PED, CRN |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | Up to 4 channels combining ana- log, relay or digital outputs and binary input |
| **Communication** | • HART<br>• PROFIBUS PA<br>• PROFIBUS DP<br>• Modbus RTU (RS 485) |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class A) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 400 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

## Technical specifications (continued)

1) If operating outdoors, avoid direct sunlight, paritcularly in warm climatic regions.

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## Overview



The compact flowmeter SITRANS FC410 is available in sizes DN 15, DN 25 and DN 50 for standard and hygienic applications.

Intended for integration into OEM skids, machines or pre-assembled plant systems. The sensor design is the marked leader in compact design which makes it easy to integrate in the compact skids. The flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Markeds most compact sensor design
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

With all global marine approvals the FC410 is ideal for integration in ship fuel efficiency and environmental measurement systems. The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FC410 is available with Modbus RTU (RS 485) multi-drop serial communication.The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates. The SITRANS FC410 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT010 transmitter always compact mounted.

## Benefits

- It is truely compact and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Shortest overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up
- Modbus RS 485 RTU allows simple and easy integration with all Modbus masters with fast update rate of process values

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## Selection and ordering data

| SITRANS FC410 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT010 transmitter | Article No. 7ME4611- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Sensor size, connector size** | | | | | | | | | | | |
| DN 15, DN 6 (½", ¼") | | 3 | E | | | | | | | | |
| DN 15, DN 10 (½", 3/8") | | 3 | F | | | | | | | | |
| DN 15, DN 15 (½", ½") | | 3 | G | | | | | | | | |
| DN 15, DN 20 (½", ¾") | | 3 | H | | | | | | | | |
| DN 15, DN 25 (½", 1") | | 3 | J | | | | | | | | |
| DN 25, DN 25 (1", 1") | | 3 | L | | | | | | | | |
| DN 25, DN 32 (1", 1¼") | | 3 | M | | | | | | | | |
| DN 25, DN 40 (1", 1½") | | 3 | N | | | | | | | | |
| DN 50, DN 40 (2", 1½") | | 4 | B | | | | | | | | |
| DN 50, DN 50 (2", 2") | | 4 | C | | | | | | | | |
| DN 50, DN 65 (2", 2½") | | 4 | D | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| EN 1092-1 B1, PN 40 | | | | A | 1 | | | | | | |
| EN 1092-1 B1, PN 63 | | | | A | 2 | | | | | | |
| EN 1092-1 B1, PN 100 | | | | A | 3 | | | | | | |
| EN 1092-1 D, PN 40 | | | | A | 5 | | | | | | |
| EN 1092-1 D, PN 63 | | | | A | 6 | | | | | | |
| EN 1092-1 D, PN 100 | | | | A | 7 | | | | | | |
| EN 1092-1 D, PN 160 (max operation pressure 100 bar) | | | | A | 8 | | | | | | |
| ASME B16.5 RF, Class 150 | | | | D | 1 | | | | | | |
| ASME B16.5 RF, Class 300 | | | | D | 2 | | | | | | |
| ASME B16.5 RF, Class 600 | | | | D | 3 | | | | | | |
| ASME B16.5 RF, Class 900 (p- and t-rating as Class 600) | | | | D | 4 | | | | | | |
| ISO 228-1G female pipe thread | | | | E | 1 | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | | E | 3 | | | | | | |
| DIN 11851 hygienic screwed | | | | F | 1 | | | | | | |
| DIN 32676, ASME, Form C (inch) (tri-clamp) | | | | G | 1 | | | | | | |
| DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3 | | | | H | 1 | | | | | | |
| DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3 | | | | H | 2 | | | | | | |
| DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3 | | | | H | 3 | | | | | | |
| ISO 2852 hygienic clamp | | | | J | 1 | | | | | | |
| ISO 2853 hygienic thread | | | | J | 2 | | | | | | |
| SMS 1145 hygienic screwed | | | | K | 1 | | | | | | |
| Quick connect | | | | K | 5 | | | | | | |
| JIS B2220/10K | | | | L | 2 | | | | | | |
| JIS B2220/20K | | | | L | 4 | | | | | | |
| JIS B2220/40K | | | | L | 6 | | | | | | |
| JIS B2220/63K | | | | L | 7 | | | | | | |
| **Wetted parts material** | | | | | | | | | | | |
| AISI 316L/1.4435/1.4404 | | | | | | 1 | | | | | |
| **Calibration/Accuracy class** | | | | | | | | | | | |
| 0.1 % flow, 5 kg/m³ density | | | | | | | | 1 | | | |
| 0.1 % flow, 0.5 kg/m³ density | | | | | | | | 4 | | | |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | |
| None (replacement sensor) | | | | | | | | | A | | |
| Compact, IP67 fieldmount, aluminum | | | | | | | | | D | | |
| **Ex approval (depending on variant)** | | | | | | | | | | | |
| Non-Ex | | | | | | | | | | A | |
| ATEX (zone 1 / zone 21) | | | | | | | | | | C | |
| IECEx (zone 1 / zone 21) | | | | | | | | | | F | |
| US (cCSAus), Div 1 | | | | | | | | | | L | |
| Canada (cCSAus), zone 1 | | | | | | | | | | M | |
| NEPSI | | | | | | | | | | N | |
| INMETRO (in preparation) | | | | | | | | | | P | |
| KCs | | | | | | | | | | Q | |
| EAC Ex | | | | | | | | | | U | |

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## Selection and ordering data (continued)

| SITRANS FC410 digital coriolis flowmeter with SITRANS FCS400 standard flow sensor compact or remote mounting with FCT010 transmitter | Article No. 7ME4611- | ● ● ● ● ● - ● ● ● ● |
|---|---|---|
| **Local User Interface** | | |
| Blind | | 1 |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (replacement sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| Modbus RTU RS 485 | **E14** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Add-on options and accessories**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Pressure testing certificate CRN | **C01** |
| Pressure testing certificate PED | **C02** |
| Material certificate EN 10204-3.1 (wetted parts) | **C05** |
| Welding inspection certificate | **C07** |
| Factory certificate EN 10204 2.1 | **C10** |
| Factory certificate EN 10204 2.2 | **C11** |
| Cleaned for oil and grease | **C50** |
| **Customer selected calibration** | |
| Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y60** |
| Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y61** |
| Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y69** |
| Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of $Q_{norm}$ | **Y71** |
| Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y72** |
| Multi-point calibration (10 flows × 1 pass) Flow 5 ... 50 % of $Q_{norm}$ | **Y73** |
| **Cable** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L53** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L55** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L57** |
| 25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L59** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L61** |
| 50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L63** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L65** |
| 75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L67** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L69** |
| **Sensor options** | |
| FCS400 marine approval | **S22** |
| **Region-specific approvals and certificates** | |
| South Korea (KCC) | **W28** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

### *Operating instructions for SITRANS FC410*

| Description | Article No. |
|---|---|
| English | |
| • for firmware V 4.0 and onwards | **A5E39789214** |
| German | |
| • for firmware V 4.0 and onwards | **TBD** |

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## Technical specifications

| SITRANS FC410 | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2") |
| **Accuracy** | ± 0.10 % |
| **Repeatability** | ± 0.05 % |
| **Flow range (liquids)**<br>$Q_{nom}$ (water @ 1 bar pressure loss) | |
| • DN 15 (½") | 3 700 kg/h (8 157 lb/h) |
| • DN 25 (1") | 11 500 kg/h (25 353 lb/h) |
| • DN 50 (2") | 52 000 kg/h (114 640 lb/h) |
| **Architecture** | Compact configuration |
| **Display** | Full graphical display, 240 × 160 pixels with selection of 6 languages |
| **Power supply** | 12 ... 27 V DC; 1.1 W |
| **Materials** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel |
| - Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | IP67 |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | 100 bar (1 450 psi) |
| - Sensore enclosure | 20 bar (DN 15, DN 25)<br>17 bar (DN 50) |
| • Sensor enclosure burst pressure | >160 bar (depending on size) |
| **Temperature ratings** | |
| • Process medium | |
| - DN 15 ... DN 50 | -50 ... +200 °C (-58 ... +392 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F)[1)] |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect |
| • Hygienic threads | DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145 |
| • Hygienic clamps | DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852 |
| **Approvals** | |
| • Hazardous area | ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs |
| • Pressure equipment | PED, CRN |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | Up to 4 channels combining ana- log, relay or digital outputs and binary input |
| **Communication** | Modbus RTU (RS 485) |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class A) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 400 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

1) If operating outdoors, avoid direct sunlight, paritcularly in warm climatic regions.

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## Overview






Full integration in the Siemens SIMATIC systems PCS7 or in TIA portal with FCT070 Faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets. The complete flowmeter system consists of a SITRANS FCS400 sensor and a Simatic ET200 SP Coriolis module FCT070 transmitter.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the FSC400 sensor can be placed in Ex Zone 1/21 or Class1 Div 1 locations . Together with the Sitrans I300 power/barrier module the FCT070 transmitter can be place in Zone 2 or Div 2 areas.

## Benefits

- FCS400 sensor in sizes from DN 15 to DN 50 mm in a large verity of process connections and wetted materials
- Markeds most compact sensor design
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can combined with all other SIMATIC ET200 ST & HF modules
- The FCT070 has all high-end transmitter functionality integrated including the advanged fraction tables on bord
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced Two-stage batch controller functionality without additional modules. I/Os are onboard

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## Selection and ordering data

| SITRANS FCS400 standard flow sensor for integration with FCT070 transmitter | Article No. 7ME4617- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Sensor size, connector size** | | | | | | | | | | | |
| DN 15, DN 6 (½", ¼") | | 3 | E | | | | | | | | |
| DN 15, DN 10 (½", 3/8") | | 3 | F | | | | | | | | |
| DN 15, DN 15 (½", ½") | | 3 | G | | | | | | | | |
| DN 15, DN 20 (½", ¾") | | 3 | H | | | | | | | | |
| DN 15, DN 25 (½", 1") | | 3 | J | | | | | | | | |
| DN 25, DN 25 (1", 1") | | 3 | L | | | | | | | | |
| DN 25, DN 32 (1", 1¼") | | 3 | M | | | | | | | | |
| DN 25, DN 40 (1", 1½") | | 3 | N | | | | | | | | |
| DN 50, DN 40 (2", 1½") | | 4 | B | | | | | | | | |
| DN 50, DN 50 (2", 2") | | 4 | C | | | | | | | | |
| DN 50, DN 65 (2", 2½") | | 4 | D | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| EN 1092-1 B1, PN 40 | | | | A | 1 | | | | | | |
| EN 1092-1 B1, PN 63 | | | | A | 2 | | | | | | |
| EN 1092-1 B1, PN 100 | | | | A | 3 | | | | | | |
| EN 1092-1 D, PN 40 | | | | A | 5 | | | | | | |
| EN 1092-1 D, PN 63 | | | | A | 6 | | | | | | |
| EN 1092-1 D, PN 100 | | | | A | 7 | | | | | | |
| EN 1092-1 D, PN 160 (max operation pressure 100 bar) | | | | A | 8 | | | | | | |
| ASME B16.5 RF, class 150 | | | | D | 1 | | | | | | |
| ASME B16.5 RF, class 300 | | | | D | 2 | | | | | | |
| ASME B16.5 RF, class 600 | | | | D | 3 | | | | | | |
| ASME B16.5 RF, class 900 (p- and t-rating as class 600) | | | | D | 4 | | | | | | |
| ISO 228-1G female pipe thread | | | | E | 1 | | | | | | |
| ASME B1.20.1 NPT female pipe thread | | | | E | 3 | | | | | | |
| DIN 11851 hygienic screwed | | | | F | 1 | | | | | | |
| DIN 32676, ASME, Form C (inch) (tri-clamp) | | | | G | 1 | | | | | | |
| DIN 11864-1 GS Form A Row A, Form A = O-ring type hygienic, aseptic thread connector, hygienic class H3 | | | | H | 1 | | | | | | |
| DIN 11864-2 BF Form A Row A, Form A = O-ring type hygienic, aseptic flange connector, hygienic class H3 | | | | H | 2 | | | | | | |
| DIN 11864-3 BKS Form A Row A, Form A = O-ring type hygienic, aseptic clamp connector, hygienic class H3 | | | | H | 3 | | | | | | |
| ISO 2852 hygienic clamp | | | | J | 1 | | | | | | |
| ISO 2853 hygienic thread | | | | J | 2 | | | | | | |
| SMS 1145 hygienic screwed | | | | K | 1 | | | | | | |
| Quick connect | | | | K | 5 | | | | | | |
| JIS B2220/10K | | | | L | 2 | | | | | | |
| JIS B2220/20K | | | | L | 4 | | | | | | |
| JIS B2220/40K | | | | L | 6 | | | | | | |
| JIS B2220/63K | | | | L | 7 | | | | | | |
| **Wetted parts material** | | | | | | | | | | | |
| AISI 316L/1.4435/1.4404 | | | | | | 1 | | | | | |
| **Calibration/Accuracy class** | | | | | | | | | | | |
| 0.1 % flow, 5 kg/m³ density | | | | | | | | 1 | | | |
| 0.1 % flow, 0.5 kg/m³ density | | | | | | | | 4 | | | |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | |
| Compact, IP67 fieldmount, aluminum | | | | | | | | | D | | |
| **Ex approval (depending on variant)** | | | | | | | | | | | |
| Non-Ex | | | | | | | | | | A | |
| ATEX (zone 1 / zone 21) | | | | | | | | | | C | |
| IECEx (zone 1 / zone 21) | | | | | | | | | | F | |
| US (cCSAus), Div 1 | | | | | | | | | | L | |
| Canada (cCSAus), zone 1 | | | | | | | | | | M | |
| NEPSI | | | | | | | | | | N | |
| INMETRO (in preparation) | | | | | | | | | | P | |
| KCs | | | | | | | | | | Q | |
| EAC Ex | | | | | | | | | | U | |
| **Local User Interface** | | | | | | | | | | | |
| Blind | | | | | | | | | | | 1 |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Metric thread with M12 socket fitted | **A20** |
| **Sofware functions and CT approvals** | |
| Standard software DSL | **B10** |
| **I/O configuration Ch1** | |
| No output channel (integration of FCT070) | **E00** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Add-on options and accessories**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Certificates** | |
| Pressure testing certificate CRN | **C01** |
| Pressure testing certificate PED | **C02** |
| Material certificate EN 10204-3.1 (wetted parts) | **C05** |
| Welding inspection certificate | **C07** |
| Factory certificate EN 10204 2.1 | **C10** |
| Factory certificate EN 10204 2.2 | **C11** |
| Cleaned for oil and grease | **C50** |
| **Customer selected calibration** | |
| Multi-point (5 flows × 2 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y60** |
| Multi-point (10 flows × 1 pass) Flow 10 ... 100 % of $Q_{norm}$ | **Y61** |
| Multi-point calibration (5 flows × 2 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y69** |
| Multi-point calibration (5 flows × 2 pass) Flow 5 ... 50 % of $Q_{norm}$ | **Y71** |
| Multi-point calibration (10 flows × 1 pass) Flow 2 ... 20 % of $Q_{norm}$ | **Y72** |
| Multi-point calibration (10 flows × 1 pass) Flow 5 – 50 % of $Q_{norm}$ | **Y73** |
| **Cable** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L53** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L57** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L61** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L65** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pc M12 plugs mounted | **L69** |
| **Region-specific approvals and certificates** | |
| South Korea (KCC) | **W28** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

| Description | Article No. | |
|---|---|---|
| **SITRANS FCT070 – Transmitter for ET 200SP** | **7ME4138-6AA00-0BB1** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP | 6ES7193-6BP20-0BB0<br>6ES7193-6BP20-0BB1 |  |
| SITRANS I300 – Isolating power supply – Ex barrier | A5E39832532 |  |

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## Technical specifications

| SITRANS FCS400 with FCT070 transmitter | |
|---|---|
| **Sizes** | DN 15 (½")<br>DN 25 (1")<br>DN 50 (2") |
| **Accuracy** | ± 0.10 % |
| **Repeatability** | ± 0.05 % |
| **Flow range (liquids)**<br>$Q_{nom}$ (water @ 1 bar pressure loss) | |
| • DN 15 (½") | 3 700 kg/h (8 157 lb/h) |
| • DN 25 (1") | 11 500 kg/h (25 353 lb/h) |
| • DN 50 (2") | 52 000 kg/h (114 640 lb/h) |
| **Measurement of** | Mass flow, volume flow, density, temperature<br>Fraction A flow, fraction A %<br>Fraction B flow, fraction B % |
| **Architecture** | Remote configuration |
| **System integration** | ET200 SP ST & HF; PCS7 and TIA portal with faceplates |
| **Power supply** | 24 V DC, 19.2 ... 28.8 V |
| **Materials** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel |
| - Enclosure | 304 stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating class C4 |
| **Enclosure rating** | IP67 |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | 100 bar (1 450 psi) |
| - Sensore enclosure | 20 bar (DN 15, DN 25)<br>17 bar (DN 50) |
| • Sensor enclosure burst pressure | >160 bar (depending on size) |
| **Temperature ratings** | |
| • Process medium | |
| - DN 15 ... DN 50 | -50 ... +200 °C (-58 ... +392 °F) |
| • Ambient | -40 ... +60 °C (-40 ... +140 °F)[1] |
| **Process connections** | |
| • Flanges | EN 1092-1 B1, EN 1092-1 D,<br>ANSI/ASME B16.5, JIS B 2220, DIN 11864-2 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228-1 G (BSPP), VCO Quick-connect |
| • Hygienic threads | DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145 |
| • Hygienic clamps | DIN 11864-3A, DIN 32676-C Tri-clamp, ISO 2852 |
| **Approvals** | |
| • Hazardous area | FCS400 sensor: ATEX, IECEx, EAC Ex, NEPSI, CSA, cCSA us, KCs<br>FCT070: Zone 2 & Class1 Div 2 |
| • Pressure equipment | PED, CRN |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O (FCT070)** | 2 digital Input and 2 digital output |
| **Totalizer (FCT070)** | 3 totalizer |
| **Communication (FCT070)** | Integrated PROFINET for SIMATIC integration and other PROFINET Controllers |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class A) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 400 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

[1] If operating outdoors, avoid direct sunlight, paritcularly in warm climatic regions.

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## Overview

MASS 2100 DI 1.5 to DI 15 and the FC300 DN4 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor is designed with a single bended tube in corrosion resistant stainless steel AISI316L or Hastelloy C22 and a solid stainless steel fully welded enclosure to protect the measuring tubes from any harsh environments. For hazardous area applications the MASS 2100 / FC300 DN4 sensor comes in a number of common hazardous area approved variants like ATEX, IECEx, cCSAus, EAC, and NEPSI.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy and delivers true multi-parameter measurements i.e.: mass flow, volume flow, density, temperature and fraction.

With the large variety of process connections and the ability for high pressure solutions up to 1 000 bar, the compact single tube design is especially suitable for high end applications in all industry segments e.g. Automotive, Painting, Chemical, Oil & Gas and F&B. Accurate dosing and mixing down to drops are widely used applications.

| The main applications for the MASS 2100 / FC300 DN 4 sensor can be found in: | |
|---|---|
| **Chemical industry** | Liquid and gas measurement within Miniplant and R&D, dosing of additives and catalysts |
| **Cosmetic industry** | Dosing of essence and fragrances |
| **Pharmaceutical industry** | High-speed dosing and coating of pills, filling of ampuls/injectors |
| **Food and beverage industry** | Dosing of flavourings, colours and additives, density measurement, in-line; Measurement of liquid or gaseous CO2 |
| **Automotive industry** | Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds |

## Integration

The SITRANS MASS 2100/FC300 DN4 sensor are suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be ordered with hazardous certification to Zone 1 (ATEX, IECEx, cCSAus, EAC Ex, NEPSI).

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site www.siemens.com

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

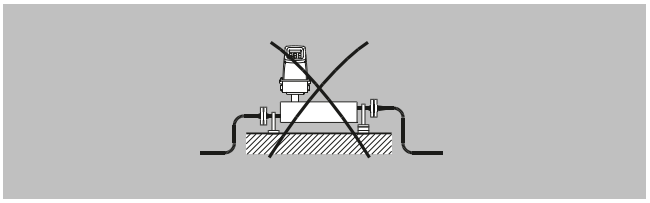
***Installation guidelines MASS 2100 DI 3 ... DI 15 (1/8" ... ½")***

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

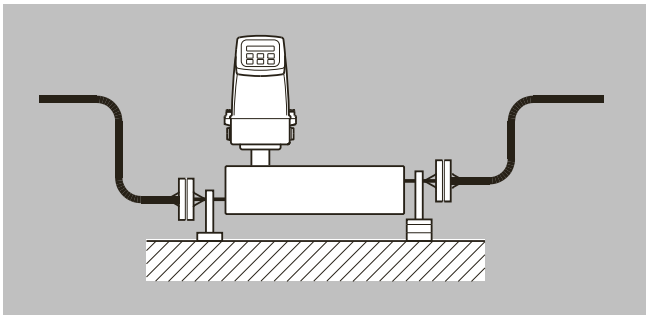
If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

Horizontal:

***Liquid***



Liquid: example of not recommended horizontal installation



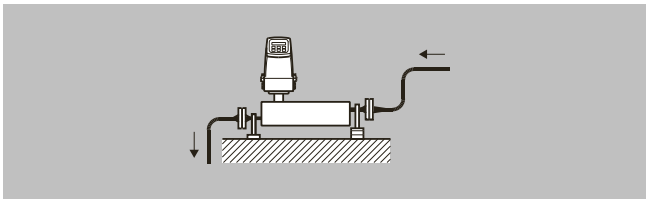
Liquid: example of recommended horizontal installation

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## Integration (continued)

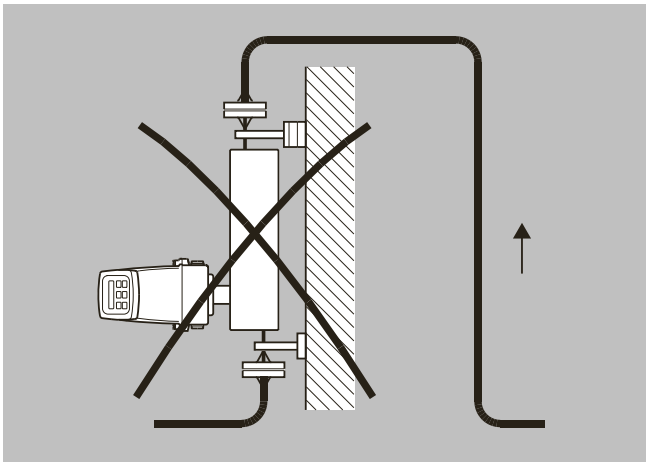
***Gas***



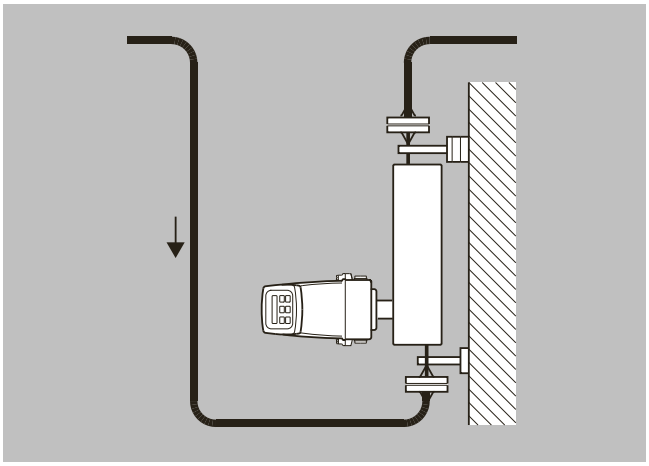
Gas: example of recommended horizontal installation

Vertical:

***Liquid***



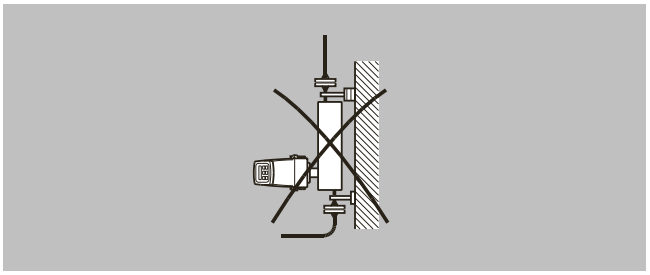
Liquid: example of not recommended vertical installation



Liquid: example of recommended vertical installation

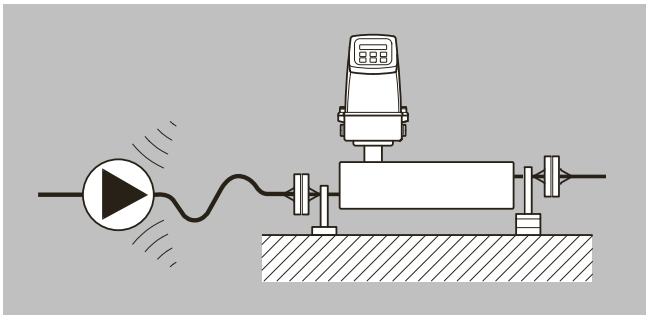
## Integration (continued)

***Gas***



Gas: example of not recommended vertical installation

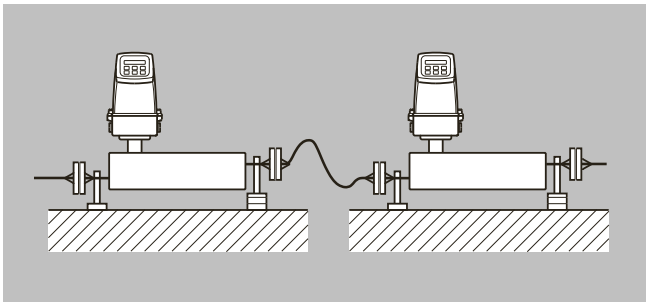
Vibration



Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping. Avoid vibration. If necessary use flexible pipes.

Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.



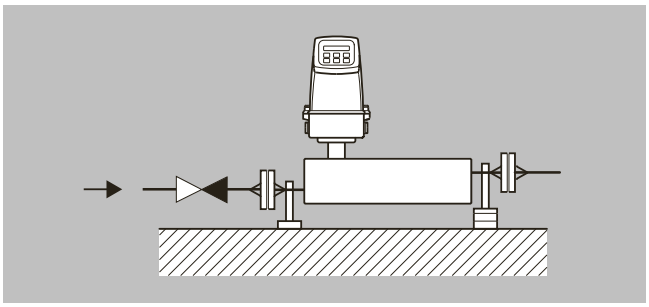
Zero point adjustment

To facilitate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuracy.

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## Integration (continued)



***Installation guidelines MASS 2100 DI 1.5 (1/16")***

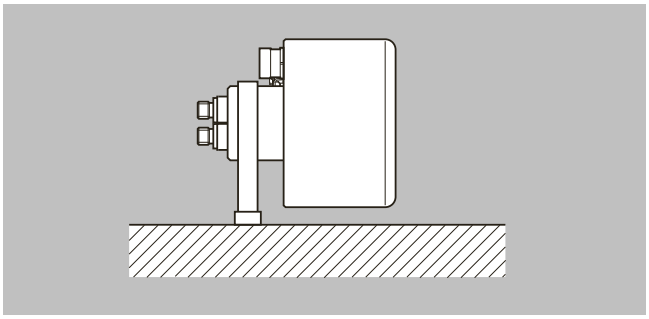
- The optimal installation is horizontal.

  If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.

  If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).

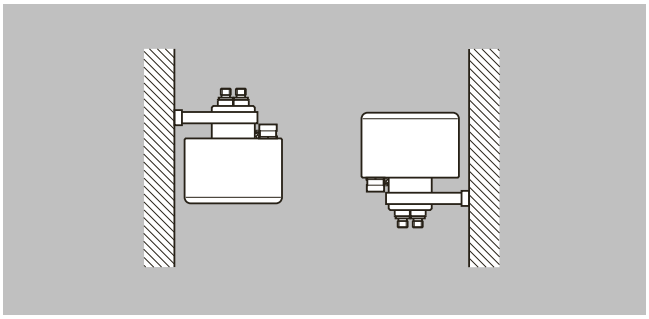
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an under-pressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal



Liquid and gas application

Vertical



Liquid application (left), gas application (right)

## Integration (continued)

***Installation guidelines for SITRANS FC300 sensor***

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

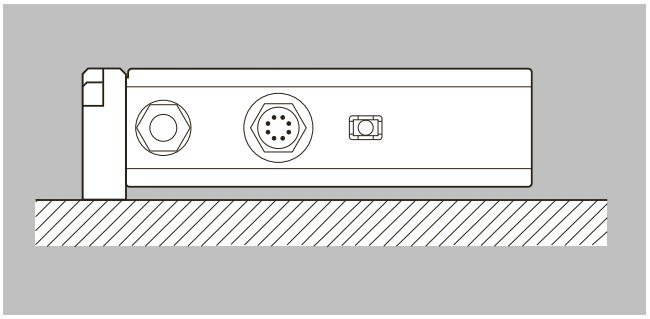
Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.

For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

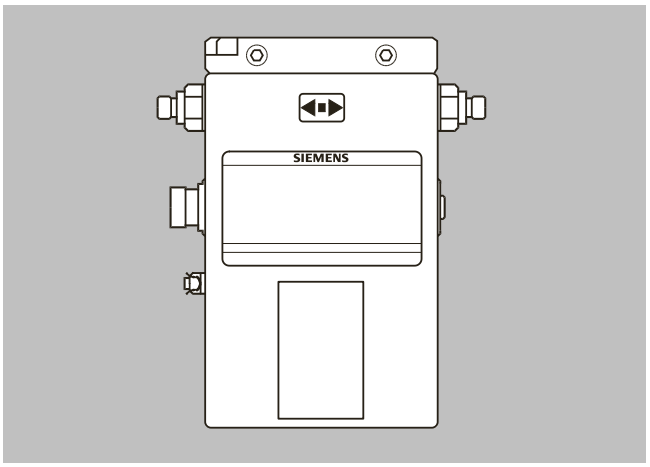
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi)
- Mount the sensor on a vibration-free and plane wall or steel frame
- Locate the sensor low in the system in order to avoid under-pressure in the sensor separating air/gas in the liquid
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur

Horizontal mounting (recommended)



Liquid or gas (low to high flow)

Vertical mounting




Liquid or gas (medium to high flow)

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## Technical specifications

| Versions dimensions | DI 1.5 (1/16) | DI 3 (1/8) | DI 6 (¼) | DI 15 (5/8) | FC300 DN 4 |
|---|---|---|---|---|---|
| **Inside pipe diameter [mm (inch)]**<br>Sensor consists of one continuous pipe | 1.5 (0.06) | 3.0 (0.12) | 6.0 (0.24) | 14.0 (0.55) | SS: 3.5 (0.14)<br>Hast. 3.0 (0.12) |
| **Pipe wall thickness [mm (inch)]** | 0.25 (0.01) | 0.5 (0.02) | 1.0 (0.04) | 1.0 (0.04) | SS: 0.25 (0.0098)<br>Hast. 0.5 (0.0196) |
| **Mass flow measuring range (liquids) [kg/h (lb/h)]** | 0 ... 30 (0 ... 66) | 0 ... 250 (0 ... 550) | 0 ... 1 000 (0 ... 2 200) | 0 ... 5 600<br>(0 ... 12 345) | 0 ... 350 (0 ... 772) |
| **Density (for liquids) [g/cm³ (lb/inch³)]** | 0 ... 2.9 (0 ... 0.10) | 0 ... 2.9 (0 ... 0.10) | 0 ... 2.9 (0 ... 0.10) | 0 ... 2.9 (0 ... 0.10) | 0 ... 2.9 (0 ... 0.10) |
| **Fraction e.g. [°Brix]** | 0 ... 100 | 0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F)) | 0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F)) | 0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F)) | 0 ... 100 |
| **Temperature** | | | | | |
| Media temperature | -50 ... +180 °C (-58 ... +356 °F) | -50 ... +180 °C (-58 ... +356 °F) | -50 ... +180 °C (-58 ... +356 °F) | -50 ... +180 °C (-58 ... +356 °F) | -40 ... 115 (40 ... 239)<br>-40 ... 180 (40 ... 356) |
| Ambient temperature | -20 ... +50 °C (-4 ... +122 °F) | -20 ... +50 °C (-4 ... +122 °F) | -20 ... +50 °C (-4 ... +122 °F) | -20 ... +50 °C (-4 ... +122 °F) | -20 ... +50 °C (-4 ... +122 °F) |
| **Liquid pressure measuring pipe**[1] | | | | | |
| Stainless steel [bar (psi)] | 230 (3 336) | 230 (3 336) | 265 (3 844) | 130 (1 885) | 130 (1 885) |
| Hastelloy C22/2.4602 [bar (psi)] | 365 (5 294) | 350 (5 076) | 410 (5 946) | 200 (2 900) | 410 (5 945) |
| **Materials** | | | | | |
| Measuring pipe, flange and thread connection | Stainless steel AISI 316L/1.4435<br>Hastelloy C22/2.4602 | | | | |
| **Enclosure and enclosure material** | IP67 (NEMA 4) and stainless steel AISI 326L/1.4404<br>**The housing is not rated for pressure containment** | | | | |
| **Process connections**[2] | | | | | |
| Flange | | | | | |
| • DIN 1092-1, PN 40 | | | DN 10 | DN 15 | |
| • ANSI B16.5, Class 150 | | | ½" | ½" | |
| • ANSI B16.5, Class 600 (Class 300) | | | ½" | ½" | |
| Dairy (screwed connection, PN 16/25/40)[3] | | | | | |
| • DIN 11851 | | | DN 10 | DN 15 | |
| • ISO 2853/BS 4825 part 4 (SS3351) | | | 25 mm | 25 mm | |
| Dairy clamp connection (PN 16)[3] | | | | | |
| • ISO 2853/BS 4825 part 3 (SS3016) | | | 25 mm | 25 mm | |
| Thread | | | | | |
| • ISO 228/1, PN 100 | G¼" male | G¼" female | G¼" male | G½" male | G¼" male |
| • ANSI/ASME B1.20.1, PN 100 | ¼" NPT male | ¼" NPT female | ¼" NPT male | ½" NPT male | ¼" NPT male |
| **Ex-version (sensor)** | | | | | |
| • ATEX, IECEX, EAC Ex | Zone 0: Ex ia IIC T3...T6 Ga | | | | |
| • UL (c-UL-us) | Class I, Div. 1: Grp. A, B, C, D | | | | |
| • cCSAus | Class 1 Div 1 or Class 1 Zone1 | | | | |

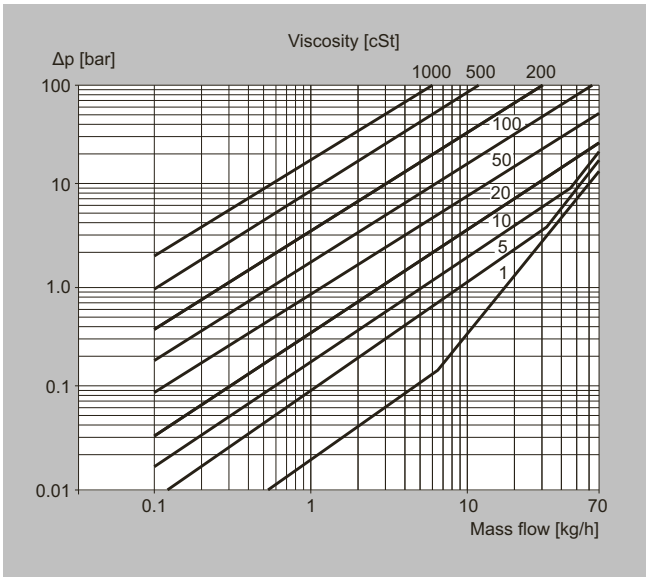
1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457
2) Other connections to order, see "Selection and Ordering data"
3) Material, AISI 316/1.4401 or corresponding
For accuracy specification see "System information SITRANS FC".

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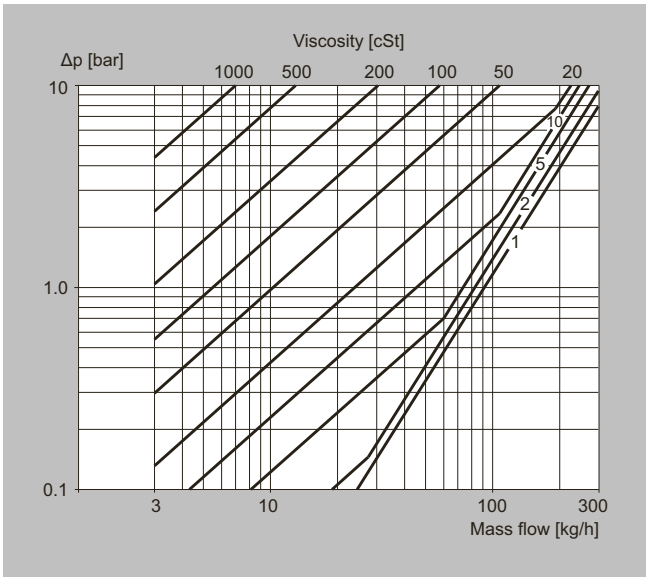


## Technical specifications (continued)

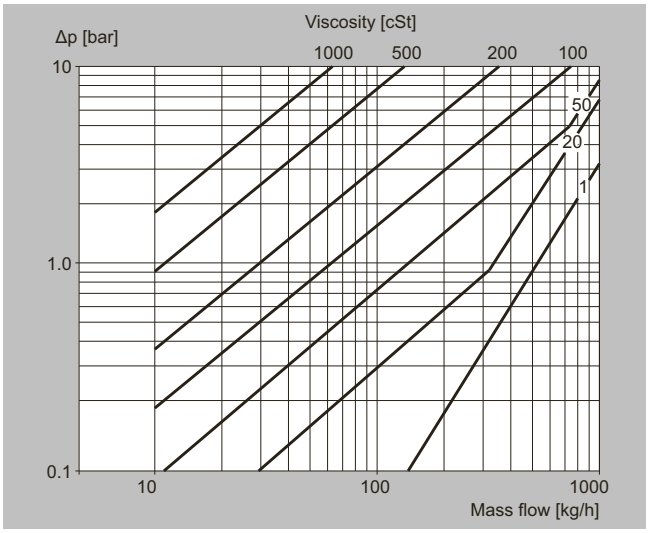
***Pressure drop MASS 2100***



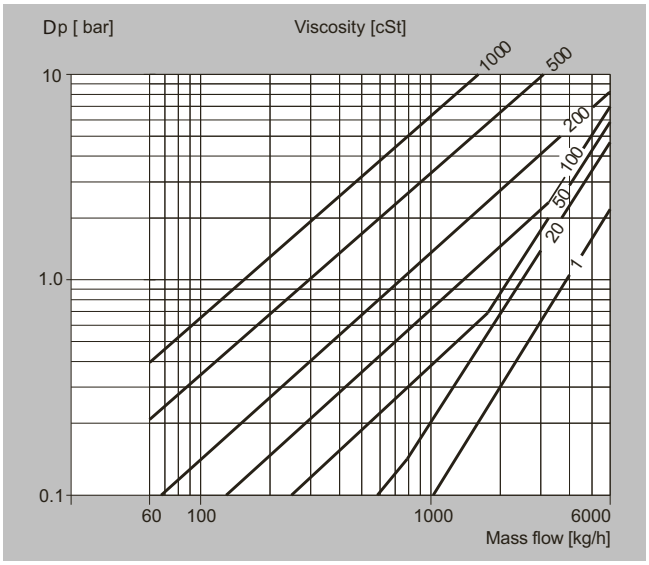

MASS 2100 DI 1.5 (1/16"), pressure drop for density = 1 000 kg/m³




MASS 2100 DI 3 (1/8"), pressure drop for density = 1 000 kg/m³

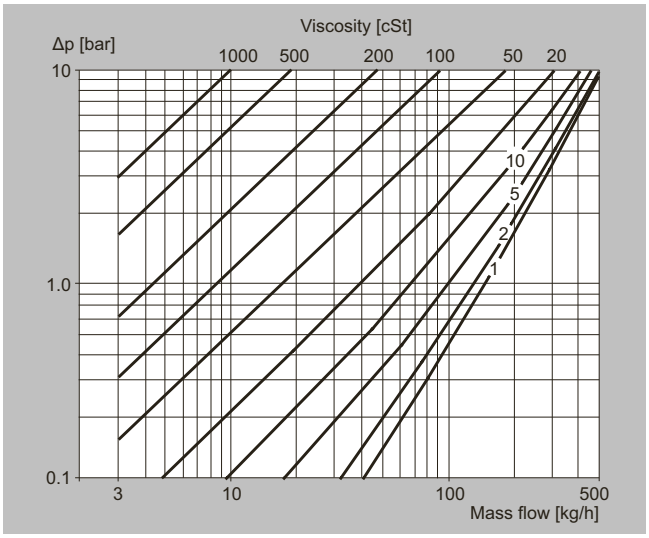



MASS 2100 DI 6 (¼"), pressure drop for density = 1 000 kg/m³




MASS 2100 DI 15 (½"), pressure drop for density = 101 500 kg/m3

***Pressure drop FC300 DN4***

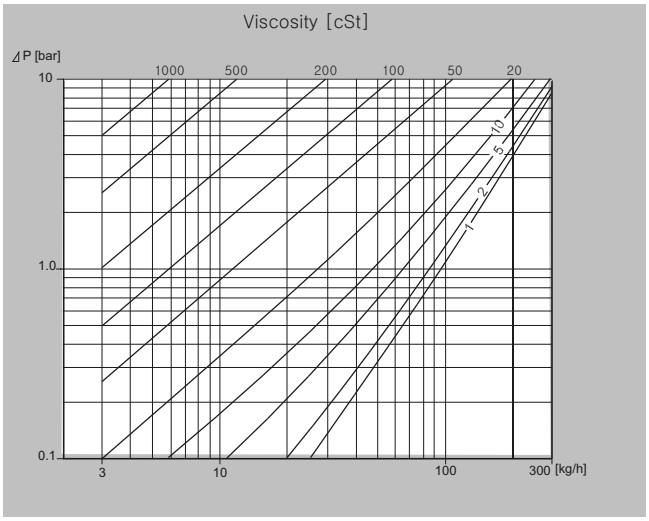



Stainless steel 316L/1.4404

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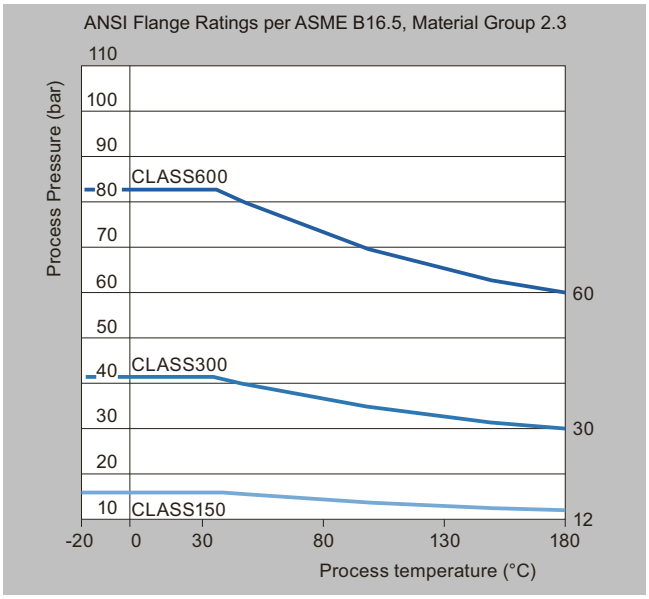


## Technical specifications (continued)

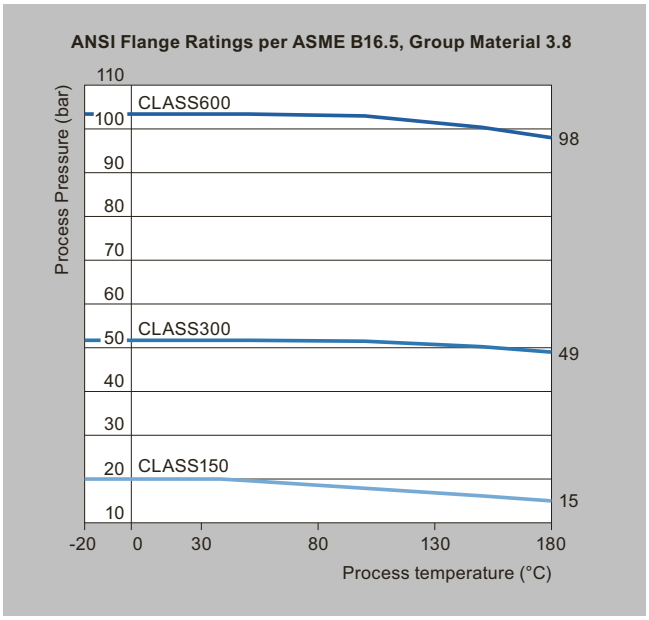



SITRANS FC300 DN 4, pressure loss, viscosity and flow rate for Hastelloy C22 / 2.4602

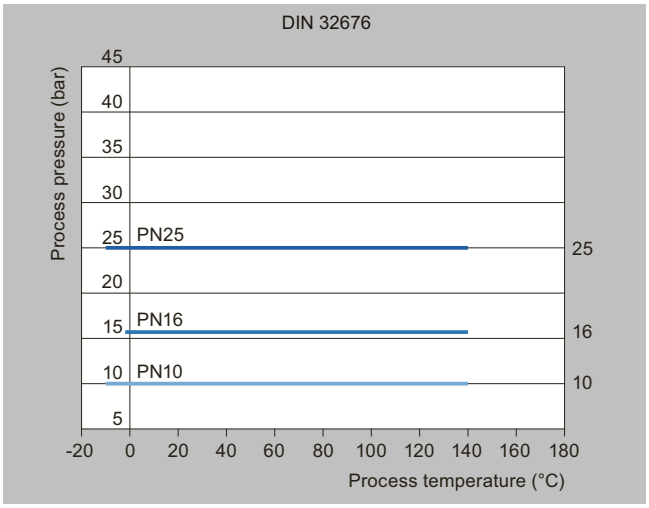
***Pressure/temperature curves MASS 2100 DI 3 ... 15***




ASME flanges B16.5 stainless steel




ASME flanges B16.5 Hastelloy C22/2.4602

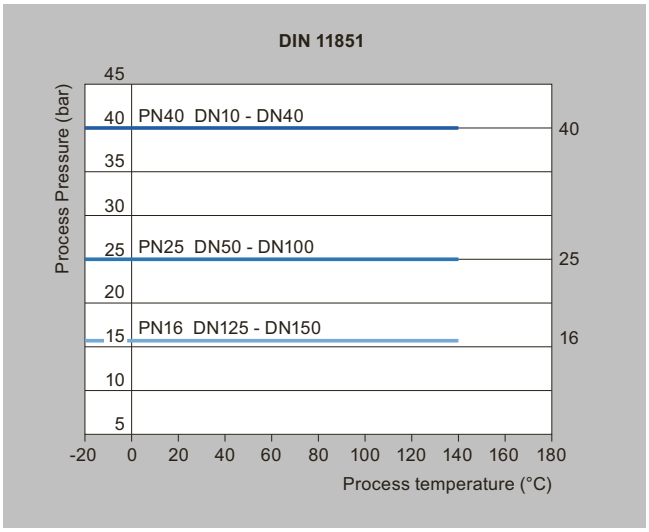



DIN 32676 flanges stainless steel (PN 10 ... PN 25)

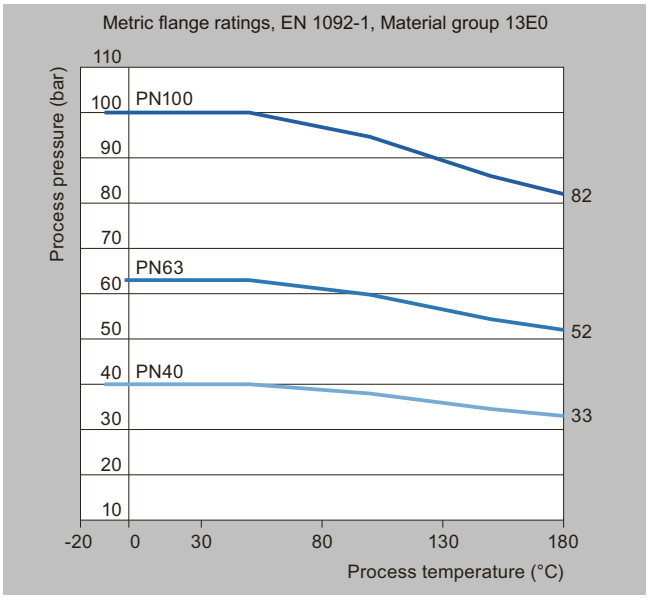
© Siemens AG 2024



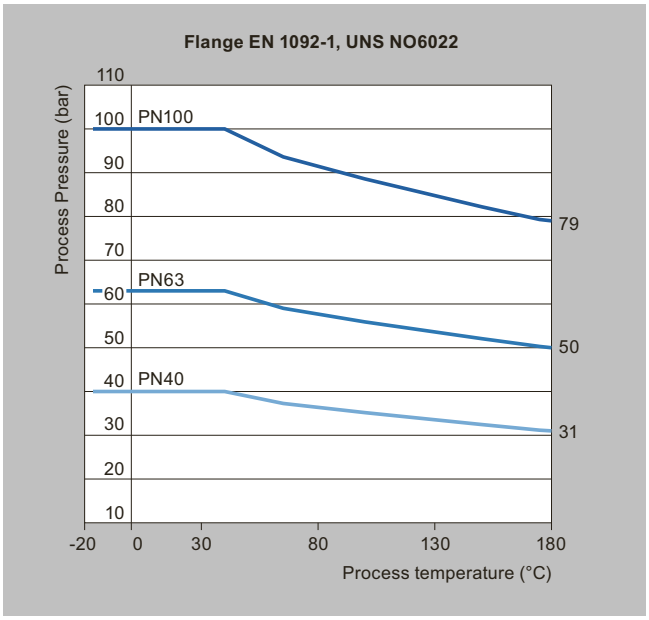
## Technical specifications (continued)



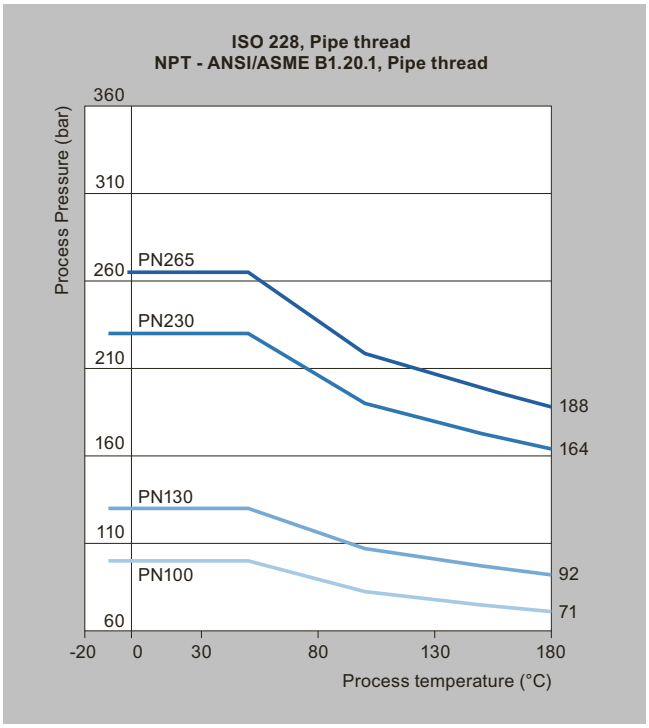

DIN 11581 flanges stainless steel (PN 25 ... PN 40)




EN 1092 flanges stainless steel (PN 40 ... PN 100)




EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)

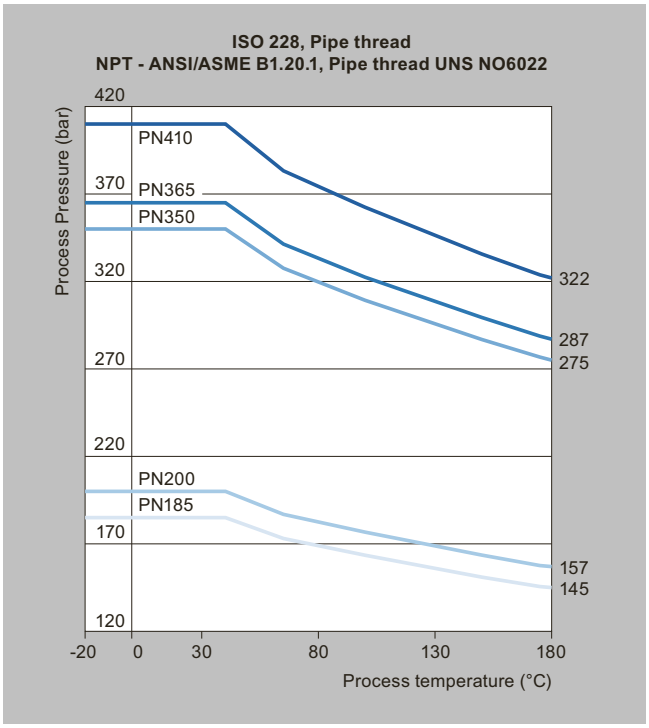



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)

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## Technical specifications (continued)




ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410)

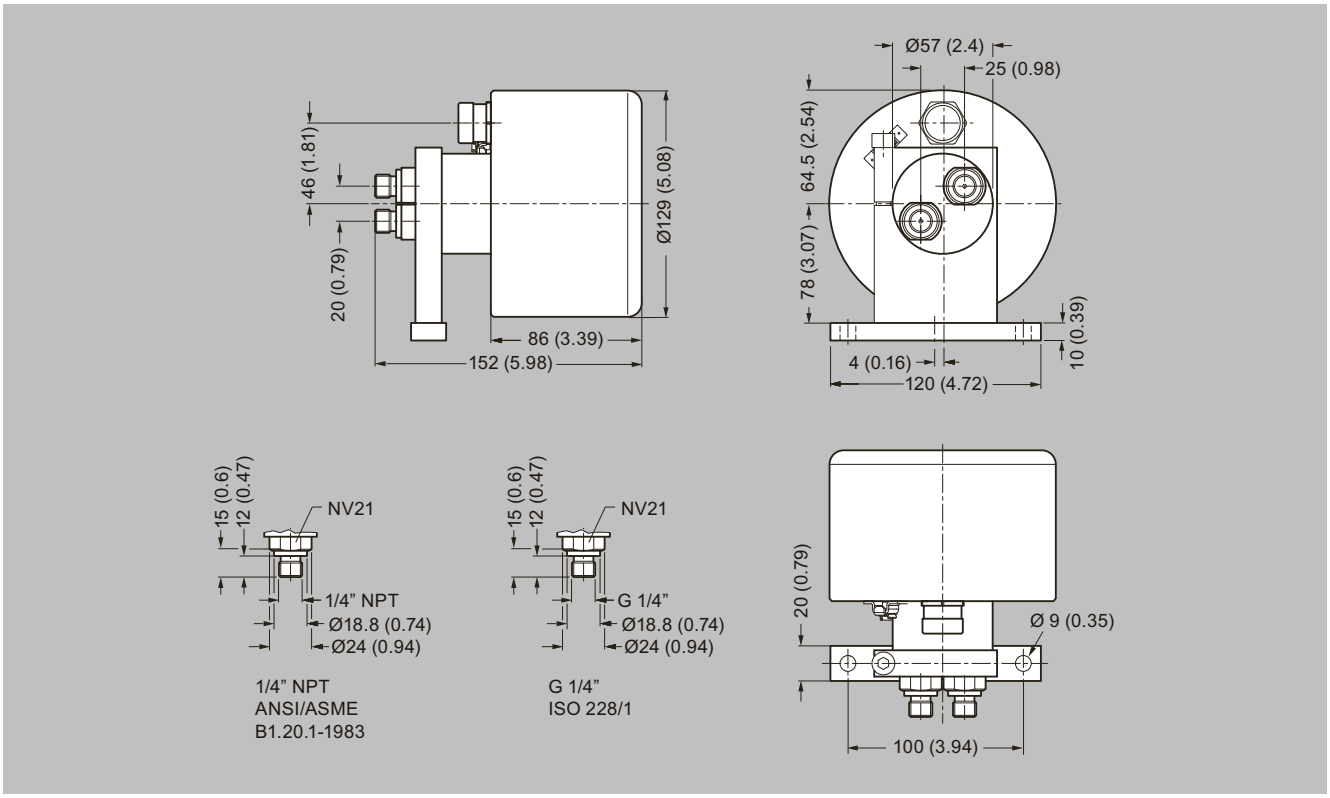
For further information on the PED standard and requirements, see the pressure equipment directives 2014/68/EU.

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## Dimensional drawings

MASS 2100 DI 1.5 (1/16")



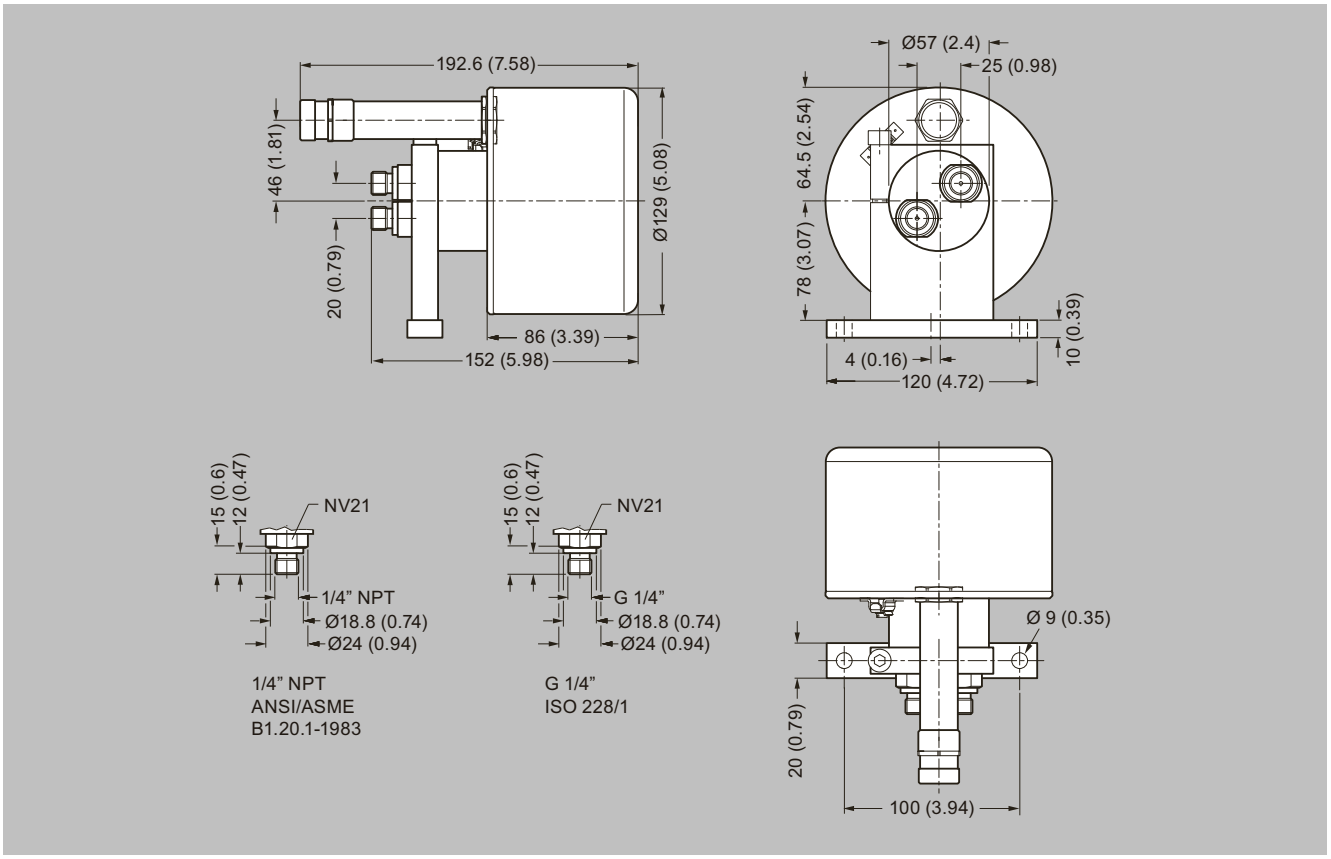

Dimensions in mm (inch)

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## Dimensional drawings (continued)

MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



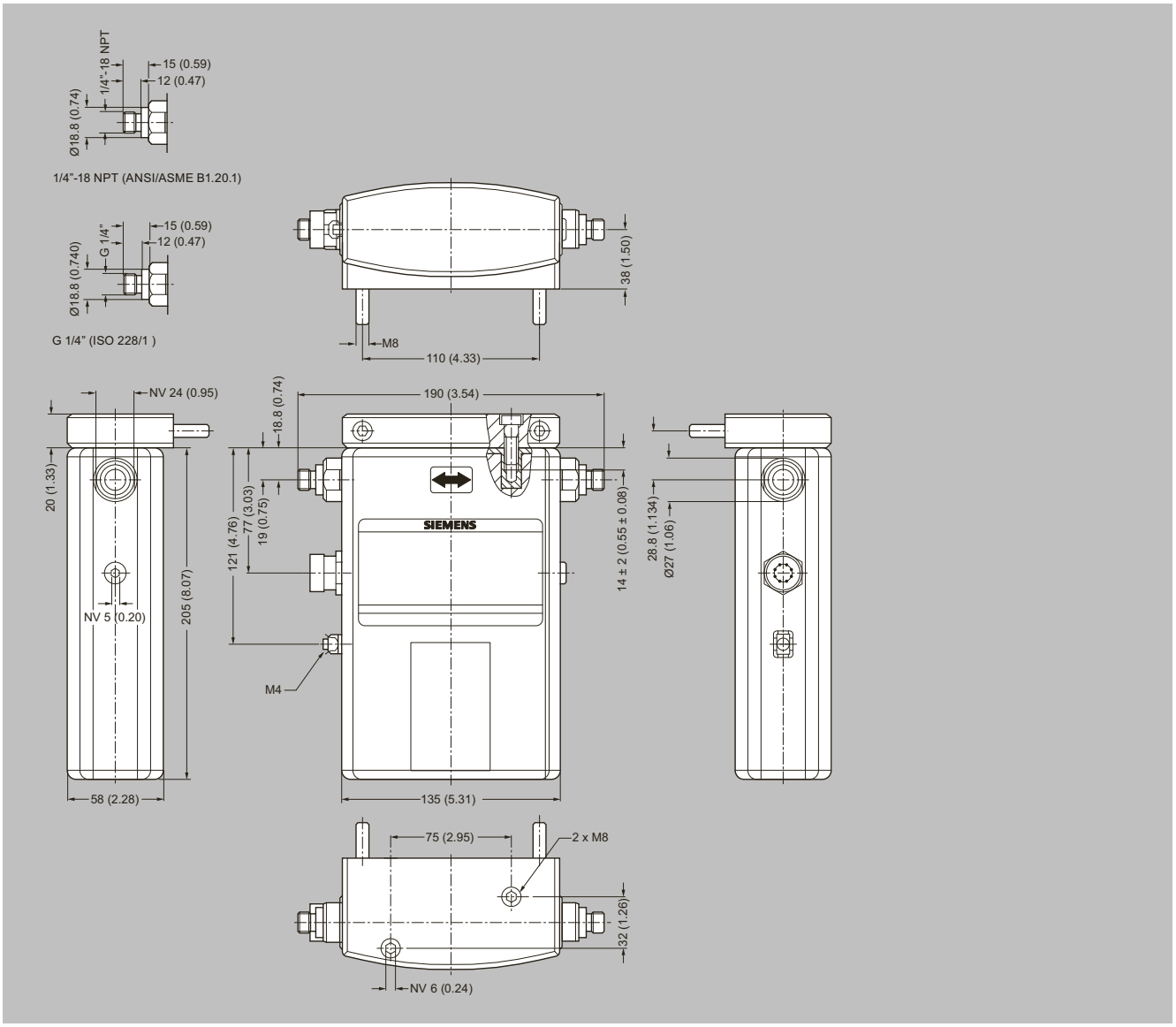

Dimensions in mm (inch)

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## Dimensional drawings (continued)

SITRANS FC300 DN 4



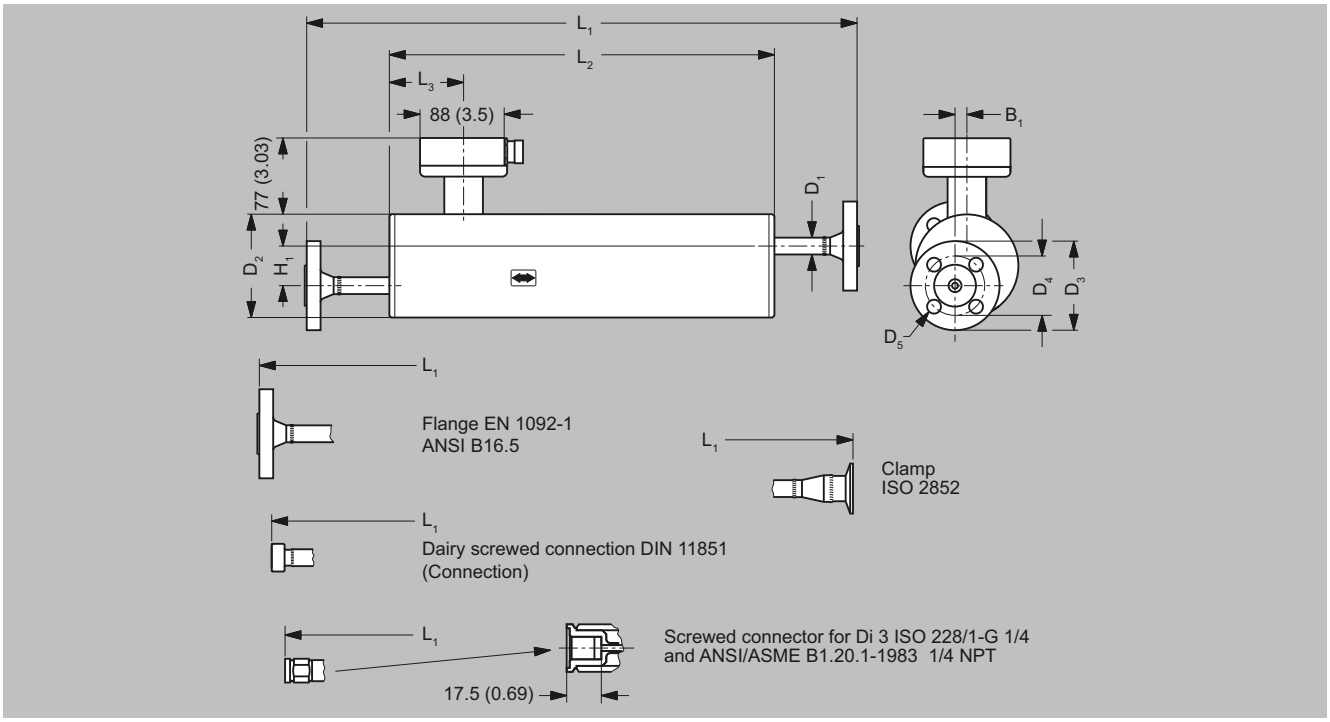

SITRANS FC300, weight 3.5 kg (7.7 lb), dimensions in mm (inch)

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## Dimensional drawings (continued)

MASS 2100 sensor for analog cable connection




Dimensions in mm (inch)

| Sensor size | Connections | | | L1 | L2 | L3 | H1 | B1 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Type | Pressure rating | Size | mm (inch) | | | | | | |
| **DN 3 (1/8")** | Pipe thread ISO 228/1 - G¼ (female) | PN 100 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| | | PN 230 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| | | PN 350 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| | Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT (female) | PN 100 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| | | PN 230 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| | | PN 350 | ¼" | 470 (18.50) | 280 (11.02) | 75.5 (2.97) | 60 (2.36) | 0 | 21.3 (0.84) | 104 (4.09) |
| **DN 6 (¼")** | Pipe thread ISO 228/1 - G¼ (male) | PN 100 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | PN 265 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | PN 410 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT (male) | PN 100 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | PN 265 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | PN 410 | ¼" | 564 (22.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Flange EN 1092-1 | PN 40 | DN 10 | 562 (22.13) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | | DN 15 | 640 (25.20) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | PN 100 | DN 10 | 582 (22.91) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | | DN 15 | 653 (25.71) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Flange ANSI B16.5 | Class 150 | ½" | 627 (24.69) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | | ¾" | 672 (26,46) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | Class 600 | ½" | 610 (24.02) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | | ¾" | 695 (27.36) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Screwed connection DIN 11851 | PN 40 | DN 10 | 534 (21.02) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | | | DN 15 | 574 (22.60) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Clamp ISO 2852 | PN 16 | 25 mm | 572 (22.52) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| | Hygienic screwed ISO 2853 | | DN 25 | 575 (22.64) | 390 (15.35) | 62 (2.44) | 40 (1.57) | 12 (0.47) | 17 (0.67) | 104 (4.09) |
| **DN 15 (½")** | Pipe thread ISO 228/1 – G½ (male) | PN 100 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | PN 130 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | PN 200 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |

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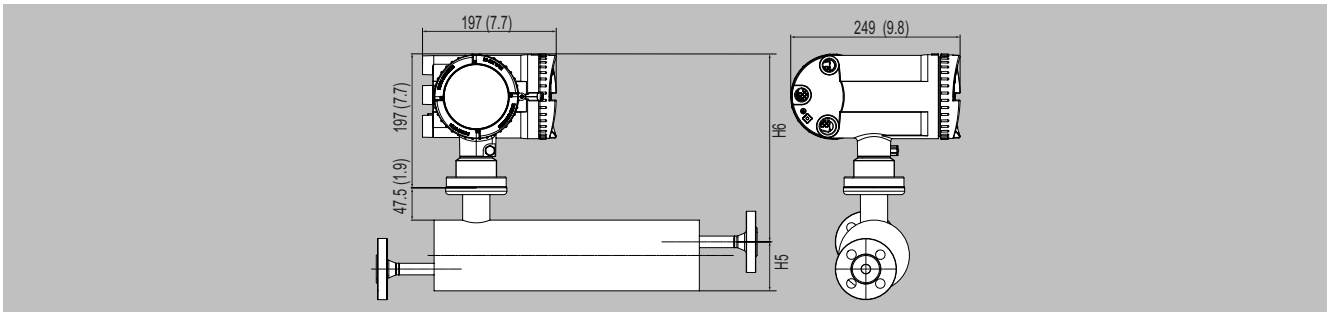


## Dimensional drawings (continued)

| Sensor size | Connections Type | Pressure rating | Size | L1 mm (inch) | L2 | L3 | H1 | B1 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| DN 15 (½") | Pipe thread ANSI/ASME B 1.20.1 - ½" NPT (male) | PN 100 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | PN 130 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | PN 200 | ½" | 618 (24.33) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | Flange EN 1092-1 | PN 40 | DN 15 | 622 (24.49) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | | DN 25 | 724 (28.50) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | PN 100 | DN 15 | 635 (25.00) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | | DN 25 | 760 (29.92) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | Flange ANSI B16.5 | Class 150 | ½" | 641 (25.24) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | | ¾" | 719 (25.24) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | Class 600 | ½" | 661 (26.02) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | | ¾" | 742 (29.21) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | Screwed connection DIN 11851 | PN 40 | DN 15 | 588 (23.15) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | | | DN 25 | 674 (26.54) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | Clamp ISO 2852 | PN 16 | DN 25 | 626 (24.65)[1] | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |
| | Hygienic screwed ISO 2853 | | DN 25 | 629 (24.76) | 444 (17.48) | 75 (2.97) | 44 (1.73) | 20 (0.79) | 21.3 (0.84) | 129 (5.08) |

[1] For Hastelloy L1 is 628 mm (24.72 inch)

***Compact with FCT030***



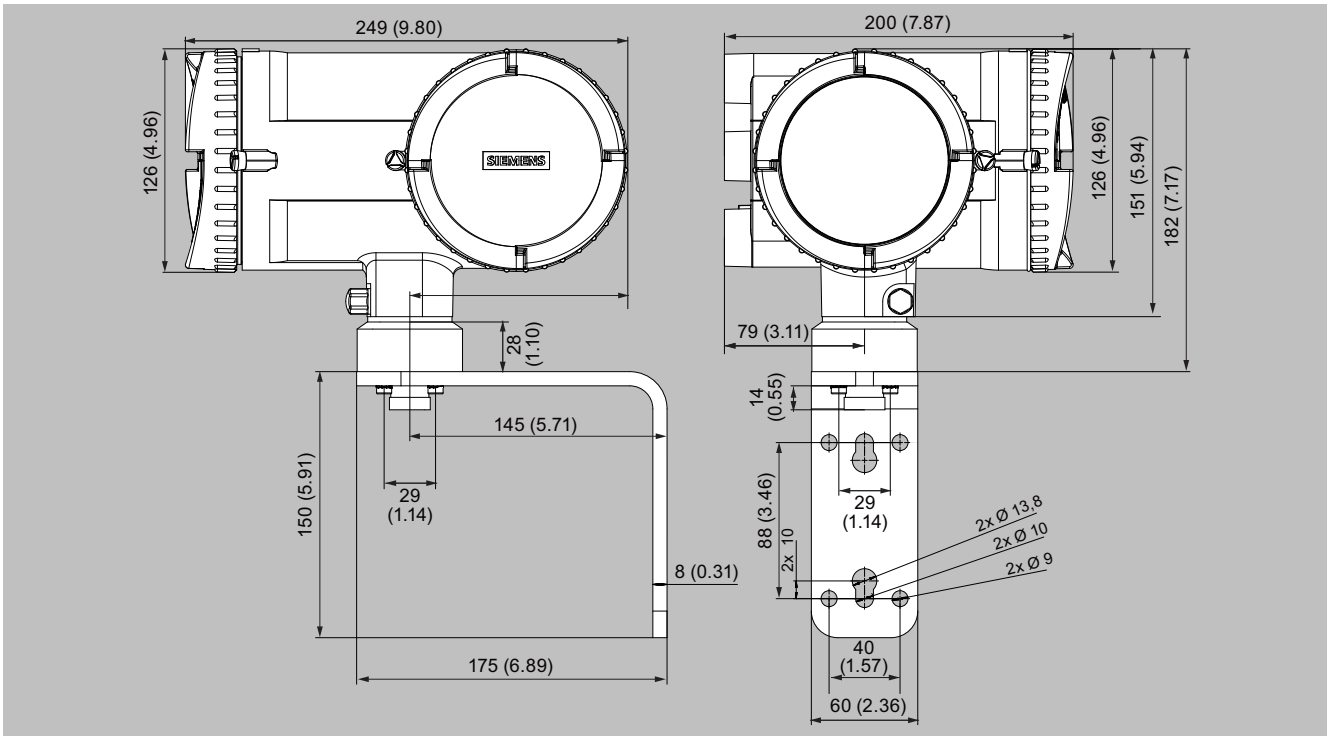

Dimensions in mm (inch)

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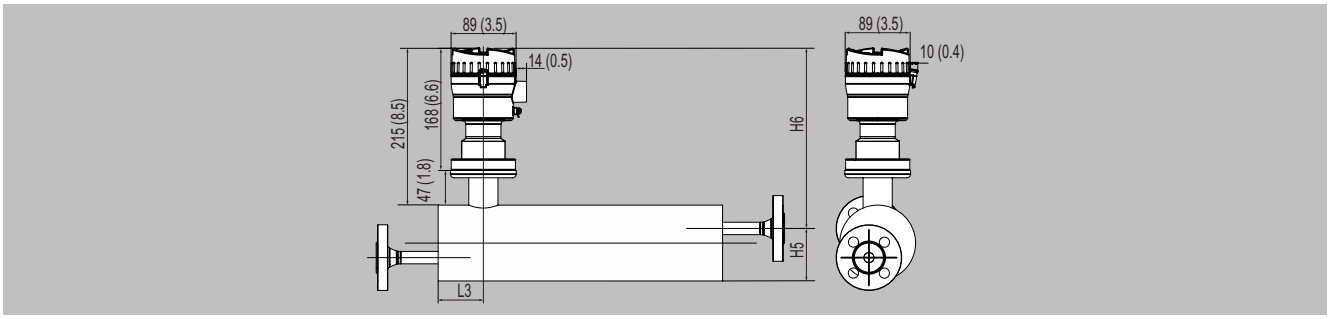
## Dimensional drawings (continued)

***Transmitter FCT030 remote field mount for M20 analog cable connection***




Dimensions in mm (inch)

***Compact with FCT010***




Dimensions in mm (inch)

***MASS 2100 with FCT010 transmitter compact***

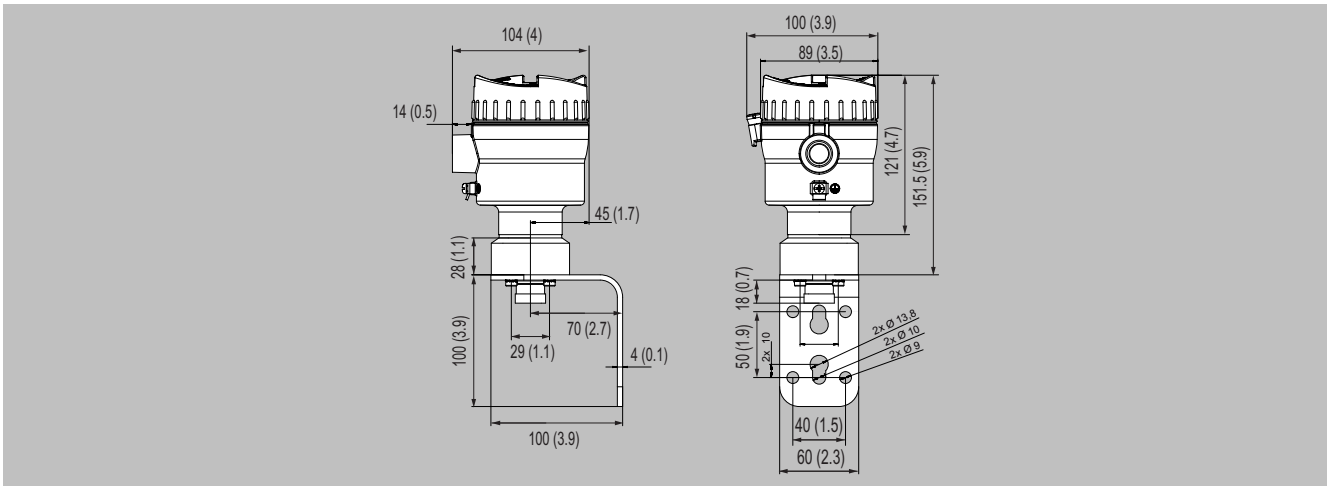
| Sensor size | L3<br>mm (inch) | H5 | H6 | H5 + H6 |
|---|---|---|---|---|
| **DN 3 (1/8")** | 75.5 (2.97) | 82 (3.23) | 237 (9.33) | 319 (12.56) |
| **DN 6 (¼")** | 62 (2.44) | 72 (2.83) | 247 (9.72) | 319 (12.56) |
| **DN 15 (½")** | 75 (2.97) | 86.5 (3.41) | 257 (10.11) | 343.5 (13.52) |

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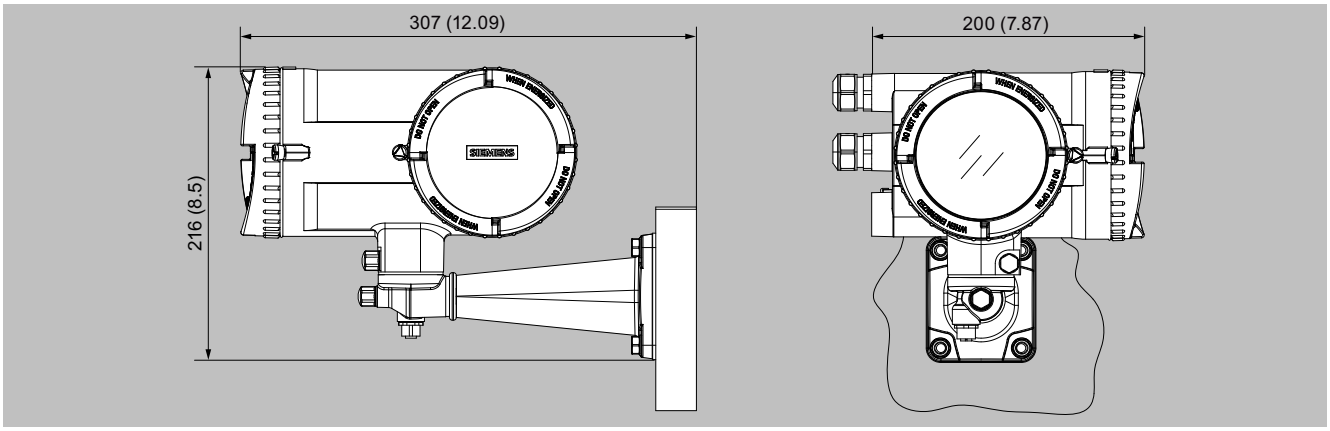
## Dimensional drawings (continued)

***Dimensions for the FCT010 remote mounted (for analog cable connections for MASS 2100 / FC300 DN4)***




Dimensions in mm (inch)

***Transmitter FCT030 remote field mount for M12 digital cable connection***




Dimensions in mm (inch)

***MASS 2100 sensor with "heating jacket"***

| Sensor size | Connections heated | | | L5 | H3 | B2 | D6 | D7 | D8 |
|---|---|---|---|---|---|---|---|---|---|
| | Type | Pressure rating | Size | mm (inch) | | | | | |
| **DN 3 (1/8")** | EN 1092-1 | PN 40 | DN 15 | 234 (9.21) | 122 (4.8) | 22 (0.87) | 95 (3.74) | 65 (2.56) | 14 (0.55) |
| | ANSI B16.5 | Class 150 | ½" | 234 (9.21) | 131.6 (5.18) | 22 (0.87) | 88.9 (3.5) | 60.5 (2.38) | 15.7 (0.62) |
| **DN 6 (¼")** | EN 1092-1 | PN 40 | DN 15 | 234 (9.21) | 112 (4.41) | 22.7 (0.89) | 95 (3.74) | 65 (2.56) | 65 (2.56) |
| | ANSI B16.5 | Class 150 | ½" | 234 (9.21) | 121.6 (4.79) | 22.7 (0.89) | 88.9 (3.5) | 60.5 (2.38) | 60.5 (2.38) |
| **DN 15 (½)** | EN 1092-1 | PN 40 | DN 15 | 234 (9.21) | 126.5 (4.98) | 31.5 (1.24) | 95 (3.74) | 65 (2.56) | 65 (2.56) |
| | ANSI B16.5 | Class 150 | ½" | 234 (9.21) | 136.1 (5.36) | 31.5 (1.24) | 88.9 (3.5) | 60.5 (2.38) | 60.5 (2.38) |

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## Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT030 transmitter.

The flowmeter comes in a compact and remote design depending for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI 1.5 and FC300 DN4 are only available with analogue connection of the FCT030 transmitter.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FCT030 is available with current output HART 7.5, Modbus RS 485 RTU, PROFIBUS DP or PROFIBUS PA as standard on Channel 1. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a microSD card for configuration backup, firmware update and data storage.

## Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm$^3$ with a typical repeatability better than 0.0001 to 0.0002 g/cm$^3$
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true “plug & play”
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard

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## Selection and ordering data

| SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter | Article No. 7ME4813- ● ● ● ● ● - ● ● ● ● ● ● ● | Order code |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Sensor type and connector size** | | |
| MASS 2100 DI 1.5, 1/4" | 1 G | |
| MASS 2100 DI 3, 1/4" | 3 A | |
| MASS 2100 DI 3, 1/4" Heated w. DIN | 3 B | |
| MASS 2100 DI 3,1/4" Heated w. ANSI | 3 C | |
| FC300 DN 4, 1/4" | 4 A | |
| MASS 2100 DI 6, 1/4" | 6 A | |
| MASS 2100 DI 6,1/4" Heated w. EN | 6 B | |
| MASS 2100 DI 6, 1/4" Heated w. ANSI | 6 C | |
| MASS 2100 DI 6, DN 10 | 6 D | |
| MASS 2100 DI 6, DN 10 Heated w. EN | 6 E | |
| MASS 2100 DI 6, DN 10 Heated w. ANSI | 6 F | |
| MASS 2100 DI 6, DN 15 (½") | 6 G | |
| MASS 2100 DI 6, DN 15 (½") Heated w. EN | 6 H | |
| MASS 2100 DI 6, DN 15 (½") Heated w. ANSI | 6 J | |
| MASS 2100 DI 6, DN 20 (¾") | 6 K | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. EN | 6 L | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI | 6 M | |
| MASS 2100 DI 6, DN 25 (1") | 6 N | |
| MASS 2100 DI 6, DN 25 (1") Heated w. EN | 6 P | |
| MASS 2100 DI 6, DN 25 (1") Heated w. ANSI | 6 Q | |
| MASS 2100 DI 15, DN 15 (½") | 7 A | |
| MASS 2100 DI 15, DN 15 (½") Heated w. EN | 7 B | |
| MASS 2100 DI 15, DN 15 (½") Heated w. ANSI | 7 C | |
| MASS 2100 DI 15, DN 20 (¾") | 7 D | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. EN | 7 E | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI | 7 F | |
| MASS 2100 DI 15, DN 25 (1") | 7 G | |
| MASS 2100 DI 15, DN 25 (1") Heated w. EN | 7 H | |
| MASS 2100 DI 15, DN 25 (1") Heated w. ANSI | 7 J | |
| **Process connection/Pressure** | | |
| No connections (spare part transmitter) | A 0 | |
| EN 1092-1 B1, PN 40 | A 1 | |
| EN 1092-1 B1, PN 100 | A 3 | |
| ASME B16.5, RF, Class 150 | D 1 | |
| ASME B16.5, RF, Class 600 | D 3 | |
| DIN 11851 crewed connection | F 1 | |
| ISO 2852 hygienic clamped | J 1 | |
| ISO 2853 hygienic screwed | J 5 | |
| ISO 228-1 pipe thread, PN 100 | C 1 | |
| ISO 228-1 pipe thread, PN 130 | C 2 | |
| ISO 228-1 pipe thread, PN 200 | C 3 | |
| ISO 228-1 pipe thread, PN 230 | C 4 | |
| ISO 228-1 pipe thread, PN 265 | C 5 | |
| ISO 228-1 pipe thread, PN 350 | C 6 | |
| ISO 228-1 pipe thread, PN 365 | C 7 | |
| ISO 228-1 pipe thread, PN 410 | C 8 | |
| NPT ASME B 1.20.1 pipe thread, PN 100 | N 1 | |
| NPT ASME B 1.20.1 pipe thread, PN 130 | N 2 | |
| NPT ASME B 1.20.1 pipe thread, PN 200 | N 3 | |
| NPT ASME B 1.20.1 pipe thread, PN 230 | N 4 | |
| NPT ASME B 1.20.1 pipe thread, PN 265 | N 5 | |
| NPT ASME B 1.20.1 pipe thread, PN 350 | N 6 | |
| NPT ASME B 1.20.1 pipe thread, PN 365 | N 7 | |
| NPT ASME B 1.20.1 pipe thread, PN 410 | N 8 | |

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## Selection and ordering data (continued)

| SITRANS FC sensors MASS 2100/FC300 with FCT030 transmitter | Article No. 7ME4813- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● |
| **Tube material (wetted) and max. operational temperature** | | | | | | | | | | | | | | |
| AISI 316L/EN 1.4435, max. 115 °C | | | | | 1 | | | | | | | | | |
| AISI 316L/EN 1.4435, max. 125 °C | | | | | 2 | | | | | | | | | |
| AISI 316L/EN 1.4435, max.180 °C | | | | | 3 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C | | | | | 5 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C | | | | | 6 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C | | | | | 7 | | | | | | | | | |
| **Calibration** | | | | | | | | | | | | | | |
| Mass flow calibration 2 flow × 2 points | | | | | | | 1 | | | | | | | |
| Mass flow calibration 2 flow × 2 points + density calibration | | | | | | | 4 | | | | | | | |
| Standard fraction ( selectable by menu) incl density calibration | | | | | | | 8 | | | | | | | |
| Individual fraction (on demand) | | | | | | | 9 | | | | | N | 0 | Y |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | | | | |
| Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 ) | | | | | | | | D | | | | | | |
| Remote field mounted, IP67, Aluminium housing, M12 socket for digital cable connection (DI 3, DI6 and DI 15 only) | | | | | | | | G | | | | | | |
| Remote field mount, IP67, Aluminium housing, terminal box for digital cable connection (DI 3, DI6 and DI 15) | | | | | | | | K | | | | | | |
| Wall mount aluminum transmitter housing, M12 socket for digital cable connection (DI 3, DI 6 and DI 15 ) | | | | | | | | U | | | | | | |
| Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors | | | | | | | | Z | | | | P | 0 | D |
| Remote wall mount, IP67, aluminum transmitter housing, analog cable connection with M20 connectors | | | | | | | | Z | | | | P | 0 | E |
| **Ex approvals** | | | | | | | | | | | | | | |
| Non-Ex | | | | | | | | | A | | | | | |
| ATEX Zone 1 / 21 | | | | | | | | | C | | | | | |
| IECEx Zone 1 / 21 (in preparation) | | | | | | | | | F | | | | | |
| USA (FM, CSA, UL), Zone 1/Div 1 | | | | | | | | | H | | | | | |
| Canada (CSA, UL), Zone 1/Div 1 | | | | | | | | | M | | | | | |
| EAC Zone 1 / 21 | | | | | | | | | U | | | | | |
| **Local User Interface** | | | | | | | | | | | | | | |
| Blind | | | | | | | | | | 1 | | | | |
| Graphical, 240 × 160 pixels, glass lid | | | | | | | | | | 3 | | | | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (mechanical sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Integral M12 socket | **A20** |
| **SW functions & CT approvals** | |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| None (replacement sensor) | **E00** |
| 4 ... 20 mA, HART, active/passive output (non-Ex) | **E02** |
| 4 ... 20 mA, HART, active Ex | **E06** |
| 4 ... 20 mA, HART, passive Ex | **E07** |
| PROFIBUS PA | **E10** |
| PROFIBUS DP | **E11** |
| Modbus RTU RS 485 (none-Ex) | **E14** |

| | Order code |
|---|---|
| **I/O configuration Ch2 (O), Ch3 (I/O) and Ch4 (I/O)** | |
| None | **F00** |
| Non Ex: Sig O, None, None. Active/passive menu selected | **F01** |
| Non Ex: Sig O, Sig I/O, None. Active/passive menu selected | **F02** |
| Non Ex: Sig O, Sig I/O, Sig I/O. Active/passive menu selected | **F03** |
| Non Ex: Sig O, Sig I/O, R. Active/passive menu selected | **F04** |
| Non Ex: Sig O, R, R. Active/passive menu selected | **F05** |
| Non Ex: Sig O, R, None. Active/passive menu selected | **F06** |
| Ex: pSig O, None, None | **F11** |
| Ex: pSig O, pSig I/O, None | **F12** |
| Ex: pSig O, pSig I/O, pSig I/O | **F13** |
| Ex: pSig O, pSig I/O, R | **F14** |
| Ex: pSig O, R, R | **F15** |
| Ex: pSig O, R, None | **F16** |
| Ex: aSig O, None, None | **F21** |
| Ex: aSig O, aSig I/O, None | **F22** |
| Ex: aSig O, aSig I/O, aSig I/O | **F23** |
| Ex: aSig O, aSig I/O, R | **F24** |
| Ex: aSig O, R, R | **F25** |
| Ex: aSig O, R, None | **F26** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Certificates** | |
| Press test certificate CRN | **C01** |
| Press test certificate PED | **C02** |
| Material certificate EN 10204-3.1 | **C12** |
| Welding inspection report | **C13** |
| Factory certificate according to EN 10204 2.2 | **C14** |
| Factory certificate according to EN 10204 2.1 | **C15** |
| Cleaning for oil and grease/ASTM-A380 | **C50** |
| **Sensor data storage** | |
| Sensor with SensorFlash for FCT | **S20** |
| Sensor with SensorProm for MASS 6000 (in preparation) | **S21** |
| **SD-Card accessibility via USB** (not allowed in USA by Patent) | |
| Mass storage enabled | **S30** |
| **Digital cable sensor-transmitter** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 10 m (32.8 ft) sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L55** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 25 m (82 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L59** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 50 m (164 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L63** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 75 m (246 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L67** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| **Analog cable sensor-transmitter** | |
| 1 m cable, analog, with 2 × M20 connectors | **L85** |
| 2 m cable, analog with 2 × M20 connectors | **L86** |
| 5 m cable, analog with 2 × M20 connectors | **L87** |
| 10 m cable, analog with 2 × M20 connectors | **L88** |
| 15 m cable, analog with 2 × M20 connectors | **L89** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |
| **Extended calibration** | |
| Multi-point high, (5 flows × 2 passes), 10 ... 100 % of $Q_{nom}$ | **Y61** |
| Multi-point high, (10 flows × 1 pass), 10 ... 100 % of $Q_{nom}$ | **Y63** |

***Accessories for MASS 2100 and FC300 DN 4 with FCT030 transmitter***

| Description | Article No. | |
|---|---|---|
| **Mounting bracket for flow sensor MASS 2100 DI 1.5** | A5E02590427 |  |
| **Mounting bracket for FC300 DN 4 in AISI 304** | A5E02590439 |  |

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## Technical specifications

| Sensors MASS 2100 / FC300 DN 4 with FCT030 transmitter | |
|---|---|
| **Sizes** | MASS 2100 DI 1.5 (1/16")<br>MASS 2100 DI 3 (1/8")<br>MASS 2100 DI 6 (1/4")<br>MASS 2100 DI 15 (1/2")<br>FC300 DN 4 (1/6") |
| **Accuracy** | ± 0.10 % for liquids additional ±0.40 for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range Q norm (liquids)**<br>(water @ 1 bar pressure loss) ($Q_{nom}$) | |
| • DI 1.5 | 19 kg/h (42 lb/h) |
| • DI 3 | 90 kg/h (198 lb/h) |
| • DI 6 | 500 kg/h (1 102 lb/h) |
| • DI 15 | 3 800 kg/h (8 370 lb/h) |
| • DN 4 | 140 kg/h (308 lb/h) |
| **Architecture** | Compact: DI 3, DI 6, DI 15<br>Remote digital: DI 3, DI 6, DI 15<br>Remote analoge: DI 1.5, DI 3, DI 6, DI 15, DN 4 |
| Display | Full graphical display, 240 × 160 pixels with selection of 6 languages |
| Power supply | 20 ... 90 V DC ± 10 %; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10 % |
| **Material** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel or Hastelly C 22 |
| - Enclosure | 316L stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating Class C4 |
| **Enclosure rating** | IP67[1)] |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | Up to 265 bar (3 844 psi), depending on size and process connection |
| - Nickel Alloy C4 | Up to 410 bar (5 945 psi), depending on size and process connection |
| • Sensor enclosure | No pressure containment |
| Temperature ratings | |
| • Process medium | -50 ... +180 °C (-58 ... +356 °F) |
| • Ambient | -20 ... +50 °C (-4 ... +122 °F)[1)] |
| **Process connections (depending on size and pressure rating)** | |
| • Flanges | EN 1092-1 B1, ANSI/ASME B16.5 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228 |
| • Hygienic threads | DIN 11851, ISO 2853/BS 4825 part 4 (SS3016) |
| • Hygienic clamps | ISO Clamp 2852 |
| **Approvals** | |
| • Hazardous area | ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC |
| • Pressure equipment | PED |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | Up to 4 channels combining analog, relay or digital outputs and binary input |
| **Communication** | HART<br>PROFIBUS PA<br>PROFIBUS DP<br>Modbus RTU (RS 485) |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class A) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 1 000 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

## Technical specifications (continued)

1) If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

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## Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT010 transmitter. The flowmeter comes in a compact design for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI 1.5 to DI 15 and FC300 DN4 are available as remote FCT010 transmitter with analogue connection. Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

The FCT010 transmitter delivers true multi-parameter measurements i.e. massflow, density, temperature.

FCT010 is available with Modbus RTU (RS 485) multi-drop serial communication.The flowmeter is supplied with SensorFlash, a microSD card containing all relevant certificates.

## Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm$^3$ with a typical repeatability better than 0.0001 to 0.0002 g/cm$^3$
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true “plug & play”
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard

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## Selection and ordering data

### *Selection and Ordering data*

| SITRANS FC sensors MASS 2100/FC300 with FCT010 transmitter | Article No. 7ME4811- | | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● | |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | | |
| **Sensor type and connector size** | | | | | | | | | | | | | | | |
| MASS 2100 DI 1.5, 1/4" | 1 | G | | | | | | | | | | | | | |
| MASS 2100 DI 3, 1/4" | 3 | A | | | | | | | | | | | | | |
| MASS 2100 DI 3, 1/4" Heated w. DIN | 3 | B | | | | | | | | | | | | | |
| MASS 2100 DI 3,1/4" Heated w. ANSI | 3 | C | | | | | | | | | | | | | |
| FC300 DN 4, 1/4" | 4 | A | | | | | | | | | | | | | |
| MASS 2100 DI 6, 1/4" | 6 | A | | | | | | | | | | | | | |
| MASS 2100 DI 6,1/4" Heated w. EN | 6 | B | | | | | | | | | | | | | |
| MASS 2100 DI 6, 1/4" Heated w. ANSI | 6 | C | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 10 | 6 | D | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 10 Heated w. EN | 6 | E | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 10 Heated w. ANSI | 6 | F | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 15 (½") | 6 | G | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 15 (½") Heated w. EN | 6 | H | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 15 (½") Heated w. ANSI | 6 | J | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 20 (¾") | 6 | K | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. EN | 6 | L | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI | 6 | M | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 25 (1") | 6 | N | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 25 (1") Heated w. EN | 6 | P | | | | | | | | | | | | | |
| MASS 2100 DI 6, DN 25 (1") Heated w. ANSI | 6 | Q | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 15 (½") | 7 | A | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 15 (½") Heated w. EN | 7 | B | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 15 (½") Heated w. ANSI | 7 | C | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 20 (¾") | 7 | D | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. EN | 7 | E | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI | 7 | F | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 25 (1") | 7 | G | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 25 (1") Heated w. EN | 7 | H | | | | | | | | | | | | | |
| MASS 2100 DI 15, DN 25 (1") Heated w. ANSI | 7 | J | | | | | | | | | | | | | |
| **Process connection/Pressure** | | | | | | | | | | | | | | | |
| No connections (spare part transmitter) | | | A | 0 | | | | | | | | | | | |
| EN 1092-1 B1, PN 40 | | | A | 1 | | | | | | | | | | | |
| EN 1092-1 B1, PN 100 | | | A | 3 | | | | | | | | | | | |
| ASME B16.5, RF, Class 150 | | | D | 1 | | | | | | | | | | | |
| ASME B16.5, RF, Class 600 | | | D | 3 | | | | | | | | | | | |
| DIN 11851 screwed connection | | | F | 1 | | | | | | | | | | | |
| ISO 2852 hygienic clamped | | | J | 1 | | | | | | | | | | | |
| ISO 2853 hygienic screwed | | | J | 5 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 100 | | | C | 1 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 130 | | | C | 2 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 200 | | | C | 3 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 230 | | | C | 4 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 265 | | | C | 5 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 350 | | | C | 6 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 365 | | | C | 7 | | | | | | | | | | | |
| ISO 228-1 pipe thread, PN 410 | | | C | 8 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 100 | | | N | 1 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 130 | | | N | 2 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 200 | | | N | 3 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 230 | | | N | 4 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 265 | | | N | 5 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 350 | | | N | 6 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 365 | | | N | 7 | | | | | | | | | | | |
| NPT ASME B 1.20.1 pipe thread, PN 410 | | | N | 8 | | | | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS FC sensors MASS 2100/FC300 with FCT010 transmitter | Article No. 7ME4811- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | | ● | ● | ● |
| **Tube material (wetted) and max. operational temperature** | | | | | | | | | | | | | | |
| AISI 316L/EN 1.4435, max 115 °C | | | | | 1 | | | | | | | | | |
| AISI 316L/EN 1.4435, max 125 °C | | | | | 2 | | | | | | | | | |
| AISI 316L/EN 1.4435, max 180 °C | | | | | 3 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C | | | | | 5 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C | | | | | 6 | | | | | | | | | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C | | | | | 7 | | | | | | | | | |
| **Calibration** | | | | | | | | | | | | | | |
| Mass flow calibration 2 flow × 2 points | | | | | | | 1 | | | | | | | |
| Mass flow calibration 2 flow × 2 points + density calibration | | | | | | | 4 | | | | | | | |
| **Mounting style, transmitter housing and material** | | | | | | | | | | | | | | |
| Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 only) | | | | | | | | D | | | | | | |
| Remote mounted, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors | | | | | | | | Z | | | | P | 0 | D |
| **Ex approvals** | | | | | | | | | | | | | | |
| Non-Ex | | | | | | | | | A | | | | | |
| ATEX Zone 1 / 21 | | | | | | | | | C | | | | | |
| IECEx Zone 1 / 21 (in preparation) | | | | | | | | | F | | | | | |
| USA (FM, CSA, UL), Zone 1/Div 1 | | | | | | | | | H | | | | | |
| Canada (CSA, UL), Zone 1/Div 1 | | | | | | | | | M | | | | | |
| EAC Zone 1 / 21 | | | | | | | | | U | | | | | |
| **Local User Interface** | | | | | | | | | | | | | | |
| Blind | | | | | | | | | | 1 | | | | |

| | Order code |
|---|---|
| **Futher designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (mechanical sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Integral M12 socket | **A20** |
| **SW functions & CT approvals** | |
| Standard | **B11** |
| **I/O configuration Ch1** | |
| Modbus RTU RS 485 | **E14** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Certificates** | |
| Press test certificate CRN | **C01** |
| Press test certificate PED | **C02** |
| Material certificate EN 10204-3.1 | **C12** |
| Welding inspection report | **C13** |
| Factory certificate according to EN 10204 2.2 | **C14** |
| Factory certificate according to EN 10204 2.1 | **C15** |
| Cleaning for oil and grease/ASTM-A380 | **C50** |
| Cleaned according to PWIS | **C51** |

| | Order code |
|---|---|
| **Digital cable sensor-transmitter** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 2 pcs M12 plugs mounted | **L51** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L53** |
| 10 m (32.8 ft) standard with M12 connectors fitted | **L55** |
| 10 m (32.8 ft), standard, without plugs | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L57** |
| 25 m (82 ft), standard with M12 connectors fitted | **L59** |
| 25 m (82 ft), standard, without plugs | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L61** |
| 50 m (164 ft), standard with M12 connectors fitted | **L63** |
| 50 m (164 ft), standard, without plugs | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L65** |
| 75 m (246 ft), standard with M12 connectors fitted | **L67** |
| 75 m (246 ft), standard, without plugs | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L69** |
| **Analog cable sensor-transmitter** | |
| 1 m cable, analog, with 2 × M20 connectors | **L85** |
| 2 m cable, analog, with 2 × M20 connectors | **L86** |
| 5 m cable, analog, with 2 × M20 connectors | **L87** |
| 10 m cable, analog, with 2 × M20 connectors | **L88** |
| 15 m cable, analog, with 2 × M20 connectors | **L89** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

| | Order code |
|---|---|
| **Extended calibration** | |
| Multi-point high, (5 flows × 2 passes), 10 ... 100 % of $Q_{nom}$ | **Y61** |
| Multi-point high, (10 flows × 1 pass), 10 ... 100 % of $Q_{nom}$ | **Y63** |

***Accessories for MASS 2100 and FC300 DN 4 with FCT010 transmitter***

| Description | Article No. | |
|---|---|---|
| **SITRANS I300 – Isolating power supply – Ex barrier** | A5E39832532 |  |
| **Mounting bracket for flow sensor MASS 2100 DI 1.5** | A5E02590427 |  |
| **Mounting bracket for FC300 DN 4 in AISI 304** | A5E02590439 |  |

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## Technical specifications

| Sensors MASS 2100 / FC300 DN 4 with FCT010 transmitter | |
|---|---|
| **Sizes mm (inch)** | MASS 2100 DI 1.5 (1/16")<br>MASS 2100 DI 3 (1/8")<br>MASS 2100 DI 6 (1/4")<br>MASS 2100 DI 15 (1/2")<br>FC300 DN 4 (1/6“) |
| **Accuracy** | ± 0.10 % for liquids additional ±0.40 for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range Q norm (liquids)**<br>(water @ 1 bar pressure loss) ($Q_{nom}$) | |
| • DI 1.5 | 19 kg/h (42 lb/h) |
| • DI 3 | 90 kg/h (198 lb/h) |
| • DI 6 | 500 kg/h (1 102 lb/h) |
| • DI 15 | 3 800 kg/h (8 370 lb/h) |
| • DN 4 | 140 kg/h (308 lb/h) |
| **Architecture** | Compact: DI 3, DI 6, DI 15<br>Remote analoge: DI 1.5, DI 3, DI 6, DI 15, DN 4 |
| **Power supply** | 12-27 V DC; 1.1 W for Ex d: 12 – 24 V DC; Intrinsic safety power supply: Ui: 20 V, Ii: 484 mA, Pi: 2.3 W, Li: 0.6 uH, Ci: 1.9 nF. |
| **Material** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel or Hastelly C 22 |
| - Enclosure | 316L stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating Class C4 |
| **Enclosure rating** | IP67[1)] |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | Up to 265 bar (3 844 psi), depending on size and process connection |
| - Nickel Alloy C4 | Up to 410 bar (5 945 psi), depending on size and process connection |
| • Sensor enclosure | No pressure containment |
| **Temperature ratings** | |
| • Process medium | -50 ... +180 °C (-58 ... +356 °F) |
| • Ambient | -20 ... +50 °C (-4 ... +122 °F)[1)] |
| **Process connections (depending on size and pressure rating)** | |
| • Flanges | EN 1092-1 B1, ANSI/ASME B16.5 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228 |
| • Hygienic threads | DIN 11851, ISO 2853/BS 4825 part 4 (SS3016) |
| • Hygienic clamps | ISO Clamp 2852 |
| **Approvals** | |
| • Hazardous area | ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC |
| • Pressure equipment | PED |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | Up to 4 channels combining analog, relay or digital outputs and binary input |
| **Communication** | Modbus RTU (RS 485) |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class B) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 1 000 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

1) If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

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## Overview



Sensors MASS 2100 and FC300 DN 4 with FCT010 / FCT030 transmitters




FCT070 transmitter

Full integration in the Siemens SIMATIC systems PCS7 or in TIA portal with FCT070 Faceplates with the ET 200SP ST & HF powerful IO system for compact control cabinets.

The SITRANS MASS 2100 and FC300 DN 4 system consists of a SITRANS sensor and a SITRANS FCT070 transmitter.

The flowmeter comes in a compact design for all MASS 2100 DI 3 to DI 15.

MASS 2100 DI and FC300 DN 4 the DSL is remote mounted with a analogue connection.

The complete flowmeter system consists of a sensor and a SIMATIC ET 200SP ST & HF Coriolis module FCT070 transmitter.

TM FCT070 offers real-time data processing and the display of all measuring and status data of the Coriolis flowmeter.

For hazardous area the MASS 2100 and the FSC300 sensor can be placed in Ex Zone 1 or Class 1 Div 1 locations . Together with the SITRANS I300 power/barrier module the FCT070 transmitter can be place in Zone 2 or Div 2 areas.

## Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm$^3$ with a typical repeatability better than 0.0001 to 0.0002 g/cm$^3$
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.)
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector enables true “plug & play”
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- Full hazardous area solutions
- Easy integration into automation process control as TIA portal and PCS7
- Easy selection and integration of flowmeters via TIA-Selector
- Cost effective integration of Coriolis flowmeters for PLC controlled machines
- SITRANS FCT070 ET 200SP technology module and can combined with all other SIMATIC ET200SP ST & HF modules
- The FCT070 has all high -end transmitter functionality integrated including the advanged fraction tables on bord
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- Integrated advanced Two-stage batch controller functionality without additional modules. I/Os are onboard

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## Selection and ordering data

| SITRANS FC sensors MASS 2100/FC300 DN 4 with DSL ready for FCT070 | Article No. 7ME4817- ● ● ● ● ● - ● ● ● ● ● ● ● | Order code |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Sensor type and connector size** | | |
| MASS 2100 DI 1.5, 1/4" | 1 G | |
| MASS 2100 DI 3, 1/4" | 3 A | |
| MASS 2100 DI 3, 1/4" Heated w. DIN | 3 B | |
| MASS 2100 DI 3,1/4" Heated w. ANSI | 3 C | |
| FC300 DN 4, 1/4" | 4 A | |
| MASS 2100 DI 6, 1/4" | 6 A | |
| MASS 2100 DI 6,1/4" Heated w. EN | 6 B | |
| MASS 2100 DI 6, 1/4" Heated w. ANSI | 6 C | |
| MASS 2100 DI 6, DN 10 | 6 D | |
| MASS 2100 DI 6, DN 10 Heated w. EN | 6 E | |
| MASS 2100 DI 6, DN 10 Heated w. ANSI | 6 F | |
| MASS 2100 DI 6, DN 15 (½") | 6 G | |
| MASS 2100 DI 6, DN 15 (½") Heated w. EN | 6 H | |
| MASS 2100 DI 6, DN 15 (½") Heated w. ANSI | 6 J | |
| MASS 2100 DI 6, DN 20 (¾") | 6 K | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. EN | 6 L | |
| MASS 2100 DI 6, DN 20 (¾") Heated w. ANSI | 6 M | |
| MASS 2100 DI 6, DN 25 (1") | 6 N | |
| MASS 2100 DI 6, DN 25 (1") Heated w. EN | 6 P | |
| MASS 2100 DI 6, DN 25 (1") Heated w. ANSI | 6 Q | |
| MASS 2100 DI 15, DN 15 (½") | 7 A | |
| MASS 2100 DI 15, DN 15 (½") Heated w. EN | 7 B | |
| MASS 2100 DI 15, DN 15 (½") Heated w. ANSI | 7 C | |
| MASS 2100 DI 15, DN 20 (¾") | 7 D | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. EN | 7 E | |
| MASS 2100 DI 15, DN 20 (¾") Heated w. ANSI | 7 F | |
| MASS 2100 DI 15, DN 25 (1") | 7 G | |
| MASS 2100 DI 15, DN 25 (1") Heated w. EN | 7 H | |
| MASS 2100 DI 15, DN 25 (1") Heated w. ANSI | 7 J | |
| **Process connection/Pressure** | | |
| No connections (spare part transmitter) | A 0 | |
| EN 1092-1 B1, PN 40 | A 1 | |
| EN 1092-1 B1, PN 100 | A 3 | |
| ASME B16.5, RF, Class 150 | D 1 | |
| ASME B16.5, RF, Class 600 | D 3 | |
| DIN 11851 crewed connection | F 1 | |
| ISO 2852 hygienic clamped | J 1 | |
| ISO 2853 hygienic screwed | J 5 | |
| ISO 228-1 pipe thread, PN 100 | C 1 | |
| ISO 228-1 pipe thread, PN 130 | C 2 | |
| ISO 228-1 pipe thread, PN 200 | C 3 | |
| ISO 228-1 pipe thread, PN 230 | C 4 | |
| ISO 228-1 pipe thread, PN 265 | C 5 | |
| ISO 228-1 pipe thread, PN 350 | C 6 | |
| ISO 228-1 pipe thread, PN 365 | C 7 | |
| ISO 228-1 pipe thread, PN 410 | C 8 | |
| NPT ASME B 1.20.1 pipe thread, PN 100 | N 1 | |
| NPT ASME B 1.20.1 pipe thread, PN 130 | N 2 | |
| NPT ASME B 1.20.1 pipe thread, PN 200 | N 3 | |
| NPT ASME B 1.20.1 pipe thread, PN 230 | N 4 | |
| NPT ASME B 1.20.1 pipe thread, PN 265 | N 5 | |
| NPT ASME B 1.20.1 pipe thread, PN 350 | N 6 | |
| NPT ASME B 1.20.1 pipe thread, PN 365 | N 7 | |
| NPT ASME B 1.20.1 pipe thread, PN 410 | N 8 | |

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## Selection and ordering data (continued)

| SITRANS FC sensors MASS 2100/FC300 DN 4 with DSL ready for FCT070 | Article No. 7ME4817- ● ● ● ● ● - ● ● ● ● ● ● ● | Order code |
|---|---|---|
| **Tube material (wetted) and max. operational temperature** | | |
| AISI 316L/EN 1.4435, max. 115 °C | 1 | |
| AISI 316L/EN 1.4435, max. 125 °C | 2 | |
| AISI 316L/EN 1.4435, max. 180 °C | 3 | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 115 °C | 5 | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 125 °C | 6 | |
| Hastelloy C22/UNS N06022/EN 2.4602, max. 180 °C | 7 | |
| **Calibration** | | |
| Mass flow calibration 2 flow × 2 points | 1 | |
| Mass flow calibration 2 flow × 2 points + density calibration | 4 | |
| **Mounting style, transmitter housing and material** | | |
| Compact mounted, IP67, Aluminium transmitter housing (DI 3, DI 6 and DI 15 ) | D | |
| Remote field mount, IP67, Aluminium transmitter housing, analog cable connection with M20 connectors | Z | P 0 D |
| **Ex approvals** | | |
| Non-Ex | A | |
| ATEX Zone 1 / 21 | C | |
| IECEx Zone 1 / 21 (in preparation) | F | |
| USA (FM, CSA, UL), Zone 1/Div 1 | H | |
| Canada (CSA, UL), Zone 1/Div 1 | M | |
| EAC Zone 1 / 21 | U | |
| **Local User Interface** | | |
| Blind | 1 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands** | |
| None (mechanical sensor) | **A00** |
| Metric, no glands | **A01** |
| Metric, plastic | **A02** |
| Metric, brass/Ni plated | **A05** |
| Metric, stainless steel | **A06** |
| NPT, no glands | **A11** |
| NPT, plastic | **A12** |
| NPT, brass/Ni plated | **A15** |
| NPT, stainless steel | **A16** |
| Integral M12 socket | **A20** |
| **SW functions & CT approvals** | |
| Standard | **B10** |
| **I/O configuration Ch1** | |
| None (replacement sensor) | **E00** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| **Certificates** | |
| Press test certificate CRN | **C01** |
| Press test certificate PED | **C02** |
| Material certificate EN 10204-3.1 | **C12** |
| Welding inspection report | **C13** |
| Factory certificate according to EN 10204 2.2 | **C14** |
| Factory certificate according to EN 10204 2.1 | **C15** |
| Cleaning for oil and grease/ASTM-A380 | **C50** |

| | Order code |
|---|---|
| **Digital cable sensor-transmitter** | |
| None | **L50** |
| 5 m (16.4 ft), sensor cable, 4 wire, without plugs for terminal connection | **L52** |
| 5 m (16.4 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L53** |
| 10 m (32.8 ft), sensor cable, 4 wire, without plugs for terminal connection | **L56** |
| 10 m (32.8 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L57** |
| 25 m (82 ft), sensor cable, 4 wire, without plugs for terminal connection | **L60** |
| 25 m (82 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L61** |
| 50 m (164 ft), sensor cable, 4 wire, without plugs for terminal connection | **L64** |
| 50 m (164 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L65** |
| 75 m (246 ft), sensor cable, 4 wire, without plugs for terminal connection | **L68** |
| 75 m (246 ft), sensor cable, 4 wire, with 1 pcs M12 plugs mounted | **L69** |
| **Analog cable sensor-transmitter** | |
| 1 m cable, analog, with 2 × M20 connectors | **L85** |
| 2 m cable, analog with 2 × M20 connectors | **L86** |
| 5 m cable, analog with 2 × M20 connectors | **L87** |
| 10 m cable, analog with 2 × M20 connectors | **L88** |
| 15 m cable, analog with 2 × M20 connectors | **L89** |
| **Additional data**<br>Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Tag name** | |
| Tag name plate, stainless steel | **Y17** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Extended calibration** | |
| Multi-point high, (5 flows × 2 passes), 10 ... 100 % of $Q_{nom}$ | **Y61** |
| Multi-point high, (10 flows × 1 pass), 10 ... 100 % of $Q_{nom}$ | **Y63** |

| Description | Article No. | |
|---|---|---|
| **SITRANS FCT070 – Transmitter for ET 200SP** | **7ME4138-6AA00-0BB1** |  |
| **BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP** | **6ES7193-6BP20-0BB0**<br>**6ES7193-6BP20-0BB1** |  |
| **SITRANS I300 – Isolating power supply – Ex barrier** | **A5E39832532** |  |

***Accessories for MASS 2100 and FC300 DN 4 with FCT070 transmitter***

| Description | Article No. | |
|---|---|---|
| **Mounting bracket for flow sensor MASS 2100 DI 1.5** | **A5E02590427** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Mounting bracket for FC300 DN 4 in AISI 304** | **A5E02590439** |  |

## Technical specifications

| Sensors MASS 2100 / FC300 DN 4 with FCT070 transmitter | |
|---|---|
| **Sizes mm (inch)** | MASS 2100 DI 1.5 (1/16")<br>MASS 2100 DI 3 (1/8")<br>MASS 2100 DI 6 (1/4")<br>MASS 2100 DI 15 (1/2")<br>FC300 DN 4 (1/6") |
| **Accuracy** | ± 0.10 % for liquids additional ±0.40 for gases |
| **Repeatability** | ± 0.05 % |
| **Flow range Q norm (liquids)**<br>(water @ 1 bar pressure loss) ($Q_{nom}$) | |
| • DI 1.5 | 19 kg/h (42 lb/h) |
| • DI 3 | 90 kg/h (198 lb/h) |
| • DI 6 | 500 kg/h (1 102 lb/h) |
| • DI 15 | 3 800 kg/h (8 370 lb/h) |
| • DN 4 | 140 kg/h (308 lb/h) |
| **Architecture** | Remote configuration |
| **System integration** | PCS7 and TIA portal with faceplates |
| **Power supply** | 24 V DC; 19.2 ... 28.8 V |
| **Material** | |
| • Sensor | |
| - Wetted parts | 316L stainless steel or Hastelly C 22 |
| - Enclosure | 316L stainless steel |
| • Transmitter | Aluminum with corrosion-resistant coating Class C4 |
| **Enclosure rating** | Sensor: IP67<br>FCT070 transmitter: IP20 |
| **Pressure ratings** | |
| • Measuring tubes | |
| - 316L | Up to 265 bar (3 844 psi), depending on size and process connection |
| - Nickel Alloy C4 | Up to 410 bar (5 945 psi), depending on size and process connection |
| • Sensor enclosure | No pressure containment |
| **Temperature ratings** | |
| • Process medium | -50 ... +180 °C (-58 ... +356 °F) |
| • Ambient | -40 ... +60 °C (-4 ... +122 °F)[1] |
| **Process connections (depending on size and pressure rating)** | |
| • Flanges | EN 1092-1 B1, ANSI/ASME B16.5 |
| • Pipe threads | ASME B1.20 (NPT), ISO 228 |
| • Hygienic threads | DIN 11851, ISO 2853/BS 4825 part 4 (SS3016) |
| • Hygienic clamps | ISO Clamp 2852 |

## Technical specifications (continued)

| Sensors MASS 2100 / FC300 DN 4 with FCT070 transmitter | |
|---|---|
| **Approvals** | |
| • Hazardous area | Sensor : ATEX, IECEx, EAC Ex, CSA, cCSAus, EAC<br>FCT070 transmitter: Zone 2 & Class 1 Div 2 ATEX, IECEx, EAC Ex, CSA, cCSAus, FM; NEPSI, EAC |
| • Pressure equipment | PED |
| **NAMUR** | NAMUR-compliant (e.g. NE 21, NE 41, NE 107 and NE 132) |
| **I/O** | 2 digital Input and 2 digital output<br>Single and 2 stage batch function |
| **Communication** | Integrated PROFINET for SIMATIC integration and other PROFINET Controllers |
| **Totalizer** | 3 totalizer |
| **EMC performance** | |
| • Emission | EN 55011/CISPR-11 (Class A) |
| • Immunity | EN/IEC 61326-1 (Industry) |
| **Mechanical load** | 18 ... 1 000 Hz random<br>The flowmeter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions. |

[1] If operating outdoors, avoid direct sunlight, particularly in warm climatic regions.

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## Selection and ordering data

*Accessories and spare parts for flowmeters*

| Description | Article No. | |
|---|---|---|
| **CT connector**<br>Tamper cover for CT locking. Fits over the M12 connector at both sensor and transmitter ends of the remote system cable (2 pcs.) | A5E31478498 |  |
| **Bag of glands (metric) in black plastic** [1] | A5E03907414 |  |
| **Bag of glands, (metric) in gray plastic Ex e/i** [1] | A5E03907424 |  |
| **Bag of glands (metric) in AISI 316 SS Ex e/i** [1] | A5E03907429 |  |
| **Bag of glands (metric) in Ni-plated brass Ex e/i** [1] | A5E03907430 | |
| **Bag of glands (NPT) in black plastic** [2] | A5E03907435 |  |
| **Bag of glands (NPT) in gray plastic Ex e/i** [2] | A5E03907451 |  |
| **Bag of glands (NPT) in AISI 316 SS Ex e/i** [2] | A5E03907467 |  |
| **Bag of glands (NPT) in Ni-plated brass Ex e/i** [2] | A5E03907473 | |
| **Standard cable (non-Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)** | |  |
| • 5 m (16.4 ft) | A5E03914805 | |
| • 10 m (32.8 ft) | A5E03914850 | |
| • 25 m (82 ft) | A5E03914853 | |
| • 50 m (164 ft) | A5E03914859 | |
| • 75 m (246 ft) | A5E03914861 | |
| • 150 m (492 ft), max. +30 °C (86 °F) | A5E03914874 | |
| **Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)** | |  |
| • 5 m (16.4 ft) | A5E03914833 | |
| • 10 m (32.8 ft) | A5E03914849 | |
| • 25 m (82 ft) | A5E03914854 | |
| • 50 m (164 ft) | A5E03914856 | |
| • 75 m (246 ft) | A5E03914864 | |
| • 150 m (492 ft), max. +30 °C (86 °F) | A5E03914873 | |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Standard cable (non-Ex) f with M12 connector on one side, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)** | | |
| • 5 m (16.4 ft) | | |
| • 10 m (32.8 ft) | | |
| • 25 m (82 ft) | | |
| • 50 m (164 ft) | | |
| • 75 m (246 ft) | | |
| • 150 m (492 ft), max. +30 °C (86 °F) | | |
| **Standard cable (Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)** | |  |
| • 5 m (16.4 ft) | A5E03914929 | |
| • 10 m (32.8 ft) | A5E03914962 | |
| • 25 m (82 ft) | A5E03914995 | |
| • 50 m (164 ft) | A5E03915004 | |
| • 75 m (246 ft) | A5E03915074 | |
| • 150 m (492 ft), max. +30 °C (86 °F) | A5E03915088 | |
| **Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)** | |  |
| • 5 m (16.4 ft) | A5E03914945 | |
| • 10 m (32.8 ft) | A5E03914973 | |
| • 25 m (82 ft) | A5E03914984 | |
| • 50 m (164 ft) | A5E03915015 | |
| • 75 m (246 ft) | A5E03915057 | |
| • 150 m (492 ft), max. +30 °C (86 °F) | A5E03915100 | |
| **Standard cable (Ex) with M12 connector on one side, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)** | | |
| • 5 m (16.4 ft) | | |
| • 10 m (32.8 ft) | | |
| • 25 m (82 ft) | | |
| • 50 m (164 ft) | | |
| • 75 m (246 ft) | | |
| • 150 m (492 ft), max. +30 °C (86 °F) | | |
| **Analog signal cable**<br>For analog cable connection between MASS 2100/ FC300 sensor and FCT010/FCT030/FCT070 transmitters.<br>5 × 2 × Ø 0.34 mm screened and twisted in pairs.<br>Blue PVC insulation and sleeve.<br>With two M20 connectors, female/female.<br>-20 ... 105 °C (-4 ... +221 °F), Ex | |  |
| • 1 m (3.28 ft) | A5E42815465 | |
| • 2 m (6.56 ft) | A5E42521862 | |
| • 5 m (16.4 ft) | A5E42522447 | |
| • 10 m (32.8 ft) | A5E42523233 | |
| • 15 m (49.21 ft) | A5E42523347 | |

[1] 2 pcs M20; 1 pce M25 with single and dual cable inserts.
[2] 2 pcs ½" NPT; 1 pce ½" NPT with single and dual cable inserts.

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## Selection and ordering data (continued)

### *Heating jacket for FCS400*

| Description | Article No. | |
|---|---|---|
| **Heating jacket**<br>indoor use, 0 ... 200 °C (32 ...392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to included controller | |  |
| • 230 V AC, DN 15 electric | **A5E33035287** | |
| • 230 V AC, DN 25 electric | **A5E33035324** | |
| • 230 V AC, DN 50 electric | **A5E33035325** | |
| • 115 V AC, DN 15 electric | **A5E32877520** | |
| • 115 V AC, DN 25 electric | **A5E32877556** | |
| • 115 V AC, DN 50 electric | **A5E32877557** | |
| **Heating jacket controller**<br>IP65, digital display for 0 ... 200 °C (32 ...392 °F) control setpoint | |  |
| • 230 V AC | **A5E03839193** | |
| • 115 V AC | **A5E03839194** | |

### *Spare parts - sensor FCS400/FCS300 and MASS 2100/FC300*

| Description | Article No. | |
|---|---|---|
| **Blind lid in painted aluminum with silicone o-ring seal** | **A5E03549295** |  |
| **Sensor housing** | |  |
| • Metric | **A5E03549313** | |
| • NPT | **A5E03906080** | |
| **Bag of loose parts for sensor**<br>including cable strain relief components, washer, seals, silicone o-rings, and assorted screws | **A5E03549324** |  |
| **M12 option for sensor housing in stainless steel**<br>pre-wired and potted to replace M12 socket in DSL housing | **A5E03906095** |  |

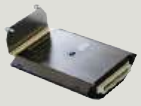
### *Spare parts - Transmitter FCT030 field mount enclosure (all FW versions)*

| Description | Article No. | |
|---|---|---|
| **Display lid in painted aluminum**<br>with Ex glass plate and silicone o-ring seal, Ex and Non-Ex | **A5E03549344** |  |
| **Blind lid in painted aluminum**<br>with silicone o-ring seal | **A5E03549429** |  |
| **Bag of loose spare parts**<br>including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors, and silicone o-rings | **A5E03549396** |  |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Mounting bracket - FCT030 field mount**<br>in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap | **A5E03906091** |  |
| **M12 option - remote**<br>in painted aluminum; pre-wired and potted replacement M12 connection for FCT030 field mount transmitter remote version | **A5E03906104** |  |
| **Remote junction box painted aluminum**<br>for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted | |  |
| • M20 | **A5E03906112** | |
| • NPT | **A5E03906130** | |

### *Spare parts - Transmitter FCT030 (FW 3.1)*

| Description | Article No. | |
|---|---|---|
| **Display and keypad assembly for field mount enclosure with Siemens logo**<br>for HW 2 and FW 3.1 version | **A5E03548971** |  |
| **Sensor cassette (compact) (HW version 2, FW 3.1.x)** | **A5E03549142** |  |
| **Sensor cassette (remote) (HW version 2, FW 3.1.x)** | **A5E03549098** | |
| **Frontend cassette**<br>Spare part frontend cassette for remote version of FC430 and cassette for FC410. For firmware 2.02.x | **A5E03549191** |  |
| **Power supply for field mount enclosure**<br>100 ... 240 V AC, 47 ... 63 Hz, 24 ... 90 V DC (HW version 2 and FW 3.1.x) | **A5E03549413** |  |
| **Transmitter cassette (active)**<br>4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x) | **A5E03549357** |  |
| **Transmitter cassette (passive)**<br>4 ... 20 mA output and HART 7.2 (HW version 2 and FW 3.1.x) | **A5E03549383** | |
| **I/O assembly**<br>Advise Order code F40 to F97, Selection and Ordering data[1)] | **A5E03939114** |  |
| **SensorFlash (micro SD card 1G)** | **A5E03915258** |  |

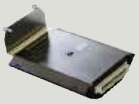
1) The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code "F40" for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input.

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## Selection and ordering data (continued)

### *Spare parts FCT030 - Fieldmount enclosure (FW 4.0)*

| Description | Article No. | |
|---|---|---|
| **Display and keypad assembly** | | |
| • From firmware 4.0, with Siemens logo | A5E37705139 |  |
| • From firmware 4.0, neutral version - no company logo | A5E39844362 |  |
| **Power supply for field mount enclosure**<br>FCT030 V 4.0 Fieldmount<br>100 ... 240 V AC, 47 ... 63 Hz,<br>19.2 ... 28.8 V DC | A5E38264471 |  |
| **Sensor cassette (compact)**<br>for systems without DSL and for systems with analog sensor connection, HW version 3, FW version 4.0 | A5E41526318 |  |
| **Sensor cassette (remote)**<br>Ex barrier module digital sensor connection (HW version 3, FW version 4.0) | A5E03549098 | |
| **Sensor cassette (remote)**<br>for systems with DSL, HW version 3, FW version 4.0 | A5E03549098 | |
| **Frontend cassette**<br>Spare part frontend DSL for remote version. For firmware V 4.0 | A5E41526286 |  |
| **SensorFlash (micro SD card 4G)** | A5E38288507 |  |
| **Transmitter cassette for firmware 4.0** | |  |
| • Ch1 E02: I/O and comm (active/passive)<br>4 ... 20 mA output and HART 7.5, Non-Ex | A5E38013040 | |
| • Ch1 E06: I/O and comm (-active)<br>4 ... 20 mA output and HART 7.5, Ex | A5E38012278 | |
| • Ch1 E07: I/O and comm (-passive)<br>4 ... 20 mA output and HART 7.5, Ex | A5E38013025 | |
| • Ch1 E10: Communication PROFIBUS PA, Non-Ex & Ex | A5E41216315 | |
| • Ch1 E11: Communication PROFIBUS DP, Non-Ex | A5E41216042 | |
| • Ch1: Communication Modbus RTU 485, Ex | A5E38013054 | |
| • Ch1: Communication Modbus RTU 485, Non-Ex | A5E38013069 | |
| **I/O Cassette for firmware 4.0** | | |
| • F01, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: None<br>Ch4: None | A5E38006256 | |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • F02, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None | A5E38006558 |  |
| • F03, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Current/Frequ./Pulse | A5E38006598 | |
| • F04, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay | A5E38006896 | |
| • F05, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: Relay | A5E38006900 | |
| • F06, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None | A5E38011432 | |
| • F11, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: None<br>Ch4: None | A5E38011478 | |
| • F12, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None | A5E38011509 | |
| • F13, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Current/Frequ./Pulse | A5E38011541 | |
| • F14, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay | A5E38011600 | |
| • F15, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: Relay | A5E38011618 | |
| • F16, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None | A5E38011908 | |
| • F21, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: None<br>Ch4: None | A5E38012039 | |
| • F22, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None | A5E38012056 | |
| • F23, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Current/Frequ./Pulse | A5E38012121 | |
| • F24, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay | A5E38019235 | |
| • F25, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: Relay | A5E38019263 | |
| • F26, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None | A5E38019378 | |
| **Adapter cable for FCS400 sensor**<br>with new transmitter<br>DSL/FCT010/FCT030, Version 4.0 | A5E50371933 | |
| **Remote adapter for wall bracket**<br>M20 cable connection | |  |
| • Ex | A5E42404417 | |
| • Non-Ex | A5E42846478 | |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Wall bracket for FCT030**<br>for M20 analog cable connector | **A5E42404426** |  |
| **Wall bracket for FCT010**<br>for M20 analog cable connector | **A5E42404447** |  |
| **Compact adapter for DSL/FCT030**<br>for upgrade from MASS 2100 DI 3, DI 6, DI 15 with MASS 6000 compact to DSL/FCT030 | |  |
| • Ex | **A5E42846758** | |
| • Non-Ex | **A5E42846760** | |
| **Compact adapter for DSL/FCT030**<br>FCS300 and FCS400 (DN 100 and DN 150 sensor) adapter for compact mount DSL, FCT010 or FCT030, Ex and Non-Ex | **TBD** | |

### *Spare parts - FCT030 wall mount enclosure*

| Description | Article No. | |
|---|---|---|
| **Display and keypad -assembly** | | |
| • For wall mount enclosure, Siemens logo | **A5E37697615** |  |
| • For wall mount enclosure, neutral version | **A5E39844261** |  |
| **Power supply for wall mount**<br>100 ... 240 V AC, 47 ... 63 Hz, 19.2 ... 28.8 V DC | **A5E38263021** |  |
| **Sensor cassette**<br>for FCT030 wall mounting enclosure | **TBD** |  |
| **Foam insert set for wall mount with connectors** | **A5E38287828** |  |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Wall mount enclosure front**<br>Versions:<br>• blind, Siemens version<br>• blind, neutral version - no company logo<br>• with glass | **A5E** |  |
| **Wall mount enclosure bracket for pipe mounting** | **A5E38288020** | |
| **Wall bracket panel mounting** | **A5E38288032** | |
| **Bag of loose spare parts for wall mount**<br>including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind connectors and O-rings | **A5E38288072** | |
| **Metall kit**<br>PSU cover back pane for wall mount enclosure | **A5E38415145** | |
| **Power input cover plate for wall mount enclosure** | **A5E38415205** |  |

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## Overview




MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

This product is not longer available. Repair and spare parts for MASS 6000 (all models and variants) can still be ordered. See spare part list.

## Selection and ordering data

***Accessories and spare parts for MASS 6000 generation***

| Description | Article No. | |
|---|---|---|
| **Cable with multiple plug** Standard blue cable between MASS 6000 and MASS 2100, 5 × 2 × 0.34 mm² twisted and screened in pairs. Temperature range -20 ... +110 °C (-4 ... +230 °F) | |  |
| • 5 m (16.4 ft) | **FDK:083H3015** | |
| • 10 m (32.8 ft) | **FDK:083H3016** | |
| • 25 m (82 ft) | **FDK:083H3017** | |
| • 50 m (164 ft) | **FDK:083H3018** | |
| • 75 m (246 ft) | **FDK:085U0229** | |
| • 150 m (492 ft) | **FDK:083H3055** | |

| Description | Article No. | |
|---|---|---|
| **Adapter for MASS 2100** M23 electrical adapter for MASS 2100 DI 3, DI 6, DI 15, DI 25 and DI 40 | **FDK:083L8889** |  |
| **M20 connector for cable mounting** | **FDK:083H5056** |  |
| **2 kB SENSORPROM unit, including programming** (Sensor Serial No. and Article No. must be specified by ordering) | **FDK:083H4410** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Cable glands, screwed entries type in polyamide 100 °C (212 °F), black, 2 pcs.** | | |
| • M20 | **A5E00822490** |  |
| • ½" NPT | **A5E00822501** |  |
| **Sun lid**<br>for MASS 6000 transmitter (frame and lid) | **A5E02328485** |  |

Add-on module

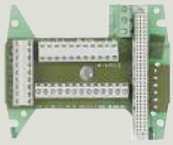
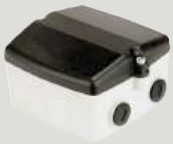
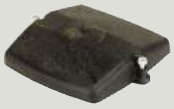
| Description | Article No. | |
|---|---|---|
| HART[1] | **FDK:085U0226** |  |
| PROFIBUS PA Profile 3[1] | **FDK:085U0236** | |
| PROFIBUS DP Profile 3 | **FDK:085U0237** | |
| MODBUS RTU RS 485 | **FDK:085U0234** | |
| FOUNDATION Fieldbus H1[1] | **A5E02054250** | |
| DeviceNet | **FDK:085U0229** | |

[1] Modules are rated Ex i when used with MASS 6000 Ex d.

### *Spare parts for compact or remote IP67 version*

| Description | Article No. | |
|---|---|---|
| **MASS 6000 transmitter IP67/NEMA 6**<br>Note: No CE decleration<br>Fibre glass reinforced polyamide and without connection board<br>1 current output<br>1 frq./pulse output<br>1 relay output | |  |
| • 115/230 V AC, 50/60 Hz | **A5E44054472** | |
| • 24 V AC/DC | **A5E44054482** | |
| **Wall mounting unit for IP67/NEMA 6 version**<br>with wall bracket, without connection board but with | | |
| • 4 × M20 cable glands | **FDK:085U1018** | |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| • 4 × ½" NPT cable glands | **A5E01164211** |  |
| **Connection board/PCB**<br>Supply voltage:<br>115/230 V/24 V AC/DC | **FDK:083H4260** |  |
| **Terminal box kit** | |  |
| • M20 cable glands | **A5E00832338** | |
| • ½" NPT cable glands | **A5E00832342** | |
| Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100.<br>The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor.<br>Not approved for hazardous locations | | |
| **Terminal box, in polyamide, inclusive lid** | |  |
| • M20 cable glands | **FDK:085U1050** | |
| • ½" NPT cable glands | **FDK:085U1052** | |
| Not approved for hazardous locations | | |
| **Terminal box - lid in polyamide** | **FDK:085U1003** |  |
| **Display and keypad**<br>• Siemens Front | **FDK:085U1039** |  |

### *Add-on spare parts required due to RoHs directives and EoL for EU and EU related countries*

| Description | Article No. |
|---|---|
| **MASS 6000 IP67**<br>Spare part PCB main | |
| • 230 V | **A5E41718138** |
| • 24 V | **A5E41718346** |
| **MASS 6000 19"/IP20**<br>Spare part PCB main | |
| • 1 current, 230 V | **A5E43226138** |
| • 3 current, 230 V | **A5E43226145** |

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## Selection and ordering data (continued)

| Description | Article No. |
|---|---|
| • 1 current, 24 V | A5E43226154 |
| • 3 current, 24 V | A5E43226168 |
| **MASS 6000 19"/IP20 Ex**<br>Spare part PCB main | |
| • 1 current, 230 V | A5E43226277 |
| • 3 current, 230 V | A5E43226342 |
| • 1 current, 24 V | A5E43226441 |
| • 3 current, 24 V | A5E43226455 |
| **MASS 6000 Ex d, spare part PCB**<br>Stainless steel, without module | FDK:083H3061 |
| **MASS 6000 Ex d, spare part barriere**<br>Stainless steel | A5E41718720 |
| **MASS 6000 19"/IP20, barriere PCB, Ex** | A5E41718669 |
| **MASS 6000 Ex d, connection board**<br>Stainless steel | A5E41718522 |

### *Accessories*

Enclosure (without PCB, connection board)

| Description | Article No. | |
|---|---|---|
| IP66/NEMA 4X, wall mounting enclosure for 19" inserts, 21 TE | FDK:083F5037 |  |

Enclosure

| Description | Article No. | |
|---|---|---|
| **Panel mounting enclosure for 19" insert (21 TE)**<br>IP65/NEMA 2 enclosure in ABS plastic for front panel mounting | FDK:083F5030 |  |
| **Panel mounting enclosure for 19" insert (42 TE)**<br>IP65/NEMA 2 enclosure in ABS plastic for front panel mounting | FDK:083F5031 |  |
| **Back of panel mounting enclosure for 19" insert (21 TE)**<br>IP20/NEMA 1 enclosure in aluminum | FDK:083F5032 |  |
| **Back of panel mounting enclosure for 19" insert (42 TE)**<br>IP20/NEMA 1 enclosure in aluminum | FDK:083F5033 |  |

## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Front cover (7 TE) for panel mounting enclosure** | FDK:083F4525 |  |

Connection boards/PCB for MASS 6000 and MASS 2100 sensors

| Description | Article No. | |
|---|---|---|
| **Connection board MASS 6000 for 19" IP20 rack mounting version**<br>• 24 V, 115/230 V | FDK:083H4272 |  |
| **Connection board MASS 6000 Ex [ia] IIC for 19" IP20 rack mounting version**<br>• 24 V, 115/230 V | FDK:083H4273 | |
| **Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38**<br>• 24 V, 115/230 V | FDK:083H4274 |  |
| **Connection board MASS 6000 Ex [ia] IIC for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38**<br>• 24 V, 115/230 V | FDK:083H4275 | |

Connection boards/PCB for MASS 6000 and MC2 sensors

| Description | Article No. | |
|---|---|---|
| **Connection board MASS 6000 for 19" IP20 rack mounting version**<br>• 24 V, 115/230 V | FDK:083H4272 |  |
| **Connection board MASS 6000 for Ex application[1] and 19" IP20 rack mounting version**<br>(connection board MASS 6000 to MC2 sensors Ex-approved)<br>• 24 V, 115/230 V | FDK:083H4294 | |
| **Connection board MASS 6000 for 19" wall mounting version, for enclosure FDK:083F5037/FDK:083F50-38**<br>• 24 V, 115/230 V | FDK:083H4274 |  |
| **Connection board MASS 6000 for Ex application1) and 19" wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F50-38**<br>• 24 V, 115/230 V | FDK:083H4295 | |

[1] Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Wall mounting enclosure in ABS plastic IP65**<br>with connection board/PCB for Ex application connected to MC2 Ex sensors | **FDK:083H4296** |  |

### *Spare parts 19" versions*

Enclosure (without PCB, connection board)

| Description | Article No. | |
|---|---|---|
| **IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814** | | |
| • 21 TE | **FDK:083F5037** |  |
| • 42 TE | **FDK:083F5038** |  |
| **Display unit for 19" versions**<br>Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display part only for replacement | **FDK:083U1039** |  |

### *Accessories*

Add-on module for remote and compact MASS 6000 Ex d

| Description | Article No. | |
|---|---|---|
| **HART (Ex-i)** | **FDK:085U0226** |  |
| **PROFIBUS PA Profile 3 (Ex-i)** | **FDK:085U0236** | |
| **FOUNDATION Fieldbus H1 (Ex-i)** | **A5E02054250** | |

### *Operating instructions for SITRANS F add-on modules*

| Description | Article No. |
|---|---|
| **HART** | |
| • English | **A5E03089708** |
| Profibus PA/DP | |
| • English | **A5E00726137** |
| • German | **A5E01026429** |
| **MODBUS** | |
| • English | **A5E00753974** |
| • German | **A5E03089262** |

## Selection and ordering data (continued)

| Description | Article No. |
|---|---|
| **FOUNDATION Fieldbus** | |
| • English | **A5E02318728** |
| • German | **A5E02488856** |
| **DeviceNet** | |
| • English | **A5E03089720** |

This device is shipped with Safety Notes and a DVD containing further SITRANS F C literature.

All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation

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## Overview



SIFLOW FC070 is only available as spare part.

SIFLOW FC070 is based on the SIMATIC S7-300 and the MASS 6000 technology.

The SIFLOW FC070 transmitter can be connected analogically with the Sitrans FC MASS 2100 DI 1.5, DI 3, DI 6, DI 15 and the FC300 DN4.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex & CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

## Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications

## Selection and ordering data

| Description | Article No. |
|---|---|
| ***SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.*** | **7ME4120-2DH20-0EA0** |
| **40 pin front plug** with screw contacts | **6ES7392-1AM00-0AA0** |
| **40 pin plug** with spring contacts | **6ES7392-1BM01-0AA0** |
| ***SIFLOW FC070 Ex flow transmitter Remember to order 20 pin front plug connector.*** | **7ME4120-2DH21-0EA0** |
| **20 pin front plug** with screw contacts | **6ES7392-1AJ00-0AA0** |
| **20 pin plug** with spring contacts | **6ES7392-1BJ00-0AA0** |

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **Cable with multiplug** for connecting MASS 2100, FCS200 and FC300 sensors, 5 × 2 × 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F) | |  |
| • 5 m (16.4 ft) | **FDK:083H3015** | |
| • 10 m (32.8 ft) | **FDK:083H3016** | |
| • 25 m (82 ft) | **FDK:083H3017** | |
| • 50 m (164 ft) | **FDK:083H3018** | |
| • 75 m (246 ft) | **FDK:083H3054** | |
| • 150 m (492 ft) | **FDK:083H3055** | |
| **Cable without multiplug** for connecting MC2 sensors, 5 × 2 × 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F) | |  |
| • 10 m (32.8 ft) | **FDK:083H3001** | |
| • 25 m (82 ft) | **FDK:083H3002** | |
| • 75 m (246 ft) | **FDK:083H3003** | |
| • 150 m (492 ft) | **FDK:083H3004** | |

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## Technical specifications

| Measurement of | Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in % |
|---|---|
| **Measurement functions** | |
| • Totalizer 1 | Totalization of mass flow, volume flow, fraction A, fraction B |
| • Totalizer 2 | Totalization of mass flow, volume flow, fraction A, fraction B |
| • Single and 2-stage batch function | Batching function with the use of one or two outputs for dosing in high and low speed |
| • 4 programmable limits | 4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached |
| **Digital input** | |
| Functions | Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output |
| High signal | • Nominal voltage: 24 V DC<br>• Lower limit: 15 V DC<br>• Upper limit: 30 V DC<br>• Current: 2 ... 15 mA |
| Low signal | • Nominal voltage: 0 V DC<br>• Lower limit: -3 V DC<br>• Upper limit: 5 V DC<br>• Current: -15 ... +15 mA |
| Input | Approx. 10 kΩ |
| Switching | Max. 100 Hz |
| **Digital output 1 and 2** | |
| Functions | • Output 1:<br>Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch<br>• Output 2:<br>Redundancy pulse, redundancy frequency, 2-stage batch |
| Voltage supply | 3 ... 30 V DC (passive output) |
| Switching current | Max. 30 mA at 30 V DC |
| Voltage drop | ≤ 3 V DC at max. current |
| Leakage current | ≤ 0.4 mA at max. voltage 30 V DC |
| Load resistance | 1 ... 10 kΩ |
| Switching frequency | 0 ... 12 kHz 50 % duty cycle |
| Functions | Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch |
| **Communication** | |
| Modbus RS 232C | • Max. baud rate: 115 200 baud<br>• Max. line length: 15 m at 115 200 baud<br>• Signal level: according to EIA-RS 232C |
| Modbus RS 485 | • Max. baud rate: 115 200 baud<br>• Max. line length: 1 200 m at 115 200 baud<br>• Signal level: according to EIA-RS 485<br>• Bus termination: Integrated. Can be enabled by inserting wire jumpers. |
| **Galvanic isolation** | All inputs, outputs and communication interfaces are galvanically isolated.<br>Isolation voltage: 500 V |
| **Power** | |
| Supply | 24 V DC nominal |
| Tolerance | 20.4 V DC ... 28.8 V DC |
| Consumption | Max. 7.2 W |
| Fuse | T1 A/125 V, not replaceable by operator |

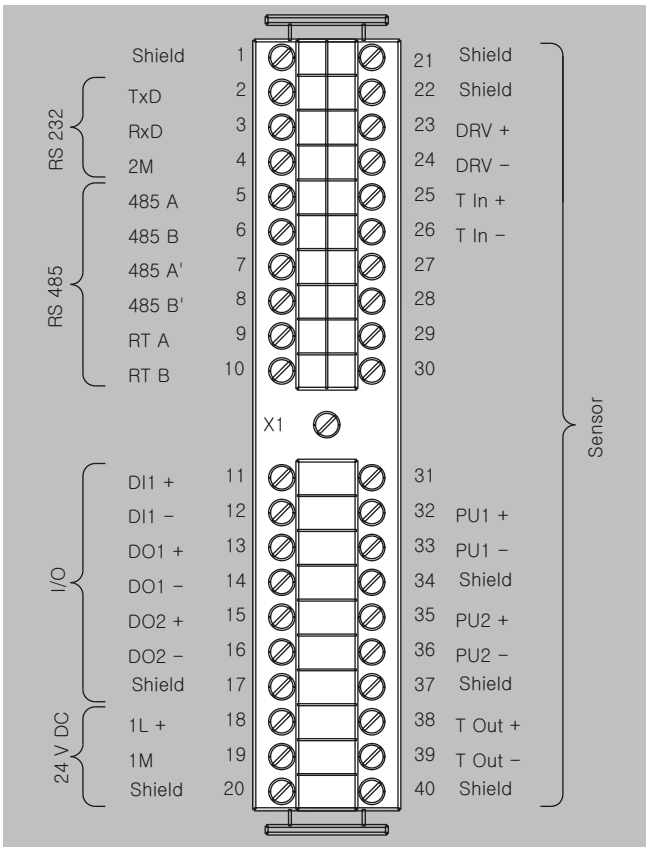
## Technical specifications (continued)

| Measurement of | Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in % |
|---|---|
| **Environment** | |
| Ambient temperature | Storage: -40 °C ... +70 °C (-40 °F ... +158 °F) |
| Operation conditions | Horizontally mounted rail:<br>• SIFLOW FC070 Standard: 0 ... +60 °C (32 ... +140 °F)<br>• SIFLOW FC070 Ex CT: -40 ... +60 °C (-40 ... +140 °F)<br>Vertically mounted rail:<br>• SIFLOW FC070 Standard: 0 ... 45 °C (32 ... 113 °F)<br>• SIFLOW FC070 Ex CT: -40 ... +45 °C (-40 ... +113 °F) |
| Altitude | Operation: -1 000 ... 2 000 m (pressure 795 ... 1 080 hPa) |
| **Enclosure** | |
| Material | Noryl, color: anthracite |
| Rating | IP20/NEMA 2 according to IEC 60529 |
| Mechanical load | According to SIMATIC standards (S7-300 devices) |
| **Programming tools** | |
| SIMATIC S7 | Configuration through backplane P-BUS, PLC program and WinCC flexible |
| SIMATIC PCS7 | Configuration trough backplane P-BUS and PLC/WinCC faceplates, certified driver |
| SIMATIC PDM | Through Modbus port RS 232C and RS 485, certified driver |

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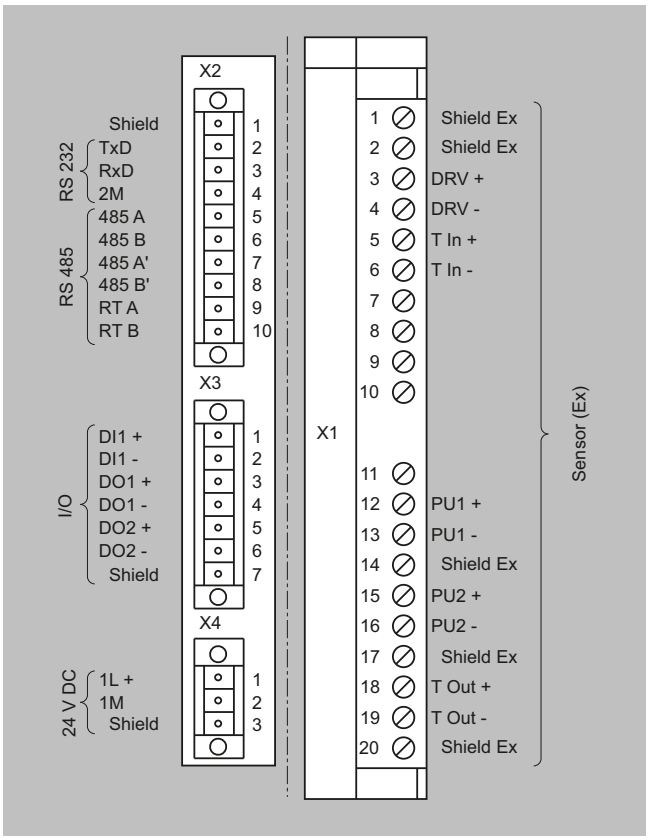


## Circuit diagrams




SIFLOW FC070, electrical connection

## Circuit diagrams (continued)




SIFLOW FC070 Ex CT, electrical connection

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## Overview



SITRANS FST030 with FSS200 and external DSL

SITRANS FS clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense.

## Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Single or dual path with internal DSL, up to four paths with external DSL option

| System performance | |
|---|---|
| Approvals | • ATEX Zone 1, 2 (Sensors: Zone 0, 1, 2)<br>• IECEx Zone 1, 2 (Sensors: Zone 0, 1, 2)<br>• FM/FMc Class I Div. 1, 2 (Sensors: Class I Div. 1) |
| Accuracy at measuring point | ± 0.5 ... 1 % for velocities above 0.3 m/s and >10 diameters straight run<br>± 0.5 % ± 0.0015 m/s with high precision or universal sensors<br>± 1 % ± 0.003 m/s with high temperature sensors<br>for velocities above 0.3 m/s and > 10 diameters straight run and optimal installation conditions |
| Repeatability at maesuring point | ± 0.25 % (based on ISO 11631) |
| Accuracy of measuring system | ± 0.2 % ± 0.0015 m/s with high precision or universal sensors<br>± 0.5 % ± 0.003 m/s with high temperature sensors |
| Repeatability of the measuring system | ± 0.05 – 0.1% |
| Pipe size range | 12.7 ... 10 m (0.5" ... 394") |
| Wall thickness range | 0.64 ... 76.2 mm (0.025" ... 3.0") |
| Pipe material | Any sonically conductive material (steel, plastic, aluminum, glass, cement, ductile iron, copper) |
| Optional External DSL | Zone 0, 1, 2, Class 1 Div. 1 with Transmitter in Zone 2 Class 1 Div. 2 area |

Digitaler Sensor Link (FS-DSL)

The electronics for creating measured values for an ultrasonic measurement are located in a compact module called: Digital Sensor Link.

Together with the ultrasonic sensors, this module creates an analogue measurement signal for volume flow and lots of other data. All data is then immediately digitized and sent to the transmitter without interference.

The advantage: best possible EMC thanks to very short analog signal lines and safer data transfer to possible transmitter variants.

The FS-DSL is suitable for clamp-on sensors as well as for inline - SONO sensors, the set firmware determines the respective technology. The FS-DSL is available for water applications, for oil measurements and also for clamp-on gas measurements.

The module can be used in Ex-Zone 1 (Class 1 Div 1) as an external FS-DSL in a pressure-encapsulated IP 66/67 housing. The distance to the transmitter can be up to 150 m, which is also how the FS-DSL is powered. The FS-DSL offers analog inputs for temperature and pressure and is always designed for up to 4 measuring paths in the external version.

Option:

Optionally, the FS-DSL module is also available integrated in the SITRANS FST030 only in the version as a wall housing, but then with reduced EMC, number of paths and Ex version.

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## Application

SITRANS FS230 standard functions are suitable for a wide variety of liquid applications, including the following:

- Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Condensers
  - Hot & cold water systems
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

SITRANS FS230 hydrocarbon functions are ideal for applications carrying crude oil, refined petroleum or liquefied gas.

***Standard volume (high end system)***

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Chemical and petrochemical processing
- Precise identification of interfaces on multi-liquid pipelines
- Product identification
- Standard density indication
- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity

SITRANS FS230 is ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

The FS230 can be supplied with an external DSL option that allows for up to four paths with two additional analog inputs. The External DSL enclosure can be installed in a Zone 1 or Div 1 area near the sensors and measurement pipe using short sensor cables, with communication cable to transmitter up to 150 meters away.

***System information and selection guide***

| SITRANS FS clamp-on flowmeters | FS230 (Standard) | FS230 (Hydrocarbon) | FS230 (Gas) |
|---|---|---|---|
| **Industry/Applications** | | | |
| Water and aqueous solutions | X | - | - |
| Utility district heating, cooling | X | - | - |
| Chemical | X | - | - |
| Hydrocarbons/petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume | - | X | - |
| Hydrocarbons (single product with limited viscosity range) gross volume | X | X | |
| Very low flow (< 0.1 m/s) in small pipes | X | - | |
| High temperature applications < 232 °C (450 °F) | X | - | - |
| Refrigeration liquids | X | - | - |
| Food products | X | - | - |
| Natural Gas | - | - | X |
| Other gases i.e. propane, oxygen, argon etc. | - | - | X |
| **Design** | | | |
| Field clamp-on (non-intrusive) | X | X | X |
| Standard volume or mass flow; per API MPMS chapter 11.1 | - | X | X |

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## Application (continued)

| SITRANS FS clamp-on flowmeters | FS230 (Standard) | FS230 (Hydrocarbon) | FS230 (Gas) |
|---|---|---|---|
| Interface detection | - | X | X |
| Standard density output | - | X | X |
| Temperature measurement | X | X | X |
| Analog input | X | X | X |
| Large graphical display | X | X | X |
| Configuration and diagnostic software PDM compatible | X | X | X |
| **Number of acoustic paths and channels** | | | |
| 1-path | X | X | X |
| 2-path | X | X | X |
| 3-path (with external DSL) | X | X | X |
| 4-path (with external DSL) | X | X | X |
| **Size** | | | |
| 12.7 ... 10 000 mm (0.5" ... 394") | X | - | - |
| 38 ... 10 000 mm (1.5" ... 394") | - | X | - |
| 38 ... 1 200 mm (1.5" ... 48") | - | - | X |
| **Approvals** | | | |
| FM /FMc[1)] | X | X | X |
| ATEX | X | X | X |
| IECEx | X | X | X |

1) NEMA 4X associated equiptment in DIV 2 connected to DIV 1 sensors and DIV 1 external DSL.

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## Selection and ordering data

| SITRANS FS230 clamp-on flowmeter | Article No. 7ME372 ● - ● ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Transmitter model** | | |
| Transmitter FST030 | 3 | |
| **Pipe material/temperature** | | |
| Transmitter only - no sensor | 0 | |
| Steel (stainless steel, carbon steel), temperature range: best use < 80 °C (176 °F) | 1 | |
| Steel (stainless steel, carbon steel), temperature range: best use > 80 °C (176 °F) | 2 | |
| Plastic (PVC) (for gas applications), temperature: -40 ... 65.5 °C (-40 ... 150 °F) | 4 | |
| Plastic (PVC) (for liquid applications), temperature: -40 ... +121 °C (-40 ... 250 °F) | 6 | |
| All materials except steel and plastic, temperature: -40 ... +121 °C (-40 ... 250 °F) | 7 | |
| Any material, very high temperature: -40 ... +230 °C (-40 ... 446 °F) | 8 | |
| **Pipe outer diameter range** | | |
| Transmitter only - no sensor | A | |
| 13 ... 19 mm (0.5 ... 0.75") | B | |
| 19.3 ... 30.5 mm (0.76 ... 1.20") | C | |
| 30.7 ... 50.8 mm (1.21 ... 2.00") | D | |
| 51 ... 76 mm (2.01 ... 3.00") | E | |
| 78 ... 127 mm (3.1 ... 5.0") | F | |
| 129 ... 203 mm (5.1 ... 8.0") | G | |
| 206 ... 305 mm (8.1 ... 12.0") | H | |
| 307 ... 508 mm (12.1 ... 20.0") | J | |
| 510 ... 1200 mm (20.1 ... 48.0") | K | |
| 1200 ... 9144 mm (48.0 ... 360") | L | |
| **Pipe wall thickness range** | | |
| Transmitter only - no sensor | A | |
| 0.635 ... 1.016 mm (0.025 ... 0.04") | B | |
| 1.016 ... 1.524 mm (0.04 ... 0.06") | C | |
| 1.524 ... 2.032 mm (0.06 ... 0.08") | D | |
| 2.032 ... 3.048 mm (0.08 ... 0.12") | E | |
| 3.048 ... 4.064 mm (0.12 ... 0.16") | F | |
| 4.064 ... 5.842 mm (0.16 ... 0.23") | G | |
| 5.842 ... 8.128 mm (0.23 ... 0.32") | H | |
| 8.128 ... 11.176 mm (0.32 ... 0.44") | J | |
| 11.176 ... 15.748 mm (0.44 ... 0.62") | K | |
| 15.748 ... 31.75 mm (0.62 ... 1.25") | L | |
| 31.75 ... 50.8 mm (1.25 ... 2.00") | M | |
| **Sensor mounting** | | |
| Transmitter only - no sensor | 0 | |
| Mounting straps only | 1 | |
| Standard frames and tracks | 2 | |
| Magnetic - no straps | 4 | |
| Magnetic - with straps | 6 | |
| High precision mount (single enclosure) | 7 | |
| High precision mount (dual enclosure) | 8 | |
| **Number of paths (sensor pairs)** | | |
| Transmitter only - no sensor | 0 | |
| One path | 1 | |
| Two path | 2 | |
| Three path | 3 | |
| Four path | 4 | |
| **Environment** | | |
| Standard | 1 | |
| **Transmitter/DSL Material and mounting style** | | |
| Industrial enclosure transmitter with external FS DSL for remote to the sensors. Transmitter and DSL: aluminum cast, NEMA 4X, max. 4 path, M12 connection between transmitter and FS-DSL with SSL cable | G | |
| Industrial enclosure transmitter with external FS DSL for remote to the sensors. Transmitter and DSL: aluminum cast, NEMA 4X, max. 4 path, cable connection between transmitter and FS-DSL with SSL cable | K | |

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## Selection and ordering data (continued)

| SITRANS FS230 clamp-on flowmeter | Article No. 7ME372 ● - ● ● ● ● ● - ● ● ● ● | Order code ● ● ● |
|---|---|---|
| Replacement DSL for option V transmitter, no transmitter<br>DSL: aluminium cast, NEMA 4X, M12 socket for DSL to transmitter interconnect cable | N | |
| Replacement DSL for option W transmitter, no transmitter<br>DSL: aluminium cast, NEMA 4X, terminal block for DSL to transmitter interconnect cable | Q | |
| Wallmount transmitter, internal DSL, transmitter: aluminum wallbox, NEMA 4X, DSL: none, direct connected sensor cables, (max 2-path, max. 20 meter sensor cable) | U | |
| Wall box housing, external DSL, remote to sensor<br>Transmitter: aluminum wallbox, NEMA 4X<br>DSL: aluminum cast, NEMA 4X, M12 socket for DSL to transmitter interconnect cable (max 4-path, max. 20 m sensor cable, max. 150 m interconnect cable) | V | |
| Wall box housing, external DSL, remote to sensor<br>Transmitter: aluminum wall box, NEMA 4X<br>DSL: aluminum cast, NEMA 4X, terminal block for DSL to transmitter interconnect cable (max. 4-path, max. 20 m sensor cable, max. 150 m interconnect cable) | W | |
| **Ex approvals** | | |
| Non-Ex | A | |
| ATEX, wallbox enclosure | B | |
| ATEX, industrial enclosure | C | |
| IECEx, wallbox | E | |
| IECEx, industrial enclosure | F | |
| FM, FMc, wallbox enclosure | G | |
| FM, FMc, industrial enclosure | H | |
| CSA, wallbox enclosure | L | |
| CSA, industrial enclosure | M | |
| ATEX, IECEx, FM, CSA, industrial enclosure | N | |
| ATEX, IECEx, FM, FMc, wallbox enclosure | P | |
| NEPSI | Z | Q 0 B |
| InMetro | Z | Q 0 D |
| KCs | Z | Q 0 F |
| **Local User Interface** | | |
| Graphical local user interface, 240 × 160 pixels | 3 | |

| | Order code |
|---|---|
| **Further designs**<br>Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable glands - transmitter, DSL (not for sensor cables)** | |
| No glands, metric threads on transmitter | **A01** |
| No cable glands, NPT thread, nickle plated brass, quantity based on option "G" data place 14 | **A20** |
| No cable glands, NPT thread, stainless steel, quantity bases on option "G" data place 14 | **A21** |
| Cable glands, nickle plated brass, quantity based on option "G" data place 14 | **A22** |
| Cable glands, plastic, quantity based on option "G" data place 14 | **A24** |
| Cable glands, stainless seel, quantity based on option "G" data place 14 | **A26** |
| No cable glands, NPT thread, nickle plated brass, quantity based on option "K" data place 14 | **A30** |
| No cable glands, NPT thread, stainless steel, quantity bases on option "K" data place 14 | **A31** |
| Cable glands, nickle plated brass, quantity based on option "K" data place 14 | **A32** |
| Cable glands, plastic, quantity based on option "K" data place 14 | **A34** |
| Cable glands, stainless seel, quantity based on option "K" data place 14 | **A36** |

| | Order code |
|---|---|
| No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "N" in data place 14 | **A40** |
| No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "N" in data place 14 | **A41** |
| Nickel plated brass glands: quantity based on selection "N" in data place 14 | **A42** |
| Plastic glands: quantity based on selection "N" in data place 14 | **A44** |
| Stainless steel glands: quantity based on selection "N" in data place 14 | **A46** |
| No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "Q" in data place 14 | **A50** |
| No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "Q" in data place 14 | **A51** |
| Nickel plated brass glands: quantity based on selection "Q" in data place 14 | **A52** |
| Plastic glands: quantity based on selection "Q" in data place 14 | **A54** |
| Stainless steel glands: quantity based on selection "Q" in data place 14 | **A56** |
| No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "U" in data place 14 | **A60** |
| No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "U" in data place 14 | **A61** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| Nickel plated brass glands: quantity based on selection "U" in data place 14 | **A62** |
| Plastic glands: quantity based on selection "U" in data place 14 | **A64** |
| Stainless steel glands: quantity based on selection "U" in data place 14 | **A66** |
| No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "V" in data place 14 | **A70** |
| No glands, metric thread with NPT thread adapters, stainless steel: quantity based on selection "V" in data place 14 | **A71** |
| Nickel plated brass glands: quantity based on selection "V" in data place 14 | **A72** |
| Plastic glands: quantity based on selection "V" in data place 14 | **A74** |
| Stainless steel glands: quantity based on selection "V" in data place 14 | **A76** |
| No glands, metric thread with NPT thread adapters, nickel plated brass: quantity based on selection "W" in data place 14 | **A80** |
| No glands, metric thread with NPT thread adapters, stainless steel: Quantity based on selection "W" in data place 14 | **A81** |
| Nickel plated brass glands: quantity based on selection "W" in data place 14 | **A82** |
| Plastic glands: quantity based on selection "W" in data place 14 | **A84** |
| Stainless steel glands: quantity based on selection "W" in data place 14 | **A86** |
| **Software functions and CT approvals** | |
| For standard industry applications (liquids, e.g. water) | **B11** |
| Hydrocarbon applications (oil table with temperature and viscosity compensation) | **B39** |
| For gas process values | **B50** |
| **I/O configuration Ch1** | |
| Non-Ex, 4 ... 20 mA HART, menu selected passive/active | **E02** |
| Ex, 4 ... 20 mA HART, active | **E06** |
| Ex, 4 ... 20 mA HART, passive | **E07** |
| Modbus RTU 485 | **E14** |
| **I/O configuration Ch2, Ch3 and Ch4** | |
| None | **F00** |
| Non-Ex | |
| • Ch2: current/freq./pulse, Ch3: none, Ch4: none. Active/passive menu selected | **F01** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: none. Active/passive menu selected | **F02** |
| • Ch2:current/freq./pulse, Ch3: current/freq./pulse, Ch4:current/freq./pulse. Active/passive menu selected | **F03** |
| • Ch2:current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay. Active/passive menu selected | **F04** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: relay. Active/passive menu selected | **F05** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: none. Active/passive menu selected | **F06** |

| | Order code |
|---|---|
| Ex Passive | |
| • Ch2: current/freq./pulse, Ch3: none, Ch4: none | **F11** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: none | **F12** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: current/freq./pulse | **F13** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay | **F14** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: relay | **F15** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: none | **F16** |
| Ex Active | |
| • Ch2: current/freq./pulse, Ch3: none, Ch4: none | **F21** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: None | **F22** |
| • Ch2:current/freq./pulse, Ch3: current/freq./pulse, Ch4:current/freq./pulse | **F23** |
| • Ch2: current/freq./pulse, Ch3: current/freq./pulse, Ch4: relay | **F24** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: relay | **F25** |
| • Ch2: current/freq./pulse, Ch3: relay, Ch4: none | **F26** |
| **Certificates** | |
| Factory certification 2.2 to EN 10204:2004 | **C19** |
| **DSL strap kit (to strap DSL to pipe)** | |
| • 60.3 mm (2 inch) pipe mount with U-bolts | **G01** |
| • Stainless steel strap to mount DSL to pipe DN 60 ... 150 pipe size (2 ... 6 inch) | **G03** |
| • Stainless steel strap to mount DSL to pipe DN 150 ... 300 (6 ... 12 inch) | **G05** |
| • Stainless steel strap to mount DSL to pipe DN 300 ... 400 (12 ... 16 inch) | **G07** |
| • Stainless steel strap to mount DSL to pipe DN 400 ... 600 (16 ... 24 inch) | **G08** |
| **Temperature sensors and pockets** | |
| 1 000 Ω platinum standard clamp-on RTD | **J61** |
| 1 000 Ω platinum submersible clamp-on RTD | **J62** |
| **Sensor cables to transmitter/DSL for 1-path** | |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands | **K21** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands | **K22** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands | **K23** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands | **K24** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands | **K25** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **K26** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **K27** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **K28** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **K29** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **K30** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands | **K31** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **K32** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands | **K33** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **K34** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands | **K35** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands | **K36** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands | **K37** |
| 5 m(16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **K38** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **K39** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands | **K40** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands | **K41** |
| 1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **K50** |
| 3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **K51** |
| 5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **K52** |
| 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands | **K53** |
| 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands | **K54** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands | **K76** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands | **K77** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with no glands | **K78** |
| **Sensor cables to transmitter/DSL for 2-path** | |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands | **T21** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands | **T22** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands | **T23** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands | **T24** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands | **T25** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **T26** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **T27** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **T28** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **T29** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **T30** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands | **T31** |

| | Order code |
|---|---|
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **T32** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands | **T33** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **T34** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands | **T35** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands | **T36** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands | **T37** |
| 5 m(16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **T38** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **T39** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands | **T40** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands | **T41** |
| 1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **T50** |
| 3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **T51** |
| 5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **T52** |
| 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands | **T53** |
| 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands | **T54** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands | **T76** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands | **T77** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with no glands | **T78** |
| **Sensor cables to transmitter/DSL for 3-path** | |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands | **U21** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands | **U22** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands | **U23** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands | **U24** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands | **U25** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **U26** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **U27** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **U28** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **U29** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **U30** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands | **U31** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **U32** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands | **U33** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **U34** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands | **U35** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands | **U36** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands | **U37** |
| 5 m(16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **U38** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **U39** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands | **U40** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands | **U41** |
| 1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **U50** |
| 3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **U51** |
| 5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **U52** |
| 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands | **U53** |
| 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands | **U54** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands | **U76** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands | **U77** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with no glands | **U78** |
| **Sensor cables to transmitter/DSL for 4-path** | |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nylon glands | **V21** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nylon glands | **V22** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nylon glands | **V23** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nylon glands | **V24** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nylon glands | **V25** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **V26** |
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **V27** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **V28** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **V29** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with nickel plated brass glands | **V30** |
| 1 m (3.2 ft) standard/submersible coax sensor cable pair with stainless steel glands | **V31** |

| | Order code |
|---|---|
| 3 m (9.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **V32** |
| 5 m (16.4 ft) standard/submersible coax sensor cable pair with stainless steel glands | **V33** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with stainless steel glands | **V34** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with stainless steel glands | **V35** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with nylon glands | **V36** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nylon glands | **V37** |
| 5 m(16.4 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **V38** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with nickel plated brass glands | **V39** |
| 5 m (16.4 ft) plenum rated coax sensor cable pair with stainless steel glands | **V40** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with stainless steel glands | **V41** |
| 1 m (3.2 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **V50** |
| 3 m (9.8 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **V51** |
| 5 m (16.4 ft) armored sensor cable pair with nickel plated brass glands. Temperature: -25 ... +80 °C | **V52** |
| 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands | **V53** |
| 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands | **V54** |
| 10 m (32.8 ft) standard/submersible coax sensor cable pair with no transmitter glands | **V76** |
| 20 m (65.6 ft) standard/submersible coax sensor cable pair with no transmitter glands | **V77** |
| 20 m (65.6 ft) plenum rated coax sensor cable pair with no glands | **V78** |
| **Cable, DSL to wallbox transmitter** | |
| 5 m (16.4 ft) standard DSL cable (2 mounted M12 plugs) | **L51** |
| 5 m (16.4 ft) standard DSL cable (no plugs mounted) | **L52** |
| 10 m (32.8 ft) standard DSL cable (2 mounted M12 plugs) | **L55** |
| 10 m (32.8 ft) standard DSL cable (no plugs mounted) | **L56** |
| 25 m (82 ft) standard DSL cable (2 mounted plugs) | **L59** |
| 25 m (82 ft) standard DSL cable (no plugs mounted) | **L60** |
| 50 m (164 ft) standard DSL cable (2 mounted plugs) | **L63** |
| 50 m (164 ft) standard DSL cable (no plugs mounted) | **L64** |
| 75 m (246.1 ft) standard DSL cable (2 mounted plugs) | **L67** |
| 75 m (246.1 ft) standard DSL cable (no plugs mounted) | **L68** |
| 150 m (492.1 ft) standard DSL cable (2 mounted plugs) | **L71** |
| 150 m (492.1 ft) standard DSL cable (no plugs mounted) | **L72** |
| **RTD cable (clamp temperature sensor to transmitter)** | |
| 6 m (20 ft) standard RTD cable | **R50** |
| 15 m (50 ft) standard RTD cable | **R51** |
| 30 m (100 ft) standard RTD cable | **R52** |
| 46 m (150 ft) standard RTD cable | **R53** |
| 61 m (200 ft) standard RTD cable | **R54** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 91 m (300 ft) standard RTD cable | **R55** |
| 6 m (20 ft) submersible RTD cable | **R56** |
| 15 m (50 ft) submersible RTD cable | **R57** |
| 30 m (100 ft) submersible RTD cable | **R58** |
| 46 m (150 ft) submersible RTD cable | **R59** |
| 61 m (200 ft) submersible RTD cable | **R60** |
| 91 m (300 ft) submersible RTD cable | **R61** |
| **Mass storage** | |
| Enable mass storage function for SD card (not available for USA) | **S30** |
| **Country specific approval** | |
| KC-Approval for South Korea | **W28** |
| **Tag plate** | |
| Tag plate for external DSL, stainless steel | **Y14** |
| Tag plate for transmitter, stainless steel | **Y15** |
| Tag name plate, stainless steel | **Y17** |

| | Article No. |
|---|---|
| **System spare parts** | |
| **Tool kits and loose parts** | |
| "F" connector tool kit, 2 per | **A5E38145699** |
| Bag of loose spare parts; for wallmount, including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and O-rings | **A5E38288072** |
| **Electronics assemblies and modules** | |
| Wall mount transmitter | |
| • Display and keypad assembly | **A5E37697615** |
| • Digital Sensor Link (DSL), internal, for wall box, standard process values | **A5E38014726** |
| • Digital Sensor Link (DSL), internal, for wall box, hydrocarbon process values | **A5E42138542** |
| • Digital Sensor Link (DSL), internal, for wall box, gas process values | **A5E47202379** |
| • SensorFlash (4 GB micro SD card) -40 °C ... +85 °C | **A5E38288507** |
| • Power supply, for wall box, (240 V AC, 47 ... 63 Hz), (24 ... 90 V DC) | **A5E38263021** |
| • Foam insert for wall box with connectors | **A5E38287828** |
| External DSL | |
| • Digital Sensor Link (DSL), external, module only, standard process values | **A5E38014662** |
| • Digital Sensor Link (DSL), external, module only, hydrocarbon process values | **A5E37843869** |
| • Digital Sensor Link (DSL), external, module only, gas process values | **A5E47202369** |
| • F connector board set: board A, board B and screws for mounting | **A5E45882316** |
| • Front end module cover plate with screws for mounting | **A5E45882046** |
| **Cassettes, I/O configuration and communication** | |
| • Ch1: I/O and comm (active) 4 ... 20 mA output and HART 7.2, Ex | **A5E38012278** |
| • Ch1: I/O and comm (passive) 4 ... 20 mA output and HART 7.2, Ex | **A5E38013025** |

| | Article No. |
|---|---|
| • Ch1: communication Modbus RTU 485, Ex | **A5E38013054** |
| • Ch1: I/O and comm (active/passive) 4 ... 20 mA output and HART 7.2, Non-Ex | **A5E38013040** |
| • Ch1: communication Modbus RTU 485, Non-Ex | **A5E38013069** |
| • F01, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: None<br>Ch4: None<br>Menu select active/passive | **A5E38006256** |
| • F02, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None<br>Menu select active/passive | **A5E38006558** |
| • F03, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Current/Frequ./Pulse<br>Menu select active/passive | **A5E38006598** |
| • F04, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay<br>Menu select active/passive | **A5E38006896** |
| • F05, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: Relay<br>Menu select active/passive | **A5E38006900** |
| • F06, Non-Ex<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None<br>Menu select active/passive | **A5E38011432** |
| • F11, Ex-passive<br>Ch2: Current/Freq./Pulse<br>Ch3: None<br>Ch4: None | **A5E38011478** |
| • F12, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None | **A5E38011509** |
| • F13, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Current/Frequ./Pulse | **A5E38011541** |
| • F14, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay | **A5E38011600** |
| • F15, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay,<br>Ch4: Relay | **A5E38011618** |
| • F16, Ex-passive<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None | **A5E38011908** |

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## Selection and ordering data (continued)

| | Article No. |
|---|---|
| • F21, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: None<br>Ch4: None | A5E38012039 |
| • F22, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: None | A5E38012056 |
| • F23, Ex-active<br>Ch2: current/freq./pulse,<br>Ch3: current/freq./pulse,<br>Ch4: current/freq./pulse | A5E38012121 |
| • F24, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Current/Frequ./Pulse<br>Ch4: Relay | A5E38019235 |
| • F25, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: Relay | A5E38019263 |
| • F26, Ex-active<br>Ch2: Current/Frequ./Pulse<br>Ch3: Relay<br>Ch4: None | A5E38019378 |
| **Miscellaneous parts** | |
| General | |
| • Blind plug brass-nickel 10 pcs (Ex version) | A5E38145685 |
| • Blind plug stainless steel 10 pcs (Ex version) | A5E38145689 |
| • Twist-on F connectors, 4 pcs | A5E38268608 |
| • M12 adapter for DSL or wall mounted transmitter | A5E03906095 |
| Wall mount transmitter | |
| • Wall bracket "pipe mounting" | A5E38288020 |
| • Wall bracket "panel mounting | A5E38288032 |

| | Article No. |
|---|---|
| • Metal kit: PSU cover, back plane | A5E38415145 |
| • Power input cover plate | A5E38415205 |
| External DSL | |
| • Wall mount bracket and screws for mounting DSL on bracket | A5E45882610 |
| • Lid with O-ring | A5E45818351 |
| • Bag with parts: cable strain reliefs, screws and washers, lid lock screw, grounding parts | A5E38111577 |
| • Acessory pipe mounting kit for FS DSL, max. 60.3 mm (2.4 inch) pipe | A5E36617118001 |
| • Accessory pipe strap kit for FS DSL, DN 50 ... 150 (2 ... 6 inch) pipe | A5E36617118002 |
| • Accessory pipe strap kit for FS DSL, DN 150 ... 300 (6 ... 12 inch) pipe | A5E36617118003 |
| • Accessory pipe strap kit for FS DSL, DN 300 ... 400 (12 ... 16 inch) pipe | A5E36617118004 |
| • Accessory pipe strap kit for FS DSL, DN 400 ... 600 (16 ... 24 inch) pipe | A5E36617118005 |
| **Cable glands** | |
| Set of cable glands, plastic, black, metric | A5E03907414 |
| Set of cable glands, Ex e/i, plastic, metric | A5E03907424 |
| Set of cable glands, Ex e/i, stainless steel, metric | A5E03907429 |
| Set of cable glands, Ex e/i, brass nickel-plated, metric | A5E03907430 |
| Set of cable glands, plastic, black, NPT | A5E03907435 |
| Set of cable glands, Ex e/i, plastic, NPT | A5E03907451 |
| Set of cable glands, Ex e/i, stainless steel, NPT | A5E03907467 |
| Set of cable glands, Ex e/i, brass nickel-plated, NPT | A5E03907473 |

***Article No./Crossreference***

| Steel (T1) | | | Steel (T2) | | | Plastic liquid | | |
|---|---|---|---|---|---|---|---|---|
| Data place 8,9,10 of 7ME372.-... combination | Sensor part number | Sensor Size Code | Data place 8,9,10 of 7ME372.-... combination | Sensor part number | Sensor Size Code | Data place 8,9,10 of 7ME372.-... combination | Sensor part number | Sensor Size Code |
| 1BB | 7ME3950-5LG01 | A1HT1 | 2BB | 7ME3950-5LB11 | A1 | 6BB | 7ME3950-5LB01 | A2 |
| 1BC | 7ME3950-5LH01 | A2HT1 | 2BC | 7ME3950-5LB01 | A2 | 6BC | 7ME3950-5LB01 | A2 |
| 1BD | 7ME3950-5LB11 | A1 | 2BD | 7ME3950-5LB11 | A1 | 6BD | 7ME3950-5LB01 | A2 |
| 1BE | 7ME3950-5LB01 | A2 | 2BE | 7ME3950-5LB01 | A2 | 6BE | 7ME3950-5LB01 | A2 |
| 1BF | 7ME3950-5LB11 | A1 | 2BF | 7ME3950-5LB11 | A1 | 6BF | 7ME3950-5LB01 | A2 |
| 1CB | 7ME3950-5LG01 | A1HT1 | 2CB | 7ME3950-5LB11 | A1 | 6CB | 7ME3950-5LB01 | A2 |
| 1CC | 7ME3950-5LH01 | A2HT1 | 2CC | 7ME3950-5LB01 | A2 | 6CC | 7ME3950-5LB01 | A2 |
| 1CD | 7ME3950-5LJ01 | A3HT1 | 2CD | 7ME3950-5LB11 | A1 | 6CD | 7ME3950-5LB01 | A2 |
| 1CE | 7ME3950-5GK01 | B1HT1 | 2CE | 7ME3950-5GK21 | B1HT2 | 6CE | 7ME3950-5LB01 | A2 |
| 1CF | 7ME3950-5LB11 | A1 | 2CF | 7ME3950-5LB11 | A1 | 6CF | 7ME3950-5LB01 | A2 |
| 1CG | 7ME3950-5LB11 | A1 | 2CG | 7ME3950-5LB11 | A1 | 6CG | 7ME3950-5LB01 | A2 |
| 1DB | 7ME3950-5LG01 | A1HT1 | 2DB | 7ME3950-5LC11 | B1 | 6DC | 7ME3950-5LC01 | B3 |
| 1DC | 7ME3950-5LH01 | A2HT1 | 2DC | 7ME3950-5LC21 | B2 | 6DD | 7ME3950-5LC01 | B3 |
| 1DD | 7ME3950-5LJ01 | A3HT1 | 2DD | 7ME3950-5LC11 | B1 | 6DE | 7ME3950-5LC01 | B3 |
| 1DE | 7ME3950-5GK01 | B1HT1 | 2DE | 7ME3950-5GK21 | B1HT2 | 6DF | 7ME3950-5LC01 | B3 |
| 1DF | 7ME3950-5GL01 | B2HT1 | 2DF | 7ME3950-5GL21 | B2HT2 | 6DG | 7ME3950-5LC01 | B3 |
| 1DG | 7ME3950-5LC01 | B3 | 2DG | 7ME3950-5LC01 | B3 | 6DH | 7ME3950-5LC01 | B3 |
| 1DH | 7ME3950-5LC21 | B2 | 2DH | 7ME3950-5LC21 | B2 | 6EC | 7ME3950-5LC01 | B3 |
| 1EB | 7ME3950-5LG01 | A1HT1 | 2EB | 7ME3950-5LC11 | B1 | 6ED | 7ME3950-5LC01 | B3 |
| 1EC | 7ME3950-5LH01 | A2HT1 | 2EC | 7ME3950-5LC21 | B2 | 6EE | 7ME3950-5LC01 | B3 |

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## Selection and ordering data (continued)

| Steel (T1) | | | Steel (T2) | | | Plastic liquid | | |
|---|---|---|---|---|---|---|---|---|
| 1ED | 7ME3950-5LJ01 | A3HT1 | 2ED | 7ME3950-5LC11 | B1 | 6EF | 7ME3950-5LC01 | B3 |
| 1EE | 7ME3950-5GK01 | B1HT1 | 2EE | 7ME3950-5GK21 | B1HT2 | 6EG | 7ME3950-5LC01 | B3 |
| 1EF | 7ME3950-5GL01 | B2HT1 | 2EF | 7ME3950-5GL21 | B2HT2 | 6EH | 7ME3950-5LC01 | B3 |
| 1EG | 7ME3950-5GM00 | C1HT1 | 2EG | 7ME3950-5GM20 | C1HT2 | 6EJ | 7ME3950-5LC01 | B3 |
| 1EH | 7ME3950-5GN00 | C2HT1 | 2EH | 7ME3950-5GN20 | C2HT2 | 6EK | 7ME3950-5LC01 | B3 |
| 1EJ | 7ME3950-5LC01 | B3 | 2EJ | 7ME3950-5LC01 | B3 | 6FE | 7ME3950-5LD00 | C3 |
| 1EK | 7ME3950-5LC01 | B3 | 2EK | 7ME3950-5LC01 | B3 | 6FF | 7ME3950-5LD00 | C3 |
| 1FC | 7ME3950-5LH01 | A2HT1 | 2FC | 7ME3950-5LD10 | C1 | 6FG | 7ME3950-5LD00 | C3 |
| 1FD | 7ME3950-5LJ01 | A3HT1 | 2FD | 7ME3950-5LD10 | C1 | 6FH | 7ME3950-5LD00 | C3 |
| 1FE | 7ME3950-5GK01 | B1HT1 | 2FE | 7ME3950-5GK21 | B1HT2 | 6FJ | 7ME3950-5LD00 | C3 |
| 1FF | 7ME3950-5GL01 | B2HT1 | 2FF | 7ME3950-5GL21 | B2HT2 | 6FK | 7ME3950-5LD00 | C3 |
| 1FG | 7ME3950-5GM00 | C1HT1 | 2FG | 7ME3950-5GM20 | C1HT2 | 6GF | 7ME3950-5LD00 | C3 |
| 1FH | 7ME3950-5GN00 | C2HT1 | 2FH | 7ME3950-5GN20 | C2HT2 | 6GG | 7ME3950-5LD00 | C3 |
| 1FJ | 7ME3950-5GP00 | D1HT1 | 2FJ | 7ME3950-5GP20 | D1HT2 | 6GH | 7ME3950-5LD00 | C3 |
| 1FK | 7ME3950-5LD10 | C1 | 2FK | 7ME3950-5LD10 | C1 | 6GJ | 7ME3950-5LD00 | C3 |
| 1GD | 7ME3950-5LJ01 | A3HT1 | 2GD | 7ME3950-5LD10 | C1 | 6GK | 7ME3950-5LD00 | C3 |
| 1GE | 7ME3950-5GK01 | B1HT1 | 2GE | 7ME3950-5GK21 | B1HT2 | 6GL | 7ME3950-5LD00 | C3 |
| 1GF | 7ME3950-5GL01 | B2HT1 | 2GF | 7ME3950-5GL21 | B2HT2 | 6HG | 7ME3950-5LE00 | D3 |
| 1GG | 7ME3950-5GM00 | C1HT1 | 2GG | 7ME3950-5GM20 | C1HT2 | 6HH | 7ME3950-5LE00 | D3 |
| 1GH | 7ME3950-5GN00 | C2HT1 | 2GH | 7ME3950-5GN20 | C2HT2 | 6HJ | 7ME3950-5LE00 | D3 |
| 1GJ | 7ME3950-5GP00 | D1HT1 | 2GJ | 7ME3950-5GP20 | D1HT2 | 6HK | 7ME3950-5LE00 | D3 |
| 1GK | 7ME3950-5GQ00 | D2HT1 | 2GK | 7ME3950-5GQ20 | D2HT2 | 6HL | 7ME3950-5LE00 | D3 |
| 1GL | 7ME3950-5LD00 | C3 | 2GL | 7ME3950-5LD00 | C3 | 6HM | 7ME3950-5LE00 | D3 |
| 1HE | 7ME3950-5GK01 | B1HT1 | 2HE | 7ME3950-5GK21 | B1HT2 | 6JJ | 7ME3950-5LE00 | D3 |
| 1HF | 7ME3950-5GL01 | B2HT1 | 2HF | 7ME3950-5GL21 | B2HT2 | 6JK | 7ME3950-5LE00 | D3 |
| 1HG | 7ME3950-5GM00 | C1HT1 | 2HG | 7ME3950-5GM20 | C1HT2 | 6JL | 7ME3950-5LE00 | D3 |
| 1HH | 7ME3950-5GN00 | C2HT1 | 2HH | 7ME3950-5GN20 | C2HT2 | 6JM | 7ME3950-5LE00 | D3 |
| 1HJ | 7ME3950-5GP00 | D1HT1 | 2HJ | 7ME3950-5GP20 | D1HT2 | 6KK | 7ME3950-5LF00 | E2 |
| 1HK | 7ME3950-5GQ00 | D2HT1 | 2HK | 7ME3950-5GQ20 | D2HT2 | 6KL | 7ME3950-5LF00 | E2 |
| 1HL | 7ME3950-5GR00 | D4HT1 | 2HL | 7ME3950-5GR20 | D4HT2 | 6KM | 7ME3950-5LF00 | E2 |
| 1JG | 7ME3950-5GM00 | C1HT1 | 2JG | 7ME3950-5GM20 | C1HT2 | 6LM | 7ME3950-5LF00 | E2 |
| 1JH | 7ME3950-5GN00 | C2HT1 | 2JH | 7ME3950-5GN20 | C2HT2 | | | |
| 1JJ | 7ME3950-5GP00 | D1HT1 | 2JJ | 7ME3950-5GP20 | D1HT2 | | | |
| 1JK | 7ME3950-5GQ00 | D2HT1 | 2JK | 7ME3950-5GQ20 | D2HT2 | | | |
| 1JL | 7ME3950-5GR00 | D4HT1 | 2JL | 7ME3950-5GR20 | D4HT2 | | | |
| 1KH | 7ME3950-5GN00 | C2HT1 | 2KH | 7ME3950-5GN20 | C2HT2 | | | |
| 1KJ | 7ME3950-5GP00 | D1HT1 | 2KJ | 7ME3950-5GP20 | D1HT2 | | | |
| 1KK | 7ME3950-5GQ00 | D2HT1 | 2KK | 7ME3950-5GQ20 | D2HT2 | | | |
| 1KL | 7ME3950-5GR00 | D4HT1 | 2KL | 7ME3950-5GR20 | D4HT2 | | | |
| 1LJ | 7ME3950-5GP00 | D1HT1 | 2LJ | 7ME3950-5GP20 | D1HT2 | | | |
| 1LK | 7ME3950-5GQ00 | D2HT1 | 2LK | 7ME3950-5GQ20 | D2HT2 | | | |
| 1LL | 7ME3950-5GR00 | D4HT1 | 2LL | 7ME3950-5GR20 | D4HT2 | | | |

| Other (Univ) | | | Other (VH) | | |
|---|---|---|---|---|---|
| **Data place 8,9,10 of 7ME372.-... combination** | **Sensor part number** | **Sensor Size Code** | **Data place 8,9,10 of 7ME372.-... combination** | **Sensor part number** | **Sensor Size Code** |
| 7BB | 7ME3950-5LB01 | A2 | 8BB | 7ME3950-5LA13 | 1 |
| 7BC | 7ME3950-5LB01 | A2 | 8BC | 7ME3950-5LA13 | 1 |
| 7BD | 7ME3950-5LB01 | A2 | 8BD | 7ME3950-5LA13 | 1 |
| 7BE | 7ME3950-5LB01 | A2 | 8BE | 7ME3950-5LA13 | 1 |
| 7BF | 7ME3950-5LB01 | A2 | 8BF | 7ME3950-5LA13 | 1 |
| 7CB | 7ME3950-5LB01 | A2 | 8CB | 7ME3950-5LA13 | 1 |
| 7CC | 7ME3950-5LB01 | A2 | 8CC | 7ME3950-5LA13 | 1 |
| 7CD | 7ME3950-5LB01 | A2 | 8CD | 7ME3950-5LA13 | 1 |
| 7CE | 7ME3950-5LB01 | A2 | 8CE | 7ME3950-5LA13 | 1 |
| 7CF | 7ME3950-5LB01 | A2 | 8CF | 7ME3950-5LA13 | 1 |
| 7CG | 7ME3950-5LB01 | A2 | 8CG | 7ME3950-5LA13 | 1 |

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## Selection and ordering data (continued)

| Other (Univ) | | | Other (VH) | | |
|---|---|---|---|---|---|
| 7DB | 7ME3950-5LC01 | B3 | 8DB | 7ME3950-5LA13 | 1 |
| 7DC | 7ME3950-5LC01 | B3 | 8DC | 7ME3950-5LA13 | 1 |
| 7DD | 7ME3950-5LC01 | B3 | 8DD | 7ME3950-5LA13 | 1 |
| 7DE | 7ME3950-5LC01 | B3 | 8DE | 7ME3950-5LA13 | 1 |
| 7DF | 7ME3950-5LC01 | B3 | 8DF | 7ME3950-5LA13 | 1 |
| 7DG | 7ME3950-5LC01 | B3 | 8DG | 7ME3950-5LA13 | 1 |
| 7DH | 7ME3950-5LC01 | B3 | 8DH | 7ME3950-5LA13 | 1 |
| 7EB | 7ME3950-5LC01 | B3 | 8EB | 7ME3950-5LA13 | 1 |
| 7EC | 7ME3950-5LC01 | B3 | 8EC | 7ME3950-5LA13 | 1 |
| 7ED | 7ME3950-5LC01 | B3 | 8ED | 7ME3950-5LA13 | 1 |
| 7EE | 7ME3950-5LC01 | B3 | 8EE | 7ME3950-5LA13 | 1 |
| 7EF | 7ME3950-5LC01 | B3 | 8EF | 7ME3950-5LA13 | 1 |
| 7EG | 7ME3950-5LC01 | B3 | 8EG | 7ME3950-5LA13 | 1 |
| 7EH | 7ME3950-5LC01 | B3 | 8EH | 7ME3950-5LA13 | 1 |
| 7EJ | 7ME3950-5LC01 | B3 | 8EJ | 7ME3950-5LA13 | 1 |
| 7EK | 7ME3950-5LC01 | B3 | 8EK | 7ME3950-5LA13 | 1 |
| 7FC | 7ME3950-5LD00 | C3 | 8FC | 7ME3950-5LA23 | 2 |
| 7FD | 7ME3950-5LD00 | C3 | 8FD | 7ME3950-5LA23 | 2 |
| 7FE | 7ME3950-5LD00 | C3 | 8FE | 7ME3950-5LA23 | 2 |
| 7FF | 7ME3950-5LD00 | C3 | 8FF | 7ME3950-5LA23 | 2 |
| 7FG | 7ME3950-5LD00 | C3 | 8FG | 7ME3950-5LA23 | 2 |
| 7FH | 7ME3950-5LD00 | C3 | 8FH | 7ME3950-5LA23 | 2 |
| 7GD | 7ME3950-5LD00 | C3 | 8GD | 7ME3950-5LA23 | 2 |
| 7GE | 7ME3950-5LD00 | C3 | 8GE | 7ME3950-5LA23 | 2 |
| 7GF | 7ME3950-5LD00 | C3 | 8GF | 7ME3950-5LA23 | 2 |
| 7GG | 7ME3950-5LD00 | C3 | 8GG | 7ME3950-5LA23 | 2 |
| 7GH | 7ME3950-5LD00 | C3 | 8GH | 7ME3950-5LA23 | 2 |
| 7GJ | 7ME3950-5LD00 | C3 | 8GJ | 7ME3950-5LA23 | 2 |
| 7GK | 7ME3950-5LD00 | C3 | 8GK | 7ME3950-5LA23 | 2 |
| 7GL | 7ME3950-5LD00 | C3 | 8GL | 7ME3950-5LA23 | 2 |
| 7HE | 7ME3950-5LE00 | D3 | 8HE | 7ME3950-5LA43 | 3 |
| 7HF | 7ME3950-5LE00 | D3 | 8HF | 7ME3950-5LA43 | 3 |
| 7HG | 7ME3950-5LE00 | D3 | 8HG | 7ME3950-5LA43 | 3 |
| 7HH | 7ME3950-5LE00 | D3 | 8HH | 7ME3950-5LA43 | 3 |
| 7HJ | 7ME3950-5LE00 | D3 | 8HJ | 7ME3950-5LA43 | 3 |
| 7HK | 7ME3950-5LE00 | D3 | 8HK | 7ME3950-5LA43 | 3 |
| 7HL | 7ME3950-5LE00 | D3 | 8HL | 7ME3950-5LA43 | 3 |
| 7HM | 7ME3950-5LE00 | D3 | 8HM | 7ME3950-5LA43 | 3 |
| 7JG | 7ME3950-5LE00 | D3 | 8JG | 7ME3950-5LA43 | 3 |
| 7JH | 7ME3950-5LE00 | D3 | 8JH | 7ME3950-5LA43 | 3 |
| 7JJ | 7ME3950-5LE00 | D3 | 8JJ | 7ME3950-5LA43 | 3 |
| 7JK | 7ME3950-5LE00 | D3 | 8JK | 7ME3950-5LA43 | 3 |
| 7JL | 7ME3950-5LE00 | D3 | 8JL | 7ME3950-5LA43 | 3 |
| 7JM | 7ME3950-5LE00 | D3 | 8JM | 7ME3950-5LA43 | 3 |
| 7KH | 7ME3950-5LF00 | E2 | 8KH | 7ME3950-5LA73 | 4 |
| 7KJ | 7ME3950-5LF00 | E2 | 8KJ | 7ME3950-5LA73 | 4 |
| 7KK | 7ME3950-5LF00 | E2 | 8KK | 7ME3950-5LA73 | 4 |
| 7KL | 7ME3950-5LF00 | E2 | 8KL | 7ME3950-5LA73 | 4 |
| 7KM | 7ME3950-5LF00 | E2 | 8KM | 7ME3950-5LA73 | 4 |
| 7LJ | 7ME3950-5LF00 | E2 | 8LJ | 7ME3950-5LA73 | 4 |
| 7LK | 7ME3950-5LF00 | E2 | 8LK | 7ME3950-5LA73 | 4 |
| 7LL | 7ME3950-5LF00 | E2 | 8LL | 7ME3950-5LA73 | 4 |
| 7LM | 7ME3950-5LF00 | E2 | 8LM | 7ME3950-5LA73 | 4 |

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## Selection and ordering data (continued)

| Spare parts (system)<br>SITRANS FS230<br>IP65/IP66 (Nema 4X) | Article No.<br>7ME3950- ● ● ● ● ● | Option |
|---|---|---|
| **Approvals** | | |
| All, FM/FMc, ATEX, IECEX - Flow sensors | 5 | |
| All, FM/FMc, ATEX, IECEX - Temperature sensors | 1 | |
| **Spare sensor code**<br>For liquid flow sensors pipe ranges please refer to catalog sensor selection chart in the FSS200 section | | |
| **Flow sensors for use with mounting frames or tracks**<br>Suitable for pipes other than steel or stainless steel | | |
| Temperature -40 ... +121 °C (-40 ... +250 °F) | | |
| • A1 Universal | 5 L B 1 1 | |
| • A2 Universal | 5 L B 0 1 | |
| • B1 Universal | 5 L C 1 1 | |
| • B2 Universal | 5 L C 2 1 | |
| • B3 Universal | 5 L C 0 1 | |
| • C1 Universal | 5 L D 1 0 | |
| • C2 Universal | 5 L D 2 0 | |
| • C3 Universal | 5 L D 0 0 | |
| • D1 Universal | 5 L E 1 0 | |
| • D2 Universal | 5 L E 2 0 | |
| • D3 Universal | 5 L E 0 0 | |
| • E1 Universal | 5 L F 1 0 | |
| • E2 Universal | 5 L F 0 0 | |
| • E3 Universal | 5 L F 2 0 | |
| **Gas and liquid sensors for use with mounting frames or tracks**<br>Suitable for steel or stainless steel pipes | | |
| Temperature T1 | | |
| • A1H high precision | 5 L G 0 1 | |
| • A2H high precision | 5 L H 0 1 | |
| • A3H high precision | 5 L J 0 1 | |
| • B1H high precision | 5 G K 0 1 | |
| • B2H high precision | 5 G L 0 1 | |
| • B3H high precision | 5 G t 0 1 | |
| • C1H high precision | 5 G M 0 0 | |
| • C2H high precision | 5 G N 0 0 | |
| • D1H high precision | 5 G P 0 0 | |
| • D2H high precision | 5 G Q 0 0 | |
| • D3H high precision | 5 G U 0 0 | |
| • D4H high precision | 5 G R 0 0 | |
| Temperature T2 | | |
| • B1H high precision | 5 G K 2 1 | |
| • B2H high precision | 5 G L 2 1 | |
| • B3H high precision | 5 G T 2 1 | |
| • C1H high precision | 5 G M 2 0 | |
| • C2H high precision | 5 G N 2 0 | |
| • D1H high precision | 5 G P 2 0 | |
| • D2H high precision | 5 G Q 2 0 | |
| • D3H high precision | 5 G U 2 0 | |
| • D4H high precision | 5 G R 2 0 | |
| **High temperature universal liquid sensors** | | |
| Very high temperature up to 230 °C (446 °F) | | |
| • Size 1 (Ø 12.7 ... 100 mm (0.47 ... 3.94")) | 5 L A 1 3 | |

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## Selection and ordering data (continued)

| Spare parts (system)<br>SITRANS FS230<br>IP65/IP66 (Nema 4X) | Article No.<br>7ME3950- ● ● ● ● ● | Option |
|---|---|---|
| • Size 2 (Ø 30 ... 200 mm (1.18 ... 7.87")) | 5 L A 2 3 | |
| • Size 2A (Ø 30 ... 200 mm (1.18 ... 7.87")) | 5 L A 3 3 | |
| • Size 3 (Ø 150 ... 610 mm (5.9 ... 24.0")) | 5 L A 4 3 | |
| • Size 3A (Ø 150 ... 610 mm (5.9 ... 24.0")) | 5 L A 6 3 | |
| • Size 4 (Ø 400 ... 1200 mm (16.75 ... 47.24")) | 5 L A 7 3 | |
| • Size 4A (Ø 400 ... 1200 mm (16.75 ... 47.24")) | 5 L A 8 3 | |
| **RTD sensors for temperature measurement** | | |
| Standard clamp-on RTD | 1 T A 0 0 | |
| Submersible clamp-on RTD | 1 T B 0 0 | |
| Insertion sensor PT1000 for use with thermowells - non Ex. For variants please select SITRANS TS500 (7MC7500) | | |
| SITRANS TS500 Insert 140 mm (5.5 in) | **7MC7500-1JB26-4BF3-Z** | E00 |
| SITRANS TS500 Insert 216 mm (8.5 in) | **7MC7500-1JC06-6BF3-Z** | **E00+Y44** |
| SITRANS TS500 Insert 292 mm (11.5 in) | **7MC7500-1JC06-6BF3-Z** | **E00+Y44** |
| SITRANS TS500 Insert 368 mm (14.5 in) | **7MC7500-1JD06-6BF3-Z** | **E00+Y44** |
| SITRANS TS500 Insert 444 mm (17.5 in) | **7MC7500-1JE06-6BF3-Z** | **E00+Y44** |
| SITRANS TS500 Insert 597 mm (23.5 in) | **7MC7500-1JE06-6BF3-Z** | **E00+Y44** |
| **Insert thermowells for TS550 RTD** | | |
| For details or variants please select Thermowell BAR (7MT2351) | | |
| SITRANS TS Thermowell 140 mm (5.5 in) | **7MT2351-0AB02-1EB2-Z** | Y44 |
| SITRANS TS Thermowell 216 mm (8.5 in) | **7MT2351-0BB02-1EB2-Z** | Y44 |
| SITRANS TS Thermowell 292 mm (11.5 in) | **7MT2351-0CB02-1EB2** | |
| SITRANS TS Thermowell 368 mm (14.5 in) | **7MT2351-0CB02-1EB2-Z** | Y44 |
| SITRANS TS Thermowell 444 mm (17.5 in) | **7MT2351-0DB02-1EB2-Z** | Y44 |
| SITRANS TS Thermowell 597 mm (23.5 in) | **7MT2351-0EB02-1EB2-Z** | Y44 |

| Spare parts (Miscellaneous)<br>SITRANS FS Clamp-on | Article No.<br>7ME3960- ● ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **FS230 dedicated sensor mounting hardware** | |
| Sensor mounting frames for | |
| Universal sensor size B, for pipes > 125 mm (5 inch) | **CQO:1012FN-PB** |
| Universal sensor size C | 0 M C 0 0 |
| Universal sensor size D | 0 M C 0 1 |
| Universal sensor size E | 0 M C 0 2 |
| High precision sensor size B, for pipes > 125 mm (5 inch) | **CQO:1012FNH-PB** |
| High precision sensor size C | 3 M D 0 0 |
| High precision sensor size D | 3 M D 0 1 |
| Magnetic mounting frames for size C, D, E, universal and high precision sensors | 3 M D 0 2 |
| **Spacer bars (for indexing sensors on pipe)** | |
| Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas) | 3 M S 1 0 |
| Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas) | 3 M S 2 0 |
| Spacer bar for pipes to 800 mm/32 inch (liquid) | 3 M S 3 0 |
| Spacer bar for pipes to 1200 mm/48 inch (liquid). Must be used with 7ME39600SM30 | 3 M S 4 0 |
| **Mounting straps (slotted stainless steel)** | |
| For pipes | |
| DN 50 ... 150 (2" ... 4") | 0 S M 0 0 |
| DN 50 ... 300 (2" ... 12") | 0 S M 1 0 |
| DN 300 ... 600 (12" ... 24") | 0 S M 2 0 |
| DN 600 ... 1200 (24" ... 48") | 0 S M 3 0 |
| DN 1200 ... 1500 (48" ... 60") | 0 S M 4 0 |
| DN 1500 ... 2100 (60" ... 84") | 0 S M 5 0 |
| DN 2100 ... 3000 (84" ... 120") | 0 S M 6 0 |
| **High precision mounting enclosures for sensors** | |
| Stainless steel mounts for high precision size "C" sensors, single enclosure | 0 W S 5 0 |
| Stainless steel mounts for high precision size "D/E" sensors, single enclosure | 0 W S 6 0 |

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## Selection and ordering data (continued)

| Spare parts (Miscellaneous)<br>SITRANS FS Clamp-on | Article No.<br>7ME3960- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| Stainless steel mounts for high precision size "C" sensors, dual enclosure | | 0 | W | D | 5 | 0 |
| Stainless steel mounts for high precision size "D/E" sensors, dual enclosure | | 0 | W | D | 6 | 0 |
| **Stainless steel bands for high precision mounting enclosures** | | | | | | |
| Mounting strap for pipe diameter to | | | | | | |
| 300 mm (13") | | 0 | S | M | 0 | 1 |
| 600 mm (24") | | 0 | S | M | 1 | 1 |
| 1200 mm (48") | | 0 | S | M | 2 | 1 |
| 1500 mm (60") | | 0 | S | M | 3 | 1 |
| 2130 mm (84") | | 0 | S | M | 4 | 1 |
| 3050 mm (120") | | 0 | S | M | 5 | 1 |
| 5486 mm (216") | | 0 | S | M | 6 | 1 |
| ADAPTER, MTG STRAP, TEMP COMP | **CQO-1012WSM-A2** | | | | | |
| **Sensor mounting tracks (aluminum with mounting straps) for pipes < 125 mm (5 inch)** | | | | | | |
| Universal sensor size A or B | | 0 | M | A | 0 | 0 |
| High precision sensor size A or B | | 0 | M | B | 0 | 0 |
| **Stainless mounting tracks for high temperature 991 sensors** | | | | | | |
| Size 1 high temperature sensor pair | **CQO: 992MTNHMSH-1** | | | | | |
| Size 2 high temperature sensor pair | **CQO: 992MTNHMSH-2** | | | | | |
| Size 3 high temperature sensor pair | **CQO: 992MTNHMSH-3** | | | | | |
| Size 4 high temperature sensor pair | **CQO: 992MTNHMSH-4** | | | | | |
| **Clamp-on RTD mounting hardware for dedicated systems** | | | | | | |
| RTD mounting hardware for dedicated system | | | | | | |
| 1152 ... 610 mm (6 ... 24") | | 0 | M | R | 0 | 0 |
| 12.7 ... 50.8 mm (0.5 ... 2") | | 0 | M | R | 0 | 1 |
| 31.8 ... 203.2 mm (1.25 ... 8") | | 0 | M | R | 0 | 2 |
| 508 ... 1219 mm (20 ... 48") | | 0 | M | R | 0 | 4 |
| **Sensor cables** | | | | | | |
| Coax (CE mark) | | | | | | |
| 10 m (32.8 ft) armored sensor cable pair with nickel plated brass glands | **A5E38028474004** | | | | | |
| 20 m (65.6 ft) armored sensor cable pair with nickel plated brass glands | **A5E38028474005** | | | | | |
| 10 m (32.8 ft) standard/submersible Coax sensor cable pair with Nylon glands | **A5E39669934004** | | | | | |
| 20 m (65.6 ft) standard/submersible Coax sensor cable pair with Nylon glands | **A5E39669934005** | | | | | |
| 10 m (32.8 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands | **A5E39669934009** | | | | | |
| 20 m (65.6 ft) standard/submersible Coax sensor cable pair with nickel plated brass glands | **A5E39669934010** | | | | | |
| 10 m (32.8 ft) standard/submersible Coax sensor cable pair with stainless steel glands | **A5E39669934014** | | | | | |
| 20 m (65.6 ft) standard/submersible Coax sensor cable pair with stainless steel glands | **A5E39669934015** | | | | | |
| 20 m (65.6 ft) plenum rated Coax sensor cable pair with Nylon glands | **A5E39669934020** | | | | | |
| 20 m (65.6 ft) plenum rated Coax sensor cable pair with nickel plated brass glands | **A5E39669934025** | | | | | |
| 20 m (65.6 ft) plenum rated Coax sensor cable pair with stainless steel glands | **A5E39669934030** | | | | | |
| **Cable glands and adapters** | | | | | | |
| Cable gland set M20, nylon | **A5E38145321** | | | | | |
| Cable gland set M20, nickel/brass | **A5E38145323** | | | | | |
| Cable gland set M20, stainless steel | **A5E38145327** | | | | | |
| Iris glands, set of 2, nickel plated brass | **A5E38635890** | | | | | |
| Iris glands, set of 2, stainless steel | **A5E38635986** | | | | | |
| M20xNPT adapters, set of 8, brass/nickel | **A5E38145635** | | | | | |
| M20xNPT adapters, set of 8, brass/nickel, Ex | **A5E38309159** | | | | | |
| M20xNPT adapters, set of 8, stainless steel | **A5E38145643** | | | | | |
| **RTD temperature sensor cables** | | | | | | |
| 6 m (20 ft) standard RTD cable | | 0 | C | R | 0 | 1 |
| 15 m (50 ft) standard RTD cable | | 0 | C | R | 0 | 2 |
| 30 m (100 ft) standard RTD cable | | 0 | C | R | 0 | 3 |
| 46 m (150 ft) standard RTD cable | | 0 | C | R | 0 | 4 |
| 61 m (200 ft) standard RTD cable | | 0 | C | R | 0 | 5 |
| 91 m (300 ft) standard RTD cable | | 0 | C | R | 0 | 6 |
| 6 m (20 ft) submersible RTD cable | | 0 | C | R | 1 | 1 |
| 15 m (50 ft) submersible RTD cable | | 0 | C | R | 1 | 2 |

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## Selection and ordering data (continued)

| Spare parts (Miscellaneous)<br>SITRANS FS Clamp-on | Article No.<br>7ME3960- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| 30 m (100 ft) submersible RTD cable | | 0 | C | R | 1 | 3 |
| 46 m (150 ft) submersible RTD cable | | 0 | C | R | 1 | 4 |
| 61 m (200 ft) submersible RTD cable | | 0 | C | R | 1 | 5 |
| 91 m (300 ft) submersible RTD cable | | 0 | C | R | 1 | 6 |
| **Dedicated cable termination kits for:** | | | | | | |
| Standard, plenum sensor cable (NEMA 4X and NEMA 7 wall) | | 0 | C | T | 0 | 1 |
| Submersible sensor cable (NEMA 4X and NEMA 7 wall) | | 0 | C | T | 1 | 1 |
| Clamp-on RTD cable termination kit for standard RTD | | 0 | C | T | 2 | 1 |
| Clamp-on RTD cable termination kit for submersible RTD | | 0 | C | T | 3 | 1 |
| Insert RTD cable termination kit | | 0 | C | T | 4 | 1 |
| Termination kit for armored cable | **CQO:1012CNFX-TK** | | | | | |
| **Ultrasonic couplants** | | | | | | |
| Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F) | | 0 | U | C | 1 | 0 |
| Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F) | | 0 | U | C | 2 | 0 |
| Permanent high temperature fluoroether: 163 ml (5.5 oz): -40 ... +230 °C (-40 ... +450 °F) | | 0 | U | C | 3 | 1 |
| Dry coupling pad kit (10 pieces) | | 0 | U | C | 4 | 0 |
| Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40...+120C (-40...+250F) | **CQO:CC112** | | | | | |
| Permanent high temperature silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F) | **CQO:CC117B** | | | | | |
| Permanent high temperature silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F) | **CQO:CC117A** | | | | | |
| Couplant for submersible sensor applications | **CQO:CC120** | | | | | |
| **Pipe damping films** | | | | | | |
| B1, B2, B3, C1 and C2 sensors | | 0 | D | M | 1 | 0 |
| D1 and D3 sensors | | 0 | D | M | 2 | 0 |
| D2 sensor | | 0 | D | M | 3 | 0 |
| D4 sensor | | 0 | D | M | 4 | 0 |
| **Universal sensor test blocks** | | | | | | |
| Test block for size A and B universal sensors | | 0 | T | B | 1 | 0 |
| Test block for size C and D universal sensors | | 0 | T | B | 2 | 0 |
| **Thickness gauge** | | | | | | |
| Stand alone thickness gauge | **7ME39510TG20** | | | | | |
| **Cable, DSL to wallbox transmitter** | | | | | | |
| Standard cable (non-Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F) | | | | | | |
| • 5 m (16.4 ft) | **A5E03914805** | | | | | |
| • 10 m (32.8 ft) | **A5E03914850** | | | | | |
| • 25 m (82 ft) | **A5E03914853** | | | | | |
| • 50 m (164 ft) | **A5E03914859** | | | | | |
| • 75 m (246 ft) | **A5E03914861** | | | | | |
| • 150 m (492 ft) | **A5E03914874** | | | | | |
| Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F) | | | | | | |
| • 5 m (16.4 ft) | **A5E03914833** | | | | | |
| • 10 m (32.8 ft) | **A5E03914849** | | | | | |
| • 25 m (82 ft) | **A5E03914854** | | | | | |
| • 50 m (164 ft) | **A5E03914856** | | | | | |
| • 75 m (246 ft) | **A5E03914864** | | | | | |
| • 150 m (492 ft) | **A5E03914873** | | | | | |
| Standard cable (Ex) with 2 × M12 connectors, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F) | | | | | | |
| • 5 m (16.4 ft) | **A5E03914929** | | | | | |
| • 10 m (32.8 ft) | **A5E03914962** | | | | | |
| • 25 m (82 ft) | **A5E03914995** | | | | | |
| • 50 m (164 ft) | **A5E03915004** | | | | | |
| • 75 m (246 ft) | **A5E03915074** | | | | | |
| • 150 m (492 ft) | **A5E03915088** | | | | | |
| Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F) | | | | | | |
| • 5 m (16.4 ft) | **A5E03914945** | | | | | |

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## Selection and ordering data (continued)

| Spare parts (Miscellaneous)<br>SITRANS FS Clamp-on | Article No.<br>7ME3960- ● ● ● ● ● |
|---|---|
| • 10 m (32.8 ft) | A5E03914973 |
| • 25 m (82 ft) | A5E03914984 |
| • 50 m (164 ft) | A5E03915015 |
| • 75 m (246 ft) | A5E03915057 |
| • 150 m (492 ft) | A5E03915100 |

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## Application



SITRANS FSS200 Clamp-on ultrasonic flow sensor

### *Sensor type selection guide*

| Considerations for sensor selection | Standard sensors supported in MLFB<br>High precision | Universal | Notes |
|---|---|---|---|
| **Media** | | | |
| General survey (clean liquids) on non-steel pipes | - | X | - |
| General survey (clean liquids) on a limited range of steel pipes | X | - | - |
| Moderately aerated liquid or slurry, up to 121 °C (250 °F) | X | - | - |
| Permanent installation on steel pipe (clean liquids and gases) | X | - | - |
| Installation in offshore or corrosive environment | X[1)] | X[2)] | Sensor size C/D/E come standard as corrosion resistant. Size A and B optional stainless steel |
| Liquid temperature greater than 120 °C (248 °F) | O | X | FSS200 high temperature metal block sensors - up to 232 °C (450 °F) |
| Operation on single pipeline flowing multiple products | X | O | - |
| **Pipe material** | | | |
| Steel | X | - | - |
| Steel pipe with diameter/wall thickness ratio < 10 | O | X | - |
| Non-steel pipe material (copper, ductile iron, cast iron, etc.) | O | X | High precision sensors can also be used on plastic and aluminum pipes in special cases |
| Wall thickness > 31.75 mm (1.25") | O | X | - |

O = not suitable
X = preferred choice
1) For steel and stainless steel pipes only
2) Not preferred for steel pipes

### *Definitions*

| Sensor chart | Description |
|---|---|
| **FSS200** | Formerly 1011 clamp-on sensors of the 1010 systems |
| **Standard** | Standard system sensor, selectable as part of a configured product |
| **Special** | Sensors available for non-standard applications and pipes. Contact tech support for application use |
| **Corrosions resistant** | Stainless steel metal parts on all Size C, D and E and all high temperature sensors |
| **Aluminum** | Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B) |
| **Spare** | Not available as part of a configured product, must be ordered separately |
| **CE** | Transmitter and sensors certified for sale in the EU |
| **Trackless mount** | Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended |
| **Tracks** | Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps. |
| **Frames** | Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare) |
| **T1** | Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F); standard |
| **T2** | Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (< 176 °F) |

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## Application (continued)

| Sensor chart | Description |
|---|---|
| **Submersible** | Sensors can be used submerged; adding Denso for supplemental protection is recommended |

### *Approvals*

| Approvals for FSS200 sensors | |
|---|---|
| ***Canada, USA*** | Class I, Division 1, Groups A, B, C, D<br>Class II, Division 1, Groups E, F, G<br>Class III<br>Class I, Zone 0, AEx/Ex ia IIC T6...T4 Gc<br>Class II, Zone 21;<br>AEx/Ex ib IIIC T70°C...T110°C Db |
| • FM16CA0142X<br>• FM16US0280X<br>• CSA 80083297X | |
| ***ATEX, UKEx, IECEx*** | II 1G Ex ia IIC T6...T4 Ga<br>II 2D Ex ib IIIC T70°C...T110°C Db |
| • IECEx FMG 17.0004X<br>• FM16ATEX0090<br>• FM21UKEX0057X | |
| ***Ambient temperature range*** | Depends on the sensor |
| ***Dust temperature class*** | $T_{dust} = T_{a\,max}$ +10 °K (T70 °C für $T_a$ = 60 °C, T110 °C für $T_a$ = 100 °C) |

### *Sensor availability guide*

FSS200 Universal Sensor

| FSS200 Universal Sensor -40 ... 120 °C (-40 ... +248 °F) plastic - stainless steel housing CE IP68 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor models** | **Stand-ard** | **Spare only** | **ATEX, FM, FMc, IECEX** | **Corro-sion resist-ant** | **Track-less** | **Tracks** | **Frames** | **High preci-sion mount** | **T1[2)]** | **T2[3)]** | **Sub-mers-ible** | **Catalog** |
| A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2") | - | x | x | x | x[1)] | x | - | - | - | - | x | - |
| A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2") | x | - | x | x | x[1)] | x | - | - | - | - | x | x |
| B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3") | - | x | x | x | x[1)] | x | x | - | - | - | x | - |
| B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3") | - | x | x | x | x[1)] | x | x | - | - | - | x | - |
| B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5") | x | - | x | x | x[1)] | x | x | - | - | - | x | x |
| C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10") | - | x | x | x | x | - | x | - | - | - | x | - |
| C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10") | - | x | x | x | x | - | x | - | - | - | x | - |
| C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12") | x | - | x | x | x | - | x | - | - | - | x | x |
| D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20") | - | x | x | x | x | - | x | - | - | - | x | - |
| D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24") | - | x | x | x | x | - | x | - | - | - | x | - |
| D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24") | x | - | x | x | x | - | x | - | - | - | x | x |
| E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120") | - | x | x | x | x | - | x | - | - | - | x | - |
| E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240") | x | - | x | x | x | - | x | - | - | - | x | x |
| E3 Universal for pipe OD – 304 ... 10007 mm (12" ... 394") | - | x | x | x | x | - | x | x | - | - | x | - |

X = available
1) Usable but not recommended for selection

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## Application (continued)

2) Best use at a temperature of < 80 °C (176 °F)
3) Best use at a temperature of > 80 °C (176 °F)

FSS200 High Precision Sensor

| FSS200 High Precision Sensor -40 ... 120 °C (-40 ... +248 °F) plastic - stainless steel housing T1/T2 CE IP68 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor models** | **Stand-ard** | **Spare only** | **ATEX/F-M/FMc/I-ECEX** | **Corro-sion resist-ant** | **Track-less** | **Tracks** | **Frames** | **High preci-sion mount** | **T1[2)]** | **T2[3)]** | **Sub-mersible** | **Catalog** |
| A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04") | - | X | X | X | X[1)] | X | - | - | X | - | X | X |
| A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06") | X | - | X | X | X[1)] | X | - | - | X | - | X | X |
| A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08") | X | - | X | X | X[1)] | X | - | - | X | - | X | X |
| B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12") | X | - | X | X | X[1)] | X | X | - | X | X | X | X |
| B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16") | X | - | X | X | X[1)] | X | X | - | X | X | X | X |
| B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128") | - | X | X | X | X[1)] | X | X | - | X | X | X | X |
| C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23") | X | - | X | X | X | - | X | X | X | X | X | X |
| C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0..23" ... 0.32") | X | - | X | X | X | - | X | X | X | X | X | X |
| D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0..32" ... 0.44") | X | - | X | X | X | - | X | X | X | X | X | X |
| D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62") | X | - | X | X | X | - | X | X | X | X | X | X |
| D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0..293" ... 0.354") | - | X | X | X | X | - | X | X | X | X | X | X |
| D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0..62" ... 1.25") | X | - | X | X | X | - | X | X | X | X | X | X |

X = available
1) Usable but not recommended for selection
2) Best use at a temperature of < 80 °C (176 °F)
3) Best use at a temperature of > 80 °C (176 °F)

FSS200 High Temperature Universal Sensor

| FSS200 High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor models** | **Stand-ard** | **Spare only** | **ATEX/F-M/FMc/I-ECEX** | **Corro-sion resist-ant** | **Track-less** | **Tracks** | **Frames** | **High preci-sion mount** | **T1[1)]** | **T2[2)]** | **Sub-mersible** | **Catalog** |
| High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm) | - | X | X | X | - | X | - | - | - | - | - | - |
| High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm ) | X | - | X | X | - | X | - | - | - | - | - | X |
| High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm) | X | - | X | X | - | X | - | - | - | - | - | X |
| High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm) | X | - | X | X | - | X | - | - | - | - | - | X |
| High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm) | - | X | X | X | - | X | - | - | - | - | - | - |
| High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm) | - | X | X | X | - | X | - | - | - | - | - | - |
| High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm) | - | X | X | X | - | X | - | - | - | - | - | - |

1) Best use at a temperature of < 80 °C (176 °F)
2) Best use at a temperature of > 80 °C (176 °F)

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## Application (continued)

***Sensor mounting availability guide***

| Mounting | Sensor<br>FSS200 Universal dedicated | FSS200 Dedicated high precision | FSS200 High temperature universal |
|---|---|---|---|
| Trackless[1)] | X | X | - |
| Tracks universal dedicated | X | - | - |
| Tracks HP dedicated | - | X | - |
| Frames universal dedicated | X | - | - |
| Frames HP dedicated | - | X | - |
| Tracks high temperature universal | - | - | X |
| High precision mounting single enclosure | - | X | - |
| High precision mounting dual enclosure | - | X | - |
| Spacer bar | X | X | - |
| Straps | X | X | X |
| Denso | X | X | - |

1) Usable but not recommended

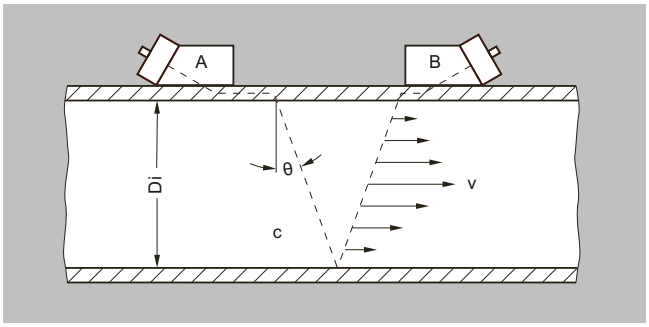
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## Function

***Operating principle***

The SITRANS FS system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly though the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.




Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$\sin \Theta = c / V_\varphi$

c = Velocity of sound in fluid

$V_\varphi$ = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensor and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid ($T_{Fluid}$).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference ($\Delta t$) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$v = V_\varphi / 2 \cdot \Delta t / T_{Fluid}$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$Re = Di \cdot v / visc \quad Q = K(Re) \cdot ( \pi / 4 \cdot Di^2 ) \cdot v$

v = Flow velocity

visc = $\mu / \rho$ = (dynamic viscosity / density)

K(Re) = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

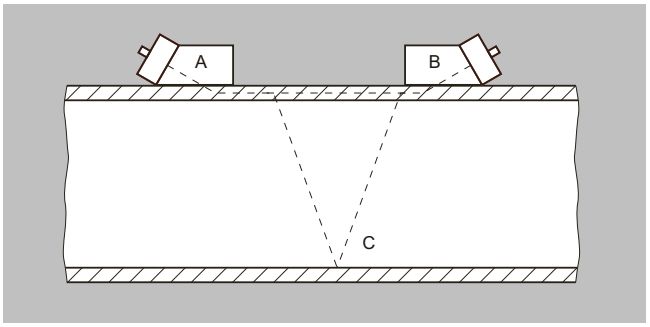
SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation ($K_{Re}$).

Ultrasonic sensor types

Two basic types of clamp-on sensors can be selected for use with the SITRANS F S flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal sensors are selected based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the patented "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

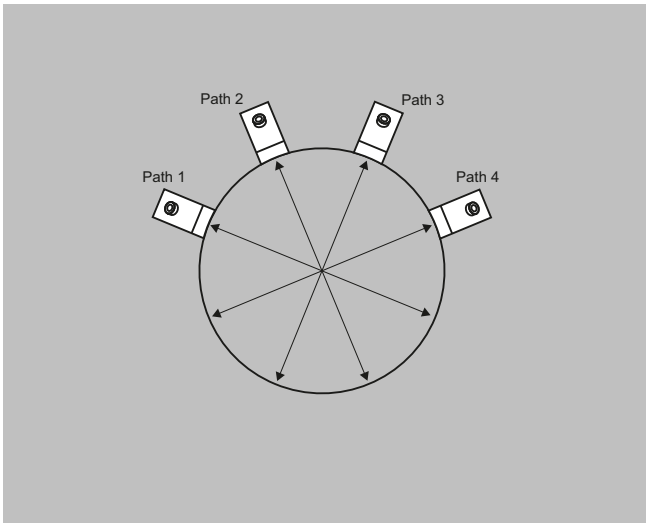
The WideBeam sensor is designed for steel pipes, but can also be used with aluminum and titanium. It is the preferred sensor for HPI applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.




Multi-path flowmeters

For improved flow profile averaging, redundancy or better cost per measurement, clamp-on meters can be supplied with 1, 2, 3 or 4 path measurement systems.

In the standard FS230 systems, these can be installed on a single pipe as shown below (four paths on same pipe).




Four path installation example

***SITRANS meter family description***

SITRANS FS230 clamp-on flowmeters

The FS230 system is a basic function, permanent (or dedicated) Clamp-on meter that is available with a full range of safety approvals and I/Os. This meter can be used in a wide range of applications.

***FST030 transmitter standard flow functions***

When configured with standard flow functions, the FST030 transmitter is typically programmed with a fixed viscosity and specific gravity entry, which can limit the mass flow and volumetric flow

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## Function (continued)

accuracy when highly variable (multi-product) liquid properties flow through the same pipeline.

It will have the ability to accommodate clamp-on RTDs, or analog input from a temperature transmitter.

FST030 hydrocarbon flow functions

When configured with hydrocarbon functions, the FST030 can be used for applications that will flow a wide range of viscosity with a standard volume (mass) and interface detection functions available. All functions rely on a variable referred to as "LiquIdent (TM)", which is used to infer the liquid's viscosity and density. This variable represents the measured liquid sonic velocity compensated by the operating temperature and pressure, so for a given liquid product the measured LiquIdent (TM) output will remain constant over a wide range of pressure or temperature.

Standard volume description

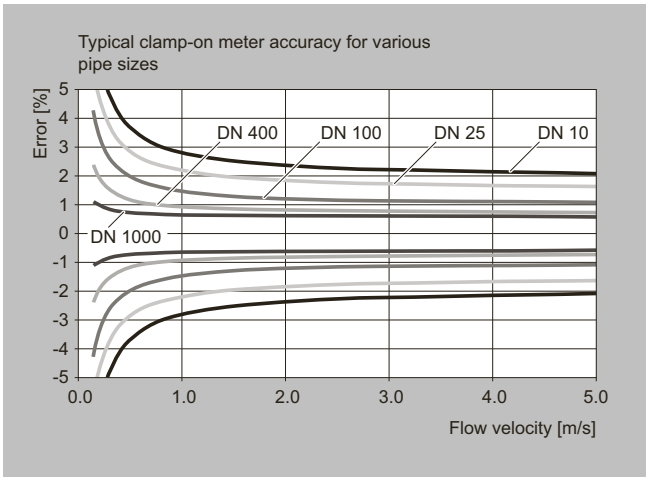
This LiquIdent (TM) variable can also be used to identify the liquid flowing through the pipe as well as it's physical properties (density, viscosity and compressibility) at base conditions. With this information the meter can be configured to output a temperature and pressure compensated (standard) volume flow rate using the API MPMS chapter 11.2.1 methods as shown below.

| | |
|---|---|
| **Correction for temperature** | |
| Compute thermal expansion coefficient ($\alpha_b$): $\alpha_b = KO / \rho_b^2 + K1 / \rho_b$ | where KO and K1 are constants dependent on type of liquid and $\rho_b$ is the liquid density at base conditions |
| Compute temperature correction factor ($K_T$): $K_T = \rho_b * EXP (- \alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$ | where $\Delta T$ = (T – base temperature) |
| **Correction for pressure** | |
| Compute compressibility factor (F): $F = EXP(A + B T + (C + D T) / \rho_b^2$ | where A, B, C and D are constants, and "T" is liquid temperature |
| Compute pressure correction factor (Kp): $K_p = 1 / (1 – F (P_{act} – P_{base}) * 10^{-4})$ | |
| **Final volume correction** | |
| $Q_{std} = Q_{act} * K_t * K_p$ | |

Available outputs from this meter include: API, standard density, mass flowrate, standard volume flowrate and liquid identification.

***General installation guidelines for transit time clamp-on sensor***

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph below for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review




## Function (continued)

- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream / 5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between 1 000 < Re < 5 000 should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

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## Overview



FST030 is based on the latest developments within Digital Signal Processing (DSP) technology – engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise, easy to install commission and maintain.

The FST030 transmitter delivers true multi-parameter measurements i.e. volume flow, standard volume flow, density, mass flow, fluid sound velocity and temperature.

The multiple outputs and bus communication mean that all primary process information can be read either instantaneously (10 ms update) or periodically as required by plant operations.

***Process values***

- Volume flow
- Mass flow
- Flow velocity
- Sound velocity
- Standard volume flow (hydrocarbon variant only)
- Density
- Kinematic viscosity
- Pressure
- Medium temperature
- Specific gravity (hydrocarbon variant only)
- Totalizer 1
- Totalizer 2
- Totalizer 3
- Standard density (hydrocarbon variant only)
- Standard specific gravity (hydrocarbon variant only)
- Standardizing factor (hydrocarbon variant only)
- Liquident (hydrocarbon variant only)
- API gravity (hydrocarbon variant only)
- Standard API gravity (hydrocarbon variant only)
- Standard kinematic viscosity (hydrocarbon variant only)
- Liquid identifier (hydrocarbon variant only)

## Benefits

***Flow calculation and measurement***

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all output on all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume and mass flow, standard volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

***Operation and display***

- User-configurable operation display
  - Full graphical display 240 x 160 pixels with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates (with ordered calibration)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters
  - 4 GB SD card for storage and data logging
  - Audit trail of all parameter changes
  - Alarm logging

***Alarms and safety***

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations

***Outputs and control***

- Monitoring comprising of 3 individually configurable totalizers
- Multi-parameter outputs, configurable outputs assigned individually to any of the following parameters:
  - Volume flow
  - Standard volume flow
  - Mass flow
  - Flow velocity
  - Sound velocity
  - Density
  - Process viscosity
  - Process pressure
  - Process/medium temperature

Up to six I/O channels are configured as follows.

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## Benefits (continued)

***Channel 1***

Channel 1 is 4 to 20 mA analog output with HART 7.5. The current signal can be configured for massflow, volumeflow and includes the availability of active or passive function selected by wiring on the non-Ex terminals. Alternative Modbus RTU RS 485 is available.

***Channel 2***

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Operational and alarm status

***Channels 3 and 4***

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

***Signal output***

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- Frequency or pulse
- Redundant frequency or pulse (linked to channel 2)
- Operational and alarm status

***Signal input***

Signal input can be user-configured for:

- Totalizer reset functions
- Force outputs or freeze process values
- Initiate automatic zero point adjustment

***Relay***

Relay output(s) can be user configured to:

- Alarm status

4-20 mA signal outputs and inputs are ordered as active or passive for Ex versions, active and passive for non-Ex versions - function selected by wiring on the terminals.

During initial commissioning of the flowmeter, all outputs can be forced to a preset value for simulation, verification or calibration purposes.

***Channels 5 and 6 (with internal DSL)***

- RTD temperature inputs for 1000, 500 or 100 Ω RTD's - 2, 3 or 4 wire RTD's supported
- Channels 5 and 6 (with external DSL option)
- RTD Temperature inputs or 4-20 ma inputs. Selectable in menu.

***Approvals and certificates***

The SITRANS FST030 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

## Design

The SITRANS FST030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be wall or pipe mounted and the enclosure can be locked with a padlock or wired with lead security seals. Includes all flow and DSL functions integrated into one unit.

The FST030 is available as standard with one current, HART 7.5 output and can be ordered with additional input/output functions.

The SITRANS FST030 wall mount housing transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

***SensorFlash***

SensorFlash is a standard, 4 GB micro SD card with the ability to be updated by PC. It is supplied with each transmitter and comes with a complete set of certification documents including report if ordered. Factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Copy site setups to SD card for easy transfer to other similar transmitters
- Permanent database of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the Siemens internet portal for Product Support and placed onto Sensor-Flash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter for system/firmware upgrade.

***SITRANS FST030 industrial housing***

Separate field enclosure with modular design. The FST030 can installed direct in the field. The SITRANS FST030 use always the seperate FS DSL for the sensor connection.

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## Function

The following functions are available:

- Up to four configurable outputs and 2 RTD input channels selected at ordering
- Outputs can be individually configured for mass flow, volume flow, etc.
- Three built-in totalizers which can count positive, negative or net flows
- Independent low flow cut-offs, adjustable
- Uni/bidirectional flow measurement
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Change log, logs all changes made to menu parameters or via communications
- Internal data logger
- Display of operating time with real-time clock
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density and temperature. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimal accuracy on massflow and density
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher

## Technical specifications

| SITRANS FST030 | |
|---|---|
| **Process media** | • Suitable for virtually any sonically conductive fluid, including hazardous liquids<br>• Aggregate state: Light slurry and liquid |
| **Process variables** | • Volume flow<br>• Mass flow<br>• Flow velocity<br>• Sound velocity<br>• Standard volume flow (hydrocarbon variant only)<br>• Density<br>• Kinematic viscosity<br>• Pressure<br>• Medium temperature<br>• Specific gravity (hydrocarbon variant only)<br>• Totalizer 1<br>• Totalizer 2<br>• Totalizer 3<br>• Standard density (hydrocarbon variant only)<br>• Standard specific gravity (hydrocarbon variant only)<br>• Standardizing factor (hydrocarbon variant only)<br>• LiquIdent (hydrocarbon variant only)<br>• API gravity (hydrocarbon variant only)<br>• Standard API gravity (hydrocarbon variant only)<br>• Standard kinematic viscosity (hydrocarbon variant only)<br>• Liquid identifier (hydrocarbon variant only) |
| **Current output** | |
| Current | 0 ... 20 mA or 4 ... 20 mA (channel 1 only 4 ... 20 mA) |
| Load | < 500 Ω per channel |
| Time constant | 0 ... 100 s adjustable |
| **Digital output** | |
| Pulse | 41.6 µs ... 5 s pulse duration |
| Frequency | 0 ... 10 kHz, 50 % duty cycle, 120 % overscale provision |
| Time constant | 0 ... 100 s adjustable |
| Active | 0 ... 22 V DC, 30 mA, short-circuit-protected |
| Passive | 3 ... 30 V DC, max. 110 mA |
| **Relay** | |
| Type | SPDT dry contact relay |
| Load | 30 V AC/100 mA |
| Functions | Alarm level, alarm number, limit, flow direction |
| **Digital input** | |
| Voltage | 15 ... 30 V DC (2 ... 15 mA) |
| Current | 4 ... 20 mA |
| Functionality | Reset totalizer 1, 2 and 3, force output, freeze process values, zero point adjustment |
| **Galvanic isolation** | All inputs and outputs are galvanically isolated, isolation voltage 500 V |
| **Alarm and warning limit** | Available for all process values |
| **Totalizer** | Three counters for forward, net and reverse flow |
| **Display** | • Background illumination with alphanumerical text to indicate flow rate, totalized values, settings and faults<br>• Adjustable damping constant of 0 ... 100 s<br>• Reverse flow indicated by negative sign |

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## Technical specifications (continued)

| SITRANS FST030 | |
|---|---|
| **SD card functions** | • Parameter change log<br>• Configurable data logger<br>• FW update log<br>• Diagnostic log<br>• Error and alarm log<br>• Parameter backup |
| **Ambient temperature** | |
| Operation | |
| • Transmitter | -40 ... +60 °C (-40 ... +140 °F), humidity max. 95 % |
| • Display | -20 ... +60 °C (-4 ... +140 °F) |
| Storage | |
| • Transmitter | -40 ... +70 °C (-40 ... +158 °F), humidity max. 95 % |
| **Communication** | HART 7.5<br>Modbus RTU RS 485 |
| **Enclosure** | |
| Material | Aluminum |
| Rating | IP66/67, NEMA 4X to IEC 529 and DIN 40050 (1 $mH_2O$ for 30 min.) |
| Mechanical load | 18 ... 400 Hz random, 3.17 g RMS, in all directions |
| **Power supply** | |
| Universal | 20 ... 27 V DC<br>100 ... 240 V AC, 47 ... 63 Hz |
| Fluctuation | No limit |
| Power consumption | 20 W/22 VA |
| **Minimum pressure for gas** | 10 bar (145 psi), gas composition and application dependent; plastic pipes support operation at atmospheric pressure. For lower pressure application please contact sales |
| **Environment**<br>Environmental conditions according to IEC/EN/UL 61010-1 | • Altitude up to 2 000 m<br>• Pollution degree 2<br>• Overvoltage category II |
| **Maintenance** | The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis |
| **Cable glands** | Cable glands are available in nylon, nickel plated brass or stainless steel (316L/W1.4404) |
| **Approvals for FST030 wall mount enclosure** | |
| ***Canada, USA*** | Class I, Division 2, Groups A, B, C, D<br>Class II, Division 2, Groups F, G<br>Class III, Division 2<br>Class I, Zone 2, AEx ia nA [ia Ga] IIC T6...T5 Gc<br>Class I, Zone 2; AEx/Ex ec ia [ia Ga] IIC T6...T5 Gc<br>Class II, Zone 22; AEx/Ex tc [ia Da] IIIC T85°C Dc |
| • FM17CA0110X<br>• FM17US0219X<br>• CSA 21CA80072942X | |
| ***ATEX, UKEx, IECEx*** | II 3(1) G Ex ec ia [ia Ga] IIC T6...T5 Gc<br>II 3(1) D Ex tc [ia Da] IIIC T85°C Dc |
| • FM17ATEX0055X<br>• FM21UKEX0059X<br>• IECEx FMG 17.0023X | |
| ***Inmetro*** | Ex ec ia [ia Ga] IIC T6 Gc<br>Ex tc [ia Ga] IIIC T85°C Dc |
| • BRA 21.GE0013X | |
| ***Ambient temperature range*** | T6 for -40 °C ≤ $T_a$ ≤ 45 °C<br>T5 for -40 °C ≤ $T_a$ ≤ 60 °C<br>T5 85 °C for -40 °C ≤ $T_a$ ≤ 60 °C |

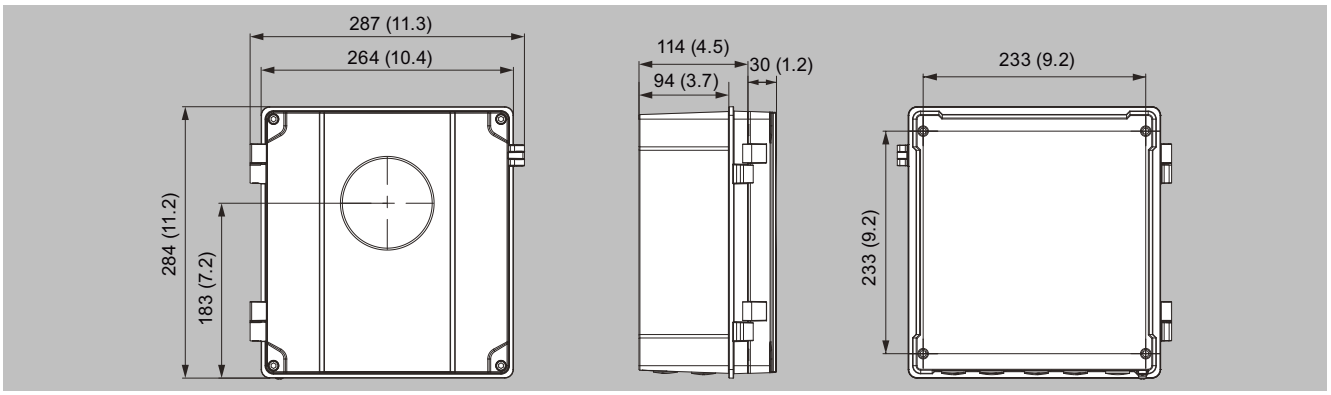
## Technical specifications (continued)

| SITRANS FST030 | |
|---|---|
| **Approvals for FST030 industrial enclosure** | |
| ***Canada, USA*** | ***Canada:*** |
| • CSA 2508628<br>• FM18US0063X<br>• FM21CA0019X | Ex db eb ia [ia Ga] IIC T6 Gb<br>Ex tb [ia Da] IIIC T85°C<br>***USA:***<br>Class I, Division 1, Groups A, B, C, D<br>Class II, Division 1, Groups E, F, G<br>Class III, Division 1<br>Class I, Zone 1: AEx db eb ia [ia Ga] IIC T6 Gb<br>Class II, Zone 21: AEx tb [ia Da] IIIC T85°C |
| ***ATEX, UKEx, IECEx*** | II 2(1) G Ex db eb ia [ia Ga] IIC T6 Gb<br>II 2(1) D Ex tb [ia Da] IIIC T85°C Db |
| • Sira 11ATEX1342X<br>• CSAE 21UKEX1109X<br>• IECEx SIR 11.0150X | |
| ***Inmetro*** | Ex db eb ia [ia Ga] IIC T6 Gb<br>Ex tb [ia Da] IIIC T85°C Db |
| • BRA 21.GE0013X | |
| ***Ambient temperature range*** | $T_a$ = -40 ... 60 °C |
| **Approvals for FS230 external DSL** | |
| ***Canada, USA*** | IS Class I, Division 1, Groups A, B, C, D<br>IS Class II, Division 1, Groups E, F, G<br>IS Class III, Division 1<br>Class I, Zone 0; AEx/Ex ia IIC T6...T5 Ga<br>Class II, Zone 21;<br>AEx/Ex ib IIIC T64°C...T74°C Db |
| • FM16CA0157X<br>• FM16US0318X<br>• CSA 21CA8007621X | |
| ***ATEX, UKEx, IECEx*** | II 1 G Ex ia IIC T6...T5 Ga<br>II 2 D Ex ib IIIC T5 64°C...T5 74°C Db |
| • FM16ATEX0094X<br>• FM21UKEX0058X<br>• IECEx FMG 16.0037X | |
| ***Inmetro*** | Ex ia IIC T6...T5 Ga<br>Ex ib IIIC T5 64°C Db |
| • BRA 21.GE001 | |
| ***EAC Ex*** | Ex ia IIC T6...T5 Ga<br>Ex ib IIIC T64°C...T5 74 °C Db |
| ***Ambient temperature range*** | T6: -40 °C ≤ $T_a$ ≤ 50 °C<br>T5: -40 °C ≤ $T_a$ ≤ 60 °C<br>$T_5$64 °C: -40 °C ≤ $T_a$ ≤ 50 °C<br>$T_5$74 °C: -40° C ≤ $T_a$ ≤ 60 °C |
| **Certificates** | |
| CE conformity marking | • Low voltage directive<br>• WEEE<br>• RoHS |
| **EMC performance** | |
| Emission | CISPR 11:2009/A1:2010 and EN 55011:2009/A1:2010 |
| Immunity | IEC/EN 61326-1:2013 |

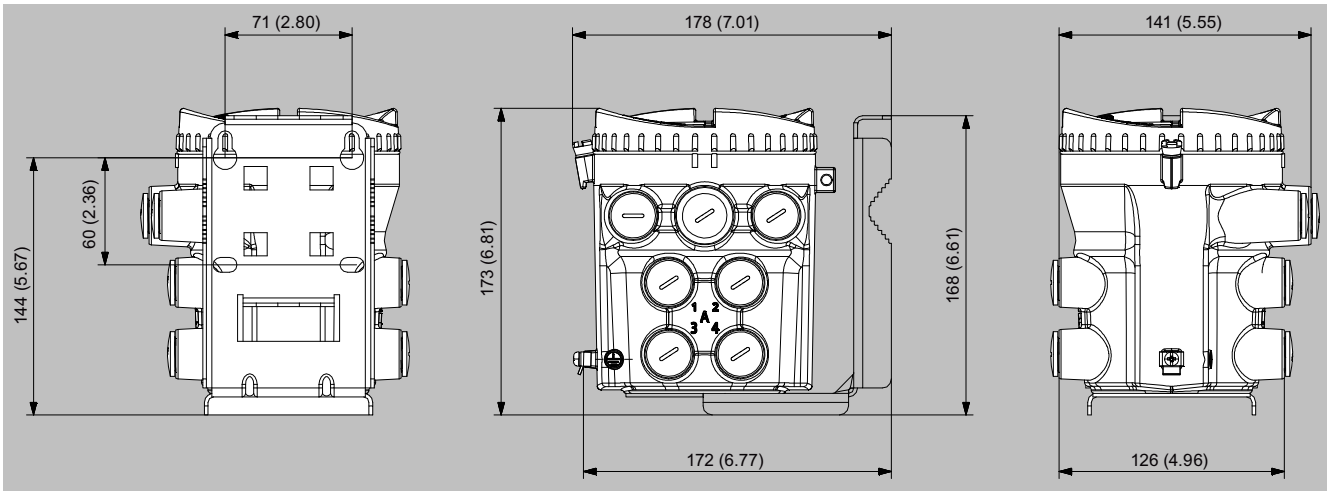
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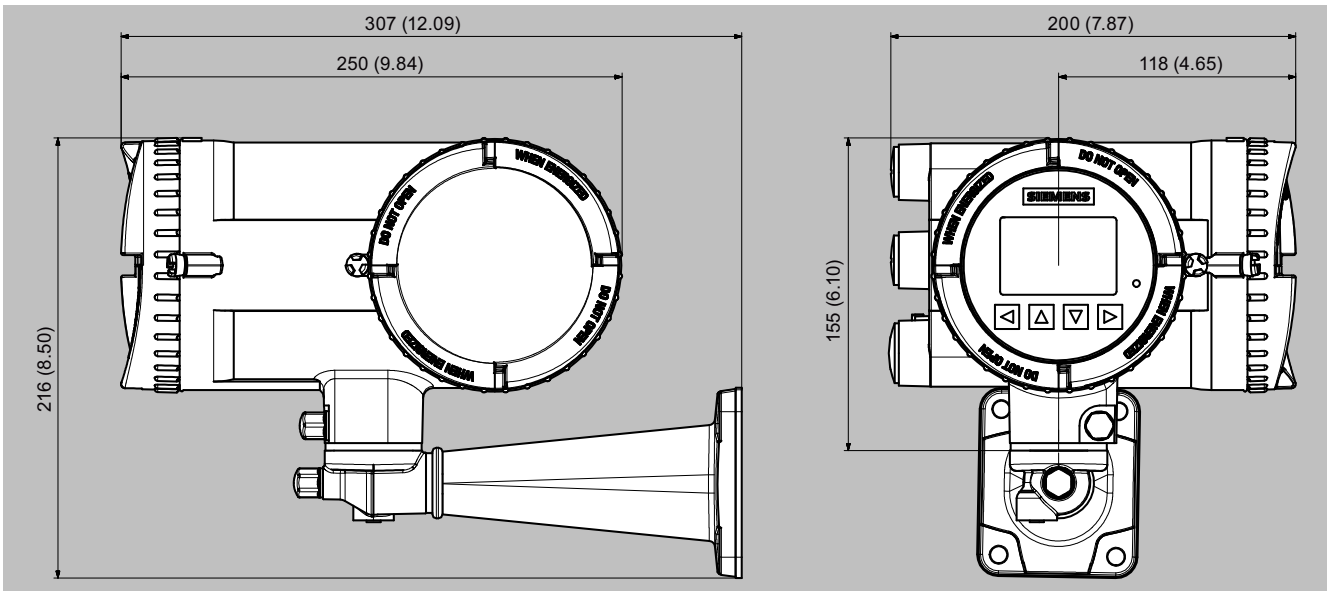
## Dimensional drawings




SITRANS FST030, wall mount version, dimensions in mm (inch)




External DSL, dimensions in mm (inch)

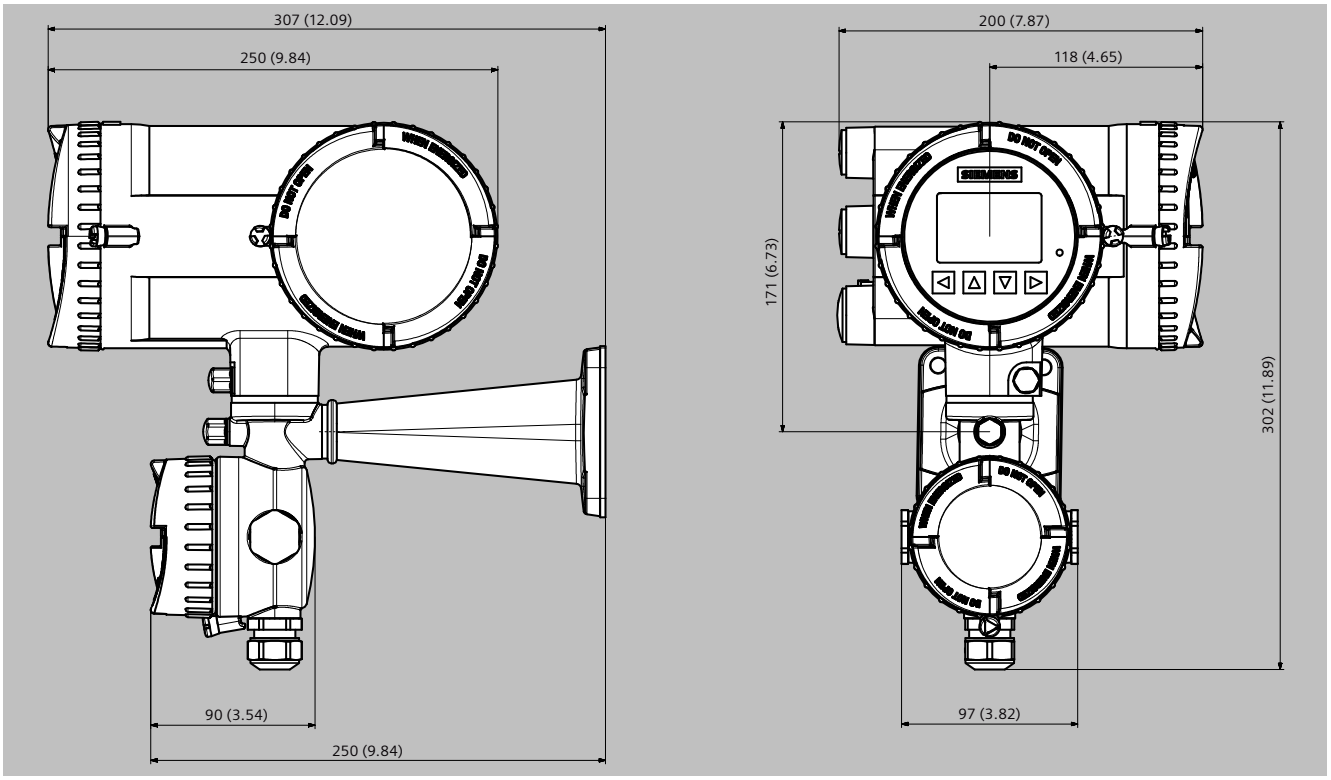



SITRANS FST030 industrial transmitter with M12 connection, dimensions in mm (inch)

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## Dimensional drawings (continued)




SITRANS FST030 with terminal house, dimensions in mm (inch)

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## Overview




The SITRANS FS220 is a clamp-on ultrasonic flow system consisting of an FST020 transmitter and FSS200 clamp-on sensors.

The transmitter classification FST020 describes a basic clamp-on ultrasonic flowmeter for basic application requirements. Based on the same digitalized platform as the FST030 this system provides the same accuracy and similar functions on a lower cost level. This system is ideal for water measurement and any application not requiring temperature or viscosity compensation.

## Benefits

- Easy installation at any time; no production stop, no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear. No contact with media
- No pressure drop or energy loss
- Wide turn-down ratio, bidirectional and high stability at zero flow conditions
- Anomaly compensation tool for correction of non-ideal straight pipe runs. Automatic compensation during backflow
- Optional WideBeam technology ensures highest performance and accuracy
- Compatible with all previously installed transit time sensors

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## Application

The SITRANS FS220 can be used for the following application conditions:

- Pipe sizes from 10 mm to 10 m
- Pipe materials: ideal for all metals, glass, FRP and most PVC variants; NOT for concrete pipes and special compound pipes
- Pipe wall thickness from 1 to 35 mm; specials on request up to 65 mm
- Media temperatures from -40 to 121 °C; universal high temperature sensors for up to 230 °C max.
- Underground/submerged locations, non-ideal environments, strong pipe vibrations

SITRANS FS220 flowmeters are suitable for most clean liquid applications, including the following:

- Water and wastewater industry
  - Potable water
  - Water and aqueous solutions
  - Wastewater, influent & effluent
  - Processed sewage, sludge
- Chemical feed industry
  - Sodium hypochlorite
  - Sodium hydroxide
- HVAC and power industries
  - Coolant flow
  - Fuel flow
  - Utility district heating, cooling
  - Refrigeration liquids
- Process control
  - Chemicals
  - Pharmaceuticals
  - Food products
  - Very low flow sensitiity (< 0.1 m/s)
  - High temperature liquids > 120 °C (248 °F)

***Sensor type selection guide***



| Application condition<br>Note all that apply before making selection | Standard sensor supported in MLFB<br>High precision | Universal | Notes |
|---|---|---|---|
| **Media** | | | |
| General survey (clean liquids) on non-steel pipes | - | X | - |
| General survey (clean liquids) on a limited range of steel pipes | X | - | - |
| Moderately aerated liquid or slurry, up to 121 °C (250 °F) | X | - | - |
| Permanent installation on steel pipe (clean liquids) | X | - | - |
| Installation in offshore or corrosive environment | X | - | With optional stainless steel mounting |
| Liquid temperature greater than 120 °C (248 °F) | O | X | High temperature metal block sensors (up to 230 °C (446 °F)) |
| Operation on single pipeline flowing multiple products | X | O | - |
| **Pipe material** | | | |
| Steel | X | - | - |
| Steel pipe with diameter/wall thickness ratio < 10 | O | X | - |
| Non-steel pipe material (copper, ductile iron, cast iron, etc.) | O | X | High precision sensors can also be used on plastic and aluminum pipes in special cases |

O = not suitable
X = preferred choice

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## Application (continued)

### *Definitions*

| Sensor chart | Description |
|---|---|
| FSS200 | Formerly 1011 clamp-on sensors of the 1010 systems |
| Standard | Standard system sensor, selectable as part of a configured product |
| Special | Sensors available for non-standard applications and pipes. Contact tech support for application use |
| Corrosions resistant | Stainless steel metal parts on all Size C, D and E and all high temperature sensors |
| Aluminum | Aluminum metal parts on all HP and Universal size A and B (Corrosion resistant on request for size B) |
| Spare | Not available as part of a configured product, must be ordered separately |
| CE | Transmitter and sensors certified for sale in the EU |
| Trackless mount | Sensors fixed only by straps, no other mounting (spacer bar as an option) - not recommended |
| Tracks | Permanent installation for universal size A/B, high precision size A/B and all sizes of high temperature. Tracks always come as dual-part for either direct or reflect mounting, and always with straps. |
| Frames | Three sizes, for permanent installation for universal size C/ D/ E, and for high precision size C/D. For universal and high precision size B available for pipes > 125 OD (Spare) |
| T1 | Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature below 80 °C (< 176 °F); standard |
| T2 | Usable from -40 ... +120 °C (-40 ... +248 °F), but best for Ø temperature above 80 °C (< 176 °F) |
| Submersible | Sensors can be used submerged; adding Denso for supplemental protection is recommended |

### *Sensor availability guide*

Universal Sensor

| Universal Sensor -40 ... 120 °C housing CE IP68 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor models** | **Standard** | **Spare only** | **Corrosion resistant** | **Trackless** | **Tracks** | **Frames** | **T1[1)]** | **T2[2)]** | **Submers-ible** | **Catalog** |
| A1 Universal for pipe OD – 5.8 ... 50.8 mm (0.23" ... 2") | - | x | - | - | x | - | - | - | x | - |
| A2 Universal for pipe OD – 12.7 ... 50.8 mm (0.5" ... 2") | x | - | - | - | x | - | - | - | x | x |
| B1 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3") | - | x | - | - | x | x | - | - | x | - |
| B2 Universal for pipe OD – 12.7 ... 76 mm (0.5" ... 3") | - | x | - | - | x | x | - | - | x | - |
| B3 Universal for pipe OD – 19 ... 127 mm (0.75" ... 5") | x | - | - | - | x | x | - | - | x | x |
| C1 Universal for pipe OD – 51 ... 254 mm (2" ... 10") | - | x | x | x | - | x | - | - | x | - |
| C2 Universal for pipe OD – 51 ... 254 mm (2" ... 10") | - | x | x | x | - | x | - | - | x | - |
| C3 Universal for pipe OD – 51 ... 305 mm (2" ... 12") | x | - | x | x | - | x | - | - | x | x |
| D1 Universal for pipe OD – 102 ... 508 mm (4" ... 20") | - | x | x | x | - | x | - | - | x | - |
| D2 Universal for pipe OD – 152 ... 610 mm (6" ... 24") | - | x | x | x | - | x | - | - | x | - |
| D3 Universal for pipe OD – 203 ... 610 mm (8" ... 24") | x | - | x | x | - | x | - | - | x | x |
| *E1 Universal for pipe OD – 254 ... 3048 mm (10" ... 120") | - | x | x | x | - | x | - | - | x | - |
| *E2 Universal for pipe OD – 254 ... 6096 mm (10" ... 240") | x | - | x | x | - | x | - | - | x | x |

1) Best use at a temperature of < 80 °C (176 °F)
2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

High Precision Sensor

| High Precision Sensor -40 ... 120 °C (-40 ... +248 °F) T1 (T2) CE IP68 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor models** | **Standard** | **Spare only** | **Corrosion resistant** | **Trackless** | **Tracks** | **Frames** | **T1[1)]** | **T2[2)]** | **Submers-ible** | **Catalog** |
| A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04") | - | x | - | - | x | - | x | - | x | x |
| A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06") | x | - | - | - | x | - | x | - | x | x |
| A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08") | x | - | - | - | x | - | x | - | x | x |

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## Application (continued)

| High Precision Sensor -40 ... 120 °C (-40 ... +248 °F) T1 (T2) CE IP68<br>Sensor models | Standard | Spare only | Corrosion resistant | Trackless | Tracks | Frames | T1[1] | T2[2] | Submers-ible | Catalog |
|---|---|---|---|---|---|---|---|---|---|---|
| B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12") | X | - | - | - | X | X | X | X | X | X |
| B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16") | X | - | - | - | X | X | X | X | X | X |
| B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128") | - | X | - | - | X | X | X | X | X | X |
| C1H (High Precision) for pipe WT - 4.1 ... 5.8 mm (0.16" ... 0.23") | X | - | X | X | - | X | X | X | X | X |
| C2H (High Precision) for pipe WT - 5.8 ... 8.1 mm (0..23" ... 0.32") | X | - | X | X | - | X | X | X | X | X |
| * D1H (High Precision) for pipe WT - 8.1 ... 11.2 mm (0..32" ... 0.44") | X | - | X | X | - | X | X | X | X | X |
| * D2H (High Precision) for pipe WT - 11.2 ... 15.7 mm (0.44" ... 0.62") | X | - | X | X | - | X | X | X | X | X |
| * D3H (High Precision) for pipe WT - 7.4 ... 9.0 mm (0..293" ... 0.354") | - | X | X | X | - | X | X | X | X | X |
| * D4H (High Precision) for pipe WT - 15.7 ... 31.8 mm (0..62" ... 1.25") | X | - | X | X | - | X | X | X | X | X |

1) Best use at a temperature of < 80 °C (176 °F)
2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

High Temperature Universal Sensor

| High Temperature Universal Sensor -40 ... +230 °C (-40 ... +446 °F)<br>Sensor models | Standard | Spare only | Corrosion resistant | Trackless | Tracks | Frames | T1[1] | T2[2] | Submers-ible | Catalog |
|---|---|---|---|---|---|---|---|---|---|---|
| High Temperature size 1 ... 230 °C (Ø 12.7 ... 100 mm) | - | X | X | - | X | - | - | - | X | - |
| High Temperature size 2 ... 230 °C (Ø 30 ... 200 mm ) | X | - | X | - | X | - | - | - | X | X |
| High Temperature size 3 ... 230 °C (Ø 150 ... 610 mm) | X | - | X | - | X | - | - | - | X | X |
| High Temperature size 4 ... 230 °C (Ø 400 ... 1200 mm) | X | - | X | - | X | - | - | - | X | X |
| High Temperature size 2A ... 230 °C (Ø 30 ... 200 mm) | - | X | X | - | X | - | - | - | X | - |
| High Temperature size 3A ... 230 °C (Ø 150 ... 610 mm) | - | X | X | - | X | - | - | - | X | - |
| High Temperature size 4A ... 230 °C (Ø 400 ... 1200 mm) | - | X | X | - | X | - | - | - | X | - |

1) Best use at a temperature of < 80 °C (176 °F)
2) Best use at a temperature of 80 ... 120 °C (176 ... 248 °F)

***Sensor mounting availability guide***

| Mounting | Sensor (Dedicated)<br>Universal | High precision | High temperature universal |
|---|---|---|---|
| Trackless (straps only) | X | X | - |
| Tracks universal dedicated | X | - | - |
| Tracks HP dedicated | - | X | - |
| Frames universal dedicated | X | - | - |
| Frames HP dedicated | - | X | - |
| Tracks high temperature universal | - | - | X |
| High precision mounting single enclosure for one pair sensors | - | X | - |
| High precision mounting dual enclosure for one pair sensors | - | X | - |
| Spacer bar | X | X | - |
| Straps | X | X | X |
| Denso | X | X | - |

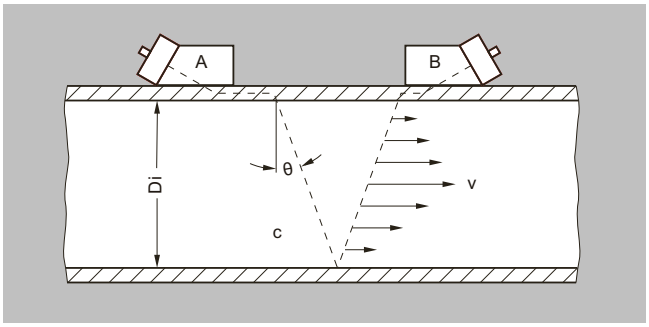
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## Function

***Operating principle***

The SITRANS FS system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly though the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.




Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$\sin \Theta = c / V_{\varphi}$

c = Velocity of sound in fluid

$V_{\varphi}$ = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensor and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid ($T_{Fluid}$).

The sound waves traveling in the same direction as the flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference ($\Delta t$) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$v = V_{\varphi} / 2 \cdot \Delta t / T_{Fluid}$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$Re = Di \cdot v / visc \quad Q = K(Re) \cdot ( \pi / 4 \cdot Di^2 ) \cdot v$

v = Flow velocity

visc = $\mu / \rho$ = (dynamic viscosity / density)

K(Re) = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

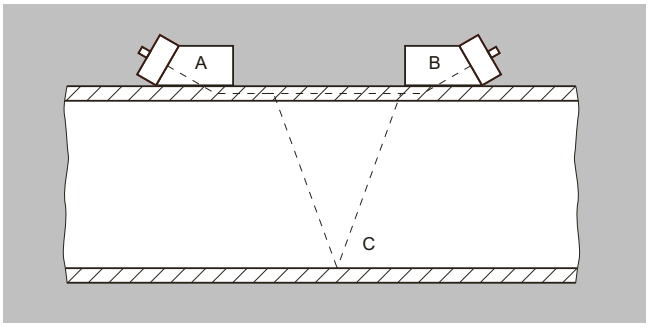
SITRANS clamp-on flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation ($K_{Re}$).

Ultrasonic sensor types

Two basic types of clamp-on sensors can be selected for use with the SITRANS FS flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for temporary survey applications. Universal sensors are selected based on the pipe diameter range alone, so wall thickness is less important to the selection process..

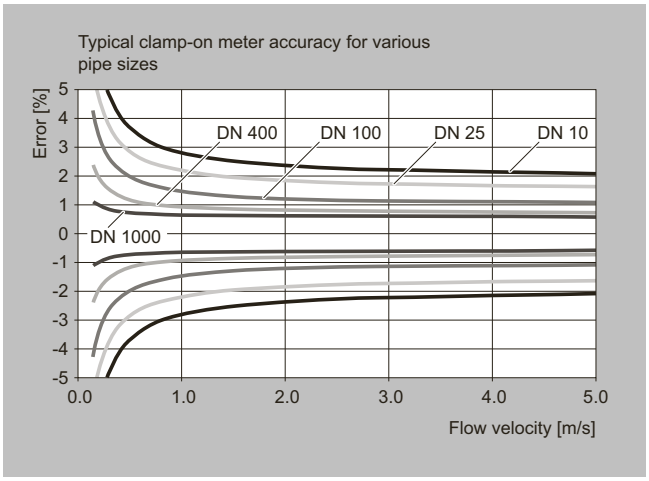
The second sensor type is the patented "WideBeam" sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

The WideBeam sensor is designed for steel pipes, but can also be used with aluminum and titanium. It is the preferred sensor for HPI applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.




General installation guidelines for SITRANS FSS200 clamp-on sensor

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph on next page for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review




- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves.
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe

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## Function (continued)

- Operation inside the Reynolds transition region, between 1000 < Re < 5000 should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

## Selection and ordering data

| Spare parts (FSS200 sensors)<br>SITRANS F US clamp-on | Article No.<br>7ME3950- | 5 | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| **Temperature range for all sensors is unless otherwise noted -40 °C ... +120 °C (-40 °F ... +248 °F)** | | | | | | |
| Ideal operating temperatures as follows: | | | | | | |
| T1: -40 ... +8065 °C (-40 ... +176 °F) | | | | | 0 | |
| T2: -80 ... 121 °C (30 ... 250 °F) | | | | | 2 | |
| **Spare sensor code**<br>(Stainless steel construction) | | | | | | |
| ***Liquid flow sensors for use with mounting frames or tracks (including portable)*** | | | | | | |
| FSS200 A2 universal | | | L | B | 0 | 1 |
| FSS200 B3 universal | | | L | C | 0 | 1 |
| FSS200 C3 universal | | | L | D | 0 | 0 |
| FSS200 D3 universal | | | L | E | 0 | 0 |
| FSS200 E2 universal | | | L | F | 0 | 0 |
| FSS200 A1H (high precision) | | | L | G | 0 | 1 |
| FSS200 A2H (high precision) | | | L | H | 0 | 1 |
| FSS200 A3H (high precision) | | | L | J | 0 | 1 |
| FSS200 B1H (high precision) | | | G | K | | 1 |
| FSS200 B2H (high precision) | | | G | L | | 1 |
| FSS200 B3H (high precision) | | | G | T | | 1 |
| FSS200 C1H (high precision) | | | G | M | | 0 |
| FSS200 C2H (high precision) | | | G | N | | 0 |
| FSS200 D1H (high precision) | | | G | P | | 0 |
| FSS200 D2H (high precision) | | | G | Q | | 0 |
| FSS200 D3H (high precision) | | | G | U | | 0 |
| FSS200 D4H (high precision) | | | G | R | | 0 |
| ***High temperature universal liquid sensors up to 230 °C (446 °F)*** | | | | | | |
| FSS200 high temperature sensor size 1 for Ø 12.7 ... 100 mm | | | L | A | 1 | 3 |
| FSS200 high temperature sensor size 2 for Ø 30 ... 200 mm | | | L | A | 2 | 3 |
| FSS200 high temperature sensor size 3 for Ø 150 ... 600 mm | | | L | A | 4 | 3 |
| FSS200 high temperature sensor size 4 for Ø 400 ... 1200 mm | | | L | A | 7 | 3 |

| Spare parts (Miscellaneous)<br>SITRANS F US clamp-on | Article No.<br>7ME3960- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| **Dedicated sensor mounting hardware** | | | | | | |
| Sensor mounting tracks (dual part aluminium with mounting straps) for pipes < 125 mm (5 inch) | | | | | | |
| • Tracks for Universal sensor pair size A or B | | 0 | M | A | 0 | 0 |
| • Tracks for High precision sensor pair size A or B | | 0 | M | B | 0 | 0 |
| Sensor mounting frames pair with mounting straps | | | | | | |
| • Frames for universal sensor size B (for pipes >125 mm (5 inch) | **CQO:1012FN-PB** | | | | | |
| • Frames for universal sensor size C | | 0 | M | C | 0 | 0 |
| • Frames for universal sensor size D | | 0 | M | C | 0 | 1 |
| • Frames for universal sensor size E | | 0 | M | C | 0 | 2 |

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## Selection and ordering data (continued)

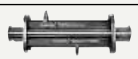
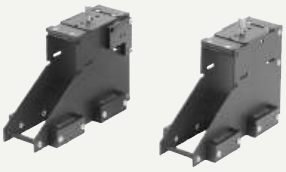
| Spare parts (Miscellaneous)<br>SITRANS F US clamp-on | Article No.<br>7ME3960- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| • Frames for High precision sensor size B (for pipes >125 mm (5 inch)) | **CQO:1012FNH-PB** | | | | | |
| • Frames for High precision sensor size C | | 0 | M | D | 0 | 0 |
| • Frames for High precision sensor size D | | 0 | M | D | 0 | 1 |
| Mounting straps for mounting frames (slotted stainless steel) | | | | | | |
| • Straps for pipes from DN 50 ... 150 | | 0 | S | M | 0 | 0 |
| • Straps for pipes from DN 50 ... 300 | | 0 | S | M | 1 | 0 |
| • Straps for pipes from DN 300 ... 600 | | 0 | S | M | 2 | 0 |
| • Straps for pipes from DN 600 ... 1200 | | 0 | S | M | 3 | 0 |
| • Straps for pipes from DN 1200 ... 1500 | | 0 | S | M | 4 | 0 |
| • Straps for pipes from DN 1500 ... 2100 | | 0 | S | M | 5 | 0 |
| • Straps for pipes from DN 2100 ... 3000 | | 0 | S | M | 6 | 0 |
| Spacer bars (for indexing sensors on pipe) | | | | | | |
| • Spacer bar for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas) | | 0 | M | S | 1 | 0 |
| • Spacer bar for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas) | | 0 | M | S | 2 | 0 |
| • Spacer bar for pipes to 800 mm/32 inch (liquid) | | 0 | M | S | 3 | 0 |
| • Spacer bar-extension for pipes to 1200 mm/48 inch (liquid), only use in conjunction with 7ME3960-0MS30 | | 0 | M | S | 4 | 0 |
| High precision mounting enclosures. Spacer bar is included; straps should be ordered separately | | | | | | |
| • Stainless steel mounts for high precision size "C" sensor pair, single enclosure (each) | | 0 | W | S | 5 | 0 |
| • Stainless steel mounts for high precision size "D/E" sensor pair, single enclosure (each) | | 0 | W | S | 6 | 0 |
| • Stainless steel mounts for high precision size "C" sensors, dual enclosure (pair) | | 0 | W | D | 5 | 0 |
| • Stainless steel mounts for high precision size "D/E" sensors, dual enclosure (pair) | | 0 | W | D | 6 | 0 |
| **Stainless steel straps for weld seal enclosure mounting (2 x required for dual enclosures)** | | | | | | |
| Mounting strap for pipe diameter to 300 mm (13 inch) | | 0 | S | M | 0 | 1 |
| Mounting strap for pipe diameter to 600 mm (24 inch) | | 0 | S | M | 1 | 1 |
| Mounting strap for pipe diameter to 1200 mm (48 inch) | | 0 | S | M | 2 | 1 |
| Mounting strap for pipe diameter to 1500 mm (60 inch) | | 0 | S | M | 3 | 1 |
| Mounting strap for pipe diameter to 2130 mm (84 inch) | | 0 | S | M | 4 | 1 |
| Mounting strap for pipe diameter to 3050 mm (120 inch) | | 0 | S | M | 5 | 1 |
| **Stainless mounting tracks for high temp 991 sensors, with straps, dual part for direct and reflect ount, inc. straps** | | | | | | |
| Size 1 high temp sensor pair | **CQO:992MTNHMSH-1** | | | | | |
| Size 2 high temp sensor pair | **CQO:992MTNHMSH-2** | | | | | |
| Size 3 high temp sensor pair | **CQO:992MTNHMSH-3** | | | | | |
| Size 4 high temp sensor pair | **CQO:992MTNHMSH-4** | | | | | |
| **Dedicated cable termination kits** | | | | | | |
| For externally supplied sensor cables, standard and plenum | | 0 | C | T | 0 | 1 |
| **Cable gland kit (normally supplied with transmitter)**<br>for IP65 NEMA 4X enclosures | **A5E41693895** | | | | | |
| **Ultrasonic couplan** | | | | | | |
| Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F) | | 0 | U | C | 1 | 0 |
| Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F) | | 0 | U | C | 2 | 0 |
| Permanent high temp fluoroether: -40 ... +230 °C (-40 ... +450 °F) | | 0 | U | C | 3 | 0 |
| Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40 ...+120 °C (-40 ... +250 °F) | **CQO:CC112** | | | | | |
| Permanent high temp silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F) | **CQO:CC117** | | | | | |
| Permanent high temp silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F) | **CQO:CC117A** | | | | | |
| Couplant for submersible sensor applications | **CQO:CC120** | | | | | |
| Dry coupling pads (qty of 10): -34 ... +200 °C (-30 ... +392 °F) | | 0 | U | C | 4 | 0 |
| **Universal sensor test blocks** | | | | | | |
| Test block for size A and B universal sensors | | 0 | T | B | 1 | 0 |
| Test block for size C and D universal sensors | | 0 | T | B | 2 | 0 |

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## Selection and ordering data (continued)

*Accessories*

| Description | Article No. | |
|---|---|---|
| **FSS200 universal sensors**<br>Selected for general purpose measurement.<br>Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected for cost savings on applications where standard accuracy is sufficient. | **7ME3950-...** | |
| **FSS200 high precision sensors**<br>Selected for increased performance on steel pipes. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy / repeatability is required primarily based on pipe wall thickness. | **7ME3950...** |  |
| **FSS200 high temperature sensors**<br>Selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Constructed in stainless steel. Connection junction box included. | **7ME3950-...** |  |
| **Mounting tracks**<br>Typically used on smaller pipes for easier and more stable mounting of dedicated universal style sensor size A or B; also available for dedicated high precision sensor size A or B. | **7ME3960-...** |  |
| **Mounting frames**<br>These items are useful in simplifying sensor installation. They are strapped to the pipe first and then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring alignment to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results. | **7ME3960-...** |  |
| **Magnetic mounting frames**<br>Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them.<br>They feature powerful magnets to ensure quick and accurate setup.<br>Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS FSS200 clamp-on family.<br>Magnetic mounting frames are constructed in aluminum for a high level of durability. Ideal use on temporary installations. | **7ME3960-0MD02** |  |
| **Test block**<br>Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors. | **7ME3960...** |  |
| **Straps**<br>Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance. | **7ME3960-...** |  |

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## Selection and ordering data (continued)

| Description | Article No. | |
|---|---|---|
| **Cable gland**<br>Cable gland kit for use with SITRANS FST020 transmitters housed in IP65 NEMA 4X wall mount enclosures. Kit contains two single port glands for power and one dual port gland for sensor cables. | A5E41693895 |  |
| **Ultrasonic couplant**<br>Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent). | 7ME3960-... |  |
| **Dry couplant**<br>The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F). | 7ME3960-... |  |
| **Termination kit (flow sensors)**<br>Termination kit for one pair of sensor cables. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at site, or when existing cable length is to be altered. Selected by cable type. | 7ME3960-... |  |
| **FST020 transmitter module**<br>Main transmitter module for FST020 including SD-card and firmware load | A5E41693884 | |
| **FST020 transmitter module cover AC**<br>Cover for FST020 Main transmitter module for AC powered units; includes label and screws | A5E41693888 | |
| **FST020 transmitter module cover DC**<br>Cover for FST020 Main transmitter module for DC powered units; includes label and screws | A5E41693889 | |
| **FST020 enclosure cover**<br>Enclosure lid for FST020; includes display module, connection label and screws | A5E38846901 | |
| **FST020 power supply AC**<br>Power supply module for FST020, AC power | 7ML1830-1MD | |
| **FST020 power supply DC**<br>Power supply module for FST020, DC power | 7ML1830-1ME | |
| **SensorFlash SD-card**<br>4 GB micro SD card -40 °C ... +85 °C for FST020 or FST030 for data storage, firmware and back-up | A5E38288507 | |
| **Hardware kit**<br>Various nuts, screws, and grounding strap for FST020 transmitter | A5E41944763 | |

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## Selection and ordering data (continued)

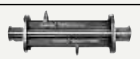
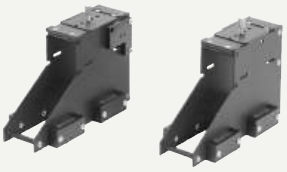
| Description | Article No. | |
|---|---|---|
| **Sensor cables FSS220 (IP65 NEMA 4X) wall mount**<br>Sensor cable for connection between FSS200 sensors and FST020 transmitter | |  |
| Sensor cable pair, terminated, 5 m | **A5E39669934031** | |
| Sensor cable pair, terminated, 10 m | **A5E39669934032** | |
| Sensor cable pair, terminated, 20 m | **A5E39669934033** | |
| Sensor cable pair, terminated, 30 m | **A5E39669934042** | |
| Sensor cable pair, terminated, 60 m | **A5E39669934043** | |
| Sensor cable pair, terminated, 100 m | **A5E39669934044** | |

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## Accessories

### *Accessories*

| Description | Article No. | |
|---|---|---|
| **FSS200 Universal Sensors**<br>Selected for general purpose measurement.<br>Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected for cost savings on applications where standard accuracy is sufficient. | **7ME3950-...** | |
| **FSS200 High Precision Sensors**<br>Selected for increased performance on steel pipes. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy / repeatability is required primarily based on pipe wall thickness. | **7ME3950...** |  |
| **FSS200 High Temperature Sensors**<br>Selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Constructed in stainless steel. Connection junction box included. | **7ME3950-...** |  |
| **Mounting tracks**<br>Typically used on smaller pipes for easier and more stable mounting of dedicated universal style sensor size A or B; also available for dedicated high precision sensor size A or B. | **7ME3960-...** |  |
| **Mounting Frames**<br>These items are useful in simplifying sensor installation. They are strapped to the pipe first and then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring alignment to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results. | **7ME3960-...** |  |
| **Magnetic mounting frames**<br>Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them.<br>They feature powerful magnets to ensure quick and accurate setup.<br>Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS FSS200 clamp-on family.<br>Magnetic mounting frames are constructed in aluminum for a high level of durability. Ideal use on temporary installations. | **7ME3960-0MD02** |  |
| **Test Block**<br>Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors. | **7ME3960...** |  |
| **Straps**<br>Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance. | **7ME3960-...** |  |

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## Accessories (continued)

| Description | Article No. | |
|---|---|---|
| **Cable Gland**<br>Cable gland kit for use with SITRANS FST020 transmitters housed in IP65 NEMA 4X wall mount enclosures. Kit contains two single port glands for power and one dual port gland for sensor cables. | A5E41693895 |  |
| **Ultrasonic Couplant**<br>Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent). | 7ME3960-... |  |
| **Dry Couplant**<br>The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F). | 7ME3960-... |  |
| **Termination Kit (Flow Sensors)**<br>Termination kit for one pair of sensor cables. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at site, or when existing cable length is to be altered. Selected by cable type. | 7ME3960-... |  |
| **FST020 Transmitter module**<br>Main transmitter module for FST020 including SD-card and firmware load | A5E41693884 | |
| **FST020 Transmitter module cover AC**<br>Cover for FST020 Main transmitter module for AC powered units; includes label and screws | A5E41693888 | |
| **FST020 Transmitter module cover DC**<br>Cover for FST020 Main transmitter module for DC powered units; includes label and screws | A5E41693889 | |
| **FST020 Enclosure cover**<br>Enclosure lid for FST020; includes display module, connection label and screws | A5E38846901 | |
| **FST020 Power Supply AC**<br>Power supply module for FST020, AC power | 7ML1830-1MD | |
| **FST020 Power Supply DC**<br>Power supply module for FST020, DC power | 7ML1830-1ME | |
| **SensorFlash SD-card**<br>4 GB micro SD card -40 °C ... +85 °C for FST020 or FST030 for data storage, firmware and back-up | A5E38288507 | |
| **Hardware kit**<br>Various nuts, screws, and grounding strap for FST020 transmitter | A5E41944763 | |

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## Accessories (continued)

| Description | Article No. | |
|---|---|---|
| **Sensor cable pair, 5 m**<br>Sensor cable for connection between FSS200 sensors and FST020 transmitter, 5 meters in length | A5E39669934031 |  |
| **Sensor cable pair, 10 m**<br>Sensor cable for connection between FSS200 sensors and FST020 transmitter, 10 meters in length | A5E39669934032 |  |
| **Sensor cable pair, 20 m**<br>Sensor cable for connection between FSS200 sensors and FST020 transmitter, 20 meters in length | A5E39669934033 |  |
| **Enclosure mounting kit**<br>Mounting kit to fix enclosure on a 2" stanchion pipe | QCB:1012NMB1 | |

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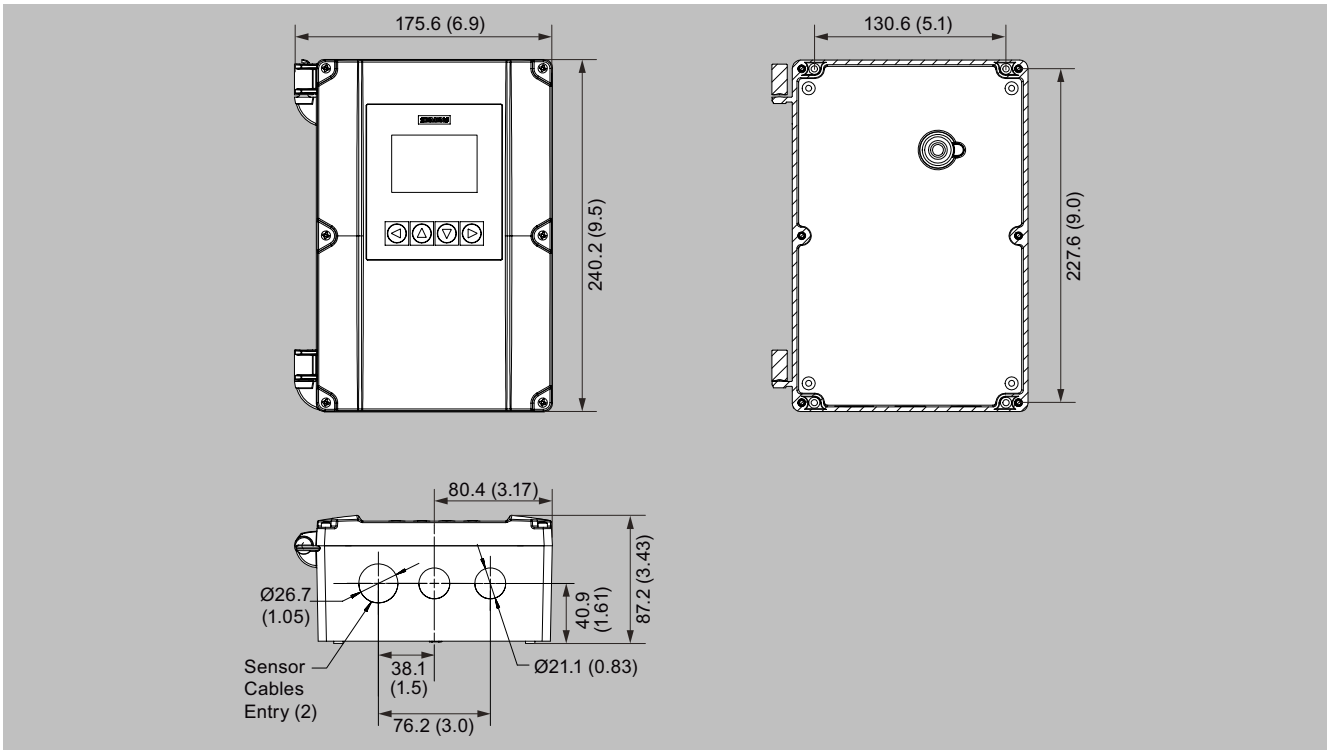
## Technical specifications

| SITRANS FS220 | |
|---|---|
| **Rangeability** | |
| Flow range | ±12 m/s (±40 ft/s), depending on pipe size higher or lower |
| Flow direction | bi-diretional |
| Flow sensitivity | 0.001 m/s (0.003 ft/s) flow rate independent |
| **Digital inputs** | |
| Totalizer Hold | Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC |
| Totalizer Reset | Optically isolated diode Activated On: Input voltage: 2 ... 10 V DC |
| **Output** | |
| Current | 4 ... 20 mA (isolated)<br>Externally powered 10 ... 30 V DC |
| Passive | 30 V DC, 3 V AC max.<br>Relay: 41.6 ms ... 5 s pulse duration<br>Frequency: 0 ... 12.5 kHz (50 % duty cylce) |
| Pulse | Optically isolated transistor 10 mA, 30 V DC max. |
| **Accuracy** | For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow |
| Repeatability | ± 0.25 % (according to ISO 11631) |
| Zero Drift | 0.1 % of rate; < ±0.001 m/s (±0.003 ft/s) |
| Data refresh rate | 100 Hz |
| **Transmitter conditions** | |
| Operating temperature | -10 ... +50 °C (14 ... 122 °F) |
| Storage temperature | -20 ... +60 °C (-4 ... +140 °F) |
| Degree of protection | IP65, NEMA 4X |
| **Design** | |
| Weight | 1.4 kg (3.0 lb) |
| Dimensions (W x H x D) | 176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch) |
| Enclosure material | Polycarbonate |
| **Power supply** | 100 ... 240 V AC @ 20 VA or<br>11.5 ... 28.5 V DC @ 10 W |
| **Certificates and approvals** | |
| Unclassified locations | |
| • General Safety | UL, cUL, CE |

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## Dimensional drawings




SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

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## Overview




The SITRANS FST020 is the basic device for simple and cost-effective clamp-on applications. As a single-path device, it is suitable for flow measurement on liquids that do not require temperature or viscosity consideration and where highest accuracies are not required.

Historically, the FST020 comes from the clamp-on family of analog FUS1010 transmitters. Since the revision in 2017, the updated transmitter is now part of a digital platform based on the latest developments within Digital Signal Processing (DSP) technology - engineered for high measuring performance, fast response to step changes in flow, high immunity against process noise and simplicity in installation, commissioning and maintenance.

The FST020 transmitter delivers standard parameter measurements i.e. volume flow, flow speed or sound velocity by analog outputs and Modbus communication.

Process values

- Volume flow
- Flow velocity
- Sound velocity
- Totalizer 1

## Benefits

***Flow calculation and measurement***

- Dedicated volume flow calculation with DSP technology
- 100 Hz update rate for all primary process values
- Maximum data age from sensor to output is 20 ms
- Independent low flow cut-off settings for volume flow and velocity
- Zero-point adjustment on command from discrete input or host system

***Operation and display***

- User-configurable operation display
  - Fully graphical display 240 x 160 pixel display with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates (with ordered calibration)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters
  - 4 GB SD card for storage and data logging
  - Audit trail of all parameter changes
  - Alarm logging

***Alarms and safety***

- Advanced diagnosis and service menu enhances troubleshooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values

***Outputs and control***

- Monitoring comprised of 1 individually configurable totalizer
- Single parameter outputs that can be assigned individually to any of the following parameters:
  - Volume flow
  - Flow velocity
  - Sound velocity
  - Flow direction

Channel 1 is 4 to 20 mA analog output. The current signal can be configured for passive volume flow.

Relay output(s) can be user configured to Alarm status or warning.

Modbus RTU RS 485 comes as standard.

***Signal input***

The signal input can be user-configured for:

- Totalizer reset functions
- Forcing outputs or freezing process values
- Initiating automatic zero point adjustment

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## Benefits (continued)

***Approvals and certificates***

The SITRANS FST020 transmitter was designed to comply with or exceed the requirements of international standards and regulations.

## Design

- Field clamp-on (non-intrusive)
- Single path, for only one pair of sensors on one pipe
- IP65 (NEMA 4X) wall mount housing, constructed of polycarbonate
- Available AC or DC power, 100 to 240 V AC, 11.5 to 28.5 V DC

## Function

- 240 x 160 pixel graphical display with 4 key navigation and back-light
- 6 user programmable views for individual process and diagnostic information
- Modbus RTU communication
- 100 Hz update rate for all primary process value
- Independent low flow cut-off settings for volume and flow velocity
- Fully compatible with Siemens PDM version 8.2 service pack 1 or higher
- Bidirectional flow operation
- Menus available in English and German

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## Selection and ordering data

| Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X) | | | | Article No. 7ME3570- | | | | | | | | | | | Order code | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ● | ● | ● | 4 | 0 | - | 0 | ● | ● | ● | | ● | ● | ● | |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | | | | | |
| **Number of ultrasonic paths** | | | | | | | | | | | | | | | | | | |
| Single path | | | | 1 | | | | | | | | | | | | | | |
| **Flowmeter functions and I/O configurations** | | | | | | | | | | | | | | | | | | |
| With display, keypad, 1× 4 ... 20 mA, 1× relay, 1× pulse/frequency, 2× digital input, Modbus RTU | | | | | J | | | | | | | | | | | | | |
| **Meter power options** | | | | | | | | | | | | | | | | | | |
| 100 ... 240 V AC | | | | | | A | | | | | | | | | | | | |
| 11.5 ... 28.5 V DC | | | | | | B | | | | | | | | | | | | |
| **Sensor FSS200**[1] When ordering a flow system, sensors always come automatically with suitable mounting equipment. Smaller sensor sizes A & B come with mounting tracks, while sensor sizes C, D & E are supplied with frames and spacer bars. Straps provided are for the indicated maximum OD listed below.Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" to find the most suitable sensors for specific pipe sizes and wall thicknesses. | | | | | | | | | | | | | | | | | | |
| No sensor | | | | | | | | | | | A | | | | | | | |
| For the following Universal sensors, temperature range is -40 ... +121 °C (-40 ... +250 °F), FSS200 Universal: select according to outer pipe diameter | | | | | | | | | | | | | | | | | | |
| FSS200 Universal | A2 | 12.7 ... 50 mm (0.5 ... 2") | Track mount and straps provided up to 75 mm (3") | | | | | | | | B | | | | | | | |
| FSS200 Universal | B3 | 19 ... 127 mm (0.75 ... 5") | Track mount and straps provided up to 125 mm (5") | | | | | | | | C | | | | | | | |
| FSS200 Universal | C3 | 51 ... 305 mm (2 ... 12") | Mounting frame, straps and spacer bar provided up to 330 mm (13") | | | | | | | | D | | | | | | | |
| FSS200 Universal | D3 | 203 ... 610 mm (8 ... 24") | Mounting frame and straps and spacer bar provded up to 600 mm (24") | | | | | | | | E | | | | | | | |
| FSS200 Universal | E2 | 304 ... 9144 mm (12 ... 360") | Mounting frame and straps and spacer bar provided up to 1200 mm (48") | | | | | | | | F | | | | | | | |
| For the following High Precision sensors T1, temperature range is -40 ... +120 °C (-40 ... +248 °F), FSS200 High Precision: select according to pipe wall thickness | | | | | | | | | | | | | | | | | | |
| FSS200 HP | A1H | 0.6 ... 1.0 mm (0.025 ... 0.4") | Track mount and straps provided up to 75 mm (3") | | | | | | | | G | | | | | | | |
| FSS200 HP | A2H | 1.0 ... 1.5 mm (0.04 ... 0.06") | Track mount and straps provided up to 75 mm (3") | | | | | | | | H | | | | | | | |
| FSS200 HP | A3H | 1.5 ... 2.0 mm (0.06 ... 0.08") | Track mount and straps provided up to 75 mm (3") | | | | | | | | J | | | | | | | |
| FSS200 HP | B1H | 2.0 ... 3.0 mm (0.08 ... 0.12") | Track mount and straps provided up to 125 mm (5") | | | | | | | | K | | | | | | | |
| FSS200 HP | B2H | 3.0 ... 4.1 mm (0.12 ... 0.16") | Track mount and straps provided up to 125 mm (5") | | | | | | | | L | | | | | | | |
| FSS200 HP | C1H | 4.1 ... 5.8 mm (0.16 ... 0.23") | Mounting frame, straps and spacer bar up to 600 min (24") | | | | | | | | M | | | | | | | |
| FSS200 HP | C2H | 5.8 ... 8.1 mm (0.23 ... 0.32") | Mounting frame, straps and spacer bar up to 600 min (24") | | | | | | | | N | | | | | | | |
| FSS200 HP | D1H | 8.1 ... 11.2 mm (0.32 ... 0.44") | Mounting frame and straps provided up to 1200 mm (48")[1] | | | | | | | | P | | | | | | | |
| FSS200 HP | D2H | 11.2 ... 15.7 mm (0.44 ... 0.62") | Mounting frame and straps provided up to 1200 mm (48")[1] | | | | | | | | Q | | | | | | | |
| FSS200 HP | D4H | 15.7 ... 31.8 mm (0.62 ... 1.25") | Mounting frame and straps provided up to 1200 mm (48")[1] | | | | | | | | R | | | | | | | |
| For the following High Temperature sensors, temperature range is -40 ... +230 °C (-40 ... +446 °F), FSS200 High Temperature: select according go outer diameter | | | | | | | | | | | | | | | | | | |
| FSS200 HT | Size 2 | 30 ... 200 mm (1 ... 8") | Mounting track and straps provided up to 250 mm (10") | | | | | | | | Z | | | | P | 1 | A | |

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## Selection and ordering data (continued)

| Transmitter SITRANS FST020 (Basic), IP65 (NEMA 4X) | | | | Article No. 7ME3570- | | | | | | | | | | | Order code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ● | ● | ● | 4 | 0 | - | 0 | ● | ● | ● | | ● | ● | ● |
| FSS200 HT | Size 3 | 150 ... 610 mm (6 ... 24") | Mounting track and straps provided up to 650 mm (26") | | | | | | | | Z | | | | P | 2 | A |
| FSS200 HT | Size 4 | 400 ... 1200 mm (16 ... 48") | Mounting track and straps provided bar provided up to 1250 mm (50") | | | | | | | | Z | | | | P | 3 | A |
| **Sensor cable (pair - terminated)** | | | | | | | | | | | | | | | | | |
| No sensor cable | | | | | | | | | | | | A | | | | | |
| Sensor cable, HDPE jacket, submersible, length | | | | | | | | | | | | | | | | | |
| • 5 m (16.4 ft) | | | | | | | | | | | | P | | | | | |
| • 10 m (32.8 ft) | | | | | | | | | | | | Q | | | | | |
| • 20 m (65.6 ft) | | | | | | | | | | | | R | | | | | |
| • 30 m (98.4 ft) | | | | | | | | | | | | S | | | | | |
| • 60 m (196.8 ft) | | | | | | | | | | | | T | | | | | |
| • 100 m (328 ft) | | | | | | | | | | | | U | | | | | |
| **Approvals** | | | | | | | | | | | | | | | | | |
| UL, ULc, CE | | | | | | | | | | | | | | 1 | | | |

1) Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-0MS40 (1012BN-4).
2) Made of stainless steel construction.

| Further designs | Order code |
|---|---|
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Cable termination kit for customer supplied sensor cable pair** | |
| Sensor cable termination for standard and plenum cable | **T01** |
| **Mass storage** | |
| Enable mass storage function or SD-card (not available for USA) | **S30** |
| **Tag and name plates** | |
| Tag plate, transmitter and sensor | **Y19** |

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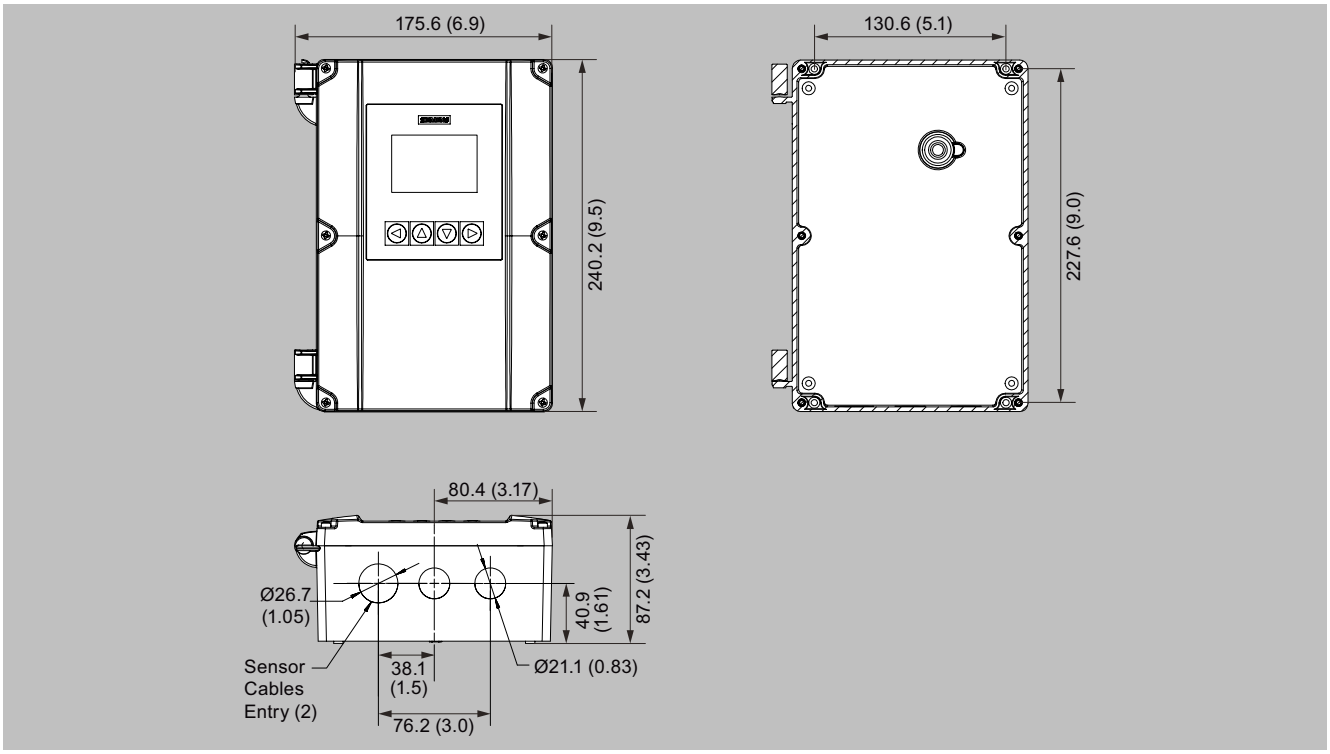
## Technical specifications

| SITRANS FST020 | |
|---|---|
| **Input** | |
| Flow range | ± 12 m/s (± 40 ft/s), depending on pipe size higher or lower |
| Flow direction | bi-directional |
| Flow sensitivity | 0.0003 m/s (0.001 ft/s) flow rate independent |
| **Digital inputs** | |
| Totalizer Hold | Optically isolated diode<br>Activated ON: Input voltage: 2 ... 10 V DC |
| Totalizer Reset | Opticall isolated diode<br>Activated ON: Input voltage: 2 ... 10 V DC |
| **Output** | |
| Current | 4 ... 20 mA (isolated)<br>Externally powered 10 ... 30 V DC |
| Passive | 30 V DC, 3 VA AC max. |
| Pulse | Optically isolated transistor 10 mA, 30 V DC max<br>Relay: 41.6 ms ... 5 s pulse duration<br>Frequency: 0 ... 12.5 kHz (50 % duty cylce) |
| **Accuracy** | |
| Accuracy | For velocities above 0.3 m/s (1 ft/s), ±1.0 % of flow |
| Repeatability | ± 0.25 % (according to ISO 11631) |
| Zero Drift | 0.1 % of rate; < ±0.001 m/s (±0.003 ft/s) |
| Data refresh rate | 100 Hz |
| **Rated operation conditions** | |
| Operating temperature | -10 ... +50 °C (14 ... +122 °F) |
| Storage temperature | -20 ... +60 °C (-4 ... +140 °F) |
| Degree of protection | IP65/NEMA 4X |
| **Design** | |
| Weight | 1.4 kg (3.0 lbs) |
| Dimensions (W x H x D) | 176 x 240 x 87 mm (6.9 x 9.5 x 3.4 inch) |
| Enclosure material | Polycarbonate |
| **Power supply** | 100 ... 240 V AC @ 20 VA or<br>11.5 ... 28.5 V DC @ 10 W |
| **Certificates and approvals** | |
| Unclassified locations | |
| • General safety | UL, cUL, CE |

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## Dimensional drawings




SITRANS FST020 IP65 (NEMA 4X), wall mount enclosure, dimensions in mm (inch)

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## Overview



SITRANS FST090 clamp-on ultrasonic flowmeter

The portable clamp-on ultrasonic flow measurement system SITRANS FS290 is formed by the SITRANS FST090 portable clamp-on flowmeter with FSS200 sensors.

This system represents the next generation of digital flow measurement which allows you to easily measure or check flows in pipes.

## Benefits

The SITRANS FST090 transmitter is based on the innovative technology of the FST020 and FST030 and is therefore identical in use and operation. The FST090 transmitter is flexible, versatile, practical: in conjunction with the SITRANS FSS200 clamp-on sensors, it is up to practically any challenge.

The main benefits at a glance:

- Easy installation: just clamp it on, with no need to cut pipe or stop flow
- Minimal maintenance: sensors do not require upkeep or cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Precise single path measuring

## Application




The SITRANS FS290 is often used for temporary checks in water supply and disposal. Cooling or hot water, reference quantities or leaks can be checked quickly in this way. A typical example is the monitoring and testing of fire protection systems or other emergency applications where there is flow.

The portable device is also versatile in the temporary use of measured values for stationary when measuring devices that have been removed for repair or calibration. In fact, the FS290 can be used almost anywhere liquid ultrasonic flow measurement is needed: such as check metering, i.e. the periodic checking of built-in clamp on sensors.

The SITRANS FS290 can be used to measure flow in many different material pipes. However, cement pipes and special plastic composite pipes cannot be used though due to their physical properties.

Inner coatings or liners are stored in the device and are taken into account when entering.

The SITRANS FS290 is suitable for pipes up to 5000 mm (200 inches) and for pipe wall thicknesses up to 50 mm (2.0 inches).

The recommended medium temperature range is from -40 °C to +121 °C. (-40 °F to 250 °F). For higher temperatures Siemens offers high temperature sensors up to maximum 230 °C (446 °F).

The transmitter comes supplied with a liquid table with all common material data for easy media selection. Relevant data can be easily and quickly adopted.

The SITRANS FS290 is not suitable for gases, steam and inhomogeneous liquids.

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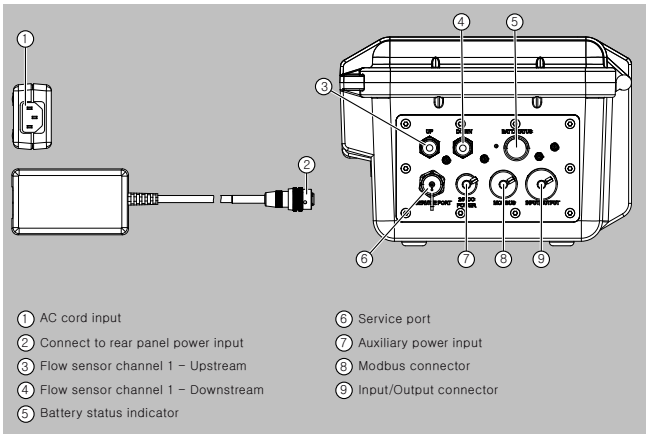
## Design




The precision electronics of the SITRANS FST090 portable ultrasonic transmitter are housed in a robust weather proof case. The case protects the electronics under harshest of field conditions. The process and control connections are accessed on the top of the device, with industrial connectors, that can be quickly and securely employed. The system can be powered with an swappable rechargeable battery, providing power for 24 hours or more as well as via mains power with the system's Vac power adapter, for a more permeant installation.

The transmitter reads the measured process values from the transducers and calculates derived values, that are converted into flow values that are then displayed. The FST090 provides Modbus communications, as well as a 4-20 mA output, a single relay and two digital inputs for totalizer start/stop and reset. Additionally there is also a pulse/frequency output an USB service port, and a local multi functional display. The system provides easy to use totalizers, access control, diagnostics, and menu driven system configuration.

Connecting plate




SITRANS FST090, AC power and connections

Easy sensor installation

Mounting rails are ideal for small sensors of sizes A and B. For the larger sensors C, D and E, mounting frames with spacers are suitable. Both rails and frames can be easily attached to the pipe using tension chains without tools. The correct sensor distance is made using calculated index points. The sensors are then clamped exactly there. The distance ruler supplied as standard helps with alignment and specifies the index distance. There is no need to measure the sensor distance on the pipe for the best possible current signal, the sensors are always on optimally aligned for every possible condition.

Magnetic frames can be used universally for all sensor sizes C, D and E. Industrial magnets ensure a strong hold on steel pipes. They can also be used on plastic pipes, with the use of tightening straps that are required for this application. A spacer bar ensures easy sensor positioning.

## Mode of operation

The SITRANS FST090 calculates the optimal sensor distance based on the calculation of pipe material, size and wall thickness, taking into account the liquid to be measured. The distance is given as an LTN value and as an index value to a reference point. The LTN value allows the distance between the sensors to be checked precisely.

Each measuring path is formed by two coordinated sensors that transmit ultrasonic signals back and forth through the pipe. Using the time difference between the two signals, the transmitter calculates the resulting measurement.

The transmitter performs analog signal processing for the sensor pair and digitalizes the generated measurements for display. The data measured is periodically recorded on the inserted SD storage card. Data output can be user-defined or take place via either analog signal or Modbus RTU.

Users can install clamp-on sensors on the pipe during ongoing operation, which means the pipe is not cut open and the flow does not need to be stopped.

High-tech reduces transmitter errors below 0.15%

The SITRANS FST090 is based on the technology of the industry leading transmitter SITRANS FST030. The analog data acquisition is digitized immediately, thus enabling signal processing in real time. The electronics of the SITRANS FST090 have been developed in so that the transmitter error is less than 0.15% under ideal measuring conditions. For normal use under good conditions, a measurement inaccuracy of 1% or less is realistic.

Measurement errors in ultrasonic flow measurements are often caused by anomalies in the inlet area. Insufficient distance to a 90° or room bend (3D double bend) causes flow profile disturbances that a clamp-on measuring device cannot easily compensate for. In portable applications, the built in patented anomaly tool helps to improve measurement accuracy under these challenging conditions.

Long battery life, easy battery change

An improved energy manager allows battery operation for at least twenty four hours at full load.

A battery change during operation is possible without any problems. As an ideal supplement to existing stationary measurements, the SITRANS FST090 can also be programmed with Siemens Process Device Manager (PDM) software via the USB interface and then integrated into control systems.

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## Mode of operation (continued)



SITRANS FST090 transmitter with battery

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## Selection and ordering data

| SITRANS FS290 clamp-on flowmeter | 7ME374 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online -configuration in the PIA Life Cycle Portal | |
| **Transmitter model** | |
| Transmitter FST090 portable clamp-on | **5** |
| **FSS200 sensor pair clamp-on for portable use, incl. suitable pipe mounting material** | |
| No sensors | **0 A** |
| **Universal: for all pipe materials; temperature -40 ... +120 °C (-40 ... +250 °F)** | |
| FSS200 universal size A2, for pipes 12.7 ... 50 mm (0.5 ... 2") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 B** |
| FSS200 universal size B3, for pipes 19 ... 127 mm (0.75 ... 5") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 C** |
| FSS200 universal size C3, for pipes 51 ... 305 mm (2 ... 12") supplied with portable frame set for pipes up to 330 mm (13") | **0 D** |
| FSS200 universal size D3, for pipes 203 ... 610 mm (8 ... 24") supplied with portable frame set for pipes up to 330 mm (13") | **0 E** |
| FSS200 universal size E2, for pipes 304 ... 6000 mm (12 ... 240") supplied with portable frame set for pipes up to 600 mm (24") | **0 F** |
| **High Precision: ideal for steel pipes; temperature -40 ... +121 °C (-40 ... +250 °F)** | |
| FSS200 high precision size A1H, for steel pipes with wall thickness 0.6 ... 1 mm (0.03 ... 0.4") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 G** |
| FSS200 high precision size A2H, for steel pipes with wall thickness 1 ... 1.5 mm (0.04 ... 0.6") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 H** |
| FSS200 high precision size A3H, for steel pipes with wall thickness 1.5 ... 2 mm (0.06 ... 0.8") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 J** |
| FSS200 high precision size B1H, for steel pipes with wall thickness 2 ... 3 mm (0.08 ... 0.12") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 K** |
| FSS200 high precision size B2H, for steel pipes with wall thickness 3 ... 4.1 mm (0.12 ... 0.16") supplied with portable mounting tracks for pipes up to 130 mm (5") | **0 L** |
| FSS200 high precision size C1H, for steel pipes with wall thickness 4.1 ... 5.8 mm (0.16 ... 0.23") supplied with portable frame sets for pipes up to 610 mm (24") | **0 M** |
| FSS200 high precision size C2H, for steel pipes with wall thickness 5.8 ... 8.1 mm (0.23 ... 0.32") supplied with portable frame sets for pipes up to 610 mm (24") | **0 N** |
| FSS200 high precision size D1H, for steel pipes with wall thickness 8.1 ... 11.2 mm (0.32 ... 0.44") supplied with portable frame sets for pipes up to 1200 mm (48") | **0 P** |
| FSS200 high precision size D2H, for steel pipes with wall thickness 11.2 ... 15.7 mm (0.44 ... 0.62") supplied with portable frame sets for pipes up to 1200 mm (48") | **0 Q** |
| FSS200 high precision size D4H, for steel pipes with wall thickness 15.7 ... 31.8 mm (0.62 ... 1.25") supplied with portable frame sets for pipes up to 1200 mm (48") | **0 R** |
| **Universal high temperature (HT): for all pipe materials; -40 ... +230 °C (-40 ... +446 °F)** | |
| FSS200 Universal HT size 1, for pipes 10 ... 100 mm (0.47 ... 3.95") supplied with mounting tracks for pipes up to 150 mm (6") | **1 A** |
| FSS200 Universal HT size 2, for pipes 30 ... 200 mm (1.5 ... 8") -supplied with mounting tracks for pipes up to 250 mm (10") | **1 B** |
| FSS200 Universal HT size 3, for pipes 150 ... 610 mm (6 ... 25") -supplied with mounting tracks for pipes up to 650 mm (26") | **1 C** |
| FSS200 Universal HT size 4, for pipes 400 ... 1200 mm (16 ... 48") supplied with mounting tracks for pipes up to 1200 mm (48") | **1 D** |
| **Sensor bundle - check meter kit with magnet frames, straps and spacer bar** | |
| Standard Performance, for any pipe material: | |
| • Small pipe check meter kit – Standard Performance, for diameters 12 ... 400 mm (0.5 ... 16"). Includes universal sensors B3, C3, D3, with tracks, magnet frames, straps, and spacer bar | **2 K** |
| • Complete pipe check meter kit – Standard Performance, for diameters 8 ... 6100 mm (0.38 ... 240"). Includes universal sensors A2, B3, C3, D3, E2 with tracks, magnet frames, straps, and spacer bar | **2 L** |
| High performance, for steel or plastic pipes, suitable for in-situ verification of flow instruments and flow surveys on critical applications in all industries: | |
| • Medium pipe check meter kit – High Performance, for steel or plastic pipe material with wall thickness 4.1 mm ... 11.2 mm (0.160 ... 0.440") and any homogeneous liquid. Includes high precision sensors sizes C1H, C2H, D1H | **2 M** |
| • Extended pipe check meter kit – High Performance, for steel or plastic pipe material with wall thickness 4.1 ... 15.7 mm (0.16 ... 620"). Includes high precision sensors C1H, C2H, D1H, D2H | **2 N** |
| • Complete pipe range check meter kit – High Performance, for steel or plastic pipe material with wall thickness 3 ... 15.7 mm (0.12 ... 620"). Includes high precision sensors B2H, C1H, C2H, D1H, D2H, with mounting tracks, magnet frames, straps, and spacer bar | **2 P** |
| **Fast charger for rechargeable battery pack** | |
| No charger | **A** |
| Charger type A for Europe (CEE7/7) | **B** |
| Charger type C for Australia (AS3112) | **C** |
| Charger type D for U.K. (BS1363) | **D** |
| Charger type J for Japan (JIS8303) | **E** |
| Charger type K for U.S. (NEMA 5-15P) | **F** |
| Charger type L for Switzerland (SEV1011) | **G** |

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## Selection and ordering data (continued)

| SITRANS FS290 clamp-on flowmeter | 7ME374 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| **Akku-Pack Lithium-Ion for battery use** | |
| No battery | 0 |
| One battery pack rechargeable | 1 |
| Two battery pack rechargeable | 2 |
| Three battery pack rechargeable | 3 |
| **Output signals and Modbus usage** | |
| Without connection terminal box | 0 |
| Connection terminal box, with connection terminals for quick connection to the FST090 multi-connector, for Modbus (8) and the inputs and outputs (9) | 1 |
| **Number of ultrasonic paths** | |
| One path (default value 1) | 1 |
| **Default Value B** | |
| Polycarbonate portable enclosure (default value B) | B |
| **Digital sensor link** | |
| Sensor link integrated in transmitter (default value B) | B |
| **External power supply unit** | |
| Without power supply unit | 0 |
| Power adaptor type A plug for Europe (CEE7/7) | 1 |
| Power adaptor type C plug for Australia (AS3112) | 2 |
| Power adaptor type D plug for U.K. (BS1363) | 3 |
| Power adaptor type J plug for Japan (JIS8303) | 4 |
| Power adaptor type K plug for U.S. (NEMA 5-15P) | 5 |
| Power adaptor type L plug for Switzerland (SEV1011) | 6 |

| | Order code |
|---|---|
| **Options** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Sensor cable set pair, complete** | |
| 2 × 6 m (20 ft) PVC coaxial cable FST090 to the sensor with BNC connection | **K21** |
| 2 × 15 m (50 ft) PVC coaxial cable FST090 to the sensor with BNC connection | **K22** |
| **Mass storage** | |
| Mass storage device function (outside USA mandatory) | **S30** |

| | Artikel-Nr. |
|---|---|
| **Accessories** | |
| **Sensor cable set pair, complete** | |
| Sensor cable 6 m (20 ft) for FST090 | **A5E51114688** |
| Sensor cable 15 m (50 ft) for FST090 | **A5E51114689** |
| **External power supply unit** | |
| Power adaptor type A plug for Europe (CEE7/7) | **7ME39403PR00** |
| Power adaptor type C plug for Australia (AS3112) | **7ME39403PS00** |
| Power adaptor type D plug for U.K. (BS1363) | **7ME39403PT00** |
| Power adaptor type J plug for Japan (JIS8303) | **7ME39403PQ00** |
| Power adaptor type K plug for U.S. (NEMA 5-15P) | **7ME39403PU00** |
| Power adaptor type L plug for Switzerland (SEV1011) | **7ME39403PV00** |

| | Artikel-Nr. |
|---|---|
| **Akku-Pack Lithium-Ion for battery use** | |
| Replacement battery | **A5E50949498** |
| **Fast charger for rechargeable battery pack** | |
| Charger type A for Europe (CEE7/7) | **7ME39404PR00** |
| Charger type C for Australia (AS3112) | **7ME39404PS00** |
| Charger type D for U.K. (BS1363) | **7ME39404PT00** |
| Charger type J for Japan (JIS8303) | **7ME39404PQ00** |
| Charger type K for U.S. (NEMA 5-15P) | **7ME39404PU00** |
| Charger type L for Switzerland (SEV1011) | **7ME39404PV00** |
| **Junction box** | |
| Junction box with terminal connection for fast connection to the FS290 bulk head connection for Modbus (8), the in- and outputs (9) | **A5E50726323** |
| **Cable** | |
| I/O cable with plug for the FST090 (connector 9) | **A5E51100281** |
| Cable for Modbus with plug for the FST090 (connector 8) | **A5E51100285** |
| **Connector adapter F/BNC** | |
| "F" connector to BNC adapter (order 2 pcs per transducer set) | **CQO:1012NFPA** |

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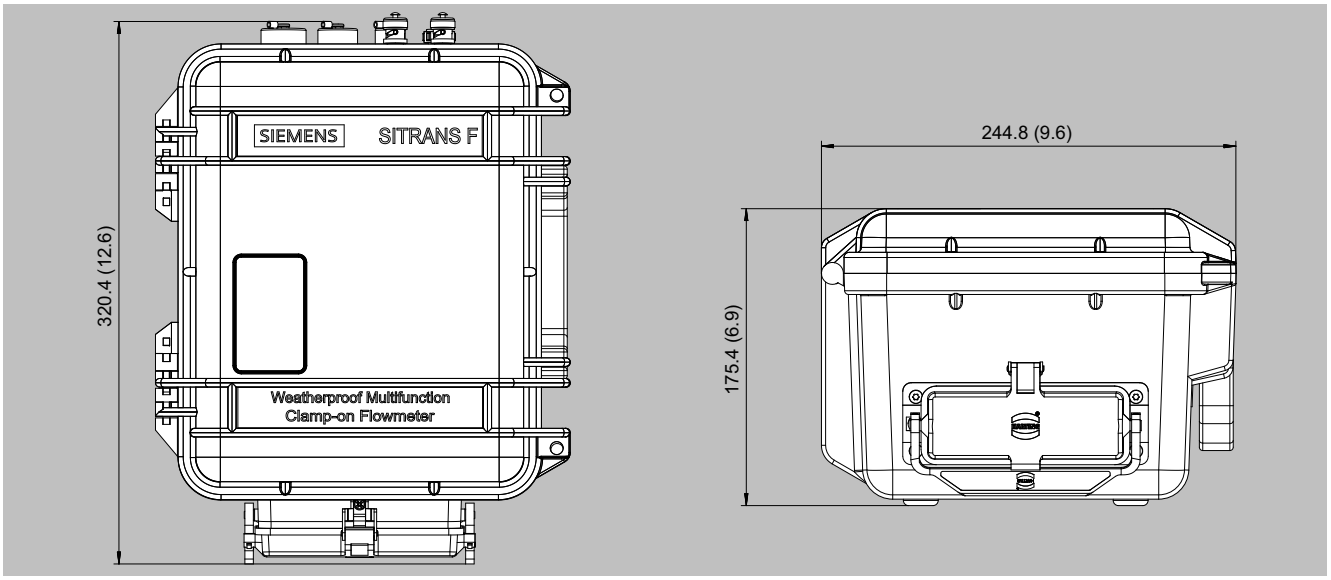
## Technical specifications

| SITRANS FST090 | |
|---|---|
| **Design** | |
| Dimension (L × B × H) | 320.4 × 244.8 × 175.4 mm (12.6 × 9.6 × 6.9 inch) |
| Weight | 2.8 kg (6.0 lb) |
| Housing material | Polypropelen (weatherproof) |
| **Architecture** | |
| Input / display | 4 pushbuttons, illuminated graphic display, 240 × 160 pixels |
| Programming | Menu assistant, free input, 50 measuring locations can be saved |
| Language selection | Switchable, with 14 languages available (English, German, Italian, French, Spanish, Portuguese, Danish, Swedish, Finnish, Dutch, Chinese, Japanese, Russian, Polish) |
| **Sensors** | FSS200 clamp-on sensors portable, compatible with older FUP1010 sensors |
| Sensor cable | PVC length 6 m (19.6 ft)/ 15 m (49 ft) with connector |
| **Power** | Transmitter power: DC 11.5 ... 28.5 V at 10 W |
| External power supply | External power supply 100 ... 240 V AC / 24 V DC, 10 W |
| Battery pack | Lithium-ion battery (99 Wh), 24 V DC with operation of up to 24 hours per battery charge. Swapping between battery and power pack possible without interrupting the flow measurement |
| Charger for battery pack | Battery carger with quick charge function: 19 ... 26 V DC -2.8 A max.<br>External battery charger AC-Adapter: 100 ... 240 V AC 50-60 Hz, 1.7 A |
| **Adjustable measuring range** | |
| Flow rate range | ± 12 m/s (± 40 ft/s), depending on the pipe width larger or smaller |
| Flow direction | Bidirectional |
| Flow sensitivity | 0.001 m/s (0.003 ft/s), independent from the flow rate |
| **Input/output connector** | |
| Digital inputs | |
| • Stop counter | Optocoupler Enabled ON:<br>Input voltage: DC 2 ... 10 V |
| • Reset counter | Optocoupler Activated ON:<br>Input voltage: DC 2 ... 10 V |
| Output option | |
| • Current | 4 ... 20 mA (isolated)<br>External current 10 ... 30 V DC |
| • Relay | DC 30 V, AC 3 V max. pulse: 41.6 ms ... 5 s Pulse duration<br>Frequency: 0 ... 12.5 kHz (50% load cycle) |
| • Pulse rate | Optical transistor 10 mA, DC 30 V max. |
| **Communication** | Modbus RTU RS 485 |
| **Diagnostic option** | Logger, alarms and events, separated in table shape |
| **USB service connection** | USB - SIMATIC PDM / internal memory<br>External memory 4 GB (possible up to 32 GB) for years of recording |
| **Accuracy** | At speeds above 0.3 m/s (1 ft/s), ±1.0% of flow rate |
| Repeatability | ±0.25% (according to ISO 11631) |
| Zero drift | 0.1% of the flow; < ±0.001 m/s (±0.003 ft/s) |
| Data repetition rate | 100 Hz |
| **Environmental conditions** | |
| Operating temperature | -10 ... +50 °C (14 ... 122 °F) |
| Storage temperature | -20 ... +60 °C (-4 ... +140 °F) |
| Protection class | • IP65 with lid closed<br>• IP67 with lid open |
| **Certificates and approvals** | |
| General safety | UL, ULc, CE |

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## Dimensional drawings



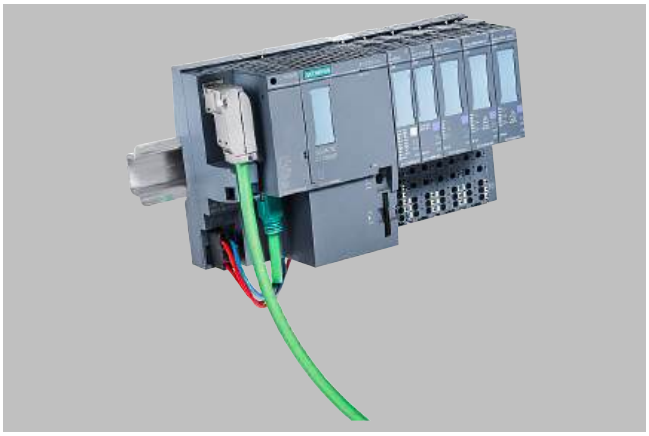

SITRANS FST090, net weight 4.1 Kg (9.038 lb), dimensions in mm (inch)

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## Overview



The technology module SITRANS FST070 is an ultrasonic clamp-on flowmeter transmitter for the SIMATIC ET200SP.

The TM SITRANS FST070 flow transmitter can be operated directly in the SIMATIC PCS 7 or in TIA Portal with the FST070 faceplates. SITRANS FST070 offers real-time data processing and the display of all measuring and status data of the Ultrasonic flowmeter.

The TM FST070 can work with all Siemens ultrasonic clamp-on flowmeters. It can be connected to the FS DSL with FSS200 clamp-on sensors.



SITRANS FS DSL with FSS200 clamp-on sensors

## Benefits

- Easy integration into automation process control as TIA portal and PCS7 (SIMATIC)
- Easy selection and integration of flowmeters via TIA selector
- Precast face plates for TIA portal and PCS7
- No additional transmitter between automation and clamp-on sensors required
- Cost effective integration of clamp-on flowmeters for water treatments, control rooms with PCS7
- SITRANS FST070 ET 200SP technology module can combined with all other SIMATIC ET200 modules
- Fast and trouble-free communication between the flowmeter and the PLC through digital data communication with up to 10 ms update rate
- SITRANS FST070 and ET 200SP have the ATEX Zone 2 Class 1 Div 2 approvals. With the barrier SITRANS I300 the flowmeters sensor can be used in Ex Zone 1/0 Class 1 Div 1 approval

## Application

SITRANS FST070 can be used for machine builders, in the chemical industry or water treatments. The meters are suitable for measuring on liquid, hydrocarbon and gas. With ET 200SP the SITRANS FST070 can be installed decentralized in small stations, with fast communication to the control room. The faceplates for TIA portal and PCS 7 offer the direct full remote access to the flow meter. The main industries for the SITRANS FST070 transmitter:

- Chemical
- Pharmaceutical
- District Energy
- Water and waste water
- Oil
- Gas

## Design

The SITRANS FST070 is designed as ET200 SP module and can directly installed with other ET200 SP modules. The FS DSL cable is directly mounted to the ET 200SP base unit is providing the supply voltage and the data communication. The SITRANS FSS200 clamp-on sensors with FS DSL can be connected directly to the SITRANS FST070. For sensors in ATEX Zone 0 or 1, the SITRANS I300 barrier must be installed between FST070 and the FS DSL.

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## Function

The following key functionalities are available:

- Volume flow rate, mass flow, flow velocity, density, temperature, pressure. kinematic viscosity, standard volume flow (hydrocarbon)
- Three built-in totalizers which can freely be set for counting volume flow, mass flow
- Two digital inputs
- Two digital outputs
- Low flow cut-off
- Zero point adjustment
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

## Selection and ordering data

| Description | Article No. | |
|---|---|---|
| **SITRANS FST070 – Transmitter for ET 200SP** | **7ME3448-6AA00-0BB1** |  |
| **BU20-P12+A0+4B, PU1 – BaseUnit plate for ET 200SP** | **6ES7193-6BP20-0BB1** |  |
| **SITRANS I300 – Isolating power supply – Ex barrier** | **A5E39832532** |  |
| **SITRANS FS DSL M12-SSL cable and FSS200 clamp-on sensors** | **7ME3720-.....-1N..** | Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on |
| **SITRANS FS DSL SSL terminal connection and FSS200 clamp-on sensors** | **7ME3720-.....-1Q..** | Configuration with the SIEMENS PIA selector SITRANS FS230 ultrasonic clamp-on |

| Description | Article No. |
|---|---|
| **SITRANS FST070 system manual**<br>• English<br>• German | **A5E49982949-AA** |

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## Technical specifications

| SITRANS FST070 | |
|---|---|
| **Measurement of** | Volume flow rate, mass flow, flow velocity, density, temperature, pressure. kinematic viscosity, standard volume flow (hydrocarbon) |
| **Measurement functions** | |
| • Totalizer 1 | Volume flow, mass flow, standard volume flow |
| • Totalizer 2 | Volume flow, mass flow; standard volume flow |
| • Totalizer 3 | Volume flow, mass flow; standard volume flow |
| **General information** | |
| Product type designation | Technology module TM FST070 |
| FW update possible | Yes |
| Usable BaseUnits | BU 20 type B1 |
| ET 200SP | Yes |
| **Engineering with** | • STEP 7 TIA Portal configurable/integrated as of version V17 or higher<br>• STEP 7 configurable/integrated as of version V5.6 SP4 and higher<br>• PCS 7 V9.1 or higher<br>• PROFINET as of GSD version/GSD revision GSDML V2.35 |
| **Cable** | |
| Maximum cable length to FS DSL | 75 m (max. 150 m) |
| **Supply voltage** | |
| Load voltage L+ | 24 V DC |
| Rated value (DC) | 24 V NEC-Class II |
| Permissible range, lower limit (DC) | 19.2 V |
| Permissible range, upper limit (DC) | 28.8 V |
| Short-circuit protection | Yes |
| Reverse polarity protection | Yes; against destruction |
| **Input current** | |
| Current consumption, max. | 500 mA |
| **Power loss** | |
| Typical power loss, max. | 1.7 W |
| **Protection class** | |
| IP protection | IP20 |
| **EMV** | • Electrostatic discharge according to IEC 61000-4-2: 2008<br>• Field-related interference according to IEC 61000-4-3: 2006<br>• Bursted interference due to burst according to IEC 61000-4-4: 2012<br>• Conducted interference by surge according to IEC 61000-4-5: 2014<br>• Conducted interference by high-frequency radiation according to IEC 61000-4-6: 2013 |
| **Decentralized operation** | |
| • to SIMATIC S7-300 | Yes |
| • to SIMATIC S7-400 | Yes |
| • to SIMATIC S7-1200 | Yes |
| • to SIMATIC S7-1500 | Yes |
| • to standard PROFINET controller | Yes |
| **Usable with the following flowmeters** | SITRANS FS DSL with FSS200<br>For hazardous area application the SITRANS I300 can be used as barrier/power supply between sensor and FST070 |

## Technical specifications (continued)

| SITRANS FST070 | |
|---|---|
| **Digital inputs 1 and 2** | |
| Free usable inputs 1 and 2 | • Start/stop totalizer 1, 2 or 3<br>• Reset totalizer 1, 2 or 3<br>• Zero adjust<br>• Force outputs<br>• Freeze process values |
| High signal | • Nominal voltage: 24 V DC<br>• Upper limit: +30 V DC<br>• Lower limit: +11 V DC<br>• Current: max 35 mA |
| Low signal | • Nominal voltage: 0 V DC<br>• Lower limit: -30 V DC<br>• Upper limit: +5 V DC<br>• Current: max 35 mA |
| Potential separation | • Module and backplane bus<br>• Short circuit protection |
| Isolation test | 707 V DC |
| Cable length | • Max. 50 m shielded<br>• Max. 25 m unshielded |
| **Digital outputs 1 and 2** | |
| Free useable outputs 1 and 2 | • Alarm acknowledgment<br>• Out of specification<br>• Failure sensor measuring<br>• Function check<br>• Flow direction |
| Low signal | Max. 1 V |
| High signal | Min 23.2 V |
| Switching capacity | 300 mA signal high |
| On lamp load | 8 W |
| Load resistance | 80 ... 10 kΩ |
| Between diffrenet circuits | Electronic/thermal |
| Potential separation | Module and backplane bus |
| Isolation test | 707 V DC |
| Cable length | • Max. 50 m shielded<br>• Max. 25 m unshielded |
| **Environment** | |
| **Ambient temperature during operation** | |
| Minimum installation | -25 °C |
| Horizontal installation, max. | 60 °C; observe derating |
| Vertical installation, max. | 50 °C; observe derating |
| **Ambient temperature during storage/transport** | |
| Storage, min. | -40 °C |
| Storage, max. | 70 °C |
| Transport, min. | -40 °C |
| Transport, max. | 70 °C |
| **Relative humidity** | |
| Operation, min. | 5 % |
| Operation, max. | 95 %; no condensation |
| **Height in operation** | |
| Ambient air pressure altitude (relative to sea level) | $T_{min}$ ... $T_{max}$ at 1 080 hPa ... 795 hPa (-1 000 ... +2 000 m) |
| **EMC performance** | |
| Emission | • EN 61000-6-4 |
| Electromagnetic compatibilty | • IEC 61000-6-2: 2016<br>• IEC 61000-6-4: 2018 |

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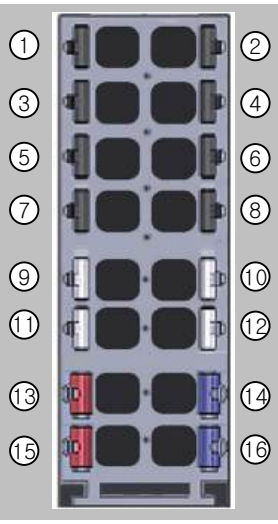
## Technical specifications (continued)

| SITRANS FST070 | |
|---|---|
| Emission of radio interference | Class A industrial environment:<br>• IEC 61000-6-4: 2018<br>• IEC/CISPR 16-2-3: 2008<br>• EN 55016-2-3: 2006 |
| Emission on power supply cables | Class A Industrial environment:<br>• IEC 61000-6-4: 2018<br>• IEC/CISPR 16-2-1: 2010<br>• EN 55016-2-1: 2009 |
| **Certification** | |
| CE mark | Low voltage directive RoHS |
| UL | ANSI / ISA 12.12.01 |
| CAN/CSA | CSA C22.2 No. 213-M1987<br>Class I, Div. 2 Group A.B.C.D T4 |
| ATEX | II 3 G Ex ec IIC T4 Gc |
| IECEx | Ex ec IIC T4 Gc |
| Tick | Yes |
| KCC | Yes |
| RoHS | Yes |
| FM | Class I, Div. 2, Group A.B.C.D T4 |
| **Communication** | |
| Digital Sensor Link | 460.8 kBits/s |
| Cable length FST070 to FC DSL Sensor | 75 m (150 m) |
| Power supply FS sensors | The operating voltage of the sensors is supplied via the sensor cable directly from the FST070 |

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## Circuit diagrams




Pin assignment of the BaseUnit BU20-P12+A0+4B

| Naming | Configuration | PIN |
|---|---|---|
| Digital input | DI0 | 1 |
| Digital output | DQ0 | 2 |
| Digital input | DI1 | 3 |
| Digital output | DQ1 | 4 |
| +24 V DC supply voltage for digital inputs | DI_L+ | 5 |
| - | nc | 6 |

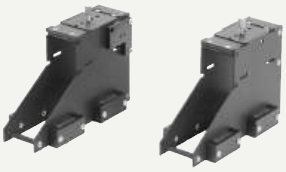
| Naming | Configuration | PIN |
|---|---|---|
| Ground for digital outputs | M | 7 |
| Ground for digital outputs | M | 8 |
| RS 485 data line B for SEN communication | SEN_B | 9 |
| +24 V DC supply voltage for SEN | SEN_L+ | 10 |
| RS 485 data line A for SEN communication | SEN_A | 11 |
| GND for SEN supply | SEN_M | 12 |
| +24 V DC supply voltage for SEN | L+ | 13 |
| Ground for supply voltage | M | 14 |
| +24 V DC supply voltage for SEN | L+ | 15 |
| Ground for supply voltage | M | 16 |

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## Overview

***Accessories / Spare parts for clamp-on ultrasonic flowmeters***

| Description | Article No. | Symbol |
|---|---|---|
| **Universal portable sensors**<br>Selected generally for portable systems where a wide variety of pipes are to be measured. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected as a cost savings on applications where standard accuracy is sufficient. | **7ME3951-...** |  |
| **High precision sensors**<br>Selected generally for dedicated meters since the need to cover a range of pipes is not a requirement. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy/repeatability is required. They are only applicable to steel pipes but no other metals, and are selected solely by wall thickness. | **7ME3950-...** |  |
| **High temperature sensors**<br>Are selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. | **7ME3950-...** |  |
| **High precision mount**<br>These provide the most secure and strongest mounting of the flow sensors. They are generally selected for "High End" meter types where maximum performance criteria applies. They accommodate high precision sensors designed to mount inside these enclosures. May be welded to the pipe if so desired by the customer. They come in 2-piece or 1-piece configurations depending upon the application pipe size and type (Liquid/Gas). | **7ME3960-...** |  |
| **Mounting tracks**<br>Typically used on smaller pipes for easier and more stable mounting for dedicated universal style sensor size A or B, also available for dedicated high precision sensor size A or B. | **7ME3960-...** |  |
| **Magnetic mounting frames**<br>Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN200) and larger by eliminating the need for straps to secure them.They feature powerful magnets to ensure quick and accurate setup.Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS F US clamp-on family, magnetic mounting frames can be installed on any carbon steel pipe and are constructed in aluminum for a high level of durability. | **7ME3960-0MD02** |  |
| **Mounting frames**<br>These items are useful in simplifying sensor installation. They are strapped to the pipe first then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring conformation to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results. | **7ME3960-...** |  |
| **Spacer bars**<br>Sensors are required to be mounted at a set distance from each other as determined by pipe size and medium being measured. The spacer bar simplifies this requirement by eliminating the need to undertake a precise dimensional measurement. The flowmeter will specify a specific spacing index which is easily accommodated with the marked indices on the bar. | **7ME3960-...** |  |

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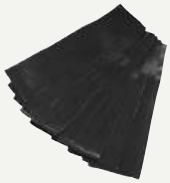
## Overview (continued)

| Description | Article No. | Symbol |
|---|---|---|
| **Clamp-on RTD's**<br>1000 W platinum RTD's for use where temperature is required. Used with Energy Meters to record supply/return temperature. For this purpose precision matched pairs (to 0.02 °C) are supplied. Single RTD's are also used with FUH and FUG meters to enable live calculations of "Liquident" and Standard Volume Correction. | 7ME3950-... |  |
| **Insert RTD's**<br>SITRANS FST030 is suitable for PT100, PT500 and PT1000. Please select best appropriate RTD and thermowell in SIEMENS product family SITRANS TS500 | 7MC7500-...<br>7MT2351-... |  |
| **Standard cable (flow sensor or RTD)**<br>Selected for general purpose installations where no special application requirements exist. | 7ME3960-... |  |
| **Submersible cable (flow sensor)**<br>Polyethylene jacketed, for locations that experience periodical or continual submersion of the flow sensors. | 7ME3960-... |  |
| **Plenum cable (flow sensor or RTD)**<br>For temperatures above 180 °F. Teflon jacketed to withstand high temperatures, is used when high temp sensors are specified. | 7ME3960-... |  |
| **Armored cable (flow sensor)**<br>Double shielded cable, selected when cable will not be installed in conduit between meter and sensors. | 7ME3960-... |  |
| **Temperature sensor cable**<br>Cable to connect field installed RTD to flowmeter, available in Teflon wrapped, plenum or submersible grade. Typically used for FUE, FUH and FUG series meters where a temperature sensor is employed. | 7ME3960-... |  |

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## Overview (continued)

| Description | Article No. | Symbol |
|---|---|---|
| **Straps**<br>Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance. | 7ME3960-... |  |
| **Chains (EZ clamps)**<br>Used to fasten portable sensors or mounting frames to pipe. Thumbscrews eliminate need for hand tools when mounting sensors, and allow for easy on/off operations. | 7ME3960-... |  |
| **Ultrasonic couplant**<br>Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent). | 7ME3960-... |  |
| **Dry couplant**<br>The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F). | 7ME3960-... |  |
| **Damping material**<br>Used with gas meters, and required as part of their sensor installation. This material absorbs excess ultrasonic energy from the pipe wall to enable the meter to detect and operate with low amplitude sensor signals normally associated with Clamp-on Gas applications. | 7ME3960-... |  |
| **Test block**<br>Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors. | 7ME3960-... |  |

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## Overview (continued)

| Description | Article No. | Symbol |
|---|---|---|
| **Termination kit (flow sensor or RTD)**<br>Provides the connectors, labels and shrink tubing or other associated hardware to complete the termination of a specific cable type. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at their site, or when existing cable length is to be altered. Selected by cable type. | **7ME3960-...** |  |
| **Cable gland kit**<br>Cable gland kit for use with SITRANS FUS1010, FUH1010 and FUG1010 Ultrasonic Flowmeters housed in IP65 NEMA 4X wall mount enclosures. Kit contains a total of 5 glands to manage and seal the exit and entry of wires and cables to ancillary devices. | **A5E32834162** |  |

## Selection and ordering data

***RTD cable selection chart (Dedicated, each)***

| RTD cable codes for length and type | | | | |
|---|---|---|---|---|
| Cable length<br>m (ft) | Standard<br>-40 ... +200 °C<br>(-40 ... +392 °F) | Submersible<br>-40 ... +200 °C<br>(-40 ... +392 °F) | for insert RTD<br>-40 ... +200 °C<br>(-40 ... 392 °F) | for submersible insert RTD<br>-40 ... +200 °C<br>(-40 ... 392 °F) |
| | **Order code** | | | |
| 6 (20) | **R01** | **R11** | **R21** | **R31** |
| 15 (50) | **R02** | **R12** | **R22** | **R32** |
| 30 (100) | **R03** | **R13** | **R23** | **R33** |
| 46 (150) | **R04** | **R14** | **R24** | **R34** |
| 61 (200) | **R05** | **R15** | **R25** | **R35** |
| 91 (300) | **R06** | **R16** | **R26** | **R36** |

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## Overview



SITRANS FX Vortex flowmeter are designed for use in industrial applications and optimally suited to the demands in auxiliary supply systems.

The proven principle of vortex flowmeters is suitable for measurement of liquids, gases and vapors unaffected by conductivity, viscosity, temperature and pressure.

## Benefits

- Integrated pressure and temperature compensation
- Temperature compensation for saturated steam included as standard
- High measuring accuracy
- Maintenance-free sensor
- Non-wearing, fully welded stainless steel construction with high resistance to corrosion, pressure and temperature
- SIL2 certified according to IEC 61508 Edition 2
- Use in hazardous areas
- Integrated reduction of nominal diameter for space-saving and economic installation and large measuring ranges
- Redundant data management: Easy exchange of electronics without loss of calibration and configuration data
- FAD (Free Air Delivery) functionality
- Gross and net heat calculation to support advanced energy management
- Remote version with cable length up to 50 m (164 ft)

Even the basic version of the vortex flowmeter SITRANS FX330 is equipped with temperature compensation for saturated steam applications. With the optional pressure sensor the SITRANS FX330 has integrated density compensation for calculation of corrected volume and mass (online density compensation). The density compensation for calculation of corrected volume and mass is based on the standards of NIST for gases and IAPWS for steam.

***Higher measuring accuracy with the use of compact measuring systems***

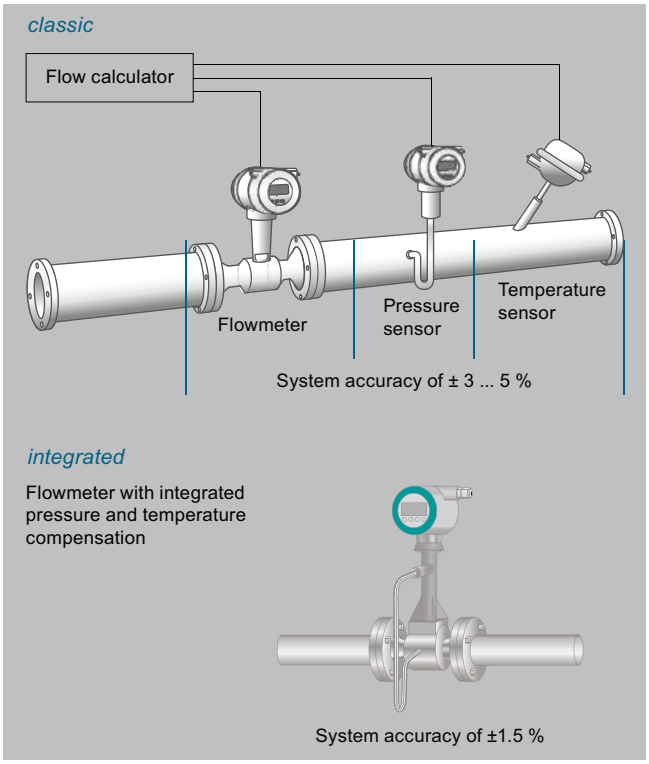
With the classic installation of a vortex flowmeter and separate pressure and temperature sensor as well as flow calculator, all errors occurring in the measuring chain must be taken into account when determining system accuracy. This can result in a measuring error between ± 3 to 5 %.

Using a vortex flowmeter with integrated pressure and temperature compensation such as the SITRANS FX330 allows you not only to lower installation costs but also increase the measuring accuracy of the measuring point. In this case the accuracy is ± 1.5 % of the measured value.

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## Benefits (continued)




The SITRANS FX330 in flange design is available with integrated reduction of nominal diameter for space-saving installations and large measuring spans. About 90% of all vortex flowmeters are ordered one size smaller than the line diameter in order to increase the flow speed and to get a wider measuring range. Here, the line has to be reduced before and widened after the sensor, typically including 20x DN inlet and 5x DN outlet run. With the reduction and widening of nominal diameter included in the sensor, it is no longer necessary. To compensate the non-existent straight inlet run between reduction and the vortex bluff body, these devices are specially calibrated and linearized.

A new feature of the SITRANS FX330 is the advanced signal processing and filtering called AVFD (Advanced Vortex Frequency Detection): Interferences and disturbances in the measuring signal are suppressed, signals outside from the relevant frequency band are filtered out.

Redundant data management prevents loss of calibration and configuration data when changing electronics or display.

By default, all SITRANS FX330 meters are factory-calibrated (traceable to international standards) and pre-set according to customer specifications. The SITRANS FX330 also comes with an installation wizard to ease installation; e.g. in a steam application it will only show related settings.

Developed according to the standard IEC 61508 edition 2, the SITRANS FX330 can be used in safety-related application with classification SIL2 for continuous volume flow measurement.

## Application

- Measurement of saturated steam and superheated steam
- Steam boiler monitoring
- Heat metering of steam and hot water
- Measurement of consumption of industrial gases
- Measurement of consumption in compressed air systems
- Monitoring of compressor output
- Evaluation of Free Air Delivery (FAD)
- SIP and CIP processes in the food, beverage and pharmaceutical industries
- Measuring of conductive and non-conductive liquids
- Safety-related measurement in SIL applications (SIL2)

***Gross and net heat quantity calculation***

The SITRANS FX330 was designed for applications in auxiliary and supply service lines, such as internal monitoring of energy flows for saturated and superheated steam or hot water. Equipped with temperature sensor as standard, the device can be installed as heat meter in the feed line directly connected with an external temperature sensor in the return line. The gross and net heat calculation can be fed into a DCS to support advanced energy management.

When it comes to energy, the most accurate measurement of consumption is essential. By combining flow, temperature and pressure measurements in one device, SITRANS FX330 provides the basis for a precise mass flow calculation.

In steam applications, the software even determines the enthalpy - the heat content - of the steam. Therefore, SITRANS FX330 is able to calculate the gross heat quantity.

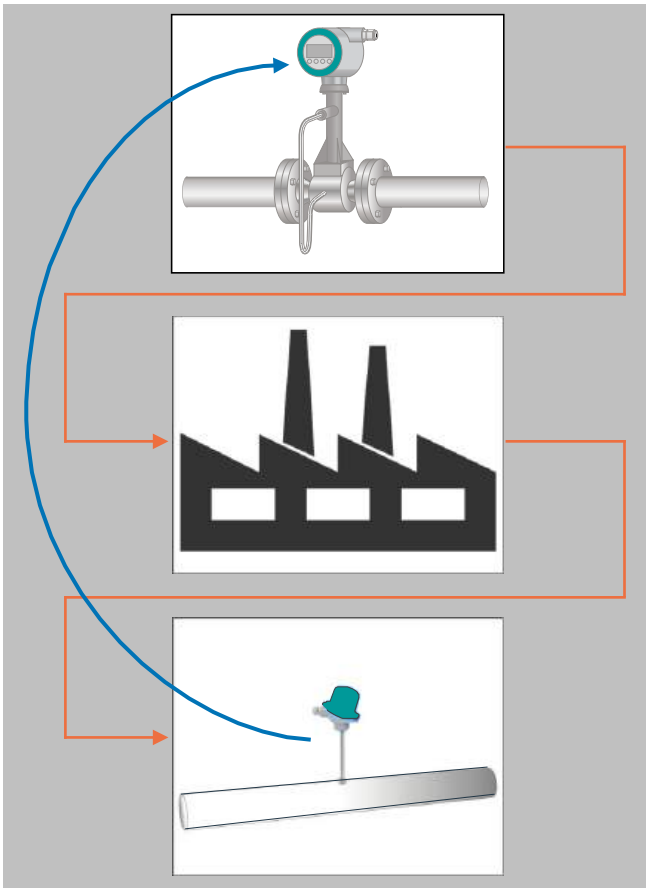
In case net heat quantity consumption of process is asked for, a single temperature sensor can be added to the return line. SITRANS FX330 uses the readings to calculate the amount of heat consumed.

The SITRANS FX330 thereby proves itself to be a reliable partner.

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## Application (continued)



## Design

| SITRANS FX330 Flange | SITRANS FX330 Sandwich |
|---|---|
|  |  |
| Flange version with integrated temperature compensation as standard for saturated steam and optional pressure compensation for superheated steam, gases and wet gases | All advantages of the flange version in a space-saving sandwich design; centering rings guarantee an easy installation without any offset |
| Integrated reduction of nominal diameter for space-saving and economic installations plus large measuring ranges | Integrated reduction of nominal diameter not available |
| Also in remote design with field housing and connection cable up to 50 m (164 ft) | Also in remote design with field housing and connection cable up to 50 m (164 ft) |
| With shut off valve allowing<br>• exchange and calibration of pressure sensor<br>• pressure and leak testing of pipeline without interrupting the process | With shut off valve allowing<br>• exchange and calibration of pressure sensor<br>• pressure and leak testing of pipeline without interrupting the process |

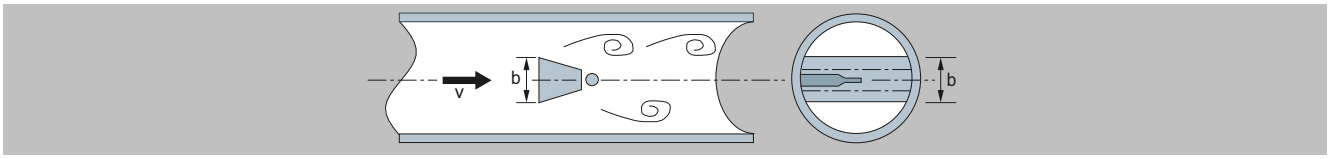
## Function

Vortex flowmeters are used to measure the flow of gases, vapors and liquids in completely filled pipes. The measuring principle is based on the principle of the Karman vortex street. Inside the measuring sensor vortices are shed from a bluff body and are detected by a sensor located behind. The frequency **f** of the vortex shedding is proportional to the flow velocity **v**.

The nondimensional Strouhal number **S** describes the relationship between vortex frequency **f,** width **b** of the bluff body and the mean flow velocity **v**:

$$f = (S \cdot v) / b$$

The vortex frequency is recorded at the sensor and evaluated at the converter.




Functional principle

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## Configuration

***Available combinations of sensors and connection size for SITRANS FX330 in flanged design***

| SITRANS FX330 Flanged (7ME2610-...) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sensor size** | **Connection size** | **EN 1092-1, Form B1/B-2, PN 10** | **EN 1092-1, Form B1/B-2, PN 16** | **EN 1092-1, Form B1/B-2, PN 25** | **EN 1092-1, Form B1/B-2, PN 40** | **EN 1092-1, Form B1/B-2, PN 63** | **EN 1092-1, Form B1/B-2, PN 100** | **ANSI B16.5, class 150** | **ANSI B16.5, class 300** | **ANSI B16.5, class 600** |
| **DN 15** | DN 15 | - | - | - | X | - | X | X | X | X |
| | DN 25 | - | - | - | X | - | X | X | X | X |
| | DN 40 | - | - | - | X | - | X | X | X | X |
| **DN 25** | DN 25 | - | - | - | X | - | X | X | X | X |
| | DN 40 | - | - | - | X | - | X | X | X | X |
| | DN 50 | - | X | - | X | X | X | X | X | X |
| **DN 40** | DN 40 | - | - | - | X | - | X | X | X | X |
| | DN 50 | - | X | - | X | X | X | X | X | X |
| | DN 80 | - | X | - | X | X | X | X | X | X |
| **DN 50** | DN 50 | - | X | - | X | X | X | X | X | X |
| | DN 80 | - | X | - | X | X | X | X | X | X |
| | DN 100 | - | X | - | X | X | X | X | X | X |
| **DN 80** | DN 80 | - | X | - | X | X | X | X | X | X |
| | DN 100 | - | X | - | X | X | X | X | X | X |
| | DN 150 | - | X | - | X | X | X | X | X | X |
| **DN 100** | DN 100 | - | X | - | X | X | X | X | X | X |
| | DN 150 | - | X | - | X | X | X | X | X | X |
| | DN 200 | X | X | X | X | - | - | X | X | - |
| **DN 150** | DN 150 | - | X | - | X | X | X | X | X | X |
| | DN 200 | X | X | X | X | - | - | X | X | - |
| | DN 250 | X | X | X | X | - | - | X | X | - |
| **DN 200** | DN 200 | X | X | X | X | - | - | X | X | - |
| | DN 250 | X | X | X | X | - | - | X | X | - |
| | DN 300 | X | X | X | X | - | - | X | X | - |
| **DN 250** | DN 250 | X | X | X | X | - | - | X | X | - |
| | DN 300 | X | X | X | X | - | - | X | X | - |
| **DN 300** | DN 300 | X | X | X | X | - | - | X | X | - |

X = available
- = not available

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## Selection and ordering data

| SITRANS FX330 Flanged<br>Not approved for SIL2 safety applications<br>Approved for SIL2 safety applications | | Article No.<br><br>7ME2610-<br>7ME2611- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Sensor size** | **Connection size** | | | | | | | | | | |
| DN 15 (½") | DN 15 (½") | 1 | A | | | | | | | | |
| | DN 25 (1") | 1 | B | | | | | | | | |
| | DN 40 (1½") | 1 | C | | | | | | | | |
| DN 25 (1") | DN 25 (1") | 2 | B | | | | | | | | |
| | DN 40 (1½") | 2 | C | | | | | | | | |
| | DN 50 (2") | 2 | D | | | | | | | | |
| DN 40 (1½") | DN 40 (1½") | 2 | K | | | | | | | | |
| | DN 50 (2") | 2 | L | | | | | | | | |
| | DN 80 (3") | 2 | M | | | | | | | | |
| DN 50 (2") | DN 50 (2") | 2 | R | | | | | | | | |
| | DN 80 (3") | 2 | S | | | | | | | | |
| | DN 100 (4") | 2 | T | | | | | | | | |
| DN 80 (3") | DN 80 (3") | 3 | L | | | | | | | | |
| | DN 100 (4") | 3 | M | | | | | | | | |
| | DN 150 (6") | 3 | R | | | | | | | | |
| DN 100 (4") | DN 100 (4") | 3 | S | | | | | | | | |
| | DN 150 (6") | 3 | T | | | | | | | | |
| | DN 200 (8") | 3 | Q | | | | | | | | |
| DN 150 (6") | DN 150 (6") | 4 | M | | | | | | | | |
| | DN 200 (8") | 4 | P | | | | | | | | |
| | DN 250 (10") | 4 | Q | | | | | | | | |
| DN 200 (8") | DN 200 (8") | 4 | T | | | | | | | | |
| | DN 250 (10") | 4 | U | | | | | | | | |
| | DN 300 (12") | 4 | V | | | | | | | | |
| DN 250 (10") | DN 250 (10") | 4 | W | | | | | | | | |
| | DN 300 (12") | 4 | Y | | | | | | | | |
| DN 300 (12") | DN 300 (12") | 5 | E | | | | | | | | |
| **Process connection and pressure rate** | | | | | | | | | | | |
| **EN 1092-1 type B1** | | | | | | | | | | | |
| PN 10 | DN 200 ... 300 | | | A | | | | | | | |
| PN 16 | DN 50 ... 300 | | | B | | | | | | | |
| PN 25 | DN 200 ... 300 | | | C | | | | | | | |
| PN 40 | DN 15 ... 300 | | | D | | | | | | | |
| PN 63 | DN 50 ... 150 | | | E | | | | | | | |
| PN 100 | DN 15 ... 150 | | | F | | | | | | | |
| **ANSI B16.5 RF** | | | | | | | | | | | |
| Class 150 | ½ ... 12" | | | J | | | | | | | |
| Class 300 | ½ ... 12" | | | K | | | | | | | |
| Class 600 | ½ ... 6" | | | L | | | | | | | |
| **System design** | | | | | | | | | | | |
| Compact version | No cable | | | | 0 | | | | | | |
| Remote version | Cable length with order code L.. | | | | 1 | | | | | | |
| **Transmitter housing** | | | | | | | | | | | |
| Aluminum | | | | | | 0 | | | | | |
| Aluminum, silicon free | | | | | | 1 | | | | | |
| Stainless steel | | | | | | 2 | | | | | |
| Stainless steel (remote version) | | | | | | 3 | | | | | |
| Dual version, aluminum | | | | | | 6 | | | | | |
| Dual version, aluminum, silicon free | | | | | | 7 | | | | | |
| **Communication** | | | | | | | | | | | |
| HART | | | | | | | | 0 | | | |
| PROFIBUS PA | | | | | | | | 1 | | | |
| FOUNDATION Fieldbus | | | | | | | | 2 | | | |

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## Selection and ordering data (continued)

| SITRANS FX330 Flanged<br>Not approved for SIL2 safety applications<br>Approved for SIL2 safety applications | Article No.<br><br>7ME2610-<br>7ME2611- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
| **Ex approval** | | | | | | | | | | |
| Without Ex approval | | | | | | | | A | | |
| ATEX II2 G Ex ia | | | | | | | | B | | |
| ATEX II2 G Ex d | | | | | | | | C | | |
| ATEX II3 G Ex nA | | | | | | | | D | | |
| ATEX II2 D Ex tb | | | | | | | | E | | |
| QPS IS Class I Div.1 | | | | | | | | F | | |
| QPS XP Class I Div.1 | | | | | | | | G | | |
| QPS NI Class I Div. 2 | | | | | | | | H | | |
| QPS DIP Class I, III Div. 1 | | | | | | | | J | | |
| IECEx II2 G Ex ia | | | | | | | | K | | |
| IECEx II2 G Ex d | | | | | | | | L | | |
| IECEx II3 G Ex nA | | | | | | | | M | | |
| IECEx II2 D Ex tb | | | | | | | | N | | |
| EAC Ex i (On Hold) | | | | | | | | R | | |
| EAC Ex d (On Hold) | | | | | | | | S | | |
| EAC Ex nA (On Hold) | | | | | | | | T | | |
| EAC Ex t (On Hold) | | | | | | | | U | | |
| **Pressure sensor and gasket material** | | | | | | | | | | |
| Without pressure sensor | | | | | | | | A | | |
| With pressure sensor and gasket material FPM (Viton), Range: | | | | | | | | | | |
| 1 bar (14.5 psi) | | | | | | | | B | | |
| 2 bar (29 psi) | | | | | | | | C | | |
| 4 bar (58 psi) | | | | | | | | D | | |
| 6 bar (87 psi) | | | | | | | | E | | |
| 10 bar (145 psi) | | | | | | | | F | | |
| 16 bar (232 psi) | | | | | | | | G | | |
| 25 bar (363 psi) | | | | | | | | H | | |
| 40 bar (580 psi) | | | | | | | | J | | |
| 60 bar (870 psi) | | | | | | | | K | | |
| 100 bar (1450 psi) | | | | | | | | L | | |
| With pressure sensor and gasket material FFKM (Kalrez), Range: | | | | | | | | | | |
| 1 bar (14.5 psi) | | | | | | | | M | | |
| 2 bar (29 psi) | | | | | | | | N | | |
| 4 bar (58 psi) | | | | | | | | P | | |
| 6 bar (87 psi) | | | | | | | | Q | | |
| 10 bar (145 psi) | | | | | | | | R | | |
| 16 bar (232 psi) | | | | | | | | S | | |
| 25 bar (363 psi) | | | | | | | | T | | |
| 40 bar (580 psi) | | | | | | | | U | | |
| 60 bar (870 psi) | | | | | | | | V | | |
| 100 bar (1450 psi) | | | | | | | | W | | |
| **Software version** | | | | | | | | | | |
| Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam | | | | | | | | | | 0 |
| Standard + Heat meter for saturated steam and water | | | | | | | | | | 1 |
| Density compensation for steam + Heat meter for saturated and superheated steam | | | | | | | | | | 2 |
| Density compensation for gases, wet gases and mixed gases + FAD | | | | | | | | | | 3 |

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## Selection and ordering data (continued)

| SITRANS FX330 Sandwich<br>Not approved for SIL2 safety applications<br>Approved for SIL2 safety applications | | Article No.<br>7ME2710-<br>7ME2711- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | |
| **Sensor size** | | | | | | | | | | | | |
| DN 15 (½") | | 1 | A | | | | | | | | | |
| DN 25 (1") | | 2 | B | | | | | | | | | |
| DN 40 (1½") | | 2 | K | | | | | | | | | |
| DN 50 (2") | | 2 | R | | | | | | | | | |
| DN 80 (3") | | 3 | L | | | | | | | | | |
| DN 100 (4") | | 3 | S | | | | | | | | | |
| **Pressure rating** | | | | | | | | | | | | |
| EN 1092-1 | | | | | | | | | | | | |
| PN 16 | DN 15 ... 100 | | | B | | | | | | | | |
| PN 25 | DN 15 ... 100 | | | C | | | | | | | | |
| PN 40 | DN 15 ... 100 | | | D | | | | | | | | |
| PN 63 | DN 15 ... 100 | | | E | | | | | | | | |
| PN 100 | DN 15 ... 100 | | | F | | | | | | | | |
| **ANSI B16.5** | | | | | | | | | | | | |
| Class 150 | ½ ... 4" | | | J | | | | | | | | |
| Class 300 | ½ ... 4" | | | K | | | | | | | | |
| Class 600 | ½ ... 4" | | | L | | | | | | | | |
| **System design** | | | | | | | | | | | | |
| Compact version | No cable | | | | 0 | | | | | | | |
| Remote version | Cable length with Order code L.. | | | | 1 | | | | | | | |
| **Transmitter housing** | | | | | | | | | | | | |
| Aluminum | | | | | | 0 | | | | | | |
| Aluminum, silicon free | | | | | | 1 | | | | | | |
| **Communication** | | | | | | | | | | | | |
| HART | | | | | | | | 0 | | | | |
| PROFIBUS PA | | | | | | | | 1 | | | | |
| FOUNDATION Fieldbus | | | | | | | | 2 | | | | |
| **Ex approval** | | | | | | | | | | | | |
| Without Ex approval | | | | | | | | | A | | | |
| ATEX II2 G Ex ia | | | | | | | | | B | | | |
| ATEX II2 G Ex d | | | | | | | | | C | | | |
| ATEX II3 G Ex nA | | | | | | | | | D | | | |
| ATEX II2 D Ex tb | | | | | | | | | E | | | |
| QPS IS Class I Div.1 | | | | | | | | | F | | | |
| QPS XP Class I Div.1 | | | | | | | | | G | | | |
| QPS NI Class I Div. 2 | | | | | | | | | H | | | |
| QPS DIP Class I, III Div. 1 | | | | | | | | | J | | | |
| IECEx II2 G Ex ia | | | | | | | | | K | | | |
| IECEx II2 G Ex d | | | | | | | | | L | | | |
| IECEx II3 G Ex nA | | | | | | | | | M | | | |
| IECEx II2 D Ex tb | | | | | | | | | N | | | |
| EAC Ex i (On Hold) | | | | | | | | | R | | | |
| EAC Ex d (On Hold) | | | | | | | | | S | | | |
| EAC Ex nA (On Hold) | | | | | | | | | T | | | |
| EAC Ex t (On Hold) | | | | | | | | | U | | | |
| **Pressure sensor and gasket material** | | | | | | | | | | | | |
| Without pressure sensor | | | | | | | | | | A | | |
| With pressure sensor and gasket material FPM (Viton), Range: | | | | | | | | | | | | |
| 1 bar (14.5 psi) | | | | | | | | | | B | | |
| 2 bar (29 psi) | | | | | | | | | | C | | |
| 4 bar (58 psi) | | | | | | | | | | D | | |
| 6 bar (87 psi) | | | | | | | | | | E | | |
| 10 bar (145 psi) | | | | | | | | | | F | | |
| 16 bar (232 psi) | | | | | | | | | | G | | |

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## Selection and ordering data (continued)

| SITRANS FX330 Sandwich<br>Not approved for SIL2 safety applications<br>Approved for SIL2 safety applications | Article No.<br><br>7ME2710-<br>7ME2711- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | |
| 25 bar (363 psi) | | | | | | | | | H | | |
| 40 bar (580 psi) | | | | | | | | | J | | |
| 60 bar (870 psi) | | | | | | | | | K | | |
| 100 bar (1450 psi) | | | | | | | | | L | | |
| With pressure sensor and gasket material FFKM (Kalrez), Range: | | | | | | | | | | | |
| 1 bar (14.5 psi) | | | | | | | | | M | | |
| 2 bar (29 psi) | | | | | | | | | N | | |
| 4 bar (58 psi) | | | | | | | | | P | | |
| 6 bar (87 psi) | | | | | | | | | Q | | |
| 10 bar (145 psi) | | | | | | | | | R | | |
| 16 bar (232 psi) | | | | | | | | | S | | |
| 25 bar (363 psi) | | | | | | | | | T | | |
| 40 bar (580 psi) | | | | | | | | | U | | |
| 60 bar (870 psi) | | | | | | | | | V | | |
| 100 bar (1450 psi) | | | | | | | | | W | | |
| **Software version** | | | | | | | | | | | |
| Standard - Uncompensated for gases, steam and liquids including temperature compensation for saturated steam | | | | | | | | | | | 0 |
| Standard + Heat meter for saturated steam and water | | | | | | | | | | | 1 |
| Density compensation for steam + Heat meter for saturated and superheated steam | | | | | | | | | | | 2 |
| Density compensation for gases, wet gases and mixed gases + FAD | | | | | | | | | | | 3 |

| | Order code |
|---|---|
| Additional information<br>Please add "**-Z**" to Article No. and specify as minimum Order code Y40, Y41, Y42, Y43, Y44 and Y45 in plain text. | |
| **Application data** | |
| Medium: Specify medium (liquid, gas, steam or customer-specific) | **Y40** |
| Temperature: Specify operating temperature with unit | **Y41** |
| Pressure: Specify operating pressure with unit | **Y42** |
| Density: Specify density with unit | **Y43** |
| Viscosity: Specify viscosity with unit | **Y44** |
| Flow rate: Specify max. flow rate with unit | **Y45** |

Operating instruction

All literature is available to download for free, in a range of languages, at www.siemens.com/processinstrumentation/documentation

| | Order code |
|---|---|
| Further designs<br>Please add "**-Z**" to Article No. and specify Order code. | |
| **Cable connection** | |
| Without cable glands | **A01** |
| M20 × 1.5 cable glands (3 cable entries) in plastic, grey | **A02** |
| M20 × 1.5 cable glands (3 cable entries) in plastic, blue | **A03** |
| M20 × 1.5 cable glands (3 cable entries) made of brass, Ex-d/t/nA | **A04** |
| M20 × 1.5 cable glands (3 cable entries) made of stainless steel, Ex-d/t/nA | **A06** |

| | Order code |
|---|---|
| 1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included) | **A07** |
| M20 × 1.5 cable glands (2 cable entries - 1 plugged) in plastic, grey | **A12** |
| M20 × 1.5 cable glands (2 cable entries - 1 plugged) in plastic, blue | **A13** |
| M20 × 1.5 cable glands (2 cable entries - 1 plugged) made of brass, Ex-d/t/nA | **A14** |
| M20 × 1.5 cable glands (2 cable entries - 1 plugged) made of stainless steel, Ex-d/t/nA | **A16** |
| 1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included) | **A17** |
| M20 × 1.5 cable glands (1 cable entry - 2 plugged) in plastic, grey | **A22** |
| M20 × 1.5 cable glands (1 cable entry - 2 plugged) in plastic, blue | **A23** |
| M20 × 1.5 cable glands (1 cable entry - 2 plugged) made of brass, Ex-d/t/nA | **A24** |
| M20 × 1.5 cable glands (1 cable entry - 2 plugged) made of stainless steel, Ex-d/t/nA | **A26** |
| 1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included) | **A27** |
| M20x1.5 cable glands (3 cable entries) made of brass, Ex-d/t/nA approved for Dual Version | **A34** |
| M20x1.5 cable glands (3 cable entries) made of Stainless steel, Ex-d/t approved for Dual Version | **A36** |
| 1/2" NPT conduit connection in stainless steel (3 cable entries, cable glands not included) for Dual Version | **A37** |
| M20x1.5 cable glands (2 cable entries - 1 plugged) made of brass, Ex-d/t/nA approved for Dual Version | **A44** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| M20x1.5 cable glands (2 cable entries - 1 plugged) made of Stainless steel, Ex-d/t approved for Dual Version | **A46** |
| 1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included) for Dual Version | **A47** |
| 1/2" NPT conduit connection in stainless steel (2 cable entries - 1 plugged, cable glands not included) for Dual Version | **A54** |
| M20x1.5 cable glands (1 cable entry - 2 plugged) made of brass, Ex-d/t/nA approved for Dual Version | **A56** |
| 1/2" NPT conduit connection in stainless steel (1 cable entry - 2 plugged, cable glands not included) for Dual Version | **A57** |
| **Isolation valve** | |
| With isolation valve | **B10** |
| ***Language*** | |
| English | **B11** |
| Chinese | **B12** |
| Russian | **B13** |
| **Certificates** | |
| Certificate of compliance according to EN 10204-2.1 | **C10** |
| Pressure test + Inspection certificate according to EN 10204-3.1 | **C11** |
| Material certification of pressure bearing metal parts according to EN 10204-3.1 | **C12** |
| Material in accordance with NACE MR0175/ISO 15156 | **C13** |
| PMI of pressure bearing metal parts + Inspection certificate according to EN 10204-3.1 | **C14** |
| Material certificate of pressure bearing metal parts according to EN 10204-3.1 + PMI | **C15** |
| Dye penetration test of wetted welds | **C16** |
| X-ray test on pressurized weld DN 15 – 80 acc. to EN | **C17** |
| X-ray test on pressurized weld DN 100 – 300 acc. to EN | **C18** |
| Dye pen test on pressurized welds acc. to ASME | **C19** |
| X-ray test on press. welds DN 15 – 80 acc. to ASME | **C20** |
| X-ray test on press. welds DN 100 - 300 acc. to ASME | **C21** |
| **Calibration** | |
| 5-point calibration with certificate | **D11** |
| **General approval** | |
| World (CE) except: EAC, KCC, UKCA, CRN | **E00** |
| EAC (On Hold) | **E07** |
| UKCA (In Preparation) | **E13** |
| KC | **E20** |
| CRN | **E70** |
| **Cleaning** | |
| Final cleaning for standard applications incl. certificate 2.1 | **K50** |
| Final cleaning for standard applications incl. certificate 3.1 | **K51** |
| Final oil & grease free cleaning for oxygen applications incl. certificate 2.1 | **K52** |
| Final oil & grease free cleaning for oxygen applications incl. certificate 3.1 | **K53** |
| **Cable length for remote design** | |
| 5 m (16 ft) | **L01** |
| 10 m (32 ft) | **L02** |
| 15 m (49 ft) | **L03** |
| 20 m (65 ft) | **L04** |
| 25 m (82 ft) | **L05** |
| 30 m (98 ft) | **L06** |
| 35 m (114 ft) | **L07** |
| 40 m (131 ft) | **L08** |
| 45 m (147 ft) | **L09** |
| 50 m (164 ft) | **L10** |
| 5 m (16 ft) UV resistant | **L31** |
| 10 m (32 ft) UV resistant | **L32** |
| 15 m (49 ft) UV resistant | **L33** |
| 20 m (65 ft) UV resistant | **L34** |
| 25 m (82 ft) UV resistant | **L35** |
| 30 m (98 ft) UV resistant | **L36** |
| 35 m (114 ft) UV resistant | **L37** |
| 40 m (131 ft) UV resistant | **L38** |
| 45 m (147 ft) UV resistant | **L39** |
| 50 m (164 ft) UV resistant | **L40** |
| **Tag name plate** | |
| TAG name plate in stainless steel 40 × 20 mm (Add plain text) | **Y17** |
| TAG name plate in stainless steel tag 120 × 46 mm (Add plain text) | **Y18** |

### *SITRANS FX330 spare parts*

| Description | Article No. |
|---|---|
| Transmitter electronic for SITRANS FX330 | |
| • FXT030 in compact design with HART (non-Ex/Ex-i) | **KRH-16000100** |
| • FXT030 in compact design with HART (Ex-d) | **A5E38663398** |
| Display with HMI and data memory | **A5E38663613** |
| Seal disc 21.8 × 12 × 0.1 | **KRH-17000700** |
| O-ring pickup | **KRH-17001400** |
| O-ring for pressure screw 17.13 × 2.62, FPM 70 | **KRH-17001200** |
| Cover gasket O-ring | **KRH-16000300** |
| Front Cover (non Ex) | **KRH-16002000** |
| Front Cover (Ex) | **KRH-16002500** |
| Back Cover | **KRH-16003000** |
| Converter housing gasket, 59,35,5-2-N | **KRH-16000400** |
| O-ring | |
| • 20 × 1, FPM (DIN 3771) | **KRH-17001100** |
| • 10 × 2, NBR | **KRH-17001000** |
| DUBOX plug 5 pole, linear, RM2 | **KRH-17000800** |
| Cable feed through 10 pole (non Ex) | **KRH-16000500** |
| Shut-off valve | **KRH-17004000** |
| Centering rings for Sandwich-Version | |
| • DN 15 | **KRH-17006000** |
| • DN 25 | **KRH-17006001** |
| • DN 40 | **KRH-17006002** |
| • DN 50 | **KRH-17006003** |
| • DN 50 (300 lbs, 600 lbs) | **KRH-17006004** |

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## Selection and ordering data (continued)

| Description | Article No. |
|---|---|
| • DN 50 (JIS 10K, 16K, 20K) | **KRH-17006005** |
| • DN 80 | **KRH-17006006** |
| • DN 100 | **KRH-17006007** |
| Wall housing incl. Neck (incl. Screws, Gaskets and cable glands) | **KRH-16112002** |
| Sensor replacement kit including seal disc, socket, pickup and O-rings (for pickup and pressure screw)[1] | |
| • DN 15 | **KRH-16111100** |
| • DN 25 | **KRH-16111150** |
| • DN 40 | **KRH-16111200** |
| • DN 50 | **KRH-16111210** |
| • DN 80 | **KRH-16111220** |
| • DN 100 | **KRH-16111230** |
| • DN 150 ... 300 | **KRH-16111300** |

| Description | Article No. |
|---|---|
| Pressure sensor replacement kit including pressure sensor with calibration certificate, DUBOX plug and O-rings[1] | |
| • 1 bar | **KRH-16111350** |
| • 2 bar | **KRH-16111370** |
| • 4 bar | **KRH-16111400** |
| • 6 bar | **KRH-16111401** |
| • 10 bar | **KRH-16111402** |
| • 16 bar | **KRH-16111403** |
| • 25 bar | **KRH-16111404** |
| • 40 bar | **KRH-16111405** |
| • 60 bar | **KRH-16111406** |
| • 100 bar | **KRH-16111407** |
| Upgrade Kit SITRANS FX300 (requires serial number of device to be replaced) | ***On request*** |

[1] Pick-up resp. pressure sensor replacement kits are delivered with replacement instructions. Please note that in case of pick-up or pressure sensor replacement the factory pressure test gets invalid and has to be repeated with test pressure PTmax indicated on the type plate.

| SITRANS FX330 Flow Straightener | Article No. 7ME2900- | ● | ● | ● | 0 | 0 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Material** | | | | | | |
| Stainless steel 1.4404 (316L) | | **1** | | | | |
| **Nominal size** | | | | | | |
| DN 15 / ANSI ½" | | | **A** | | | |
| DN 25 / ANSI 1" | | | **B** | | | |
| DN 40 / ANSI 1½" | | | **C** | | | |
| DN 50 / ANSI 2" | | | **D** | | | |
| DN 80 / ANSI 3" | | | **E** | | | |
| DN 100 / ANSI 4" | | | **F** | | | |
| DN 150 / ANSI 6" | | | **G** | | | |
| DN 200 / ANSI 8" | | | **H** | | | |
| DN 250 / ANSI 10" | | | **J** | | | |
| DN 300 / ANSI 12" | | | **K** | | | |
| **Pressure rating** | | | | | | |
| PN 10 | | | | **A** | | |
| PN 16 | | | | **B** | | |
| PN 25 | | | | **C** | | |
| PN 40 | | | | **D** | | |
| PN 63 | | | | **E** | | |
| PN 100 | | | | **F** | | |
| Class 150 | | | | **J** | | |
| Class 300 | | | | **K** | | |
| Class 600 | | | | **L** | | |

| | Order code |
|---|---|
| Additional information<br>Please add "**-Z**" to Article No. and specify Order code. | |
| **Certificates** | |
| Certificate of compliance to EN 10204-2.1 | **C10** |
| Material certification of pressure bearing parts to EN 10204-3.1 | **C12** |

| | Order code |
|---|---|
| Material in accordance with NACE MR0175/ISO 15156 | **C13** |
| PMI of pressure bearing parts + Inspection certificate according to EN 10204-3.1 | **C14** |
| Material certificate of pressure bearing parts according to EN 10204-3.1 + PMI | **C15** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Cleaning** | |
| Free of oil and grease (wetted parts) | **K46** |
| Free of oil and grease (wetted parts) + Inspection certificate according to EN 10204-3.1 | **K48** |

## Technical specifications

| SITRANS FX330 | | |
|---|---|---|
| **Range of application** | Flow measurement of liquids, gases and vapors | |
| **Mode of operation** | | |
| Measuring principle | Karman vortex street | |
| Primary measured value | • Volume flow<br>• Mass flow<br>• Corrected volume flow<br>• Density<br>• Temperature<br>• Pressure<br>• Heat energy | |
| Design | | |
| Transmitter | | |
| • Compact and remote version | Cable length up to 50 m (164 ft) | |
| Sensor | Flange version | Sandwich version |
| • Integrated temperature measurement | Yes | Yes |
| • Reduction of nominal diameter | Yes | No |
| • Pressure and temperature compensation | Yes | Yes |
| • Isolation valve | Yes | Yes |
| • Dual measuring device | Yes | No |
| **Display** | 4-line graphical display (backlit) with control keys | |
| **Operation** | • Via local display (languages: German, English, French, Italian, Spanish, Swedish, Danish, Czech, Polish, Russian, Chinese, Turkish, Slovenian)<br>• Via SIMATIC PDM | |
| **Accuracy** | | |
| Volume flow | | |
| • Liquids | | |
| - Re ≥ 20 000 | ± 0.75 % of measured value | |
| - 10 000 < Re < 20 000 | ± 2.0 % of measured value | |
| • Gases and vapors | | |
| - Re ≥ 20 000 | ± 1.0 % of measured value | |
| - 10 000 < Re < 20 000 | ± 2.0 % of measured value | |
| Mass flow/Corrected volume flow | | |
| • Gases and vapors | | |
| - Re ≥ 20 000 | ± 1.5 % of measured value | |
| - 10 000 < Re < 20 000 | ± 2.5 % of measured value | |
| Mass flow | | |
| • Liquid/water | | |
| - Re ≥ 20 000 | ± 1.5 % of measured value | |
| - 10 000 < Re < 20 000 | ± 2.5 % of measured value | |
| Repeatability (Volume flow) | ± 0.1 % of measured value | |

## Technical specifications (continued)

| SITRANS FX330 | |
|---|---|
| **Operating conditions** | |
| Temperature ratings | |
| • Medium | -40 ... +240 °C (-40 ... +465 °F) |
| • Ambient | |
| - Non-Ex | -40 ... +85 °C (-40 ... +185 °F) |
| - Ex | -40 ... +65 °C (-40 ... +140 °F) |
| • Storage | -40 ... +85 °C (-40 ... +185 °F) |
| Pressure ratings | Max. 100 bar (1450 psi), higher pressure rates on request |
| Max. allowable test pressure | |
| • With integrated pressure sensor and isolation valve (closed) | 1.5 x PN |
| • With integrated pressure sensor and without isolation valve | 2 times the measuring range of pressure sensor |
| Process medium | |
| • Density | Taken into consideration when sizing |
| • Viscosity | < 10 cP |
| • Reynold's number | > 10000 |
| Recommended flow velocities | |
| • Liquids | 0.3 ... 7 m/s (0.98 ... 23 ft/s) |
| • Gases and vapors | 2.0 ... 80 m/s (6.6 ... 262.5 ft/s) |
| - DN 15 | 3.0 ... 45 m/s (9.8 ... 148 ft/s) |
| - DN 25 | 2.0 ... 70 m/s (6.6 ... 230 ft/s) |
| | For detailed information see operating instructions "Intended use" |
| **Installation conditions** | |
| Inlet run | |
| • For undisturbed flow profile, after pipe section with reducer, after 1 x 90° pipe bend | ≥ 15 x DN |
| • After 2 x 90° pipe bend | ≥ 30 x DN |
| • After 2 x 90° three-dimensional pipe bend | ≥ 40 x DN |
| • After control valves | ≥ 50 x DN |
| • Before flow conditioner | ≥ 2 x DN |
| • After flow conditioner | ≥ 8 x DN |
| Outlet run | ≥ 5 x DN |
| **Material** | |
| Sensor and process connections | |
| • Standard | 1.4404/316L |
| • Option | Hastelloy C22 on request |
| Transmitter housing | Aluminum |
| • Standard | Aluminum die-cast, two-layer coating (epoxy/polyester) |
| • Option | Die-cast aluminum with finish for advanced requirements / 1.4409 / 316L / A 351-CF3M |
| Pressure sensor gasket | |
| • Standard | FPM |

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## Technical specifications (continued)

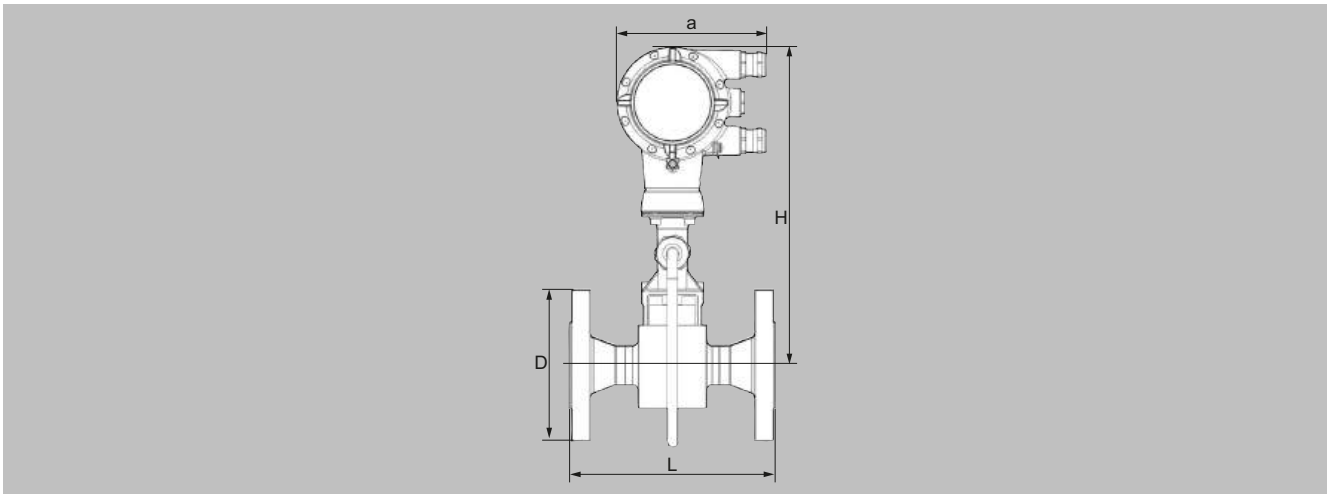
| SITRANS FX330 | |
|---|---|
| • Option | FFKM |
| Sensor gasket (Pick-up) | |
| • Standard | 1.4535/316L |
| • Option | Hastelloy C276 |
| **Process connections** | |
| DIN EN 1092-1 | DN 15 ... 300 / PN 16 ... 100 |
| ANSI B16.5 | ½" ... 12"/150 ... 600 lb |
| | For valid combinations of connection size and pressure rating see table in section "Configuration" |
| **Enclosure rating** | |
| Standard | Compact and remote version: IP66/IP67 |
| Option | Remote version: IP66/IP68 for sensor |
| **Power supply** | |
| Non-Ex version | 14 ... 36 V DC |
| Ex version | 14 ... 30 V DC |
| **Inputs/Outputs** | |
| Current output | 4 ... 20 mA, HART |
| Binary output | Pulse/Frequency/Status/Limit switch |
| Current input | 4 ... 20 mA, passive |
| **Communication** | HART 7<br>PROFIBUS PA<br>FOUNDATION Fieldbus |
| **Calibration** | |
| Standard calibration | 3-point calibration: 3 x 15 %, 3 x 50 %, 3 x 80 % |
| Special calibration | 5-point calibration: 3 x 15 %, 3 x 30 %, 3 x 50 %, 3 x 60 %, 3 x 80 % |
| **Certificates and approvals** | |
| Ex approvals | ATEX, QPS, IECEx |
| CE declaration of conformity | PED 2014/68/EU EMC 2014/30/EU |
| Safety integration level (SIL) | SIL2 according to IEC 61508 |

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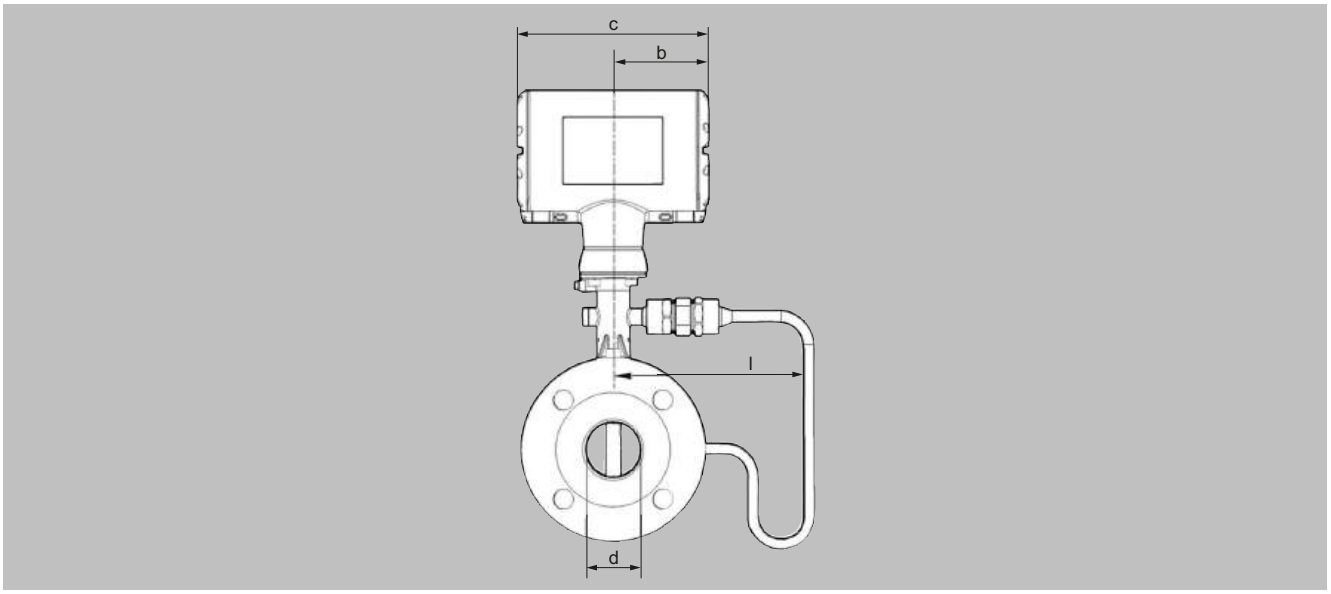


## Dimensional drawings

Compact version




SITRANS FX330 (Vortex), Flanged version with pressure sensor, front view




SITRANS FX330 (Vortex), Flanged version with pressure sensor, side view

***Flange version EN 1092-1***

| Size | Pressure rating | Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76) | | | | | | | Weight [kg (lb)] | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN | PN | d | d FR[1)] | d FR[2)] | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| 15 | 40 | 17.3 (0.68) | - | - | 95 (3.74) | 200 (7.87) | 358.8 (14.2) | 169.3 (6.67) | 5.5 (12.13) | 6.1 (13.45) |
| 15 | 100 | 17.3 (0.68) | - | - | 105 (4.13) | 200 (7.87) | 358.8 (14.2) | 169.3 (6.67) | 6.5 (14.33) | 7.1 (15.65) |
| 25 | 40 | 28.5 (1.12) | 17.3 (0.68) | - | 115 (4.53) | 200 (7.87) | 358.4 (14.1) | 169.3 (6.67) | 7.3 (16.09) | 7.9 (17.42) |
| 25 | 100 | 28.5 (1.12) | 17.3 (0.68) | - | 140 (5.51) | 200 (7.87) | 358.4 (14.1) | 169.3 (6.67) | 9.3 (20.50) | 9.9 (21.83) |
| 40 | 40 | 43.1 (1.70) | 28.5 (1.12) | 17.3 (0.68) | 150 (5.91) | 200 (7.87) | 362.3 (14.3) | 169.5 (6.67) | 10.2 (22.49) | 10.8 (23.81) |
| 40 | 100 | 42.5 (1.67) | 28.5 (1.12) | 17.3 (0.68) | 170 (6.69) | 200 (7.87) | 362.3 (14.3) | 169.5 (6.67) | 14.2 (31.31) | 14.8 (32.63) |

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## Dimensional drawings (continued)

| Size | Pressure rating | Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76) | | | | | | | Weight [kg (lb)] | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN | PN | d | d FR[1] | d FR[2] | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| 50 | 16 | 54.5 (2.15) | 42.5 (1.67) | 28.5 (1.12) | 165 (6.50) | 200 (7.87) | 368.3 (14.5) | 169.3 (6.67) | 12.1 (26.68) | 12.7 (28.00) |
| 50 | 40 | 54.5 (2.15) | 42.5 (1.67) | 28.5 (1.12) | 165 (6.50) | 200 (7.87) | 368.3 (14.5) | 169.3 (6.67) | 12.3 (27.12) | 12.9 (28.44) |
| 50 | 63 | 54.5 (2.15) | 42.5 (1.67) | 28.5 (1.12) | 180 (7.09) | 200 (7.87) | 368.3 (14.5) | 169.3 (6.67) | 16.3 (35.94) | 16.9 (37.26) |
| 50 | 100 | 53.9 (2.12) | 42.5 (1.67) | 28.5 (1.12) | 195 (7.68) | 200 (7.87) | 368.3 (14.5) | 169.3 (6.67) | 17.8 (39.24) | 18.4 (40.57) |
| 80 | 16 | 82.5 (3.25) | 54.5 (2.15) | 42.5 (1.67) | 200 (7.87) | 200 (7.87) | 380.3 (15.0) | 169.3 (6.67) | 16.8 (37.04) | 17.4 (38.36) |
| 80 | 40 | 82.5 (3.25) | 54.5 (2.15) | 42.5 (1.67) | 200 (7.87) | 200 (7.87) | 380.3 (15.0) | 169.3 (6.67) | 18.8 (41.45) | 19.4 (42.77) |
| 80 | 63 | 81.7 (3.22) | 54.5 (2.15) | 42.5 (1.67) | 215 (8.46) | 200 (7.87) | 380.3 (15.0) | 169.3 (6.67) | 22.8 (50.27) | 23.4 (51.59) |
| 80 | 100 | 80.9 (3.19) | 54.5 (2.15) | 42.5 (1.67) | 230 (9.06) | 200 (7.87) | 380.3 (15.0) | 169.3 (6.67) | 26.8 (59.08) | 27.4 (60.41) |
| 100 | 16 | 107 (4.21) | 80.9 (3.19) | 54.5 (2.15) | 220 (8.66) | 250 (9.84) | 396.8 (15.7) | 171.5 (6.75) | 21.4 (47.18) | 22 (48.50) |
| 100 | 40 | 107 (4.21) | 80.9 (3.19) | 54.5 (2.15) | 235 (9.25) | 250 (9.84) | 396.8 (15.7) | 171.5 (6.75) | 24.4 (53.79) | 25 (55.12) |
| 100 | 63 | 106 (4.17) | 80.9 (3.19) | 54.5 (2.15) | 250 (9.84) | 250 (9.84) | 396.8 (15.7) | 171.5 (6.75) | 29.4 (64.82) | 30 (66.14) |
| 100 | 100 | 104 (4.09) | 80.9 (3.19) | 54.5 (2.15) | 265 (10.43) | 250 (9.84) | 396.8 (15.7) | 171.5 (6.75) | 35.4 (78.04) | 36 (79.37) |
| 150 | 16 | 159 (6.26) | 107 (4.21) | 80.9 (3.19) | 285 (11.22) | 300 (11.81) | 416.3 (16.4) | 191.5 (7.54) | 35.2 (77.60) | 35.8 (78.93) |
| 150 | 40 | 159 (6.26) | 107 (4.21) | 80.9 (3.19) | 300 (11.81) | 300 (11.81) | 416.3 (16.4) | 191.5 (7.54) | 41.2 (90.83) | 41.8 (92.15) |
| 150 | 63 | 157 (6.18) | 107 (4.21) | 80.9 (3.19) | 345 (13.58) | 300 (11.81) | 416.3 (16.4) | 191.5 (7.54) | 59.2 (130.51) | 59.8 (131.84) |
| 150 | 100 | 154 (6.06) | 107 (4.21) | 80.9 (3.19) | 355 (13.98) | 300 (11.81) | 416.3 (16.4) | 191.5 (7.54) | 67.2 (148.15) | 67.8 (149.47) |
| 200 | 10 | 207 (8.15) | 159 (6.26) | 107 (4.21) | 340 (13.39) | 300 (11.81) | 442.1 (17.4) | 202.8 (7.98) | 37.8 (83.33) | 38.4 (84.66) |
| 200 | 16 | 207 (8.15) | 159 (6.26) | 107 (4.21) | 340 (13.39) | 300 (11.81) | 442.1 (17.4) | 202.8 (7.98) | 37.8 (83.33) | 38.4 (84.66) |
| 200 | 25 | 207 (8.15) | 159 (6.26) | 107 (4.21) | 360 (14.17) | 300 (11.81) | 442.1 (17.4) | 202.8 (7.98) | 46.8 (103.18) | 47.4 (104.50) |
| 200 | 40 | 207 (8.15) | 159 (6.26) | 107 (4.21) | 375 (14.76) | 300 (11.81) | 442.1 (17.4) | 202.8 (7.98) | 54.8 (120.81) | 55.4 (122.14) |
| 250 | 10 | 260 (10.24) | 207 (8.15) | 159.3 (6.27) | 395 (15.55) | 380 (14.96) | 468.8 (18.5) | 229.5 (9.04) | 57.4 (126.55) | 58.0 (127.87) |
| 250 | 16 | 260 (10.24) | 207 (8.15) | 159.3 (6.27) | 405 (15.94) | 380 (14.96) | 468.8 (18.5) | 229.5 (9.04) | 58.4 (128.75) | 59.0 (130.07) |
| 250 | 25 | 259 (10.20) | 207 (8.15) | 159.3 (6.27) | 425 (16.73) | 380 (14.96) | 468.8 (18.5) | 229.5 (9.04) | 74.4 (164.02) | 75.0 (165.35) |
| 250 | 40 | 259 (10.20) | 207 (8.15) | 159.3 (6.27) | 450 (17.72) | 380 (14.96) | 468.8 (18.5) | 229.5 (9.04) | 92.4 (203.71) | 93.0 (205.03) |
| 300 | 10 | 310 (12.20) | 260 (10.24) | 207 (8.15) | 445 (17.52) | 450 (17.72) | 492.8 (19.4) | 255 (10.04) | 75.7 (166.89) | 76.3 (168.21) |
| 300 | 16 | 310 (12.20) | 260 (10.24) | 207 (8.15) | 460 (18.11) | 450 (17.72) | 492.8 (19.4) | 255 (10.04) | 82.2 (181.22) | 82.8 (182.54) |
| 300 | 25 | 308 (12.13) | 260 (10.24) | 207 (8.15) | 485 (19.09) | 450 (17.72) | 492.8 (19.4) | 255 (10.04) | 98.7 (217.60) | 99.3 (218.92) |
| 300 | 40 | 308 (12.13) | 260 (10.24) | 207 (8.15) | 515 (20.28) | 450 (17.72) | 492.8 (19.4) | 255 (10.04) | 127.5 (281.09) | 128.1 (282.41) |

1) FR - single reduction
2) F2R - double reduction

***Flange version ANSI B16.5***

| Size | Pressure rating | Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76) | | | | | | | Weight [kg (lb)] | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN | Class | d | d FR[1] | d FR[2] | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| ½ | 150 | 16 (0.63) | - | - | 90 (3.5) | 200 (7.9) | 358.8 (14.2) | 169.3 (6.67) | 4.5 (9.92) | 5.1 (11.24) |
| ½ | 300 | 16 (0.63) | - | - | 95 (3.7) | 200 (7.9) | 358.8 (14.2) | 169.3 (6.67) | 4.9 (10.80) | 5.5 (12.13) |
| ½ | 600 | 14 (0.55) | - | - | 95 (3.7) | 200 (7.9) | 358.8 (14.2) | 169.3 (6.67) | 5.1 (11.24) | 5.7 (12.57) |
| 1 | 150 | 27 (1.1) | 15.8 (0.62) | - | 110 (4.3) | 200 (7.9) | 358.4 (14.1) | 169.3 (6.67) | 6.2 (13.67) | 6.8 (14.99) |
| 1 | 300 | 27 (1.1) | 15.8 (0.62) | - | 125 (4.9) | 200 (7.9) | 358.4 (14.1) | 169.3 (6.67) | 7.2 (15.87) | 7.8 (17.20) |
| 1 | 600 | 24 (1.0) | 15.8 (0.62) | - | 125 (4.9) | 200 (7.9) | 358.4 (14.1) | 169.3 (6.67) | 7.5 (16.53) | 8.1 (17.86) |
| 1½ | 150 | 41 (1.6) | 26.6 (1.1) | 15.8 (0.6) | 125 (4.9) | 200 (7.9) | 362.3 (14.3) | 169.5 (6.67) | 8.3 (18.30) | 8.9 (19.62) |
| 1½ | 300 | 41 (1.6) | 26.6 (1.1) | 15.8 (0.6) | 155 (6.1) | 200 (7.9) | 362.3 (14.3) | 169.5 (6.67) | 10.4 (22.93) | 11 (24.25) |
| 1½ | 600 | 38 (1.5) | 26.6 (1.1) | 15.8 (0.6) | 155 (6.1) | 200 (7.9) | 362.3 (14.3) | 169.5 (6.67) | 11.4 (25.13) | 12 (26.46) |
| 2 | 150 | 53 (2.1) | 40.9 (1.6) | 26.6 (1.1) | 150 (5.9) | 200 (7.9) | 368.3 (14.5) | 169.5 (6.67) | 11 (24.25) | 11.6 (25.57) |
| 2 | 300 | 53 (2.1) | 40.9 (1.6) | 26.6 (1.1) | 165 (6.5) | 200 (7.9) | 368.3 (14.5) | 169.5 (6.67) | 12.4 (27.34) | 13 (28.66) |
| 2 | 600 | 49 (1.9) | 40.9 (1.6) | 26.6 (1.1) | 165 (6.5) | 200 (7.9) | 368.3 (14.5) | 169.5 (6.67) | 13.9 (30.64) | 14.5 (31.97) |
| 3 | 150 | 78 (3.1) | 52.6 (2.1) | 40.9 (1.6) | 190 (7.5) | 200 (7.9) | 380.3 (15.0) | 169.3 (6.67) | 19.8 (43.65) | 20.4 (44.97) |
| 3 | 300 | 78 (3.1) | 52.6 (2.1) | 40.9 (1.6) | 210 (8.3) | 200 (7.9) | 380.3 (15.0) | 169.3 (6.67) | 22.8 (50.27) | 23.4 (51.59) |
| 3 | 600 | 74 (2.9) | 52.6 (2.1) | 40.9 (1.6) | 210 (8.3) | 200 (7.9) | 380.3 (15.0) | 169.3 (6.67) | 23.8 (52.47) | 24.4 (53.79) |
| 4 | 150 | 102 (4.0) | 78 (3.1) | 52.6 (2.1) | 230 (9.1) | 250 (9.8) | 396.8 (15.7) | 171.5 (6.76) | 23.4 (51.59) | 24 (52.91) |
| 4 | 300 | 102 (4.0) | 78 (3.1) | 52.6 (2.1) | 255 (10) | 250 (9.8) | 396.8 (15.7) | 171.5 (6.76) | 31.4 (69.23) | 32 (70.55) |
| 4 | 600 | 97 (3.8) | 78 (3.1) | 52.6 (2.1) | 275 (11) | 250 (9.8) | 396.8 (15.7) | 171.5 (6.76) | 40.4 (89.07) | 41 (90.39) |

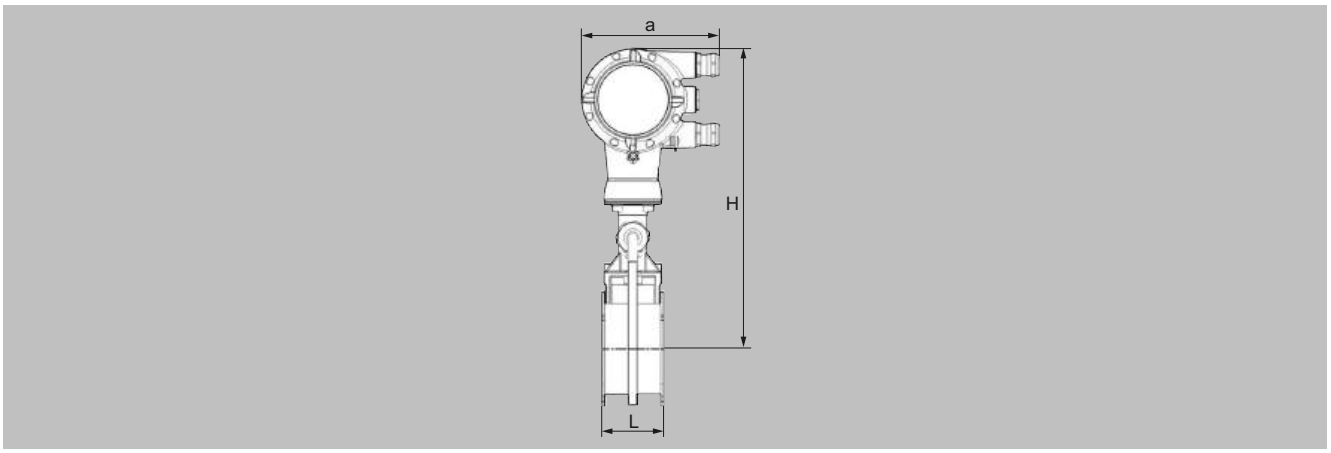
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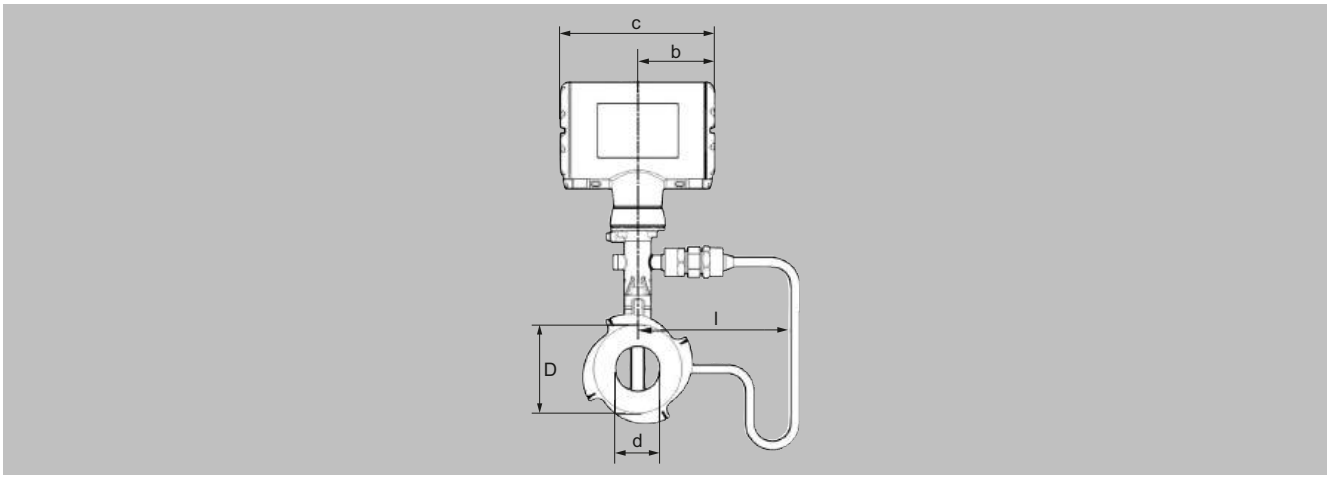
## Dimensional drawings (continued)

| Size | Pressure rating | Dimensions [mm (inch)] a = 148.5 (5.85), b = 85.8 (3.38), c = 171.5 (6.76) | | | | | | | Weight [kg (lb)] | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN | Class | d | d FR[1] | d FR[2] | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| 6 | 150 | 154 (6.1) | 102 (4.0) | 78.0 (3.1) | 280 (11) | 300 (12) | 416.3 (16.4) | 191.5 (7.54) | 36.2 (79.81) | 36.8 (81.13) |
| 6 | 300 | 154 (6.1) | 102 (4.0) | 78.0 (3.1) | 320 (13) | 300 (12) | 416.3 (16.4) | 191.5 (7.54) | 51.2 (112.88) | 51.8 (114.20) |
| 6 | 600 | 146 (5.8) | 102 (4.0) | 78.0 (3.1) | 355 (14) | 300 (12) | 416.3 (16.4) | 191.5 (7.54) | 76.2 (167.99) | 76.8 (169.31) |
| 8 | 150 | 203 (8.0) | 154 (6.1) | 102 (4.0) | 345 (14) | 300 (12) | 442.1 (17.4) | 202.8 (8.0) | 50.0 (110.23) | 50.6 (111.55) |
| 8 | 300 | 203 (8.0) | 154 (6.1) | 102 (4.0) | 380 (15) | 300 (12) | 442.1 (17.4) | 202.8 (8.0) | 74.8 (164.91) | 75.4 (166.23) |
| 10 | 150 | 255 (10.0) | 203 (8.0) | 154 (6.1) | 405 (16) | 380 (15) | 468.8 (18.5) | 229.5 (9.04) | 74.4 (164.02) | 75.0 (165.35) |
| 10 | 300 | 255 (10.0) | 203 (8.0) | 154 (6.1) | 455 (18) | 380 (15) | 468.8 (18.5) | 229.5 (9.04) | 106.4 (234.57) | 107.0 (235.89) |
| 12 | 150 | 305 (12.0) | 255 (10.0) | 203 (8.0) | 485 (19) | 450 (18) | 492.8 (19.4) | 255 (10.0) | 106.4 (234.35) | 107.0 (235.67) |
| 12 | 300 | 305 (12.0) | 255 (10.0) | 203 (8.0) | 520 (21) | 450 (18) | 492.8 (19.4) | 255 (10.0) | 151.4 (333.56) | 152.0 (334.88) |

[1] FR - single reduction
[2] F2R - double reduction




SITRANS FX330 (Vortex), Sandwich version with pressure sensor, front view




SITRANS FX330 (Vortex), Sandwich version with pressure sensor, side view

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## Dimensional drawings (continued)

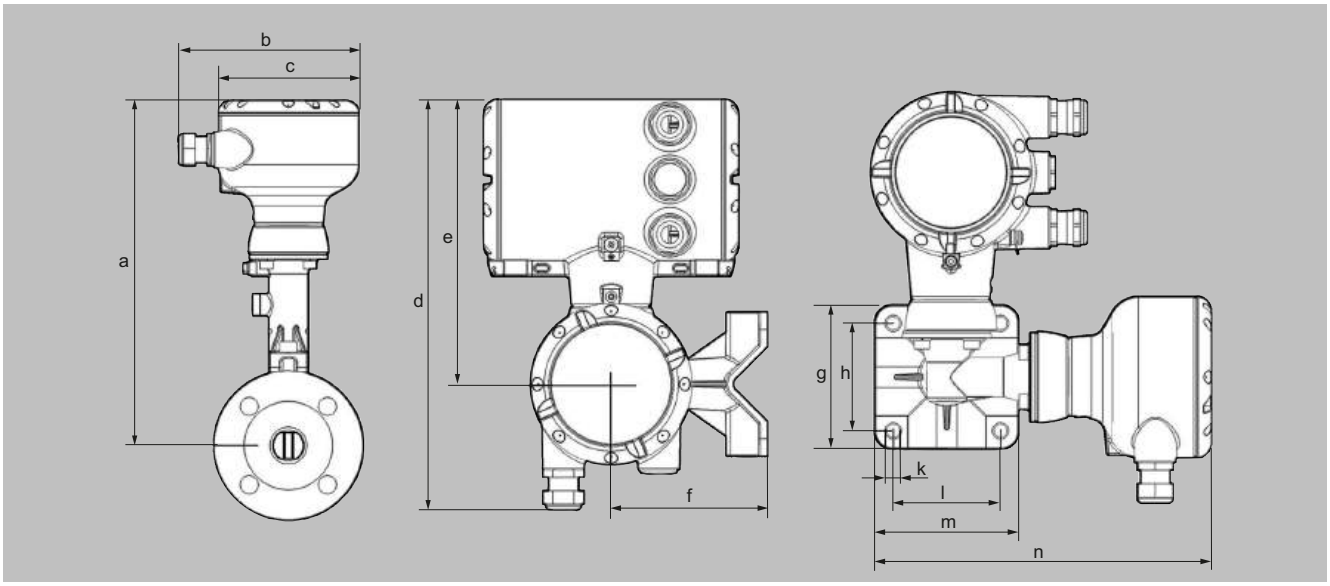
### *Sandwich version EN*

| Size | Pressure rating | Dimensions [mm (inch)] | | | | | | | | Weight [kg (lb)] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | PN | a | b | c | d | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| 15 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 16 (0.63) | 45 (1.77) | 65 (2.56) | 265 (10.43) | 174.25 (6.86) | 3.5 (7.72) | 4.1 (9.04) |
| 25 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 24 (0.94) | 65 (2.56) | 65 (2.56) | 265 (10.43) | 174.25 (6.86) | 4.3 (9.48) | 4.9 (10.80) |
| 40 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 38 (1.50) | 82 (3.23) | 65 (2.56) | 270 (10.63) | 174.5 (6.87) | 4.9 (10.80) | 5.5 (12.13) |
| 50 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 50 (1.97) | 102 (4.02) | 65 (2.56) | 275 (10.83) | 174.5 (6.87) | 6 (13.23) | 6.6 (14.55) |
| 80 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 74 (2.91) | 135 (5.31) | 65 (2.56) | 290 (11.42) | 174.25 (6.86) | 8.2 (18.08) | 8.8 (19.40) |
| 100 | 16 ... 100 | 133 (5.24) | 105 (4.13) | 179 (7.05) | 97 (3.82) | 158 (6.22) | 65 (2.56) | 310 (12.20) | 176.5 (6.95) | 9.5 (20.94) | 10.1 (22.27) |

### *Sandwich version ANSI*

| Size | Pressure rating | Dimensions [inch] | | | | | | | | Weight [lb] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | Class | a | b | c | d | D | L | H | l | Flowmeter (without pressure sensor) | Flowmeter (with pressure sensor) |
| ½" | 150, 300 | 5.32 | 4.26 | 7.25 | 0.63 | 1.77 | 2.56 | 10.43 | 6.82 | 7.72 | 9.04 |
| ½" | 600 | 5.32 | 4.26 | 7.25 | 0.55 | 1.77 | 2.56 | 10.43 | 6.82 | 7.72 | 9.04 |
| 1" | 150, 300, 600 | 5.32 | 4.26 | 7.25 | 0.94 | 2.56 | 2.56 | 10.43 | 6.82 | 9.48 | 10.80 |
| 1½" | 150, 300, 600 | 5.32 | 4.26 | 7.25 | 1.50 | 3.23 | 2.56 | 10.63 | 6.82 | 10.80 | 12.13 |
| 2" | 150, 300, 600 | 5.32 | 4.26 | 7.25 | 1.97 | 4.02 | 2.56 | 10.83 | 6.82 | 13.23 | 14.55 |
| 3" | 150, 300, 600 | 5.32 | 4.26 | 7.25 | 2.91 | 5.31 | 2.56 | 11.42 | 6.82 | 18.08 | 19.40 |
| 4" | 150, 300, 600 | 5.32 | 4.26 | 7.25 | 3.82 | 6.22 | 2.56 | 12.20 | 6.82 | 20.94 | 22.27 |

Remote version




SITRANS FX330 (Vortex), Remote version

### *Dimension a*

| | Flanged and Sandwich version | | | | | | Flanged version | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DN | 15 (½") | 25 (1") | 40 (1½") | 50 (2") | 80 (3") | 100 (4") | 150 (6") | 200 (8") | 250 (10") | 300 (12") |
| [mm] | 265.7 | 265.2 | 269.2 | 275.2 | 287.2 | 303.7 | 323.2 | 348.9 | 375.7 | 399.7 |
| [inch] | 10.5 | 10.4 | 10.6 | 10.8 | 11.3 | 12.0 | 12.7 | 13.7 | 14.8 | 15.7 |

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## Dimensional drawings (continued)

### *Dimension a F1/2R*

| | Flanged version | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **DN** | **15 (½")** | **25 (1")** | **40 (1½")** | **50 (2")** | **80 (3")** | **100 (4")** | **150 (6")** | **200 (8")** | **250 (10")** | **300 (12")** |
| F1R[1] [mm] | - | 315.7 | 315.2 | 319.2 | 325.2 | 337.2 | 353.7 | 373.2 | 398.9 | 425.7 |
| F1R[1] [inch] | - | 12.4 | 12.4 | 12.6 | 12.8 | 13.3 | 13.9 | 14.7 | 15.7 | 16.8 |
| F2R[2] [mm] | - | - | 315.7 | 315.2 | 319.2 | 325.2 | 337.2 | 353.7 | 373.2 | 398.9 |
| F2R[2] [inch] | - | - | 12.4 | 12.4 | 12.6 | 12.8 | 13.3 | 13.9 | 14.7 | 15.7 |

### *Dimension b ... n*

| | b | c | d | e | f | g | h | j | k | l | m | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [mm] | 139 | 108 | 276 | 191 | 105 | 97 | 72 | 108 | 9 | 72 | 97 | 226 |
| [inch] | 5.46 | 4.25 | 10.9 | 7.53 | 4.14 | 3.82 | 2.84 | 4.25 | 0.35 | 2.84 | 3.82 | 8.90 |

### *Flow tables*

Measuring range limits

| Size DN to EN 1092-1 | DN to NSI B16.5 | $Q_{min}$ EN 1092-1 [m³/h] | $Q_{max}$ EN 1092-1 [m³/h] | $Q_{min}$ ANSI B16.5 [m³/h] | $Q_{max}$ ANSI B16.5 [m³/h] |
|---|---|---|---|---|---|
| **Water** | | | | | |
| 15 | ½" | 0.45 | 5.07 | 0.44 | 4.94 |
| 25 | 1" | 0.81 | 11.40 | 0.81 | 11.40 |
| 40 | 1½" | 2.04 | 28.58 | 2.04 | 28.58 |
| 50 | 2" | 3.53 | 49.48 | 3.53 | 49.48 |
| 80 | 3" | 7.74 | 108.37 | 7.74 | 108.37 |
| 100 | 4" | 13.30 | 186.22 | 13.30 | 186.21 |
| 150 | 6" | 30.13 | 421.86 | 30.13 | 421.86 |
| 200 | 8" | 56.60 | 792.42 | 56.60 | 792.42 |
| 250 | 10" | 90.48 | 1 266.8 | 90.48 | 1 266.8 |
| 300 | 12" | 131.41 | 1 839.8 | 131.41 | 1 839.8 |

Values based on water at 20 °C (68 °F)

| Size DN to EN 1092-1 | DN to NSI B16.5 | $Q_{min}$ EN 1092-1 [m³/h] | $Q_{max}$ EN 1092-1 [m³/h] | $Q_{min}$ ANSI B16.5 [m³/h] | $Q_{max}$ ANSI B16.5 [m³/h] |
|---|---|---|---|---|---|
| **Air** | | | | | |
| 15 | ½" | 6.80 | 25.33 | 6.72 | 24.70 |
| 25 | 1" | 10.20 | 81.43 | 10.20 | 81.43 |
| 40 | 1½" | 25.35 | 326.63 | 25.35 | 326.63 |
| 50 | 2" | 43.89 | 565.49 | 43.89 | 565.49 |
| 80 | 3" | 96.14 | 1 238.64 | 96.14 | 1 238.6 |
| 100 | 4" | 165.19 | 2 128.27 | 165.19 | 2 128.27 |
| 150 | 6" | 374.23 | 4 821.60 | 374.23 | 4 821.6 |
| 200 | 8" | 702.95 | 9 056.8 | 702.95 | 9 056.8 |
| 250 | 10" | 1 123.7 | 14 478.0 | 1 123.7 | 14 478.0 |
| 300 | 12" | 1 632.1 | 21 028.0 | 1 632.1 | 21 028.0 |

Values based on air at 20 °C (68 °F) and 1.013 $bar_{abs}$ (14.7 $psi_{abs}$)

Flow rate limits

| Product | Nominal sizes to EN | to ANSI | Minimum flow rates [m/s] | Maximum flow rates [m/s] |
|---|---|---|---|---|
| Liquids | DN 15 ... DN 300 | DN ½" ... DN 12" | 0.5 x $(998/\rho)^{0.5}$ [1] | 7 x $(998/\rho)^{0.47}$ [1] |
| Gas, steam/vapor | DN 15 ... DN 300 | DN ½" ... DN 12" | 6 x $(1.29/\rho)^{0.5}$ [2] | 7 x $(998/\rho)^{0.47}$ [3] |

ρ = operating density [kg/m³]

1) Minimum flow rate 0.3 m/s (0.984 ft/s) - maximum flow rate 7 m/s (23 ft/s)
2) Minimum flow rate 2 m/s (6.6 ft/s)
3) Maximum flow rate 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

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## Dimensional drawings (continued)

Measuring range saturated steam: 1 ... 7 bar

| Overpressure [bar] | | 1 | | 3.5 | | 5.2 | | 7 | |
|---|---|---|---|---|---|---|---|---|---|
| Density [kg/m³] | | 1.13498 | 1.13498 | 2.4258 | 2.4258 | 3.27653 | 3.27653 | 4.16732 | 4.16732 |
| Temperature [°C] | | 120.6 | 120.6 | 148.2 | 148.2 | 160.4 | 160.4 | 170.6 | 170.6 |
| Flow [kg/h] | | min. | max. | min. | max. | min. | max. | min. | max. |
| DN to EN 1092-1 | DN to ASME B16.5 | | | | | | | | |
| 15 | ½" | 5.87 | 28.75 | 7.68 | 61.46 | 8.93 | 83.01 | 10.06 | 105.57 |
| 25 | 1" | 11.82 | 92.42 | 17.28 | 197.53 | 20.09 | 266.81 | 22.66 | 339.35 |
| 40 | 1½" | 29.64 | 370.71 | 43.33 | 792.33 | 50.63 | 1 070.2 | 56.80 | 1 361.2 |
| 50 | 2" | 51.31 | 641.82 | 75.02 | 1 371.8 | 87.19 | 1 852.8 | 98.33 | 2 356.6 |
| 80 | 3" | 112.41 | 1 405.8 | 164.33 | 3 004.7 | 191.00 | 4 058.4 | 215.39 | 5 161.8 |
| 100 | 4" | 193.14 | 2 415.5 | 282.36 | 5 162.7 | 328.16 | 6 973.3 | 370.09 | 8 869.2 |
| 150 | 6" | 437.56 | 5 472.4 | 639.69 | 11 696.0 | 743.45 | 15 798.0 | 838.44 | 20 093.0 |
| 200 | 8" | 821.9 | 10 279.0 | 1 201.6 | 21 970.0 | 1 396.5 | 29 675.0 | 1 574.9 | 37 743.0 |
| 250 | 10" | 1 313.9 | 16 433.0 | 1 920.9 | 35 122.0 | 2 232.5 | 47 439.0 | 2 517.7 | 60 337.0 |
| 300 | 12" | 1 908.3 | 23 866.0 | 2 789.8 | 51 010.0 | 3 242.4 | 68 899.0 | 3 656.6 | 87 630.0 |

Measuring range saturated steam: 10.5 ... 20 bar

| Overpressure [bar] | | 10.5 | | 14.0 | | 17.5 | | 20.0 | |
|---|---|---|---|---|---|---|---|---|---|
| Density [kg/m³] | | 5.88803 | 5.88803 | 7.60297 | 7.60297 | 9.31702 | 9.31702 | 10.5442 | 10.5442 |
| Temperature [°C] | | 186.2 | 186.2 | 198.5 | 198.5 | 208.7 | 208.7 | 215.0 | 215.0 |
| Flow [kg/h] | | min. | max. | min. | max. | min. | max. | min. | max. |
| DN to EN 1092-1 | DN to ANSI B16.5 | | | | | | | | |
| 15 | ½" | 12.78 | 149.17 | 16.51 | 192.61 | 20.23 | 236.04 | 22.89 | 267.12 |
| 25 | 1" | 26.93 | 479.46 | 30.60 | 619.11 | 33.87 | 758.69 | 36.04 | 858.62 |
| 40 | 1½" | 67.51 | 1 878.2 | 76.72 | 2 150.7 | 84.93 | 2 395.3 | 90.35 | 2 557.7 |
| 50 | 2" | 116.89 | 3 251.7 | 132.82 | 3 723.4 | 147.03 | 4 147.0 | 156.42 | 4 428.1 |
| 80 | 3" | 256.03 | 7 122.4 | 290.93 | 8 155.8 | 322.06 | 9 083.7 | 342.62 | 9 699.3 |
| 100 | 4" | 439.91 | 12 238 | 499.90 | 14 013.0 | 553.38 | 15 608.0 | 588.69 | 16 666.0 |
| 150 | 6" | 996.62 | 27 725.0 | 1 132.5 | 31 747.0 | 1 253.7 | 35 359.0 | 1 333.7 | 37 756.0 |
| 200 | 8" | 1 872.1 | 52 079.0 | 2 127.3 | 59 634.0 | 2 354.9 | 66 419.0 | 2 505.2 | 70 921.0 |
| 250 | 10" | 2 992.7 | 83 254.0 | 3 400.7 | 95 333.0 | 3 764.6 | 106 180.0 | 4 004.9 | 113 380.0 |
| 300 | 12" | 4 346.5 | 120 920.0 | 4 939.1 | 138 460.0 | 5 467.5 | 154 210.0 | 5 816.5 | 164 660.0 |

Measuring range saturated steam: 15 ... 100 psig

| Overpressure [psig] | | 15 | | 50 | | 75 | | 100 | |
|---|---|---|---|---|---|---|---|---|---|
| Density [lbs/ft³] | | 0.0719 | 0.0719 | 0.1497 | 0.1497 | 0.2036 | 0.2036 | 0.2569 | 0.2569 |
| Temperature [°F] | | 249.98 | 249.98 | 297.86 | 297.86 | 320.36 | 320.36 | 338.184 | 338.184 |
| Flow [lbs/h] | | min. | max. | min. | max. | min. | max. | min. | max. |
| DN to EN 1092-1 | DN to ANSI B16.5 | | | | | | | | |
| 15 | ½" | 12.95 | 64.35 | 16.83 | 133.87 | 19.62 | 182.02 | 22.04 | 229.63 |
| 25 | 1" | 26.25 | 206.83 | 37.86 | 430.30 | 44.15 | 585.06 | 49.59 | 738.09 |
| 40 | 1½" | 65.81 | 829.61 | 94.92 | 1 726 | 110.68 | 2 346.7 | 124.32 | 2 960.5 |
| 50 | 2" | 113.94 | 1 436.3 | 164.34 | 2 988 | 191.63 | 4 062.9 | 215.23 | 5 125.6 |
| 80 | 3" | 249.57 | 3 146.1 | 360.00 | 6 545.3 | 419.74 | 8 899.4 | 471.45 | 11 227 |
| 100 | 4" | 428.81 | 5 405.7 | 618.51 | 11 246 | 721.21 | 15 291 | 810.06 | 19 291 |
| 150 | 6" | 971.47 | 12 246 | 1 401.2 | 25 478 | 1 633.9 | 34 642 | 1 835.2 | 43 703 |
| 200 | 8" | 1 824.8 | 23 004 | 2 632.1 | 47 859 | 3 069.1 | 65 072 | 3 447.2 | 82 092 |
| 250 | 10" | 2 917.2 | 36 774 | 4 207.7 | 76 508 | 4 906.4 | 104 030 | 5 510.8 | 131 230 |
| 300 | 12" | 4 236.8 | 53 410 | 6 111.1 | 111 120 | 7 125.8 | 151 080 | 8 003.6 | 190 600 |

Measuring range saturated steam: 150 ... 300 psig

| Overpressure [psig] | 150 | | 200 | | 250 | | 300 | |
|---|---|---|---|---|---|---|---|---|
| Density [lbs/ft³] | 0.3627 | 0.3627 | 0.4681 | 0.4681 | 0.5735 | 0.5735 | 0.6792 | 0.6792 |
| Temperature [°F] | 366.08 | 366.08 | 388.04 | 388.04 | 406.22 | 406.22 | 422.06 | 422.06 |
| Flow [lbs/h] | min. | max. | min. | max. | min. | max. | min. | max. |

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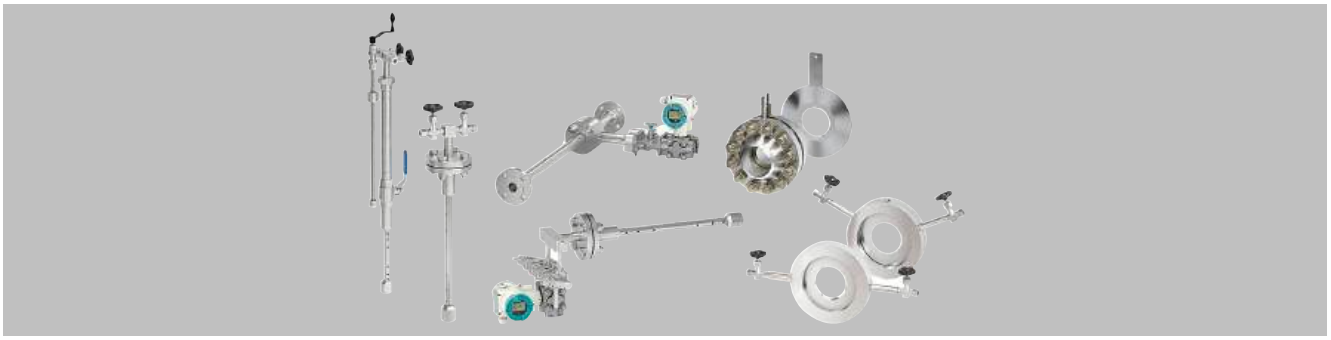
## Dimensional drawings (continued)

| Overpressure [psig] | | 150 | | 200 | | 250 | | 300 | |
|---|---|---|---|---|---|---|---|---|---|
| DN to EN 1092-1 | DN to ANSI B16.5 | | | | | | | | |
| 15 | ½" | 27.79 | 324.21 | 35.86 | 418.47 | 43.94 | 512.66 | 52.04 | 607.12 |
| 25 | 1" | 58.93 | 1 042.1 | 66.94 | 1 345.1 | 74.10 | 1 647.8 | 80.63 | 1 951.5 |
| 40 | 1½" | 147.72 | 4 107.2 | 167.83 | 4 702.8 | 185.76 | 5 237 | 202.15 | 5 728 |
| 50 | 2" | 255.75 | 7 111.9 | 290.56 | 8 141.9 | 321.60 | 9 066.8 | 350.00 | 9 917 |
| 80 | 3" | 560.19 | 15 578 | 636.44 | 17 834 | 704.43 | 19 860 | 766.60 | 21 722 |
| 100 | 4" | 962.54 | 26 766 | 1 093.5 | 30 643 | 1 210.4 | 34 124 | 1 317.2 | 37 324 |
| 150 | 6" | 2 180.6 | 60 639 | 2 477.4 | 69 421 | 2 742.1 | 77 307 | 2 984 | 84 556 |
| 200 | 8" | 4 096.1 | 113 900 | 4 653.6 | 130 400 | 5 150.7 | 145 210 | 5 605.2 | 158 830 |
| 250 | 10" | 6 548.1 | 182 090 | 7 439.3 | 208 460 | 8 234.1 | 232 140 | 8 960.6 | 253 910 |
| 300 | 12" | 9 510.2 | 264 460 | 10 805 | 302 760 | 11 959 | 337 150 | 13 014 | 368 770 |

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## Overview



With the SITRANS FP product line Siemens offers a complete solution for differential pressure flow measurements. This well-established technology is suitable for all kinds of applications – liquids, dry or humid gases and steam. Due to the robust though variable design it has been and still is one of the main technologies for flow measurement in various industries.

The new product line offers full flexibility for your processes. SITRANS FP is not a simple substitution of our previous orifice program but a completely new setup. A new digital sizing process ensures minimum effort during presales and full traceability in aftersales. The differential pressure portfolio consists of the averaging pitot tube measuring system SITRANS FPS300 and the primary elements according to ISO 5167 (orifices) SITRANS FPS200.

***Product overview***

SITRANS FP230/FPS200 primary elements according to ISO 5167

| Product name | Fluid | Design | Pressure tapping | Nominal size | Article No. |
|---|---|---|---|---|---|
| **Standard orifice plate with corner pressure tappings**<br>Compact orifice plate with integrated corner pressure tappings in carbon or stainless steel<br>  | • Gas<br>• Steam<br>• Liquid | • Remote<br>• Compact | Corner tapping | DN 50 ... 500<br>(2 ...20 inch) | **7ME171.-.....-....** |
| **Standard orifice plate with annular chamber**<br>Standard orifice plate with annular chamber and pressure tapping in carbon or stainless steel<br>  | • Gas<br>• Steam<br>• Liquid | • Remote<br>• Compact | Annular chamber | DN 50 ... 600<br>(2 ...24 inch) | **7ME172.-.....-....** |

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## Overview (continued)

| Product name | Fluid | Design | Pressure tapping | Nominal size | Article No. |
|---|---|---|---|---|---|
| **Orifice meter run**<br>Orifice meter run with flanges ends in carbon or stainless steel<br>  | • Gas<br>• Steam<br>• Liquid | • Remote<br>• Compact | Annular chamber | DN 10 ... 50<br>(3/8 ...2 inch) | **7ME173.-.....-....** |
| **Orifice plate**<br>Orifice plate for installation between flanges in stainless steel<br>  | • Gas<br>• Steam<br>• Liquid | • Remote | Not included | DN 50 ... 600<br>(2 ...24 inch) | **7ME174.-.....-....** |
| **Orifice plate with orifice flange**<br>Orifice flange pair according to ASME B36.16 with orifice plate in carbon steel (flanges) or stainless steel<br>  | • Gas<br>• Liquid | • Remote | In the flange | DN 50 ... 600<br>(2 ...24 inch) | **7ME175.-.....-....** |

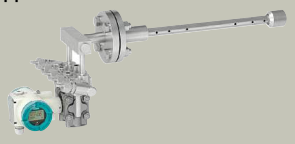
SITRANS FP330/FPS300 averaging pitot tube

| Product name | Fuid | Design | Mounting type | Nominal size | Article No. |
|---|---|---|---|---|---|
| **Averaging pitot tube for gases and liquids**<br>  | • Gas<br>• Liquid | • Remote<br>• Compact | Flange, cutting ring | DN 40 ... 4000<br>(1½" ... 160") | **7ME161.-.....-....** |

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## Overview (continued)

| Product name | Fuid | Design | Mounting type | Nominal size | Article No. |
|---|---|---|---|---|---|
| **Averaging pitot tube for steam applications**  | • Superheated steam<br>• Saturated steam | • Remote<br>• Compact | Flange | DN 40 ... 2000<br>(1½" ... 80") | **7ME162.-.....-....** |
| **Averaging pitot tube with FASTLOK** The sensor can be assembled and disassembled into the pipe without interrupting plant operation.  | • Dry gas<br>• Wet gas<br>• Liquid | • Remote<br>• Compact | Screwed ball valve | DN 40 ... 2000<br>(1½" ... 80") | **7ME163.-.....-....** |

***Sizing procedure***

The SITRANS FP sizing tool is available via PIA Life Cycle Portal and supports you in choosing the right device within this portfolio:

pia-portal.automation.siemens.com

After registration you have access to a web-based sizing procedure generating reference IDs which can be used as application data for the ordering process.

## Benefits

- Suitable for a vast range of different applications
- Available as pre-mounted compact system as well as remote parts
- Advanced intelligent sizing procedure
- Web-based sizing and data storage enables full traceability and easy communication
- All benefits of SITRANS P320 available

## Application

The SITRANS FP230/330 devices are applicable in a variety of applications:

Chemical industry

- Different materials for aggressive substances
- Namur NE107, self-monitoring and diagnostics
- Namur NE21, increase EMC conformity
- Measurement of various liquid and gas media

Oil & Gas industry

- Complete setup made of stainless steel
- Robust design and well-established technology
- Measurement of liquid and gas hydrocarbons

Power industry

- QAL1 approval for continuous emission monitoring applications according to EN 15267
- Specific design for steam applications
- Measurement of steam, condensate and water

and others

- Cost-effective device
- Easy commissioning

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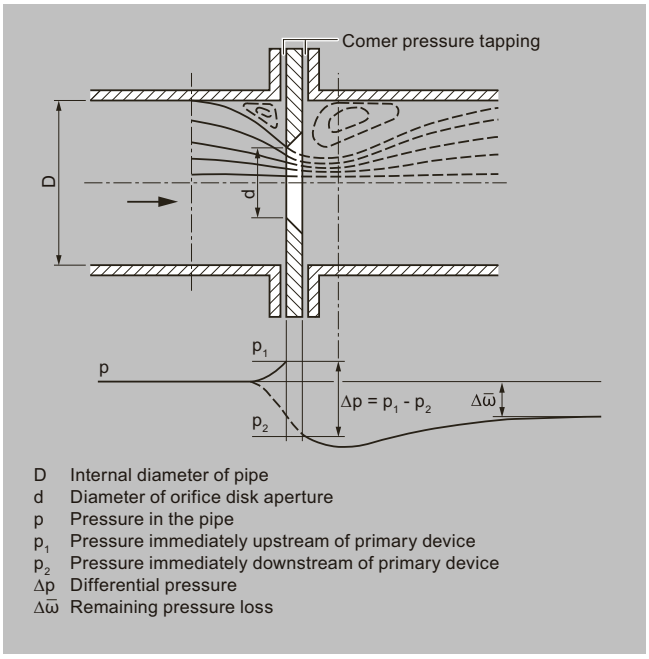
## Function

***Mode of operation***

The so-called primary element (orifice plate, averaging pitot tube, etc.) creates a differential pressure. The pressure is transferred to the measuring cell of the differential pressure transmitter. This can be done through a compact installation where the differential pressure transmitter is installed directly at the primary element or as remote installation through separately installed pipes that connect primary element and differential pressure transmitter.

Different types and designs of primary elements for differential pressure flow measurement have been established historically. Traditional primary elements such as orifice meters are harmonized in the international standard ISO 5167. Other primary elements such as the averaging pitot tube follow the same working principle, they are not standardized but are widely used and accepted.

Principle of the differential pressure method




D Internal diameter of pipe
d Diameter of orifice disk aperture
p Pressure in the pipe
$p_1$ Pressure immediately upstream of primary device
$p_2$ Pressure immediately downstream of primary device
$\Delta p$ Differential pressure
$\Delta\bar{\omega}$ Remaining pressure loss

Principle of the differential pressure method: Pressure curve at orifice plate

The differential pressure method is based on the law of continuity and Bernoulli's energy equation. A primary differential pressure device is installed at the measuring point to measure the flow. The primary element restricts the pipe.

According to the law of continuity, the mass flow of a moving fluid (gas, steam or liquid) in a pipeline is the same at all points. If the cross-section is reduced at one point, the flow velocity must increase at this point. Thus, the restriction causes an overpressure directly in front of the primary element and a drop in pressure behind the primary element. This pressure drop is greatly influenced by the degree of restriction. This degree is usually measured in relation of the diameters of the restriction to the diameter of the pipe, the diameter ratio β:

$\beta = d / D$

The difference between overpressure before the primary element and lower pressure after the primary element is called differential pressure ($\Delta p$, "delta p"). According to Bernoulli's energy equation, the square-root of the differential pressure is proportional to the flow rate:

$q \sim \sqrt{\Delta p}$

## Function (continued)

The created differential pressure is partly recovered with sufficient distance to the primary element but a permanent pressure drop, $\Delta\omega$, remains.

The exact flow equation of ISO 5167 additionally considers the properties of the primary device, the pipe, and the fluid:

$q = f(C, \Delta p, \rho, \epsilon, \beta)$

Where:

- $q$: mass flow
- $\Delta p$: differential pressure
- $C$: "coefficient of discharge"
- $\rho$: density of fluid before the point of measurement
- $\epsilon$: expansion number
- $\beta$: diameter ratio

The C-factor is determined during design of the differential pressure flowmeter. For certain types of flowmeters it is a constant (e.g. Venturi flowmeters), for others it is slightly non-linear and dependent on flow rate (orifice flowmeters).

The expansion number considers the change in fluid properties due to the differential pressure itself.

All factors will be considered during the design of the differential pressure flowmeter.

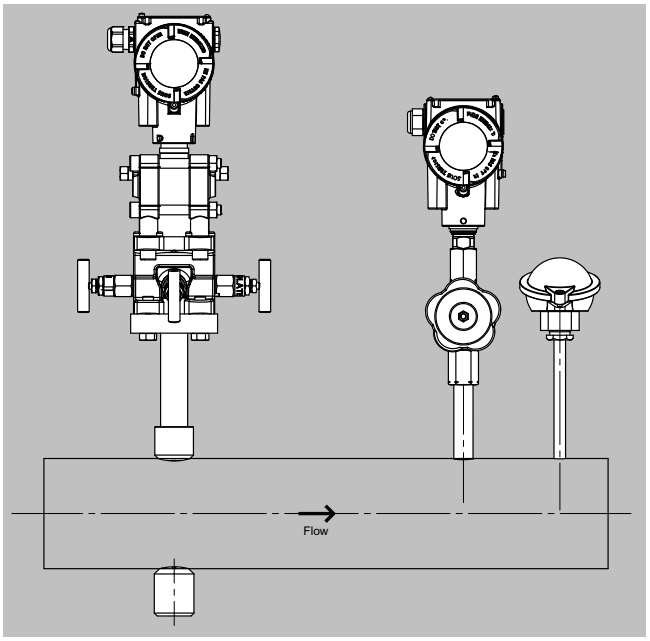
For flow measurement applications where all quantities (density, pressure, temperature, etc.) can – with sufficient accuracy – be considered constant, it can be reduced to the basic relation given above:

$q \sim \sqrt{\Delta p}$

Differential pressure flow measurement in practice

A differential pressure flow measurement usually consists of at least 3 components:

- primary element (orifice, pitot tube, etc.)
- manifold (plus primary shut-off valve for remote installations)
- differential pressure transmitter



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## Function (continued)

The picture above shows all these components installed together in a “compact” arrangement (manifold and differential pressure transmitter sitting on top of the primary element).

Depending on the process the application might require additional components such as:

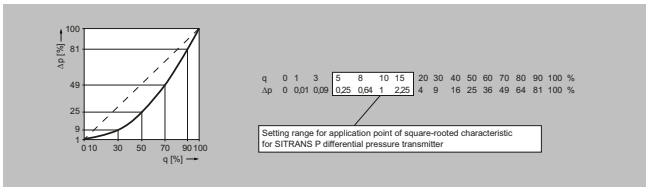
- absolute pressure measurement
- temperature measurement

which are also shown above. If absolute pressure and/or temperature are not constant, these quantities have to be measured as well to calculate the density changes caused by the change of these process conditions. This process is called “compensation” meaning recalculation of actual fluid density based on actual process conditions as explained above.

## Characteristic curves

Based on the relations described above differential pressure measurement systems generally show a square-root relationship between differential pressure and flow. Therefore, a square-root transmitter is required to create a linear flow characteristic. If no square-root characteristic is selected, the transmitter will output a signal proportional to differential pressure.

The conversion from differential pressure to flow has to be done in a subsequent system (flow computer, DCS, etc.). This is required if additional measurements such as absolute pressure and/or temperature are connected to such a system to correct for changes in operational density (so called “compensation”).

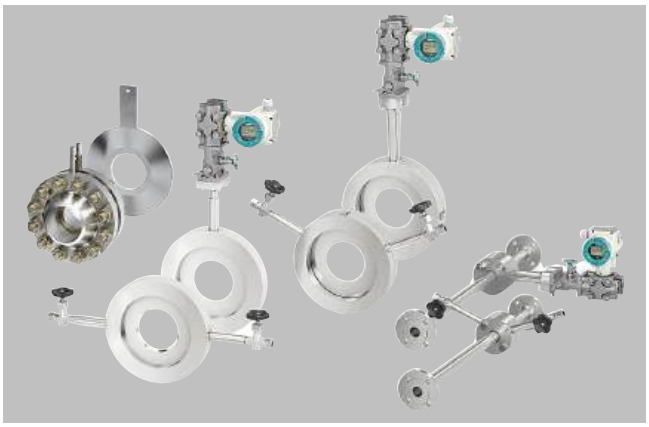



Relationship between flow q and differential pressure Δp

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## Overview



Primary differential pressure devices are standardized mechanical flow sensors, often also referred to as differential pressure transducers. The primary differential pressure devices are calculated and manufactured according to EN ISO 5167.

Through constriction of the line diameter in the pressure device, the flow rate creates a differential pressure that is converted with the help of a differential pressure transmitter into a proportional current signal or flow value. The assignment of differential pressure to flow is created by a calculation of the primary differential pressure device.

Primary differential pressure devices are suitable for single-phase media such as gas, steam and liquids without solid components.

## Benefits

- Suitable for universal use across the globe and widely accepted in all industries
- Very robust and can be used in a wide range of nominal diameters
- Suitable for high temperature and pressure ranges
- Low uncertainty of measurement
- No wet calibration required as they use an internationally standardized flow rate measurement procedure
- Differential pressure transmitter can be used over a long distance from the measuring location
- Differential pressure method is well known and has a large installed base
- SITRANS P differential pressure transmitter is easy to parameterize again if process data change. They are adapted by recalculating and assigning new parameters to the transmitter or, in case of an orifice plate with annular chamber, by using a new orifice plate

## Application

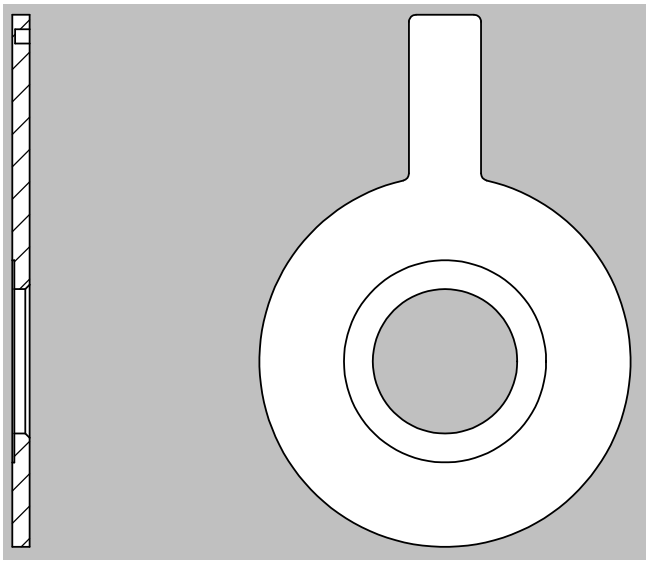
- Technical gases
- Compressed air
- Fresh and combustion air
- Steam/Heat quantities
- Heat transfer fluids
- Water

## Design

***Basics: Orifices for flow measurement***

Orifice plates are usually differentiated by their type of installation, type of differential pressure tapping and the shape of the orifice.

The characteristic differential pressure is created by the orifice bore which is the defined circular opening. It is usually of square edged concentric type according to ISO 5167-2 positioned in the middle of the pipe.



The main features are a sharp edge, a cylindrical bore of a certain length and a conical bevel tapering to the rear. Alternatively, the relevant standards provide for deviating designs, which are used for applications with highly viscous (e.g. quarter-circle nozzles) or contaminated media (e.g. segment orifices).

The standard design is permitted by the standard for an inner diameter of the pipe between 50 mm and 1000 mm. For pipes with smaller inside diameters, standards such as ISO 15377-TR or ASME MFC-14M which go beyond these standards must be taken into account. Orifice plates for pipes with small inside diameters are usually designed as meter tubes.

In order to reduce the uncertainties of these meter tubes, the devices can be calibrated on a flow test bench if required on request.

***Types of differential pressure tappings***

The differential pressure can be tapped in different ways:

Corner tapping

Directly in front of and behind the orifice plate an opening is placed in the corner of a carrier ring to measure upstream and downstream pressure. Both pressure signals are routed through these openings to the outside.

Corner tapping with annular chamber

The orifice plated is held by an annular chamber. Upstream and downstream pressure are measured through an annular gap opening between carrier ring and orifice plate. Both pressure signals are averaged over the entire circumference and routed outside.

Flange tapping

The orifice plate is held between two so-called orifice flanges. Upstream and downstream pressure signals are measured through flange taps which are drilled into the flanges.

Tapping with distance D, D/2

The orifice plate is held between regular flanges. Upstream and downstream pressure signals are measured through taps in the pipe

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## Design (continued)

with distance of D (upstream) and D/2 (downstream) to the orifice plate.

***Designs***

- Standard orifice plate with corner pressure tappings (7ME171)
- Standard orifice plate with annular chamber (7ME172)
- Orifice meter run (7ME173)
- Orifice plate (7ME174)
- Orifice plate with orifice flanges (7ME175)

***Mounting arrangements***

For more information on installation position and piping, please see the Operating Instructions "SITRANS FPS200" on SIOS.

## Integration

The orifice plate is installed between two flanges in the pipeline. Using condensation pots (for steam) and initial shut-off valves, the differential pressure of the high-pressure side and low-pressure side is directed through differential pressure lines to a manifold and to the differential pressure transmitter. For fluids with pressure and temperature fluctuations it makes sense to take an additional measurement of the pressure and temperature in order to correct the flow signal of the transmitter in a subsequent correction computer.

***Selection of mounting point***

The flow measuring regulations EN ISO 5167 not only consider the design of primary differential pressure devices, but also assume that their installation is in accordance with the standard so that the specified tolerances can be retained. The required inlet and outlet pipe sections according to ISO 5167 can be found in the calculation protocol of the respective orifice plate. Configuration of the pipeline should allow for standardized installation (required inlet and outlet pipe section). Particular attention must be paid to ensure that the primary device can be fitted in a sufficiently long straight section of pipe. Bends, valves and similar should be fitted sufficiently far upstream of the primary device to prevent them having a detrimental effect. Primary devices with a large diameter ratio are particularly sensitive to interferences.

***Design of measuring point***

The design of the measuring point depends on the medium and on the spatial conditions. The designs for gas and water only differ with regard to the position of the tapping sockets (see section "Tapping sockets"); condensation pots are provided for steam applications.

***Orifice meter runs***

On lines with small nominal diameters (DN 10 to DN 50) the measurements are influenced by the wall roughness and diameter tolerances of the pipes, more than measurements with larger nominal diameters. These influences are counteracted by using orifice meter runs with fitted inlet and outlet pipe sections made of precision pipes. For exact measurements with orifice meter runs, the flow coefficient C can be determined by means of calibration.

## Technical specifications

| SITRANS FP230/FPS200 | |
|---|---|
| **General design** | |
| Working principle | Differential pressure orifice meter (other ISO 5167 primary elements on request) |
| Media | • Steam (saturated, superheated)<br>• Gas (dry, up to 100% water saturated)<br>• Liquids (water, non-conductive liquids, oil, etc.) |
| Transmitter installation | • Compact mount with differential pressure transmitter (acc. to IEC 61518)<br>• Remote mounted differential pressure transmitter |
| Bidirectional flow | On request |
| Design | According to ISO 5167-2 (2003); for orifice plates smaller than 50 mm inner diameter according to ISO/TR 15377 or ASME MFC-14M:2003 |
| **Accuracy** | |
| Uncertainty at design flow (of Sensor Coefficient of Discharge) | Typically in the range of 0.5 ... 1.2% (depends on application and final design) |
| Measurement range | Typically between up to 1:5 ... 1:10 (real measurement range depends on transmitter performance and non-linearity of coefficient of discharge) |
| **Operating conditions** | |
| Pressure | Max. PN 100 or Class 600 (higher pressure ratings on request) |
| Temperature | According to EN 1092-1 or ASME B16.5 (exact maximum temperature depends on sensor design) |
| Pressure loss | 30 ... 80% of differential pressure |
| **Installation conditions** | |
| Straight inlet diameter | Will be calculated by sizing tool (depends on β-coefficient, typically in the range of 16 ... 44 × inner diameter behind 90° elbow, can be reduced with 0.5% added uncertainty) |
| Straight outlet diameter | Will be calculated by sizing tool (depends on β-coefficient, typically in the range of 6 ... 8 × inner diameter, can be reduced with 0.5% added uncertainty)<br>Note: For detailed calculation of recommended installation pipe length please refer to sizing tool or manual |
| **Design** | |
| Material orifice plate | Standard:<br>• Stainless steel 1.4404/AISI 316L<br>• Carbon steel<br>(other materials on request) |
| Material orifice flanges / orifice holder | • Stainless steel 1.4404/AISI 316L<br>• Carbon steel<br>(other materials on request) |
| Pipe diameter | • DIN: DN 10 ... 600<br>• ASME: 3/8" ... 24"<br>(other sizes on request) |
| Process connection | Orifice meter runs: Flanges EN 1092-1 B1 or ASME B16.5 RF<br>All other designs: Suitable for installation between flanges EN 1092-1 B1 or ASME B16.5 RF<br>(other process connections on request) |
| Length | Orifice with carrier ring and pressure tappings: 40 mm (65 mm for compact steam applications)<br>Orifice plate with annular chamber: 65 mm<br>Orifice meter run: depends on pipe diameter (see below)<br>Single piece orifice for orifice flanges (with or without orifice flanges): depends on pipe diameter (see below) |

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## Technical specifications (continued)

| SITRANS FP230/FPS200 | |
|---|---|
| Approvals | |
| • Hazardous area | (see differential pressure transmitter) |
| • Enclosure rating | (see differential pressure transmitter) |
| • Operational safety | (see differential pressure transmitter) |

## Accessories

Z-Options for cable glands, plugs, labeling, approvals, blanking plugs, flanges seals, device settings, etc. according to SITRANS P320

## Options

Further versions that are available on request:

- Other types of primary differential pressure device: nozzles, venturi nozzles, classic venturi tubes etc.
- Other nominal diameters and nominal pressures to EN, ASME and other standards
- Other lengths, special lengths
- Other materials
- Sealing face with recess or groove
- Flushing rings
- Other tapping sockets, multiple tappings
- Material acceptance test certificates or cold water pressure tests

## More information

For more information please see the Installation Instructions and the Instruction Manuals SITRANS P on SIOS.

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## Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Compact orifice plate with integrated pressure tappings in carbon or stainless steel for flow measurement of gas, steam and liquid.

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## Design

Standard orifice plates with integral tappings are manufactured from a single body and are therefore particularly inexpensive. The pressure tapping takes place at two points and is integrated into the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to handle and offer good accuracy with reasonable inlet and outlet runs. They are installed between regular flanges.

Nominal size

- EN: DN 50 ... 500
- ASME: 2 ... 20 inch

Nominal pressure

- EN: PN 6 ... 100
- ASME: class 150 ... 600

Differential pressure tapping

- Corner tapping: Measurement of differential pressure at 2 points in the corner of the carrier ring

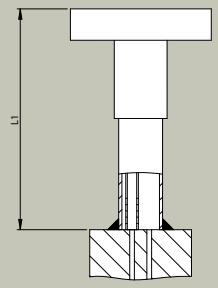
Sealing face

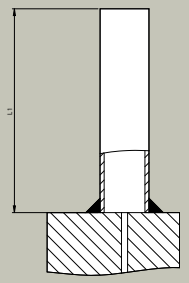
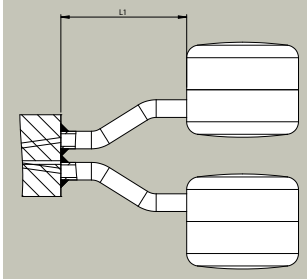
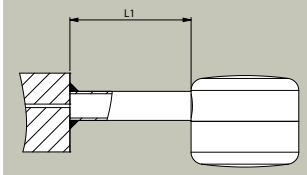
- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- Orifice: Carbon steel / orifice edge: ER307
- Orifice: 316L/1.4404 / orifice edge: 316L/1.4404

Connection length

| Connection length | |
|---|---|
| **Compact mount for gas and liquids**   | • L1 = 130 mm<br>• Max. isolation = 110 mm |

| Connection length | |
|---|---|
| **Remote mount for gas and liquids**   | • L1 = 100 mm<br>• Max. isolation = 80 mm |
| **Compact mount for steam**   | • L1 = 150 mm<br>• Max. isolation = 110 mm |
| **Remote mount for steam**   | • L1 = 150 mm<br>• Max. isolation = 140 mm |

***Tapping sockets***

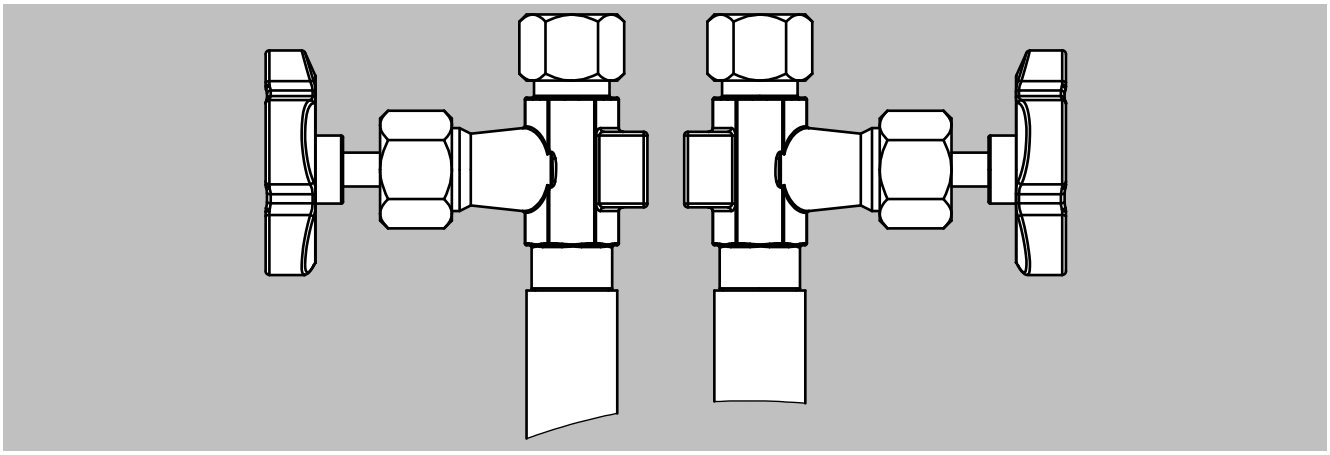
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## Design (continued)

***Gases and liquids***

Remote design



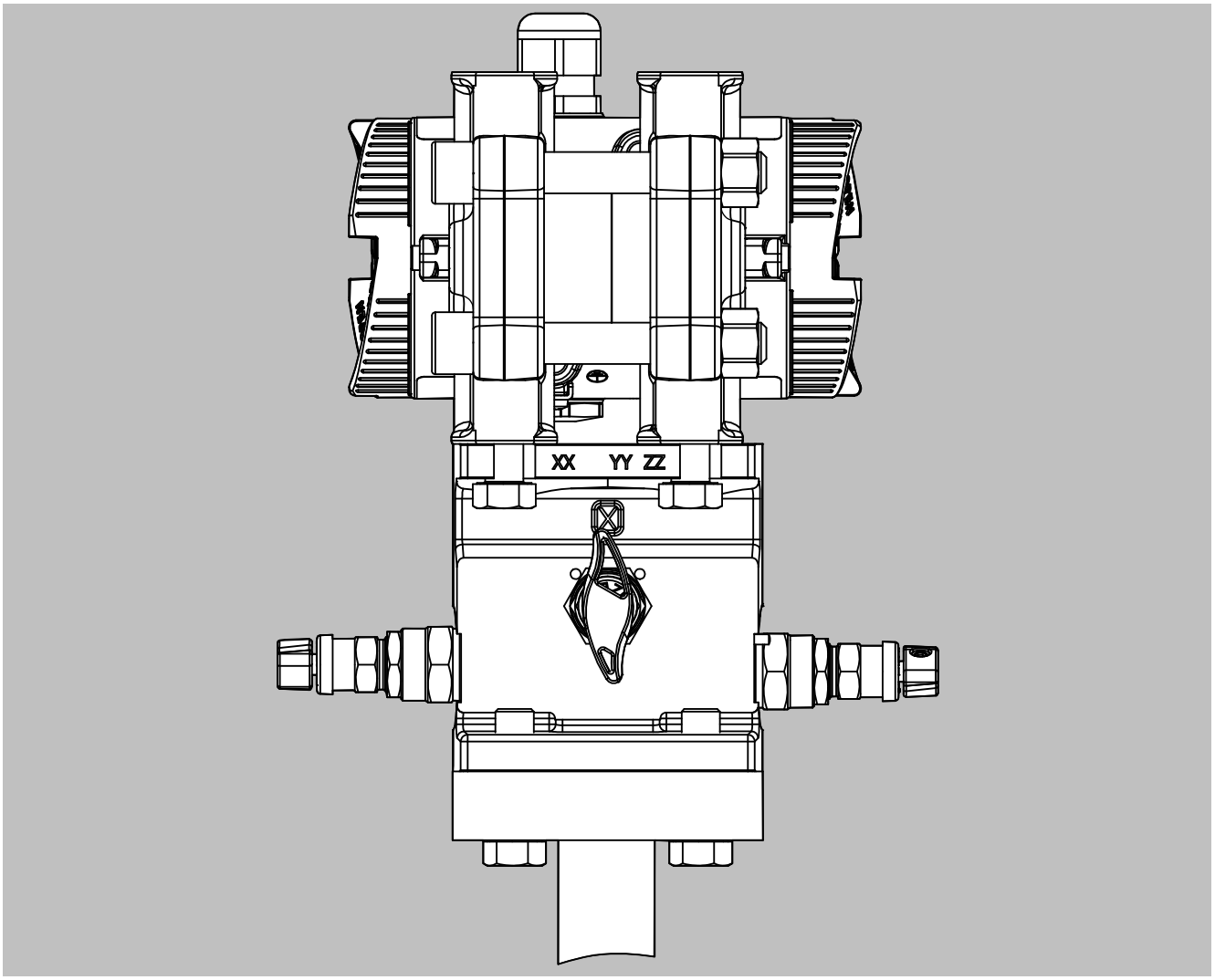
For single body standard orifice plates in remote design, the angle α between the pressure tapppings depends on the pressure rating and the nominal diameter of the flanges.

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## Design (continued)

Compact design



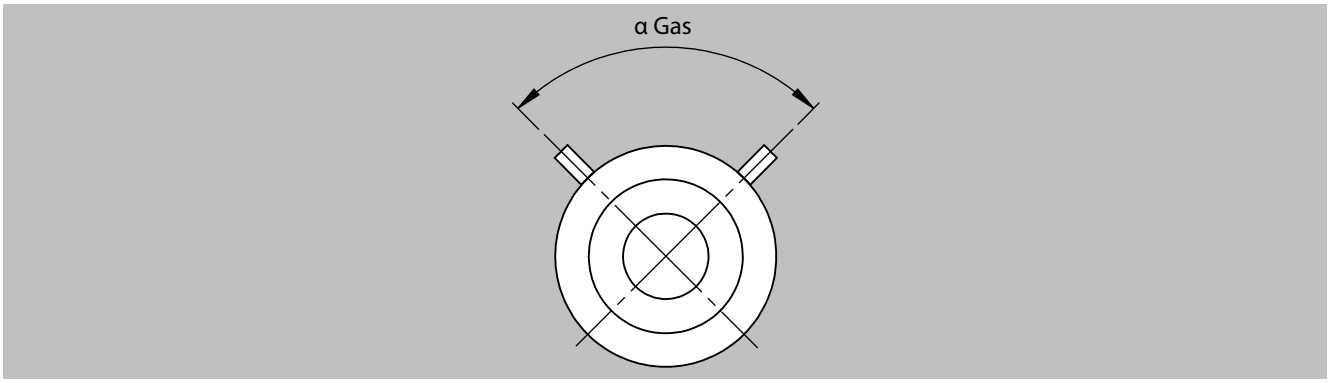

For single body standard orifice plates in compact design, a so-called flange plate is used. The manifold and the differential pressure transmitter are mounted on this flange plate.

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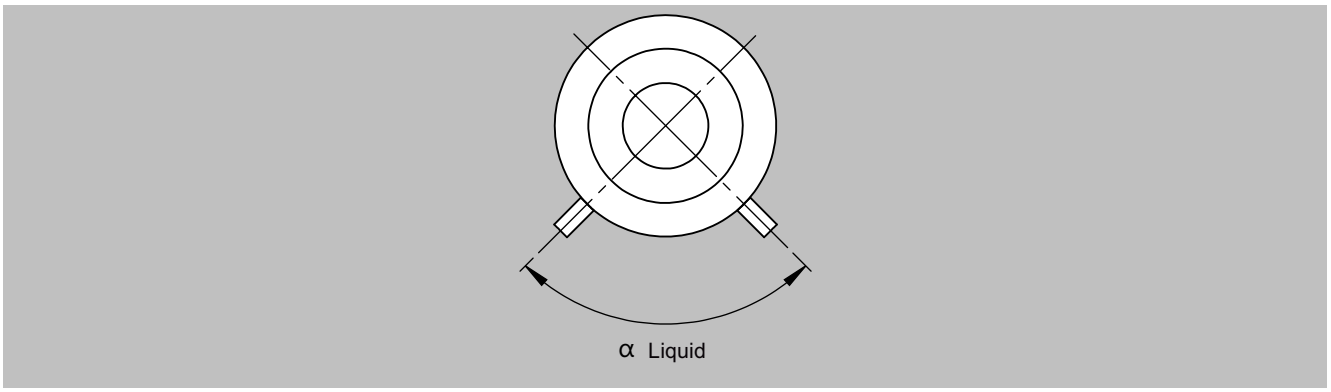


## Design (continued)

Tap position/angle in horizontal pipe




Tap position/angle in horizontal pipe (gas)




Tap position/angle in horizontal pipe (liquid)

Remote design for gases and liquids for DIN flange

| Nominal size | DIN flange PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 64 | PN 100 |
|---|---|---|---|---|---|---|---|
| DN 50 | 135 | 135 | 135 | 135 | 135 | 135 | 135 |
| DN 65 | 135 | 135 | 135*) | 90 | 90 | 90 | 90 |
| DN 80 | 135 | 90 | 90 | 90 | 90 | 90 | 90 |
| DN 100 | 135 | 90 | 90 | 90 | 90 | 90 | 90 |
| DN 125 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| DN 150 | 90 | 90 | 90 | 90 | 90 | 90 | 60 |
| DN 175 | 90 | 90 | 90 | 60 | 60 | 60 | 60 |
| DN 200 | 90 | 90 | 60 | 60 | 60 | 60 | 60 |
| DN 250 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| DN 300 | 60 | 60 | 60 | 45 | 45 | 45 | 45 |
| DN 350 | 60 | 45 | 45 | 45 | 45 | 45 | 45 |
| DN 400 | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| DN 450 | 45 | 36 | 36 | 36 | - | - | - |
| DN 500 | 36 | 36 | 36 | 36 | 36 | 36 | 36 |

*) Fitting for DN 65 PN 16 flange with 4 holes. If design for flange with 8 holes is required, please add a comment to the corresponding project within the sizing tool.

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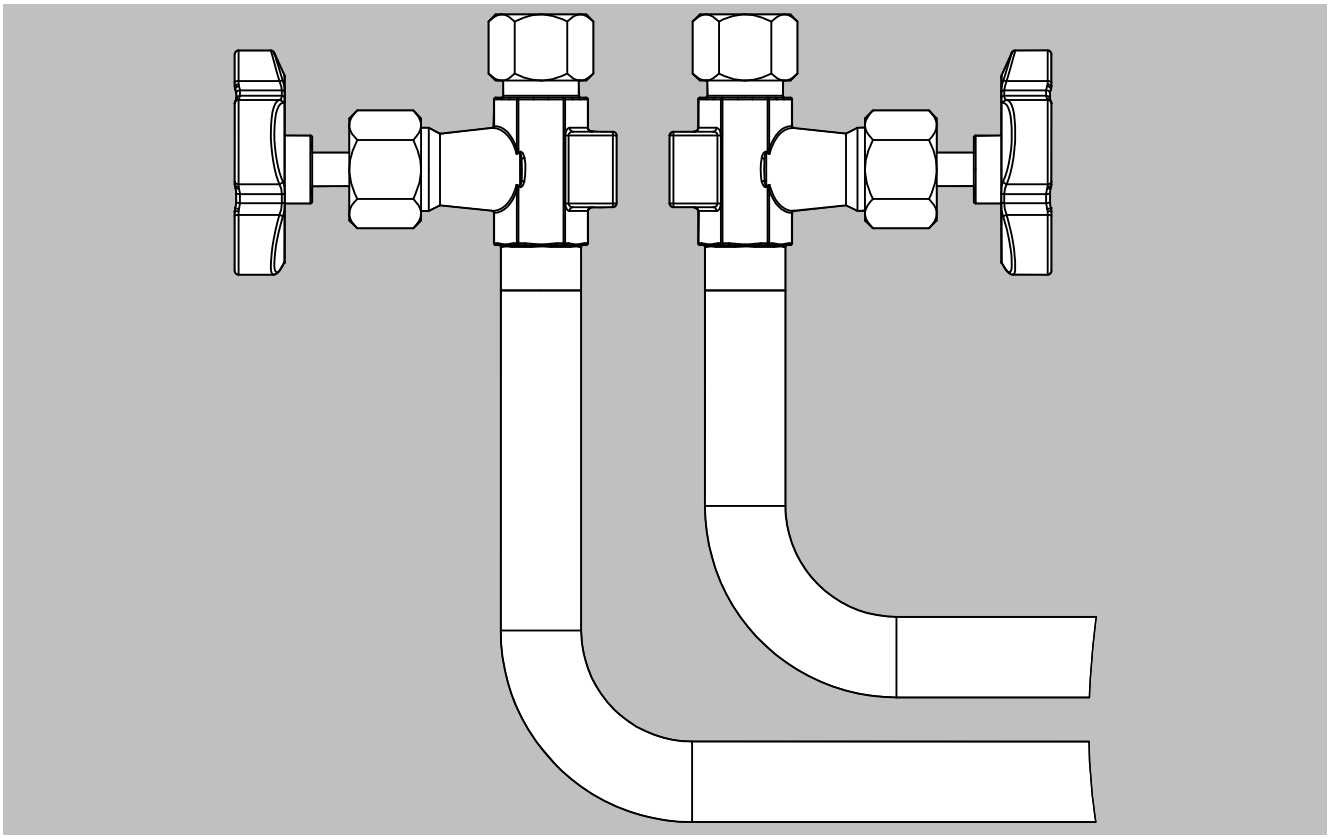
## Design (continued)

Remote design for gases and liquids for ANSI flange

| Nominal size | ANSI flange Class 150 | Class 300 | Class 600 |
|---|---|---|---|
| 2" | 135 | 90 | 90 |
| 2,5" | 135 | 90 | 90 |
| 3" | 135 | 90 | 90 |
| 4" | 90 | 90 | 90 |
| 5" | 90 | 90 | 90 |
| 6" | 90 | 60 | 60 |
| 8" | 90 | 60 | 60 |
| 10" | 60 | 45 | 45 |
| 12" | 60 | 45 | 36 |
| 14" | 60 | 36 | 36 |
| 16" | 45 | 36 | 36 |
| 18" | 45 | 30 | 36 |
| 20" | 36 | 30 | 30 |

***Wet gases***

Remote design



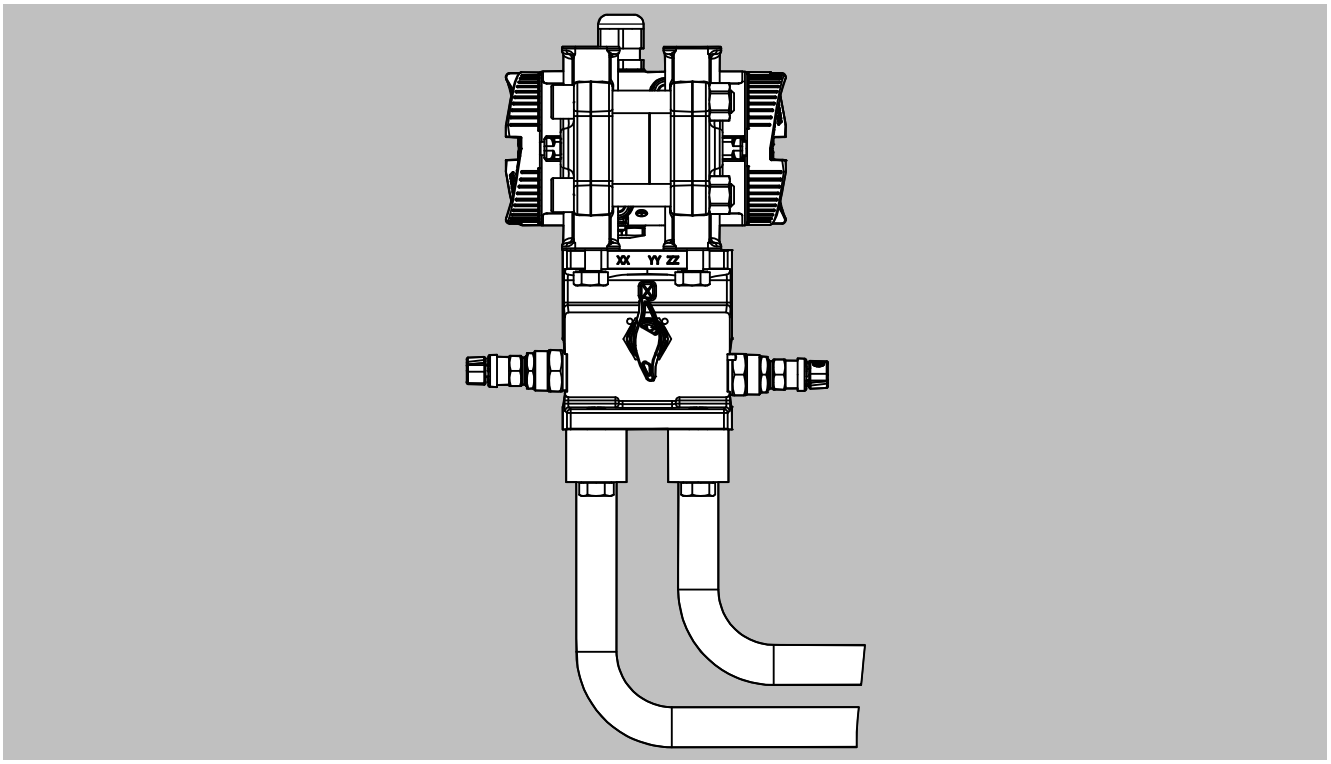
For single body standard orifice plates in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

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## Design (continued)

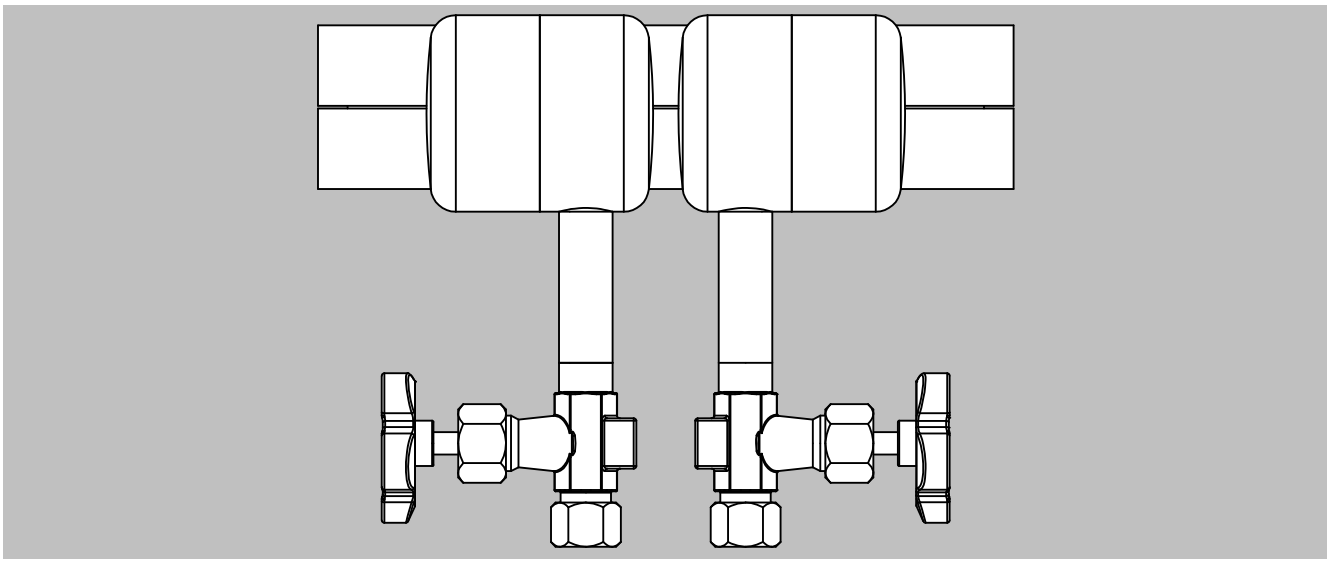
Compact design




For single body standard orifice plates in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

***Steam***

Remote design



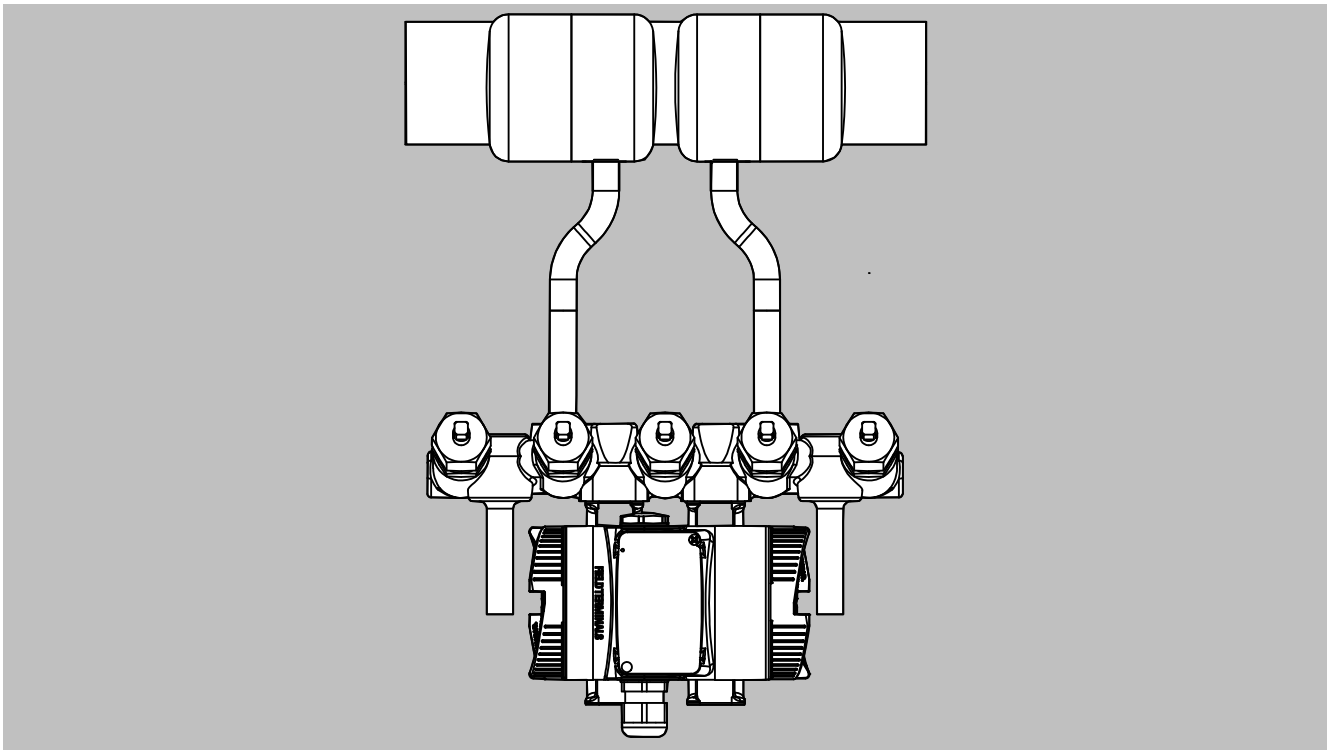
For single body standard orifice plates in remote design for steam, the condensate vessels with shut-off valves are welded at an angle of 180°.

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## Design (continued)

Compact remote



For single body standard orifice plates in compact design for steam, the condensate vessels and the manifold are welded-on one side. The orifice has a width of 65 mm in this case (deviating from the standard).

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## Selection and ordering data

| SITRANS FP230/FPS200 standard orifice plate with corner pressure tappings | Article No. 7ME171 | ● | - | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | | |
| DN 50 (2") | | | | 1 | D | | | | | | | | |
| DN 65 (2½") | | | | 1 | E | | | | | | | | |
| DN 80 (3") | | | | 1 | F | | | | | | | | |
| DN 100 (4") | | | | 2 | G | | | | | | | | |
| DN 125 (5") | | | | 2 | H | | | | | | | | |
| DN 150 (6") | | | | 2 | J | | | | | | | | |
| DN 200 (8") | | | | 2 | K | | | | | | | | |
| DN 250 (10") | | | | 2 | L | | | | | | | | |
| DN 300 (12") | | | | 2 | M | | | | | | | | |
| DN 350 (14") | | | | 2 | N | | | | | | | | |
| DN 400 (16") | | | | 2 | P | | | | | | | | |
| DN 450 (18") | | | | 2 | Q | | | | | | | | |
| DN 500 (20") | | | | 2 | R | | | | | | | | |
| **Nominal pressure** | | | | | | | | | | | | | |
| Flange EN 1092-1 type B1 PN 6 | | | | | | A | | | | | | | |
| Flange EN 1092-1 type B1 PN 10 | | | | | | B | | | | | | | |
| Flange EN 1092-1 type B1 PN 16 | | | | | | C | | | | | | | |
| Flange EN 1092-1 type B1 PN 25 | | | | | | D | | | | | | | |
| Flange EN 1092-1 type B1 PN 40 | | | | | | E | | | | | | | |
| Flange EN 1092-1 type B1 PN 64 | | | | | | F | | | | | | | |
| Flange EN 1092-1 type B1 PN 100 | | | | | | G | | | | | | | |
| Flange ASME B16.5 Class 150 | | | | | | Q | | | | | | | |
| Flange ASME B16.5 Class 300 | | | | | | R | | | | | | | |
| Flange ASME B16.5 Class 600 | | | | | | S | | | | | | | |
| **Wetted parts material** | | | | | | | | | | | | | |
| Orifice: Carbon steel / orifice edge: ER307 | | | | | | | 0 | | | | | | |
| Orifice: 316L/1.4404 / orifice edge: 316L/1.4404 | | | | | | | 1 | | | | | | |
| **System design** | | | | | | | | | | | | | |
| Compact design for dry gases (horizontal and vertical pipes) | | | | | | | | | | 0 | | | |
| Compact design for liquids | | | | | | | | | | 1 | | | |
| Compact design for wet gases (only vertical pipes) | | | | | | | | | | 2 | | | |
| Compact design for steam | | | | | | | | | | 3 | | | |
| Remote design for dry gases | | | | | | | | | | 4 | | | |
| Remote design for liquids | | | | | | | | | | 5 | | | |
| Remote design for wet gases | | | | | | | | | | 6 | | | |
| Remote design for steam | | | | | | | | | | 7 | | | |
| **Type of protection of pressure transmitter** | | | | | | | | | | | | | |
| No Ex / without pressure tranmitter | | | | | | | | | | | A | | |
| Intrinsic safety | | | | | | | | | | | B | | |
| Explosion proof | | | | | | | | | | | C | | |
| Intrinsic safety, Explosion proof | | | | | | | | | | | D | | |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | L | | |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | | | | | | | | | | | M | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | S | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | | | | | | | | | | | T | | |
| **Electrical connections/cable entries of pressure transmitter** | | | | | | | | | | | | | |
| Without pressure transmitter | | | | | | | | | | | | A | |
| 2 × M20 × 1.5 | | | | | | | | | | | | F | |
| 2 × 1/2-14 NPT | | | | | | | | | | | | M | |
| **Local operation/display of pressure transmitter** | | | | | | | | | | | | | |
| Without display (closed lid) / without pressure tranmitter | | | | | | | | | | | | | 0 |
| With display (closed lid) | | | | | | | | | | | | | 1 |

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## Selection and ordering data (continued)

| SITRANS FP230/FPS200 standard orifice plate with corner pressure tappings | Article No. 7ME171 ● - ● ● ● ● 0 - ● ● ● ● |
|---|---|
| With display (lid with glass window) | 2 |

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. manifolds** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Inspection certificate (DIN EN 571-1) - dye penetration test of weldings | **C56** |
| Hydrostatic pressure test of the primary element (EN 13480-5) of weldings | **C58** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm | **T56** |
| With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm | **T57** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U40** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U41** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U42** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U43** |
| With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel | **U46** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm | **U56** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

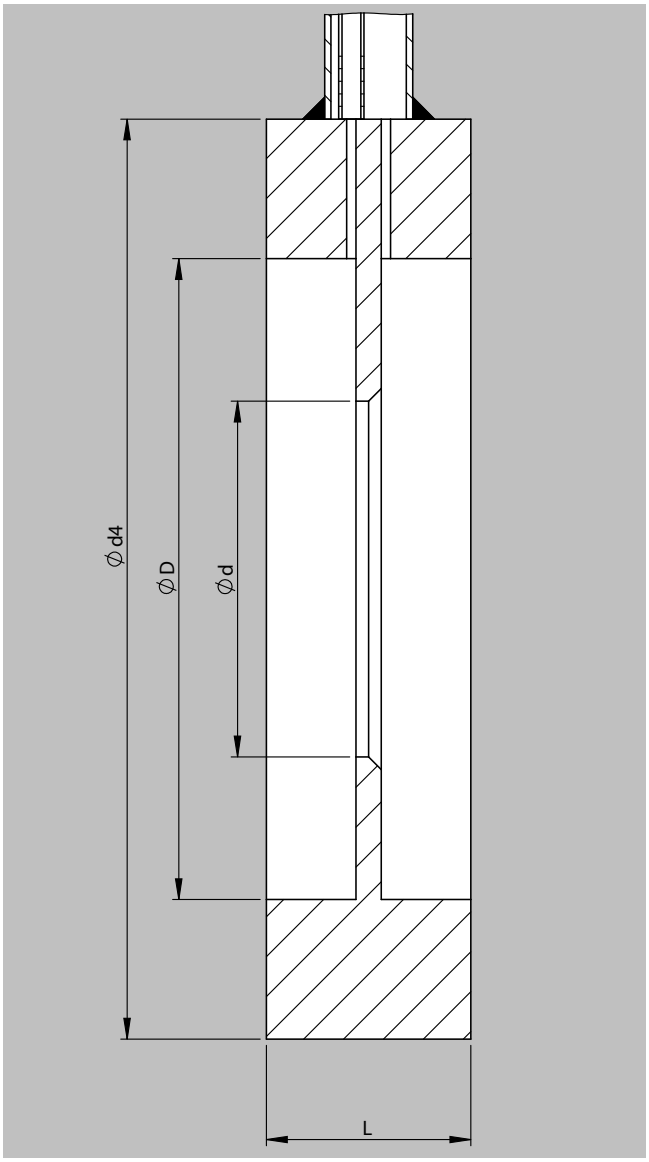
Scope of delivery

- Orifice with pressure tapping in carrier ring
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Dimensional drawings




L: Overall length 40 mm (65 mm for compact steam applications)
d: According to sizing calculation
D: According to inner diameter of pipe (sizing tool)
d4: See table below

| | Outer diameter d4 / Sealing face: flat | | | | | | |
|---|---|---|---|---|---|---|---|
| Nominal size | PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 63 | PN 100 |
| DN 50 | 96 | 107 | 107 | 107 | 107 | 113 | 119 |
| DN 65 | 116 | 127 | 127 | 127 | 127 | 138 | 144 |
| DN 80 | 132 | 142 | 142 | 142 | 142 | 148 | 154 |
| DN 100 | 152 | 162 | 162 | 168 | 168 | 174 | 180 |
| DN 125 | 182 | 192 | 192 | 194 | 194 | 210 | 217 |
| DN 150 | 207 | 218 | 218 | 224 | 224 | 247 | 257 |
| DN 200 | 262 | 273 | 273 | 284 | 290 | 309 | 324 |
| DN 250 | 317 | 328 | 329 | 340 | 352 | 364 | 391 |
| DN 300 | 373 | 378 | 384 | 400 | 417 | 424 | 458 |

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## Dimensional drawings (continued)

| Nominal size | Outer diameter d4 / Sealing face: flat PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 63 | PN 100 |
|---|---|---|---|---|---|---|---|
| DN 350 | 423 | 438 | 444 | 457 | 474 | 486 | 512 |
| DN 400 | 473 | 489 | 495 | 514 | 546 | 543 | - |
| DN 500 | 578 | 594 | 617 | 624 | 628 | - | - |

| Nominal size | Outer diameter d4 / Sealing face: flat Class 150 | Class 300 | Class 600 |
|---|---|---|---|
| 2" | 105 | 111 | 111 |
| 2,5" | 124 | 130 | 130 |
| 3" | 137 | 149 | 149 |
| 4" | 175 | 181 | 194 |
| 5" | 197 | 216 | 241 |
| 6" | 222 | 251 | 267 |
| 8" | 279 | 308 | 321 |
| 10" | 340 | 362 | 400 |
| 12" | 410 | 422 | 457 |
| 14" | 451 | 486 | 492 |
| 16" | 514 | 540 | 565 |
| 20" | 549 | 597 | 613 |

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## Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Orifice plate with annular chamber pressure tapping in carbon or stainless steel for flow measurement of gas, steam and liquid.

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## Design

Annular chamber orifice plates consist of two rings pressed together, between which the orifice plate is clamped. The pressure is measured upstream and downstream through an annular chamber. The accuracy is comparable to that of the standard orifice plate.

Orifice plates with annular chamber tappings consist of a two-piece carrier ring with annular chamber and integral tappings and an inserted orifice plate. Pressure before and after the orifice is averaged through the annular chamber. Tapping connections are integrated into each part of the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to handle and offer good accuracy with reasonable inlet and outlet runs. They are installed between regular flanges. The orifice can be disassembled to replace the inserted orifice plate.

Nominal sizes

- EN: DN 50 ... 600
- ASME: 2 ... 24 inch

Nominal pressure

- EN: PN 6 ... 64 (for steam applications maximum of PN 16 is recommended)
- ASME: class 150 ... 600 (for steam applications maximum of class 150 is recommended)

Pressure tapping

- Annular chamber: Corner tapping through annular chamber

Connection length

- Suitable for gases and liquids for a maximum of approx. 80 mm pipe insulation
- Suitable for steam for a maximum of approx. 140 mm pipe insulation

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- Carrier ring: Carbon steel / orifice plate: 316L/1.4404
- Carrier ring: 316L/1.4404 / orifice plate: 316L/1.4404

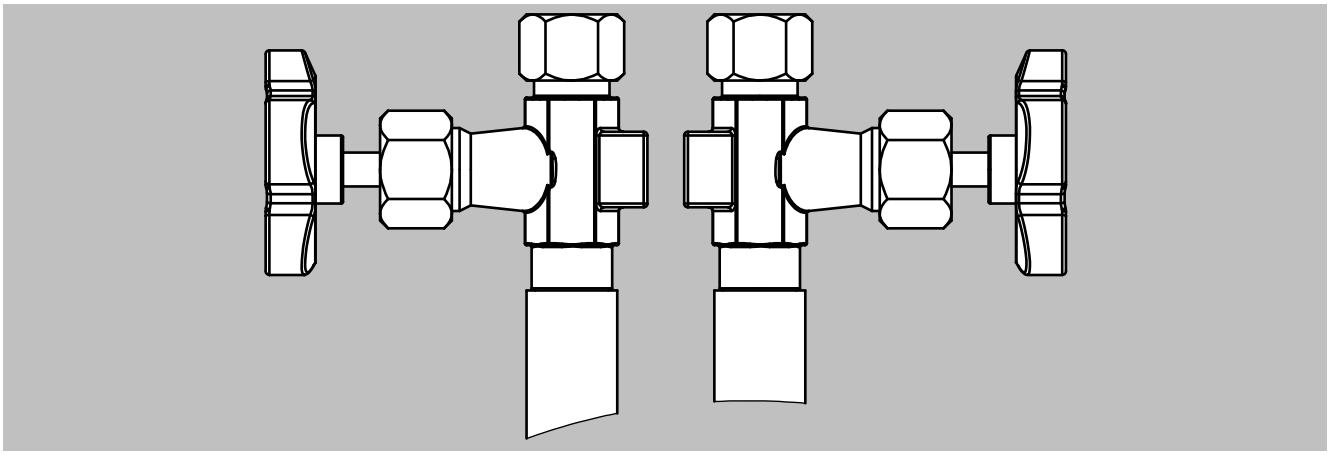
Gaskets

- Gas and liquids: Klingersil C4400
- Steam: Graphite with stainless steel inlay

***Tapping sockets***

***Gases and liquids***

Remote design



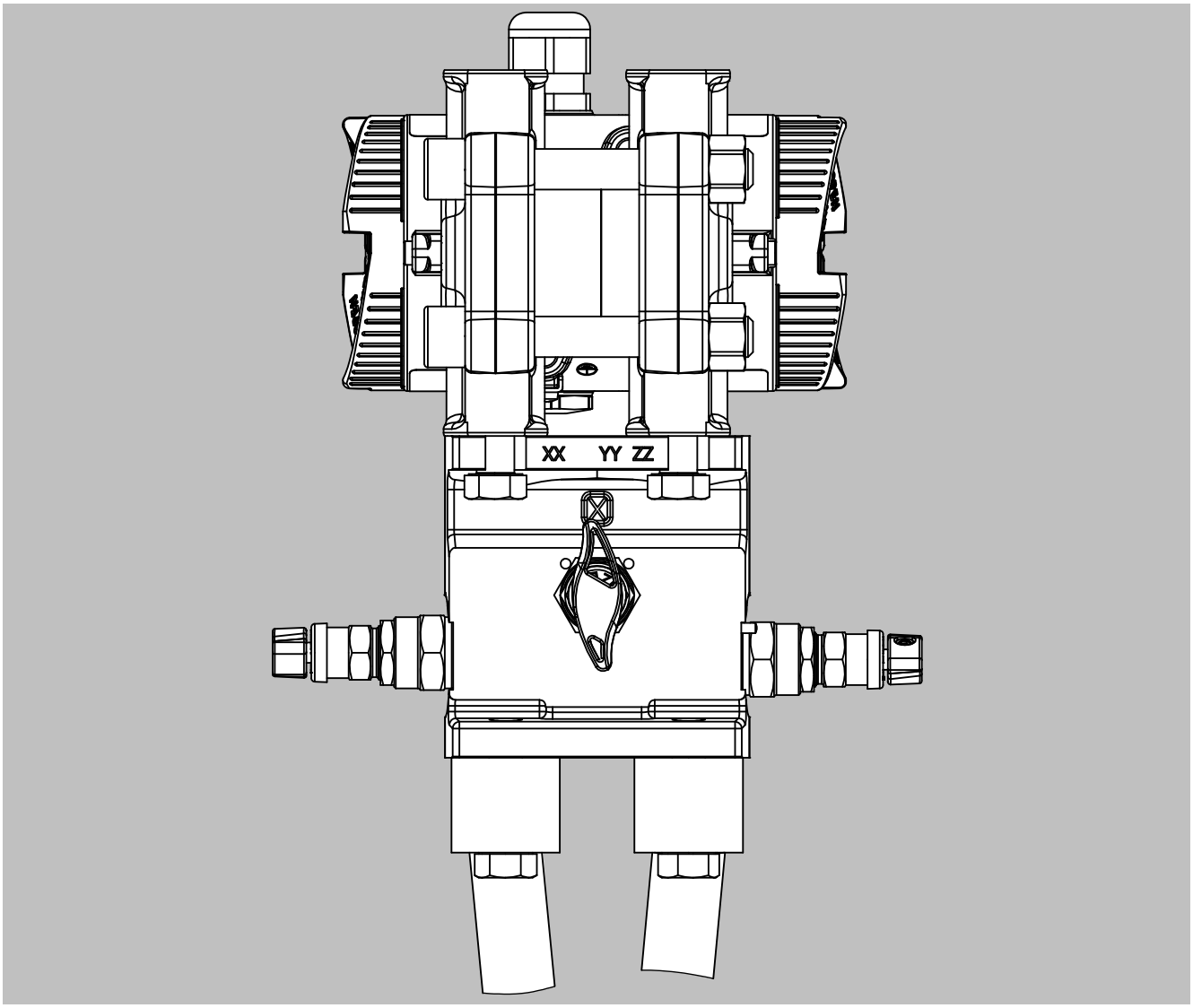
For annular chamber orifice plates in remote design, the angle α between the pressure tap depends on the pressure rating and the nominal size of the flanges.

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## Design (continued)

Compact design



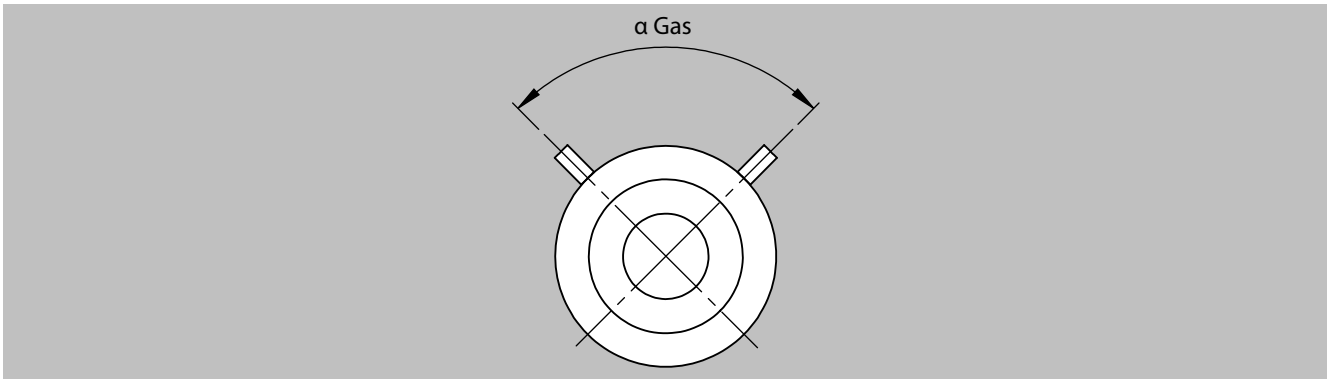

For annular chamber orifice plates in compact design, so-called oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges.

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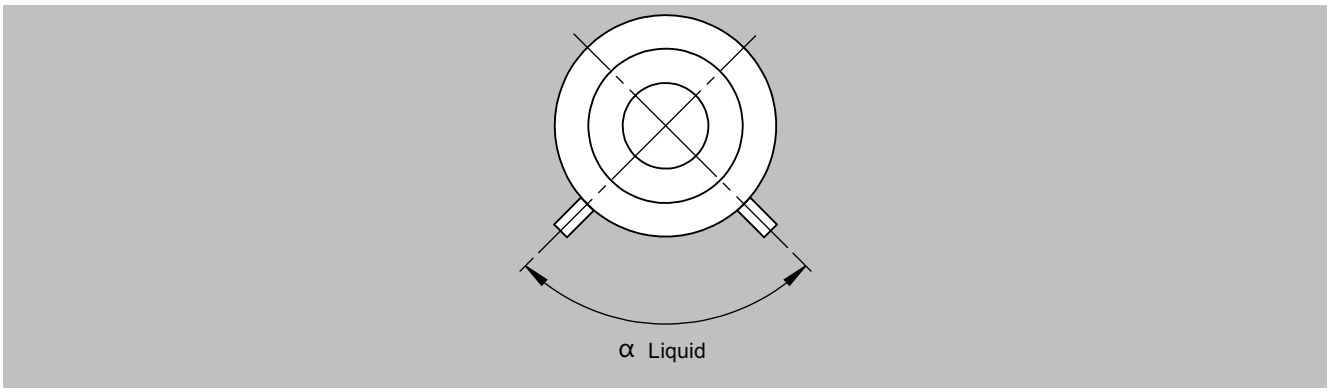


## Design (continued)

Tap position/angle in horizontal pipe




Tap position/angle in horizontal pipe (gas)




Tap position/angle in horizontal pipe (liquid)

| Nominal size | DIN flange PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 64 |
|---|---|---|---|---|---|---|
| **DN 50** | 135 | 135 | 135 | 135 | 135 | 135 |
| **DN 65** | 135 | 135 | 135*) | 90 | 90 | 90 |
| **DN 80** | 135 | 90 | 90 | 90 | 90 | 90 |
| **DN 100** | 135 | 90 | 90 | 90 | 90 | 90 |
| **DN 125** | 90 | 90 | 90 | 90 | 90 | 90 |
| **DN 150** | 90 | 90 | 90 | 90 | 90 | 90 |
| **DN 175** | 90 | 90 | 90 | 60 | 60 | 60 |
| **DN 200** | 90 | 90 | 60 | 60 | 60 | 60 |
| **DN 250** | 60 | 60 | 60 | 60 | 60 | 60 |
| **DN 300** | 60 | 60 | 60 | 45 | 45 | 45 |
| **DN 350** | 60 | 45 | 45 | 45 | 45 | 45 |
| **DN 400** | 45 | 45 | 45 | 45 | 45 | 45 |
| **DN 450** | 45 | 36 | 36 | 36 | - | - |
| **DN 500** | 36 | 36 | 36 | 36 | 36 | 36 |

*) Fitting for DN 65 PN 16 flange with 4 holes. If design for flange with 8 holes is required, please add a comment to the corresponding project within the sizing tool.

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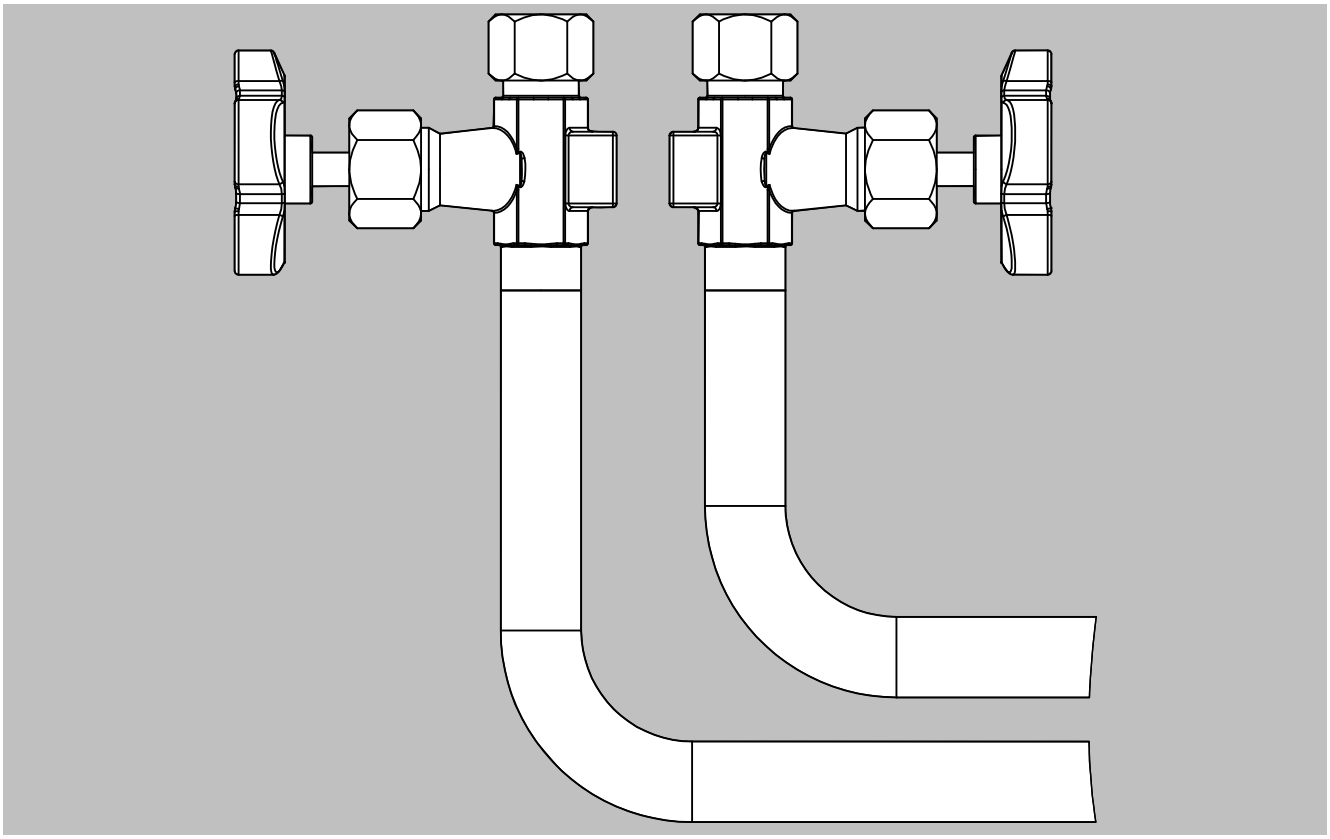


## Design (continued)

| Nominal size | ANSI flange Class 150 | Class 300 | Class 600 |
|---|---|---|---|
| **2"** | 135 | 90 | 90 |
| **2,5"** | 135 | 90 | 90 |
| **3"** | 135 | 90 | 90 |
| **4"** | 90 | 90 | 90 |
| **5"** | 90 | 90 | 90 |
| **6"** | 90 | 60 | 60 |
| **8"** | 90 | 60 | 60 |
| **10"** | 60 | 45 | 45 |
| **12"** | 60 | 45 | 36 |
| **14"** | 60 | 36 | 36 |
| **16"** | 45 | 36 | 36 |
| **18"** | 45 | 30 | 36 |
| **20"** | 36 | 30 | 30 |
| **22"** | 36 | 30 | 30 |
| **24"** | 36 | 30 | 30 |

***Wet gases***

Remote design



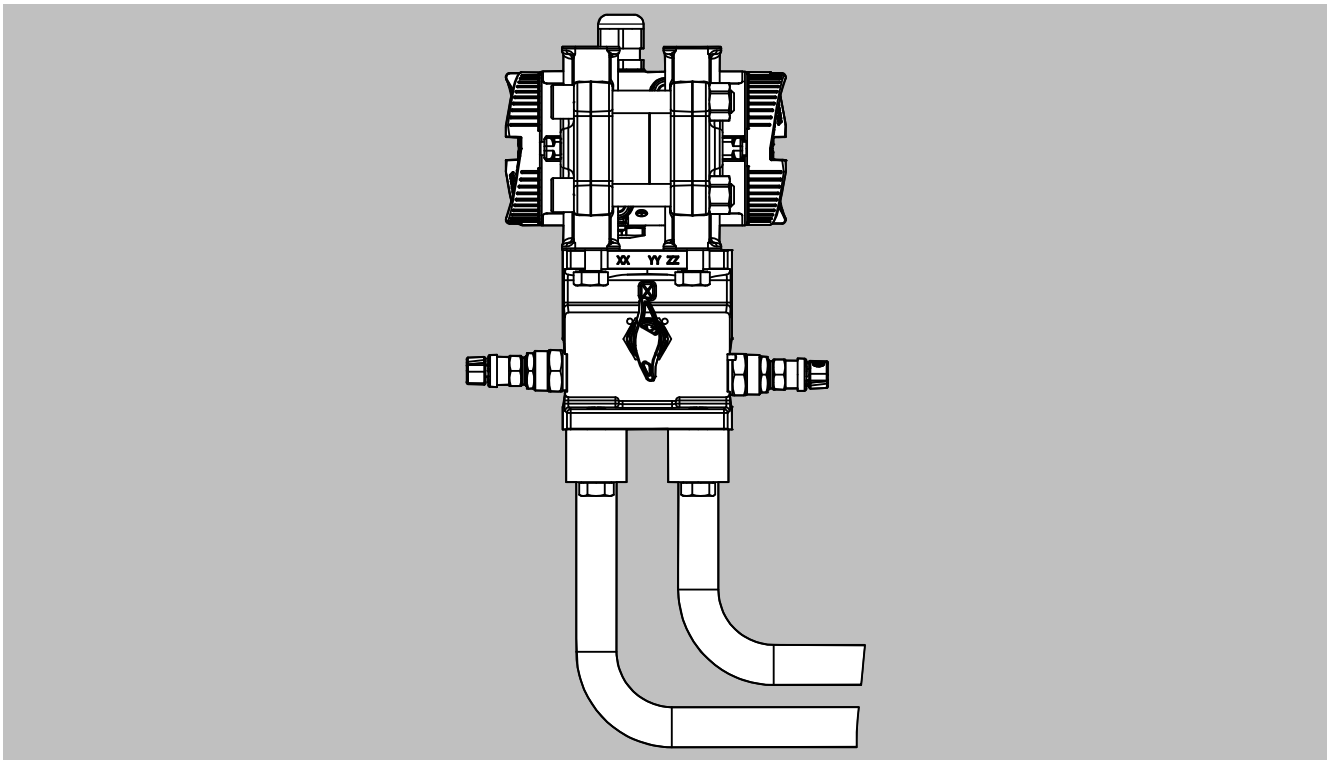
For annular chamber orifice plates in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary **for vertical pipes**. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

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## Design (continued)

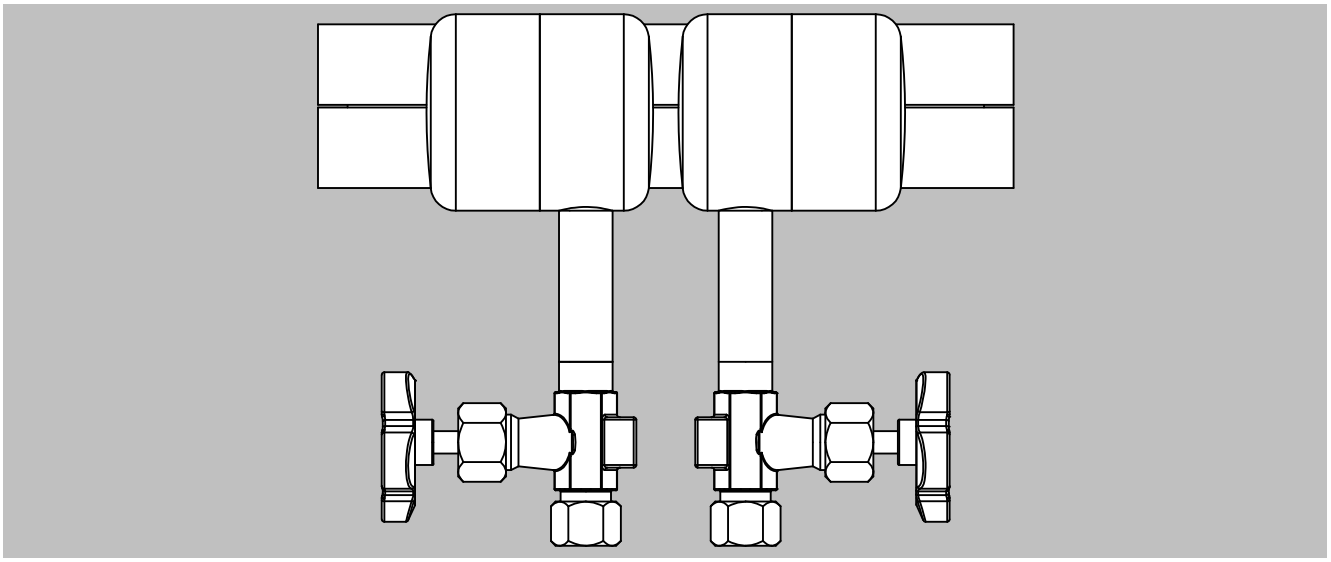
Compact design




For annular chamber orifice plates in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary **for vertical pipes**. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

***Steam***

Remote design



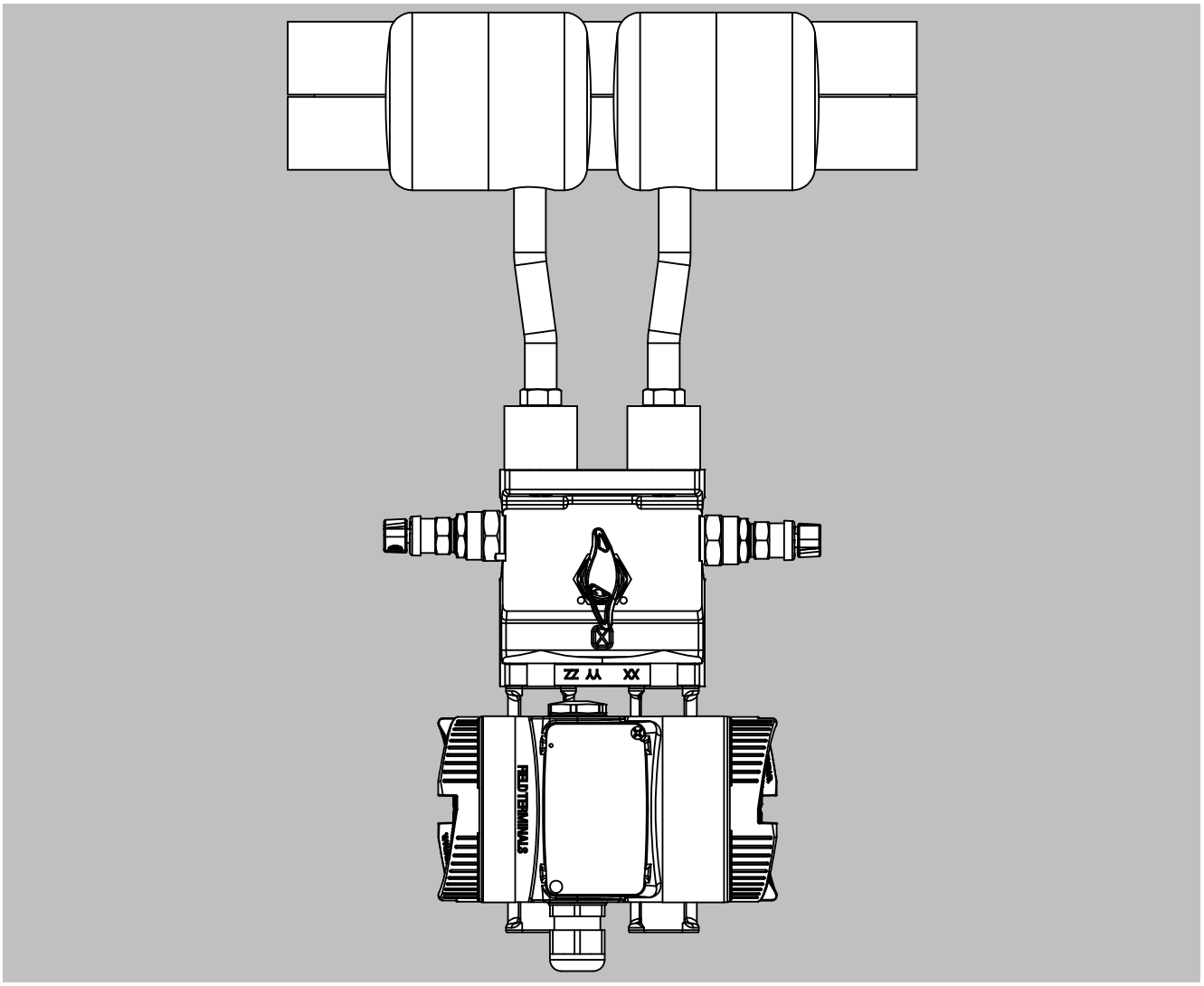
For annular chamber orifice plates in remote design for steam, the condensate vessels with shut-off valves are mounted at an angle of 0°.

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## Design (continued)

Compact design




For annular chamber orifice plates in compact design for steam, the condensate vessels are mounted on one side. The manifold and the differential pressure transmitter are mounted to the condensate vessels using oval flanges. The condensate vessels are equipped with filling nozzles, which means a 3-way manifold can be used.

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## Selection and ordering data

| SITRANS FP230/FPS200 standard orifice plate with annular chamber | Article No. 7ME172 | ● | - | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | | |
| DN 50 (2") | | | | 1 | D | | | | | | | | |
| DN 65 (2½") | | | | 1 | E | | | | | | | | |
| DN 80 (3") | | | | 1 | F | | | | | | | | |
| DN 100 (4") | | | | 2 | G | | | | | | | | |
| DN 125 (5") | | | | 2 | H | | | | | | | | |
| DN 150 (6") | | | | 2 | J | | | | | | | | |
| DN 200 (8") | | | | 2 | K | | | | | | | | |
| DN 250 (10") | | | | 2 | L | | | | | | | | |
| DN 300 (12") | | | | 2 | M | | | | | | | | |
| DN 350 (14") | | | | 2 | N | | | | | | | | |
| DN 400 (16") | | | | 2 | P | | | | | | | | |
| DN 450 (18") | | | | 2 | Q | | | | | | | | |
| DN 500 (20") | | | | 2 | R | | | | | | | | |
| DN 600 (24") | | | | 2 | S | | | | | | | | |
| **Nominal pressure** | | | | | | | | | | | | | |
| Flange EN 1092-1 type B1 PN 6 | | | | | | A | | | | | | | |
| Flange EN 1092-1 type B1 PN 10 | | | | | | B | | | | | | | |
| Flange EN 1092-1 type B1 PN 16 | | | | | | C | | | | | | | |
| Flange EN 1092-1 type B1 PN 25 | | | | | | D | | | | | | | |
| Flange EN 1092-1 type B1 PN 40 | | | | | | E | | | | | | | |
| Flange EN 1092-1 type B1 PN 64 | | | | | | F | | | | | | | |
| Flange ASME B16.5 Class 150 | | | | | | Q | | | | | | | |
| Flange ASME B16.5 Class 300 | | | | | | R | | | | | | | |
| Flange ASME B16.5 Class 600 | | | | | | S | | | | | | | |
| **Wetted part materials** | | | | | | | | | | | | | |
| Carrier ring: Carbon steel / orifice plate: 316L/1.4404 | | | | | | | 2 | | | | | | |
| Carrier ring: 316L/1.4404 / orifice plate: 316L/1.4404 | | | | | | | 3 | | | | | | |
| **System design** | | | | | | | | | | | | | |
| Compact design for dry gases (horizontal and vertical pipes) | | | | | | | | | | 0 | | | |
| Compact design for liquids | | | | | | | | | | 1 | | | |
| Compact design for wet gases (only vertical pipes) | | | | | | | | | | 2 | | | |
| Compact design for steam | | | | | | | | | | 3 | | | |
| Remote design for dry gases | | | | | | | | | | 4 | | | |
| Remote design for liquids | | | | | | | | | | 5 | | | |
| Remote design for wet gases | | | | | | | | | | 6 | | | |
| Remote design for steam | | | | | | | | | | 7 | | | |
| **Type of protection of pressure transmitter** | | | | | | | | | | | | | |
| No Ex / without pressure tranmitter | | | | | | | | | | | A | | |
| Intrinsic safety | | | | | | | | | | | B | | |
| Explosion proof | | | | | | | | | | | C | | |
| Intrinsic safety, Explosion proof | | | | | | | | | | | D | | |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | L | | |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | | | | | | | | | | | M | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | S | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | | | | | | | | | | | T | | |
| **Electrical connections/cable entries of pressure transmitter** | | | | | | | | | | | | | |
| Without pressure transmitter | | | | | | | | | | | | A | |
| 2 × M20 × 1.5 | | | | | | | | | | | | F | |
| 2 × 1/2-14 NPT | | | | | | | | | | | | M | |
| **Local operation/display of pressure transmitter** | | | | | | | | | | | | | |
| Without display (closed lid) / without pressure tranmitter | | | | | | | | | | | | | 0 |
| With display (closed lid) | | | | | | | | | | | | | 1 |

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## Selection and ordering data (continued)

| SITRANS FP230/FPS200 standard orifice plate with annular chamber | Article No. 7ME172 ● - ● ● ● ● 0 - ● ● ● ● |
|---|---|
| With display (lid with glass window) | 2 |

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. manifolds** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Inspection certificate (DIN EN 571-1) - dye penetration test of weldings | **C56** |
| Hydrostatic pressure test of the primary element (EN 13480-5) of weldings | **C58** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm | **T56** |
| With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm | **T57** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U40** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U41** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U42** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U43** |
| With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel | **U46** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws and condensation vessels incl. filling union 1/2" NPT made of stainless steel | **U47** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm | **U56** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

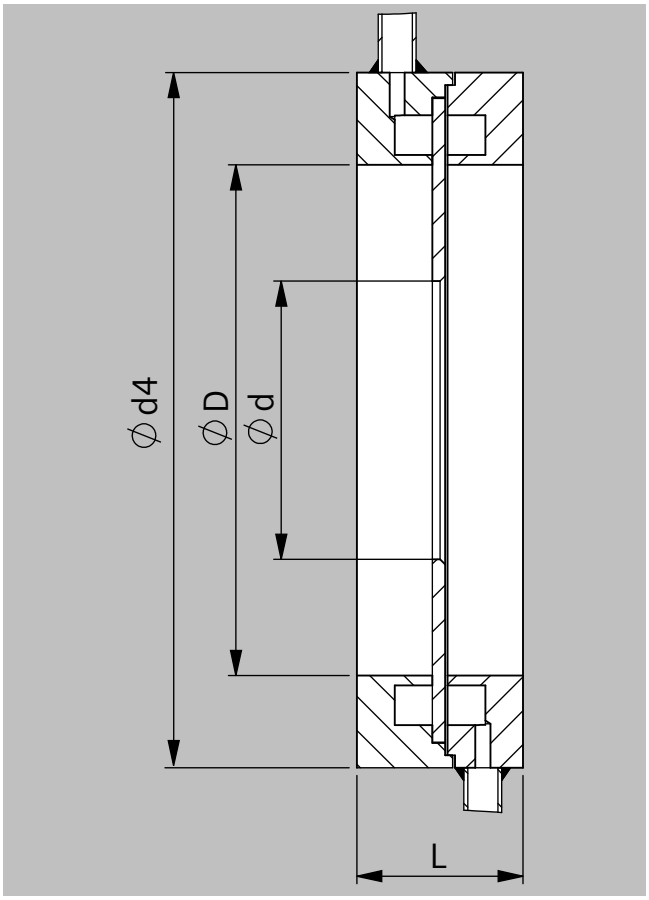
Scope of delivery

- Annular chamber consisting of two pieces, each with integrated pressure tapping
- Orifice plate mounted in annular chamber
- Gasket for annular chamber
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Dimensional drawings




d4: See table below

L: Overall length 65 mm
d: According to sizing calculation
D: According to inner diameter of pipe (sizing tool)

| | Outer diameter d4 / Sealing face: flat | | | | | | |
|---|---|---|---|---|---|---|---|
| Nominal size | PN 6 | PN 10 | PN 16 | PN 25 | PN 40 | PN 63 | PN 100 |
| DN 50 | 96 | 107 | 107 | 107 | 107 | 113 | 119 |
| DN 65 | 116 | 127 | 127 | 127 | 127 | 138 | 144 |
| DN 80 | 132 | 142 | 142 | 142 | 142 | 148 | 154 |
| DN 100 | 152 | 162 | 162 | 168 | 168 | 174 | 180 |
| DN 125 | 182 | 192 | 192 | 194 | 194 | 210 | 217 |
| DN 150 | 207 | 218 | 218 | 224 | 224 | 247 | 257 |
| DN 200 | 262 | 273 | 273 | 284 | 290 | 309 | 324 |
| DN 250 | 317 | 328 | 329 | 340 | 352 | 364 | 391 |
| DN 300 | 373 | 378 | 384 | 400 | 417 | 424 | 458 |
| DN 350 | 423 | 438 | 444 | 457 | 474 | 486 | 512 |
| DN 400 | 473 | 489 | 495 | 514 | 546 | 543 | - |
| DN 500 | 578 | 594 | 617 | 624 | 628 | - | - |

| | Outer diameter d4 / Sealing face: flat | | |
|---|---|---|---|
| Nominal size | Class 150 | Class 300 | Class 600 |
| 2" | 105 | 111 | 111 |
| 2,5" | 124 | 130 | 130 |
| 3" | 137 | 149 | 149 |
| 4" | 175 | 181 | 194 |

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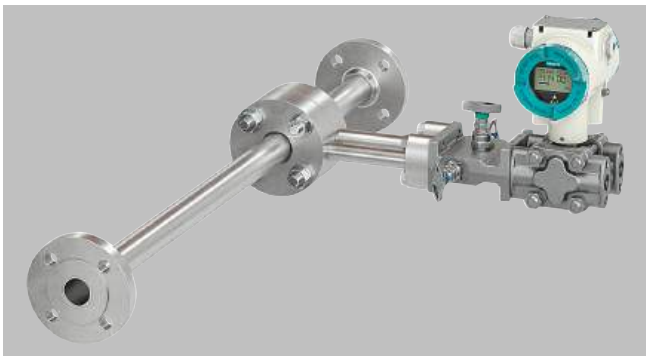
## Dimensional drawings (continued)

| Nominal size | Outer diameter d4 / Sealing face: flat<br>Class 150 | Class 300 | Class 600 |
|---|---|---|---|
| 5" | 197 | 216 | 241 |
| 6" | 222 | 251 | 267 |
| 8" | 279 | 308 | 321 |
| 10" | 340 | 362 | 400 |
| 12" | 410 | 422 | 457 |
| 14" | 451 | 486 | 492 |
| 16" | 514 | 540 | 565 |
| 20" | 549 | 597 | 613 |

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## Application



SITRANS FP230 compact design



SITRANS FPS200 remote design

Orifice meter run with flanges ends in carbon or stainless steel for flow measurement of gas, steam and liquid.

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## Design

Orifice meter runs for small diameter pipes come with partial straight inlet and outlet pipe runs with flanged ends. The pipes are connected to an annular chamber where the orifice plate is mounted. The annular chamber consists of a two-piece carrier ring with annular chamber and integral tappings and an inserted orifice plate.

Pressure before and after the orifice is averaged through the annular chamber. Tapping connections are integrated into each part of the carrier ring. Differential pressure connection can be compact and remote. The instruments are easy to install in the pipe system. Additional straight pipe length may be required before and after the orifice meter run. The orifice can be disassembled to replace the inserted orifice plate.

Nominal sizes

- EN: DN 10 ... 50
- ASME: 3/8 ... 2 inch

Nominal pressure

- EN: PN 6 ... 64
- ASME: class 150 ... 600

Pressure tapping

- Annular chamber: Corner tapping through annular chamber

Connection length

- Suitable for gases for a maximum of approx. 80 mm pipe insulation
- Suitable for steam for a maximum of approx. 140 mm pipe insulation

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- Pipe/Flanges: Carbon steel / orifice plate: 316L/1.4404
- Pipe/Flanges: 316L/1.4404 / orifice plate: 316L/1.4404

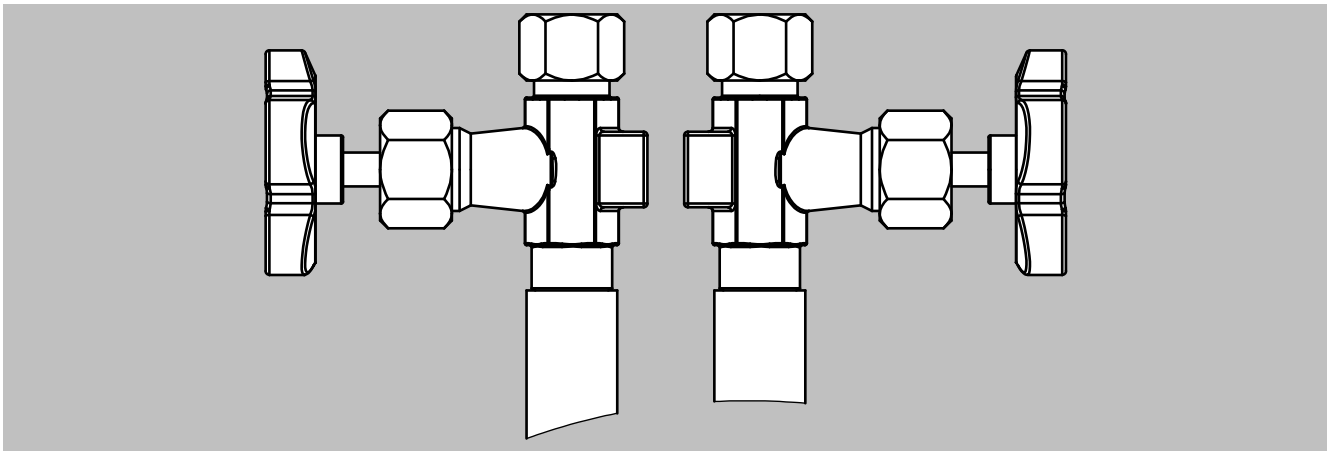
Gaskets

- Gas and liquids: Klingersil C4400
- Steam: Graphite with stainless steel inlay

***Tapping sockets***

***Gases and liquids***

Remote design



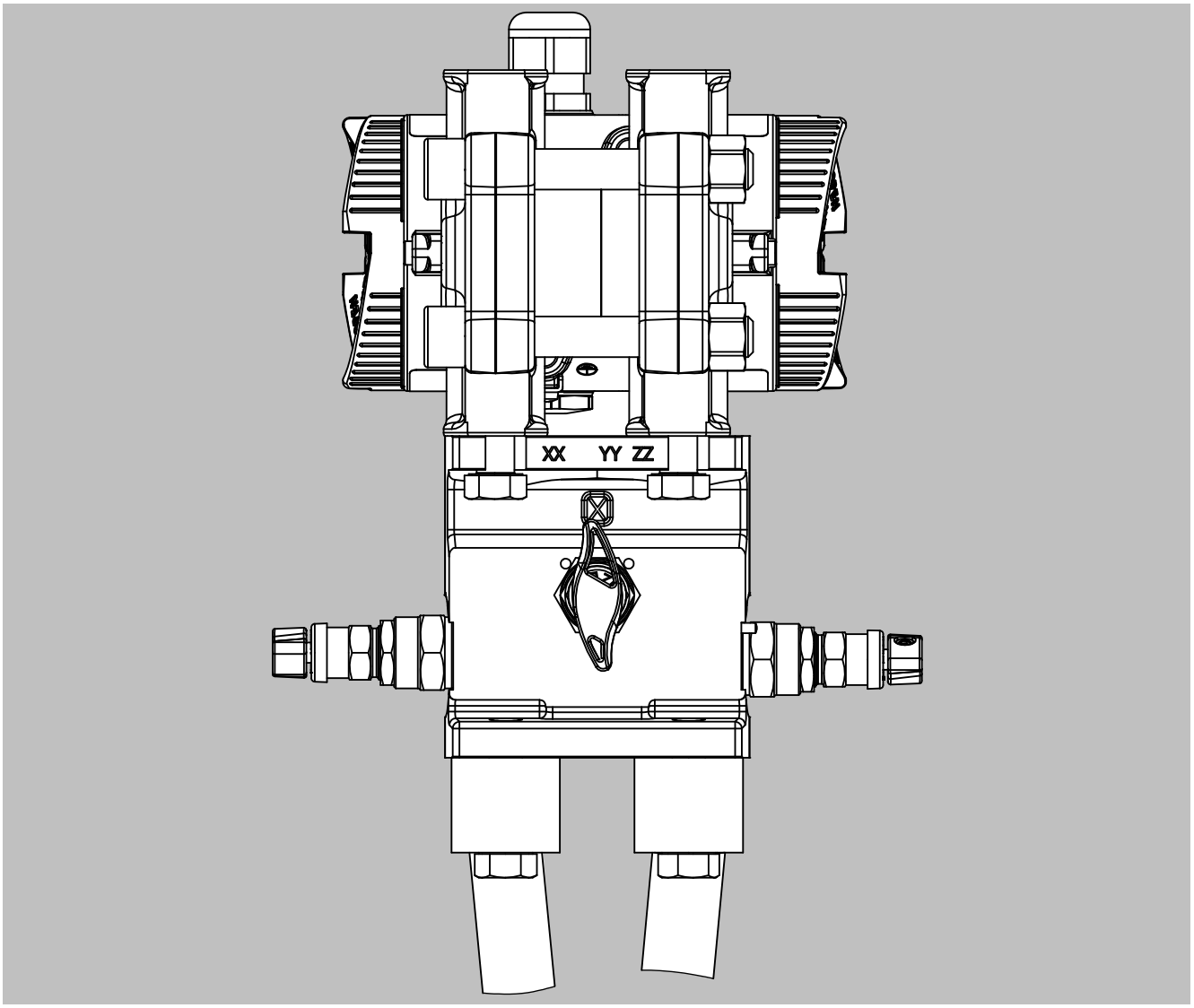
For metering pipes in remote design, the angle α between the pressure taps is 135°.

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## Design (continued)

Compact design



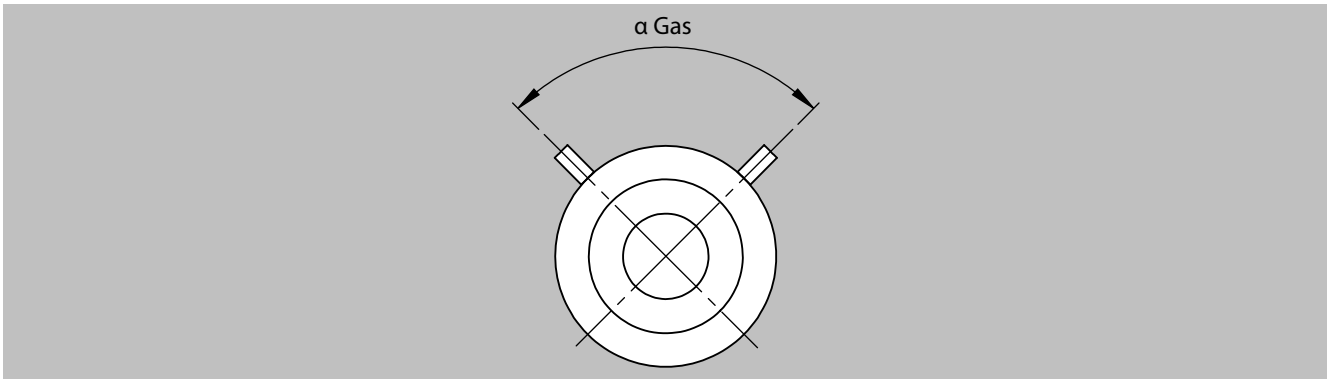

For metering pipes in compact design, so-called oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges.

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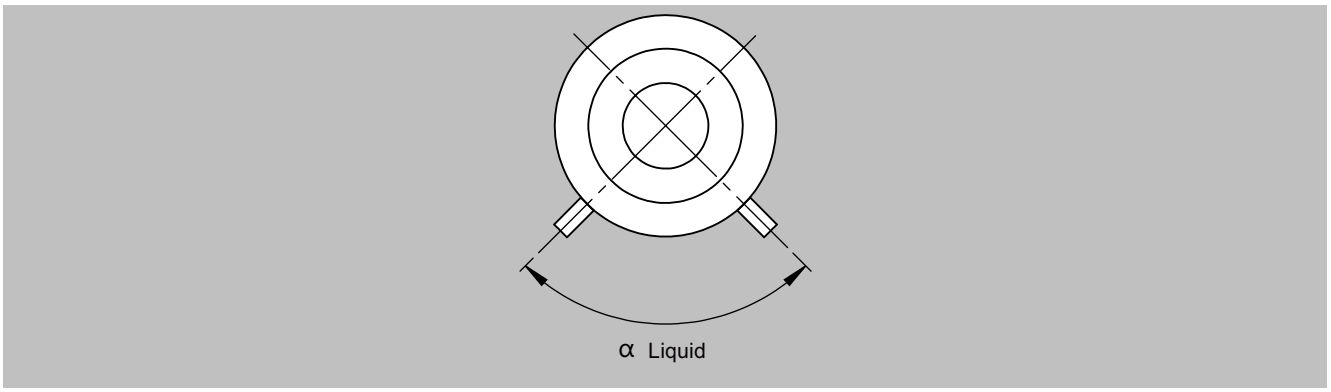


## Design (continued)

Tap position/angle in horizontal pipe




Tap position/angle in horizontal pipe (gas)




Tap position/angle in horizontal pipe (liquid)

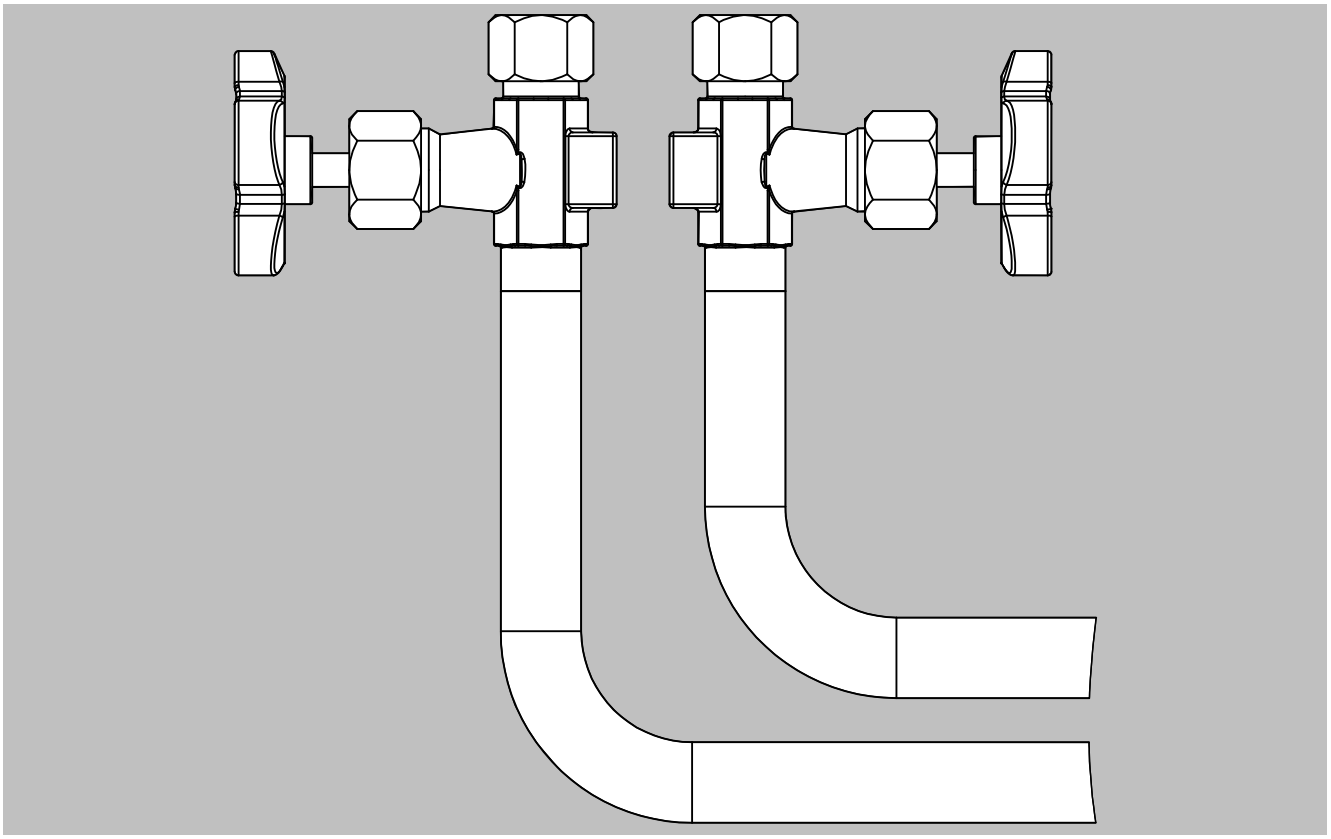
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## Design (continued)

***Wet gases***

Remote design



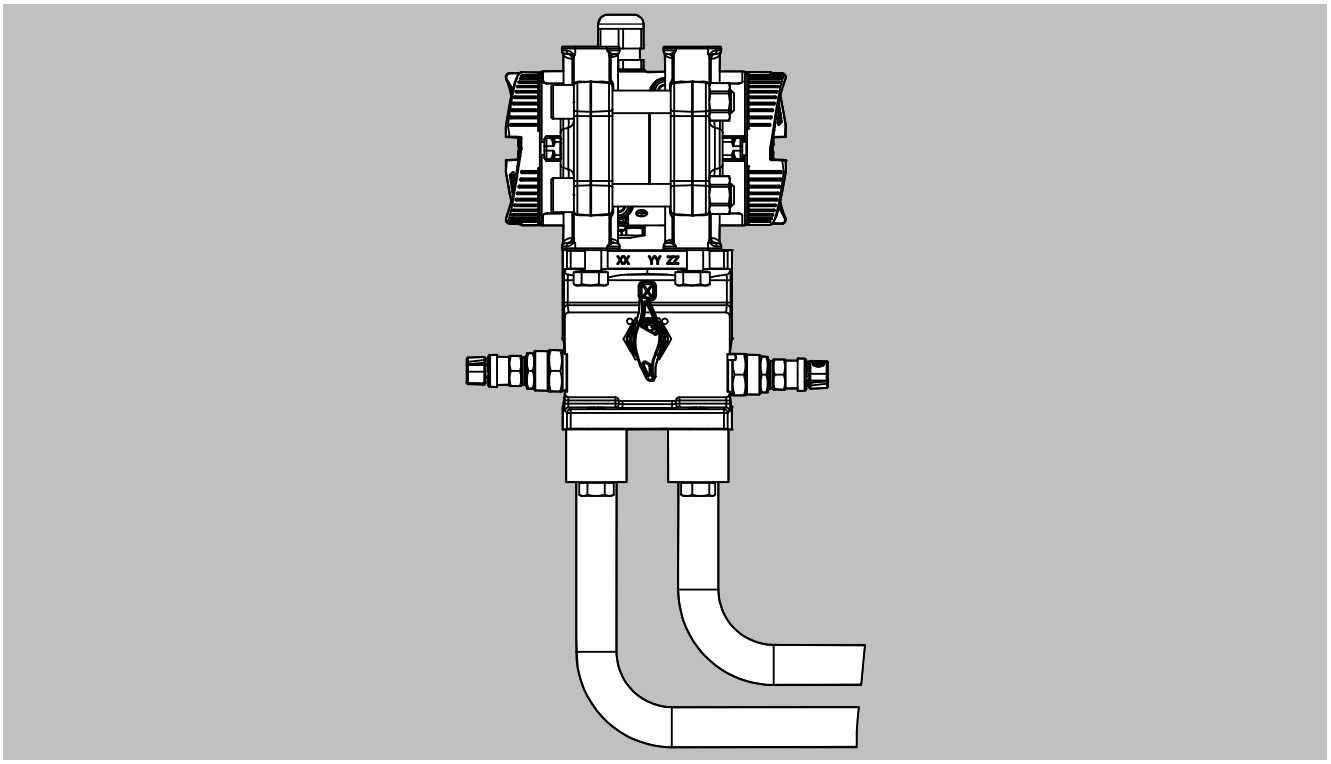
For metering pipes in remote design for wet gases, nozzles bent at right angles with welded-on valves are used. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the nozzles point up as listed in the table above.

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## Design (continued)

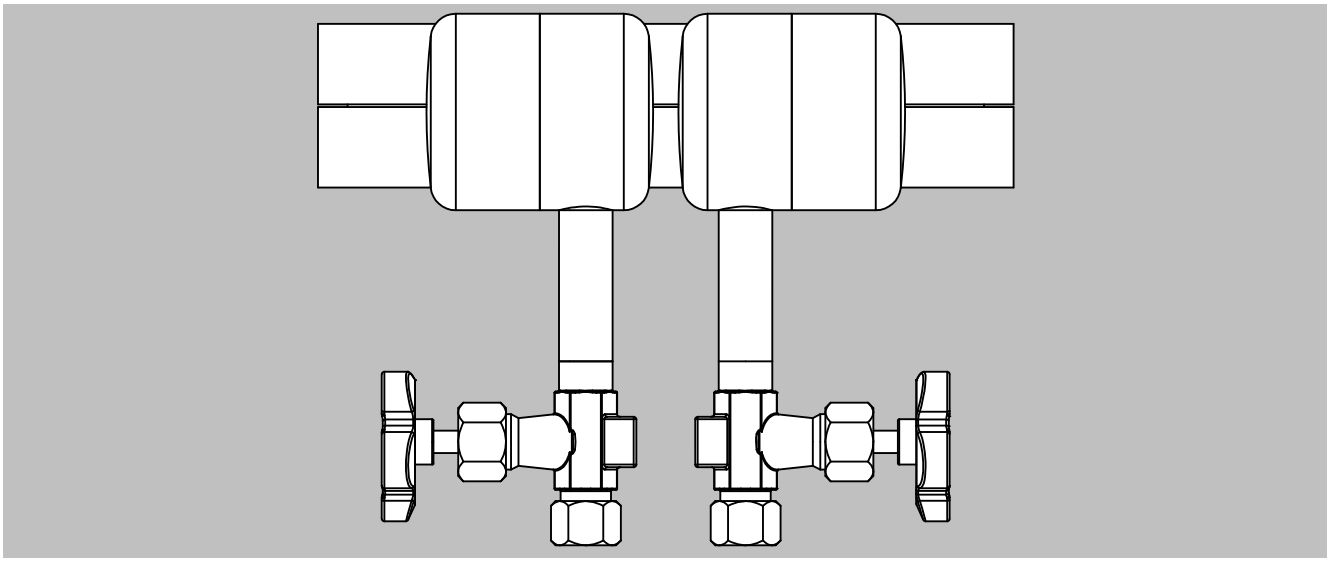
Compact design




For metering pipes in compact design for wet gases, nozzles bent at right angles with oval flanges are used. The manifold and the differential pressure transmitter are mounted on these oval flanges. This design is only necessary for vertical pipes. For horizontal pipes, the design for gases and liquids can be selected because the flange plate with manifold and transmitter always points up.

***Steam***

Remote design



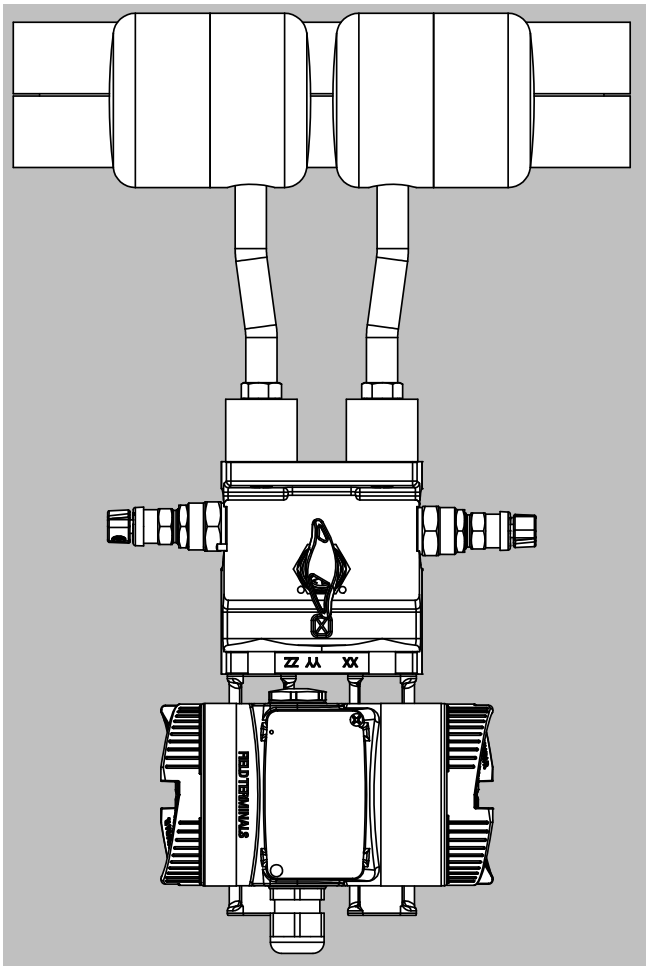
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## Design (continued)

For metering pipes in remote design for steam, the condensate vessels with shut-off valves are mounted at an angle of 180°.

Compact design




For metering pipes in compact design for steam, the condensate vessels are mounted on one side. The manifold and the differential pressure transmitter are mounted to the condensate vessels using oval flanges. The condensate vessels are equipped with filling nozzles, which means a 3-way manifold can be used.

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## Selection and ordering data

| SITRANS FP230/FPS200 orifice meter run | Article No. 7ME173 | ● | - | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | | |
| DN 10 (3/8") | | | | 0 | A | | | | | | | | |
| DN 15 (½") | | | | 0 | B | | | | | | | | |
| DN 20 (¾") | | | | 0 | C | | | | | | | | |
| DN 25 (1") | | | | 0 | D | | | | | | | | |
| DN 32 (1¼") | | | | 0 | E | | | | | | | | |
| DN 40 (1½") | | | | 1 | C | | | | | | | | |
| DN 50 (2") | | | | 1 | D | | | | | | | | |
| **Nominal pressure** | | | | | | | | | | | | | |
| Flange EN 1092-1 type B1 PN 6 | | | | | | A | | | | | | | |
| Flange EN 1092-1 type B1 PN 10 | | | | | | B | | | | | | | |
| Flange EN 1092-1 type B1 PN 16 | | | | | | C | | | | | | | |
| Flange EN 1092-1 type B1 PN 25 | | | | | | D | | | | | | | |
| Flange EN 1092-1 type B1 PN 40 | | | | | | E | | | | | | | |
| Flange EN 1092-1 type B1 PN 64 | | | | | | F | | | | | | | |
| Flange ASME B16.5 Class 150 | | | | | | Q | | | | | | | |
| Flange ASME B16.5 Class 300 | | | | | | R | | | | | | | |
| Flange ASME B16.5 Class 600 | | | | | | S | | | | | | | |
| **Wetted parts material** | | | | | | | | | | | | | |
| Pipe/Flanges: Carbon steel / orifice plate: 316L/1.4404 | | | | | | | 4 | | | | | | |
| Pipe/Flanges: 316L/1.4404 / orifice plate: 316L/1.4404 | | | | | | | 5 | | | | | | |
| **System design** | | | | | | | | | | | | | |
| Compact design for dry gases (horizontal and vertical pipes) | | | | | | | | | | 0 | | | |
| Compact design for liquids | | | | | | | | | | 1 | | | |
| Compact design for wet gases (only vertical pipes) | | | | | | | | | | 2 | | | |
| Compact design for steam | | | | | | | | | | 3 | | | |
| Remote design for dry gases | | | | | | | | | | 4 | | | |
| Remote design for liquids | | | | | | | | | | 5 | | | |
| Remote design for wet gases | | | | | | | | | | 6 | | | |
| Remote design for steam | | | | | | | | | | 7 | | | |
| **Type of protection of pressure transmitter** | | | | | | | | | | | | | |
| No Ex / without pressure tranmitter | | | | | | | | | | | A | | |
| Intrinsic safety | | | | | | | | | | | B | | |
| Explosion proof | | | | | | | | | | | C | | |
| Intrinsic safety, Explosion proof | | | | | | | | | | | D | | |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | L | | |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | | | | | | | | | | | M | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | S | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | | | | | | | | | | | T | | |
| **Electrical connections/cable entries of pressure transmitter** | | | | | | | | | | | | | |
| Without pressure transmitter | | | | | | | | | | | | A | |
| 2 × M20 × 1.5 | | | | | | | | | | | | F | |
| 2 × 1/2-14 NPT | | | | | | | | | | | | M | |
| **Local operation/display of pressure transmitter** | | | | | | | | | | | | | |
| Without display (closed lid) / without pressure tranmitter | | | | | | | | | | | | | 0 |
| With display (closed lid) | | | | | | | | | | | | | 1 |
| With display (lid with glass window) | | | | | | | | | | | | | 2 |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. manifolds** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Inspection certificate (DIN EN 571-1) - dye penetration test of weldings | **C56** |
| Hydrostatic pressure test of the primary element (EN 13480-5) of weldings | **C58** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C and condensate vessel made of carbon steel with tube fitting 12 mm | **T56** |
| With mounted shut-off valves DN8 made of stainless steel, and condensate vessel made of stainless steel with tube fitting 12 mm | **T57** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U40** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U41** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U42** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U43** |
| With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws and condensate vessel made of carbon steel | **U46** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws and condensation vessels incl. filling union 1/2" NPT made of stainless steel | **U47** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm | **U56** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

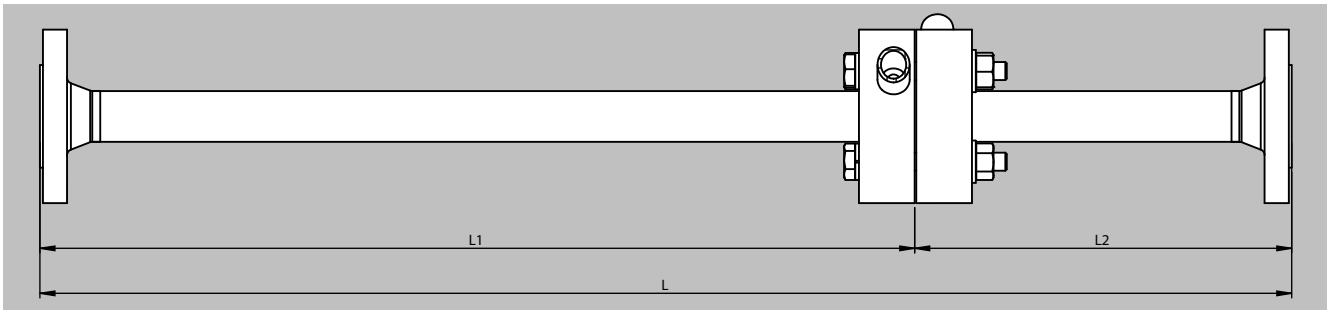
Scope of delivery

- Orifice meter run consisting of 2 parts, each with flanged ends, pipe, and annular chamber with integrated pressure tapping
- Orifice plate mounted in annular chamber
- Gasket for annular chamber
- Screws and nuts for annular chamber
- Condensation pots for steam applications
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Dimensional drawings




### *Overall length*

| Nominal size | DN 10<br>3/8" | DN 15<br>½" | DN 20<br>¾" | DN 25<br>1" | DN 32<br>1 ¼" | DN 40<br>1 ½" | DN 50<br>2" |
|---|---|---|---|---|---|---|---|
| L | 400 | 550 | 700 | 900 | 1100 | 1300 | 1500 |
| L1 | 230 | 380 | 500 | 650 | 800 | 1000 | 1200 |
| L2 | 170 | 170 | 200 | 250 | 300 | 300 | 300 |

### *Pipe dimensions*

| Carbon steel<br>Nominal size | PN 16 | PN 40 | PN 63 | Nominal size | Class 150 | Class 300 | Class 600 |
|---|---|---|---|---|---|---|---|
| DN 10 | 21.3 × 6.3 | 21.3 × 6,3 | 21.3 × 6,3 | 3/8" | 21.3 × 7.47*) | 21.3 × 7.47*) | 21.3 × 7.47[1)] |
| DN 15 | 21.3 × 2.6 | 21.3 × 2.6 | 21.3 × 2.6 | ½" | 21.3 × 3.73 | 21.3 × 3.73 | 21.3 × 3.73 |
| DN 20 | 26.9 × 2.6 | 26.9 × 2.6 | 26.9 × 2.6 | ¾" | 26.7 × 2.87 | 26.7 × 2.87 | 26,7 × 2.87 |
| DN 25 | 33.7 × 2.6 | 33,7 × 2.6 | 33,7 × 2.6 | 1" | 33.4 × 3.38 | 33.4 × 3.38 | 33.4 × 3.38 |
| DN 32 | 42.4 × 2.6 | 42.4 × 2.6 | n/a | 1 ¼" | 42.2 × 3.56 | 42.2 × 3.56 | 42.2 × 3.56 |
| DN 40 | 48.3 × 2.6 | 48.3 × 2.6 | 48.3 × 2.9 | 1 ½" | 48.3 × 3.68 | 48.3 × 3.68 | 48.3 × 3.68 |
| DN 50 | 60.3 × 2.9 | 60.3 × 2.9 | 60.3 × 3.6 | 2" | 60.3 × 3.91 | 60.3 × 3.91 | 60.3 × 3.91 |

| Stainless steel<br>Nominal size | PN 16 | PN 40 | PN 63 | Nominal size | Class 150 | Class 300 | Class 600 |
|---|---|---|---|---|---|---|---|
| DN 10 | 21.3 × 7.47 | 21.3 × 7.47 | 21.3 × 7.47 | 3/8" | 21.3 × 2.77*) | 21.3 × 2.77*) | 21.3 × 2.77[1)] |
| DN 15 | 21.3 × 2.77 | 21.3 × 2.77 | 21.3 × 3.73 | ½" | 21.3 × 2.77 | 21.3 × 2.77 | 21.3 × 2.77 |
| DN 20 | 26.7 × 2.87 | 26.7 × 2.87 | 26.7 × 3.91 | ¾" | 26.7 × 2.87 | 26.7 × 2.87 | 26.7 × 2.87 |
| DN 25 | 33.4 × 3.38 | 33.4 × 3.38 | 33.4 × 3.38 | 1" | 33.4 × 3.38 | 33.4 × 3.38 | 33.4 × 3.38 |
| DN 32 | 42.2 × 3.56 | 42.2 × 3.56 | n/a | 1 ¼" | 42.2 × 3.56 | 42.2 × 3.56 | 42.2 × 3.56 |
| DN 40 | 48.3 × 2.77 | 48.3 × 2.77 | 48.3 × 3.68 | 1 ½" | 48.3 × 3.68 | 48.3 × 3.68 | 48.3 × 3.68 |
| DN 50 | 60.3 × 3.91 | 60.3 × 3.91 | 60.3 × 3.91 | 2" | 60.3 × 3.91 | 60.3 × 3.91 | 60.3 × 3.91 |

[1)] Orifice meter runs with 3/8" diameter will be built with ½" flanges.

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## Application



SITRANS FPS200 remote design

Orifice plate for installation between flanges in stainless steel for flow measurement of gas, steam and liquid.

## Design

Orifice plates for the installation with flange tappings consist of the orifice plate with a welded-on marking and grip plate. The plates have no pressure tappings and are therefore normally mounted between measuring flanges containing the pressure tappings.

Pressure tapping

- Not included

Sealing face

- According to EN 1092-1: flat (for flanges type B1 and B2)
- According to ASME B16.5: flat (for flanges RF and SF)

Material

- 316L/1.4404

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## Selection and ordering data

| SITRANS FP230/FPS200 orifice plate | Article No. 7ME174 | ● | - | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | | |
| DN 50 (2") | | | | 1 | D | | | | | | | | |
| DN 65 (2½") | | | | 1 | E | | | | | | | | |
| DN 80 (3") | | | | 1 | F | | | | | | | | |
| DN 100 (4") | | | | 2 | G | | | | | | | | |
| DN 125 (5") | | | | 2 | H | | | | | | | | |
| DN 150 (6") | | | | 2 | J | | | | | | | | |
| DN 200 (8") | | | | 2 | K | | | | | | | | |
| DN 250 (10") | | | | 2 | L | | | | | | | | |
| DN 300 (12") | | | | 2 | M | | | | | | | | |
| DN 350 (14") | | | | 2 | N | | | | | | | | |
| DN 400 (16") | | | | 2 | P | | | | | | | | |
| DN 450 (18") | | | | 2 | Q | | | | | | | | |
| DN 500 (20") | | | | 2 | R | | | | | | | | |
| DN 600 (24") | | | | 2 | S | | | | | | | | |
| **Nominal pressure** | | | | | | | | | | | | | |
| Flange EN 1092-1 type B1 PN 6 | | | | | | A | | | | | | | |
| Flange EN 1092-1 type B1 PN 10 | | | | | | B | | | | | | | |
| Flange EN 1092-1 type B1 PN 16 | | | | | | C | | | | | | | |
| Flange EN 1092-1 type B1 PN 25 | | | | | | D | | | | | | | |
| Flange EN 1092-1 type B1 PN 40 | | | | | | E | | | | | | | |
| Flange EN 1092-1 type B1 PN 64 | | | | | | F | | | | | | | |
| Flange EN 1092-1 type B1 PN 100 | | | | | | G | | | | | | | |
| Flange ASME B16.5 Class 150 | | | | | | Q | | | | | | | |
| Flange ASME B16.5 Class 300 | | | | | | R | | | | | | | |
| Flange ASME B16.5 Class 600 | | | | | | S | | | | | | | |
| **Wetted parts material** | | | | | | | | | | | | | |
| Orifice plate: 316L/1.4404 | | | | | | | 6 | | | | | | |
| **System design** | | | | | | | | | | | | | |
| Without connection for pressure lines | | | | | | | | | | 8 | | | |
| **Type of protection of pressure transmitter** | | | | | | | | | | | | | |
| No Ex / without pressure tranmitter | | | | | | | | | | | A | | |
| Intrinsic safety | | | | | | | | | | | B | | |
| Explosion proof | | | | | | | | | | | C | | |
| Intrinsic safety, Explosion proof | | | | | | | | | | | D | | |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | L | | |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | | | | | | | | | | | M | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | S | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | | | | | | | | | | | T | | |
| **Electrical connections/cable entries of pressure transmitter** | | | | | | | | | | | | | |
| Without pressure transmitter | | | | | | | | | | | | A | |
| 2 × M20 × 1.5 | | | | | | | | | | | | F | |
| 2 × 1/2-14 NPT | | | | | | | | | | | | M | |
| **Local operation/display of pressure transmitter** | | | | | | | | | | | | | |
| Without display (closed lid) / without pressure tranmitter | | | | | | | | | | | | | 0 |
| With display (closed lid) | | | | | | | | | | | | | 1 |
| With display (lid with glass window) | | | | | | | | | | | | | 2 |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. manifolds** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |

| | Order code |
|---|---|
| **Valve manifolds for mounting on primary element** | |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

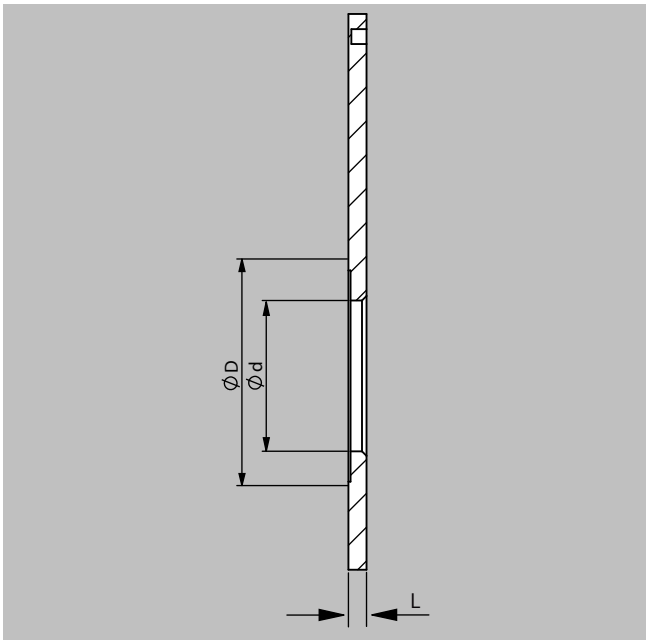
Scope of delivery

- Orifice plate
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Dimensional drawings




D: According to inner diameter of pipe (sizing tool)

L: Overall length
d: According to sizing calculation

***Nominal size of orifice plate***

DIN/EN

| DN | Nominal size, up to 50 | 65 | 80 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 | 6 |

ASME

| DN | Nominal size, up to 2" | 2,5" | 3" | 4" | 5" | 6" | 7" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 22" | 24" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 3 | 3 | 3 | 3 | 3 | 3 | 6 | 6 | 6 | 6 | 6 | 10 | 10 | 10 | 12 | 12 |

*) Not standardized in DIN standard.

Up to DN 50 adjusted for general practice. Nominal width designed for a differential pressure of up to 1000 mbar.

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## Application



SITRANS FPS200 remote design

Orifice flange pair according to ASME B16.36 with orifice plate in carbon steel (flanges) or stainless steel for flow measurement of gas and liquid.

## Design

The orifice plate is mounted between traditional orifice flanges according to ASME B16.36. The orifice flanges are manufactured with integral pressure tappings. System design is always remote. The orifice plate can be exchanged. The flanges have to be welded into the pipe.

- Design of orifice plate, see Orifice plates

Differential pressure tapping

- In the flange: Differential pressure tapping in special measuring flanges with integrated connectors in the flange, always remote

Tapping sockets

- 0°

Connection length

- For gases and liquids suitable for up to approx. 80 mm pipe insulation

Sealing face

- According to ASME B16.5: flat

Materials

- Flange carbon steel, plate 316L
- Flange and plate 316L

Gaskets

- Spiral graphite

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## Selection and ordering data

| SITRANS FP230/FPS200 orifice plate with orifice flanges | Article No. 7ME175 | ● | - | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size** | | | | | | | | | | | | | |
| DN 50 (2") | | | | 1 | D | | | | | | | | |
| DN 65 (2½") | | | | 1 | E | | | | | | | | |
| DN 80 (3") | | | | 1 | F | | | | | | | | |
| DN 100 (4") | | | | 2 | G | | | | | | | | |
| DN 125 (5") | | | | 2 | H | | | | | | | | |
| DN 150 (6") | | | | 2 | J | | | | | | | | |
| DN 200 (8") | | | | 2 | K | | | | | | | | |
| DN 250 (10") | | | | 2 | L | | | | | | | | |
| DN 300 (12") | | | | 2 | M | | | | | | | | |
| DN 350 (14") | | | | 2 | N | | | | | | | | |
| DN 400 (16") | | | | 2 | P | | | | | | | | |
| DN 450 (18") | | | | 2 | Q | | | | | | | | |
| DN 500 (20") | | | | 2 | R | | | | | | | | |
| DN 600 (24") | | | | 2 | S | | | | | | | | |
| **Nominal pressure** | | | | | | | | | | | | | |
| Flange ASME B16.5 Class 300 | | | | | | R | | | | | | | |
| Flange ASME B16.5 Class 600 | | | | | | S | | | | | | | |
| **Wetted parts material** | | | | | | | | | | | | | |
| Flanges: Carbon steel / orifice plate: 316L/1.4404 | | | | | | | 7 | | | | | | |
| Flanges: 316L/1.4404 / orifice plate: 316L/1.4404 | | | | | | | 8 | | | | | | |
| **System design** | | | | | | | | | | | | | |
| Remote design for dry gases | | | | | | | | | | 4 | | | |
| Remote design for liquids | | | | | | | | | | 5 | | | |
| Remote design for wet gases | | | | | | | | | | 6 | | | |
| **Type of protection of pressure transmitter** | | | | | | | | | | | | | |
| No Ex / without pressure tranmitter | | | | | | | | | | | A | | |
| Intrinsic safety | | | | | | | | | | | B | | |
| Explosion proof | | | | | | | | | | | C | | |
| Intrinsic safety, Explosion proof | | | | | | | | | | | D | | |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | L | | |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | | | | | | | | | | | M | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | | | | | | | | | | | S | | |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | | | | | | | | | | | T | | |
| **Electrical connections/cable entries of pressure transmitter** | | | | | | | | | | | | | |
| Without pressure transmitter | | | | | | | | | | | | A | |
| 2 × M20 × 1.5 | | | | | | | | | | | | F | |
| 2 × 1/2-14 NPT | | | | | | | | | | | | M | |
| **Local operation/display of pressure transmitter** | | | | | | | | | | | | | |
| Without display (closed lid) / without pressure tranmitter | | | | | | | | | | | | | 0 |
| With display (closed lid) | | | | | | | | | | | | | 1 |
| With display (lid with glass window) | | | | | | | | | | | | | 2 |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. manifolds** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |

| | Order code |
|---|---|
| **Valve manifolds for mounting on primary element** | |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

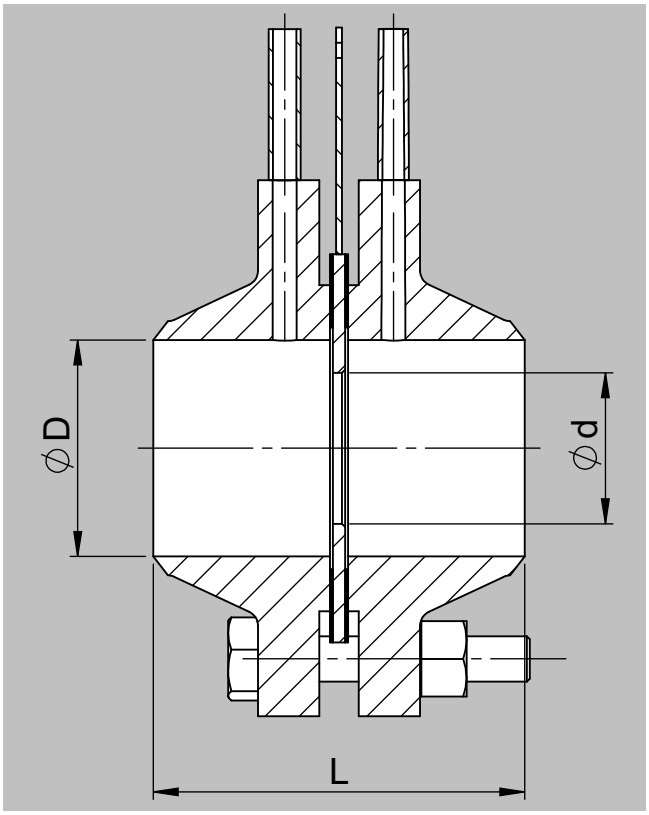
Scope of delivery

- Orifice plate
- Orifice flanges according to ASME B16.36 with pressure tappings
- 2× Gaskets for orifice flanges
- Screws and nuts
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Dimensional drawings




D: According to inner diameter of pipe (sizing tool)

L: Overall length
d: According to sizing calculation

***Overall lenght***

| DN/Inch | PN/lbs | L | Hex nut bolt | Bolts (pcs.) | Gasket |
|---|---|---|---|---|---|
| 24 | 600 | 433.10 | 1 7/8 | 24 | 2.0 |
| 20 | 600 | 407.70 | 1 5/8 | 24 | 2.0 |
| 18 | 600 | 395.00 | 1 5/8 | 20 | 2.0 |
| 16 | 600 | 382.30 | 1 1/2 | 20 | 2.0 |
| 14 | 600 | 352.90 | 1 3/8 | 20 | 2.0 |
| 12 | 600 | 333.60 | 1 1/4 | 20 | 2.0 |
| 10 | 600 | 327.50 | 1 1/4 | 16 | 2.0 |
| 8 | 600 | 286.40 | 1 1/8 | 12 | 2.0 |
| 6 | 600 | 254.40 | 1 | 12 | 2.0 |
| 4 | 600 | 222.90 | 7/8 | 8 | 2.0 |
| 3 | 600 | 184.80 | 3/4 | 8 | 2.0 |
| 2½ | 600 | 184.80 | 3/4 | 8 | 2.0 |
| 2 | 600 | 178.70 | 5/8 | 8 | 2.0 |
| 24 | 300 | 350.30 | 1 1/2 | 24 | 2.0 |
| 20 | 300 | 338.10 | 1 1/4 | 24 | 2.0 |
| 18 | 300 | 331.50 | 1 1/4 | 24 | 2.0 |
| 16 | 300 | 306.10 | 1 1/4 | 20 | 2.0 |
| 14 | 300 | 295.50 | 1 1/8 | 20 | 2.0 |
| 12 | 300 | 270.10 | 1 1/8 | 16 | 2.0 |
| 10 | 300 | 244.70 | 1 | 16 | 2.0 |
| 8 | 300 | 229.50 | 7/8 | 12 | 2.0 |

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## Dimensional drawings (continued)

| DN/Inch | PN/lbs | L | Hex nut bolt | Bolts (pcs.) | Gasket |
|---|---|---|---|---|---|
| 6 | 300 | 207.16 | 3/4 | 12 | 2.0 |
| 4 | 300 | 190.90 | 3/4 | 8 | 2.0 |
| 3 | 300 | 184.80 | 3/4 | 8 | 2.0 |
| 2½ | 300 | 184.80 | 3/4 | 8 | 2.0 |
| 2 | 300 | 178.70 | 5/8 | 4 | 2.0 |

***Nominal size of orifice plate***

DIN/EN

| | Nominal size, up to | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | 50 | 65 | 80 | 100 | 125 | 150 | 175 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| mm | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 6 | 6 |

ASME

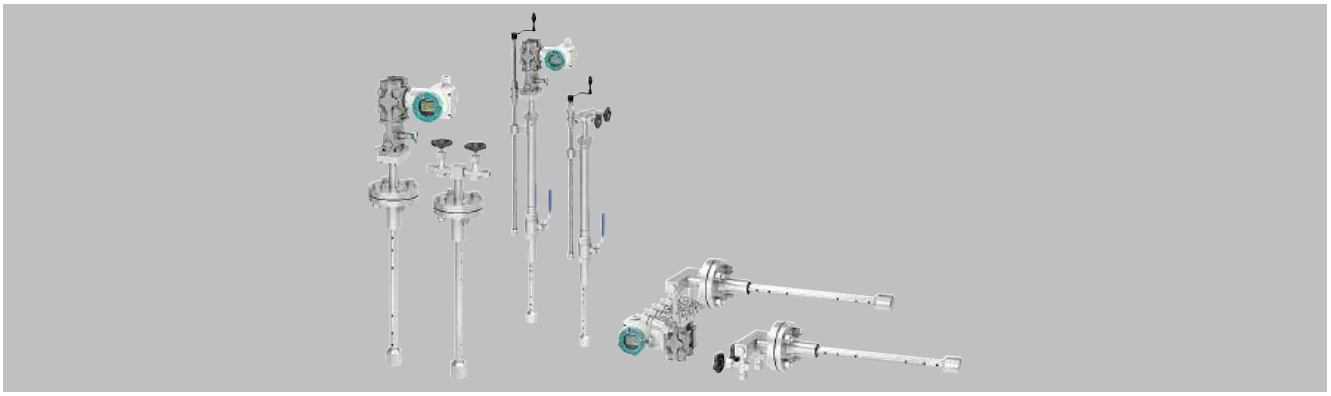
| | Nominal size, up to | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DN | 2" | 2.5" | 3" | 4" | 5" | 6" | 7" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 22" | 24" |
| mm | 3 | 3 | 3 | 3 | 3 | 3 | 6 | 6 | 6 | 6 | 6 | 10 | 10 | 10 | 12 | 12 |

Nominal size designed for a differential pressure of up to 1000 mbar.
The specified dimensions are approximate dimensions, exact dimensions depend on the gasket used.

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## Overview



Due to the robust technology and the simple principle of measurement, averaging pitot tubes can be used in many different ways even under difficult conditions and offer considerable advantages over other measuring technology from easy installation to long-term measuring stability.

Further special advantages are the possibilities of bidirectional flow measurement as well as the integration of temperature and pressure measurement.

## Benefits

- Easy to retrofit (no rebuilding of the pipe)
- Easy to install
- Good for large nominal diameters
- Wide range of application (media, nominal diameters, process conditions)
- Minor measurement inaccuracy
- Special designs possible for special applications
- Also work in rectangular ducts and pipes

## Application

- Technical Gases
- Compressed Air
- Exhaust Air
- Fresh and Combustion Air
- Heat Transfer Fluids
- Water
- Exhaust Gas
- Steam/Heat Quantities

## Design

***Basics: Averaging pitot tubes for flow measurement***

- Mounting by insertion into the pipe (no flange-to-flange instrument)
- Differential pressure generation through forced flow
- Variation of the classic "pitot tube" through multiple metering orifices (so-called "averaging pitot tube")
- Design follows manufacturer guidelines, not standardized

***Designs***

- Averaging pitot tube for gases and liquids (7ME161)
- Averaging pitot tube for steam applications (7ME162)
- Averaging pitot tube with FASTLOK (7ME163), to remove sensor during operation without interruption of process

***System design***

- Compact design for dry gases and liquids without integrated temperature measurement
- Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement
- Compact design for steam with or without integrated temperature measurement
- Remote design for dry or wet gases, liquids and steam

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## Function

***Design of the averaging pitot tube***

Similar to other differential pressure devices averaging pitot tubes create a differential pressure to measure flow. They are not specified in the general standard ISO 5167, but they follow the same technical principle. In contrast to the classic primary elements, averaging pitot tubes are not "in-line" devices but consist of a "profile" that is inserted into the side of the pipeline.

Differential pressure is created when fluid flows around the profile of the averaging pitot tube. Since the constriction of the pipeline by the profile in relation to the cross-sectional area is much smaller than, for example, with an orifice plate, the created differential pressure and the respective permanent pressure drop are smaller.

The flow comes to a complete stop at the upstream side of the averaging pitot tube creating the upstream pressure. At the downstream side a negative pressure is created by the so-called Kármán vortex street. The differential pressure (difference between upstream pressure and negative pressure) is the measurement signal and is proportional to the flow rate. This results in the following basic formula for flow measurement with averaging pitot tubes:

$q_m = A \bullet k \bullet \sqrt{(2 \bullet \Delta p \bullet \rho)}$

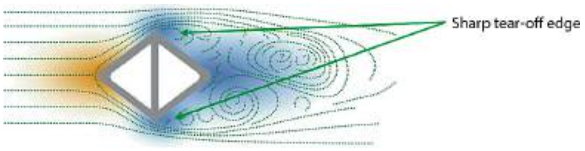
$q_m$: mass flow

A: cross-sectional area of the pipe

k: device factor of the pitot tube

Δp: differential pressure

ρ: density




The k-factor is the device factor of the averaging pitot tube and is determined, among other things, by the shape of the profile of the pitot tube. Thanks to the sharp-edged shape of the profile, it remains constant over a very wide Reynolds number range and enables linear flow measurement.

The averaging pitot tube features the same number of measuring openings on the front and back. The special distribution of the measuring openings over the cross section allows geometric averaging in case of uneven flow distribution and thus an accurate measurement even with very short inlet and outlet distances. The generated upstream and downstream pressures are averaged in the respective chambers and routed to the differential pressure transmitter.

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## Technical specifications

| SITRANS FP330/FPS300 | |
|---|---|
| **General design** | |
| Working principle | Multi-port averaging pitot tube for round and rectangular pipes |
| Media | • Steam (saturated, superheated)<br>• Gas (dry, up to 100% water saturated) (automatic purging unit for high dust applications on request)<br>• Liquids (water, non-conductive liquids, oil, etc.) |
| Transmitter installation | • Compact mount with differential pressure transmitter<br>• Remote mounted differential pressure transmitter |
| Bidirectional flow | Yes (symmetric sensor design) |
| Calculation | According to manufacturer standard |
| **Accuracy** | |
| Linearity (of Sensor k-Factor) | Re > 20 000: 1% |
| Repeatability (of Sensor k-Factor) | Re > 20 000: 0.1% |
| Measurement range | Typically, up to 1:10 (real measurement range depends on transmitter performance) |
| **Operating conditions** | |
| Pressure | Flange: Max. PN 100<br>Cutting Ring: Max. PN 40 (max. 180 °C)<br>FASTLOK: Max. PN 16 (max. 180 °C)<br>(higher pressure ratings on request) |
| Temperature | Stainless Steel sensor: -100 ... 500 °C<br>16Mo3: -20 ... 530 °C<br>Alloy: -20 ... 700 °C<br>(exact maximum temperature depends on sensor design, feasibility will be calculated by sizing tool) |
| Pressure loss | generally, <10% of differential pressure |
| **Installation conditions** | |
| Straight inlet diameter | 7 × Inner diameter behind 90° elbow |
| Straight outlet diameter | 3 × Inner diameter<br>(for detailed calculation of recommended installation pipe length please refer to sizing tool or manual) |
| **Design** | |
| Material sensor | Standard: Stainless steel 1.4404/ AISI 316L<br>Optional: 1.5415/16Mo3, Alloy C22<br>(other materials on request) |
| Diameter | 40 ... 4000 mm<br>(larger sensors on request) |
| Material mounting parts | Standard: Carbon steel<br>Optional: Stainless Steel 1.4404 / AISI 316L<br>(other materials on request) |
| Process connection | Flange EN 1092-1 B1<br>Flange ASME B16.5 RF<br>Cutting Ring fitting<br>FASTLOK (retractable design)<br>(other process connections on request) |
| Thickness of pipe insulation | 0 ... 200 mm |
| **Approvals** | |
| Hazardous area | (see differential pressure transmitter) |
| Enclosure rating | (see differential pressure transmitter) |
| Operational safety | (see differential pressure transmitter) |
| QAL1, SIRA | |

## Accessories

Z-Options for cable glands, plugs, labeling, approvals, blanking plugs, flange seals, device settings, etc.according to SITRANS P320

## Options

Further versions that are available on request:

- Weld-in sensor for high pressure steam
- Calibrated metering pipes
- FASTLOK with flange ball valve
- Etc.

## More information

For more information please see the Installation Instructions and the Instruction Manuals SITRANS P on SIOS.

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## Application



SITRANS FP330 compact design



SITRANS FPS300 remote design

These sensors are using the averaging pitot tube technology and can be used wherever flow rates of gases or liquids are to be measured.

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## Design

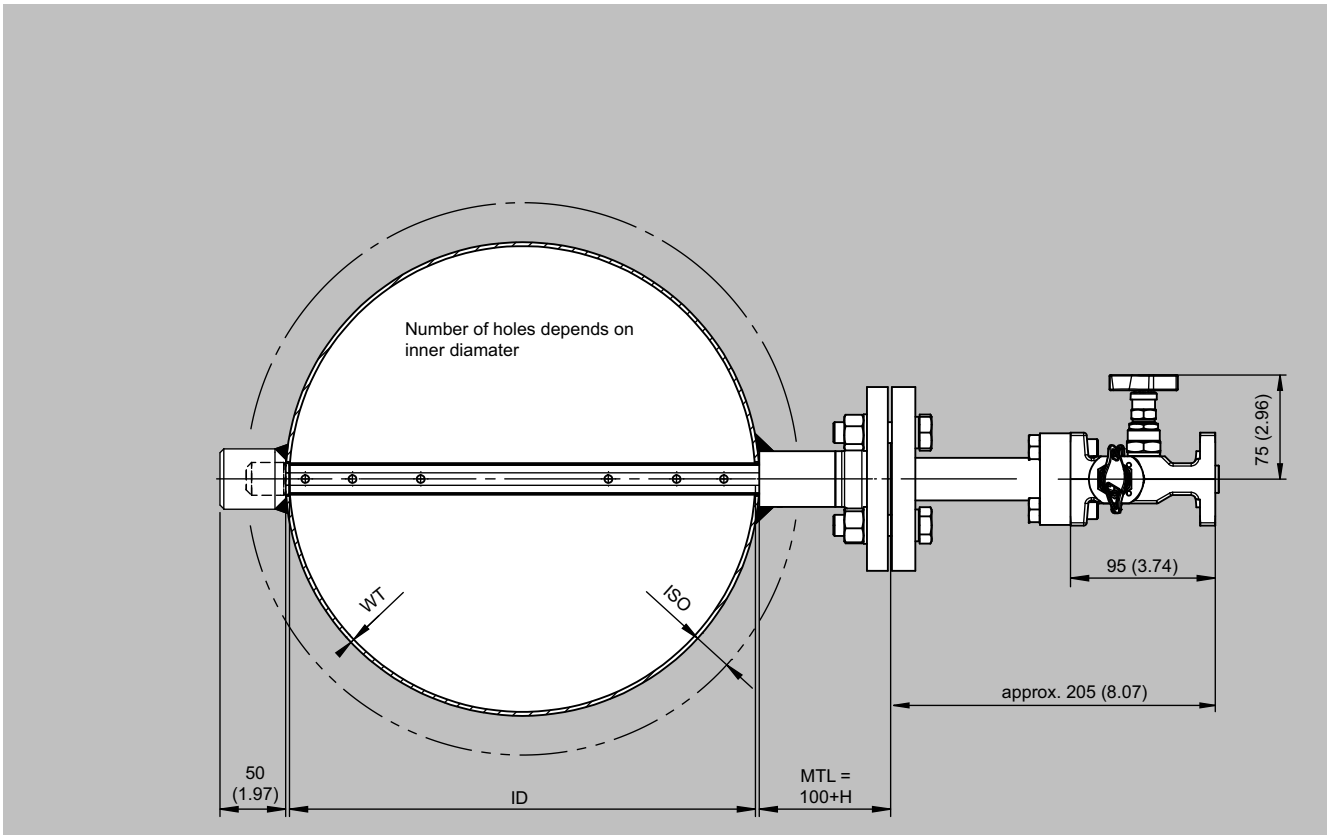
***Mounting type***

- Flange
- Cutting ring

Material: carbon steel, stainless steel

The averaging pitot tube can be mounted to pipes and ducts either with a traditional flange or a cutting ring fitting:

Flange mounting

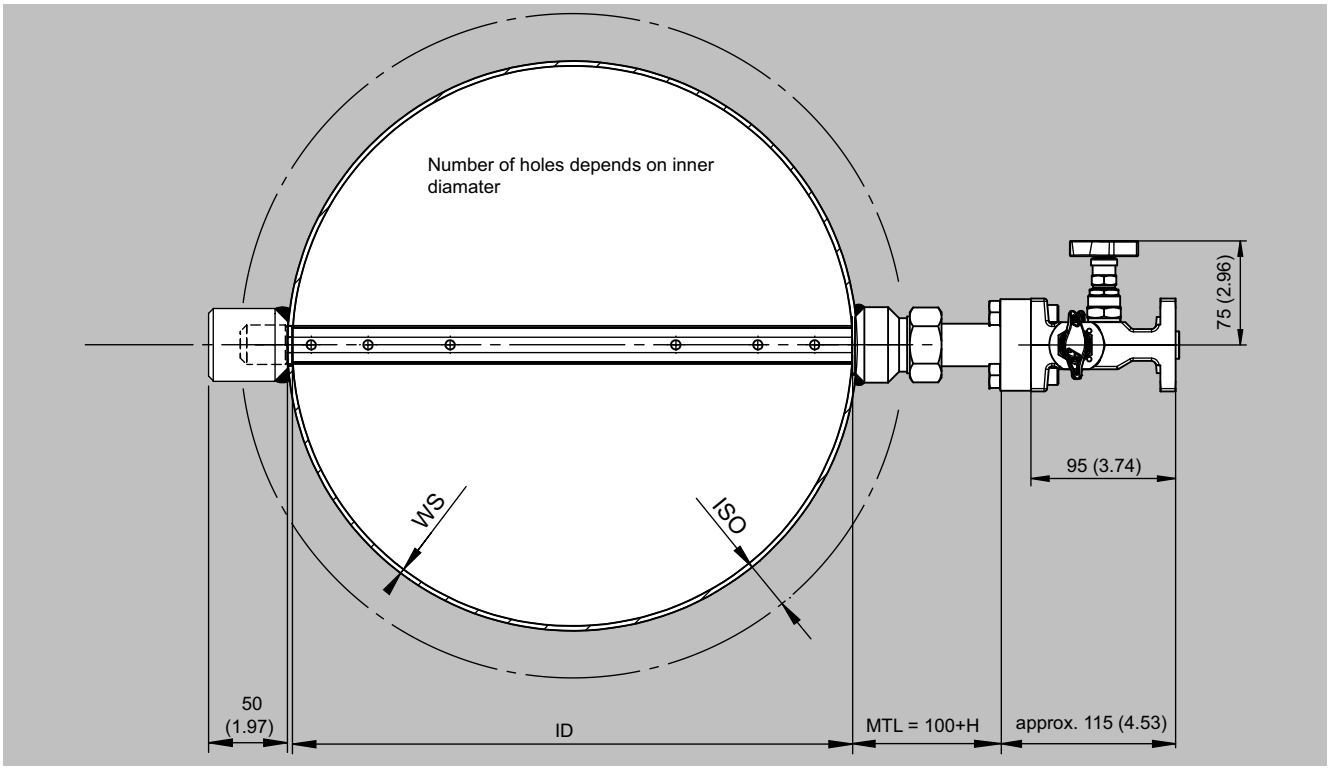


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## Design (continued)

Cutting ring mounting




The required mounting components are always supplied together with the averaging pitot tube.

Flange mounting style can be applied to a large range of applications and is widely accepted. Cutting ring mounting style has a limited temperature and pressure range (see max. pressure and max. temperature below) but provides an economic alternative for simple flow measurement applications.

Dimensions of mounting parts

| Flange mounting | Profile 10 | Profile 22 | Profile 32 | Profile 50 |
|---|---|---|---|---|
| **PN 16** | - | - | - | DN 80 |
| **PN 40** | DN 15 | DN 32 | DN 40 | On request |
| **PN 100** | DN 25 | DN 40 | DN 40 | On request |
| **Class 150** | ½" | 1 ¼" | 1 ½" | 3" |
| **Class 300** | ½" | 1 ¼" | 1 ½" | On request |
| **Class 600** | 1" | 1 ½" | 1 ½" | On request |

| Cutting ring mounting | Profile 10 | Profile 22 |
|---|---|---|
| **PN 40** | M22 | M36 |

Standard lengths of mounting parts (MTL)

| Profile 10 | Profile 22 | Profile 32 | Profile 50 |
|---|---|---|---|
| 80 mm | 100 mm | 100 mm | 120 mm |

Mounting part length can be increased based on thermal pipe insulation in 50 mm steps (H).

***System design of differential pressure connection***

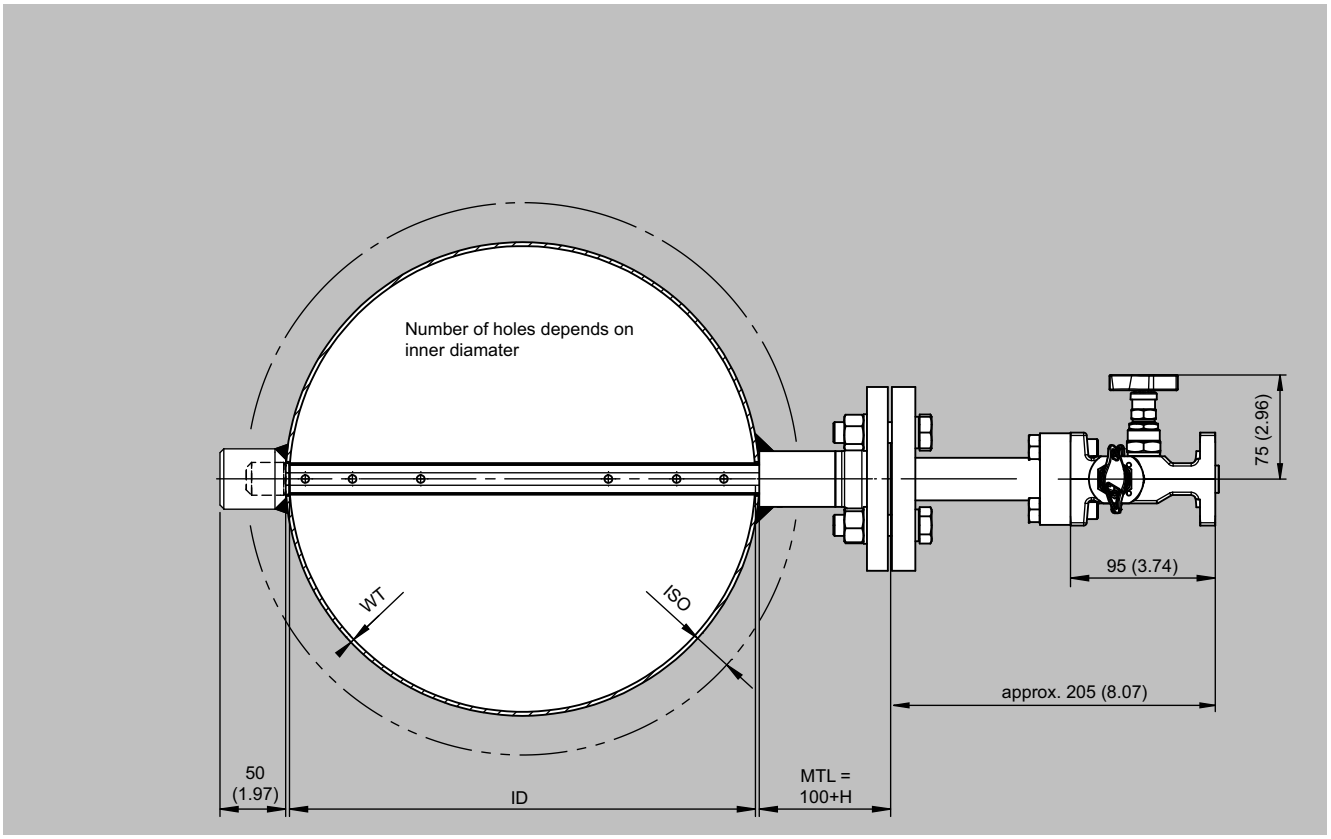
The differential pressure transmitter can be installed in compact design (at the averaging pitot tube) or in remote design.

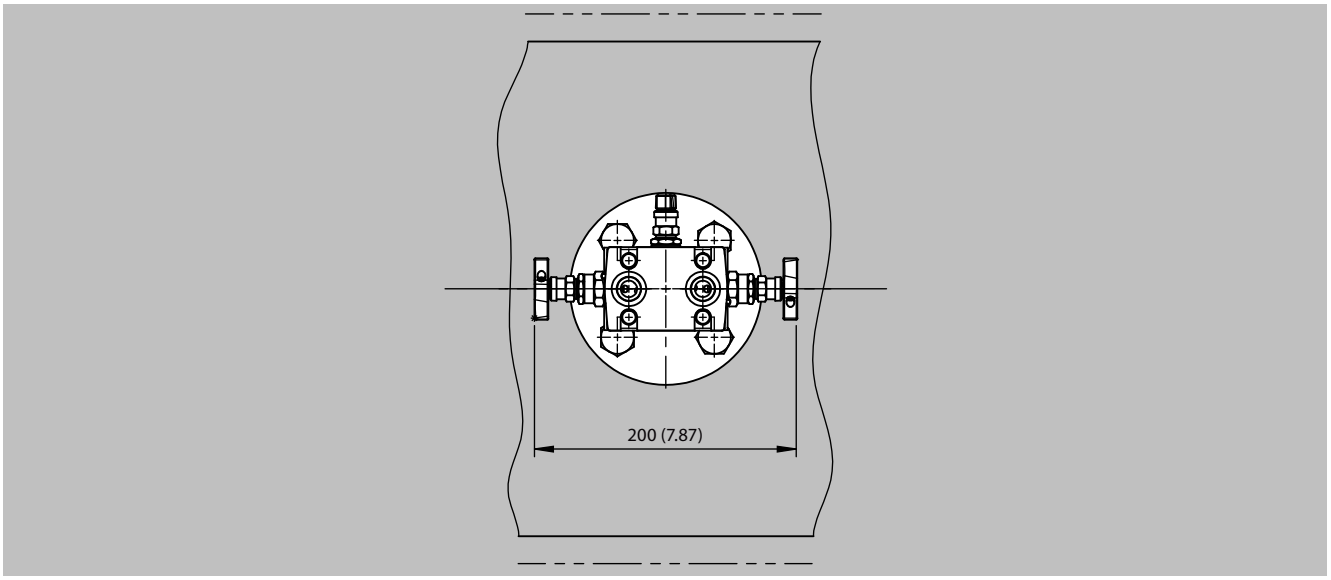
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## Design (continued)

Gas and liquid application, compact design



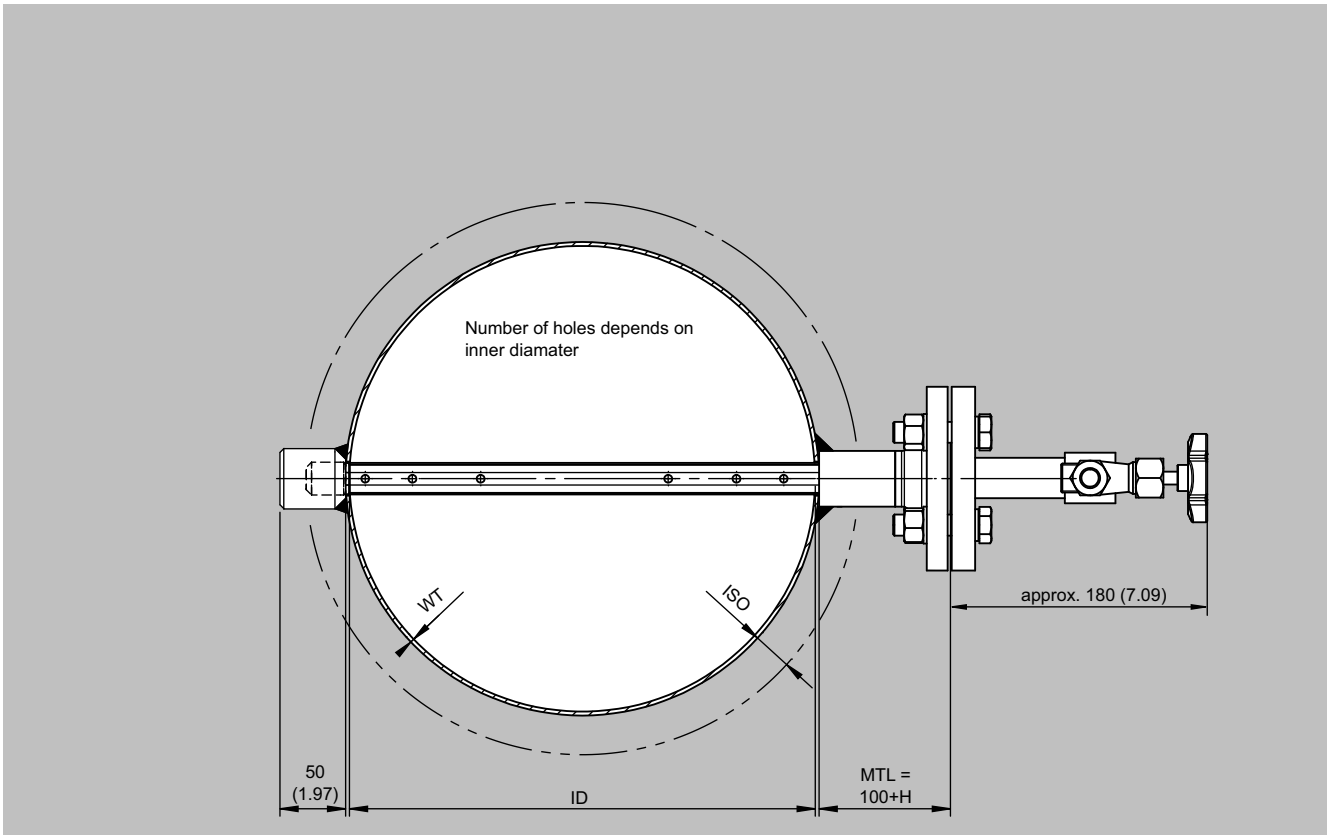

For gas and liquid applications with compact design the averaging pitot tube is equipped with a traditional flange plate to mount manifold and differential pressure transmitter directly at the sensor.

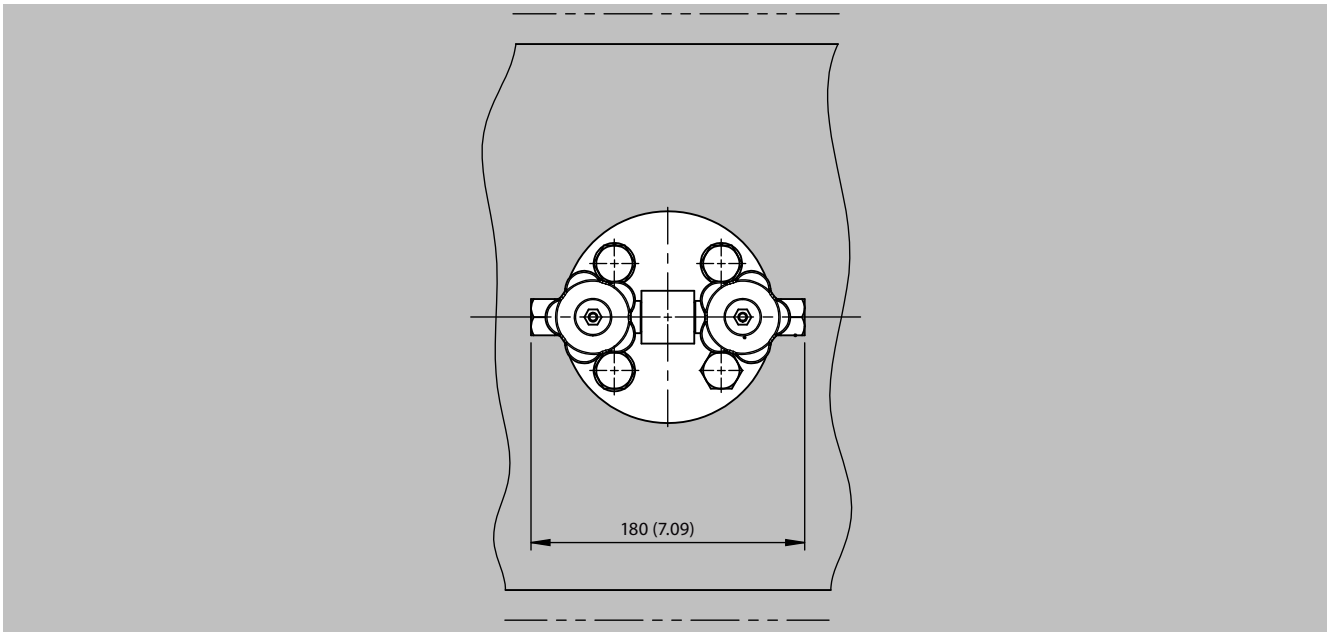
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## Design (continued)

Gas and liquid application, remote design




For gas and liquid applications with remote design the averaging pitot tube is equipped with valves mounted directly to the sensor. Impulse

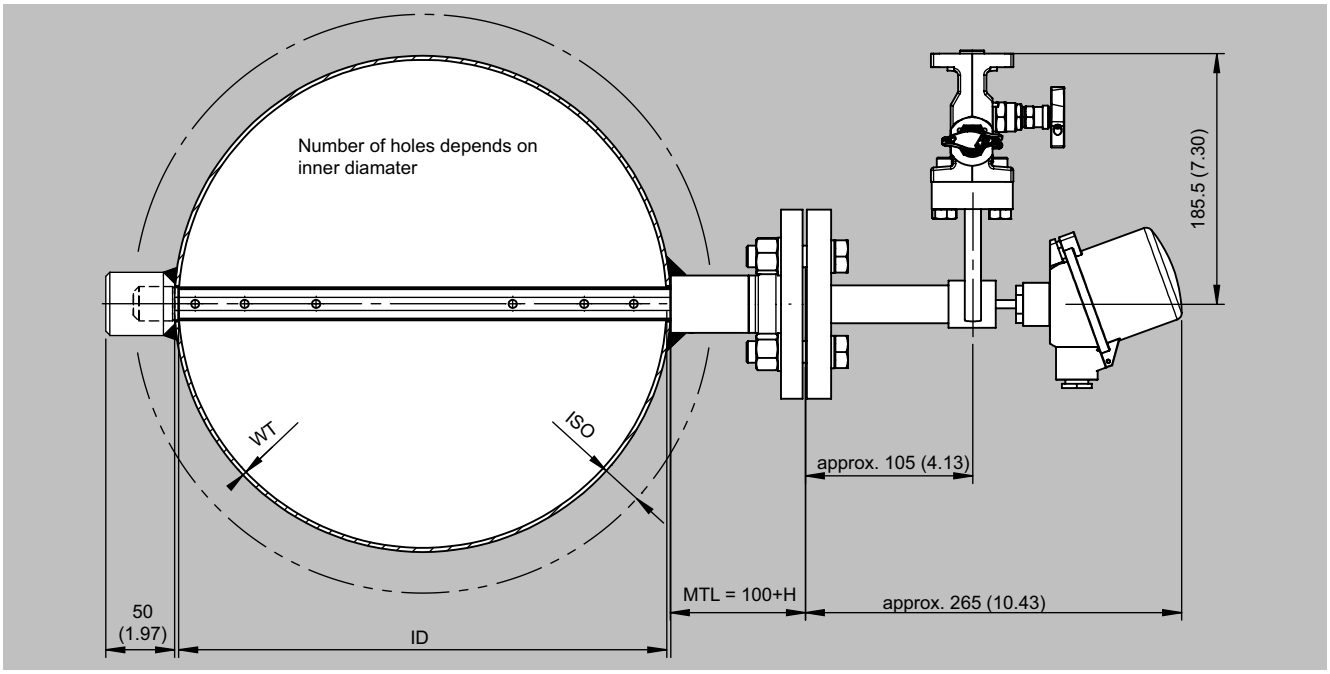
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## Design (continued)

pressure piping (not supplied) has to be installed from the valves to the remote mounted manifold and differential pressure transmitter.

Gas and liquid application, compact design for wet gases and/or with integrated temperature measurement with PT100




The averaging pitot tube is equipped with a 90° rotated flange plate to mount manifold and differential pressure transmitter directly at the sensor. The rotated flange plate serves the purpose of providing space for the integrated temperature measurement and will also allow condensed water of wet gases to flow back from the outside assembly into the averaging pitot tube. This is particularly useful for installations in vertical pipes, or in horizontal pipes where the averaging pitot tube has to be mounted from the side. If the pitot tube can be mounted from the top, a regular flange plate is sufficient.

Averaging pitot tube materials

- Standard: 1.4404/316L
- Option: Alloy C22

Mounting parts materials

- Carbon steel, 1.4404/316L

Flange gaskets

- Up to PN 40: Klingersil C4400
- As of PN 63: graphite with stainless steel insert

Integrated temperature measurement using PT100

- Can be integrated in averaging pitot tube (> DN 100, only 1.4404, ≤ PN 40)

Max. pressure

- EN 1092-1: up to PN 100 (for flange), PN 40 (for cutting ring)
- ASME B16.5: up to Class 600 (for flange)

Max. temperature

- Mounting parts:
  - Flange: according to EN 1092-1 or ASME B16.5
  - Cutting ring: 200 °C (carbon steel), 400 °C (stainless steel)
- Sensor: will be calculated by sizing tool

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## Selection and ordering data

| SITRANS FP330/FPS300 averaging pitot tube for gases and liquids | Article No. 7ME161 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size/Sensor type (according to sizing tool)** | | | | | | | | | | | | | |
| DN 40/Sensor type 10 | | | | 1 | C | | | | | | | | |
| DN 50/Sensor type 10 | | | | 1 | D | | | | | | | | |
| DN 65/Sensor type 10 | | | | 1 | E | | | | | | | | |
| DN 80/Sensor type 10 | | | | 1 | F | | | | | | | | |
| DN 100/Sensor type 10 | | | | 1 | G | | | | | | | | |
| DN 125/Sensor type 10 | | | | 1 | H | | | | | | | | |
| DN 100/Sensor type 22 | | | | 2 | G | | | | | | | | |
| DN 125/Sensor type 22 | | | | 2 | H | | | | | | | | |
| DN 150/Sensor type 22 | | | | 2 | J | | | | | | | | |
| DN 200/Sensor type 22 | | | | 2 | K | | | | | | | | |
| DN 250/Sensor type 22 | | | | 2 | L | | | | | | | | |
| DN 300/Sensor type 22 | | | | 2 | M | | | | | | | | |
| DN 350/Sensor type 22 | | | | 2 | N | | | | | | | | |
| DN 400/Sensor type 22 | | | | 2 | P | | | | | | | | |
| DN 450/Sensor type 22 | | | | 2 | Q | | | | | | | | |
| DN 500/Sensor type 22 | | | | 2 | R | | | | | | | | |
| DN 600/Sensor type 22 | | | | 2 | S | | | | | | | | |
| DN 700/Sensor type 22 | | | | 2 | T | | | | | | | | |
| DN 800/Sensor type 22 | | | | 2 | U | | | | | | | | |
| DN 900/Sensor type 22 | | | | 2 | V | | | | | | | | |
| DN 1000/Sensor type 22 | | | | 2 | W | | | | | | | | |
| DN 1100/Sensor type 22 | | | | 2 | X | | | | | | | | |
| DN 1200/Sensor type 22 | | | | 2 | Y | | | | | | | | |
| DN 300/Sensor type 32 | | | | 3 | M | | | | | | | | |
| DN 350/Sensor type 32 | | | | 3 | N | | | | | | | | |
| DN 400/Sensor type 32 | | | | 3 | P | | | | | | | | |
| DN 450/Sensor type 32 | | | | 3 | Q | | | | | | | | |
| DN 500/Sensor type 32 | | | | 3 | R | | | | | | | | |
| DN 600/Sensor type 32 | | | | 3 | S | | | | | | | | |
| DN 700/Sensor type 32 | | | | 3 | T | | | | | | | | |
| DN 800/Sensor type 32 | | | | 3 | U | | | | | | | | |
| DN 900/Sensor type 32 | | | | 3 | V | | | | | | | | |
| DN 1000/Sensor type 32 | | | | 3 | W | | | | | | | | |
| DN 1100/Sensor type 32 | | | | 3 | X | | | | | | | | |
| DN 1200/Sensor type 32 | | | | 3 | Y | | | | | | | | |
| DN 1400/Sensor type 32 | | | | 4 | A | | | | | | | | |
| DN 1500/Sensor type 32 | | | | 4 | B | | | | | | | | |
| DN 1600/Sensor type 32 | | | | 4 | C | | | | | | | | |
| DN 1800/Sensor type 32 | | | | 4 | D | | | | | | | | |
| DN 2000/Sensor type 32 | | | | 4 | E | | | | | | | | |
| DN 2200/Sensor type 32 | | | | 4 | F | | | | | | | | |
| DN 2400/Sensor type 32 | | | | 4 | G | | | | | | | | |
| DN 500/Sensor type 50 | | | | 5 | R | | | | | | | | |
| DN 600/Sensor type 50 | | | | 5 | S | | | | | | | | |
| DN 700/Sensor type 50 | | | | 5 | T | | | | | | | | |
| DN 800/Sensor type 50 | | | | 5 | U | | | | | | | | |
| DN 900/Sensor type 50 | | | | 5 | V | | | | | | | | |
| DN 1000/Sensor type 50 | | | | 5 | W | | | | | | | | |
| DN 1100/Sensor type 50 | | | | 5 | X | | | | | | | | |
| DN 1200/Sensor type 50 | | | | 5 | Y | | | | | | | | |
| DN 1400/Sensor type 50 | | | | 6 | A | | | | | | | | |
| DN 1500/Sensor type 50 | | | | 6 | B | | | | | | | | |
| DN 1600/Sensor type 50 | | | | 6 | C | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS FP330/FPS300 averaging pitot tube for gases and liquids | Article No. 7ME161 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| DN 1800/Sensor type 50 | 6 D |
| DN 2000/Sensor type 50 | 6 E |
| DN 2200/Sensor type 50 | 6 F |
| DN 2400/Sensor type 50 | 6 G |
| DN 2600/Sensor type 50 | 6 H |
| DN 2800/Sensor type 50 | 6 J |
| DN 3000/Sensor type 50 | 6 K |
| DN 3200/Sensor type 50 | 6 L |
| DN 3400/Sensor type 50 | 6 M |
| DN 3600/Sensor type 50 | 6 N |
| DN 3800/Sensor type 50 | 6 P |
| DN 4000/Sensor type 50 | 6 Q |
| **Process connection/wetted parts material** | |
| Flange EN 1092-1 type B1, PN 16/stainless steel 316L/1.4404 | C |
| Flange EN 1092-1 type B1, PN 40/stainless steel 316L/1.4404 | E |
| Flange EN 1092-1 type B1, PN 64/100/stainless steel 316L/1.4404 | F |
| Flange EN 1092-1 type B1, PN 160/stainless steel 316L/1.4404 | H |
| Flange EN 1092-1 type B1, PN 16/alloy C22 (up to max. 0.5 bar g) | L |
| Flange EN 1092-1 type B1, PN 40/alloy C22 (up to max. 0.5 bar g) | M |
| Cutting ring PN 40/stainless steel 316L/1.4404 | N |
| Flange ASME B16.5, Class 150 RF/stainless steel 316L/1.4404 | Q |
| Flange ASME B16.5, Class 300 RF/stainless steel 316L/1.4404 | R |
| Flange ASME B16.5, Class 600 RF/stainless steel 316L/1.4404 | S |
| Flange ASME B16.5, Class 900 RF/stainless steel 316L/1.4404 | T |
| Flange ASME B16.5, Class 150 RF/alloy C22 (up to max. 0.5 bar g) | W |
| **Material of welding parts/type of end support** | |
| Carbon steel P235GH/without end support | 0 |
| Stainless steel 316L/1.4404 / without end support | 1 |
| Heat-resistant steel 16Mo3/1.5415 / without end support | 2 |
| Carbon steel P235GH mounting components with closed end support | 3 |
| Stainless steel 316L/1.4404 / closed end support | 4 |
| Heat-resistant steel 16Mo3/1.5415 / closed end support | 5 |
| Carbon steel P235GH/end support with flange | 6 |
| Stainless steel 316L/1.4404 / end support with flange | 7 |
| **Thickness of pipe insulation** | |
| Pipe insulation: 0 ... < 50 mm | 0 |
| Pipe insulation: 50 ... < 100 mm | 1 |
| Pipe insulation: 100 ... < 150 mm | 2 |
| Pipe insulation: 150 ... < 200 mm | 3 |
| **System design** | |
| Compact design for dry gases and liquids without integrated temperature measurement | 0 |
| Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement | 1 |
| Remote design for dry gases, wet gases and liquids | 3 |
| **Type of protection of pressure transmitter** | |
| No Ex/without pressure tranmitter | A |
| Intrinsic safety | B |
| Explosion proof | C |
| Intrinsic safety, Explosion proof | D |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | L |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | M |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | S |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | T |
| **Electrical connections/cable entries of pressure transmitter** | |
| Without pressure transmitter | A |
| 2 x M20 x 1.5 | F |
| 2 x 1/2-14 NPT | M |
| **Local operation/display of pressure transmitter** | |
| Without display (closed lid)/without pressure tranmitter | 0 |
| With display (closed lid) | 1 |

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## Selection and ordering data (continued)

| SITRANS FP330/FPS300 averaging pitot tube for gases and liquids | Article No. 7ME161 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| With display (lid with glass window) | 2 |

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. fittings** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Inspection certificate (DIN EN 571-1) - dye penetration test of weldings | **C56** |
| Hydrostatic pressure test of the primary element (EN 13480-5) | **C58** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 in$H_2O$) | **I01** |
| 60 mbar (24.11 in$H_2O$) | **I02** |
| 250 mbar (100.5 in$H_2O$) | **I03** |
| 600 mbar (241.1 in$H_2O$) | **I04** |
| 1600 mbar (643 in$H_2O$) | **I05** |
| **Integrated temperature measurement** | |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; without head transmitter | **S01** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; without head transmitter | **S02** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; incl. Head transmitter TH320, General Purpose (non Ex) (CE, RCM, FM, CSA) (7NG0310-0BA00-0AA0) | **S03** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; incl. Head transmitter TH320, Ex i,Ex nA (ec)(Ex- Zone)/IS, NIFW, NI (Class-Div) (ATEX, IECEx, CSA, FM, NEPSI) (7NG0310-0BA00-0NA0) | **S04** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |
| With mounted ball valve made of stainless steel, up to 200 °C with tube fitting 12 mm | **T59** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U40** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U41** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U42** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U43** |
| With mounted multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U44** |
| With mounted multi-way cock made of stainless steel, PTFE sealings, stainless steel screws | **U45** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| With enclosed multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U54** |
| With enclosed multi-way cock made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U55** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |
| Measuring range setting (temperature transmitter): lower range value (max. 5 characters), upper range value (max. 5 characters), unit (C, F) | **Y41** |

* For further options, please refer to SITRANS P320.

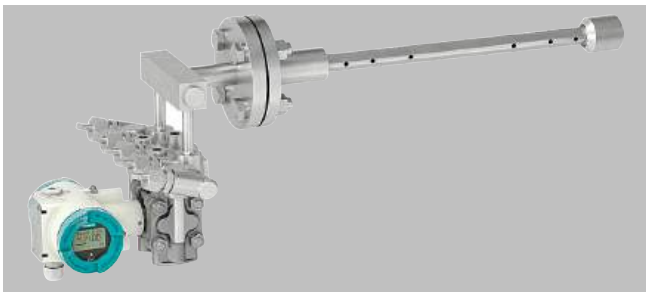
Scope of delivery

- Averaging pitot tube with differential pressure connections
- Mounting part:
  - Flanged installation: Flanged mounting part including gasket, screws and nuts.
  - Cutting ring installation: Welding socket, cutting ring, nut
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

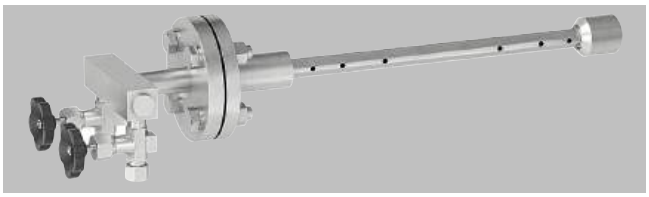
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## Application



SITRANS FP330 compact design



SITRANS FPS300 remote design

These sensors for steam probes are used wherever flow of superheated or saturated steam is to be measured.

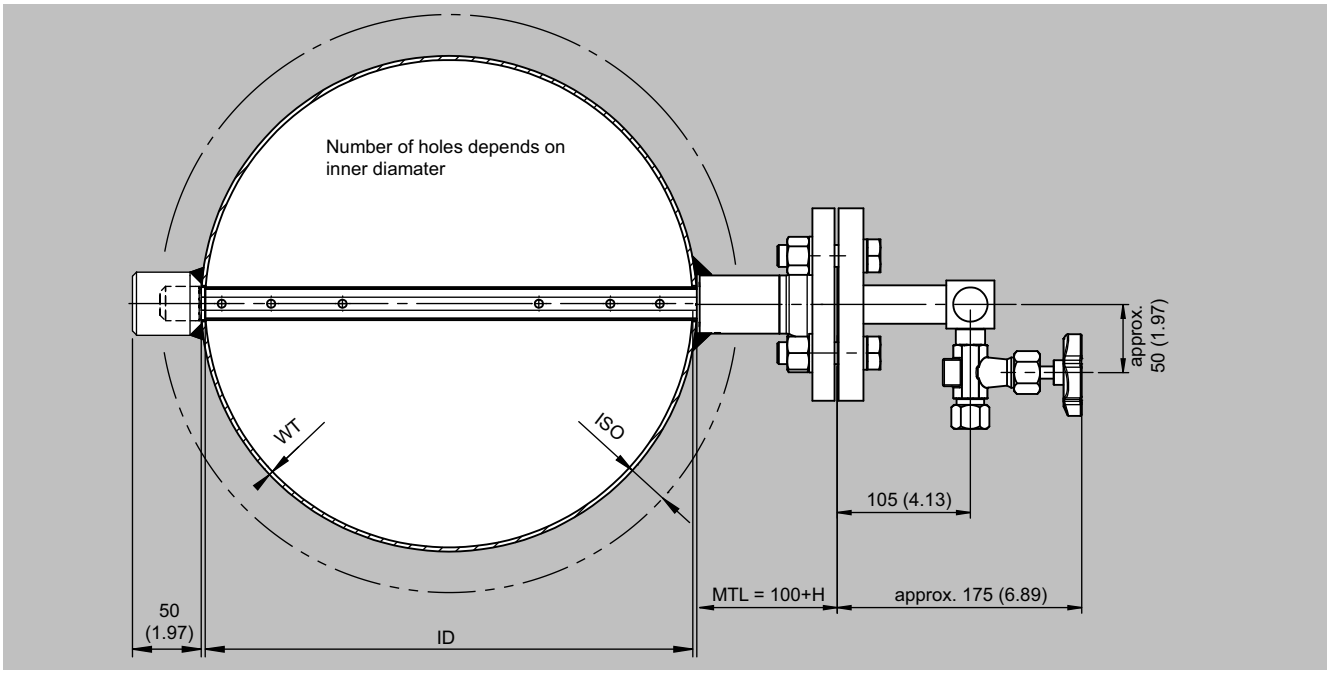
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## Design

***Mounting type***

The averaging pitot tube for steam can be mounted to pipes with a traditional flange:




Dimensions of mounting parts

| Flange mounting | Profile 10 | Profile 22 | Profile 32 |
|---|---|---|---|
| **PN 40** | DN 15 | DN 32 | DN 40 |
| **PN 100** | DN 25 | DN 40 | DN 40 |
| **Class 150** | ½" | 1 ¼" | 1 ½" |
| **Class 300** | ½" | 1 ¼" | 1 ½" |
| **Class 600** | 1" | 1 ½" | 1 ½" |

Standard lengths of mounting parts

| Profile 10 | Profile 22 | Profile 32 |
|---|---|---|
| 80 mm | 100 mm | 100 mm |

***System design of differential pressure connection***

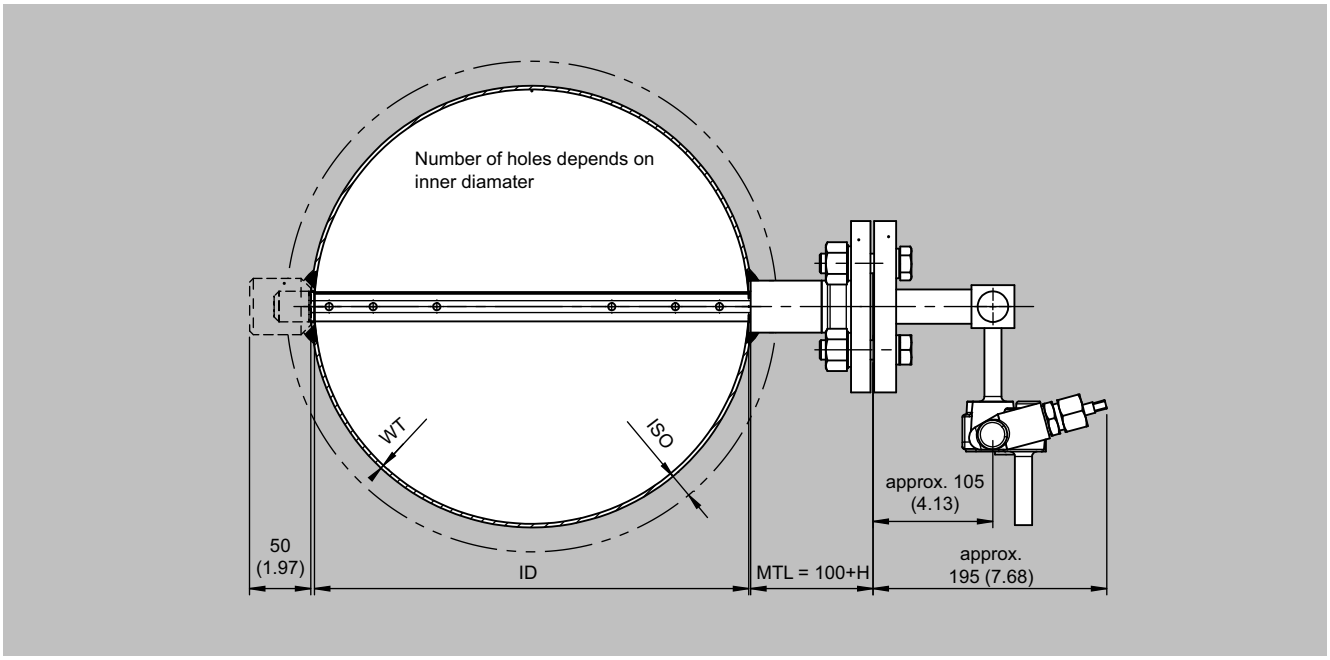
The differential pressure transmitter can be installed in compact design (at the averaging pitot tube) or in remote design.

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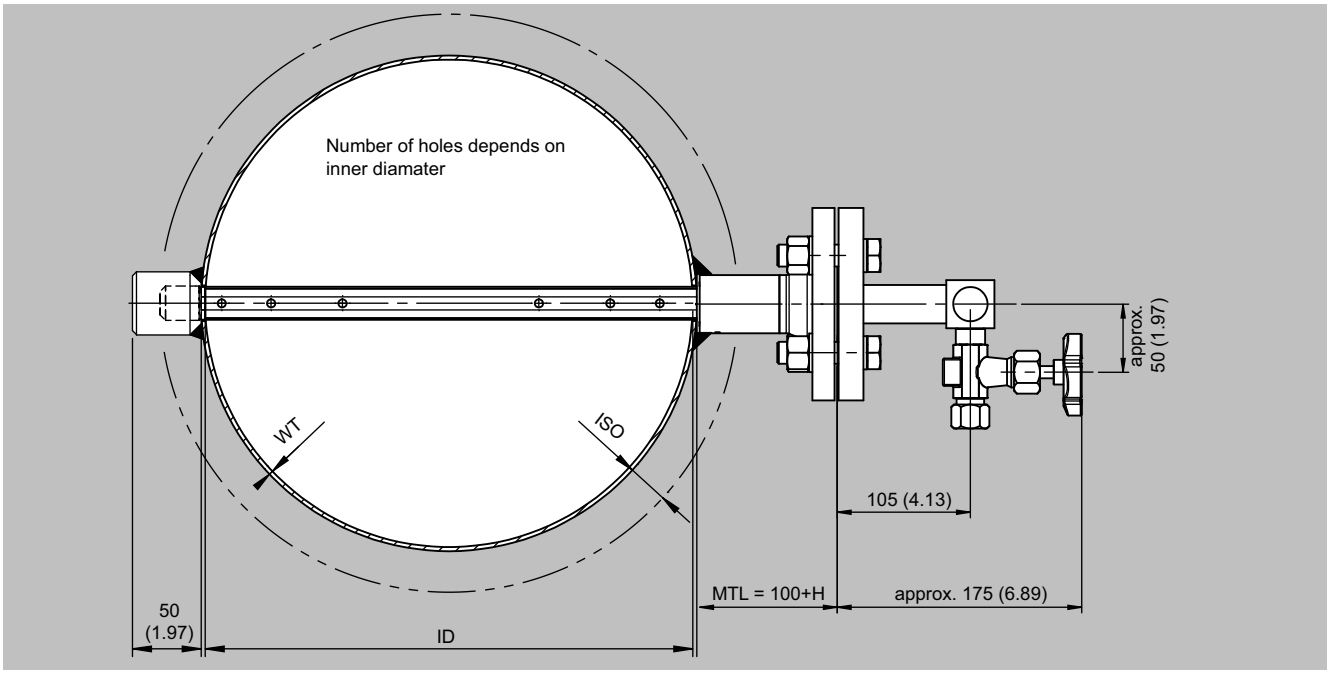
## Design (continued)

Steam applications, compact design




For steam applications with compact design the averaging pitot tube sensor is equipped with integrated condensation pots, a 5-way-manifold is welded directly to the sensor.

Steam applications, remote design




For steam applications with remote design the averaging pitot tube sensor is equipped with integrated condensation pots, valves are welded directly to the sensor. Impulse pressure piping (not supplied) has to be installed from the valves to the remote mounted manifold and differential pressure transmitter.

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## Design (continued)

Profile width

- Depending on selected type

Averaging pitot tube materials

- Standard: 1.4404/316L
- Option: 16Mo3/1.5415

Mounting parts materials

- Carbon steel, 1.4404/316L

Flange gaskets

- Up to PN 40: graphite
- As of PN 63: graphite with stainless steel insert

Integrated temperature measurement using PT100

- Can be integrated in averaging pitot tube (> DN 100, only 1.4404, ≤ PN 40)

Max. pressure

- EN: up to PN 100
- ASME: up to Class 600

Max. temperature

- Mounting parts: According to EN 1092-1 or ASME B16.5
- Sensor: Will be calculated by sizing tool

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## Selection and ordering data

| SITRANS FP330/FPS300 averaging pitot tube for steam applications | Article No. 7ME162 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size/Sensor type (according to sizing tool)** | | | | | | | | | | | | | |
| DN 40/Sensor type 10 | | | | 1 | C | | | | | | | | |
| DN 50/Sensor type 10 | | | | 1 | D | | | | | | | | |
| DN 65/Sensor type 10 | | | | 1 | E | | | | | | | | |
| DN 80/Sensor type 10 | | | | 1 | F | | | | | | | | |
| DN 100/Sensor type 10 | | | | 1 | G | | | | | | | | |
| DN 125/Sensor type 10 | | | | 1 | H | | | | | | | | |
| DN 100/Sensor type 22 | | | | 2 | G | | | | | | | | |
| DN 125/Sensor type 22 | | | | 2 | H | | | | | | | | |
| DN 150/Sensor type 22 | | | | 2 | J | | | | | | | | |
| DN 200/Sensor type 22 | | | | 2 | K | | | | | | | | |
| DN 250/Sensor type 22 | | | | 2 | L | | | | | | | | |
| DN 300/Sensor type 22 | | | | 2 | M | | | | | | | | |
| DN 350/Sensor type 22 | | | | 2 | N | | | | | | | | |
| DN 400/Sensor type 22 | | | | 2 | P | | | | | | | | |
| DN 450/Sensor type 22 | | | | 2 | Q | | | | | | | | |
| DN 500/Sensor type 22 | | | | 2 | R | | | | | | | | |
| DN 600/Sensor type 22 | | | | 2 | S | | | | | | | | |
| DN 700/Sensor type 22 | | | | 2 | T | | | | | | | | |
| DN 800/Sensor type 22 | | | | 2 | U | | | | | | | | |
| DN 900/Sensor type 22 | | | | 2 | V | | | | | | | | |
| DN 1000/Sensor type 22 | | | | 2 | W | | | | | | | | |
| DN 1100/Sensor type 22 | | | | 2 | X | | | | | | | | |
| DN 1200/Sensor type 22 | | | | 2 | Y | | | | | | | | |
| DN 300/Sensor type 32 | | | | 3 | M | | | | | | | | |
| DN 350/Sensor type 32 | | | | 3 | N | | | | | | | | |
| DN 400/Sensor type 32 | | | | 3 | P | | | | | | | | |
| DN 450/Sensor type 32 | | | | 3 | Q | | | | | | | | |
| DN 500/Sensor type 32 | | | | 3 | R | | | | | | | | |
| DN 600/Sensor type 32 | | | | 3 | S | | | | | | | | |
| DN 700/Sensor type 32 | | | | 3 | T | | | | | | | | |
| DN 800/Sensor type 32 | | | | 3 | U | | | | | | | | |
| DN 900/Sensor type 32 | | | | 3 | V | | | | | | | | |
| DN 1000/Sensor type 32 | | | | 3 | W | | | | | | | | |
| DN 1100/Sensor type 32 | | | | 3 | X | | | | | | | | |
| DN 1200/Sensor type 32 | | | | 3 | Y | | | | | | | | |
| DN 1400/Sensor type 32 | | | | 4 | A | | | | | | | | |
| DN 1500/Sensor type 32 | | | | 4 | B | | | | | | | | |
| DN 1600/Sensor type 32 | | | | 4 | C | | | | | | | | |
| DN 1800/Sensor type 32 | | | | 4 | D | | | | | | | | |
| DN 2000/Sensor type 32 | | | | 4 | E | | | | | | | | |
| DN 500/Sensor type 50 | | | | 5 | R | | | | | | | | |
| DN 600/Sensor type 50 | | | | 5 | S | | | | | | | | |
| DN 700/Sensor type 50 | | | | 5 | T | | | | | | | | |
| DN 800/Sensor type 50 | | | | 5 | U | | | | | | | | |
| DN 900/Sensor type 50 | | | | 5 | V | | | | | | | | |
| DN 1000/Sensor type 50 | | | | 5 | W | | | | | | | | |
| DN 1100/Sensor type 50 | | | | 5 | X | | | | | | | | |
| DN 1200/Sensor type 50 | | | | 5 | Y | | | | | | | | |
| DN 1400/Sensor type 50 | | | | 6 | A | | | | | | | | |
| DN 1500/Sensor type 50 | | | | 6 | B | | | | | | | | |
| DN 1600/Sensor type 50 | | | | 6 | C | | | | | | | | |
| DN 1800/Sensor type 50 | | | | 6 | D | | | | | | | | |
| DN 2000/Sensor type 50 | | | | 6 | E | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS FP330/FPS300 averaging pitot tube for steam applications | Article No. 7ME162 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| **Process connection/wetted parts material** | |
| Flange EN 1092-1 type B1, PN 16/stainless steel 316L/1.4404 | C |
| Flange EN 1092-1 type B1, PN 40/stainless steel 316L/1.4404 | E |
| Flange EN 1092-1 type B1, PN 64/100/stainless steel 316L/1.4404 | F |
| Flange EN 1092-1 type B1, PN 160/stainless steel 316L/1.4404 | H |
| Flange EN 1092-1 type B1, PN 64/100/heat-resistant steel 16Mo3/1.5415 | J |
| Flange ASME B16.5, Class 150 RF/stainless steel 316L/1.4404 | Q |
| Flange ASME B16.5, Class 300 RF/stainless steel 316L/1.4404 | R |
| Flange ASME B16.5, Class 600 RF/stainless steel 316L/1.4404 | S |
| Flange ASME B16.5, Class 900 RF/stainless steel 316L/1.4404 | T |
| Flange ASME B16.5, Class 600 RF/heat-resistant steel 16Mo3/1.5415 | U |
| **Material of welding parts/type of end support** | |
| Carbon steel P235GH/without end support | 0 |
| Stainless steel 316L/1.4404 / without end support | 1 |
| Heat-resistant steel 16Mo3/1.5415 / without end support | 2 |
| Carbon steel P235GH mounting components with closed end support | 3 |
| Stainless steel 316L/1.4404 / closed end support | 4 |
| Heat-resistant steel 16Mo3/1.5415 / closed end support | 5 |
| Carbon steel P235GH/end support with flange | 6 |
| Stainless steel 316L/1.4404 / end support with flange | 7 |
| **Thickness of pipe insulation** | |
| Pipe insulation: 0 ... < 50 mm | 0 |
| Pipe insulation: 50 ... < 100 mm | 1 |
| Pipe insulation: 100 ... < 150 mm | 2 |
| Pipe insulation: 150 ... < 200 mm | 3 |
| **System design** | |
| Compact design for steam with or without integrated temperature measurement | 2 |
| Remote design for dry gases, wet gases and liquids | 3 |
| **Type of protection of pressure transmitter** | |
| No Ex/without pressure tranmitter | A |
| Intrinsic safety | B |
| Explosion proof | C |
| Intrinsic safety, Explosion proof | D |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | L |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | M |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | S |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | T |
| **Electrical connections/cable entries of pressure transmitter** | |
| Without pressure transmitter | A |
| 2 × M20 × 1.5 | F |
| 2 × 1/2-14 NPT | M |
| **Local operation/display of pressure transmitter** | |
| Without display (closed lid)/without pressure tranmitter | 0 |
| With display (closed lid) | 1 |
| With display (lid with glass window) | 2 |

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. fittings** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |

| | Order code |
|---|---|
| Dimensional record of the primary element | **C55** |
| Inspection certificate (DIN EN 571-1) - dye penetration test of weldings | **C56** |
| Hydrostatic pressure test of the primary element (EN 13480-5) | **C58** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 $inH^2O$) | **I01** |
| 60 mbar (24.11 $inH^2O$) | **I02** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| 250 mbar (100.5 inH²O) | **I03** |
| 600 mbar (241.1 inH²O) | **I04** |
| 1600 mbar (643 inH2O) | **I05** |
| **Integrated temperature measurement** | |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; without head transmitter | **S01** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; without head transmitter | **S02** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; incl. Head transmitter TH320, General Purpose (non Ex) (CE, RCM, FM, CSA) (7NG0310-0BA00-0AA0) | **S03** |
| Integrated temperature measurement with Pt100; cl. A; 3-wire; ATEX II 1/2G Ex ia IIC T5 Ga/Gb; incl. Head transmitter TH320, Ex i,Ex nA (ec)(Ex- Zone)/IS, NIFW, NI (Class-Div) (ATEX, IECEx, CSA, FM, NEPSI) (7NG0310-0BA00-0NA0) | **S04** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |
| With mounted shut off valves DN8 made of carbon steel, up to 550 °C with butt weld end 14 × 2,5 mm | **T58** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws | **U46** |
| With mounted manifold (5-fold) made of carbon steel, up to 550 °C cadmium-plated steel screws with butt weld end 14 × 2,5 mm | **U48** |
| With enclosed manifold (5-fold) made of carbon steel, up to 300 °C cadmium-plated steel screws with tube fitting 12 mm | **U56** |
| With enclosed manifold (5-fold) made of carbon steel, up to 550 °C cadmium-plated steel screws with butt weld end 14 × 2,5 mm | **U58** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |
| Measuring range setting (temperature transmitter): lower range value (max. 5 characters), upper range value (max. 5 characters), unit (C, F) | **Y41** |

* For further options, please refer to SITRANS P320.

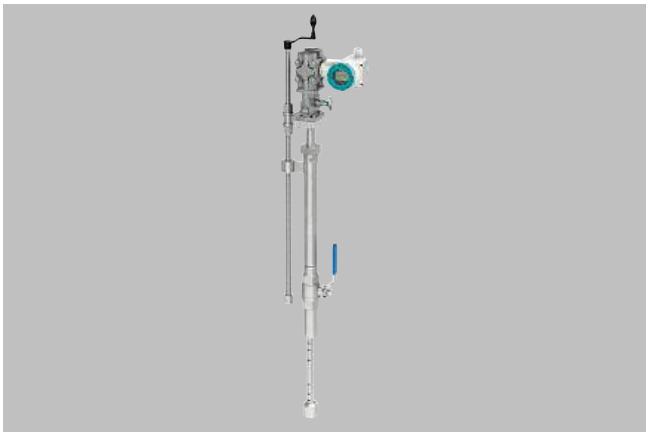
Scope of delivery

- Averaging pitot tube with integrated condensation pots and differential pressure connections
- Flanged mounting part including gasket, screws and nuts
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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## Application



SITRANS FP330 compact design



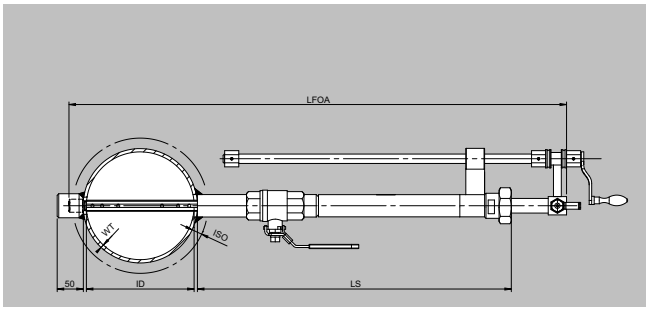
SITRANS FPS300 remote design

In the FASTLOK version the sensor can be assembled and disassembled into the pipe without interrupting plant operation. This pitot tube is used for dry gases, wet gases and liquids. On request it is available in different pressure ratings or with an integrated gear drive.

## Design

***Mounting type***

The averaging pitot tube with FASTLOK mechanism is mounted with a screwed ball valve. A threaded nozzle is welded to the pipe onto which the ball valve is screwed.




Isolation mechanism

- Ball valve with screwed-on threaded pipe with gland packing

Retraction mechanism

- The sensor is inserted or removed into/out of the pipe by turning the operating handle on top of the threaded rod. A gland packing prevents gas or liquid from exiting while the isolation ball valve is opened.

System design of differential pressure connection[1)]

- Compact, remote

Profile width

- Depending on selected type

Averaging pitot tube materials

- 1.4404/316L

Mounting parts materials

- Carbon steel, 1.4404/316L

Ball valve material

- Stainless steel 1.4404

Gasket ball valve

- PTFE

Pressure rating

- PN16

Max. temperature

- Approx. 200 °C

1) For details see Design under the section "Averaging pitot tube for gas and liquids".

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## Selection and ordering data

| SITRANS FP330/FPS300 averaging pitot tube with FASTLOK | Article No. 7ME163 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| PROFIBUS PA | | 1 | | | | | | | | | | | |
| FOUNDATION Fieldbus | | 2 | | | | | | | | | | | |
| Without transmitter | | 8 | | | | | | | | | | | |
| **Nominal size/Sensor type (according to sizing tool)** | | | | | | | | | | | | | |
| DN 40/Sensor type 10 | | | | 1 | C | | | | | | | | |
| DN 50/Sensor type 10 | | | | 1 | D | | | | | | | | |
| DN 65/Sensor type 10 | | | | 1 | E | | | | | | | | |
| DN 80/Sensor type 10 | | | | 1 | F | | | | | | | | |
| DN 100/Sensor type 10 | | | | 1 | G | | | | | | | | |
| DN 125/Sensor type 10 | | | | 1 | H | | | | | | | | |
| DN 100/Sensor type 22 | | | | 2 | G | | | | | | | | |
| DN 125/Sensor type 22 | | | | 2 | H | | | | | | | | |
| DN 150/Sensor type 22 | | | | 2 | J | | | | | | | | |
| DN 200/Sensor type 22 | | | | 2 | K | | | | | | | | |
| DN 250/Sensor type 22 | | | | 2 | L | | | | | | | | |
| DN 300/Sensor type 22 | | | | 2 | M | | | | | | | | |
| DN 350/Sensor type 22 | | | | 2 | N | | | | | | | | |
| DN 400/Sensor type 22 | | | | 2 | P | | | | | | | | |
| DN 450/Sensor type 22 | | | | 2 | Q | | | | | | | | |
| DN 500/Sensor type 22 | | | | 2 | R | | | | | | | | |
| DN 600/Sensor type 22 | | | | 2 | S | | | | | | | | |
| DN 700/Sensor type 22 | | | | 2 | T | | | | | | | | |
| DN 800/Sensor type 22 | | | | 2 | U | | | | | | | | |
| DN 900/Sensor type 22 | | | | 2 | V | | | | | | | | |
| DN 1000/Sensor type 22 | | | | 2 | W | | | | | | | | |
| DN 1100/Sensor type 22 | | | | 2 | X | | | | | | | | |
| DN 1200/Sensor type 22 | | | | 2 | Y | | | | | | | | |
| DN 300/Sensor type 32 | | | | 3 | M | | | | | | | | |
| DN 350/Sensor type 32 | | | | 3 | N | | | | | | | | |
| DN 400/Sensor type 32 | | | | 3 | P | | | | | | | | |
| DN 450/Sensor type 32 | | | | 3 | Q | | | | | | | | |
| DN 500/Sensor type 32 | | | | 3 | R | | | | | | | | |
| DN 600/Sensor type 32 | | | | 3 | S | | | | | | | | |
| DN 700/Sensor type 32 | | | | 3 | T | | | | | | | | |
| DN 800/Sensor type 32 | | | | 3 | U | | | | | | | | |
| DN 900/Sensor type 32 | | | | 3 | V | | | | | | | | |
| DN 1000/Sensor type 32 | | | | 3 | W | | | | | | | | |
| DN 1100/Sensor type 32 | | | | 3 | X | | | | | | | | |
| DN 1200/Sensor type 32 | | | | 3 | Y | | | | | | | | |
| DN 1400/Sensor type 32 | | | | 4 | A | | | | | | | | |
| DN 1500/Sensor type 32 | | | | 4 | B | | | | | | | | |
| DN 1600/Sensor type 32 | | | | 4 | C | | | | | | | | |
| DN 1800/Sensor type 32 | | | | 4 | D | | | | | | | | |
| DN 2000/Sensor type 32 | | | | 4 | E | | | | | | | | |
| DN 500/Sensor type 50 | | | | 5 | R | | | | | | | | |
| DN 600/Sensor type 50 | | | | 5 | S | | | | | | | | |
| DN 700/Sensor type 50 | | | | 5 | T | | | | | | | | |
| DN 800/Sensor type 50 | | | | 5 | U | | | | | | | | |
| DN 900/Sensor type 50 | | | | 5 | V | | | | | | | | |
| DN 1000/Sensor type 50 | | | | 5 | W | | | | | | | | |
| DN 1100/Sensor type 50 | | | | 5 | X | | | | | | | | |
| DN 1200/Sensor type 50 | | | | 5 | Y | | | | | | | | |
| DN 1400/Sensor type 50 | | | | 6 | A | | | | | | | | |
| DN 1500/Sensor type 50 | | | | 6 | B | | | | | | | | |
| DN 1600/Sensor type 50 | | | | 6 | C | | | | | | | | |
| DN 1800/Sensor type 50 | | | | 6 | D | | | | | | | | |
| DN 2000/Sensor type 50 | | | | 6 | E | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS FP330/FPS300 averaging pitot tube with FASTLOK | Article No. 7ME163 ● - ● ● ● ● ● - ● ● ● ● |
|---|---|
| **Process connection/wetted parts material** | |
| Cutting ring PN40/stainless steel 316L/1.4404 | N |
| **Material of welding parts/type of end support** | |
| Carbon steel P235GH/without end support | 0 |
| Stainless steel 316L/1.4404 / without end support | 1 |
| Carbon steel P235GH mounting components with closed end support | 3 |
| Stainless steel 316L/1.4404 / closed end support | 4 |
| **Thickness of pipe insulation** | |
| Pipe insulation: 0 ... < 50 mm | 0 |
| Pipe insulation: 50 ... < 100 mm | 1 |
| Pipe insulation: 100 ... < 150 mm | 2 |
| Pipe insulation: 150 ... < 200 mm | 3 |
| **System design** | |
| Compact design for dry gases and liquids without integrated temperature measurement | 0 |
| Compact design for wet gases with or without integrated temperature measurement as well as for dry gases and liquids with integrated temperature measurement | 1 |
| Remote design for dry gases, wet gases and liquids | 3 |
| **Type of protection of pressure transmitter** | |
| No Ex/without pressure tranmitter | A |
| Intrinsic safety | B |
| Explosion proof | C |
| Intrinsic safety, Explosion proof | D |
| Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | L |
| Dust ignition proof zone 20/21/22 (DIP), increased safety zone 2 | M |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2 | S |
| Intrinsic safety, Explosion proof, Dust ignition proof zone 21/22 (DIP), increased safety zone 2, class division | T |
| **Electrical connections/cable entries of pressure transmitter** | |
| Without pressure transmitter | A |
| 2 × M20 × 1.5 | F |
| 2 × 1/2-14 NPT | M |
| **Local operation/display of pressure transmitter** | |
| Without display (closed lid)/without pressure tranmitter | 0 |
| With display (closed lid) | 1 |
| With display (lid with glass window) | 2 |

| | Order code |
|---|---|
| **Further designs*** | |
| Please add "**-Z**" to Article No. and specify Order code(s) and plain text. | |
| **Certificates of primary element incl. fittings** | |
| Inspection certificate of the primary element (EN 10204-3.1) - material of pressure-containing and wetted parts | **C52** |
| Factory certificate of the primary element (EN 10204-2.2) - wetted parts (MR 0175-2015) | **C54** |
| Dimensional record of the primary element | **C55** |
| Dimensional drawing 1:1 DWG of the primary element | **C59** |
| **Maximum measuring span of pressure transmitter** | |
| 20 mbar (8.037 $inH_2O$) | **I01** |
| 60 mbar (24.11 $inH_2O$) | **I02** |
| 250 mbar (100.5 $inH_2O$) | **I03** |
| 600 mbar (241.1 $inH_2O$) | **I04** |
| 1600 mbar (643 $inH_2O$) | **I05** |
| **Shut-off valves** | |
| With mounted shut-off valves DN8 made of carbon steel, up to 300 °C with tube fitting 12 mm | **T50** |
| With mounted shut-off valves DN8 made of stainless steel, up to 300 °C with tube fitting 12 mm | **T51** |

| | Order code |
|---|---|
| With mounted ball valve made of stainless steel, up to 200 °C with tube fitting 12 mm | **T59** |
| **Valve manifolds for mounting on primary element** | |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U40** |
| With mounted manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U41** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U42** |
| With mounted manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws | **U43** |
| With mounted multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws | **U44** |
| With mounted multi-way cock made of stainless steel, PTFE sealings, stainless steel screws | **U45** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U50** |
| With enclosed manifold (3-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U51** |

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## Selection and ordering data (continued)

| | Order code |
|---|---|
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U52** |
| With enclosed manifold (5-fold) made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U53** |
| With enclosed multi-way cock made of stainless steel, PTFE sealings, cadmium-plated steel screws with tube fitting 12 mm | **U54** |
| With enclosed multi-way cock made of stainless steel, PTFE sealings, stainless steel screws with tube fitting 12 mm | **U55** |
| **Application data** | |
| ID number of the primary element according to sizing tool | **Y40** |

* For further options, please refer to SITRANS P320.

Scope of delivery

- Averaging pitot tube with removal mechanism, packing gland, differential pressure connection
- Mounting part threaded welding socket with isolation ball valve
- If necessary: closed counter support
- Shut-off valves for remote design (options T5x selected in PIA)
- Manifold for compact/remote design (options U4x, U5x selected in PIA) incl. mounting brackets

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| | |
|---|---|
| **4/3** | **Product overview** |
| **4/11** | **Point level measurement** |
| 4/11 | Capacitance switches |
| 4/11 | SITRANS LCS100 |
| 4/25 | SITRANS LCS050 |
| 4/30 | RF Capacitance |
| 4/32 | Pointek CLS100 |
| 4/38 | Pointek CLS200 |
| 4/55 | Pointek CLS200 - Digital |
| 4/73 | Pointek CLS300 |
| 4/88 | Pointek CLS300 - Digital |
| 4/105 | Vibrating switches |
| 4/105 | SITRANS LVL100 |
| 4/112 | SITRANS LVL200 |
| 4/148 | SITRANS LVS100 |
| 4/152 | SITRANS LVS200 |
| 4/163 | SITRANS LVS300 |
| 4/170 | Rotation paddle switches |
| 4/170 | SITRANS LPS200 |
| 4/184 | Ultrasonic non-contacting switch |
| 4/184 | Pointek ULS200 |
| **4/189** | **Continuous level measurement** |
| 4/189 | Controllers |
| 4/190 | SITRANS LT500 - HydroRanger / MultiRanger |
| 4/200 | MultiRanger 200 HMI |
| 4/205 | HydroRanger 200 HMI |
| 4/210 | SITRANS LUT400 series |
| 4/218 | Ultrasonic |
| 4/220 | Ultrasonic transmitters |
| 4/221 | SITRANS LU150 |
| 4/226 | SITRANS LU180 |
| 4/231 | SITRANS Probe LU240 |
| 4/239 | The Probe |
| 4/243 | Ultrasonic transducers |
| 4/244 | ST-H |
| 4/248 | EchoMax XRS-5 |
| 4/253 | EchoMax XPS |
| 4/262 | Accessories for level sensors |
| 4/263 | EA aiming devices |
| 4/265 | FMS mounting brackets |
| 4/267 | TS-3 temperature sensor |
| 4/270 | Radar level transmitters |
| 4/273 | SITRANS LR100 |
| 4/278 | SITRANS LR110 |
| 4/284 | SITRANS LR120 |
| 4/290 | SITRANS LR140 |
| 4/295 | SITRANS LR150 |
| 4/299 | SITRANS LR200 |
| 4/314 | SITRANS LR250 Horn Antenna |
| 4/326 | SITRANS LR250 Polypropylene Lens Antenna |
| 4/337 | SITRANS LR250 Flanged Encapsulated Antenna |




| | |
|---|---|
| 4/349 | SITRANS LR250 Hygienic Encapsulated Antenna |
| 4/375 | SITRANS LR460 |
| 4/381 | SITRANS LR560 |
| 4/387 | Guided wave radar transmitters |
| 4/388 | SITRANS LG series |
| 4/441 | Capacitance transmitters |
| 4/442 | SITRANS LC300 |
| **4/459** | **Communication** |
| 4/460 | SmartLinx module |

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## Overview

| | Application | Device description | Programming Software |
|---|---|---|---|
| **Point level measurement - Capacitance switches** | | | |
|  | A point level switch that detects point level in liquids, solids, slurries, foam, and interface detection. | **SITRANS LCS100**<br>• Potted construction provides protection from shock and vibration<br>• Factory calibrated to work in most applications without tuning<br>• Active shield and tunable to compensate for build-up | |
|  | An ultra compact, capacitance switch for point level detection in constricted spaces, water based liquids, slurries, and foam. | **SITRANS LCS050**<br>• Easy installation with no need for adjustment.<br>• Low maintenance with no moving parts.<br>• Highly visible 360 degree status indication. | |
| **Point level measurement - RF Capacitance switches** | | | |
|  | Powerful range of level switches suitable for a variety of industries. | **Pointek CLS100/CLS200/CLS300**<br>• CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam. | -<br>SIMATIC PDM |
| | | • CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. | |
| | | • CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features. | SIMATIC PDM |
| **Point level measurement - Vibrating switches** | | | |
|  | Reliable vibrating point level switches for liquid and slurry applications across all industries. | **SITRANS LVL100/LVL200**<br>• LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand level applications. Also ideal for dry run protection. | -<br>- |
| | | • LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection. Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. | |
| | Reliable vibrating point | **SITRANS LVS100/LVS200/LVS300** | |

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## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
|  | level switches for bulk solids in a wide variety of applications. | • LVS100: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications.<br>• LVS200: vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications.<br>• LVS300: vibrating rod point level switch for high, low, or demand level detection of bulk solids. Durable probe, ideal for larger granule sizes. | -<br>-<br> |
| **Point level measurement - Rotating paddle switches**<br>  | Reliable rotating point level switches for bulk solids in a wide variety of applications. | **SITRANS LPS200**<br>• Rotating paddle switch for detection of high, low, and demand levels in a wide variety of bulk solids industries. Unique engineering provides long-lasting, reliable performance.<br>• Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511. | - |
| **Point level measurement - Ultrasonic switch**<br>  | Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries. | **Pointek ULS200**<br>• Rugged design, no moving parts, and virtually maintenance-free.<br>• Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals. | - |
| **Continuous level measurement - Controllers**<br>  | A versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries. | **SITRANS LT500 - HydroRanger / MultiRanger**<br>• Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions.<br>• Easy to use HMI display with local four-button programming, menu-driven parameters, and wizard support for key applications. | - |

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## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
|  | The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow. | **SITRANS LUT420/430/440**<br>In addition to industry leading 1 mm (0.04 inch) accuracy, each of the three models in the series are compatible with our full range of EchoMax transducers and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface.<br>• 1 mm accuracy.<br>• HART communications.<br>• Next Generation Sonic Intelligence. | SIMATIC PDM |
|  | Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries. | **MultiRanger 200**<br>• Using non-contacting ultrasonic technology, the controller measures the level in short to medium range applications up to 15 m (50 ft) of solids, liquids, or slurries<br>• Auto False-Echo Suppression of false echoes | SIMATIC PDM |
|  | Ultrasonic level controller for up to six pumps - control, differential control, and open channel flow monitoring. | **HydroRanger 200**<br>• An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards<br>• Auto False-Echo Suppression of false echoes | SIMATIC PDM |

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## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
| **Continuous level measurement - Ultrasonic transmitters** | | | |
|  | SITRANS LU150 and LU180 are short-range integrated ultrasonic level transmitters. These 2-wire, 4 to 20 mA loop powered transmitter are ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft). | **SITRANS LU150**<br>• LU150 is approved for general purpose applications.<br>• Easy to install, program, and maintain.<br>• Patented Sonic Intelligence echo processing.<br>**SITRANS LU180**<br>• LU180 is approved for intrinsically safe applications.<br>• Easy to install, program, and maintain.<br>• Patented Sonic Intelligence echo processing. | -<br>- |
|  | Ultrasonic level transmitter with HART, 4 to 20 mA is ideal for level, volume, and volume flow measurements. It works with liquids, slurries, and bulk materials up to 12 meters (40 feet). | **SITRANS Probe LU240**<br>• Continuous level measurement up to 12 m (40 ft) range.<br>• Next generation Process Intelligence signal processing.<br>• Auto False-Echo Suppression for fixed obstruction avoidance.<br>• Fast and easy configuration with quick start wizards. | SIMATIC PDM |
|  | Compact level transmitter with integrated transducer for accurate level measurement of liquid applications. | **The Probe**<br>• A short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.<br>• 3 wire system with mA output and alarm relay. | - |
| **Continuous level measurement - Ultrasonic transducers** | | | |
|  | ST-H: ETFE or PVDF transducer for chemicals<br>XRS-5: Standard transducer for applications to 8 m (26 ft) | **ST-H/EchoMax XRS-5**<br>• ST-H: the narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection<br>• XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids, and slurries | -<br>- |
|  | Transducers for liquids and bulk solids<br>XPS series: Hermetically sealed PVDF enclosure for chemical immunity | **EchoMax XPS**<br>• XPS series offers versions for various distances up to 30 m (100 ft) and up to a maximum temperature of 95 °C (203 °F) | - |

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## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
| **Continuous level measurement - Radar transmitters** | | | |
|  | SITRANS LR100: a compact radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).<br>SITRANS LR110: a compact radar transmitter for continuous level measurement of liquids, slurries, or solids to a range of 15 m (49.2 ft). | **SITRANS LR100**<br>• Bluetooth connectivity for easy setup with SITRANS mobile IQ<br>• Chemically resistant PVDF enclosure<br>• W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications<br>• 5 mm accuracy<br>**SITRANS LR110**<br>• Bluetooth connectivity for easy setup with SITRANS mobile IQ<br>• Chemically resistant PVDF enclosure<br>• W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications<br>• HART 7.0 or Modbus RTU communication for intelligent integration into your application<br>• 2 mm accuracy and zero near range distance yields optimum inventory management capability | |
|  | Compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft). | **SITRANS LR120**<br>• Bluetooth connectivity for easy setup with SITRANS mobile IQ<br>• Chemically resistant PVDF enclosure<br>• W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications<br>• HART 7.0 or Modbus RTU communication for intelligent integration into your application<br>• Submergence shield accessory prevents build up on sensor during flooding conditions<br>• 2 mm accuracy and zero near range distance yields optimum inventory management capability | |
|  <br>  | SITRANS LR140: a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).<br>SITRANS LR150: a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft), with optional HMI. | **SITRANS LR140**<br>• Bluetooth connectivity for easy setup with SITRANS mobile IQ.<br>• Chemically resistant PVDF sensor.<br>• W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.<br>**SITRANS LR150**<br>• Bluetooth connectivity for easy setup with SITRANS mobile IQ.<br>• Optional HMI with pushbutton programming and local diagnostic data.<br>• Chemically resistant PVDF sensor.<br>• W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications. | |

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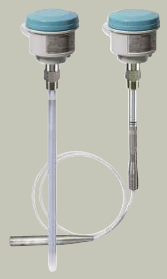
## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
|  | 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft). | **SITRANS LR200**<br>• Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer<br>• Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection<br>• Built-in alphanumeric display with support in four languages | SIMATIC PDM<br>AMS<br>SITRANS DTM |
|  | 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); antenna designs ideal for small vessels, low dielectric media, food & beverages and corrosive/aggressive media. | **SITRANS LR250**<br>• Simple operation using the graphical local user interface (LUI)<br>• Plug-and-play setup using the intuitive Quick Start Wizard<br>• 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles<br>• Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions | SIMATIC PDM<br>AMS<br>SITRANS DTM |
|  | 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust and high temperature applications | **SITRANS LR460**<br>• Process Intelligence for advanced signal processing and quick and easy adjustment<br>• Self-guided Quick Start Wizard for plug and play startup<br>• 100 m (328 ft) range for long-range and difficult applications | SIMATIC PDM |
|  | 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft); easy to install, plug and play, virtually no maintenance | **SITRANS LR560**<br>• Rugged stainless steel design<br>• 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids<br>• Aimer option to direct beam to area of interest, such as draw point of cone<br>• Air purge connection is included for self-cleaning of extremely sticky solids<br>• Lens antenna is highly resistant to product buildup<br>• Local display interface (LDI) allows local programming and diagnostics | SIMATIC PDM<br>AMS<br>SITRANS DTM |
| **Continuous level measurement - Guided wave radar transmitters** | | | |
|  | Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options. | **SITRANS LG240/250/260/270**<br>• Measures accurately on materials with dielectric (dK) as low as 1.4<br>• Guided wave radar measurement for up to 2 mm (0.08 inch) accuracy<br>• Measures level, level/interface, and volume of solids, slurries, and liquids<br>• 4 button programming for quick setup<br>• Reliable level measurement on harsh applications with pressure up to 400 bar g (40 000 kPa) and temperatures as high as 450 °C (842 °F) | SIMATIC PDM<br>SITRANS DTM |

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## Overview (continued)

| | Application | Device description | Programming Software |
|---|---|---|---|
| **Continuous level measurement - Capacitance transmitters**  | For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement industries. | **SITRANS LC300**<br>• Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes<br>• Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation | - |
| **Communications**  | | **SmartLinx Module, Dolphin Plus software**<br>• Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems<br>• Dolphin Plus for quick and easy configuring, monitoring, tuning, and diagnostics of Siemens devices | -<br>- |

| Level Measurement Selector Continuous Level Conditions | Ultrasonic | Radar | Guided Wave Radar | Capacitance | Gravimetric | Hydrostatic pressure |
|---|---|---|---|---|---|---|
| **Measurement** | | | | | | |
| Level | × | × | × | × | • | × |
| Interface (liquid/liquid) | | | × | • | | × |
| Interface (liquid/solid) | • | | | • | | |
| Volume | × | × | × | • | • | × |
| Mass | | | | | × | × |
| Flow (open channel) | × | • | | | | |
| **Level Applications** | | | | | | |
| Changing density | × | × | × | × | | |
| Changing dielectric | × | × | × | • | × | × |
| Aggressive chemicals | × | × | × | × | × | × |
| Pressure/vacuum | | × | × | × | × | × |
| High temperature | | × | × | × | × | × |
| Cryogenic | | | × | | × | |
| Turbulence | × | × | • | • | × | × |
| Steam | | • | × | • | × | × |
| Hydrocarbon vapors/solvents | | × | × | × | × | × |
| Foam | • | • | • | • | × | × |
| Buildup | • | • | • | • | × | • |
| High viscosity | × | × | • | • | × | • |
| Dust | • | × | × | × | × | |
| Solids powders | • | × | • | • | × | |

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## Overview (continued)

| Level Measurement Selector<br>Continuous Level<br>Conditions | Ultrasonic | Radar | Guided Wave Radar | Capacitance | Gravimetric | Hydrostatic pressure |
|---|---|---|---|---|---|---|
| Solids granules/pellets < 25 mm (1 inch) | × | × | • | • | × | |
| Solids > 25 mm (1 inch) | × | × | | | × | |
| High angle of repose | • | × | × | • | × | |

× preferred
• condition dependent

| Level Measurement Selector<br>Point Level<br>Conditions | Vibration | Capacitance | Paddle | Ultrasonic |
|---|---|---|---|---|
| **Measurement** | | | | |
| Level | × | × | × | × |
| Interface (liquid/liquid) | | × | | |
| Interface (liquid/solid) | • | | | |
| Volume | | | | |
| Mass | | | | |
| Flow (open channel) | | | | |
| **Level Applications** | | | | |
| Changing density | × | × | × | × |
| Changing dielectric | × | • | × | × |
| Aggressive chemicals | × | × | • | × |
| Pressure/vacuum | × | × | × | |
| High temperature | × | × | × | |
| Cryogenic | × | | | |
| Turbulence | • | • | | × |
| Steam | × | • | × | |
| Hydrocarbon vapors/solvents | × | • | | |
| Foam | • | • | | • |
| Buildup | • | • | × | • |
| High viscosity | • | • | • | × |
| Dust | × | × | × | • |
| Solids powders | × | • | × | • |
| Solids granules/pellets < 25 mm (1 inch) | × | • | × | × |
| Solids > 25 mm (1 inch) | • | • | × | × |
| High angle of repose | × | × | × | • |

× preferred
• condition dependent

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## Overview



SITRANS LCS100 is a point level switch that detects point level in liquids, solids, slurries, foam, and interface detection. Its compact design is ideal for confined spaces with plastic or stainless steel process connections and flexible rod and cable probe extensions. SITRANS LCS100 is used for overflow, high, low, and demand applications as well as pump protection. It works in all types of vessels, pipes, and silos in a broad range of industries including food, pharmaceuticals, chemical, petrochemical, water, and machine building.

## Benefits

- Potted construction provides protection from shock and vibration
- Factory calibrated to work in most applications without tuning
- Active shield and tunable to compensate for build-up
- Optional IO-link communication and remote testing
- Options for plastic or Stainless steel enclosure and M12 connection

## Application

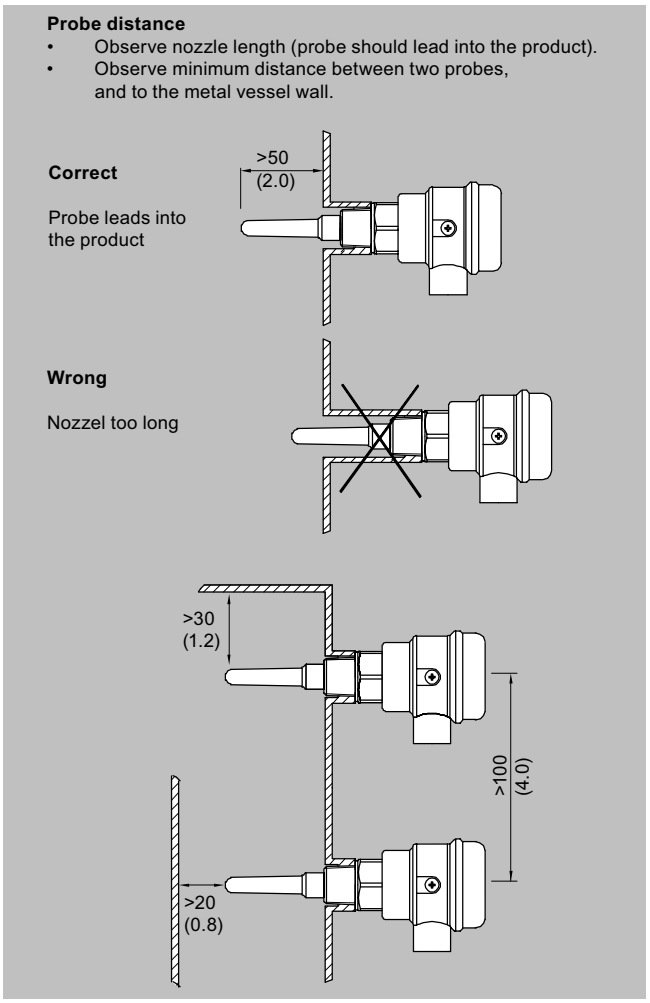
SITRANS LCS100's flexible insertion length, starting at 92 mm (3.6 inch), and its versatility in various applications and in vessels or pipes make it a good fit for most point level applications.

Its advanced design provides accurate, repeatable, switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] and optional peek are chemically resistant with an effective process operating temperature range from -40 to +125 °C (-40 to +257 °F). The fully potted design ensures reliability in a vibrating environment such as agitated tanks. When used with a SensGuard protection cover, the LCS100 is protected from shearing, impact, and abrasion in tough primary processes.

The SITRANS LCS100 is available with either a stainless steel enclosure or a polyester enclosure and stainless steel or PPS process connection options.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

## Configuration




SITRANS LCS100 Installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LCS100 Point level switch Compact, versatile point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. Compact design is ideal for confined spaces with plastic process connections. Supports IO-link communications. | Article No. 7ML700 | ● | - | 0 | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Electronic** | | | | | | | | | | | | | |
| 2-wire (8/16 mA or 4 ... 20 mA), 4-wire relay (general purpose) or transistor (intrinsically safe) | | 1 | | | | | | | | | | | |
| ¾-wire, IO-Link, PNP, NPN, Push/Pull[1] | | 2 | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| Thread G 1" DIN ISO 228-1 | | | | | A | D | | | | | | | |
| Thread NPT ¾" ASME B 1.20.1 | | | | | A | E | | | | | | | |
| **Material of sensor** | | | | | | | | | | | | | |
| PPS | | | | | | | 1 | | | | | | |
| PVDF[2] | | | | | | | 2 | | | | | | |
| **Material of process connection[3]** | | | | | | | | | | | | | |
| PPS | | | | | | | | 1 | | | | | |
| PVDF[2] | | | | | | | | 2 | | | | | |
| **Enclosure** | | | | | | | | | | | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, cable gland M20 x 1.5 (attached) | | | | | | | | | | 1 | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, conduit NPT ½" | | | | | | | | | | 2 | | | |
| Enclosure Ø65 mm (2.56 inch), M12-plug (mounted in M20 x 1.5) [1] | | | | | | | | | | 3 | | | |
| Enclosure Ø35 mm, M12-plug[4] | | | | | | | | | | 4 | | | |
| **Approvals** | | | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA | | | | | | | | | | | A | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA, FM, CSA | | | | | | | | | | | B | | |
| ATEX II 1G Ex ia IIC T* Ga, IECEx Ex ia IIC T* Ga; ATEX II 1/2G Ex ia IIC T* Ga/Gb, IECEx Ex ia IIC T* Ga/Gb; ATEX II 1/2D Ex ia IIIC $T_{200}$* Da/Db, IECEx Ex ia IIIC $T_{200}$* Da/Db | | | | | | | | | | | C | | |
| FM/CSA IS Cl. I, II, III Div. 1 Gr. A-G | | | | | | | | | | | D | | |

| Selection and ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Stainless steel tag [70 x 13 mm (2.76 x 0.51 inch)]:** | |
| Tag (max. 27 characters), plate, stainless steel 304/1.4301 | **Y17** |
| **Wetted seals** | |
| FFKM seal O-ring[5] | **A22** |
| **Test certificates** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts | **C12** |
| **Approvals and Certificates** | |
| INMETRO Ex-Approval[7] | **E25** |
| WHG/VLAREM Overfill and Leakage certificate | **E61** |

| Selection and ordering data | Order code |
|---|---|
| **Operating instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Spare parts** | |
| Sensguard G 1" DIN ISO 228-1 PPS (Internal Thread 3/4" NPT)[8] | **A5E53337203** |
| Sensguard NPT 3/4" ASME B 1.20.1 PPS (Internal Thread 3/4" NPT)[8] | **A5E53337200** |

1) Available only with Approvals options A and B.
2) Available only with Approvals option A.
3) The material of the sensor and material of the process connection must be the same.
4) With Ex-approvals intrinsically safe: Electronic connection only with 2-wire.
5) Ambient and process temperatures are limited to -20 °C (-4 °F).
6) Max. process pressure: -1 ... +25 bar (-15 ... 363 psi).
7) Available only with Approvals option C; specific INMETRO Ex-marking.
8) Available only with Process connection NPT ¾", max. process pressure: -1 ... 10 bar (146 psi)

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## Selection and ordering data (continued)

| SITRANS LCS100 Point level switch Versatile, compact point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. ideal for use in confined spaces with stainless steel process connections. Supports IO-link communications. | Article No. 7ML701 | ● | - | 0 | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Electronic** | | | | | | | | | | | | | |
| 2-wire (8/16 mA or 4 ... 20 mA), 4-wire relay (general purpose) or transistor (intrinsically safe) | | 1 | | | | | | | | | | | |
| ¾-wire, IO-Link, PNP, NPN, Push/Pull[1] | | 2 | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| Thread G ½" DIN ISO 228-1, hygienic | | | | | A | A | | | | | | | |
| Thread G ½" DIN ISO 228-1 | | | | | A | B | | | | | | | |
| Thread G ¾" DIN ISO 228-1 | | | | | A | C | | | | | | | |
| Thread G 1" DIN ISO 228-1 | | | | | A | D | | | | | | | |
| Thread NPT ¾" ASME B 1.20.1 | | | | | A | E | | | | | | | |
| Tri-clamp DN25 (1") /DN40 (1 ½")DIN 32676 Type A (DIN 11851), DIN 32676 Type C (ASME BPE 2009) | | | | | A | F | | | | | | | |
| Tri-clamp DN50 (2") DIN 32676 Type A (DIN 11851), DIN 32676 Type C (ASME BPE 2009) | | | | | A | G | | | | | | | |
| Flange DN 25, PN 16/40 EN 1092-1 Type A flat faced[2] | | | | | A | H | | | | | | | |
| Flange DN 40, PN 16/40 EN 1092-1 Type A flat faced[2] | | | | | A | J | | | | | | | |
| Flange DN 50, PN 16/25/40 EN 1092-1 Type A flat faced[2] | | | | | A | K | | | | | | | |
| Flange 1" 150 lb ASME B16.5, raised face[2] | | | | | A | L | | | | | | | |
| Flange 1" 300 lb ASME B16.5, raised face[2] | | | | | A | M | | | | | | | |
| Flange 1 ½" 150 lb ASME B16.5, raised face[2] | | | | | A | N | | | | | | | |
| Flange 1 ½" 300 lb ASME B16.5, raised face[2] | | | | | A | P | | | | | | | |
| Flange 2" 150 lb ASME B16.5, raised face[2] | | | | | A | Q | | | | | | | |
| Flange 2" 300 lb ASME B16.5, raised face[2] | | | | | A | R | | | | | | | |
| **Material of sensor** | | | | | | | | | | | | | |
| PPS[3] | | | | | | | 1 | | | | | | |
| PVDF[3] | | | | | | | 2 | | | | | | |
| PEEK[4] | | | | | | | 3 | | | | | | |
| **Material of process connection** | | | | | | | | | | | | | |
| 1.4404 (316L) | | | | | | | | 3 | | | | | |
| **Enclosure** | | | | | | | | | | | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, cable gland M20 x 1.5 (attached) | | | | | | | | | | 1 | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, conduit NPT ½" | | | | | | | | | | 2 | | | |
| Enclosure Ø65 mm (2.56 inch), M12-plug (mounted in M20 x 1.5)[1] | | | | | | | | | | 3 | | | |
| Enclosure Ø35 mm (1.38 inch), M12-plug[5] | | | | | | | | | | 4 | | | |
| **Approvals** | | | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA | | | | | | | | | | | A | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA, FM, CSA | | | | | | | | | | | B | | |
| ATEX II 1G Ex ia IIC T* Ga,<br>IECEx Ex ia IIC T* Ga;<br>ATEX II 1/2G Ex ia IIC T* Ga/Gb,<br>IECEx Ex ia IIC T* Ga/Gb;<br>ATEX II 1/2D Ex ia IIIC $T_{200}$* Da/Db,<br>IECEx Ex ia IIIC $T_{200}$* Da/Db | | | | | | | | | | | C | | |
| FM/CSA IS Cl. I, II, III Div. 1 Gr. A-G | | | | | | | | | | | D | | |

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## Selection and ordering data (continued)

| Selection and ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Stainless steel tag [70 x 13 mm (2.76 x 0.51 inch)]:** | |
| Tag (max. 27 characters), plate, stainless steel 304/1.4301 | **Y17** |
| **Wetted seals** | |
| FFKM seal O-ring[6)] | **A22** |
| **Test certificates** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts | **C12** |
| **Approvals certificates** | |
| INMETRO Ex-Approval[10)] | **E25** |
| WHG/VLAREM Overfill and Leakage certificate | **E61** |
| EHEDG[4)] | **E86** |

| Selection and ordering data | Order code |
|---|---|
| **Operating instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Spare parts** | |
| Sensguard G 1" DIN ISO 228-1 PPS (Internal Thread 3/4" NPT)[11)] | **A5E53337203** |
| Sensguard NPT 3/4" ASME B 1.20.1 PPS (Internal Thread 3/4" NPT)[11)] | **A5E53337200** |

1) Available only with Approvals options A and B.
2) Flange is screwed to the process connection.
3) Not available with Process connection option AA, G ½" hygienic.
4) Available only with Process connection option AA, G ½" hygienic.
5) With Ex-approvals intrinsically safe: Electronic connection ONLY with 2-wire.
6) Ambient and process temperatures are limited to -20 °C (-4 °F).
7) Max. process pressure: -1 ... +25 bar (-15 ... 363 psi).
8) Available only with Process connection option AA, G ½" hygienic, and EHEDG Hygiene certificate E86.
9) Available only with Process connection option AB, G ½", max. process pressure: -1 ... 10 bar (146 psi).
10) Available only with Approvals option C; specific INMETRO Ex-marking.
11) Available only with Process connection NPT ¾", max. process pressure: -1 ... 10 bar (146 psi)

| **SITRANS LCS100 Point level switch Rod extended, versatile point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. Supports IO-link communications.** | **Article No. 7ML702** | ● | - | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Electronic** | | | | | | | | | | | | | |
| 2-wire (8/16 mA or 4 ... 20 mA), 4-wire relay (general purpose)[1)] | | 1 | | | | | | | | | | | |
| ¾-wire, IO-Link, PNP, NPN, Push/Pull[2)] | | 2 | | | | | | | | | | | |
| **Extension length** | | | | | | | | | | | | | |
| Fix extension 300 mm (11.81 inch) | | | | 1 | | | | | | | | | |
| Fix extension 500 mm (19.69 inch) | | | | 2 | | | | | | | | | |
| Fix extension 1 000 mm (39.37 inch) | | | | 3 | | | | | | | | | |
| ***Add order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | | | |
| 301 ... 1 000 mm (11.85 ... 39.37 inch) | | | | 4 | | | | | | | | | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | 5 | | | | | | | | | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | 6 | | | | | | | | | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | 7 | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| Thread G ¾" DIN ISO 228-1 | | | | | A | C | | | | | | | |
| Thread G 1" DIN ISO 228-1 | | | | | A | D | | | | | | | |
| Thread NPT ¾" ASME B 1.20.1 | | | | | A | E | | | | | | | |
| Flange DN 25, PN 16/40 EN 1092-1 type A flat faced[3)] | | | | | A | H | | | | | | | |
| Flange DN 40, PN 16/40 EN 1092-1 type A flat faced[3)] | | | | | A | J | | | | | | | |
| Flange DN 50, PN 16/25/40 EN 1092-1 type A flat faced[3)] | | | | | A | K | | | | | | | |
| Flange 1" 150 lb ASME B16.5, raised face[3)] | | | | | A | L | | | | | | | |
| Flange 1" 300 lb ASME B16.5, raised face[3)] | | | | | A | M | | | | | | | |
| Flange 1 ½" 150 lb ASME B16.5, raised face[3)] | | | | | A | N | | | | | | | |
| Flange 1 ½" 300 lb ASME B16.5, raised face[3)] | | | | | A | P | | | | | | | |
| Flange 2" 150 lb ASME B16.5, raised face[3)] | | | | | A | Q | | | | | | | |
| Flange 2" 300 lb ASME B16.5, raised face[3)] | | | | | A | R | | | | | | | |
| **Material of sensor** | | | | | | | | | | | | | |
| PPS | | | | | | | 1 | | | | | | |
| PVDF | | | | | | | 2 | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LCS100 Point level switch<br>Rod extended, versatile point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. Supports IO-link communications. | Article No.<br>7ML702 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Material of process connection and extension** | | | | | | | | | | | | | |
| 1.4404 (316L) | | | | | | | | 1 | | | | | |
| **Enclosure** | | | | | | | | | | | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, cable gland M20 x 1.5 (attached) | | | | | | | | | | 1 | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, conduit NPT ½" | | | | | | | | | | 2 | | | |
| Enclosure Ø65 mm (2.56 inch), M12-plug (mounted in M20 x 1.5) [2] | | | | | | | | | | 3 | | | |
| **Approvals** | | | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA | | | | | | | | | | | A | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA, FM, CSA | | | | | | | | | | | B | | |
| ATEX II 1G Ex ia IIC T* Ga,<br>IECEx Ex ia IIC T* Ga;<br>ATEX II 1/2G Ex ia IIC T* Ga/Gb,<br>IECEx Ex ia IIC T* Ga/Gb;<br>ATEX II 1/2D Ex ia IIIC $T_{200}$* Da/Db,<br>IECEx Ex ia IIIC $T_{200}$* Da/Db | | | | | | | | | | | C | | |
| FM/CSA IS Cl. I, II, III Div.1 Gr. A-G | | | | | | | | | | | D | | |

| Selection and ordering data | |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Order No. and specify Order code(s). | |
| **Total insertion length** | |
| Custom insertion length: enter total length, min. 301 mm (11.85 inch), max. 4 000 mm (157.48 inch). Specify in plain text. | **Y01** |
| **Sliding sleeve [max.process pressure -1 ... 10 bar (-14 ... 146 psi)][4][5]** | |
| Sliding sleeve G1 ¼", DIN ISO 228-1 1.4404 (316L) | **P12** |
| Sliding sleeve G1 ½", DIN ISO 228-1 1.4404 (316L) | **P13** |
| Sliding sleeve NPT1 ¼", ASME B 1.20.1 1.4404 (316L) | **P14** |
| Sliding sleeve NPT1 ½", ASME B 1.20.1 1.4404 (316L) | **P15** |
| **Stainless steel tag [70 x 13 mm (2.76 x 0.51 inch)]:** | |
| Tag (max. 27 characters), plate, stainless steel 304/1.4301 | **Y17** |
| **Wetted seals** | |
| FFKM seal O-ring[6] | **A22** |

| Selection and ordering data | |
|---|---|
| **Test certificates** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts | **C12** |
| **Approvals[1] and certificates** | |
| INMETRO Ex-Approval[8] | **E25** |
| WHG/VLAREM Overfill and Leakage certificate | **E61** |
| **Operating instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |

1) With Ex-approvals intrinsically safe: Electronic connection ONLY with 2-wire.
2) Available only with Approvals options A and B.
3) Flange is screwed to process connection.
4) Process connection of the unit is ¾" (Process connection options AC or AE). Sliding sleeve has process connections as selected in this position.
5) Minimum extension length for sliding sleeve: 500 mm (19.69 inch).
6) Ambient and process temperatures are limited to -20 °C (-4 °F).
7) Max. process pressure: -1 ... +25 bar (-15 ... 363 psi).
8) Available only with Approvals option C; specific INMETRO Ex-marking.

| SITRANS LCS100 Point level switch<br>Cable extended, versatile point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. Supports IO-link communications. | Article No.<br>7ML703 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Electronic** | | | | | | | | | | | | | |
| 2-wire (8/16 mA or 4 ... 20 mA), 4-wire relay (general purpose)[1] | | 1 | | | | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LCS100 Point level switch<br>Cable extended, versatile point level switch, detects level in liquids and solids. For use with overflow, high, low, and demand applications as well as pump protection. Supports IO-link communications. | Article No.<br>7ML703 | ● | - | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Extension length** | | | | | | | | | | | | | |
| Fix extension 500 mm (19.69 inch) | | | | 0 | | | | | | | | | |
| Fix extension 1 000 mm (39.37 inch)[2] | | | | 1 | | | | | | | | | |
| Fix extension 1 500 mm (59.06 inch)[2] | | | | 2 | | | | | | | | | |
| Fix extension 2 000 mm (78.74 inch)[2] | | | | 3 | | | | | | | | | |
| ***Add order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch)[3] | | | | 4 | | | | | | | | | |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch)[3] | | | | 5 | | | | | | | | | |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | | | | 6 | | | | | | | | | |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | | | | 7 | | | | | | | | | |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | | | | 8 | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| Thread G ¾" DIN ISO 228-1 | | | | | A | C | | | | | | | |
| Thread G 1" DIN ISO 228-1 | | | | | A | D | | | | | | | |
| Thread NPT ¾" ASME B 1.20.1 | | | | | A | E | | | | | | | |
| Flange DN 25, PN 16/40 EN 1092-1 type A flat faced[4] | | | | | A | H | | | | | | | |
| Flange DN 40, PN 16/40 EN 1092-1 type A flat faced[4] | | | | | A | J | | | | | | | |
| Flange DN 50, PN 16/25/40 EN 1092-1 type A flat faced[4] | | | | | A | K | | | | | | | |
| Flange 1" 150 lb ASME B16.5, raised face[4] | | | | | A | L | | | | | | | |
| Flange 1 ½" 150 lb ASME B16.5, raised face[4] | | | | | A | N | | | | | | | |
| Flange 2" 150 lb ASME B16.5, raised face[4] | | | | | A | Q | | | | | | | |
| **Material of sensor** | | | | | | | | | | | | | |
| PPS | | | | | | | 1 | | | | | | |
| **Material of process connection and extension** | | | | | | | | | | | | | |
| PPS, extension cable FEP, extension cable fixing PPS[5] | | | | | | | | 1 | | | | | |
| 1.4404 (316L), extension cable FEP, extension cable fixing PPS | | | | | | | | 2 | | | | | |
| **Enclosure** | | | | | | | | | | | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, cable gland M20 x 1.5 (attached) | | | | | | | | | | 1 | | | |
| Enclosure Ø65 mm (2.56 inch), internal terminal block, conduit NPT ½" | | | | | | | | | | 2 | | | |
| Enclosure Ø65 mm (2.56 inch), M12-plug (mounted in M20 x 1.5)[6] | | | | | | | | | | 3 | | | |
| **Approvals** | | | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA | | | | | | | | | | | A | | |
| Ordinary Locations/General Purpose (Non-Ex): CE, UKCA, FM, CSA | | | | | | | | | | | B | | |
| ATEX II 1G Ex ia IIC T* Ga,<br>IECEx Ex ia IIC T* Ga;<br>ATEX II 1/2G Ex ia IIC T* Ga/Gb,<br>IECEx Ex ia IIC T* Ga/Gb | | | | | | | | | | | C | | |
| FM/CSA IS Cl. I Div.1 Gr. A-D | | | | | | | | | | | D | | |

| Selection and ordering data | |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Order No. and specify Order code(s). | |
| **Total insertion length** | |
| Custom insertion length: enter total length, min. 501 mm (19.72 inch), max. 20 000 mm (787.40 inch). Specify in plain text. | **Y01** |
| **Stainless steel tag [70 x 13 mm (2.76 x 0.51 inch)]:** | |
| Tag (max. 27 characters), plate, stainless steel 304/1.4301 | **Y17** |

| Selection and ordering data | |
|---|---|
| **Wetted seals** | |
| FFKM seal O-ring[7] | **A22** |
| **Test certificates** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts | **C12** |
| **Approvals and Certificates** | |
| INMETRO Ex-Approval[9] | **E25** |
| WHG/VLAREM Overfill and Leakage certificate | **E61** |

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## Selection and ordering data (continued)

| Selection and ordering data | |
|---|---|
| **Operating instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |

1) With Ex-approvals intrinsically safe: Electronic connection ONLY with 2-wire.
2) Length can be shortened by customer with use of the Shortening kit for extension cable, found in Accessories.
3) Can be used with Shortening kit for extension cable, found in Accessories.
4) Flange is screwed to process connection.
5) Available only with Process connection option AD, with Thread G1" and option AE, Thread NPT ¾".
6) Available with Approval options A and B only.
7) Ambient and process temperatures are limited to -20 °C (-4 °F).
8) Max. process pressure: -1 ... +25 bar (-15 ... 363 psi).
9) Available only with Approvals option C; specific INMETRO Ex-marking.

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## Technical specifications

| | Compact (7ML701 and 7ML700) | Extended (7ML702 and 7ML703) |
|---|---|---|
| **Mode of Operation** | | |
| Measuring principle | Capacitive level detection | Capacitive level detection |
| **Input** | | |
| Measured variable | Change in picoFarad (pF) | Change in picoFarad (pF) |
| **Output** | | |
| Output signal | | |
| • Alarm output | 8/16 mA or 4 ... 20 mA , 2-wire loop or IO-Link, PNP, NPN | 8/16 mA or 4 ... 20 mA, 2-wire loop or IO-Link, PNP, NPN *IO-Link not available with Cable version |
| • Switch output | 4-wire relay (general purpose) or transistor (intrinsically safe) | 4-wire relay (general purpose) or transistor (intrinsically safe) |
| • Fail-safe mode | Min. or max. | Min. or max. |
| **Accuracy** | | |
| Repeatability | 2 mm (0.08 inch) | 2 mm (0.08 inch) |
| **Rated operating conditions**[1] | | |
| Installation conditions | | |
| • Location | Indoor and outdoor | Indoor and outdoor |
| Ambient conditions | | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F) | -40 ... +85 °C (-40 ... +185 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I | I |
| • Pollution degree | 4 | 4 |
| Medium conditions | | |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 | Min. 1.5 |
| • Process temperature – configuration dependent | -40 ... +125 °C (-40 ... +257 °F), see temperature curve | -40 ... +125 °C (-40 ... +257 °F), see temperature curve |
| • Pressure (vessel) – configuration dependent | -1 ... 25 bar (363 psi) – Stainless Process connection | -1 ... 25 bar (363 psi) - Rod extensions |
| | -1 ... 10 bar (146 psi) – PPS process connection | -1 ... 10 bar (146 psi) - Cable extensions |
| • Degree of protection | | |
| - Enclosure Ø65 mm | Type 4X/IP68 | Type 4X/IP68 |
| - Enclosure Ø35 mm | Type 4X/IP68 | Not applicable |
| • Cable inlet | ½" NPT or M20 x 1.5 | ½" NPT or M20 x 1.5 |
| **Device version** | | |
| Material | | |
| • Body (enclosure version) | Thermoplastic polyester | Thermoplastic polyester |
| • Lid (enclosure version) | Transparent thermoplastic polycarbonate (PC) | Transparent thermoplastic polycarbonate (PC) |
| • Enclosure Ø35 mm | 316L stainless steel | Not applicable |
| Sensor length (nominal) | 92 mm (3.6 inch) | 300 ... 4 000 mm (11.8 ... 157 inch) - Rod version<br>400 ... 20 000 mm (15.7 ... 787 inch) - Cable version |

## Technical specifications (continued)

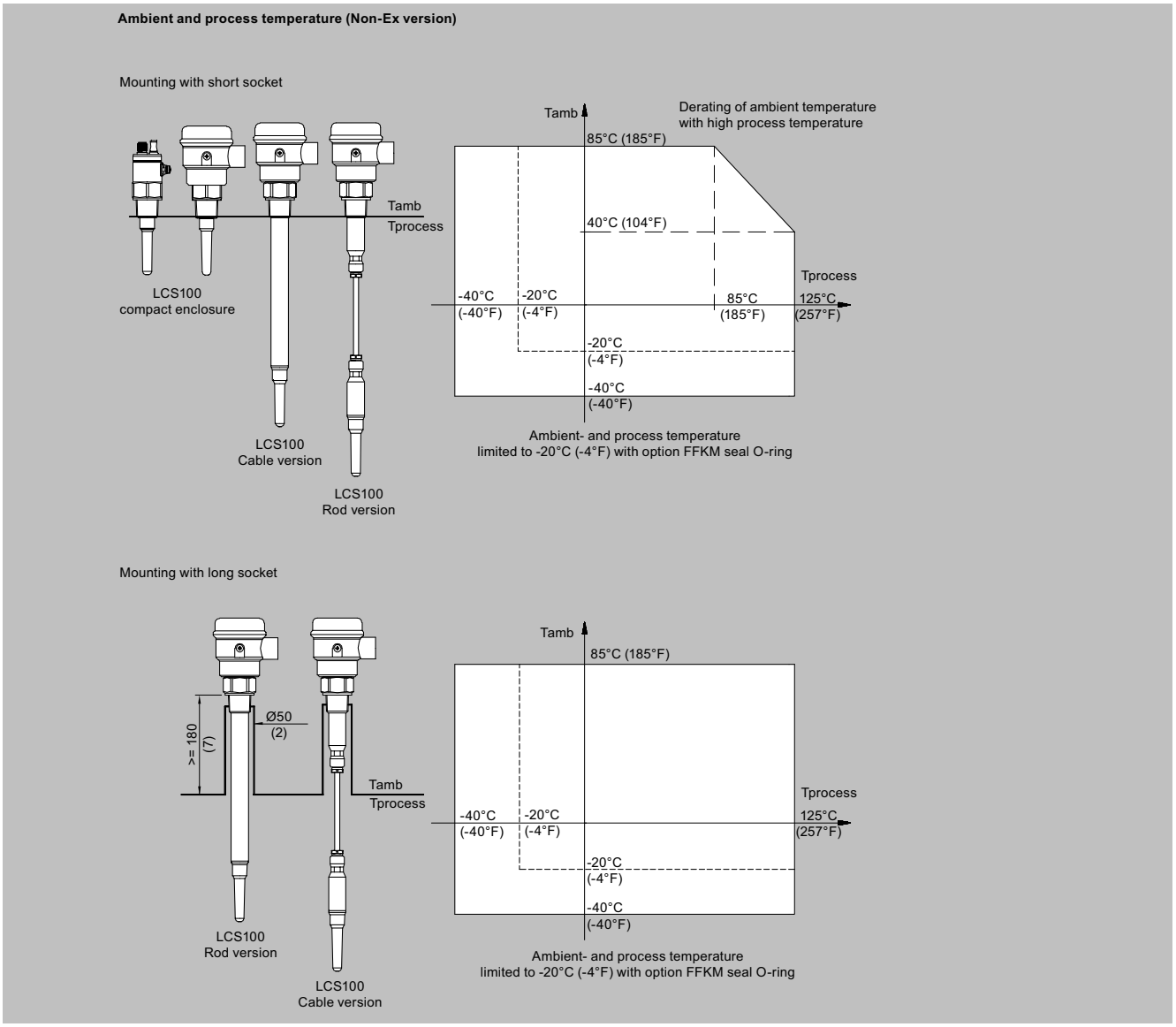
| | Compact (7ML701 and 7ML700) | Extended (7ML702 and 7ML703) |
|---|---|---|
| Process connection material of probe/wetted parts[2] | Connection: 316L stainless steel or PPS;<br>Process seal: FKM (optional FFKM);<br>Sensor: PEEK or PPS or PVDF | Connection: 316L stainless steel or PPS;<br>Process seal: FKM (optional FFKM);<br>Sensor: PPS or PVDF<br>Extension: Pipe 316L Cable: FEP jacketed |
| Connection (Enclosure 65 mm) | Terminal block, terminals 0.14 ... 1.5 mm² (AWG 28 ... 16) or M12 x 1 according to IEC 61076-2-101, male, 4-pole, coding A-standard | Terminal block, terminals 0.14 ... 1.5 mm² (AWG 28 ... 16) or M12 x 1 according to IEC 61076-2-101, male, 4-pole, coding A-standard |
| Connection (Enclosure 35 mm) | M12 x 1 according to IEC 61076-2-101, male, 4-pole, coding A-standard | Not applicable |
| Process connection | Thread: G ½", G ¾", G 1", NPT ¾"<br>Tri-clamp DN25 (1"), DN40 (1 1/2"), DN50 (2")<br>DIN 32676 Type A (DIN 11851) and DIN 32676 Type C (ASME BPE 2009)<br>Flange (screwed) DN 25, 40, 50; ASME 1", 1 ½", 2" | Thread: G ¾", G 1", NPT ¾"<br>Flange: DN 25, 40, 50; ASME 1", 1 ½", 2"<br>Adapters for G 1 ½", NPT 1 ¼", NPT 1 ½" |
| **Power supply** | | |
| Standard | • 4-wire with relay supply: 9 ... 33 V DC, 0.7W including 10 % of EN 61010-1<br>• 2-wire with 8/16 or 4 ... 20 mA loop: 9 ... 33 V DC, 0.7W including 10 % of EN 61010-1<br>• IO-Link / PNP / NPN 10 ... 30 V DC, incl. 10 % of EN 61010-1 | • 4-wire with relay supply: 9 ... 33 V DC, 0.7W including 10 % of EN 61010-1<br>• 2-wire with 8/16 or 4 ... 20 mA loop: 9 ... 33 V DC, 0.7W including 10 % of EN 61010-1<br>• IO-Link / PNP / NPN 10 ... 30 V DC, incl. 10 % of EN 61010-1 |
| Intrinsically Safe | • 2-wire with 8/16 or 4 ... 20 mA loop: 10.8 ... 30 V DC, 0.7W incl. 10 % of EN 61010-1, intrinsically safe barrier required<br>• 4-wire with relay: 10.8 .... 30 V DC, 0.7W incl. 10 % of EN 61010-1, intrinsically safe barrier required | • 2-wire with 8/16 or 4 ... 20 mA loop: 10.8 ... 30 V DC, 0.7W incl. 10 % of EN 61010-1, intrinsically safe barrier required |
| **Certificates and approvals** | • General purpose: CE, UKCA, FM, CSA<br>• ATEX II 1G, 1/2G Ex ia IIC<br>• ATEX II 1D, 1/2D Ex ia IIIC<br>• IEC Ex ia IIC<br>• IEC Ex ia IIIC<br>• FM/CSA IS Class I, II, III, Div. 1, Groups A ... G<br>• Overfill protection: WHG (Germany) VLAREM | • General purpose: CE, UKCA, FM, CSA<br>• ATEX II 1G, 1/2G Ex ia IIC<br>• ATEX II 1D, 1/2D Ex ia IIIC<br>• IEC Ex ia IIC<br>• IEC Ex ia IIIC<br>• FM/CSA IS Class I, II, III, Div. 1, Groups A ... G<br>• Overfill protection: WHG (Germany) VLAREM |

[1] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves.
[2] For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

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## Characteristic curves



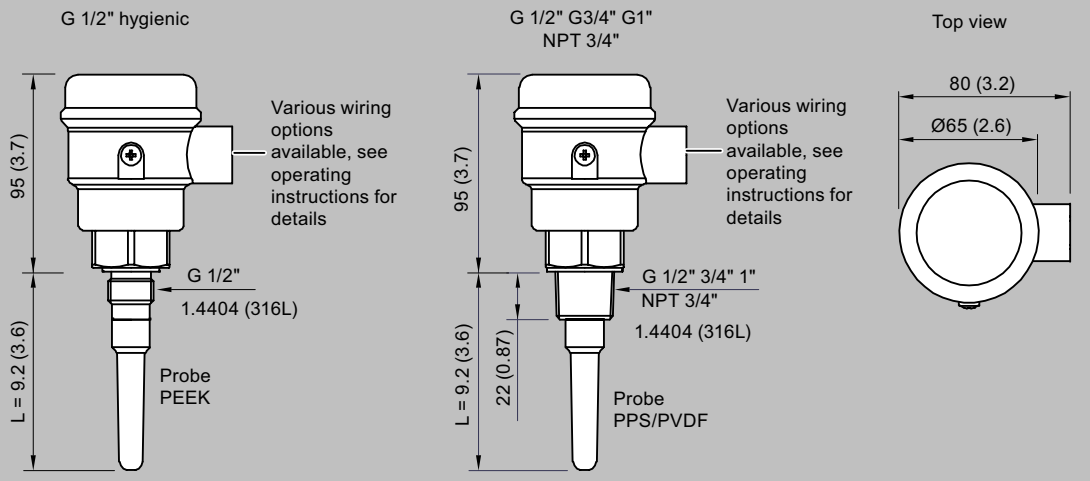

SITRANS LCS100 Ambient and process temperature, dimensions in mm (inch)

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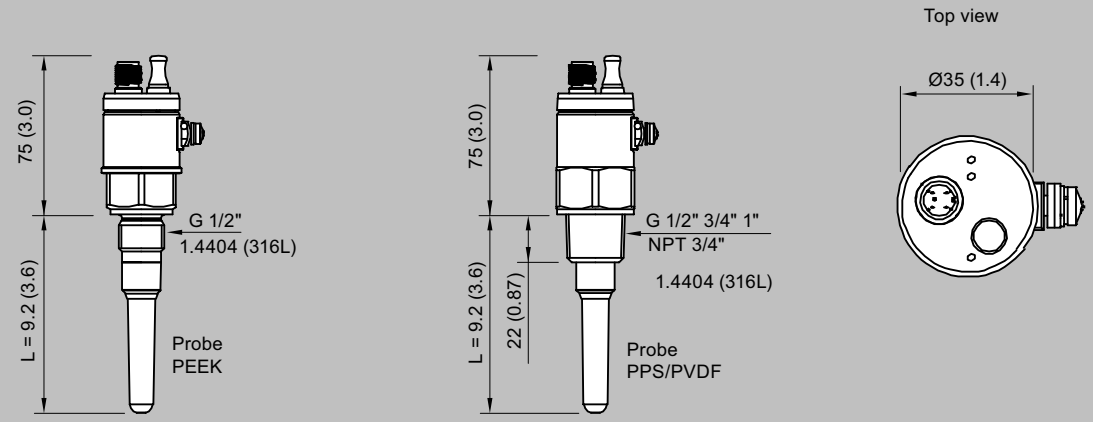
## Dimensional drawings

**Compact version: Stainless steel process connection, enclosure Ø65 mm (2.56 inch)**




Note: Short extension length version with stainless steel process connection are available with certificate EHEDG EL class I

**Compact version: Stainless steel process connection, enclosure Ø35 mm (1.38 inch)**




Note: Short extension length version with stainless steel process connection are available with certificate EHEDG EL class I

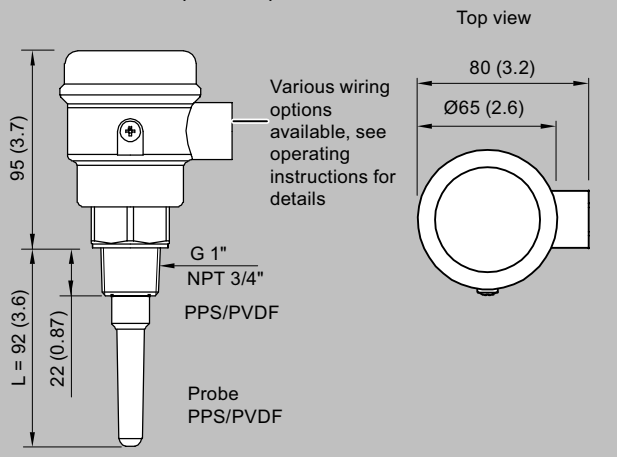
SITRANS LCS100, Compact stainless steel, dimensions in mm (inch)

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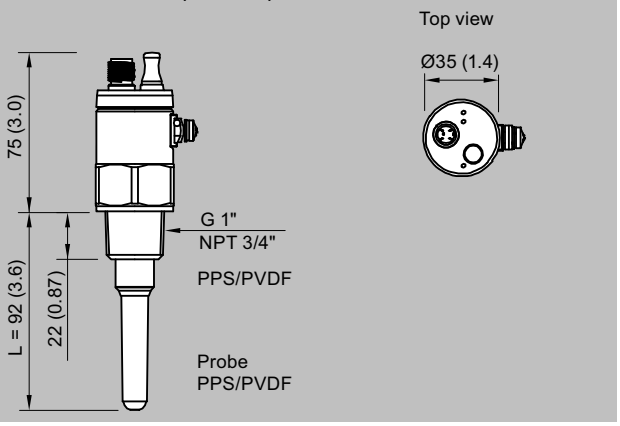


## Dimensional drawings (continued)

**Compact version: Plastic process connection, enclosure Ø65 mm (2.56 inch)**




**Compact version: Plastic process connection, enclosure Ø35 mm (1.38 inch)**



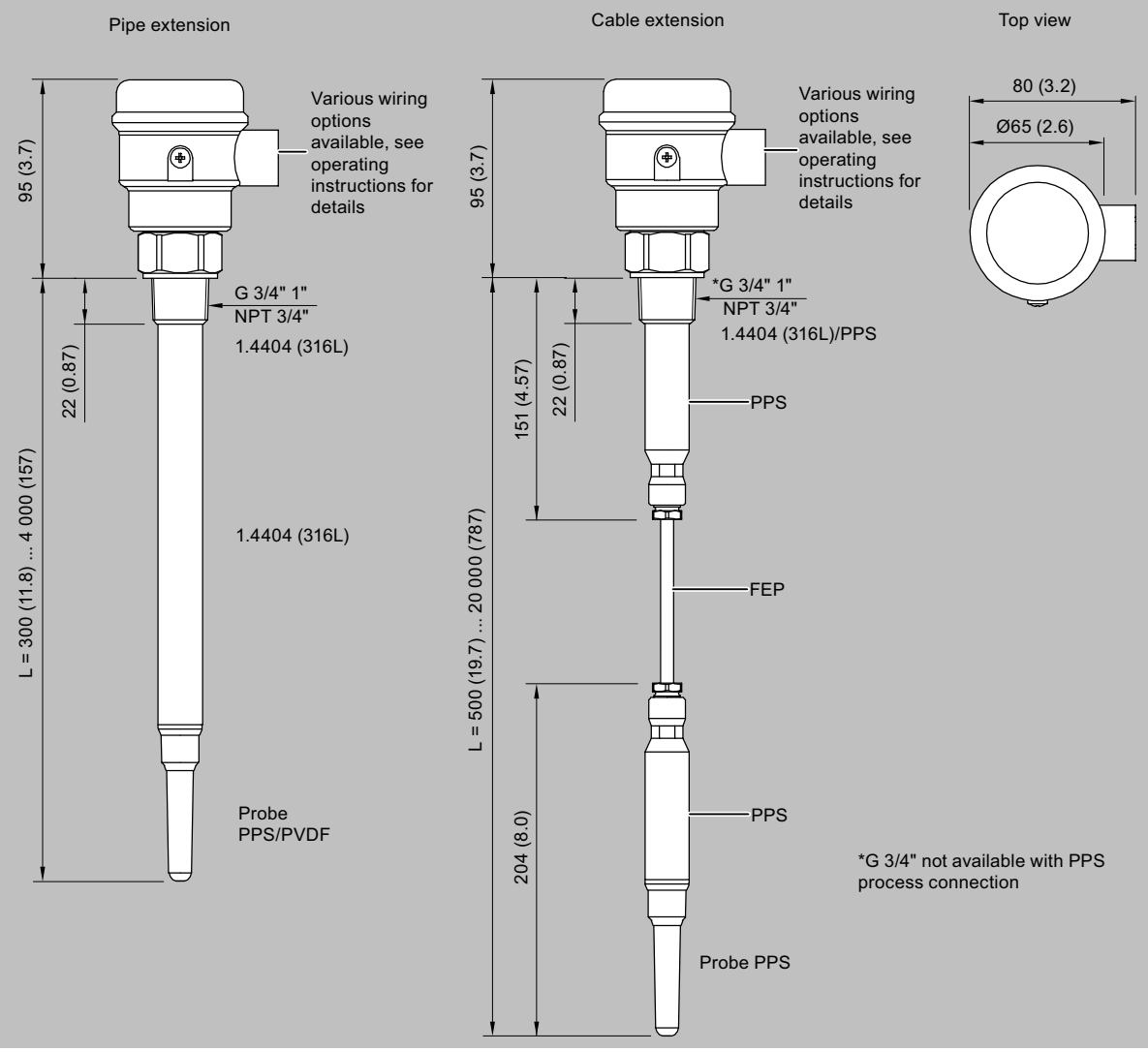

SITRANS LCS100, Compact with plastic process connection, dimensions in mm (inch)

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## Dimensional drawings (continued)

**Pipe extension and cable extension**




SITRANS LCS100, Pipe and cable extension, dimensions in mm (inch)

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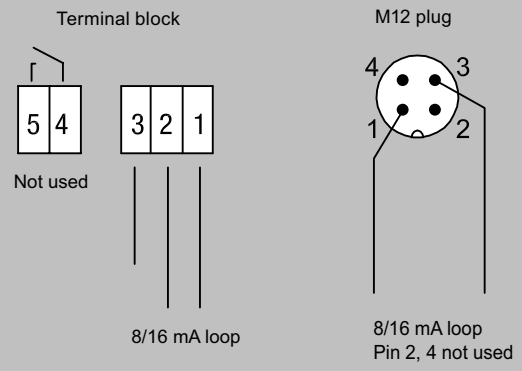
## Circuit diagrams

**2- wire operation with 8/16 mA loop**

8/16 mA loop: 9 .. 33 V DC,
0,7W incl. 10% of EN 61010-1

External resistor in loop: The above stated voltage is the resulting voltage on the unit. Any voltage drop on an external series resistance must be considered.
Rmax = (Vsupply -9 V)/ 16 mA

Example: 24 V supply allows Rmax of 938 Ohms



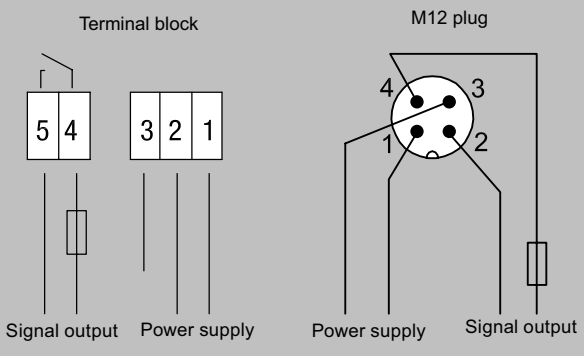

**4-wire operation with DC supply and relay (signal output)**

Power supply: 9 .. 33 V DC,
0,7W incl. 10% of EN 61010-1

Signal output: Floating relay SPST

Max. 60 V DC or 30 V AC; Limited to 35 V DC or 16 V AC in wet locations
Max. 1 A, 60 W

External fuse: max.1A, fast or slow, HBC, 250V




SITRANS LCS100, Standard connections

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## Circuit diagrams (continued)

**Intrinsically safe version: 2-wire operation with 8/16 mA loop**

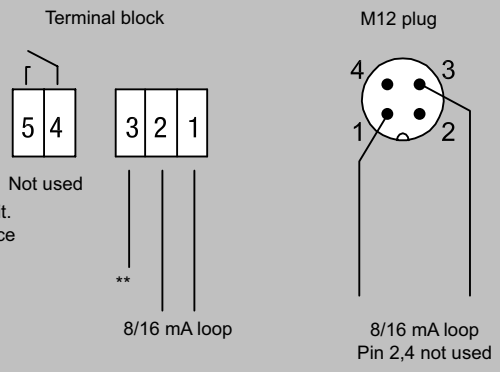
8/16 mA loop: 10.8 .. 30 V DC, 0,7W incl. 10% of EN 61010-1

Intrinsically safe supply required (barrier or signal conditioning instruments): Ui=30 V Ii=160 mA Pi=0,8 W, Ci=7,6 nF Li =0,3 mH

External resistor in loop: The above stated voltage is the resulting voltage on the unit. Any voltage drop on an external series resistance must be considered.

Rmax = (Vsupply -10.8 V)/ 16 mA

Example: 24 V supply allows Rmax of 825 Ohms




**Intrinsically safe version: 4-wire operation with DC supply and solid state relay (signal output)**

This operation is only available for LCS100 compact with enclosure Ø65 mm (2.56 inch) and connection via terminal block (Solid state relay integrated).

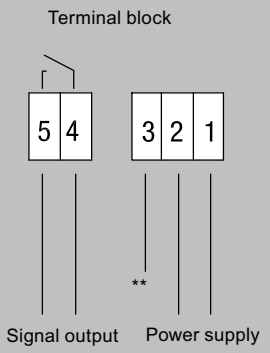
Power supply: 10.8 .. 30 V DC, 0,7W incl. 10% of EN 61010-1

Intrinsically safe barrier required: Ui=30 V Ii=160 mA Pi=0,8 W, Ci=7,6 nF Li =0,3 mH

Signal output: Solid state relay

Max. switching voltage / current: 30 V DC / 82mA

For connection to an intrinsically safe "switch amplifier for contact input" or to an intrinsically safe PLC with integrated input card for contact input. Ui=30 V Ii=200 mA Pi=350 mW, Ci=4,2 nF, Li=0




SITRANS LCS100, Intrinsically safe connections

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## Overview




SITRANS LCS050 is an ultra-compact, capacitance switch for point level detection in constricted spaces, water-based liquids, slurries, and foam.

## Benefits

- Easy installation with no need for adjustment
- Low maintenance with no moving parts
- Highly visible 360-degree status indication
- M12 connector for ease of installation
- IO-Link communication option for advanced monitoring and configuration

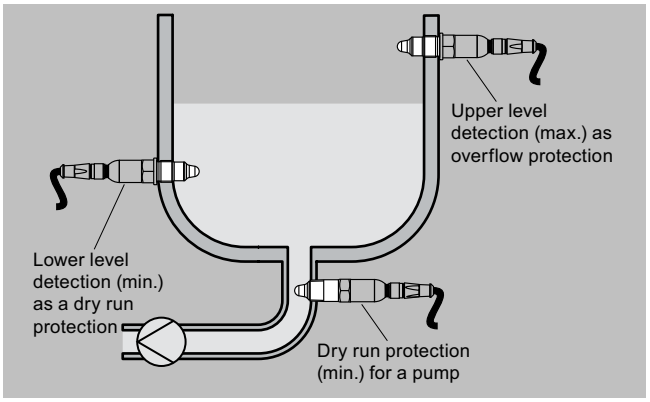
## Application

The SITRANS LCS050's ultra-compact design, short insertion length of 15 mm (0.59 inch), and versatility in various applications in vessels or pipes, makes it a good replacement for traditional point level switches.

Its advanced alternating capacitance field at the sensor tip ensures material detection based on changes in capacitance, providing repeatable performance. The PEEK probe is chemically resistant with an effective process operating temperature range from -20 to +100 °C (-4 to +212 °F) and supports sterilization in place at 135 °C (275 °F) for up to 1 hour. The product design ensures reliability in a vibrating environment such as agitated tanks up to 5 g.

- Key Applications: water-based liquids with > 10 % water (alcohols, acids, cleaning agents), slurries and foam for point level, overfill and dry run protection including small pipes due to its compact design.

## Configuration




SITRANS LCS050, installation examples

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## Selection and ordering data

| SITRANS LCS050 Point level switch<br>Compact, point level switch, detects level in liquids. For use with overflow, high, low, and demand applications as well as pump protection. Compact design is ideal for confined spaces. Support for IO-Link communications. | Article No.<br>7ML5772- | ● | ● | ● | ● | 0 | - | 0 | A | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary location | | 1 | | | | | | | | | |
| With FDA, Regulation (EC) No. 1935/2004 | | 2 | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Thread M24 x 1.5 PN 25, DIN 13 / 316L, EPDM | | | A | A | | | | | | | |
| Thread G ½" PN 25, DIN 3852-A / 316L | | | A | B | | | | | | | |
| Thread G ½" PN 25, ISO228-1 / 316L (Ra < 0.76 µm); for ½" hygiene adapter | | | A | C | | | | | | | |
| Thread ½" NPT PN 25, ASME B1.20.1 / 316L | | | A | D | | | | | | | |
| Thread G ¾" PN 25, DIN 3852-A / 316L | | | A | E | | | | | | | |
| Thread ¾" NPT PN 25, ASME B1.20.1 / 316L | | | A | F | | | | | | | |
| Thread G 1" PN 25, DIN 3852-A / 316L | | | A | G | | | | | | | |
| Thread G 1" PN 25, ISO228-1, hygiene design / 316L (Ra < 0.76 µm), EPDM, for hygiene adapter sealing with O-ring | | | A | H | | | | | | | |
| Thread 1" NPT PN 25, ASME B1.20.1 / 316L | | | A | J | | | | | | | |
| Thread G 1" PN 25, ISO228-1, cone 40° / 316L (Ra < 0.76 µm); for hygiene adapter metallically sealing | | | A | K | | | | | | | |
| **Electronics** | | | | | | | | | | | |
| Three-wire transistor with IO-Link | | | | | 1 | | | | | | |

| Selection and ordering data | |
|---|---|
| **Accessories** | |
| Hygienic adapter for G ½" is available, contact factory for pricing. | |
| Welded socket, suitable for LCS050 series, with threaded fittings or hygienic connections is available, contact factory for pricing | |
| **Operating instructions** | |
| Note: due to ATEX regulations one Quick start manual is included with every product.<br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |

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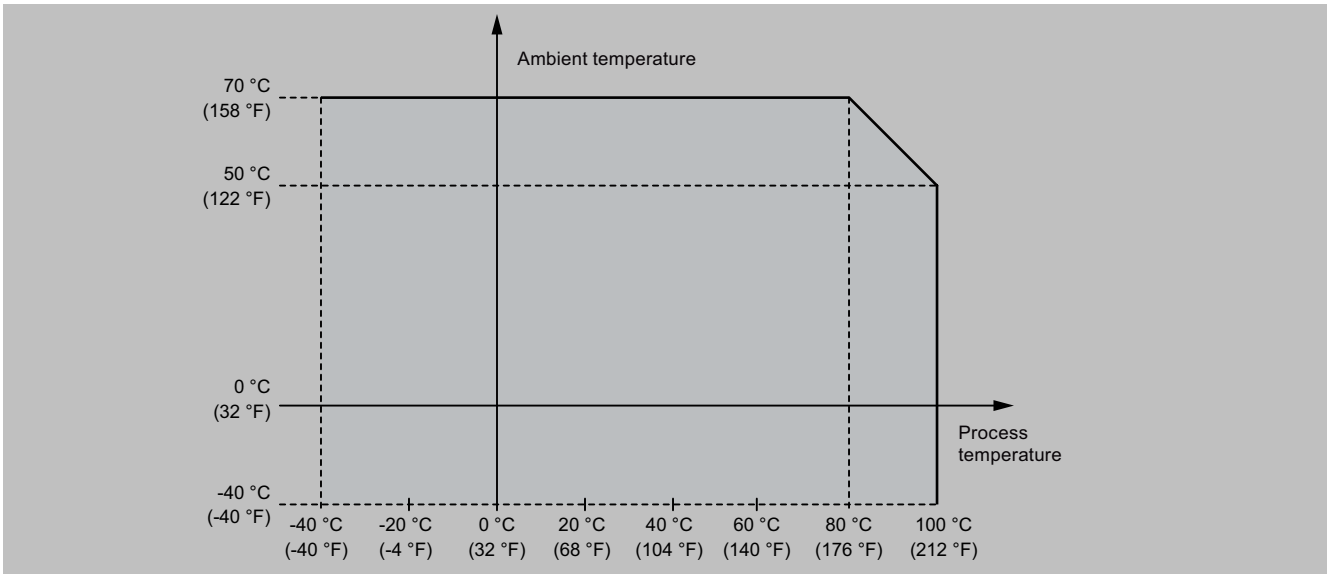
## Technical specifications

| SITRANS LCS050 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Capacitance level detection |
| **Input** | |
| Measured variable | Change in picoFarad (pF) |
| **Output** | |
| Output signal | |
| • Alarm output | Transistor (PNP/NPN)<br>IO-Link acc. to IEC 61131-9 |
| • Fail-safe mode | Min. or max. |
| **Accuracy** | |
| Hysteresis | Approx. 1 mm (0.04 inch) |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +70 °C (-40 ... +158 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| Medium conditions | |
| • Relative dielectric constant $\epsilon_r$ | Min. 2 |
| • Process temperature | -20 ... +100 °C (-4 ... +212 °F) up to 1 hour, 135 °C (275 °F) |
| • Pressure (vessel) | -1 ... 25 bar/-100 ... 2 500 kPa (-14.5 ... 363 psig) |
| • Degree of protection | |
| - M 12x 1 plug | IP66/IP67/IP69 |
| **Design** | |
| | ***Enclosure/integral cable version*** |
| Material | |
| • Body | 316L and plastic (polycarbonate) |
| Sensor length | 15 mm (0.59 inch) |
| Process connection material of probe/wetted parts | • Connection: 316L stainless steel<br>• Device seal: FKM (hygienic version EPDM)<br>• Sensor tip: PEEK |
| Connection (Enclosure version) | M12 x 1 plug |
| Process connection | Pipe thread, cylindrical (DIN 3852-A) G½, G¾, G1pipe thread, conical (ASME B1.20.1) ½ NPT, ¾ NPT, 1 NPT metric fine thread, cylindrical M24 x 1.5 |
| **Power supply** | |
| Standard | 12 ... 35 V DC |
| **Certificates and approvals** | General: CE, UKCA |

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## Characteristic curves

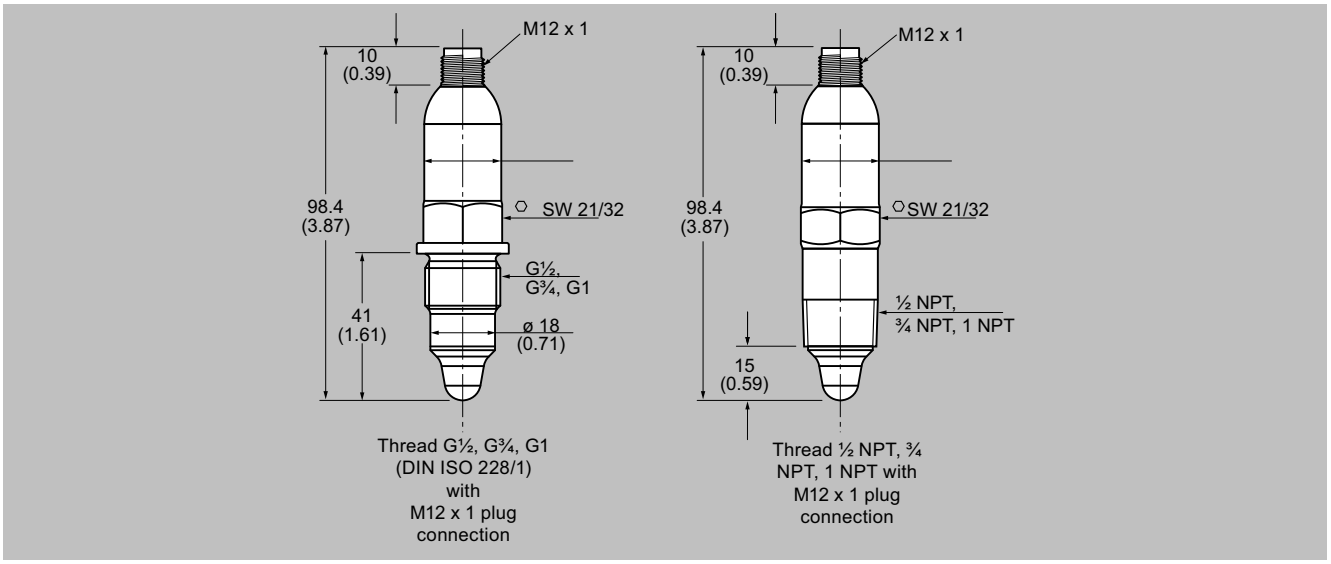



SITRANS LCS050 ambient temperature/process temperature curve

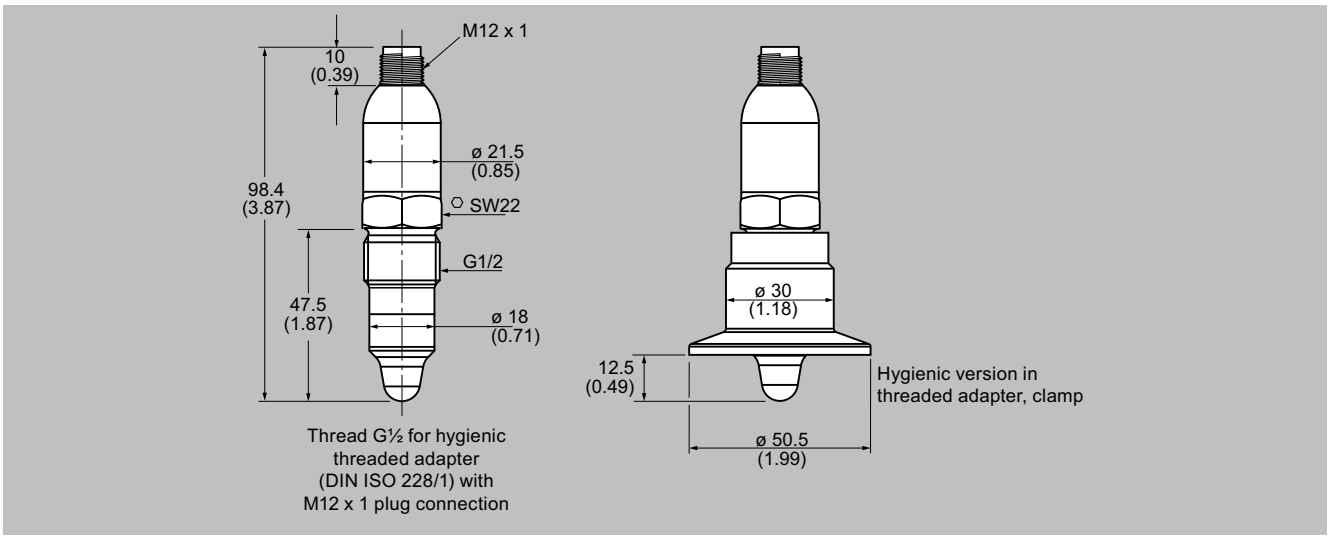
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## Dimensional drawings

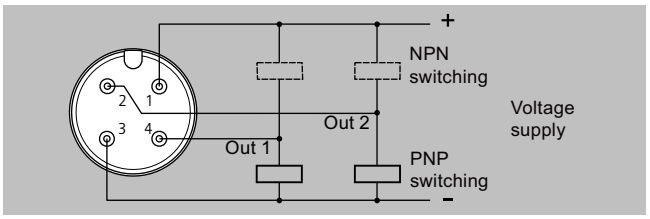



SITRANS LCS050, standard version - thread, dimensions in mm (inch)




SITRANS LCS050, hygienic version - thread, dimensions in mm (inch)

## Circuit diagrams




SITRANS LCS050 connections

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## Overview

***Introduction***

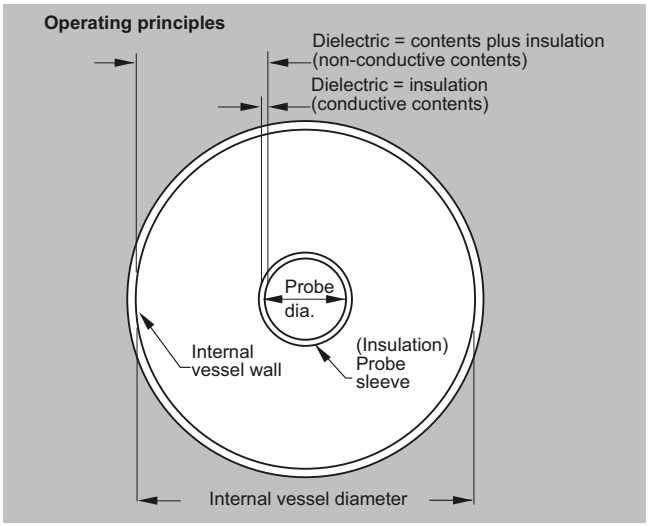
Inverse frequency shift capacitance point level and material detection switches are designed to withstand the harsh environments of high pressure and high temperature applications.

***Inverse Frequency Technology***

Siemens inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

***Principle of Operation***

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.




Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

## Mode of operation

***Common Terms***

Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapor concentration, material buildup, dust, or condensation.

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## Technical specifications

| Point Level Measurement<br>Criteria | Pointek CLS100 | Pointek CLS200 | Pointek CLS300 |
|---|---|---|---|
| Typical applications | Liquids, slurries, powders, granules, applications in constricted spaces | Liquids, slurries, powders, granules, foam, food, and pharmaceuticals, petrochemicals | Liquids, slurries, powders, granules, relatively high pressure, and temperature, hazardous areas |
| Max. length including sensor | 100 mm (4 inch) | Rod: 5.5 m (18 ft)<br>Cable: up to 30 m (98 ft) | Rod: 1 m (40 inch)<br>Cable: 25 m (82 ft) |
| Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.) | • Stainless steel process connection: -30 ... +100 °C (22 ... +212 °F)<br>• Fully Synthetic (PPS process connection): -10 ... +100 °C (14 ... 212 °F) | • -40 ... +85 °C (-40 ... +185 °F)<br>• With thermal isolator: -40 ... +125 °C (-40 ... +257 °F) | • -40 ... +200 °C (-40 ... +392 °F)<br>• HT version: -40 ... +400 °C (-40 ... +752 °F) |
| Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.) | Up to 10 bar g (146 psi g) | • Rod versions: Up to 25 bar g (365 psi g)<br>• Cable version: Up to 10 bar g (146 psi g) | Up to 35 bar g (511 psi g) |
| Output | Stainless steel cable or enclosure version:<br>• 4 ... 20/20 ... 4 mA, 2-wire current loop<br>• Solid-state output<br>Fully-synthetic version (PPS)<br>• Relay output | Standard:<br>• 1 SPDT Form C relay, solid-state switch<br>Digital:<br>• Solid-state switch included | Standard:<br>• 1 SPDT Form C relay, solid-state switch<br>Digital:<br>• Solid-state switch included |
| Communications | | Standard:<br>• 3 LED indicators<br>Digital:<br>• PROFIBUS PA; SIMATIC PDM compatible | Standard:<br>• 3 LED indicators<br>Digital:<br>• PROFIBUS PA; SIMATIC PDM compatible |
| Power Specifications | Standard:<br>• 12 ... 33 V DC<br>Intrinsically Safe (Stainless steel version only):<br>• 10 ... 30 V DC | Standard:<br>• 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max.<br>Digital:<br>• Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC<br>• Current consumption: 12.5 mA | Standard:<br>• 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max.<br>Digital:<br>• Bus voltage: 12 ... 30 V DC, IS version: 12 ... 24 V DC<br>• Current consumption: 12.5 mA |
| Approvals | Stainless steel cable or enclosure version: CE, CSA, FM, ATEX, RCM, Lloyds Register, WHG<br>Fully-synthetic version (PPS): CSA, FM | CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II | CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II |

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## Overview



Pointek CLS100 is a compact, 2-wire, inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries, and foam; with the ability to tune out buildup on probe.

## Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

## Application

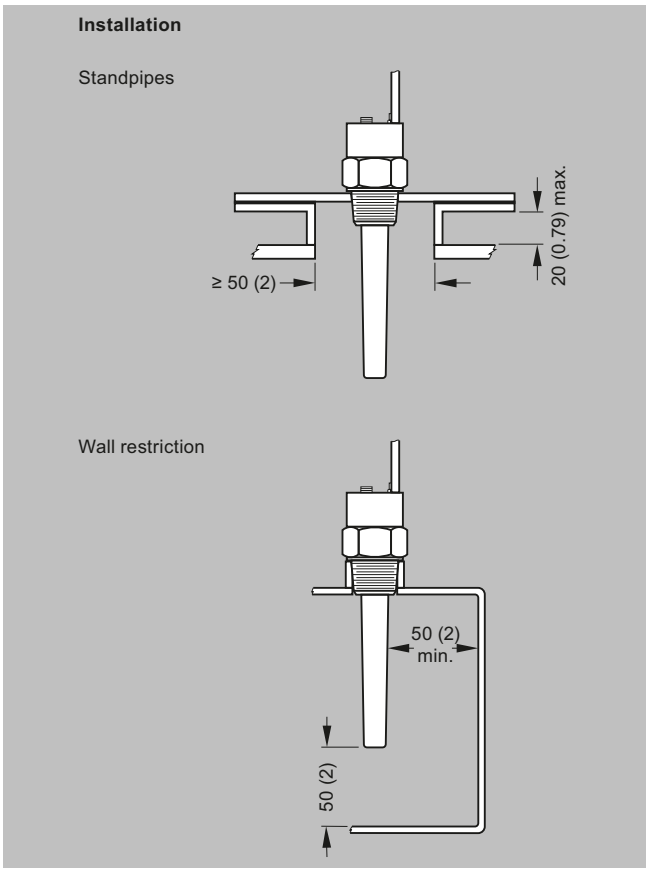
Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

## Configuration




Pointek CLS100 installation, dimensions in mm (inch)

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## Selection and ordering data

| Pointek CLS100 RF Capacitance point level switch, stainless steel process connection<br>Detects level and interface in liquids, solids, slurries and foam. Compact, with 100 mm (4 inch) insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5501- 0 | ● | ● | ● | ● |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Process Connection** | | | | | |
| ¾" NPT [(Taper), ANSI/ASME B1.20.1] | | A | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | E | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | J | | | |
| **Approvals** | | | | | |
| General Purpose: CE, CSA, FM, RCM | | | A | | |
| CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD ½ GD EEx ia IIC T4 ... T6 T107 °C[1] | | | C | | |
| CSA/FM Class II and III, Div. 1, Groups E, F, G[1] | | | G | | |
| **Device version** | | | | | |
| Integral cable version (PPS probe) | | | | 1 | |
| Enclosure version (PPS probe), ½" NPT cable inlet | | | | 3 | |
| Integral cable version with PVDF probe body | | | | 5 | |
| Enclosure version with PVDF probe body (½" NPT cable inlet) | | | | 6 | |
| Enclosure version (PPS probe), M20 x 1.5 cable inlet | | | | 7 | |
| Enclosure version with PVDF probe body, M20 x 1.5 cable inlet | | | | 8 | |
| **Overfill protection** | | | | | |
| Not required | | | | | 0 |
| Required (WHG) | | | | | 1 |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text | **Y17** |
| FFKM seal O-ring[1] | **A22** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[2] | **E34** |
| **Operating Instructions** | |
| Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

1) See also CLS100 pressure/temperature curve.
2) Available only with Approvals option C.

| Selection and Ordering data | Article No. |
|---|---|
| **Accessories** | |
| SensGuard, ¾" NPT (PPS). Only available for CLS100 with ¾" NPT thread. | **7ML1830-1DL** |
| SensGuard, R 1" (BSPT) (PPS). Only available for CLS100 with ¾" NPT thread. | **7ML1830-1DM** |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures | **7ML1930-1AC** |
| Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia | **7NG4124-0AA00** |
| ½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch) | **7ML1830-1JA** |
| M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch) | **7ML1830-1JC** |

| Pointek CLS100 RF Capacitance point level switch, PPS process connection<br>Detects level and interface in liquids, solids, slurries, and foam. Compact, with 100 mm (4 inch) insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5610- 0 | ● | ● | ● | ● |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Process connection (PPS)** | | | | | |
| ¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body) | | A | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body) | | B | | | |
| **Approvals** | | | | | |
| General Purpose: CSA, FM | | | D | | |
| **Versions/Options** | | | | | |
| Enclosure version, PPS process connection, ½" NPT cable inlet | | | | 1 | |
| Enclosure version, PPS process connection, M20 x 1.5 | | | | 2 | |

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## Selection and ordering data (continued)

| Pointek CLS100 RF Capacitance point level switch, PPS process connection Detects level and interface in liquids, solids, slurries, and foam. Compact, with 100 mm (4 inch) insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5610- 0 | ● | ● | ● | ● |
|---|---|---|---|---|---|
| **Overfill protection** | | | | | |
| Not required | | | | | 0 |
| Required | | | | | 1 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text | **Y17** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: due to ATEX regulations one Quick start manual is included with every product. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SensGuard, ¾" NPT (PPS). Only available for CLS100 with ¾" NPT thread. | **7ML1830-1DL** |
| SensGuard, R 1" (BSPT) (PPS). Only available for CLS100 with ¾" NPT thread. | **7ML1830-1DM** |
| Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures | **7ML1930-1AC** |

[1] See also CLS100 pressure/temperature curve.

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## Technical specifications

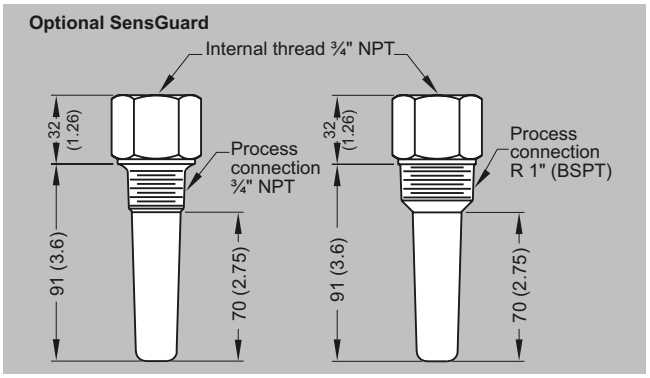
| Pointek CLS100 | Stainless steel process connection (integral cable or enclosure version) (7ML5501) | Fully synthetic process connection (enclosure version only) (7ML5610) |
|---|---|---|
| **Mode of operation** | | |
| Measuring principle | Inverse frequency shift capacitive level detection | Inverse frequency shift capacitive level detection |
| **Input** | | |
| Measured variable | Change in picoFarad (pF) | Change in picoFarad (pF) |
| **Output** | | |
| Output signal | | |
| • Alarm output | 4 ... 20/20 ... 4 mA 2-wire loop | 4 ... 20/20 ... 4 mA 2-wire loop |
| • Switch output[1)] | Solid-state: 30 V DC/30 V AC, max. 82 mA | Max. switching voltage: 60 V DC/30 V AC<br>Max. switching current: 1 A |
| • Fail-safe mode | Min. or max. | Min. or max. |
| **Accuracy** | | |
| Repeatability | 2 mm (0.08 inch) | 2 mm (0.08 inch) |
| **Rated operating conditions**[2)] | | |
| Installation conditions | | |
| • Location | Indoor/outdoor | Indoor/outdoor |
| Ambient conditions | | |
| • Ambient temperature | -30 ... +85 °C (-22 ... +185 °F) | -10 ... +85 °C (14 ... 185 °F) |
| • Storage temperature | -40 ... 85 °C (-40 ... +185 °F) | -40 ... 85 °C (-40 ... +185 °F) |
| • Installation category | I | I |
| • Pollution degree | 4 | 4 |
| Medium conditions | | |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 | Min. 1.5 |
| • Process temperature | -30 ... +100 °C (-22 ... +212 °F) | -10 ... +100 °C (14 ... 212 °F) |
| • Pressure (vessel) | -1 ... +10 bar g (-14.6 ... +146 psi g), nominal[2)] | -1 ... +10 bar g (-14.6 ... +146 psi g), nominal |
| • Degree of protection | | |
| - Enclosure version | IP68/Type 4/NEMA 4 | IP68/Type 4/NEMA 4 |
| - Integral cable version | IP65/Type 4/NEMA 4 | Not applicable |
| • Cable inlet | ½" NPT (M20 x 1.5 optional) | ½" NPT (M20 x 1.5 optional) |
| **Design** | | |
| | ***Enclosure/Integral cable version*** | ***Fully synthetic version*** |
| Material | | |
| • Body (Enclosure version) | Thermoplastic polyester | Thermoplastic polyester |
| • Lid (Enclosure version) | Transparent thermoplastic polycarbonate (PC) | Transparent thermoplastic polycarbonate (PC) |
| • Integrated cable body (Integral cable version) | 316L stainless steel | Not applicable |
| Sensor length (nominal) | 100 mm (4 inch) | 100 mm (4 inch) |
| Process connection material of probe/wetted parts[3)] | Connection: 316L stainless steel;<br>Process seal: FKM (optional FFKM);<br>Sensor: PPS (optional PVDF)[4)] | PPS process connection and PPS sensor (Uni-Construction) |
| Connection (Enclosure version) | Internal 5-point terminal block,<br>½" NPT wiring entrance, M20 x 1.5 optional | Removable internal 5-point terminal block,<br>½" NPT wiring entrance, M20 x 1.5 optional |

## Technical specifications (continued)

| Pointek CLS100 | Stainless steel process connection (integral cable or enclosure version) (7ML5501) | Fully synthetic process connection (enclosure version only) (7ML5610) |
|---|---|---|
| Connection (Integral cable version) | 4 conductors, 1 m (3.3 ft), 0.5 mm² (22 AWG), shielded, polyester jacket | Not applicable |
| Process connection | ¾" NPT [(Taper), ANSI/ASME B1.20.1]<br>R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | ¾" NPT [(Taper), ANSI/ASME B1.20.1]<br>R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] |
| **Power supply** | | |
| Standard | 12 ... 33 V DC | 12 ... 33 V DC |
| Intrinsically Safe | 10 ... 30 V DC (Intrinsically Safe barrier required) | Not applicable |
| **Certificates and approvals** | • General: CE, CSA, FM, RCM<br>• Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5<br>Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4<br>• Intrinsically Safe (barrier required): CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G T4<br>ATEX II 1 GD ½ GD EEx ia IIC T4 to T6 T107 °C<br>• Overfill protection: WHG (Germany) | • General: CSA, FM |

1) When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.
2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also CLS100 Pressure/Temperature curves.
3) For caustic materials, consult a local sales person for alternative O-rings.
For more information, please visit http://www.automation.siemens.com/aspa_app.
4) When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

## Options

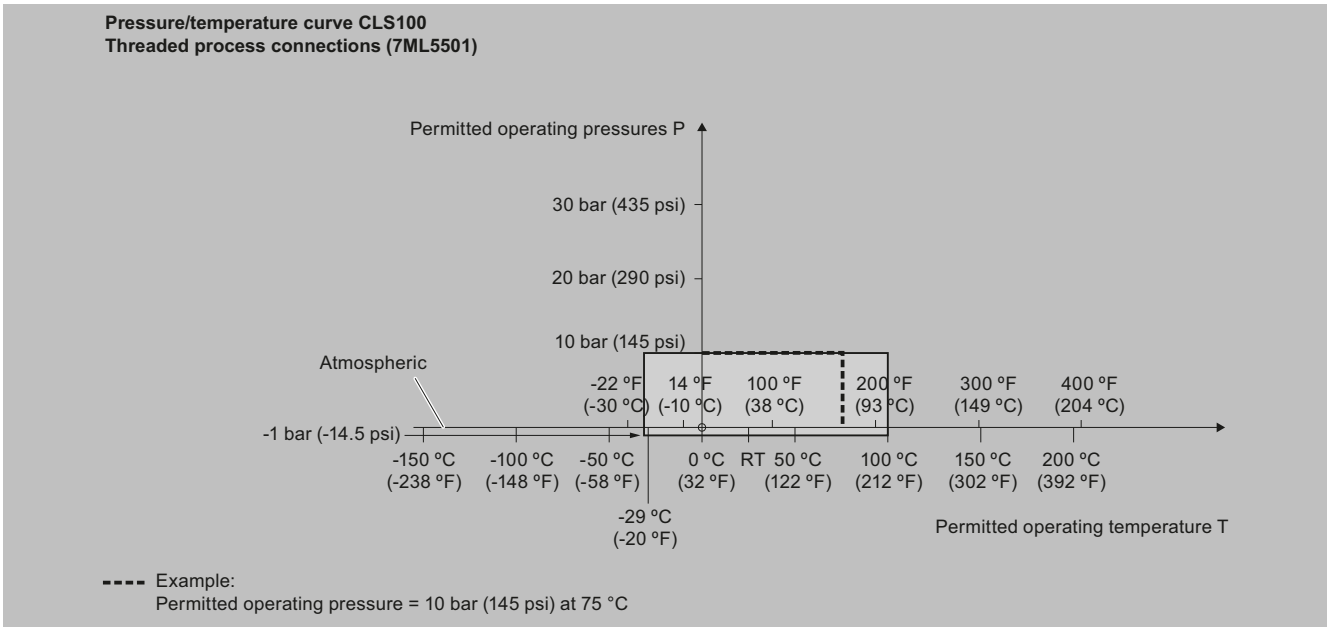



Optional SensGuard, dimensions in mm (inch)

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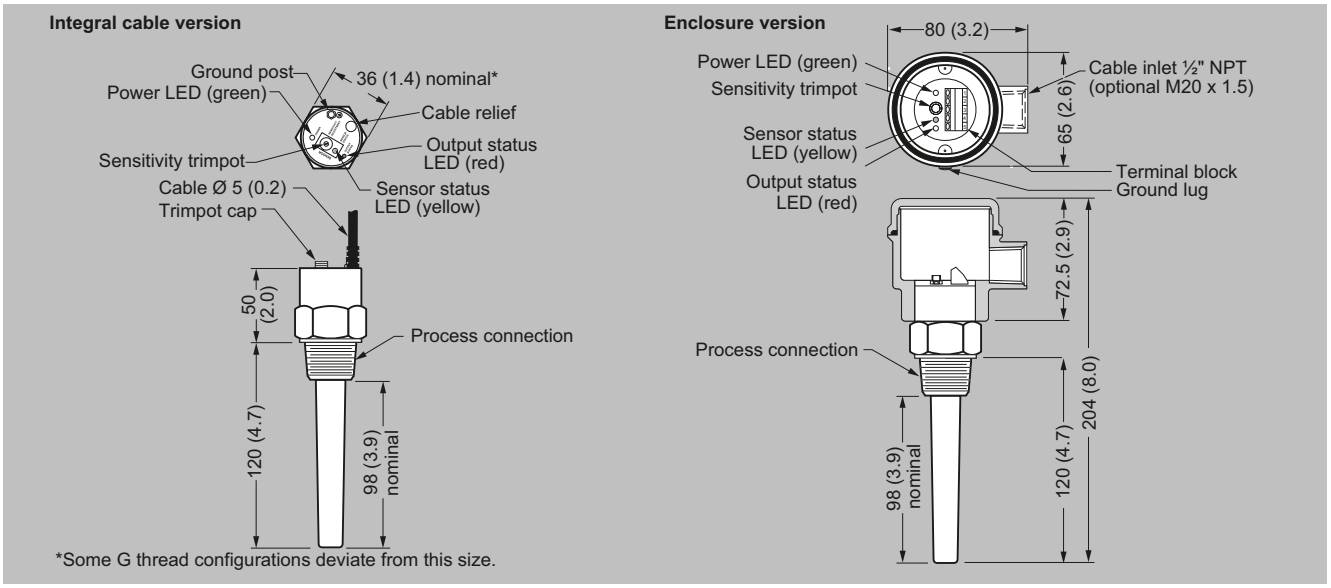


## Characteristic curves




Pointek CLS100 process pressure/temperature derating curves

## Dimensional drawings




Pointek CLS100, dimensions in mm (inch)

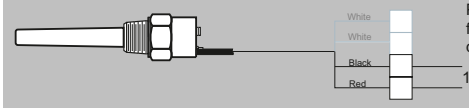
© Siemens AG 2024



## Circuit diagrams

**Integral Cable Version - Non Intrinsically Safe only**

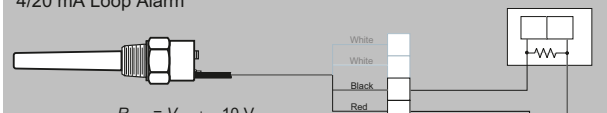
LOW/HIGH Alarm




Polarity as required for desired operation

12 ... 33 V DC

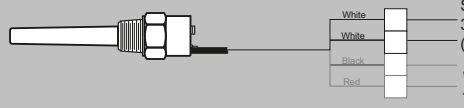
4/20 mA Loop Alarm




$R_{max} = V_{supply} - 10\ V$
20 mA

$V_{supply}$
12 ... 33 V DC

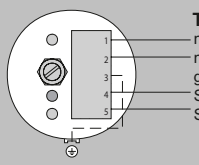
Solid State Switch Version




Solid state switch,
30 V DC/AC
(peak) 82 mA (max)

$V_{supply}$
12 ... 33 V DC

**Enclosure and Fully Synthetic Version**




| Terminal operations | Cable equivalent |
|---|---|
| mA current loop (+V or -V) | Red wire |
| mA current loop (+V or -V) | Black wire |
| ground | Cable shield |
| Solid state switch/relay* | White wire |
| Solid state switch/relay* | White wire |

* Switch/relay normally open in unpowered state
* Relay not available on Pointek CLS100 IS version (7ML5501)

**Note:**
When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

Pointek CLS100 connections

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## Overview



Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe.

## Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power
- Suitable for API 2350

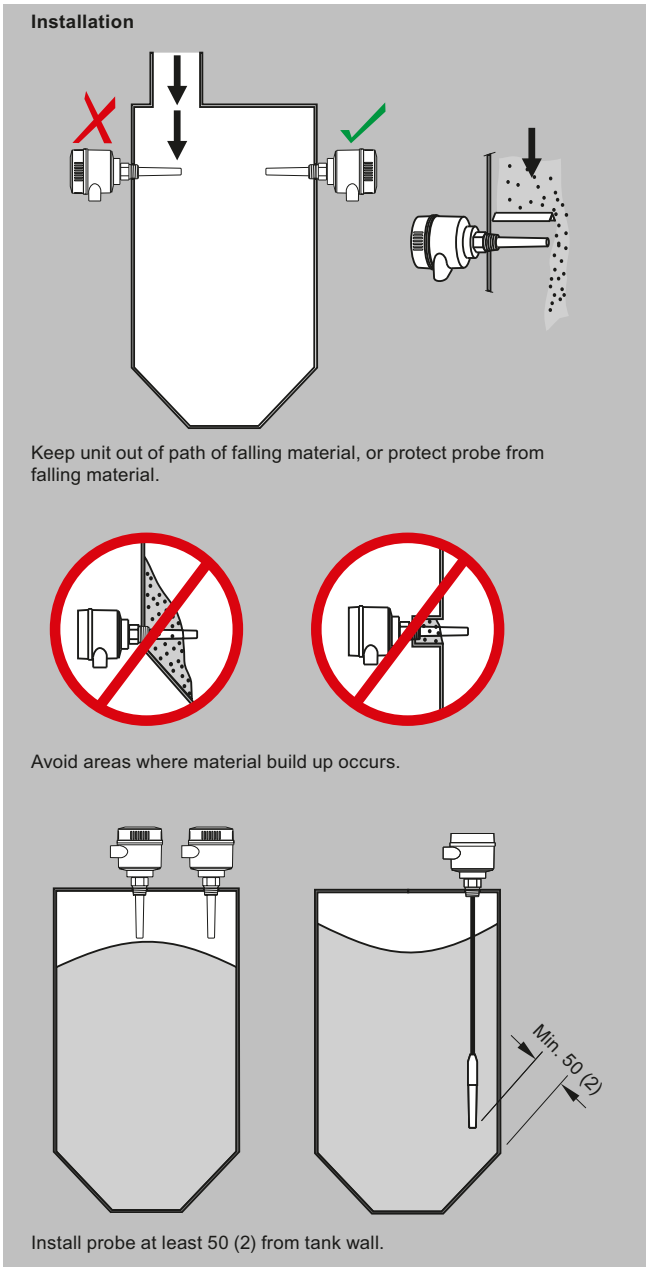
## Application

Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms. Universal switch for solids/liquids and interface.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

## Configuration




Pointek CLS200 installation, dimensions in mm (inch)

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## Selection and ordering data

| Pointek CLS200 RF Capacitance point level switch, rod design<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No.<br>7ML5630- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN SO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length**<br>(length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)] | | | | A | | | | | | | |
| Extended rod, 250 mm (9.84 inch) | | | | B | | | | | | | |
| Extended rod, 350 mm (13.78 inch) | | | | C | | | | | | | |
| Extended rod, 500 mm (19.69 inch) | | | | D | | | | | | | |
| Extended rod, 750 mm (29.53 inch) | | | | E | | | | | | | |
| Extended rod, 1 000 mm (39.37 inch) | | | | F | | | | | | | |
| Extended rod, 1 250 mm (49.21 inch) | | | | G | | | | | | | |
| Extended rod, 1 350 mm (53.15 inch) | | | | H | | | | | | | |
| Extended rod, 1 500 mm (59.06 inch) | | | | J | | | | | | | |
| Extended rod, 1 750 mm (68.90 inch) | | | | K | | | | | | | |
| Extended rod, 2 000 mm (78.74 inch) | | | | L | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, rod design<br>Detects level and interface in liquids, solids, slurries, and foam.<br>Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No.<br>7ML5630- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | |
| Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch) | M |
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | N |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | P |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | Q |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | R |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | S |
| **Thermal isolator** | |
| Without thermal isolator | 0 |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | 1 |
| **Remote mount electronics and mounting bracket** | |
| With 2 m (79 inch) of cable[1)2)] | 2 |
| With 5 m (197 inch) of cable[1)2)] | 3 |
| **Wetted seals** | |
| FKM | 0 |
| FFKM [for process temperatures above -20 °C (-4 °F)] | 1 |
| **Probe material** | |
| 316L stainless steel with PPS probe body | 0 |
| 316L stainless steel with PVDF probe body | 1 |
| **Approvals** | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | D |
| Flameproof Enclosure with IS Probe, with WHG Approval CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div.1 Gr. E, F, G T4 | F |
| Explosion Proof Enclosure with IS Probe CSA/ FM Class I, II, III Div.1 Gr.A, B, C, D, E, F, G T4 | G |
| General Purpose (CSA, FM) | H |
| General Purpose (CSA, FM, CE, UKCA, RCM) | J |
| General Purpose CSA, FM, CE, UKCA, RCM with WHG approval | K |
| **Enclosure and lid** | |
| Aluminum epoxy coated | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet IP68 | D |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
2) Available with Approval options F, G, and H.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)] | **C20** |
| INMETRO[1)] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approvals options C, D, E.

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, cable design<br>Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5631- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length**<br>(length from flange face)<br>(threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly[1)] | | | | A | | | | | | | |
| Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly[1)] | | | | B | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch) | | | | C | | | | | | | |
| Extended cable, 5 001 ... 1 000 mm (196.89 ... 393.70 inch) | | | | D | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, cable design<br>Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. | Article No.<br>7ML5631- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | E |
| Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.4 inch) | F |
| Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | G |
| Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.1 inch) | H |
| **Thermal isolator** | |
| Without thermal isolator | 0 |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | 1 |
| **Remote mount electronics and mounting bracket** | |
| With 2 m (79 inch) of cable[2)] | 2 |
| With 5 m (197 inch) of cable[2)] | 3 |
| **Wetted seals** | |
| FKM and PTFE | 0 |
| FFKM and PTFE [for process temperatures above -20 °C ) (-4 °F)] | 1 |
| **Probe material** | |
| FEP jacketed cable with PPS probe body | 0 |
| FEP jacketed cable with PVDF probe body | 1 |
| **Approvals** | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | D |
| Flameproof Enclosure with IS Probe, with WHG Approval CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div.1 Gr. E, F, G T4 | F |
| Explosion Proof Enclosure with IS Probe CSA/ FM Class I, II, III Div.1 Gr.A, B, C, D, E, F, G T4 | G |
| General Purpose (CSA, FM) | H |
| General Purpose (CSA, FM, CE, UKCA, RCM) | J |
| General Purpose CSA, FM, CE, UKCA, RCM with WHG approval | K |
| **Enclosure and lid** | |
| Aluminum epoxy coated | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |

1) Sensor detached to allow customer to set desired cable length.
2) Available with Approvals options F ... H.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)] | **C20** |
| INMETRO[1)] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approvals options C, D, E.

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, sanitary rod design<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5632- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Sanitary 316L stainless steel*** | | | | | | | | | | | |
| 1" sanitary fitting clamp | | 8 | A | | | | | | | | |
| 1½" sanitary fitting clamp | | 8 | B | | | | | | | | |
| 2" sanitary fitting clamp | | 8 | C | | | | | | | | |
| 2½" sanitary fitting clamp | | 8 | D | | | | | | | | |
| 3" sanitary fitting clamp<br>(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard) | | 8 | E | | | | | | | | |
| **Probe length**<br>(length from process connection face) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Compact, 98 mm (3.86 inch) | | | | A | | | | | | | |
| Extended rod, 250 mm (9.84 inch) | | | | B | | | | | | | |
| Extended rod, 350 mm (13.78 inch) | | | | C | | | | | | | |
| Extended rod, 500 mm (19.69 inch) | | | | D | | | | | | | |
| Extended rod, 750 mm (29.53 inch) | | | | E | | | | | | | |
| Extended rod, 1 000 mm (39.37 inch) | | | | F | | | | | | | |
| Extended rod, 1 250 mm (49.21 inch) | | | | G | | | | | | | |
| Extended rod, 1 350 mm (53.15 inch) | | | | H | | | | | | | |
| Extended rod, 1 500 mm (59.06 inch) | | | | J | | | | | | | |
| Extended rod, 1 750 mm (68.90 inch) | | | | K | | | | | | | |
| Extended rod, 2 000 mm (78.74 inch) | | | | L | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch) | | | | M | | | | | | | |
| Extended rod, 351 ... 1 000 mm (13.78 ... 39.37 inch) | | | | N | | | | | | | |
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | P | | | | | | | |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | Q | | | | | | | |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | R | | | | | | | |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | S | | | | | | | |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | | | | T | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Remote mount electronics and mounting bracket** | | | | | | | | | | | |
| Remote mount electronics and mounting bracket | | | | | 2 | | | | | | |
| Remote mount electronics with 5 m (197 inch) of cable | | | | | 3 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with PPS probe body | | | | | | | | 0 | | | |
| 316L stainless steel with PVDF probe body | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Flameproof Enclosure with IS Probe, with WHG Approval CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | E | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div.1 Gr. E, F, G T4 | | | | | | | | | F | | |
| Explosion Proof Enclosure with IS Probe CSA/ FM Class I, II, III Div.1 Gr.A, B, C, D, E, F, G T4 | | | | | | | | | G | | |
| General Purpose (CSA, FM) | | | | | | | | | H | | |
| General Purpose (CSA, FM, CE, UKCA, RCM) | | | | | | | | | J | | |
| General Purpose CSA, FM, CE, UKCA, RCM with WHG approval | | | | | | | | | K | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, sanitary rod design<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5632- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Enclosure and lid** | | | | | | | | | | | |
| ***Aluminum epoxy coated*** | | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)] | **C20** |
| INMETRO[1)] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approvals options C, D, E.

| Pointek CLS200 RF Capacitance point level switch, sliding coupling design<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5633- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| **Probe length**<br>(length from flange face)<br>(threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Extended rod, 350 mm (13.78 inch) | | | | C | | | | | | | |
| Extended rod, 500 mm (19.69 inch) | | | | D | | | | | | | |
| Extended rod, 750 mm (29.53 inch) | | | | E | | | | | | | |
| Extended rod, 1 000 mm (39.37 inch) | | | | F | | | | | | | |
| Extended rod, 1 250 mm (49.21 inch) | | | | G | | | | | | | |
| Extended rod, 1 350 mm (53.15 inch) | | | | H | | | | | | | |
| Extended rod, 1 500 mm (59.06 inch) | | | | J | | | | | | | |
| Extended rod, 1 750 mm (68.90 inch) | | | | K | | | | | | | |
| Extended rod, 2 000 mm (78.74 inch) | | | | L | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, 350 ... 1 000 mm (13.78 ... 39.37 inch) | | | | M | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, sliding coupling design<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. | Article No. 7ML5633- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | N | | | | | | | |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | P | | | | | | | |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | Q | | | | | | | |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | R | | | | | | | |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | | | | S | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Remote mount electronics and mounting bracket** | | | | | | | | | | | |
| With 2 m (79 inch) of cable[1)] | | | | | 2 | | | | | | |
| With 5 m (197 inch) of cable[1)] | | | | | 3 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM and PTFE | | | | | | 0 | | | | | |
| FFKM and PTFE [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with PPS probe body | | | | | | | | 0 | | | |
| 316L stainless steel with PVDF probe body | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Flameproof Enclosure with IS Probe, with WHG Approval CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | E | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div.1 Gr. E, F, G T4 | | | | | | | | | F | | |
| Explosion Proof Enclosure with IS Probe CSA/ FM Class I, II, III Div.1 Gr.A, B, C, D, E, F, G T4 | | | | | | | | | G | | |
| General Purpose (CSA, FM) | | | | | | | | | H | | |
| General Purpose (CSA, FM, CE, UKCA, RCM) | | | | | | | | | J | | |
| General Purpose CSA, FM, CE, UKCA, RCM with WHG approval | | | | | | | | | K | | |
| **Enclosure and lid** | | | | | | | | | | | |
| Aluminum epoxy coated | | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |

1) Available with Approvals options F ... H.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)] | **C20** |
| INMETRO[1)] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approval options C, D, E.

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## Technical specifications

| Pointek CLS200 - Standard | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Inverse frequency shift capacitive level detection |
| **Input** | |
| Measured variable | Change in picoFarad (pF) |
| **Output** | |
| Output signal | |
| • Relay output | 1 SPDT Form C relay |
| - Max. contact voltage | • 30 V DC<br>• 250 V AC |
| - Max. contact current | • 5 A DC<br>• 8 A AC |
| - Max. switching capacity | 150 W DC<br>2 000 VA AC |
| - Time delay (ON and/or OFF) | 1 ... 60 s |
| • Solid-state output | |
| - Output | Galvanically isolated |
| - Protection | Against reversed polarity (bipolar) |
| - Max. switching voltage | • 30 V DC<br>• 30 V peak AC |
| - Max. load current | 82 mA |
| - Voltage drop | < 1 V, typical at 50 mA |
| - Time delay (pre or post switching) | 1 ... 60 s |
| **Rated operating conditions**[1] | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F)[2] |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| • Installation category | II |
| • Pollution degree | 4 |
| Medium conditions | Liquids, bulk solids, slurries and interfaces |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 |
| • Process temperature | |
| - Without thermal isolator | -40 ... +85 °C (-40 ... +185 °F)[2] |

| Pointek CLS200 - Standard | |
|---|---|
| - With thermal isolator | -40 ... +125 °C (-40 ... +257 °F) |
| • Process pressure (rod version) | -1 ... +25 bar g (-14.6 ... +365 psi g) (nominal) |
| • Process pressure (cable version)[3] | -1 ... +10 bar g (-14.6 ... +150 psi g) (nominal) |
| • Process pressure (sliding coupling version) | -1 ... +10 bar g (-14.6 ... +150 psi g) (nominal) |
| **Electromagnetic compatibility** | To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual. |
| **Design** | |
| Material | |
| • Enclosure | Epoxy-coated aluminum with gasket |
| • Optional thermal isolator | 316L stainless steel |
| Connection | Removable terminal block, max. 2.5mm² |
| Degree of protection | IP65/Type 4/NEMA 4 (optional IP68) |
| Cable inlet | 2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry) |
| **Power supply** | 12 ... 250 V AC/DC,<br>0 ... 60 Hz max. 2 W |
| **Certificates and approvals** | |
| General Purpose | CSA, FM, CE, RCM |
| Dust Ignition Proof | ATEX II ½ D T100 °C |
| Flameproof Enclosure With IS Probe | ATEX II 1 G EEx d[ia] IIC T6 ... T4<br>ATEX II ½ D T100 °C |
| Dust Ignition Proof with IS Probe | CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Explosion Proof Enclosure With IS Probe | CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Marine | Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5 |
| Overfill Protection | WHG (Germany)<br>VLAREM II |
| Others | Pattern Approval (China), SIL |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS200 pressure/temperature curves.
2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
3) Pressure rating of process seal is temperature dependent. See also CLS200 pressure/temperature curves.

| Design: Probe | Rod version | Sanitary version | Cable version | Sliding Coupling version |
|---|---|---|---|---|
| Max. length | 5 500 mm (216.53 inch) | 5 500 mm (216.53 inch) | • 30 000 mm (1 181.1 inch) liquids and slurries<br>• 5 000 mm (196.85 inch) solids (under loads) | 5 500 mm (216.53 inch) |
| Process connection | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1½", 2" sanitary fitting clamp 316L stainless steel | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] |
| | ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] | | ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] | ¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1] |
| | G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] |
| | 316L stainless steelASME/EN flange | | 316L stainless steel ASME/EN flange | |
| Extension material | 316L stainless steel optional PFA coated[1] | 316L stainless steel | Fluoroethylene propylene (FEP) cable with stainless steel core | 316L stainless steel |
| Sensor wetted parts | PPS (optional PVDF) | PPS (optional PVDF) | PPS (optional PVDF) | PPS (optional PVDF) |
| O-ring seal material | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] |
| Thermal isolator[3] | Optional | Optional | Optional | Optional |

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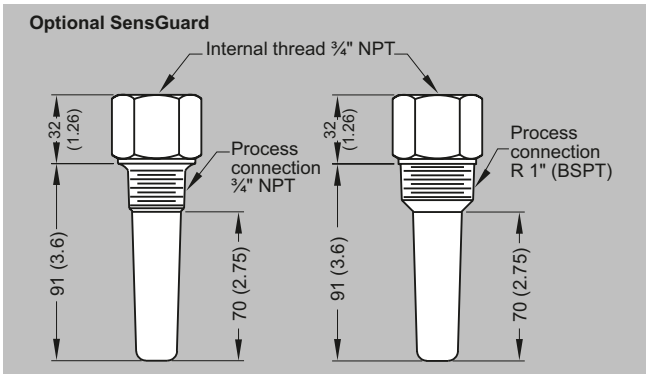


## Technical specifications (continued)

| Design: Probe | Rod version | Sanitary version | Cable version | Sliding Coupling version |
|---|---|---|---|---|
| Extension | User selected length | User selected length | Cable extension | User selected length |

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness
2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.
3) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

## Options



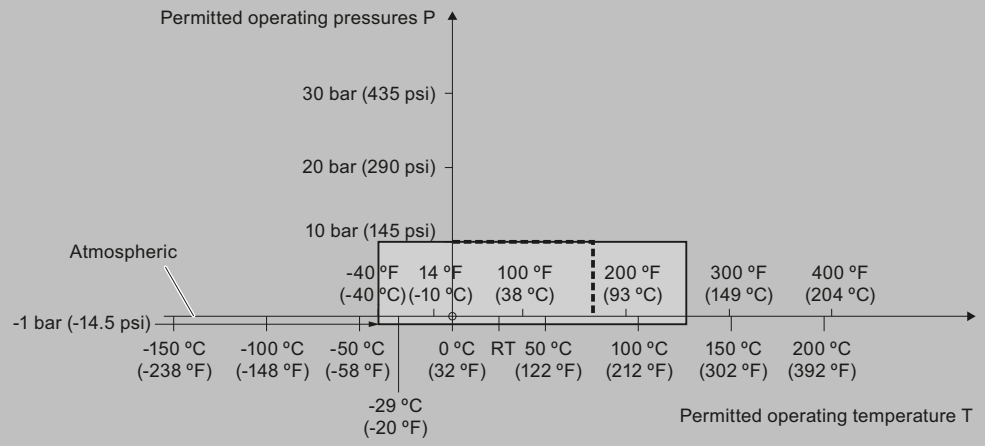

Optional SensGuard, dimensions in mm (inch)

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## Characteristic curves

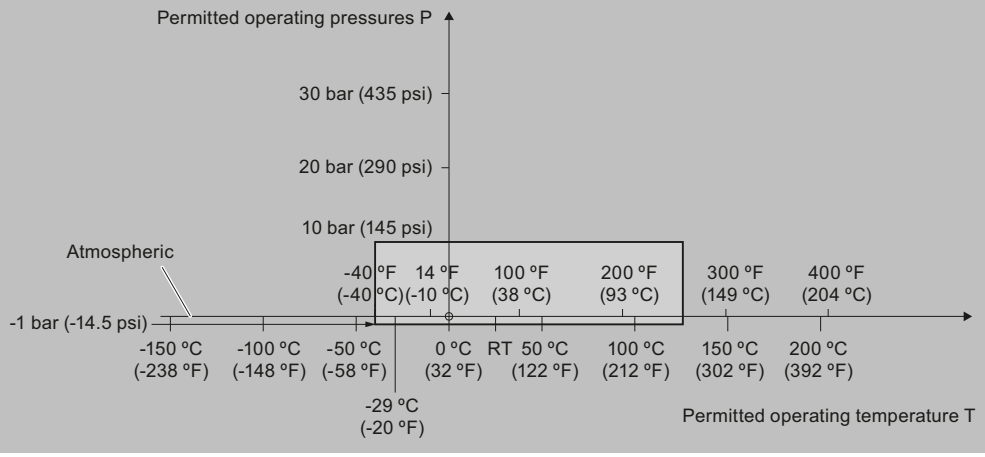
**Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)**




---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 process pressure/temperature derating curves (7ML5633 and 7ML5643)

**Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)**



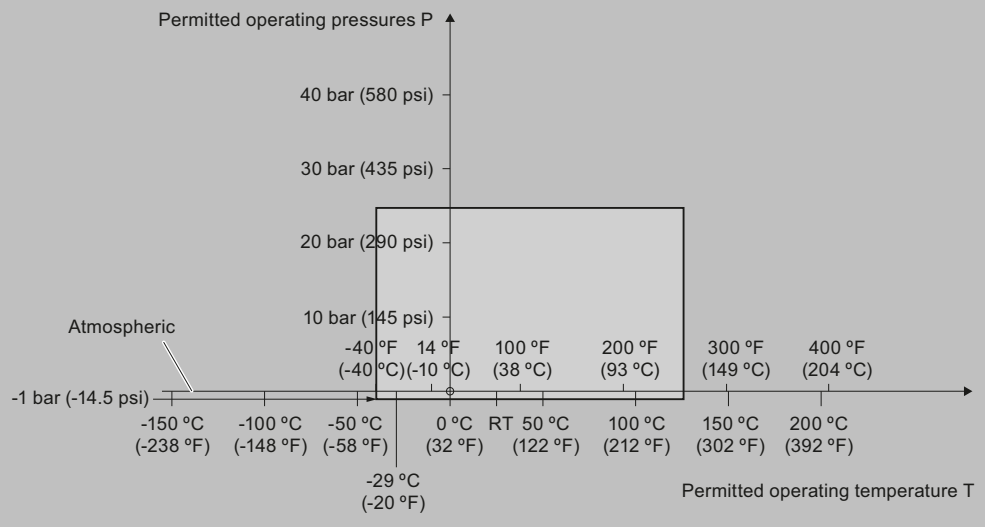

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

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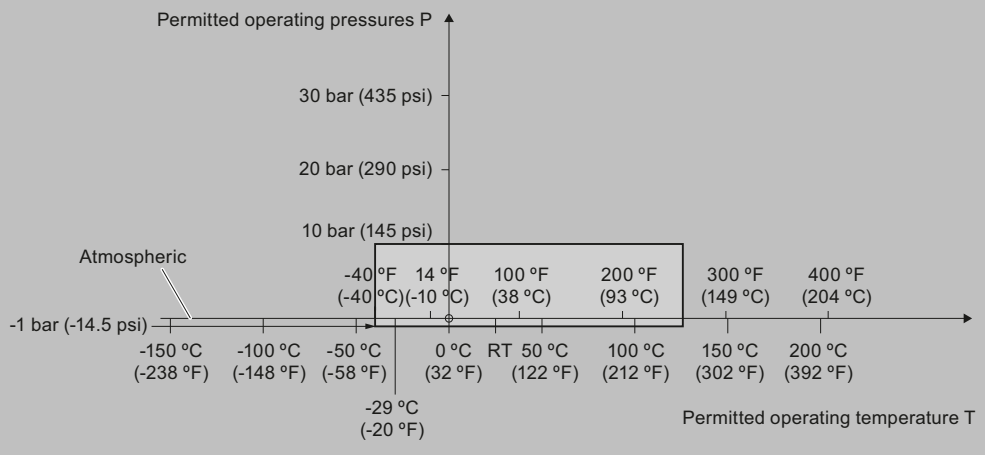
## Characteristic curves (continued)

**Pressure/temperature curve**
**CLS200 compact and extended rod**
**Threaded process connections**
**(7ML5630 and 7ML5640)**




Pointek CLS200 process pressure/temperature derating curves (7ML5630 or 7ML5640)

**Pressure/temperature curve**
**CLS200 compact and extended sanitary type**
**Sanitary process connections**
**(7ML5632 and 7ML5642)**



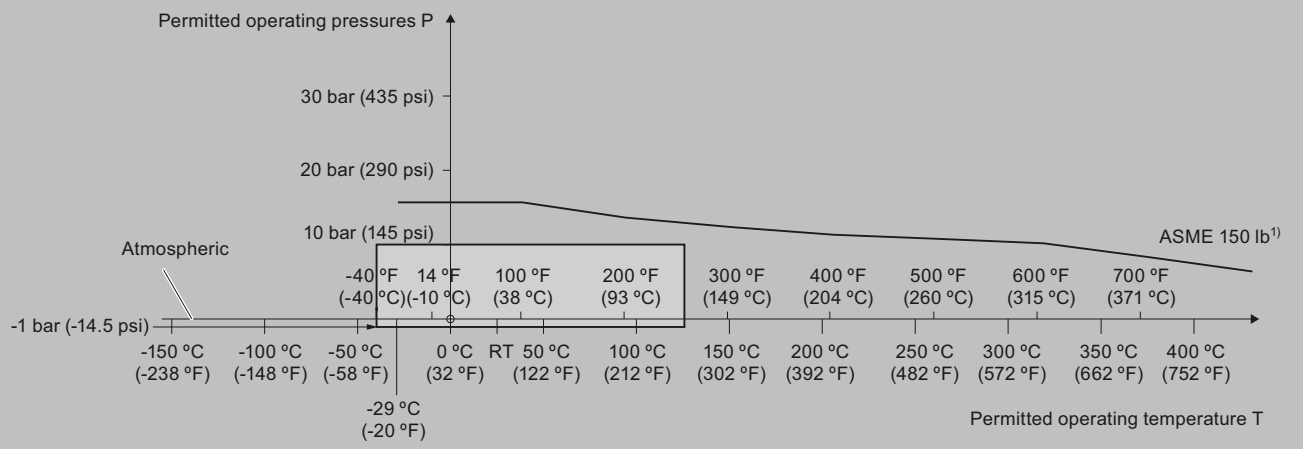

Pointek CLS200 process pressure/temperature derating curves (7ML5632 and 7ML5642)

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## Characteristic curves (continued)

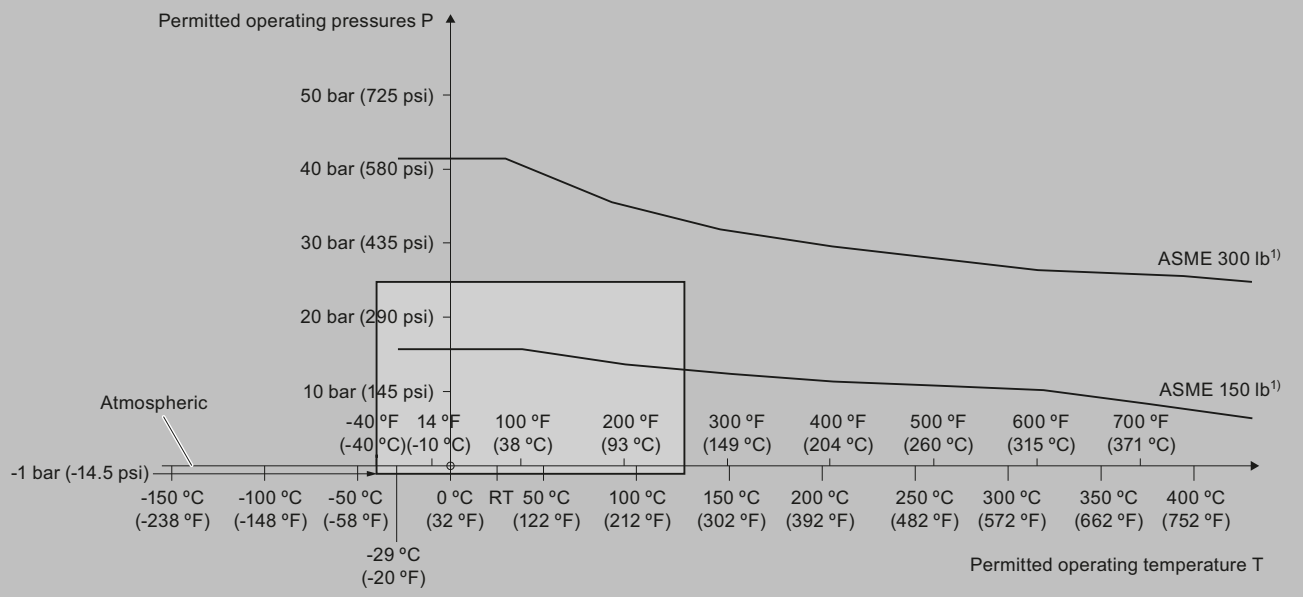
**Pressure/temperature curve**
**CLS200, cable**
**ASME flanged process connections**
**(7ML5631 and 7ML5641)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

**Pressure/temperature curve**
**CLS200 compact and extended rod**
**ASME flanged process connections**
**(7ML5630 and 7ML5640)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

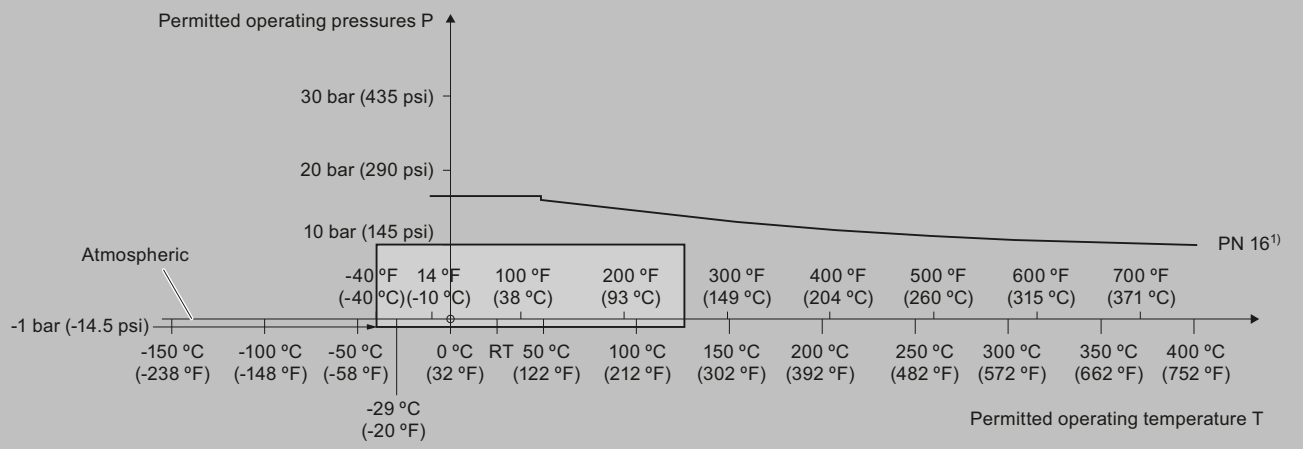
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

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## Characteristic curves (continued)

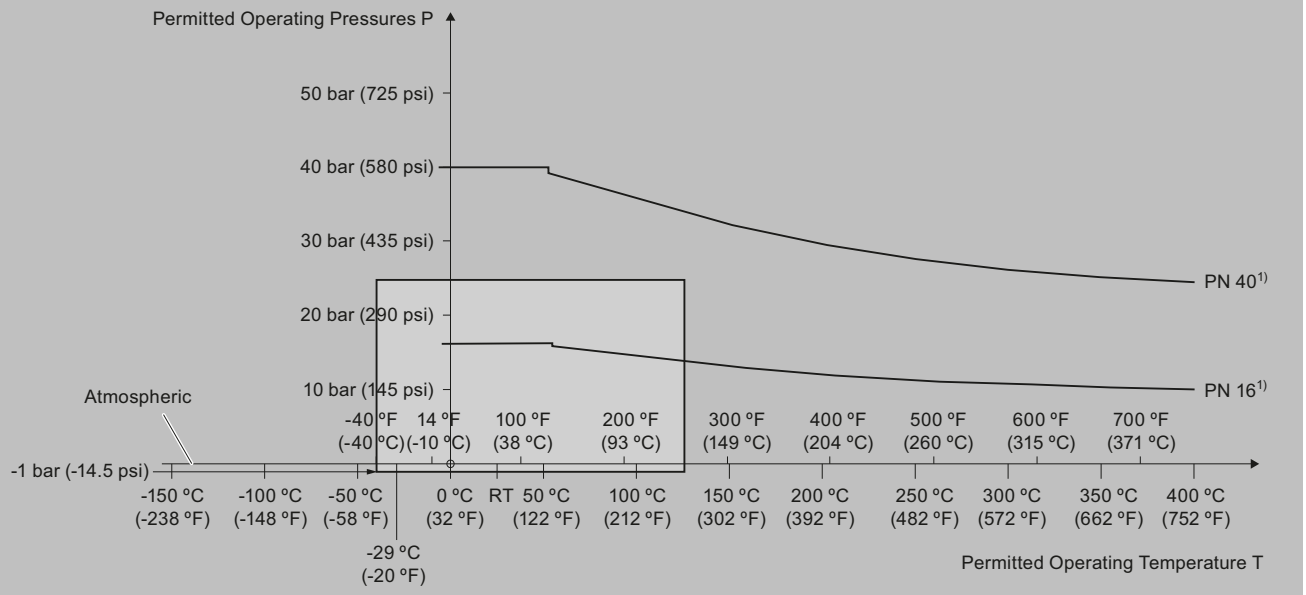
**Pressure/temperature curve**
**CLS200 cable**
**EN flanged process connections**
**(7ML5631 and 7ML5641)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

**Pressure/Temperature Curve**
**CLS200 Compact and Extended Rod**
**EN Flanged Process Connections**
**(7ML5630 and 7ML5640)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

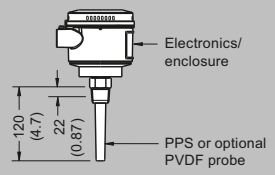
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

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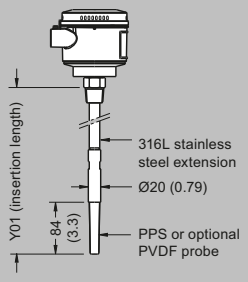


## Dimensional drawings

**Compact version**
**Threaded**
**(7ML5630 and 7ML5640)**

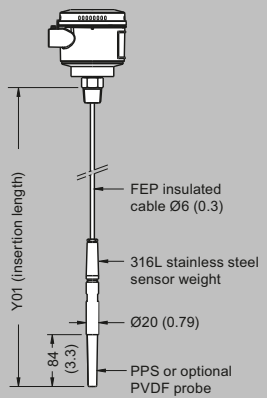



**Extended rod version**
**Threaded**
**(7ML5630 and 7ML5640)**



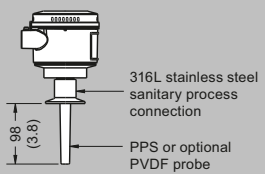

Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

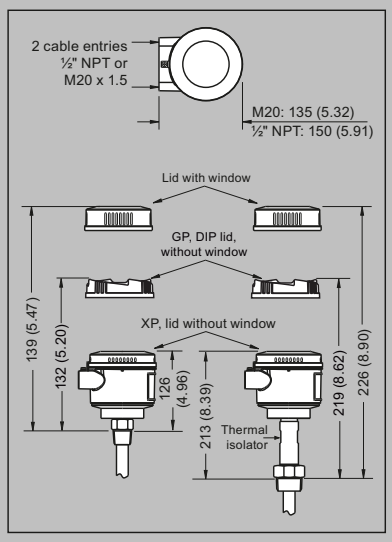
**Extended cable version**
**Threaded**
**(7ML5631 and 7ML5641)**



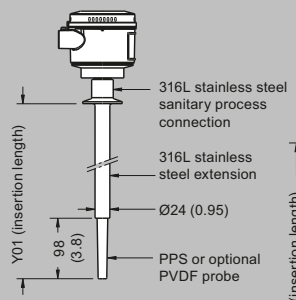

Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

**Sanitary compact version**
**Sanitary fitting**
**(7ML5632 and 7ML5642)**



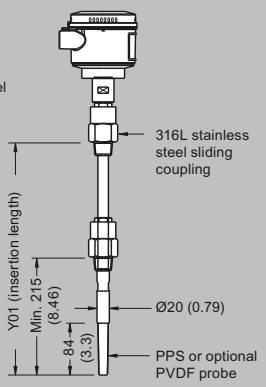




**Sanitary extended version**
**Sanitary fitting**
**(7ML5632 and 7ML5642)**




Min. insertion length = 110 (4.3)
Max. insertion length = 5 500 (216)

**Sliding coupling version**
**Threaded**
**(7ML5633 and 7ML5643)**




Min. insertion length = 350 (13.82)
Max. insertion length = 5 500 (216)

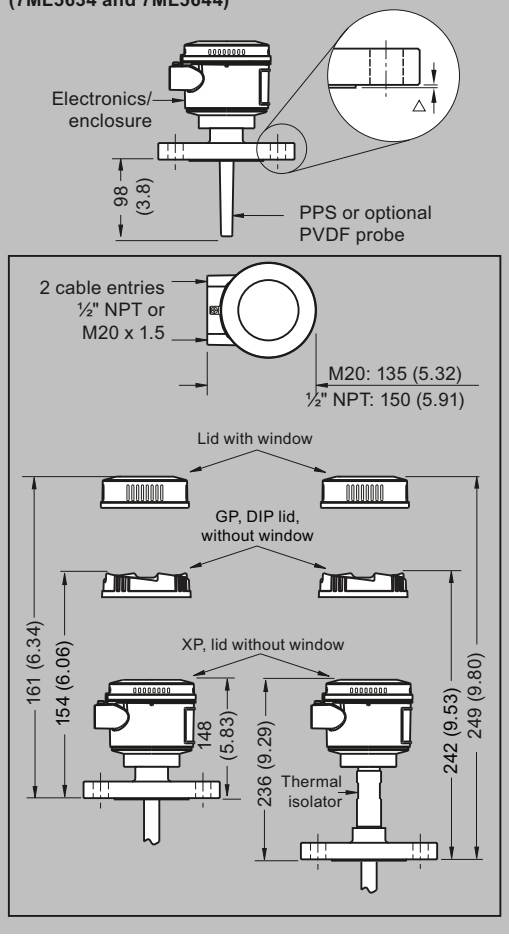
Pointek CLS200 threaded/sanitary process connection, dimensions in mm (inch)

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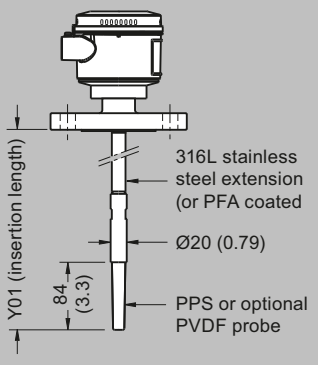


## Dimensional drawings (continued)

**Compact version**
**Welded Flange (7ML5630 and 7ML5640)**
**Welded Flange, PFA coated**
**(7ML5634 and 7ML5644)**

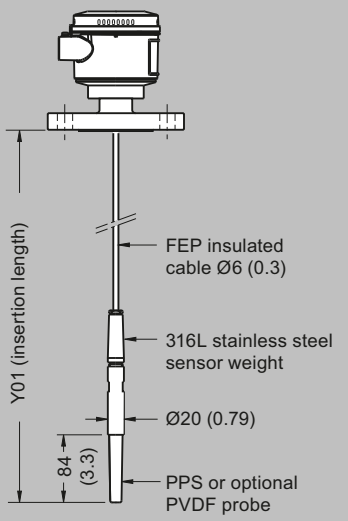



**Extended rod version**
**Welded Flange (7ML5630 and 7ML5640)**
**Welded Flange, PFA coated**
**(7ML5634 and 7ML5644)**




Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

**Extended cable version**
**Welded Flange**
**(7ML5631 and 7ML5641)**




Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

| Flange Facing (raised face) | |
|---|---|
| **Flange Class** | **Facing thickness** |
| △ ASME 150/300 | 2 (0.08) |
| △ ASME 600/900 | 7 (0.28) |
| △ PN16/40 | 2 (0.08) |

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

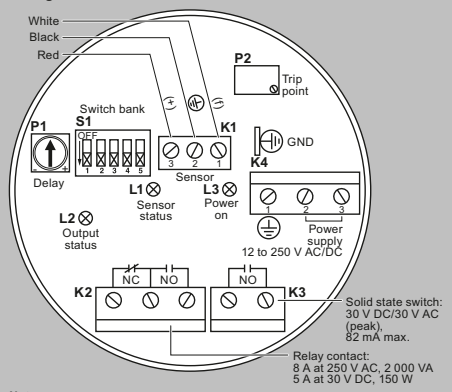
Pointek CLS200 flanged process connections, dimensions in mm (inch)

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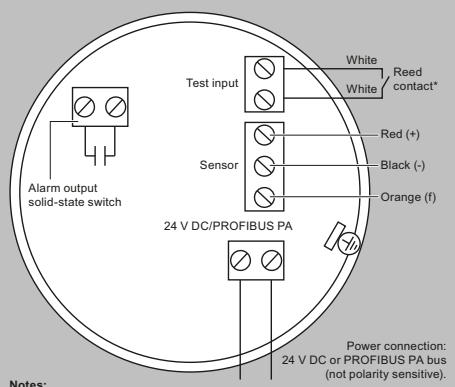
## Circuit diagrams

**Wiring: Pointek CLS200 standard**




**Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

**Wiring: Pointek CLS200 Digital**




**Notes:**
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor Test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.




Pointek CLS200 connections

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## Overview



Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

## Benefits

- Potted construction protects signal circuit from shock, vibration, humidity, and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

## Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

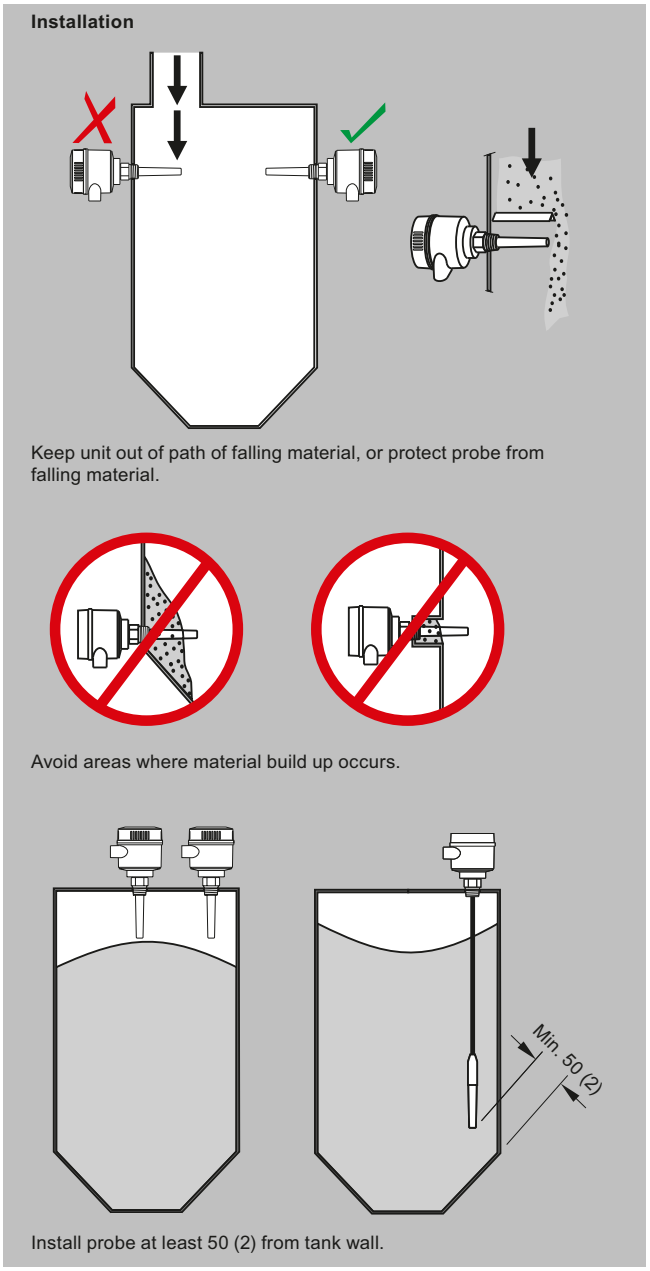
The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

## Configuration




Pointek CLS200 installation, dimensions in mm (inch)

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## Selection and ordering data

| Pointek CLS200 RF Capacitance point level switch, digital, rod design Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5640- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40<br>(Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length**<br>(length from flange face)<br>(threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)] | | | | A | | | | | | | |
| Extended rod, 250 mm (9.84 inch) | | | | B | | | | | | | |
| Extended rod, 350 mm (13.78 inch) | | | | C | | | | | | | |
| Extended rod, 500 mm (19.69 inch) | | | | D | | | | | | | |
| Extended rod, 750 mm (29.53 inch) | | | | E | | | | | | | |
| Extended rod, 1 000 mm (39.37 inch) | | | | F | | | | | | | |
| Extended rod, 1 250 mm (49.21 inch) | | | | G | | | | | | | |
| Extended rod, 1 350 mm (53.15 inch) | | | | H | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, digital, rod design<br>Detects level and interface in liquids, solids, slurries, and foam.<br>Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No.<br>7ML5640- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Extended rod, 1 500 mm (59.06 inch) | J |
| Extended rod, 1 750 mm (68.90 inch) | K |
| Extended rod, 2 000 mm (78.74 inch) | L |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | |
| Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch) | M |
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | N |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | P |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | Q |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | R |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | S |
| **Thermal isolator** | |
| Without thermal isolator | 0 |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | 1 |
| **Remote mount electronics and mounting bracket** | |
| With 2 m (79 inch) of cable[2] | 2 |
| With 5 m (197 inch) of cable[2] | 3 |
| **Wetted seals** | |
| FKM | 0 |
| FFKM [for process temperatures above -20 °C (-4 °F)] | 1 |
| **Probe material** | |
| 316L stainless steel with PPS probe body | 0 |
| 316L stainless steel with PVDF probe body | 1 |
| **Approvals** | |
| Non-Sparking CE, UKCA, RCM, ATEX, UKEX II 3G Ex ic | B |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Intrinsically Safe:[1] CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | D |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Non-incendive CSA/ FM Class I, II, III Div. 2 Gr. A, B, C, D, F, G T4 or T6 | F |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, G T4 | G |
| Intrinsically Safe:[1] CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | H |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | J |
| General Purpose (CSA, FM) | K |
| General Purpose (CSA, FM, CE, UKCA, RCM) | L |
| **Enclosure and lid**<br>***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
2) Available with Approvals options F, G, H, J, and K.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection certificate Type 3.1 per EN 10204 | **C12** |

| Selection and Ordering data | Order code |
|---|---|
| INMETRO[1] | **E34** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

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## Selection and ordering data (continued)

1) Available only with Approvals options C and E.

| Pointek CLS200 RF Capacitance point level switch, digital, cable design<br>Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No.<br>7ML5641- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 | | 6 | K | | | | | | | | |
| (Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | | | | | | | | | | |
| **Probe length**<br>(length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly | | | | A | | | | | | | |
| Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly | | | | B | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch) | | | | C | | | | | | | |
| Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | | | | D | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, digital, cable design<br>Detects level and interface in liquids, solids, slurries, and foam. Cable extension options to 30 m (98.43 ft), adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5641- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | E |
| Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | F |
| Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | G |
| Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | H |
| **Thermal isolator** | |
| Without thermal isolator | 0 |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | 1 |
| **Remote mount electronics and mounting bracket** | |
| With 2 m (79 inch) of cable[2] | 2 |
| With 5 m (197 inch) of cable[2] | 3 |
| **Wetted seals** | |
| FKM and PTFE | 0 |
| FFKM and PTFE [for process temperatures above -20 °C (-4 °F)] | 1 |
| Probe material | |
| FEP jacketed cable with PPS probe body | 0 |
| FEP jacketed cable with PVDF probe body | 1 |
| **Approvals** | |
| Non-Sparking CE, UKCA, RCM, ATEX, UKEX II 3G Ex ic | B |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Intrinsically Safe:[1] CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | D |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Non-incendive CSA/ FM Class I, II, III Div. 2 Gr. A, B, C, D, F, G T4 or T6 | F |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, G T4 | G |
| Intrinsically Safe:[1] CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | H |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | J |
| General Purpose (CSA, FM) | K |
| General Purpose (CSA, FM, CE, UKCA, RCM) | L |
| **Enclosure and lid** | |
| ***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
2) Available with Approvals options F, G, H, J, and K.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approvals options C and E.

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, digital, sanitary rod design.<br>Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5642- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Sanitary 316L stainless steel*** | | | | | | | | | | | |
| 1" sanitary fitting clamp | | 8 | A | | | | | | | | |
| 1½" sanitary fitting clamp | | 8 | B | | | | | | | | |
| 2" sanitary fitting clamp | | 8 | C | | | | | | | | |
| 2½" sanitary fitting clamp | | 8 | D | | | | | | | | |
| 3" sanitary fitting clamp (Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard.) | | 8 | E | | | | | | | | |
| **Probe length**<br>(length from process connection face) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Compact, 98 mm (3.86 inch) | | | | A | | | | | | | |
| Extended rod, 250 mm (9.84 inch) | | | | B | | | | | | | |
| Extended rod, 350 mm (13.78 inch) | | | | C | | | | | | | |
| Extended rod, 500 mm (19.69 inch) | | | | D | | | | | | | |
| Extended rod, 750 mm (29.53 inch) | | | | E | | | | | | | |
| Extended rod, 1 000 mm (39.37 inch) | | | | F | | | | | | | |
| Extended rod, 1 250 mm (49.21 inch) | | | | G | | | | | | | |
| Extended rod, 1 350 mm (53.15 inch) | | | | H | | | | | | | |
| Extended rod, 1 500 mm (59.06 inch) | | | | J | | | | | | | |
| Extended rod, 1 750 mm (68.90 inch) | | | | K | | | | | | | |
| Extended rod, 2 000 mm (78.74 inch) | | | | L | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch) | | | | M | | | | | | | |
| Extended rod, 351 ... 1 000 mm (13.82 ... 39.37 inch) | | | | N | | | | | | | |
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | P | | | | | | | |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | Q | | | | | | | |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | R | | | | | | | |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | S | | | | | | | |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | | | | T | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Remote mount electronics and mounting bracket** | | | | | | | | | | | |
| With 2 m (79 inch) of cable[2)] | | | | | 2 | | | | | | |
| With 5 m (197 inch) of cable[2)] | | | | | 3 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with PPS probe body | | | | | | | | 0 | | | |
| 316L stainless steel with PVDF probe body | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Non-Sparking CE, UKCA, RCM, ATEX, UKEX II 3G Ex ic | | | | | | | | | B | | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Intrinsically Safe:[1)] CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | | | | | | | | | D | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | E | | |
| Non-incendive CSA/ FM Class I, II, III Div. 2 Gr. A, B, C, D, F, G T4 or T6 | | | | | | | | | F | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, G T4 | | | | | | | | | G | | |
| Intrinsically Safe:[1)] CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | | | | | | | | | H | | |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | J | | |
| General Purpose (CSA, FM) | | | | | | | | | K | | |
| General Purpose (CSA, FM, CE, UKCA, RCM) | | | | | | | | | L | | |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, digital, sanitary rod design. Detects level and interface in liquids, solids, slurries, and foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5642- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| **Enclosure and lid** | |
| ***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
2) Available with Approvals options F, G, H, J, and K.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1)] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

1) Available only with Approvals options C and E.

| Pointek CLS200 RF Capacitance point level switch, digital, sliding coupling design. Detects level and interface in liquids, solids, slurries, and, foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5643- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| **Process connection** | |
| ***Threaded, 316L stainless steel*** | |
| ¾" NPT [(Taper), ASME B1.20.1] | 0 A |
| 1" NPT [(Taper), ASME B1.20.1] | 0 B |
| 1¼" NPT [(Taper), ASME B1.20.1] | 0 C |
| 1½" NPT [(Taper), ASME B1.20.1] | 0 D |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 A |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 B |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 D |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 A |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 B |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 D |
| **Probe length** (length from flange face) (threaded lengths include process thread) | |
| ***Note: No Y01 needed in Order code for standard lengths*** | |
| Extended rod, 350 mm (13.78 inch) | C |
| Extended rod, 500 mm (19.69 inch) | D |
| Extended rod, 750 mm (29.53 inch) | E |
| Extended rod, 1 000 mm (39.37 inch) | F |
| Extended rod, 1 250 mm (49.21 inch) | G |
| Extended rod, 1 350 mm (53.15 inch) | H |
| Extended rod, 1 500 mm (59.06 inch) | J |
| Extended rod, 1 750 mm (68.90 inch) | K |

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## Selection and ordering data (continued)

| Pointek CLS200 RF Capacitance point level switch, digital, sliding coupling design. Detects level and interface in liquids, solids, slurries, and, foam. Adjustable, 5.5 m (18.04 ft), insertion, adaptable sensitivity, with the ability to tune out build-up on probe. With display and digital communications. | Article No. 7ML5643- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Extended rod, 2 000 mm (78.74 inch) | L |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | |
| Extended rod, 350 ... 1 000 mm (13.82 ... 39.37 inch) | M |
| Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | N |
| Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | P |
| Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | Q |
| Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | R |
| Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch) | S |
| **Thermal isolator** | |
| Without thermal isolator | 0 |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | 1 |
| **Remote mount electronics and mounting bracket** | |
| With 2 m (79 inch) of cable[2] | 2 |
| With 5 m (197 inch) of cable[2] | 3 |
| **Wetted seals** | |
| FKM and PTFE | 0 |
| FFKM and PTFE [for process temperatures above -20 °C (-4 °F)] | 1 |
| **Probe material** | |
| 316L stainless steel with PPS probe body | 0 |
| 316L stainless steel with PVDF probe body | 1 |
| **Approvals** | |
| Non-Sparking CE, UKCA, RCM, ATEX, UKEX II 3G Ex ic | B |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Intrinsically Safe:[1] CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | D |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Non-incendive CSA/ FM Class I, II, III Div. 2 Gr. A, B, C, D, F, G T4 or T6 | F |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, G T4 | G |
| Intrinsically Safe:[1] CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | H |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | J |
| General Purpose (CSA, FM) | K |
| General Purpose (CSA, FM, CE, UKCA, RCM) | L |
| **Enclosure and lid** | |
| ***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
[2] Available with Approvals options F, G, H, J, and K.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **See accessories shown following CLS200 Digital selection and ordering data.** |

[1] Available only with Approvals options C and E.

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## Selection and ordering data (continued)

| Selection and Ordering data | Article No. |
|---|---|
| **Accessories** | |
| SensGuard, ¾" NPT (PPS). Only available for CLS200 with ¾" NPT thread. | **7ML1830-1DL** |
| SensGuard, R 1" (BSPT) (PPS). Only available for CLS200 with ¾" NPT thread. | **7ML1830-1DM** |
| One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, with integrated shield connection (available for PROFIBUS PA) | **7ML1930-1AQ** |
| ***General Purpose*** | |
| ½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch) | **7ML1830-1JA** |
| M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch) | **7ML1830-1JC** |
| ***Hazardous Locations*** | |
| 1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) 60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch) | **7ML1830-1JB** |
| M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) 60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch) | **7ML1830-1JD** |
| Blind threaded flanges are available. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app. | |
| **Pointek Specials** | **See Pointek Specials following the CLS300 Digital selection and ordering data.** |

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## Technical specifications

| Pointek CLS200 - Digital | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Inverse frequency shift capacitive level detection |
| **Input** | |
| Measured variable | Change in picoFarad (pF) |
| **Output** | |
| Output signal | |
| • Solid-state output | |
| - Output | Galvanically isolated |
| - Protection | Against reversed polarity (bipolar) |
| - Max. switching voltage | • 30 V (DC)<br>• 30 V peak (AC) |
| - Max. load current | 82 mA |
| - Voltage drop | < 1 V, typical at 50 mA |
| - Time delay (ON and/or OFF) | Programmable by user (0 ... 100 s) |
| • Fail-safe mode | Min. or max. |
| • Connection | Removable terminal block |
| **Rated operating conditions**[1] | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F)[2] |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| • Installation category | II |
| • Pollution degree | 4 |
| Medium conditions | Liquids, bulk solids, slurries, and interfaces |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 |
| • Process temperature | |
| - Without thermal isolator | -40 ... +85 °C (-40 ... +185 °F)[2] |
| - With thermal isolator | -40 ... +125 °C (-40 ... +257 °F) |
| • Process pressure (rod version) | -1 ... +25 bar g (-14.6 ... +365 psi g) (nominal) |
| • Process pressure (cable version)[3] | -1 ... +10 bar g (-14.6 ... +150 psi g) (nominal) |
| • Process pressure (sliding coupling version) | -1 ... +10 bar g (-14.6 ... +150 psi g) (nominal) |
| **Design** | |
| Material | |
| • Enclosure | Epoxy-coated aluminum with gasket |
| • Optional thermal isolator | 316L stainless steel |
| Connection | Removable terminal block, max. 2.5 mm² |
| Degree of protection | IP65/Type 4/NEMA 4 (optional IP68) |

| Pointek CLS200 - Digital | |
|---|---|
| Cable inlet | 2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry) |
| Electromagnetic compatibility | To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual. |
| **Power supply** | |
| Bus voltage | Standard: 12 ... 30 V DC<br>Intrinsically Safe: 12 ... 24 V DC |
| Current consumption | 12.5 mA |
| **Certificates and approvals** | |
| General Purpose | CSA, FM, CE, RCM |
| Dust Ignition Proof | ATEX II 1/2 D T100 °C |
| Dust Ignition Proof with IS Probe | CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Flameproof Enclosure with IS Probe | ATEX II 1/2 G EEx d[ia] IIC T6 ... T4<br>ATEX II ½ D T100 °C |
| Explosion Proof with IS Probe | CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Intrinsically Safe[4] | ATEX II 1 G EEx ia IIC T6 ... T4<br>ATEX II ½ D IP6X T100 °C<br>CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Non-incendive | CSA/FM Class I, Div. 2, Groups A, B, C, D<br>CSA/FM Class II, Div. 2, Groups F, G<br>CSA/FM Class III T4 or T6 |
| Non-Sparking | ATEX II 3 G Ex nA IIC T6 ... T4<br>ATEX II 2 D IP6X T100 °C<br>UKEX II 3 G Ex ec IIC T6 ... T4<br>UKEX II 2 D IP6x T100°C |
| Marine | Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5 |
| Others | Pattern Approval (China) |
| **Communication** | PROFIBUS PA (IEC 61158 CPF3 CP3/2)<br>Bus physical layer: IEC 61158-2 MBP (IS)<br>Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B<br>FISCO field device |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS200 pressure/temperature curves.
2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
3) Pressure rating of process seal is temperature dependent. See also CLS200 pressure/temperature curves.
4 Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

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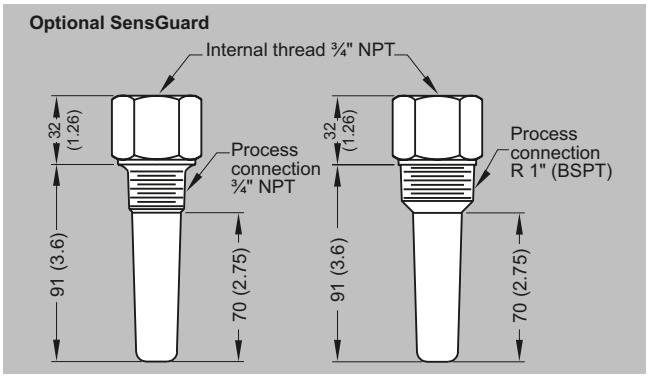


## Technical specifications (continued)

| Design: Probe | Rod version | Sanitary version | Cable version | Sliding Coupling version |
|---|---|---|---|---|
| Max. length | 5 500 mm (216.53 inch) | 5 500 mm (216.53 inch) | • 30 000 mm (1 181.1 inch) liquids and slurries<br>• 5 000 mm (196.85 inch) solids (under loads) | 5 500 mm (216.53 inch) |
| Process connection | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1]<br>G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]<br>316L stainless steel ASME/EN flange | 1½", 2" sanitary fitting clamp 316L stainless steel | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1]<br>G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]<br>316L stainless steel ASME/EN flange | R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>¾", 1", 1¼", 1½" NPT [(Taper), ASME B1.20.1]<br>G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] |
| Extension material | 316L stainless steel optional PFA coated[1] | 316L stainless steel | Fluoroethylene propylene (FEP) cable with stainless steel core | 316L stainless steel |
| Sensor wetted parts | PPS (optional PVDF) | PPS (optional PVDF) | PPS (optional PVDF) | PPS (optional PVDF) |
| O-ring seal material | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] | FKM (optional FFKM)[2] |
| Thermal isolator[3] | Optional | Optional | Optional | Optional |
| Extension | User selected length | User selected length | Cable extension | User selected length |

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness
2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.
3) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

## Options



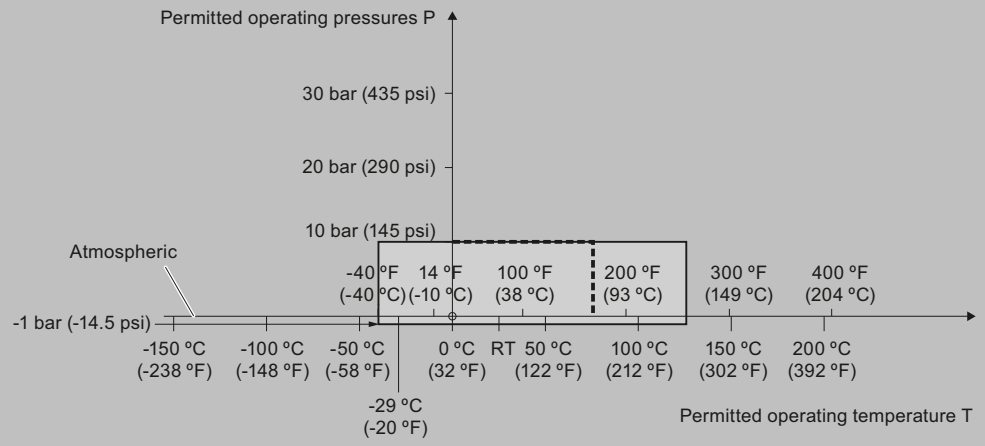

Optional SensGuard, dimensions in mm (inch)

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## Characteristic curves

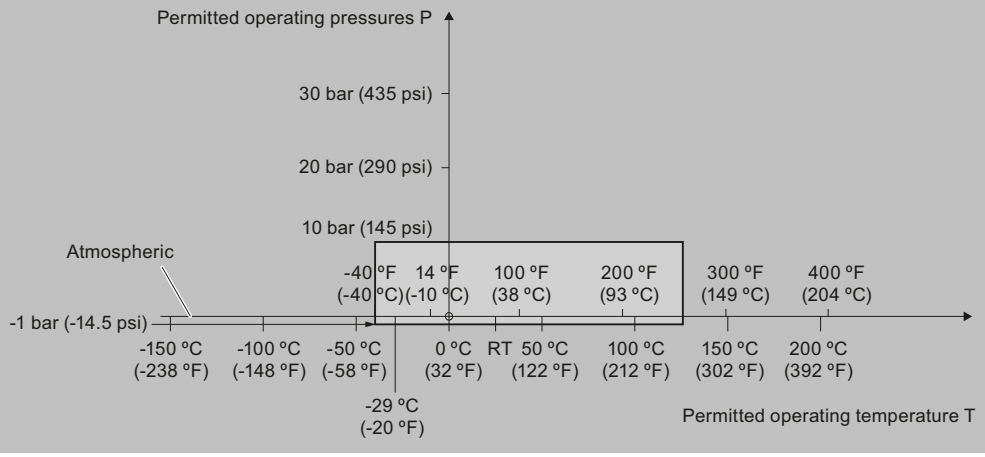
**Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)**




---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 process pressure/temperature derating curves (7ML5633 and 7ML5643)

**Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)**



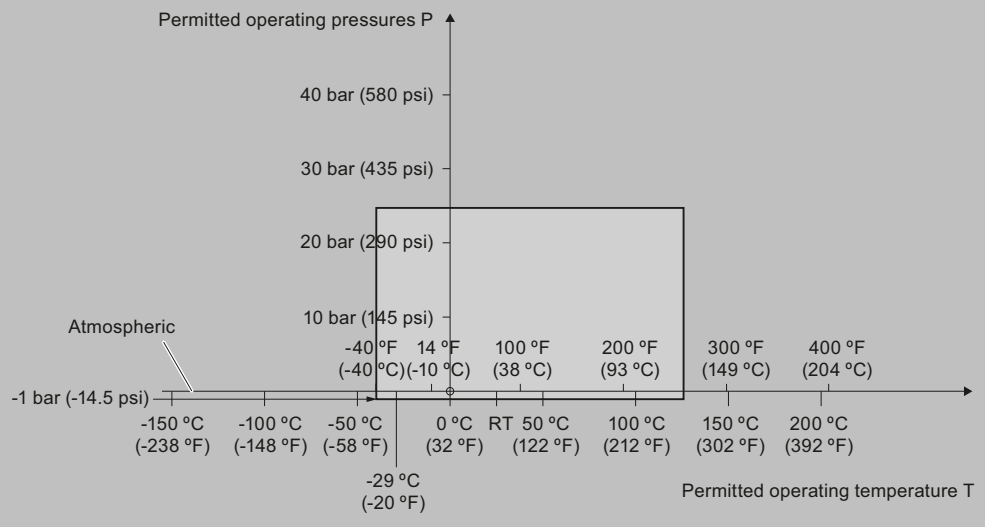

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

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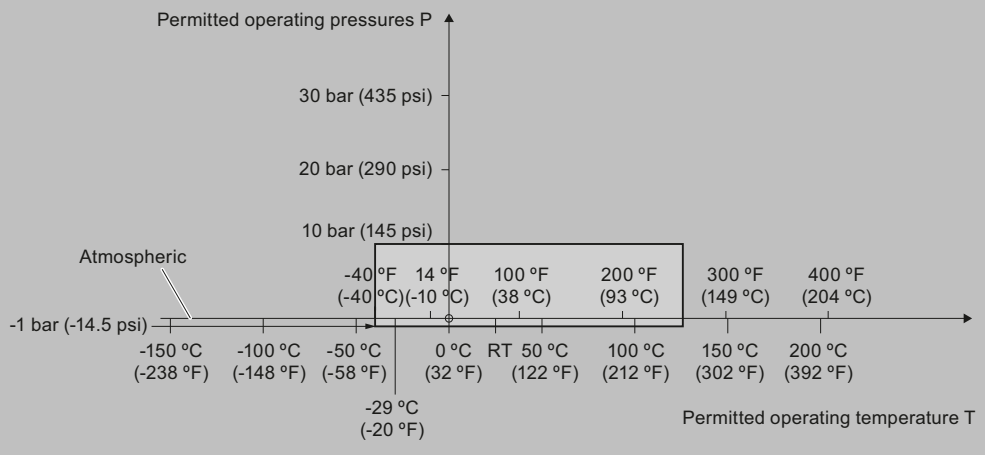
## Characteristic curves (continued)

**Pressure/temperature curve**
**CLS200 compact and extended rod**
**Threaded process connections**
**(7ML5630 and 7ML5640)**




Pointek CLS200 process pressure/temperature derating curves (7ML5630 or 7ML5640)

**Pressure/temperature curve**
**CLS200 compact and extended sanitary type**
**Sanitary process connections**
**(7ML5632 and 7ML5642)**



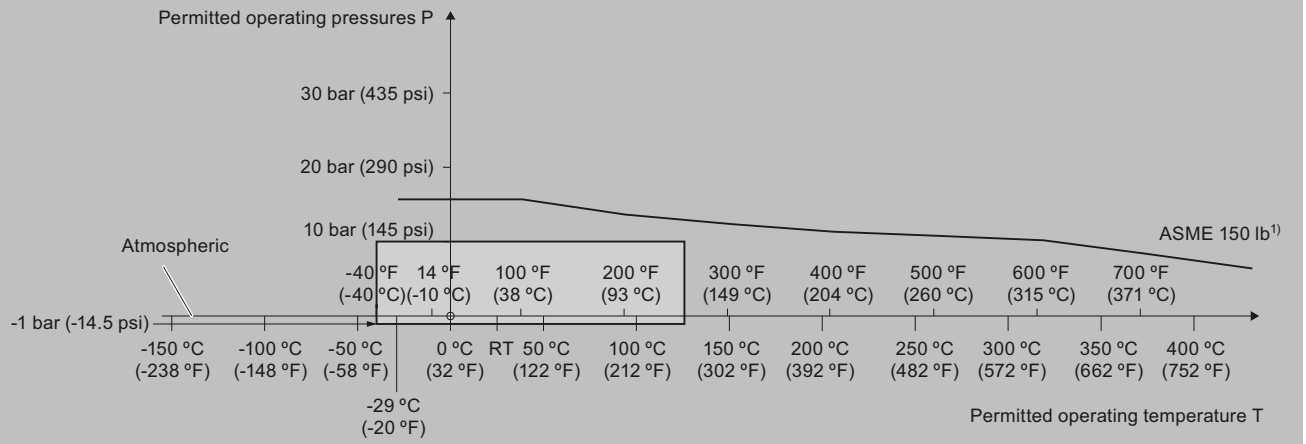

Pointek CLS200 process pressure/temperature derating curves (7ML5632 and 7ML5642)

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## Characteristic curves (continued)

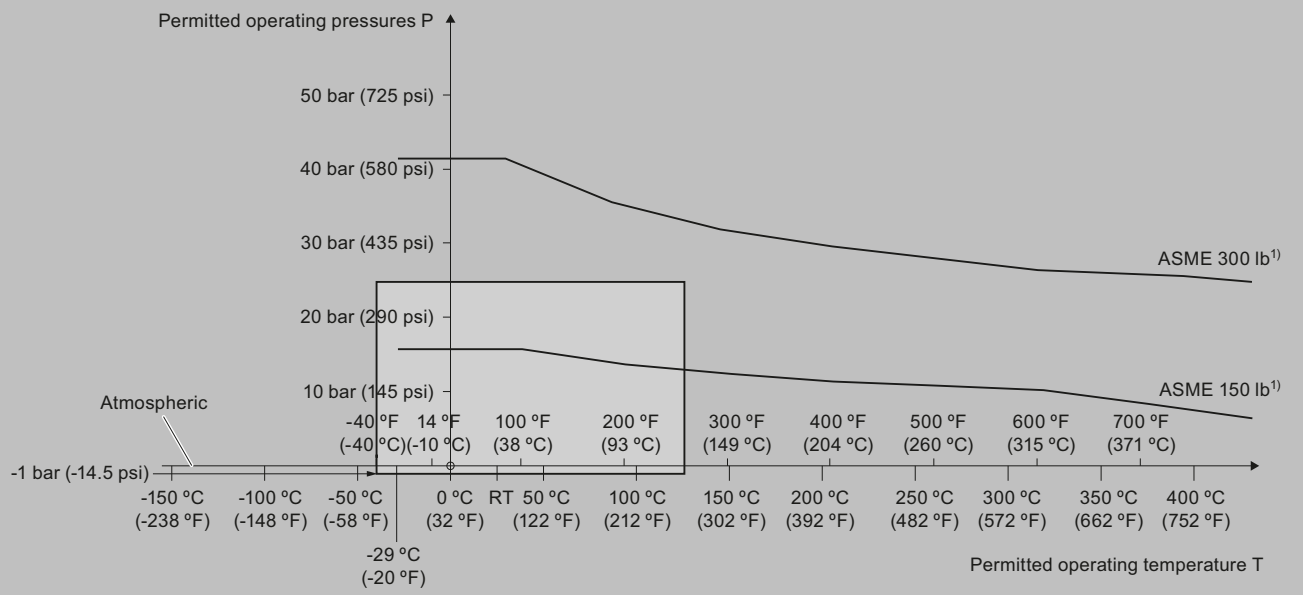
**Pressure/temperature curve**
**CLS200, cable**
**ASME flanged process connections**
**(7ML5631 and 7ML5641)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

**Pressure/temperature curve**
**CLS200 compact and extended rod**
**ASME flanged process connections**
**(7ML5630 and 7ML5640)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

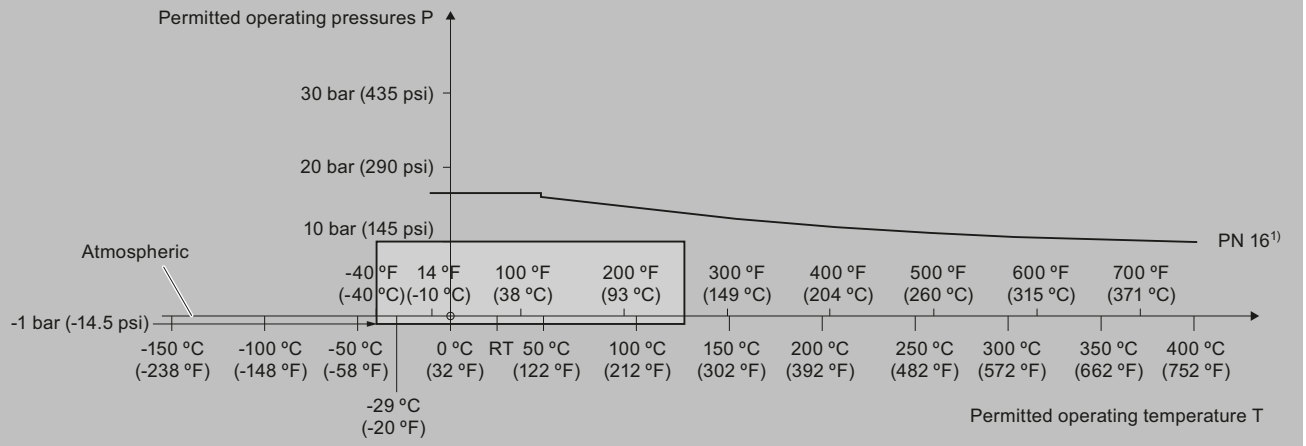
Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

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## Characteristic curves (continued)

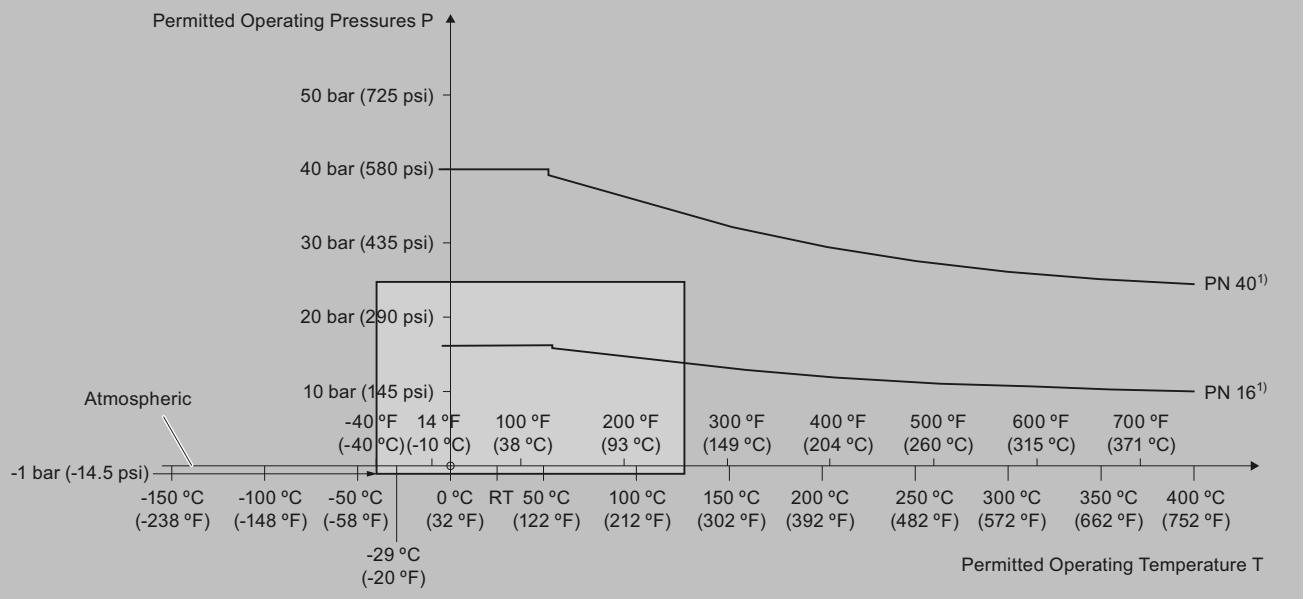
**Pressure/temperature curve**
**CLS200 cable**
**EN flanged process connections**
**(7ML5631 and 7ML5641)**




[1)] The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5631 and 7ML5641)

**Pressure/Temperature Curve**
**CLS200 Compact and Extended Rod**
**EN Flanged Process Connections**
**(7ML5630 and 7ML5640)**



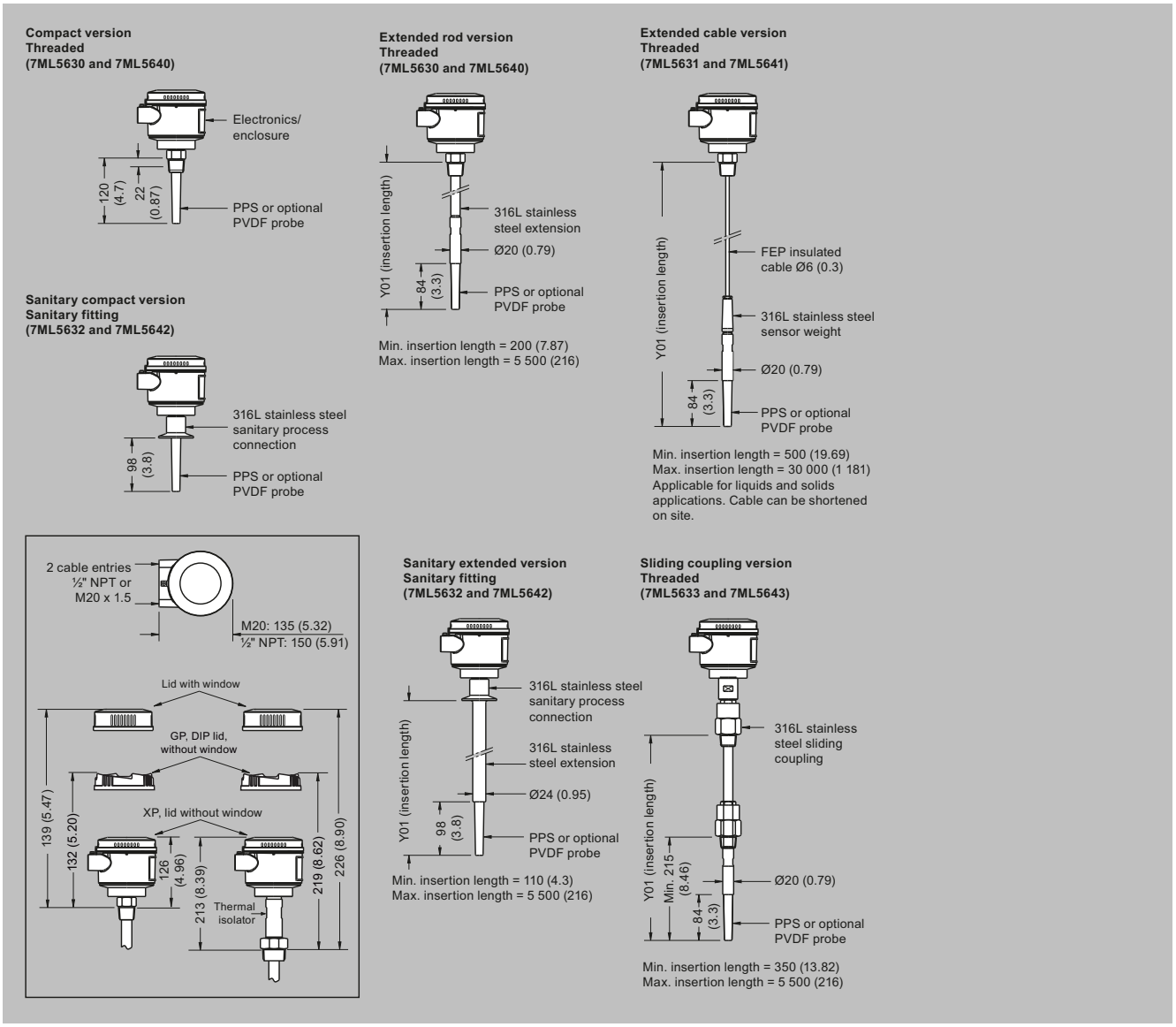

[1)] The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 process pressure/temperature derating curves (7ML5630 and 7ML5640)

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## Dimensional drawings



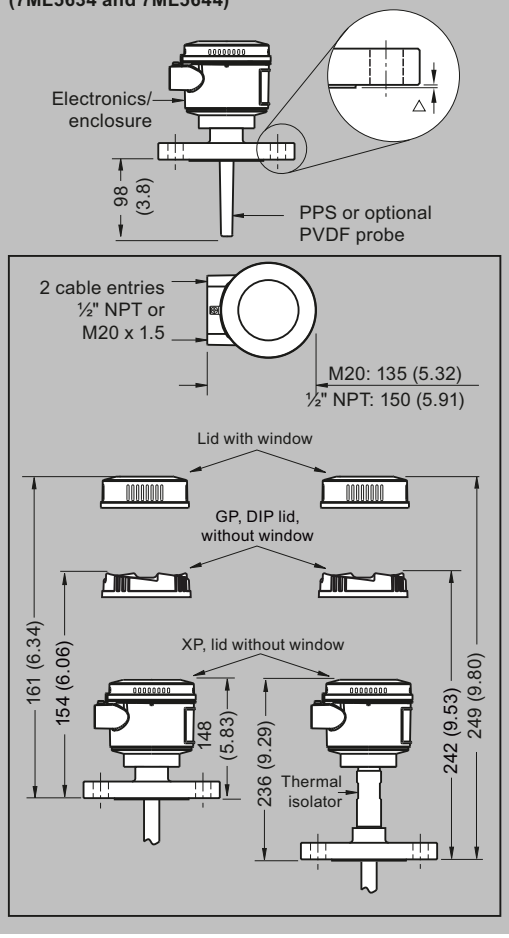

Pointek CLS200 threaded/sanitary process connections, dimensions in mm (inch)

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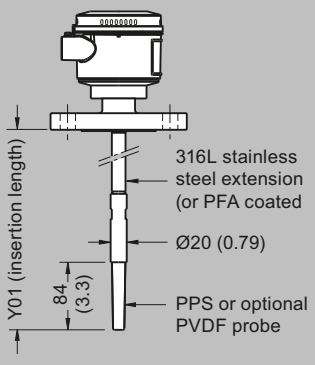


## Dimensional drawings (continued)

**Compact version**
**Welded Flange (7ML5630 and 7ML5640)**
**Welded Flange, PFA coated**
**(7ML5634 and 7ML5644)**

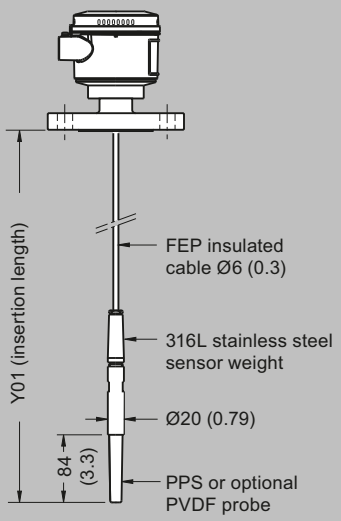



**Extended rod version**
**Welded Flange (7ML5630 and 7ML5640)**
**Welded Flange, PFA coated**
**(7ML5634 and 7ML5644)**




Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

**Extended cable version**
**Welded Flange**
**(7ML5631 and 7ML5641)**




Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

| Flange Facing (raised face) | |
|---|---|
| **Flange Class** | **Facing thickness** |
| △ ASME 150/300 | 2 (0.08) |
| △ ASME 600/900 | 7 (0.28) |
| △ PN16/40 | 2 (0.08) |

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

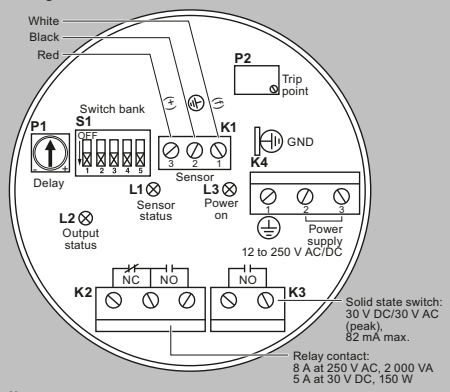
Pointek CLS200 flanged process connections, dimensions in mm (inch)

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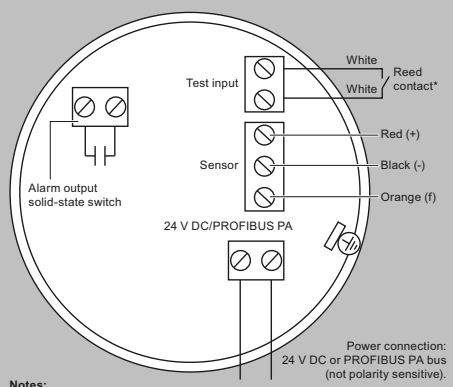
## Circuit diagrams

**Wiring: Pointek CLS200 standard**




**Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

**Wiring: Pointek CLS200 Digital**




**Notes:**
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor Test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.

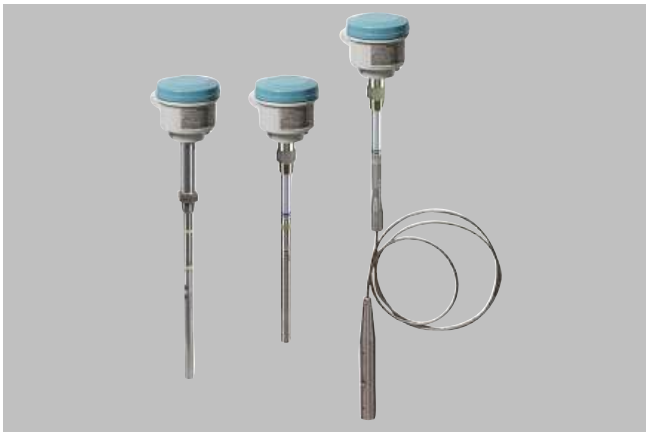



Pointek CLS200 connections

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## Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe.

## Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status, and power
- High-temperature version up to 400 °C (752 °F)

## Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.

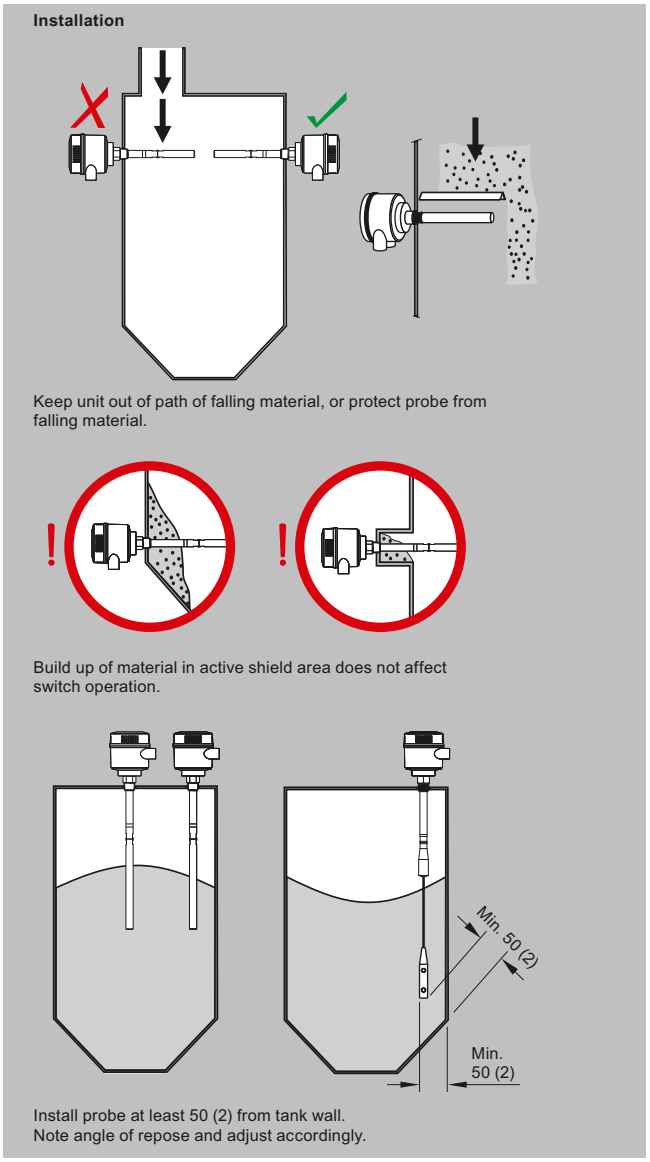
The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry. The fully potted electronics are unaffected by condensation, dust or vibration.

Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

## Configuration




Pointek CLS300 installation, dimensions in mm (inch)

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## Selection and ordering data

| Pointek CLS300 RF Capacitance point level switch, rod design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5650- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length** (length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Standard version, rod 350 mm (13.78 inch) | | | | A | | | | | | | |
| Extended rod, length 500 mm (19.69 inch) | | | | B | | | | | | | |
| Extended rod, length 750 mm (29.53 inch) | | | | C | | | | | | | |
| Extended rod, length 1 000 mm (39.37 inch) | | | | D | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) | | | | E | | | | | | | |
| Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) | | | | F | | | | | | | |
| Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) | | | | G | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, rod design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5650- ● ● ● ● ● - ● ● ● ● |
|---|---|
| **Wetted seals** | |
| FKM | 0 |
| FFKM [for process temperatures above -20 °C (-4 °F)] | 1 |
| **Probe material** | |
| 316L stainless steel with PFA lining and PEEK isolators | 0 |
| **Approvals** | |
| Dust Ignition Proof with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | C |
| Flameproof Enclosure with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | D |
| Flameproof Enclosure with IS Probe, with WHG Approval: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | E |
| Dust Ignition Proof with IS Probe: CSA/ FM Class II, III Div. 1 Gr .E, F, G T4 | F |
| Explosion Proof Enclosure with IS Probe: CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | G |
| General Purpose CSA, FM | H |
| General Purpose CSA, FM, CE, UKCA, RCM | J |
| General Purpose with WHG Approval CSA, FM, CE, UKCA, RCM | K |
| **Enclosure and lid** | |
| ***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |
| **Active shield length** | |
| Standard length - (125 mm threaded, 105 mm flanged) | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[1] | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[2] | 2 |

[1] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].
[2] Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material Inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

[1] Available only with Approvals options C, D, E.

| Pointek CLS300 RF Capacitance point level switch, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5651- ● ● ● ● ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Process connection** | |
| ***Threaded, 316L stainless steel*** | |
| 1¼" NPT [(Taper), ASME B1.20.1] | 0 C |
| 1½" NPT [(Taper), ASME B1.20.1] | 0 D |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, cable design.<br>Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5651- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length**<br>(length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer | | | | A | | | | | | | |
| Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer | | | | B | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)[2)] | | | | E | | | | | | | |
| Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | | | | F | | | | | | | |
| Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | | | | G | | | | | | | |
| Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | | | | H | | | | | | | |
| Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | | | | J | | | | | | | |
| Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | | | | K | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight | | | | | | | | 0 | | | |
| PFA coated cable, PEEK isolators and 316L stainless steel cable weight | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Flameproof Enclosure with IS Probe, with WHG Approval: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | E | | |
| Dust Ignition Proof with IS Probe: CSA/ FM Class II, III Div. 1 Gr .E, F, G T4 | | | | | | | | | F | | |
| Explosion Proof Enclosure with IS Probe: CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | G | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, cable design.<br>Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. | Article No.<br>7ML5651- ● ● ● ● ● - ● ● ● ● |
|---|---|
| General Purpose CSA, FM | H |
| General Purpose CSA, FM, CE, UKCA, RCM | J |
| General Purpose with WHG Approval CSA, FM, CE, UKCA, RCM | K |
| **Enclosure and lid** | |
| ***Aluminum epoxy coated*** | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | A |
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |
| **Active shield length** | |
| Standard length - (125 mm threaded, 105 mm flanged) | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[1] | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[1] | 2 |

[1] Available with Probe version options A, B, F ... K, only [≥ 1 000 mm (39.7 inch)].
[2] Not available with Active shield option 1.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material Inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

[1] Available only with Approvals options C, D, E.

| Pointek CLS300 RF Capacitance point level switch, high temperature design.<br>Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. | Article No.<br>7ML5652- ● ● ● 0 ● - ● ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Process connection** | |
| ***Threaded, 316L stainless steel*** | |
| ¾" NPT [(Taper), ASME B1.20.1] | 0 A |
| 1" NPT [(Taper), ASME B1.20.1] | 0 B |
| 1¼" NPT [(Taper), ASME B1.20.1] | 0 C |
| 1½" NPT [(Taper), ASME B1.20.1] | 0 D |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 A |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 B |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 D |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 A |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 B |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 D |
| ***Welded flange, 316L stainless steel, raised face*** | |
| 1" ASME, 150 lb | 5 A |
| 1" ASME, 300 lb | 5 B |
| 1" ASME, 600 lb | 5 C |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5652- | ● | ● | ● | 0 | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length** (length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Standard version rod, 350 mm (13.78 inch) | | | | A | | | | | | | |
| Extended rod, length 500 mm (19.69 inch) | | | | B | | | | | | | |
| Extended rod, length 750 mm (29.53 inch) | | | | C | | | | | | | |
| Extended rod, length 1 000 mm (39.37 inch) | | | | D | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) | | | | E | | | | | | | |
| Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) | | | | F | | | | | | | |
| Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) | | | | G | | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| Graphite | | | | | | 0 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with ceramic ($ZrO_2$) isolators | | | | | | | | 0 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Flameproof Enclosure with IS Probe, with WHG Approval: CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | E | | |
| Dust Ignition Proof with IS Probe: CSA/ FM Class II, III Div. 1 Gr .E, F, G T4 | | | | | | | | | F | | |
| Explosion Proof Enclosure with IS Probe: CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | G | | |
| General Purpose CSA, FM | | | | | | | | | H | | |
| General Purpose CSA, FM, CE, UKCA, RCM | | | | | | | | | J | | |
| General Purpose with WHG Approval CSA, FM, CE, UKCA, RCM | | | | | | | | | K | | |
| **Enclosure and lid** | | | | | | | | | | | |
| ***Aluminum epoxy coated*** | | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. | Article No. 7ML5652- ● ● ● 0 ● - ● ● ● ● |
|---|---|
| 2 x M20 x 1.5 cable inlet, IP65 | B |
| 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| 2 x M20 x 1.5 cable inlet, IP68 | D |
| **Active shield length** | |
| Standard length - (125 mm threaded, 105 mm flanged) | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[1] | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[2] | 2 |

[1] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].
[2] Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description[1] | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material Inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[2] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

[1] Not available with Probe length option B.
[2] Available only with Approvals options C, D, E.

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## Technical specifications

| Pointek CLS300 - Standard | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Inverse frequency shift capacitive level detection |
| **Input** | |
| Measured variable | Change in picoFarad (pF) |
| **Output** | |
| Output signal | |
| • Relay output | 1 SPDT Form C relay |
| - Max. contact voltage | • 30 V DC<br>• 250 V AC |
| - Max. contact current | • 5 A (DC)<br>• 8 A (AC) |
| - Max. switching capacity | • 150 W (DC)<br>• 2 000 VA (AC) |
| - Time delay (ON and/or OFF) | 1 ... 60 s |
| • Solid-state output | |
| - Output | Galvanically isolated |
| - Protection | Against reversed polarity (bipolar) |
| - Max. switching voltage | • 30 V (DC)<br>• 30 V peak (AC) |
| - Max. load current | 82 mA |
| - Voltage drop | < 1 V, typical at 50 mA |
| - Time delay (pre or post switching) | 1 ... 60 s |
| **Accuracy** | |
| Resolution | |
| • Min. sensitivity (pF) | 1 % change in actual capacitance |
| • Max. temperature error | 0.2 % of actual capacitance value |
| **Rated operating conditions**[1] | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F)[2] |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Medium conditions | Liquids, bulk solids, slurries and interfaces, and applications with viscous materials |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 |
| • Process temperature | |
| - Rod/Cable version | -40 ... +200 °C (-40 ... +392 °F)[2] |
| - High-temperature version | -40 ... +400 °C (-40 ... +752 °F) |
| • Process pressure[3] | -1 ... +35 bar g (-14.6 ... +511 psi g) |

| Pointek CLS300 - Standard | |
|---|---|
| **Design** | |
| Material (enclosure) | Powder-coated aluminum with gasket |
| Degree of Protection | Standard: Type 4/NEMA 4/IP65<br>Optional: Type 4/NEMA 4/IP68 |
| Cable inlet | 2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry) |
| **Controls and displays** | |
| Displays | 3 LEDs, for probe status, output status and power supply |
| Potentiometers | 2 potentiometers for time delay and sensitivity |
| Switches | 5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings |
| **Power supply** | |
| Supply | 12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W |
| **Certificates and approvals** | |
| General Purpose | CSA, FM, CE, RCM |
| Flameproof Enclosure with IS Probe | ATEX II ½ G EEx d[ia] IIC T6 ... T1<br>ATEX II ½ D T100 °C |
| Dust Ignition Proof with IS Probe | ATEX II ½ D T100 °C<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Explosion Proof Enclosure with IS Probe | CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 |
| Marine | Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5 |
| Overfill Protection | WHG (Germany)<br>VLAREM II (Belgium) |
| Others | Pattern Approval (China) |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS300 pressure/temperature curves.
2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).
3) Pressure rating of process seal is temperature dependent. See also CLS300 pressure/temperature curves.

| Design: Probe | Rod version | High Temperature version | Cable version |
|---|---|---|---|
| Length | Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch) | Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch) | Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch) |
| Sensor wetted parts | PFA (no insulation on active probe), 316L stainless steel, PEEK isolators | Ceramic ($ZrO_2$[1]) isolators (no insulation on active probe), 316L stainless steel | 316 stainless steel, optional PFA, PEEK isolators |
| O-ring seal material | FKM (optional FFKM)[2] | Graphite[2] | FKM (optional FFKM)[2] |
| Thermal isolator | Optional | Standard | Optional |
| Extension | User-selectable length | User-selectable length | User selectable cable length |

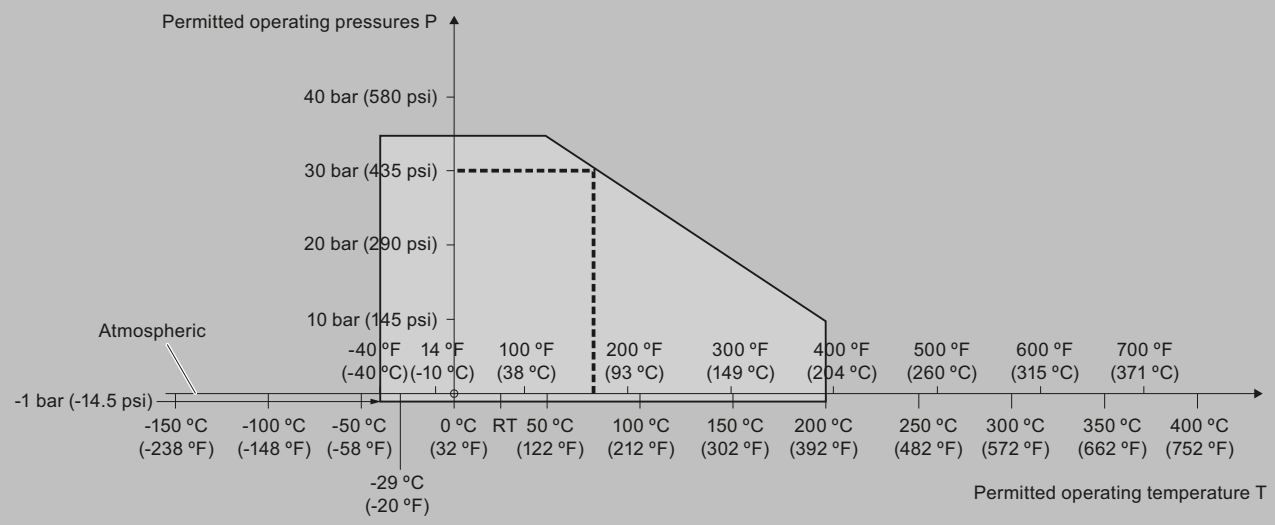
1) Zirconium Oxide
2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

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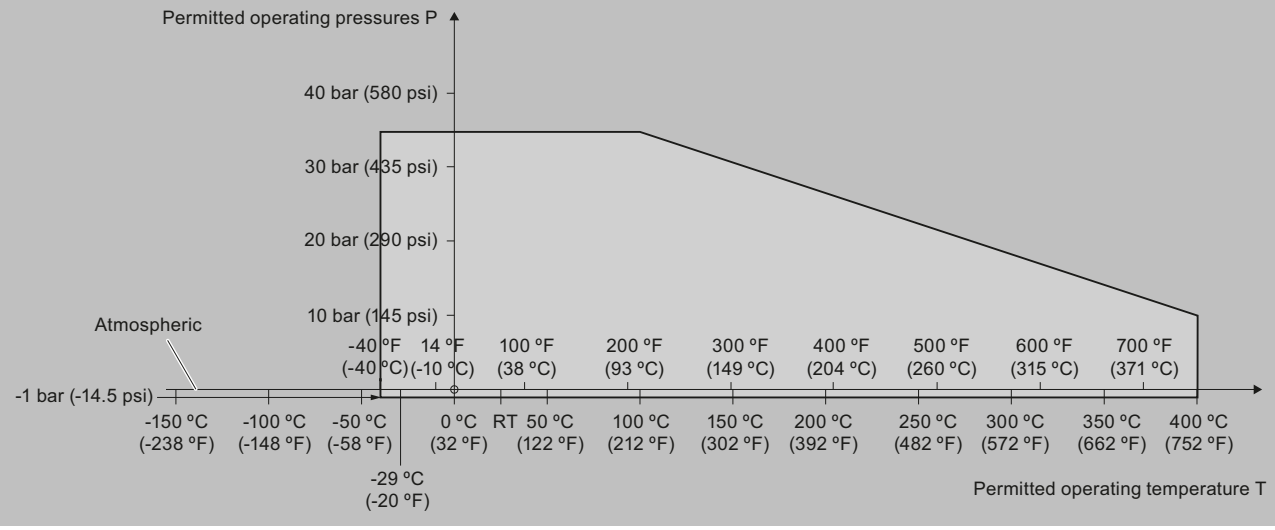
## Characteristic curves

**Pressure/temperature curve**
**CLS300 extended rod and cable probes**
**Threaded process connections**
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**




Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661 )

**Pressure/temperature curve**
**CLS300 high temperature rod probes**
**Threaded process connections**
**(7ML5652 and 7ML5662)**



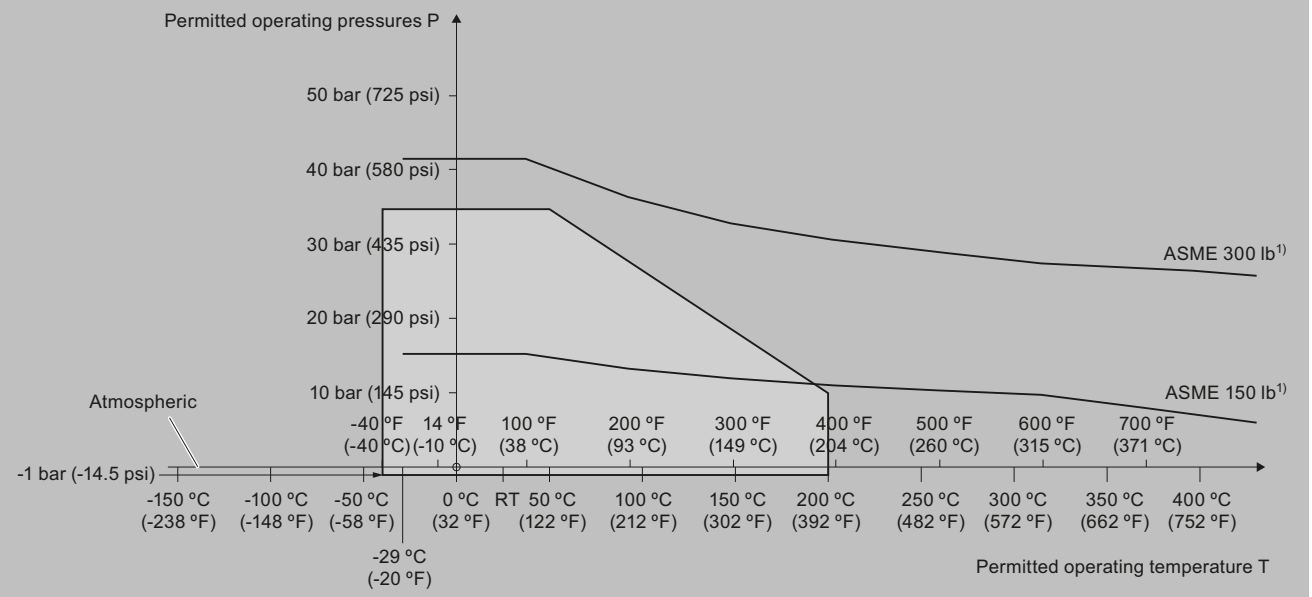

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Characteristic curves (continued)

**Pressure/temperature curve**
**CLS300 extended rod and cable probes**
**ASME flanged process connections**
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**



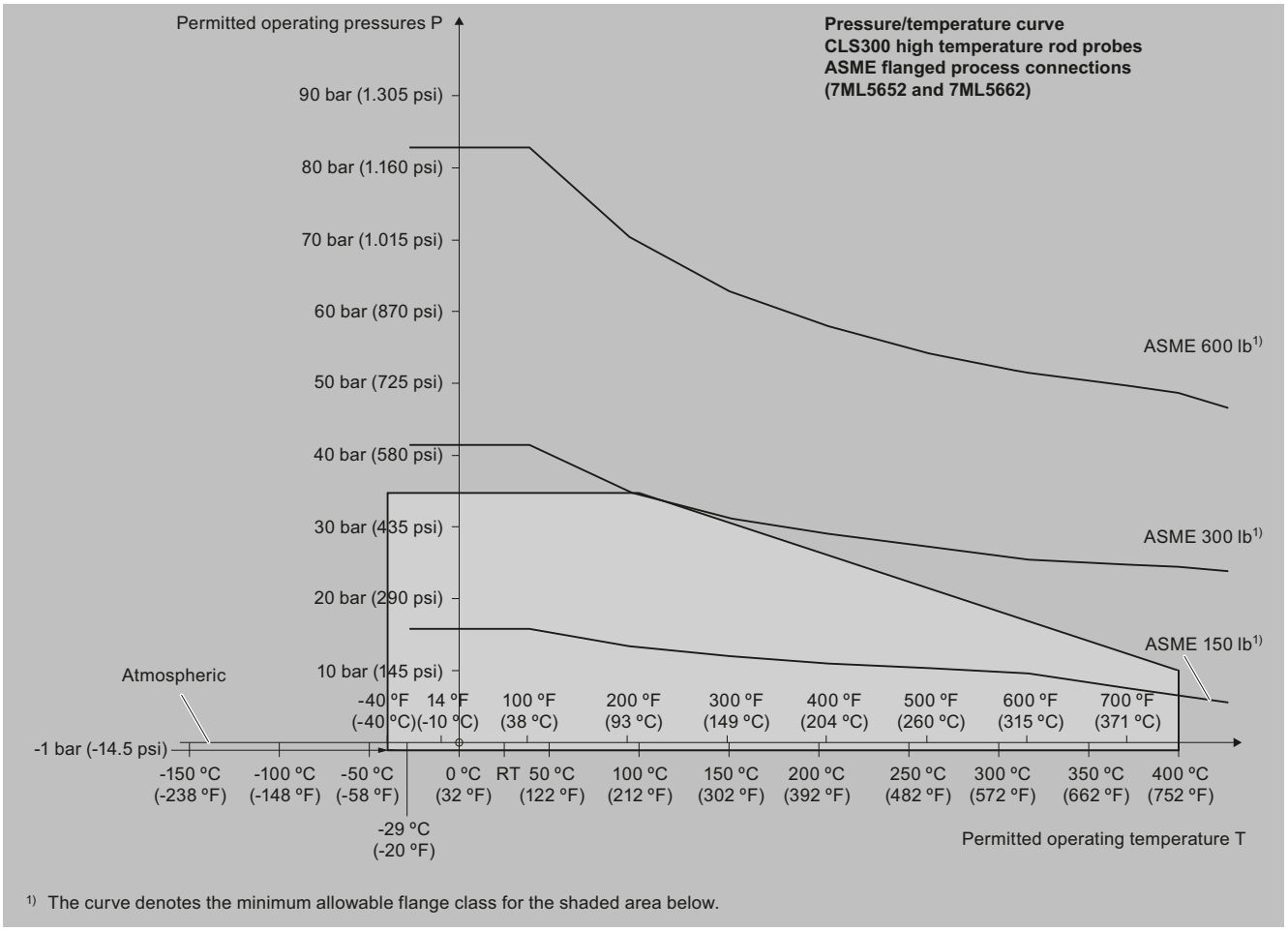

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

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## Characteristic curves (continued)



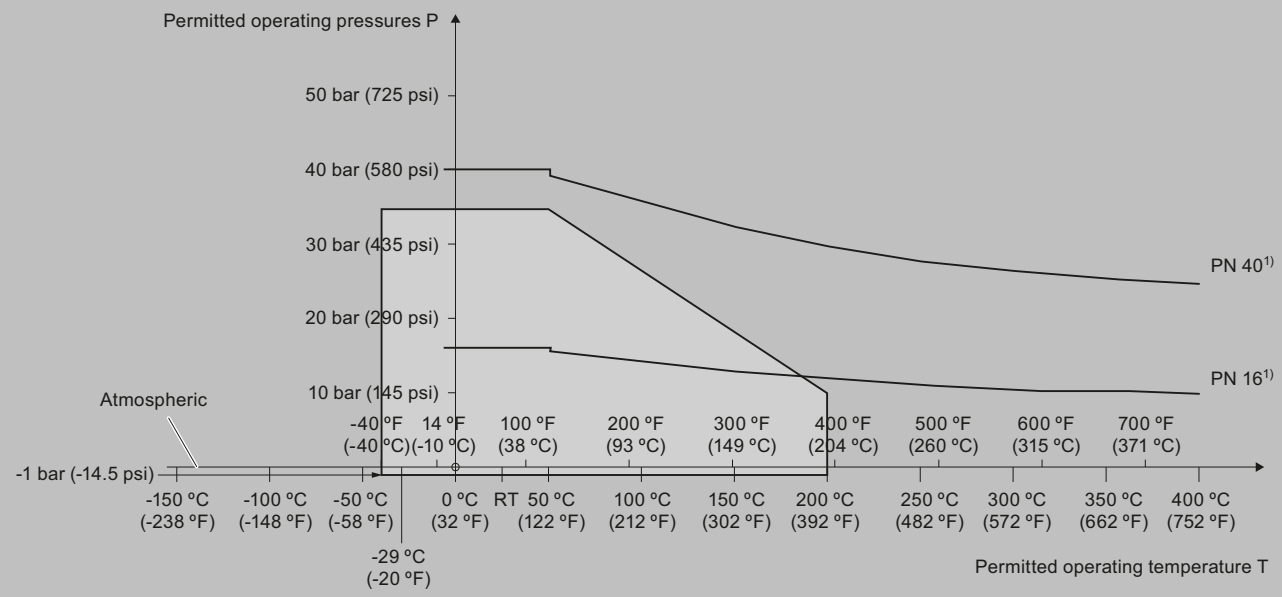

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Characteristic curves (continued)

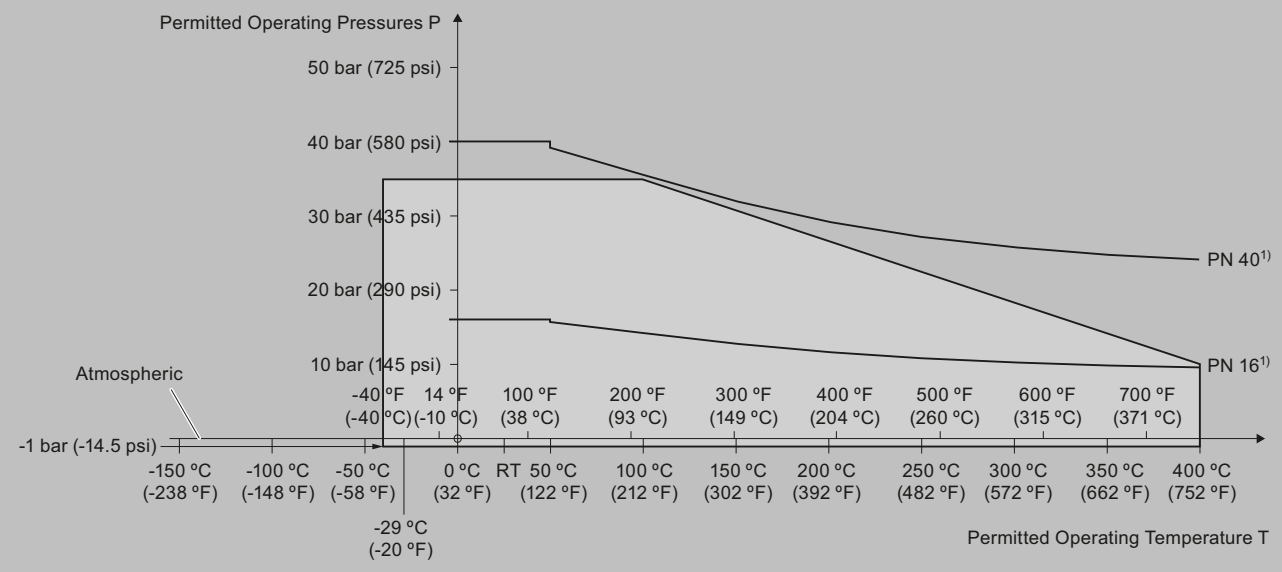
**Pressure/temperature curve**
**CLS300 extended rod and cable probes**
**EN flanged process connections**
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

**Pressure/Temperature Curve**
**CLS300 High Temperature Rod Probes**
**EN Flanged Process Connections (7ML5652 and 7ML5662)**



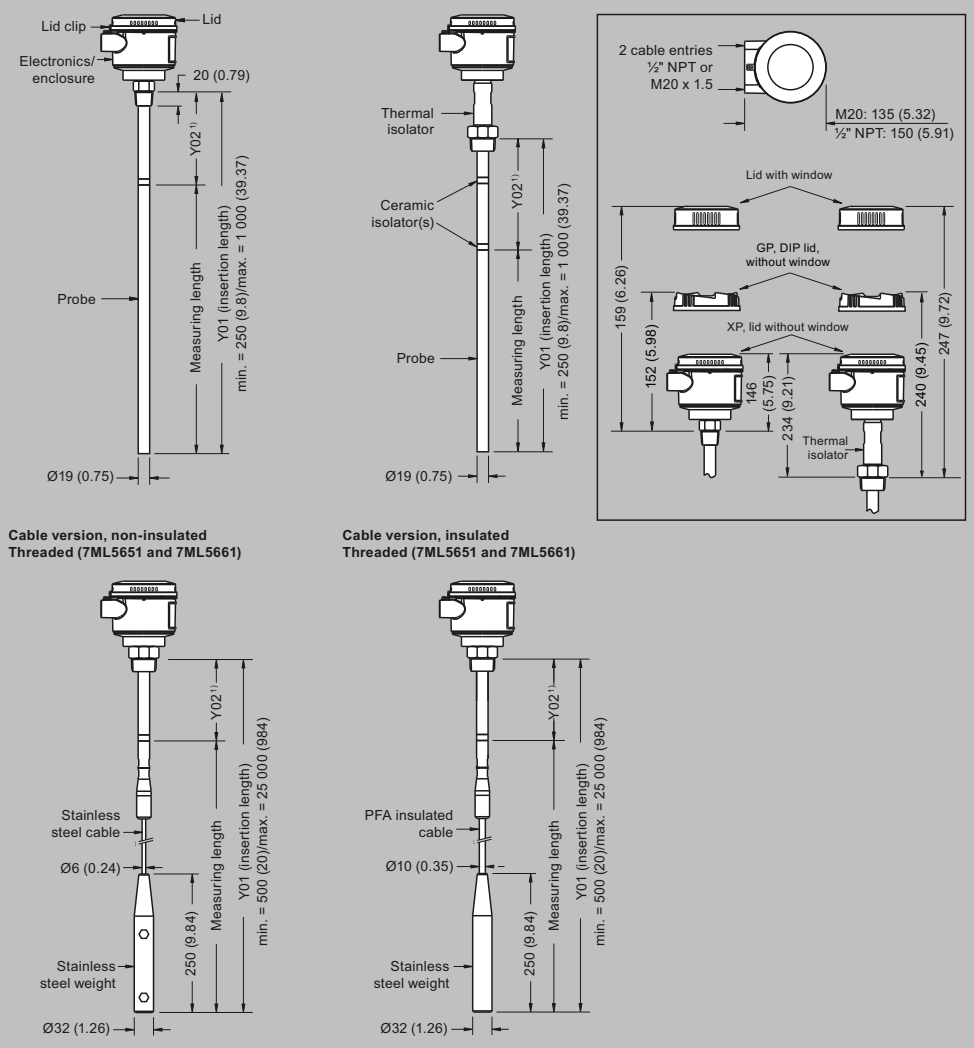

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Dimensional drawings




**Note:**

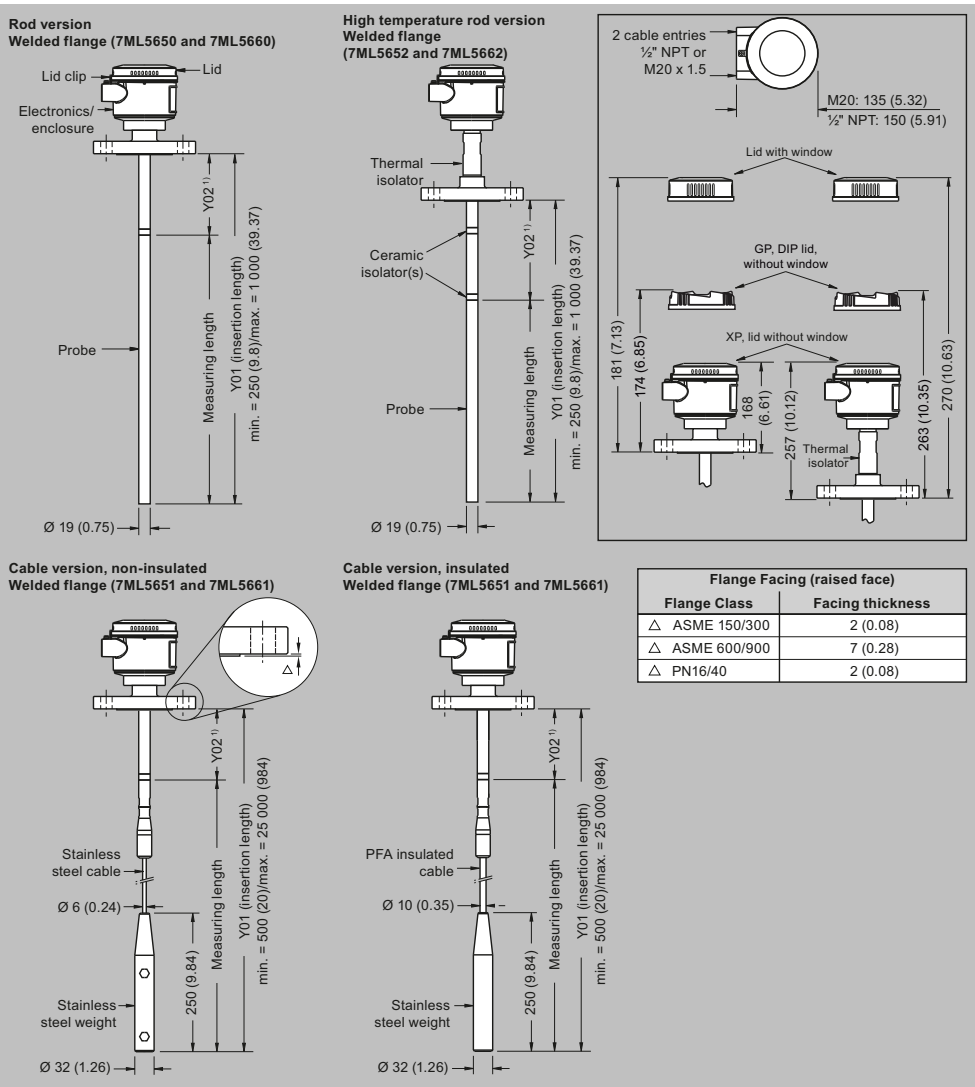
1) Extended Active Shield (Y02): standard length 125 (4.92). Optional active shield lengths: 250 (9.84) or 400 (15.75).

Pointek CLS300 threaded process connections, dimensions in mm (inch)

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## Dimensional drawings (continued)




| Flange Facing (raised face) | |
|---|---|
| **Flange Class** | **Facing thickness** |
| △ ASME 150/300 | 2 (0.08) |
| △ ASME 600/900 | 7 (0.28) |
| △ PN16/40 | 2 (0.08) |

**Note:**

[1] Extended Active Shield (Y02): standard length 105 (4.13). Optional active shield lengths: 230 (9.06) or 380 (14.96).
Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

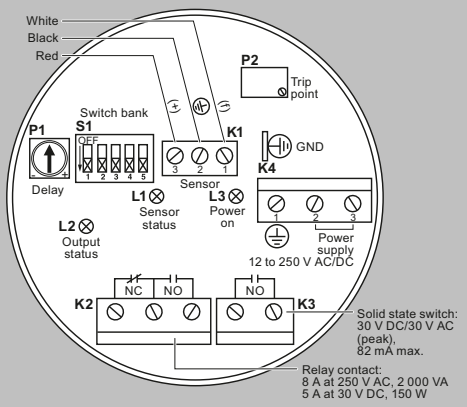
Pointek CLS300 flanged process connections, dimensions in mm (inch)

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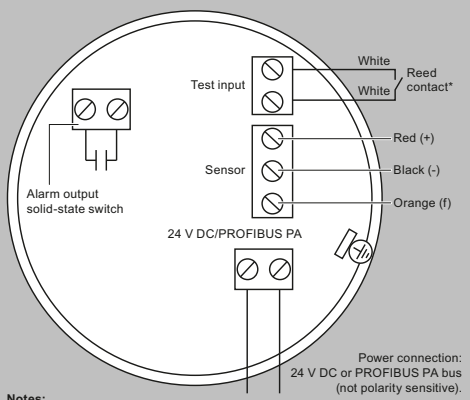
## Circuit diagrams

**Wiring: Pointek CLS300 standard**




**Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

**Wiring: Pointek CLS300 digital**




**Notes:**
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.

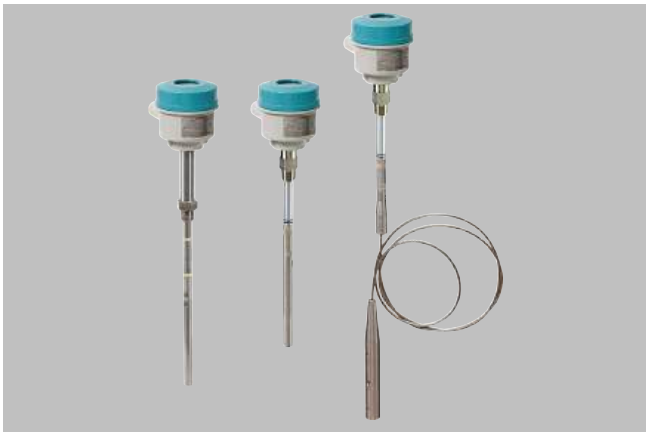



Pointek CLS300 connections

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## Overview



Pointek CLS300 (digital version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out buildup on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

## Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

## Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

The fully potted electronics are unaffected by condensation, dust or vibration.

Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

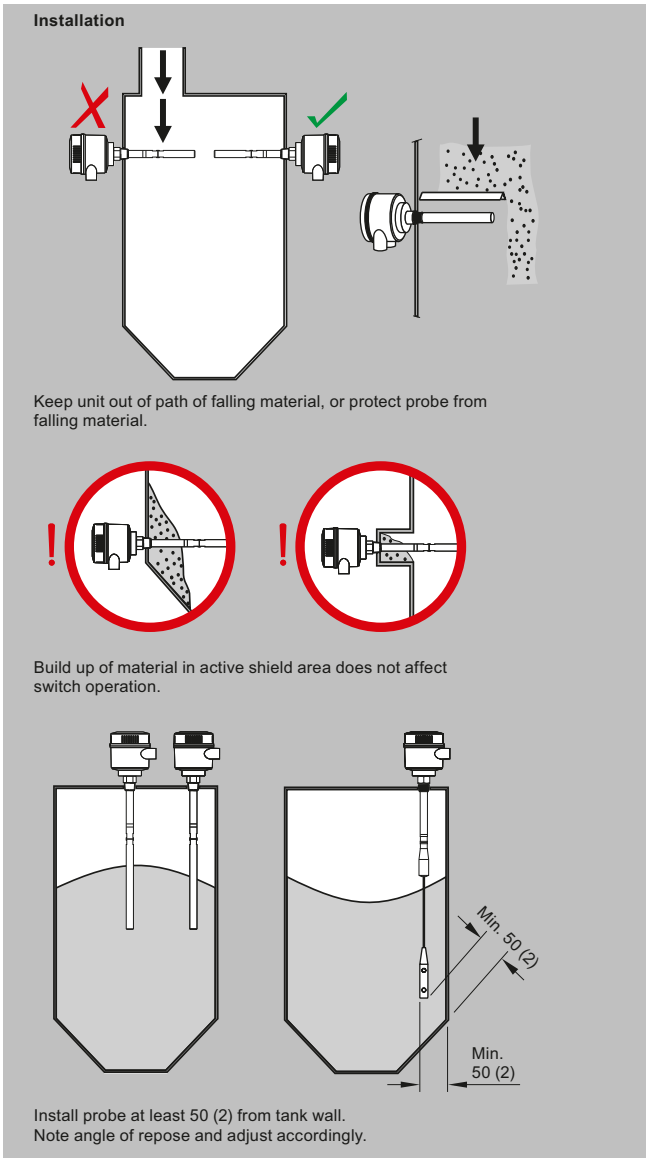
The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

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## Configuration




Pointek CLS300 installation, dimensions in mm (inch)

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## Selection and ordering data

| Pointek CLS300 RF Capacitance point level switch, digital, rod design.<br>Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, and active shield to tune out build-up on probe. With display and digital communications. | Article No.<br>7ML5660- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length**<br>(length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Standard version, rod 350 mm (13.78 inch) | | | | A | | | | | | | |
| Extended rod, length 500 mm (19.69 inch) | | | | B | | | | | | | |
| Extended rod, length 750 mm (29.53 inch) | | | | C | | | | | | | |
| Extended rod, length 1 000 mm (39.37 inch) | | | | D | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) | | | | E | | | | | | | |
| Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) | | | | F | | | | | | | |
| Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) | | | | G | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, digital, rod design.<br>Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, and active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5660- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with PFA lining and PEEK isolators | | | | | | | | 0 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | B | | |
| Intrinsically Safe CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, GT4 | | | | | | | | | E | | |
| Intrinsically Safe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | | | | | | | | | F | | |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | G | | |
| General Purpose CSA, FM | | | | | | | | | H | | |
| General Purpose CSA, FM, CE, UKCA, RCM | | | | | | | | | J | | |
| **Enclosure and Lid** | | | | | | | | | | | |
| ***Aluminum epoxy coated*** | | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |
| **Active shield length** | | | | | | | | | | | |
| Standard length - (125 mm threaded, 105 mm flanged) | | | | | | | | | | | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[2] | | | | | | | | | | | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[3] | | | | | | | | | | | 2 |

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
[2] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].
[3] Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

[1] Available only with Approvals options B and D.

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, digital, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5661- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length** (length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer | | | | A | | | | | | | |
| Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer | | | | B | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)[3)] | | | | E | | | | | | | |
| Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | | | | F | | | | | | | |
| Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | | | | G | | | | | | | |
| Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | | | | H | | | | | | | |
| Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | | | | J | | | | | | | |
| Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | | | | K | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight | | | | | | | | 0 | | | |
| PFA coated cable, PEEK isolators and 316L stainless steel cable weight | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | B | | |
| Intrinsically Safe CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | | | | | | | | | C | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, digital, cable design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Cable extension options to 25 m (82.02 ft), adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5661- ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | D | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, GT4 | | | | | | | | E | | |
| Intrinsically Safe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | | | | | | | | F | | |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | G | | |
| General Purpose CSA, FM | | | | | | | | H | | |
| General Purpose CSA, FM, CE, UKCA, RCM | | | | | | | | J | | |
| **Enclosure and Lid** | | | | | | | | | | |
| ***Aluminum epoxy coated*** | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | A | |
| 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | B | |
| 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | C | |
| 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | D | |
| **Active shield length** | | | | | | | | | | |
| Standard length - (125 mm threaded, 105 mm flanged) | | | | | | | | | | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[2] | | | | | | | | | | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[2] | | | | | | | | | | 2 |

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
[2] Available with Probe version options A, B, F ... K, only [≥ 1 000 mm (39.7 inch)].
[3] Not available with Active shield option 1.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

[1] Available only with Approvals options B and D.

| Pointek CLS300 RF Capacitance point level switch, digital, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5662- ● | ● | ● | 0 | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Process connection** | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, digital, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5662- | ● | ● | ● | 0 | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.) | | 6 | K | | | | | | | | |
| **Probe length** (length from flange face) (threaded lengths include process thread) | | | | | | | | | | | |
| ***Note: No Y01 needed in Order code for standard lengths*** | | | | | | | | | | | |
| Standard version rod, 350 mm (13.78 inch) | | | | A | | | | | | | |
| Extended rod, length 500 mm (19.69 inch) | | | | B | | | | | | | |
| Extended rod, length 750 mm (29.53 inch) | | | | C | | | | | | | |
| Extended rod, length 1 000 mm (39.37 inch) | | | | D | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch) | | | | E | | | | | | | |
| Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch) | | | | F | | | | | | | |
| Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch) | | | | G | | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| Graphite | | | | | | 0 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 316L stainless steel with ceramic ($ZrO_2$)isolators | | | | | | | | 0 | | | |
| **Approvals** | | | | | | | | | | | |
| Dust Ignition Proof CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | B | | |
| Intrinsically Safe CE, UKCA, RCM, ATEX, UKEX II 1G Ex ia; ATEX, UKEX II 1/2D Ex ia | | | | | | | | | C | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | D | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1 Gr. E, F, GT4 | | | | | | | | | E | | |
| Intrinsically Safe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 or T6 | | | | | | | | | F | | |
| Explosion Proof with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | G | | |
| General Purpose CSA, FM | | | | | | | | | H | | |
| General Purpose CSA, FM, CE, UKCA, RCM | | | | | | | | | J | | |

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## Selection and ordering data (continued)

| Pointek CLS300 RF Capacitance point level switch, digital, high temperature design. Detects level and interface in aggressive liquids, solids, slurries, and foam. Adjustable, 1 m (3.28 ft), insertion, adaptable sensitivity, with active shield to tune out build-up on probe. With display and digital communications. | Article No. 7ML5662- | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | 0 | ● | - | ● | ● | ● | ● | | |
| **Enclosure and Lid** | | | | | | | | | | | | |
| ***Aluminum epoxy coated*** | | | | | | | | | | | | |
| 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | | |
| 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | | |
| 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | | |
| 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | | |
| **Active shield length** | | | | | | | | | | | | |
| Standard length - (125 mm threaded, 105 mm flanged) | | | | | | | | | | | | 0 |
| Extended shield - (250 mm threaded, 230 mm flanged)[2] | | | | | | | | | | | | 1 |
| Extended shield - (400 mm threaded, 380 mm flanged)[3] | | | | | | | | | | | | 2 |

1) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection.
2) Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)].
3) Available with Probe version options C, D, and G only [≥ 750 mm (29.53 inch)].

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: enter the total insertion length in plain text description | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material Inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | **See accessories following CLS300 Digital selection and ordering data.** |

1) Available only with Approvals options B and D.

| Selection and Ordering data | Article No. |
|---|---|
| **Accessories** | |
| One metallic cable gland M20 x 1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA) | **7ML1930-1AQ** |
| ***General Purpose*** | |
| ½" NPT General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 6 ... 12 mm (0.236 ... 0.472 inch) | **7ML1830-1JA** |
| M20 x 1.5 General Purpose Cable Entry IP68/IP69K NEMA 6, -40 ... +80 °C (-40 ... +176 °F), Dust Ignition Proof, cable size 7 ... 12 mm (0.275 ... 0.472 inch) | **7ML1830-1JC** |

| Selection and Ordering data | Article No. |
|---|---|
| ***Hazardous Locations*** | |
| ½" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch) | **7ML1830-1JB** |
| M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch) | **7ML1830-1JD** |
| ***Blind threaded flanges are available. Customers interested in a custom designed device should consult a local sales person. For more information, please visit*** http://www.automation.siemens.com/aspa_app. | |
| **Pointek Specials** | **See page 4/60** |

| Pointek Specials[1] | Article No. |
|---|---|
| **CLS100 Polycarbonate Lid and Gasket, FKM** | |
| Kit, lid and gasket, CLS100 enclosure version | **A5E01163671** |
| **CLS100 Miscellaneous Parts** | |
| Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x[2] | |
| **CLS200 Gasket (IP65), Synprene** | |
| Spare gasket, enclosure version (IP65 versions only) | **A5E01163672** |
| **CLS200 Gasket (IP68), Silicone** | |
| Spare gasket, enclosure version (IP68 versions) | **A5E01163673** |
| **CLS200/CLS300/LC300 Blind Lid** | |
| Spare aluminum blind lid (for standard versions only) | **A5E01163674** |
| **CLS200/CLS300 Lid with window** | |
| Spare aluminum lid with window | **A5E01163676** |
| **CLS200 Sensor Kit for cable units** | |
| Kit, sensor for cable units, PPS, standard, FKM | **A5E01163677** |
| Kit, sensor for cable units, PPS, digital, FKM | **A5E01163678** |
| Kit, sensor for cable units, PPS, standard, FFKM | **A5E01163679** |
| Kit, sensor for cable units, PPS, digital, FFKM | **A5E01163680** |
| Kit, sensor for cable units, PVDF, standard, FKM | **A5E01163681** |

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## Selection and ordering data (continued)

| Pointek Specials[1] | Article No. |
|---|---|
| Kit, sensor for cable units, PVDF, digital, FKM | A5E01163682 |
| Kit, sensor for cable units, PVDF, standard, FFKM | A5E01163683 |
| Kit, sensor for cable units, PVDF, digital, FFKM | A5E01163684 |
| **CLS200 Mounting Bracket, 316L stainless steel** | |
| Spare mounting bracket, mounting hole 27 mm (1 inch) | A5E01163685 |
| **CLS200 PROFIBUS Connector (IP65)** | |
| Spare, PROFIBUS connector (IP65 versions only) | A5E01163686 |
| **CLS200 Miscellaneous Parts** | |
| CLS200 with FFKM O-rings (any version)[2] | |
| **CLS200 Electronics** | |
| Test magnet, digital version | 7ML1830-1JE |
| Amplifier/power supply kit, standard version | A5E03251681 |
| Amplifier/power supply, digital version | 7ML1830-1JF |
| LCD display, digital version | 7ML1830-1JK |
| **CLS300 Cable Extensions, 316L stainless steel** | |
| Kit, stainless steel cable extension, 1 m, adjustable by customer | A5E01163688 |
| Kit, stainless steel cable extension, 3 m, adjustable by customer | A5E01163689 |
| Kit, stainless steel cable extension, 5 m, adjustable by customer | A5E01163690 |
| Kit, stainless steel cable extension, 10 m, adjustable by customer | A5E01163691 |
| Kit, stainless steel cable extension, 15 m, adjustable by customer | A5E01163693 |
| Kit, stainless steel cable extension, 20 m, adjustable by customer | A5E01163695 |
| **CLS300 Cable Extensions, 316 stainless steel with PFA coating** | |
| Kit, PFA cable extension, 1 m, adjustable by customer | A5E01163697 |
| Kit, PFA cable extension, 3 m, adjustable by customer | A5E01163698 |
| Kit, PFA cable extension, 5 m, adjustable by customer | A5E01163699 |
| Kit, PFA cable extension, 10 m, adjustable by customer | A5E01163700 |
| Kit, PFA cable extension, 15 m, adjustable by customer | A5E01163701 |
| Kit, PFA cable extension, 20 m, adjustable by customer | A5E01163702 |
| **CLS300 Rod Kits, 316L stainless steel** | |
| Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch). | A5E01163719 |
| Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch). | A5E01163720 |
| Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch). | A5E01163721 |
| Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch). | A5E01163722 |
| Kit, stainless steel rod 1330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch).[2] | |
| Kit, stainless steel rod 1830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch).[2] | |
| Kit, stainless steel rod customized length up to 1 m[2] | |
| Kit, stainless steel rod customized length up to 2 m[2] | |
| **CLS300 Electronics Kits with drivers (for rod or cable versions)** | |
| Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m.[3][4] | A5E01163723 |
| Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m.[3][4] | A5E01163725 |
| **CLS300 Electronics Kits with drivers (for cable versions)** | |
| Kit, electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m.[3][4] | A5E01163724 |
| Kit, electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m.[3][4] | A5E01163726 |
| **CLS300 Electronics** | |
| Test magnet, digital version | 7ML1830-1JE |
| Amplifier/power supply kit, standard version | A5E03251683 |
| Amplifier/power supply, digital version | 7ML1830-1JF |
| LCD display, digital version | 7ML1830-1JK |
| **CLS300 Weight Kit, 316L stainless steel** | |
| Kit, spare stainless steel weight. To be used in any cable version of CLS300. | A5E01163727 |

1) Special flange sizes and facings are available. Please consult a local sales person for details.
2) Please consult a local sales person for part number and pricing
3) For General Purpose approvals only
4) To maintain approvals, qualified trained Siemens personnel required for part replacement

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

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## Technical specifications

| Pointek CLS300 Digital | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Inverse frequency shift capacitive level detection |
| **Input** | |
| Measured variable | Change in picoFarad (pF) |
| **Output** | |
| Solid-state output | |
| • Output | Galvanically isolated |
| • Protection | Against reversed polarity (bipolar) |
| • Max. switching voltage | • 30 V (DC)<br>• 30 V peak (AC) |
| • Max. load current | 82 mA |
| • Voltage drop | < 1 V, typical at 50 mA |
| • Time delay (pre or post switching) | Programmable by user (0 ... 100 s) |
| Fail-safe mode | Min. or max. |
| Connection | Removable terminal block |
| **Accuracy** | |
| Resolution | |
| • Min. sensitivity (pF) | 1 % change in actual capacitance |
| • Max. temperature error | 0.2 % of actual capacitance value |
| **Rated operating conditions**[1] | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F)[2] |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Medium conditions | Liquids, bulk solids, slurries, interfaces, and applications with viscous materials |
| • Relative dielectric constant $\epsilon_r$ | Min. 1.5 |
| • Process temperature | |
| - Rod/Cable version | -40 ... +200 °C (-40 ... +392 °F)[2] |
| - High Temperature version | -40 ... +400 °C (-40 ... +752 °F) |
| • Process pressure[3] | -1 ... +35 bar g (-14.6 ... +511 psi g) |
| **Design** | |
| Material (enclosure) | Powder-coated aluminum with gasket |
| Degree of protection | Standard: Type 4/NEMA 4/IP65<br>Optional: Type 4/NEMA 4/IP68 |
| Cable inlet | 2 x M20 x 1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry) |

| Pointek CLS300 Digital | |
|---|---|
| **Controls and displays** | |
| Local display | LCD |
| Configuration | • Locally, using 3 button keypad (for standalone operation)<br>• Remotely, using SIMATIC PDM (for installation on a network) |
| **Power supply** | |
| Bus voltage (at process connection) | • Standard: 12 ... 30 V DC<br>• Intrinsically Safe: 12 ... 24 V DC |
| Current consumption | 12.5 mA |
| **Certificates and approvals** | |
| General Purpose | CSA, FM, CE, RCM |
| Dust Ignition Proof | ATEX II 1/2 D, 2 D IP6X T100 °C |
| Flameproof Enclosure With IS Probe | ATEX II 1/2 G EEx d[ia] IIC T6 ... T4<br>ATEX II 1/2 D T100 °C |
| Dust Ignition Proof With IS Probe | CSA/FM Class II, Div. 1,<br>Groups E, F, G<br>CSA/FM Class III T4 |
| Intrinsically Safe[4] | ATEX II 1 G EEx ia IIC T6 ... T4<br>ATEX II 1/2 D, 2 D IP6X T100 °C<br>CSA/FM Class I, Div. 1,<br>Groups A, B, C, D<br>CSA/FM Class II, Div. 1,<br>Groups E, F, G<br>CSA/FM Class III T4 |
| Non-incendive | CSA/FM Class I, Div. 2,<br>Groups A, B, C, D<br>CSA/FM Class II, Div. 2,<br>Groups F, G<br>CSA/FM Class III T4 or T6 |
| Explosion Proof with IS Probe | CSA/FM Class I, Div. 1,<br>Groups A, B, C, D<br>CSA/FM Class II, Div. 1,<br>Groups E, F, G<br>CSA/FM Class III T4 |
| Marine | Lloyds Register of Shipping, Categories ENV1, ENV2, and ENV5 |
| Others | Pattern Approval (China) |
| **Communication** | PROFIBUS PA<br>(IEC 61158 CPF3 CP3/2)<br>Bus physical layer: IEC 61158-2 MBP-(IS)<br>Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B<br>FISCO field device |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also CLS300 pressure/temperature curves.
2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
3) Pressure rating of process seal is temperature dependent. See also CLS300 pressure/temperature curves.
4) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

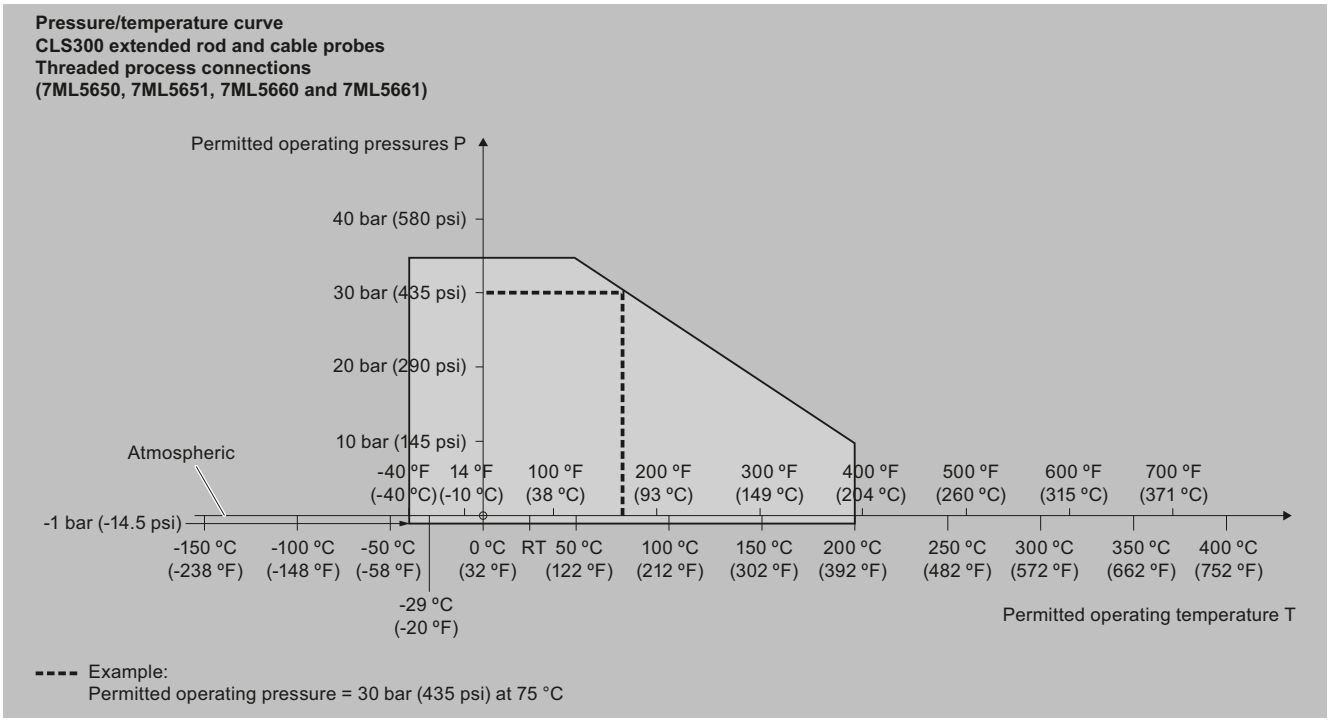
| Design: Probe | | | |
|---|---|---|---|
| | **Rod version** | **High Temperature version** | **Cable version** |
| Length | Min. 250 mm (9.8 inch),<br>max. 1 000 mm (40 inch) | Min. 250 mm (9.8 inch),<br>max. 1 000 mm (40 inch) | Min. 1 000 mm (40 inch),<br>max. 25 000 mm (984 inch) |
| Sensor wetted parts | PFA (no insulation on active probe), 316L stainless steel, PEEK isolators | Ceramic ($ZrO_2$[1]) isolators (no insulation on active probe), 316L stainless steel | 316 stainless steel, optional PFA, PEEK isolators |
| O-ring seal material | FKM (optional FFKM)[2] | Graphite[2] | FKM (optional FFKM)[2] |
| Thermal isolator | Optional | Standard | Optional |
| Extension | User selectable length | User selectable length | User selectable cable length |

1) Zirconium Oxide
2) For caustic materials, consult a local sales person for alternative O-rings. For more information, please visit http://www.automation.siemens.com/aspa_app.

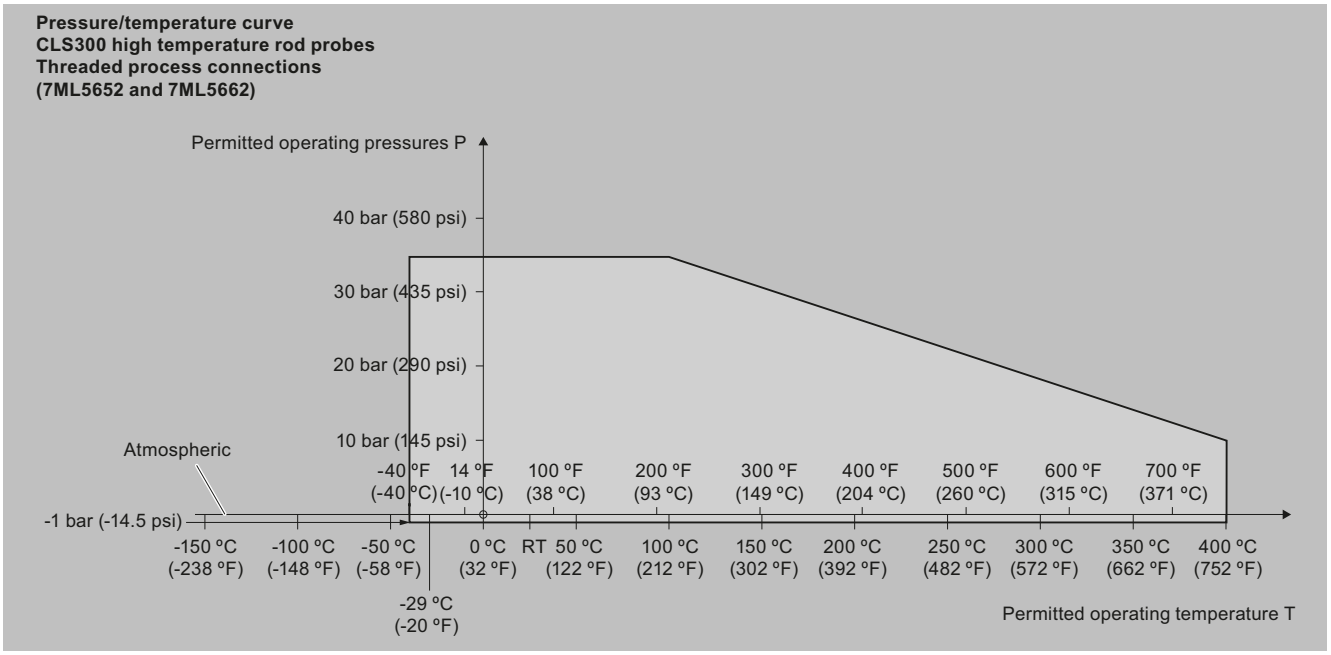
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## Characteristic curves




Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)



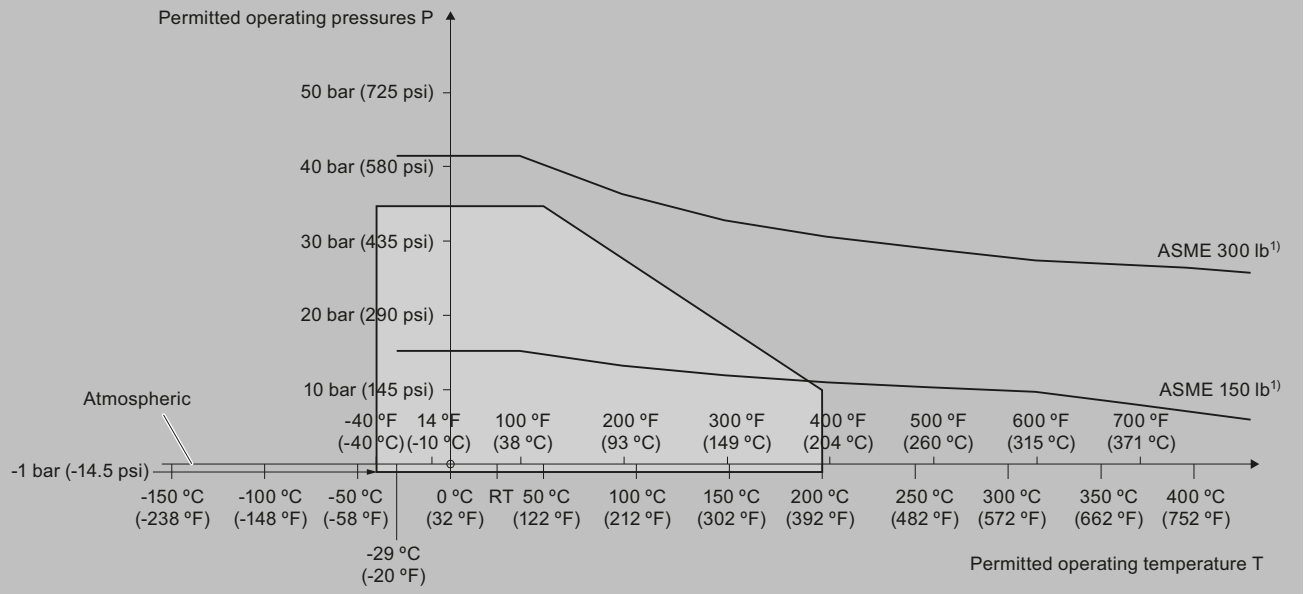

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Characteristic curves (continued)

**Pressure/temperature curve**
**CLS300 extended rod and cable probes**
**ASME flanged process connections**
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**



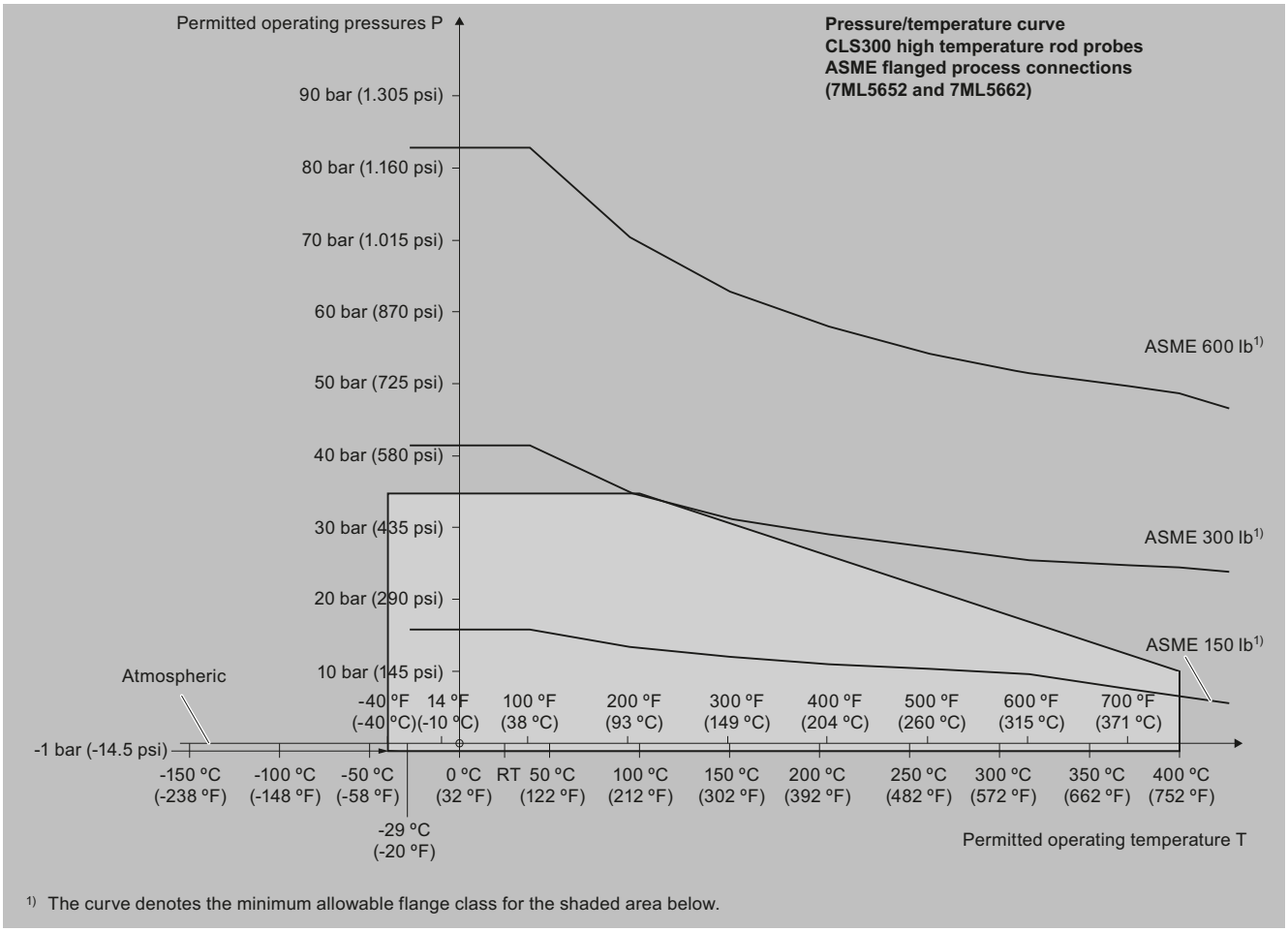

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

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## Characteristic curves (continued)



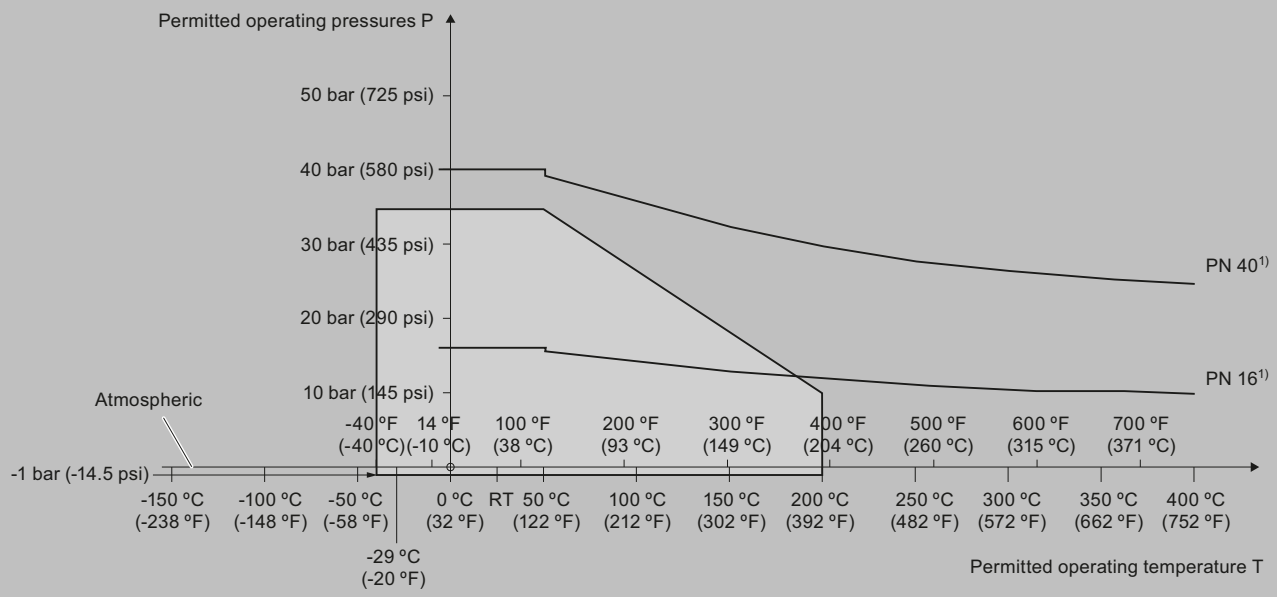

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Characteristic curves (continued)

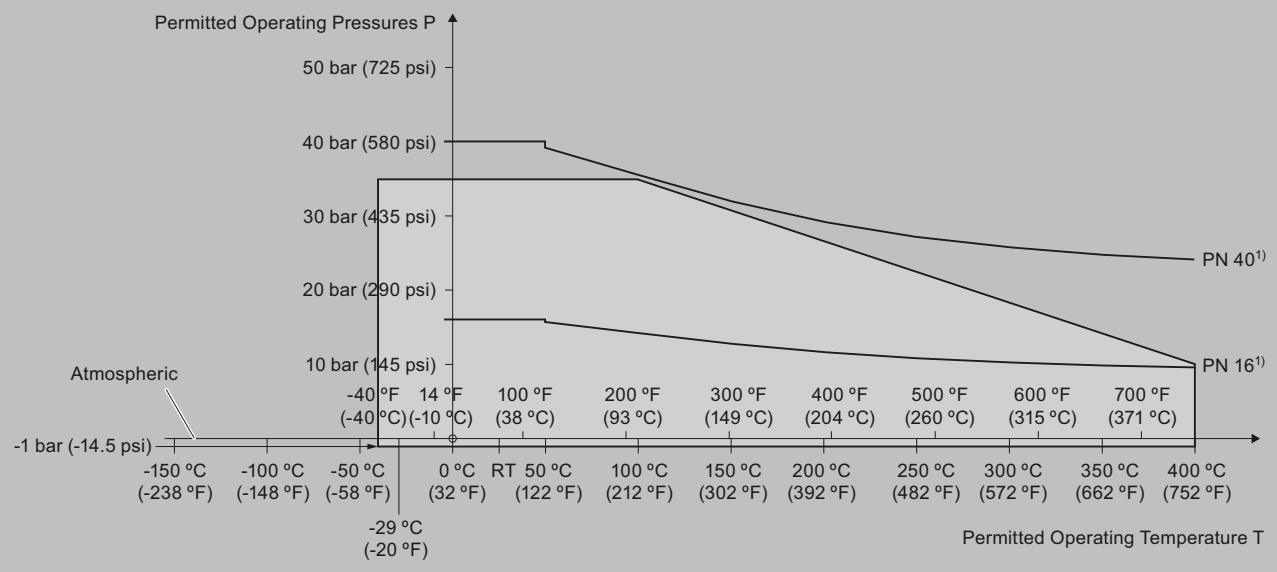
**Pressure/temperature curve**
**CLS300 extended rod and cable probes**
**EN flanged process connections**
**(7ML5650, 7ML5651, 7ML5660 and 7ML5661)**




1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

**Pressure/Temperature Curve**
**CLS300 High Temperature Rod Probes**
**EN Flanged Process Connections (7ML5652 and 7ML5662)**



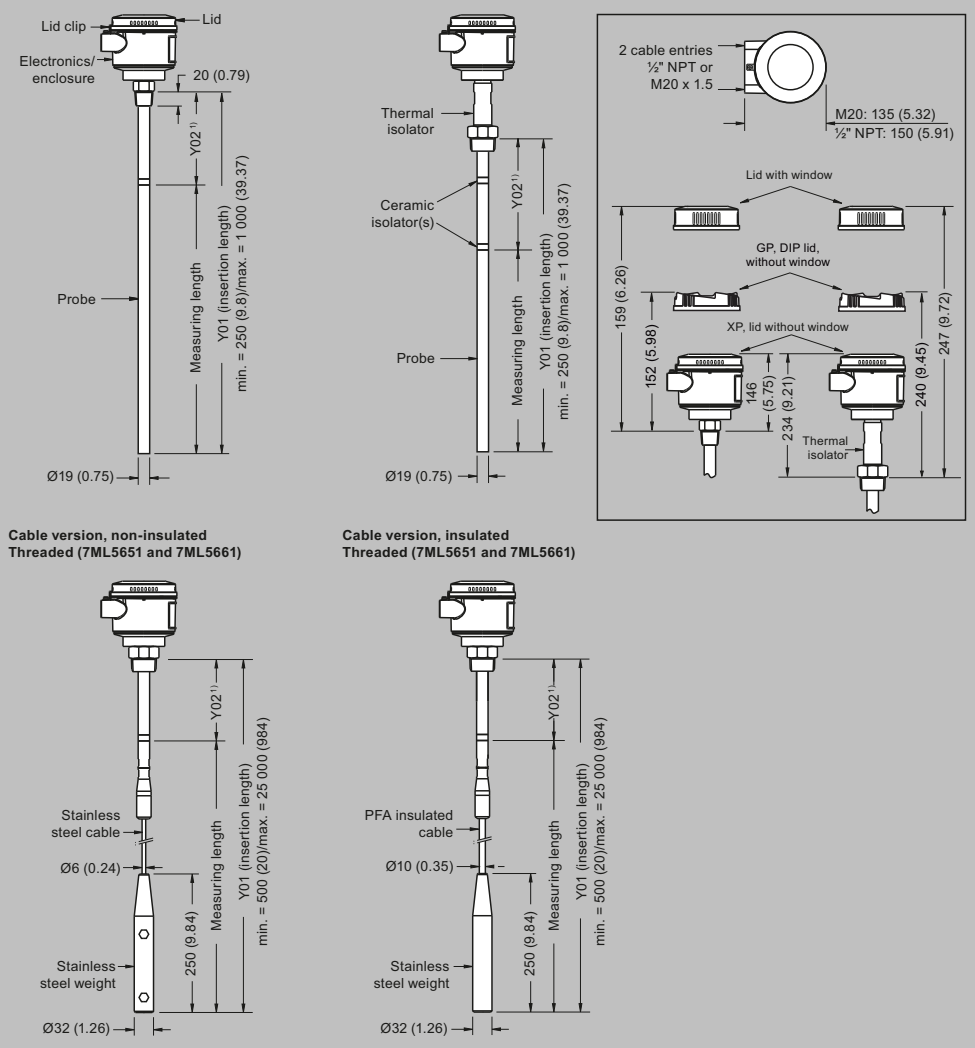

1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 process pressure/temperature derating curves (7ML5652 and 7ML5662)

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## Dimensional drawings




**Note:**

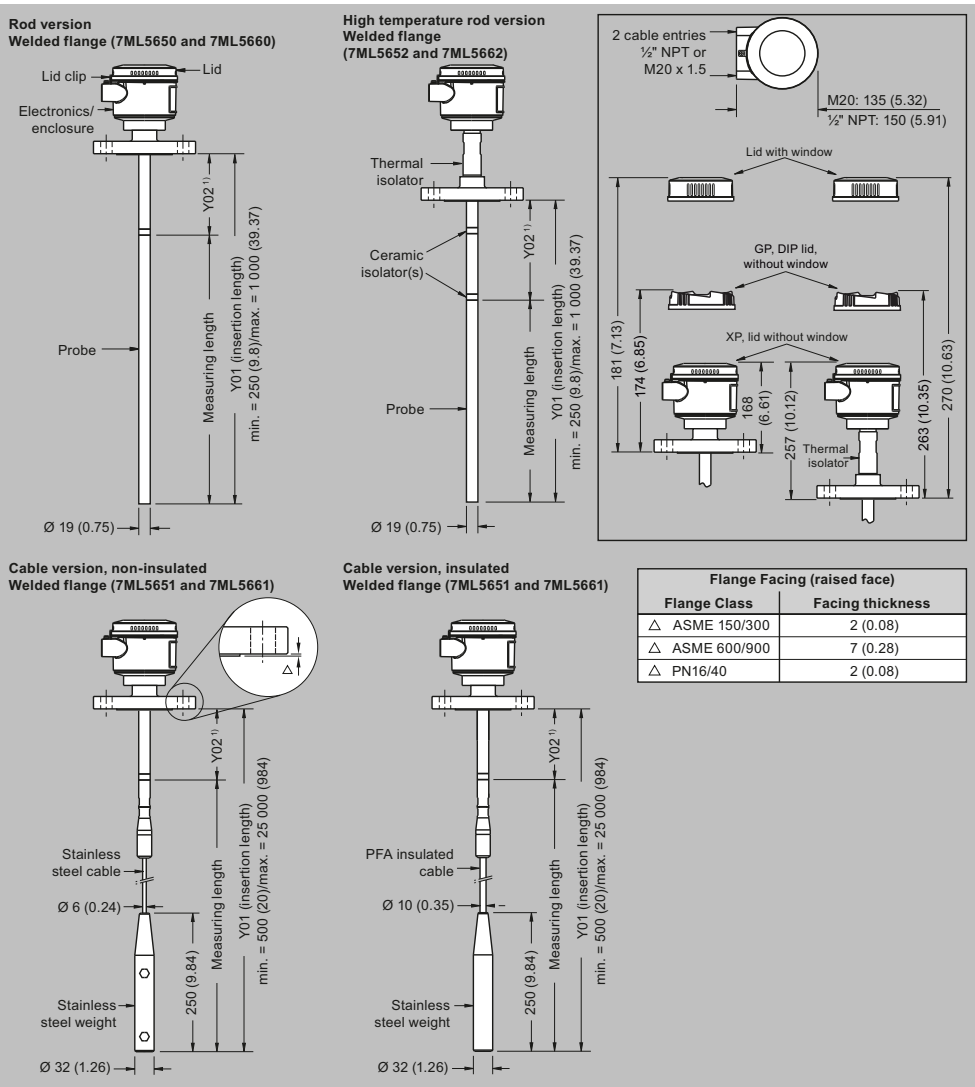
1) Extended Active Shield (Y02): standard length 125 (4.92). Optional active shield lengths: 250 (9.84) or 400 (15.75).

Pointek CLS300 threaded process connections, dimensions in mm (inch)

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## Dimensional drawings (continued)




| Flange Facing (raised face) | |
|---|---|
| **Flange Class** | **Facing thickness** |
| △ ASME 150/300 | 2 (0.08) |
| △ ASME 600/900 | 7 (0.28) |
| △ PN16/40 | 2 (0.08) |

**Note:**

[1] Extended Active Shield (Y02): standard length 105 (4.13). Optional active shield lengths: 230 (9.06) or 380 (14.96).
Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

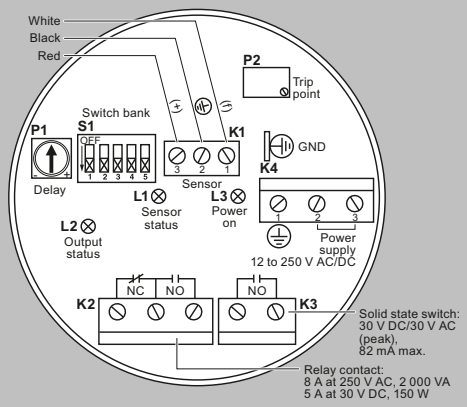
Pointek CLS300 flanged process connections, dimensions in mm (inch)

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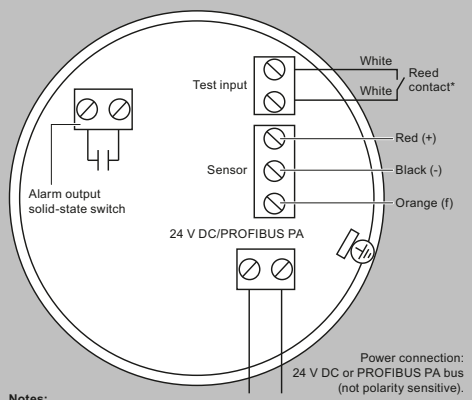
## Circuit diagrams

**Wiring: Pointek CLS300 standard**




**Notes:**
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

**Wiring: Pointek CLS300 digital**




**Notes:**
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.




Pointek CLS300 connections

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## Overview



SITRANS LVL100 is a compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

## Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Available starting at 1/2" threaded process connections
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

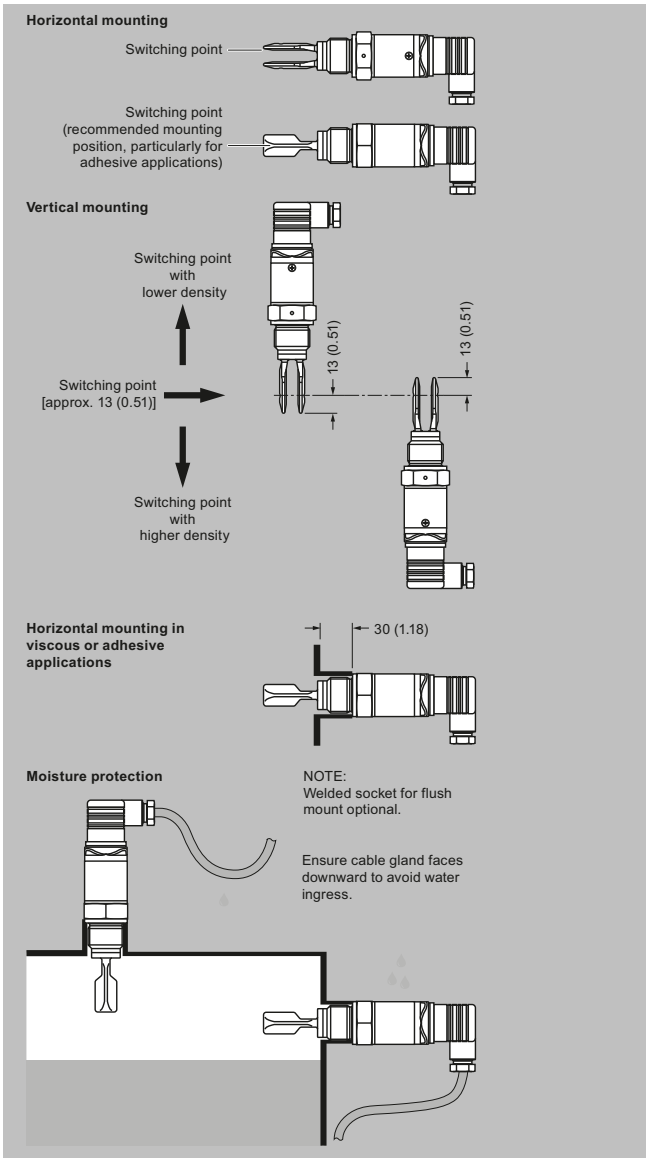
## Application

SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used for material detection with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

- Key Applications: for use in liquids and slurries, for level measurement, overfill, and dry run protection

## Configuration




SITRANS LVL100 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LVL100 Vibrating point level switch<br>Detects level and material in liquids and slurries. Compact, with 40 mm (1.6 inch) insertion. | Article No.<br>7ML5745- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA | | 1 | | | | | | | | | |
| CE, UKCA, Marine Approvals (ABS, CCS, DNV-GL, LR, RINA)[5] | | 2 | | | | | | | | | |
| CE, UKCA, Overfill Protection (WHG)[1] | | 3 | | | | | | | | | |
| Canada/US for Ordinary Locations/General Purpose (Non-Ex), CE, UKCA[7] | | 4 | | | | | | | | | |
| **Version/Process temperature** | | | | | | | | | | | |
| Standard -40 ... +100 °C (-40 ... +212 °F)[2] | | | A | | | | | | | | |
| Extended -40 ... +150 °C (-40 ... +302 °F)[2][6] | | | B | | | | | | | | |
| Hygienic applications -40 ... +150 °C (-40 ... +302 °F)[3] | | | C | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Thread G¾" A PN 64/316L | | | | A | 0 | | | | | | |
| Thread G¾" A PN 64/316L Ra < 0.8 µm | | | | A | 1 | | | | | | |
| Thread ¾" NPT PN 64/316L | | | | A | 2 | | | | | | |
| Thread ¾" NPT PN 64/316L Ra < 0.8 µm | | | | A | 3 | | | | | | |
| Thread G1" A PN 64/316L | | | | A | 4 | | | | | | |
| Thread G1" A PN 64/316L Ra < 0.8 µm | | | | A | 5 | | | | | | |
| Thread 1" NPT PN 64/316L | | | | A | 6 | | | | | | |
| Thread 1" NPT PN 64/316L Ra < 0.8 µm | | | | A | 7 | | | | | | |
| Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 µm | | | | A | 8 | | | | | | |
| Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 µm | | | | B | 0 | | | | | | |
| Tri-Clamp 2" PN 16 DIN 32676/316L Ra < 0.8 µm | | | | B | 1 | | | | | | |
| Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.8 µm | | | | B | 2 | | | | | | |
| Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.8 µm | | | | B | 3 | | | | | | |
| Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.8 µm | | | | B | 4 | | | | | | |
| SMS DN 38 PN 6 316L Ra < 0.8 µm | | | | B | 5 | | | | | | |
| Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 µm | | | | B | 6 | | | | | | |
| Thread G½" (DIN 3852-A) PN 64/316L | | | | C | 0 | | | | | | |
| Thread G½" (DIN 3852-A) PN 64/316L Ra < 0.8 µm | | | | C | 1 | | | | | | |
| Thread ½" NPT (ASME B1.20.1) PN 64/316L | | | | C | 2 | | | | | | |
| Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 µm | | | | C | 3 | | | | | | |
| Thread R¾" PN 64, EN 10226-1/316L | | | | D | 0 | | | | | | |
| R1 Thread R1 PN 64, EN 10226-1/316L | | | | D | 1 | | | | | | |
| RF Thread R1 PN 64, EN 10226-1/316L (Ra < 0.8 µm) | | | | D | 2 | | | | | | |
| **Electronics** | | | | | | | | | | | |
| Contactless electronic switch 20 ... 250 V AC/DC[4] | | | | | | 1 | | | | | |
| Transistor output PNP 10 ... 35 V DC | | | | | | 2 | | | | | |
| I/O link 18 ... 30 V DC | | | | | | 3 | | | | | |
| **Housing** | | | | | | | | | | | |
| 316L | | | | | | | | 1 | | | |
| **Electrical connection/Protection** | | | | | | | | | | | |
| M12 x 1/IP67 | | | | | | | | | A | | |
| According to ISO4400 including plug/IP65 | | | | | | | | | B | | |
| According to DIN 43650 incl. plug with QuickOn connection/IP65 | | | | | | | | | C | | |
| M12 x 1 incl. 5 m cable/IP68 (0.2 bar) | | | | | | | | | D | | |

1) Available only with Electronics option 2.
2) Available only with Process connection options A0, A2, A4, A6, C0, C2, D0, and D1.
3) Available only with Process connection options A1, A3, A5, and A7 ... B6, C1, C3, and D2.
4) Available only with Electrical connection/Protection options B and C.
5) Available only with Process temperature options A and B.
6) Available only with Marine approval options DNV and GL.
7) Available only with Electrical connection/Protection option B.

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## Selection and ordering data (continued)

| Selection and ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Cleaning including certificate (oil, grease and silicone free) | **W01** |
| Identification Label, foil laser marking | **Y16** |
| Acceptance test Certificate 2.2 for material EN 10204 | **C15** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204) | **C25** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Spare Parts** | |
| ***LVL100 Threaded Welded Socket*** | |
| G¾" A/316L with FKM Seal | **7ML1930-1EE** |
| G1" A/316L with FKM Seal | **7ML1930-1EF** |
| M27 x 1.5/316L with FKM Seal | **7ML1930-1EG** |
| G¾" A/316L with EPDM Seal | **7ML1930-1EH** |
| G1" A/316L with EPDM Seal | **7ML1930-1EJ** |
| M27 x 1.5/316L with EPDM Seal | **7ML1930-1EK** |

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## Technical specifications

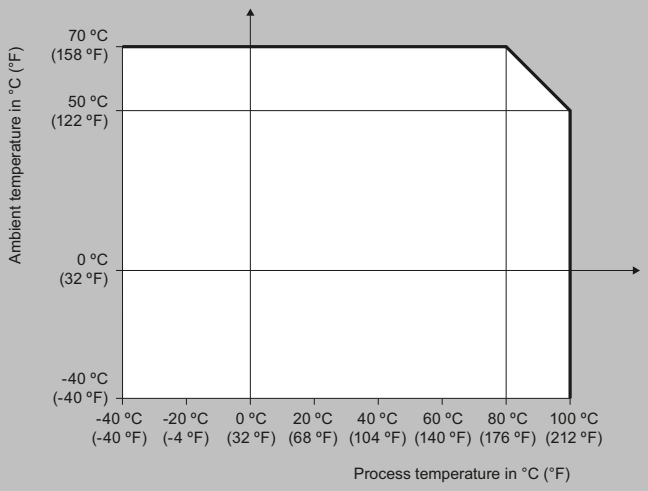
| SITRANS LVL100 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Vibrating point level switch |
| **Input** | |
| Measured variable | High and low and demand |
| **Output** | |
| Output options | • Contactless electronic switch<br>• Transistor output PNP |
| **Measuring accuracy** | |
| Hysteresis | Approx. 2 mm (0.08 inch) with vertical installation |
| Switching delay | Approx. 500 ms (on/off) |
| Frequency | Approx. 1 100 Hz |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +70 °C (-40 ... +158 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | III |
| • Pollution degree | 2 |
| Medium conditions | |
| • Temperature | |
| - Standard | -40 ... +100 °C (-40 ... +212 °F) |
| - High temperature option | -40 ... +150 °C (-40 ... +302 °F) |
| • Pressure (vessel) | -1 ... 64 bar g (-14.5 ... 928 psi g) |
| • Density | 0.7 ... 2.5 g/cm³<br>(0.025 ... 0.09 lb/in³) |
| **Design** | |
| Material | |
| • Enclosure | 316L and Plastic PEI |
| • Tuning fork | 316L (1.4404 or 1.4435) |
| • Process connection (threaded) | 316L (1.4404 or 1.4435) |
| • Process seal | Klingersil C-4400 |
| Process connection | |
| • Pipe thread, cylindrical (ISO 228 T1) | G ½" A, G ¾" A, or G 1" A |
| • Pipe thread, tapered | ½" NPT, ¾" NPT, or 1" NPT |
| • Hygienic fittings | Bolting DN 40 PN 40<br>Tri-clamp 1", 1½", 2" PN 10 |
| Degree of protection | IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector) |
| Conduit entry | 1 x M12 [IP66/IP67 or IP68 (0.2 bar)] |
| Weight (housing) | 250 g (9 oz) |
| **Power supply** | |
| Supply voltage | 20 ... 253 V AC, 50/60 Hz<br>20 ... 253 V DC |
| Power consumption | Max. 0.5 W |
| **Certificates and approvals** | • Overfill protection (WHG)<br>• Marine approvals (ABS, CCS, DNV-GL, LR, RINA) |

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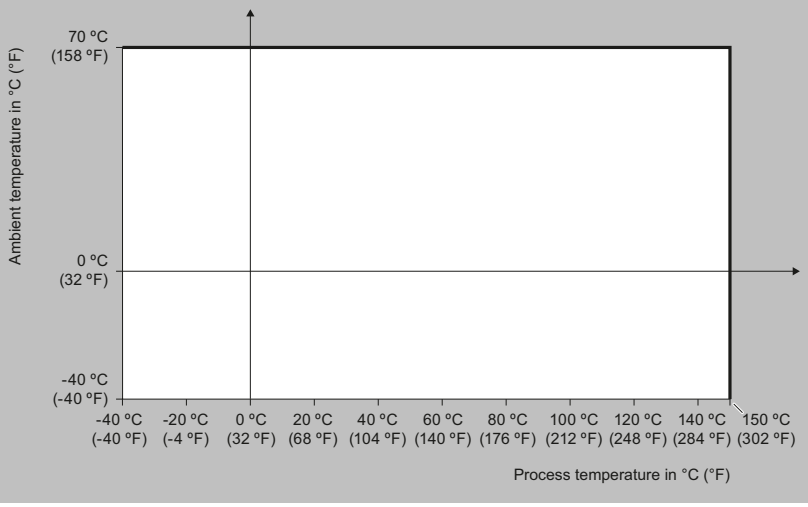


## Characteristic curves

**Ambient temperature to process temperature dependency (standard version)**




**Ambient temperature to process temperature dependency (high temperature version)**

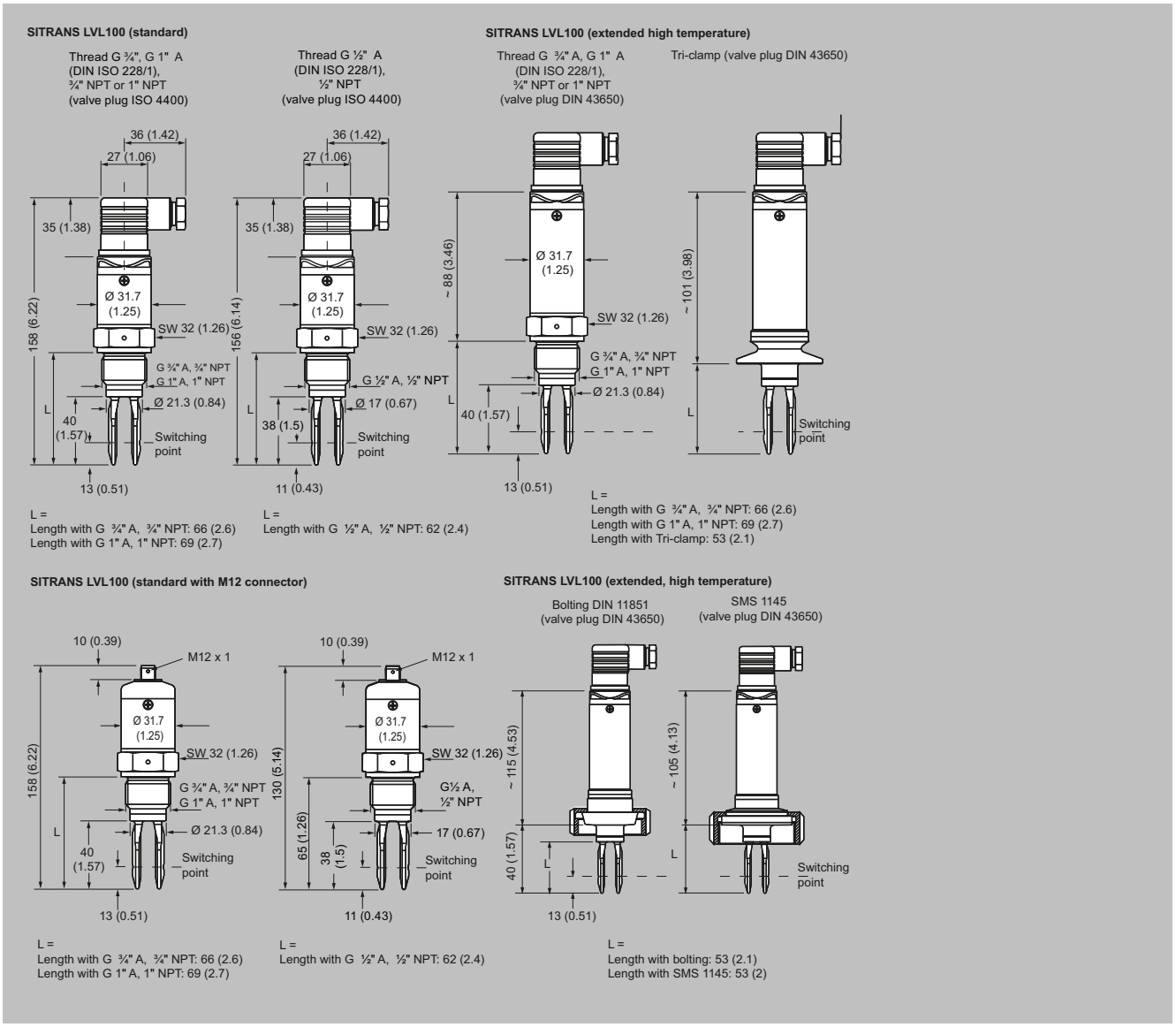



SITRANS LVL100 ambient temperature/process temperature derating curves

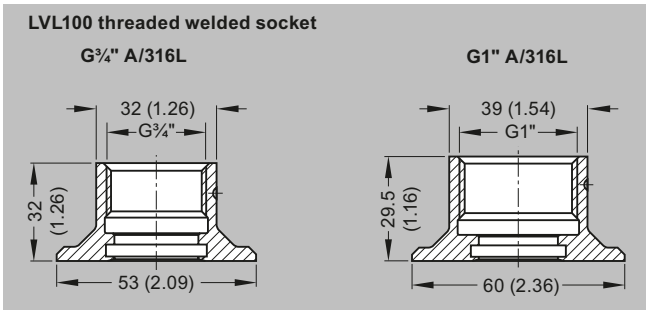
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## Dimensional drawings




SITRANS LVL100, dimensions in mm (inch)

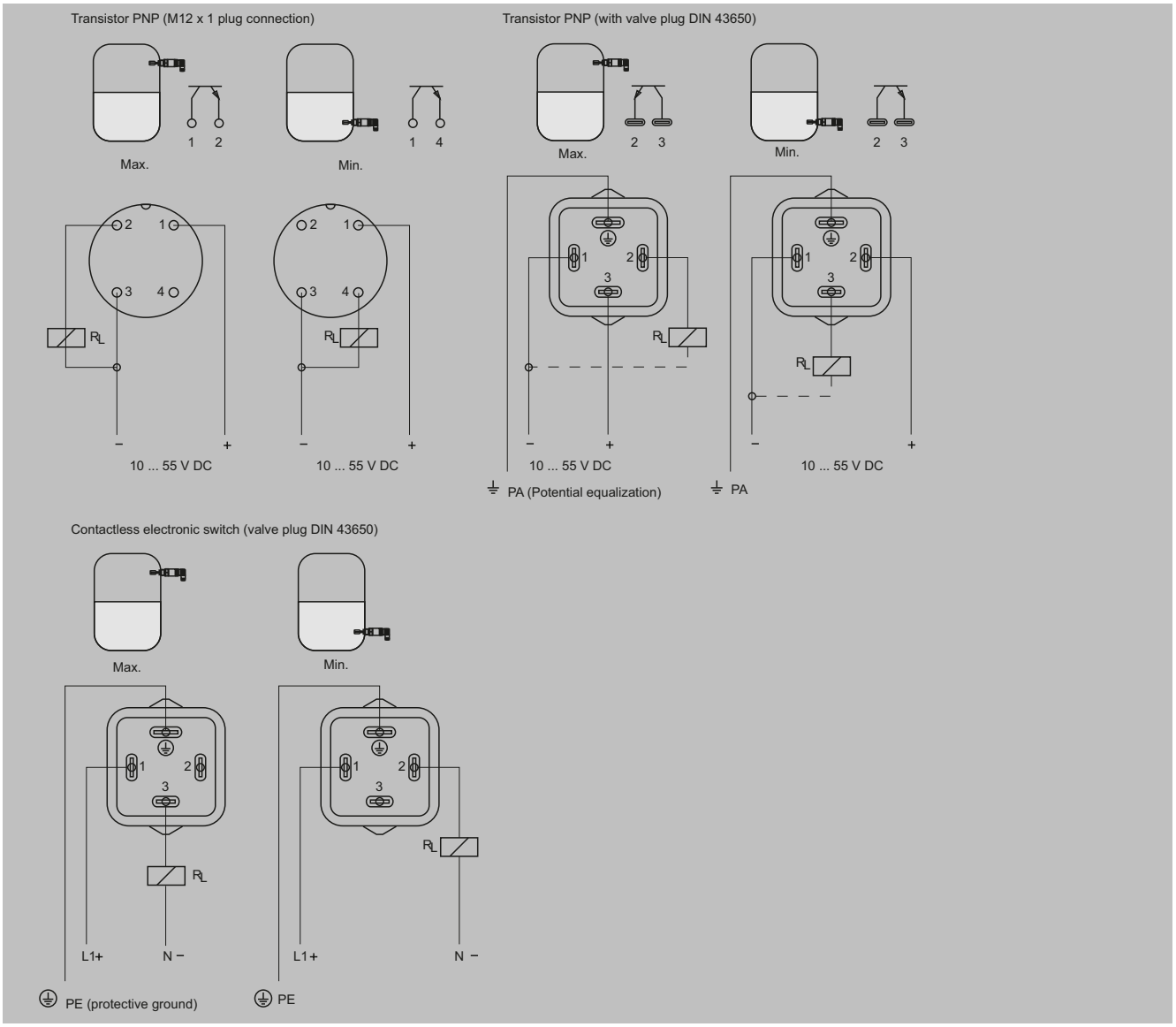



SITRANS LVL100 welded socket, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LVL100 connections

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## Overview



SITRANS LVL200 is a standard vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 applications.

## Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Hygienic process connections
- Suitable for API 2350
- Optional remote test signal conditioner

## Application

SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57 inch), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of > 0.5 g/cm³ (0.018 lb/in³). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

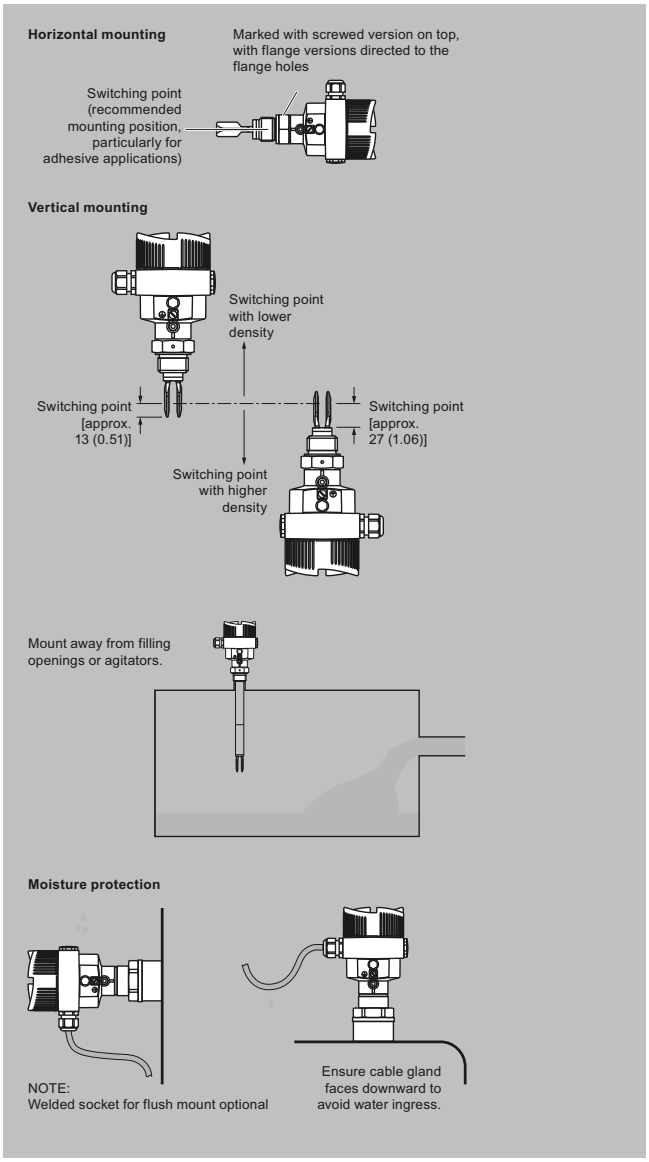
SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

The optional signal conditioner provides a remote test feature to ensure continuous product reliability.

- Key Applications: for use in liquids and slurries, for level measurement, overfill, and dry run protection

## Configuration




SITRANS LVL200 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 | Ord. Code<br>● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Electronics** | | | | | | | | | | | | | | |
| Contactless electronic switch 20 ... 250 V AC/DC[1)9)24)] | | 1 | | | | | | | | | | | | |
| Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC[24)] | | 2 | | | | | | | | | | | | |
| NAMUR signal[9)] | | 4 | | | | | | | | | | | | |
| Transistor (NPN/PNP) 10 ... 55 V DC[1)25)] | | 5 | | | | | | | | | | | | |
| Two-wire (8/16 mA) 12 ... 36 V DC[27)] | | 6 | | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | | | | |
| CE | | | A | | | | | | | | | | | |
| Overfill protection (WHG)[9)] | | | B | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6[6)] | | | W | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG[6)9)] | | | C | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6 + WHG[5)15)] | | | D | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + shipping approvals[6)16)] | | | E | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6 + shipping approvals[5)15)] | | | F | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + ATEX II ½D IP6X T[6)7)17)] | | | G | | | | | | | | | | | |
| IECEx Ex ia IIC T6[6)18)] | | | H | | | | | | | | | | | |
| Shipping approvals[16)] | | | K | | | | | | | | | | | |
| ATEX II 3G Ex nA II T5 ... T1 X[14)19)] | | | L | | | | | | | | | | | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[6)20)] | | | N | | | | | | | | | | | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[2)5)10)] | | | P | | | | | | | | | | | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D, CE[21)] | | | Q | | | | | | | | | | | |
| IECEx d IIC T6 ... T2 Ga/Gb[5)15)] | | | R | | | | | | | | | | | |
| CSA (XP) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G[5)15)] | | | S | | | | | | | | | | | |
| CSA (NI) Class I, II, III, Div. 2, Groups A, B, C, D, E, F, G, CE[22)] | | | T | | | | | | | | | | | |
| BR-Ex d IIC T6 ... T2[5)23)] | | | U | | | | | | | | | | | |
| CSA (IS) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G[6)9)] | | | V | | | | | | | | | | | |
| ATEX II ½D, 2D ExtD A20/21, A21 IP6 T...[6)19)] | | | X | | | | | | | | | | | |
| GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG[9)26)] | | | Z | | | | | | | | | J | 1 | A |
| GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + WHG[5)15)28)] | | | Z | | | | | | | | | J | 1 | B |
| GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + Ship approval[5)15)28)] | | | Z | | | | | | | | | J | 1 | C |
| GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + II ½D, 2D ExtD[7)17)28)] | | | Z | | | | | | | | | J | 1 | D |
| GOST-R/EAC + ATEX II ½D, 2D ExtD A20/21, A21 IP6 T...[17)26)] | | | Z | | | | | | | | | J | 1 | E |
| **Process connection** | | | | | | | | | | | | | | |
| Thread G¾" A, PN 64/316L | | | | A | 0 | 0 | | | | | | | | |
| Thread G¾" A, PN 64/316L Ra < 0.8 µm | | | | A | 0 | 1 | | | | | | | | |
| Thread ¾" NPT, PN 64/316L | | | | A | 0 | 2 | | | | | | | | |
| Thread ¾" NPT, PN 64/316L Ra < 0.8 µm | | | | A | 0 | 3 | | | | | | | | |
| Thread ¾" NPT, PN 64/Alloy 400 (2.4360) | | | | A | 0 | 4 | | | | | | | | |
| Thread G¾" A, PN 64/Alloy C22 (2.4602) | | | | A | 0 | 5 | | | | | | | | |
| Thread ¾" NPT, PN 64/Alloy C22 (2.4602) | | | | A | 0 | 6 | | | | | | | | |
| Thread G1" A, PN 64/316L | | | | A | 0 | 7 | | | | | | | | |
| Thread G1" A, PN 64/316L ECTFE coated MB1982[4)] | | | | A | 0 | 8 | | | | | | | | |
| Thread G1" A, PN 64/316L PFA coated[4)] | | | | A | 1 | 0 | | | | | | | | |
| Thread G1" A, PN 64/Alloy 400 (2.4360) | | | | A | 1 | 1 | | | | | | | | |
| Thread G1" A, PN 64/316L Ra < 0.8 µm | | | | A | 1 | 2 | | | | | | | | |
| Thread 1" NPT, PN 64/316L | | | | A | 1 | 3 | | | | | | | | |
| Thread 1" NPT, PN 64/316L ECTFE coated MB1982[4)] | | | | A | 1 | 4 | | | | | | | | |
| Thread 1" NPT, PN 64/316L PFA-coated[4)] | | | | A | 1 | 5 | | | | | | | | |
| Thread 1" NPT, PN 64/Alloy 400 (2.4360) | | | | A | 1 | 6 | | | | | | | | |
| Thread 1" NPT, PN 64/316L Ra < 0.8 µm | | | | A | 1 | 7 | | | | | | | | |
| Thread G1" A, PN 64/Alloy C22 (2.4602) | | | | A | 1 | 8 | | | | | | | | |
| Thread G1" A, PN 64/Alloy C22 (2.4602) Ra < 0.3 µm | | | | A | 2 | 0 | | | | | | | | |
| Thread G1½" A, PN 64/316L | | | | A | 2 | 1 | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| Thread G1½" A, PN 64/316L Ra < 0.8 µm | A 2 2 | |
| Thread G1½" A, PN 64/Alloy C22 (2.4602) | A 2 3 | |
| Thread 1" NPT, PN 64/Alloy C22 (2.4602) | A 2 4 | |
| Thread 1½" NPT, PN 64/316L | A 2 5 | |
| Thread 1½" NPT, PN 64/316L Ra < 0.8 µm | A 2 6 | |
| Thread 1½" NPT, PN 64/Alloy C22 (2.4602) | A 2 7 | |
| Thread G2" A, PN 64/316L | A 2 8 | |
| Thread M27 x 1.5, PN 64/316L | A 3 0 | |
| Conus DN 25, PN 40/316L Ra < 0.3 µm | A 3 1 | |
| Conus DN 25, PN 40/316L Ra < 0.8 µm | A 3 2 | |
| Conus DN 25, PN 40/ECTFE (ZB3033)[4] | A 3 3 | |
| Conus M52, PN 40/316L | A 3 4 | |
| Conus M52, PN 40/316L Ra < 0.3 µm | A 3 5 | |
| Conus M52, PN 40/316L Ra < 0.8 µm | A 3 6 | |
| Tri-Clamp 1", PN 16/316L Ra < 0.3 µm | A 3 7 | |
| Tri-Clamp 1", PN 16/Alloy C22 (2.4602) | A 3 8 | |
| Tri-Clamp 1", PN 16/316L Ra < 0.8 µm | A 4 0 | |
| Tri-Clamp 1½", PN 16/316L Ra < 0.3 µm | A 4 1 | |
| Tri-Clamp 1½", PN 16/Alloy C22 (2.4602) | A 4 2 | |
| Tri-Clamp 1½", PN 16/316L Ra < 0.8 µm | A 4 3 | |
| Tri-Clamp 2", PN 16/316L Ra < 0.3 µm | A 4 4 | |
| Tri-Clamp 2", PN 16/Alloy C22 (2.4602) | A 4 5 | |
| Tri-Clamp 2", PN 16/316L Ra < 0.8 µm | A 4 6 | |
| Tri-Clamp 2½", PN 10/316L Ra < 0.3 µm | A 4 7 | |
| Tri-Clamp 2½", PN 10/316L Ra < 0.8 µm | A 4 8 | |
| Tri-Clamp 3", PN 10/316L Ra < 0.3 µm | A 5 0 | |
| Tri-Clamp 3", PN 10/316L Ra < 0.8 µm | A 5 1 | |
| Bolting DN 32, PN 40 DIN11851/316L Ra < 0.3 µm | A 5 2 | |
| Bolting DN 32, PN 40 DIN11851/316L Ra < 0.8 µm | A 5 3 | |
| Bolting DN 25, PN 40 DIN11851/316L Ra < 0.3 µm | A 5 4 | |
| Bolting DN 25, PN 40 DIN11851/316L Ra < 0.8 µm | A 5 5 | |
| Bolting DN 40, PN 40 DIN11851/316L Ra < 0.3 µm | A 5 6 | |
| Bolting DN 40, PN 40 DIN11851/316L Ra < 0.8 µm | A 5 7 | |
| Bolting DN 40, PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 | A 5 8 | |
| Bolting DN 50, PN 25 DIN11851/316L Ra < 0.3 µm | A 6 0 | |
| Bolting DN 50, PN 25 DIN11851/316L Ra < 0.8 µm | A 6 1 | |
| Bolting DN 50, PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 | A 6 2 | |
| Hygienic w. compr. nut F40, PN 25/316L | A 6 3 | |
| Hygienic w. compr. nut F40, PN 25/316L Ra < 0.3 µm | A 6 4 | |
| Hygienic w. compr. nut F40, PN 25/316L Ra < 0.8 µm | A 6 5 | |
| Varivent N50-40/316L Ra < 0.3 µm | A 6 6 | |
| Varivent N50-40/316L Ra < 0.8 µm | A 6 7 | |
| Varivent N125/100/316L Ra < 0.8 µm | A 6 8 | |
| DRD flange, PN 40/316L ZB3007 | A 7 0 | |
| SMS DN 38/316L Ra < 0.8 µm[4] | A 7 1 | |
| SMS DN 51, PN 6/316L Ra < 0.8 µm[4] | A 7 2 | |
| Swagelok VCR screwing ZG2579, PN 64/316L | A 7 3 | |
| Neumo biocontrol size 25, PN 16/316L Ra < 0.8 µm | A 7 4 | |
| Neumo biocontrol size 50, PN 16/316L Ra < 0.8 µm[4] | A 7 5 | |
| Neumo biocontrol size 65, PN 16/316L Ra < 0.8 µm | A 7 6 | |
| Neumo biocontrol size 80, PN 16/316L Ra < 0.8 µm | A 7 7 | |
| SÜDMO DN 50, PN 10/316L Ra < 0.8 µm | A 7 8 | |
| Small flange DN 25, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm | A 8 0 | |
| Small flange DN 40, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm | A 8 1 | |
| Ingold connection, PN16/316L a < 0.8 µm (acc. to MB2523) | A 8 2 | |
| Ingold connection, PN 16/Alloy C22 (2.4602) Ra < 0.8 µm (acc. to MB6017) | A 8 3 | |
| Terminal DN 33.7 PN 40 DIN 11864-3-A-/316L BN2 Ra < 0.8 µm[4] | A 8 4 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| Hygienic fl. DN 50 PN 16 DIN 11864-2-A-/316L Ra < 0.8 µm | A 8 5 | |
| Flange DN 25, PN 6 Form C, DIN 2501/316L | A 8 6 | |
| Flange DN 25, PN 6 Form C, DIN 2501/PFA[4)] | A 8 7 | |
| Flange DN 25, PN 40 Form C, DIN 2501/316L | A 8 8 | |
| Flange DN 25, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | B 0 0 | |
| Flange DN 25, PN 40 Form C, DIN 2501/ECTFE[4)] | B 0 1 | |
| Flange DN 25, PN 40 Form C, DIN 2501/PFA[4)] | B 0 2 | |
| Flange DN 25, PN 40 Form C, DIN 2501/Enamelled | B 0 3 | |
| Flange DN 25, PN 40 Form D, DIN 2501/316L | B 0 4 | |
| Flange DN 25, PN 40 Form F, DIN 2501/316L | B 0 5 | |
| Flange DN 25, PN 40 Form N, DIN 2501/316L | B 0 6 | |
| Flange DN 25, PN 40 Form N, DIN 2501/Alloy C22 (2.4602) | B 0 7 | |
| Flange DN 25, PN 40 Form N, DIN 2501/Alloy 400 (2.4360) solid | B 0 8 | |
| Flange DN 25, PN 40 V13, DIN 2501/316L | B 1 0 | |
| Flange DN 32, PN 40 Form C, DIN 2501/316L | B 1 1 | |
| Flange DN 32, PN 40 Form C, DIN 2501/ECTFE[4)] | B 1 2 | |
| Flange DN 40, PN 6 Form C, DIN 2501/316L | B 1 3 | |
| Flange DN 40, PN 6 Form C, DIN 2501/ECTFE[4)] | B 1 4 | |
| Flange DN 40, PN 40 Form C, DIN 2501/316L | B 1 5 | |
| Flange DN 40, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | B 1 6 | |
| Flange DN 40, PN 40 Form C, DIN 2501/ECTFE[4)] | B 1 7 | |
| Flange DN 40, PN 40 Form C, DIN 2501/PFA[4)] | B 1 8 | |
| Flange DN 40, PN 40 Form C, DIN 2501/Enamelled[3)] | B 2 0 | |
| Flange DN 40, PN 40 Form F, DIN 2501/316L | B 2 1 | |
| Flange DN 40, PN 40 Form N, DIN 2501/316L | B 2 2 | |
| Flange DN 40, PN 40 Form E, DIN 2501/316L | B 2 3 | |
| Flange DN 40, PN 40 V13, DIN 2501/316L | B 2 4 | |
| Flange DN 50, PN 40 Form C, DIN 2501/316L | B 2 5 | |
| Flange DN 50, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | B 2 6 | |
| Flange DN 50, PN 40 Form C, DIN 2501/ECTFE[4)] | B 2 7 | |
| Flange DN 50, PN 40 Form C, DIN 2501/ECTFE (ZB3108)[4)] | B 2 8 | |
| Flange DN 50, PN 40 Form C, DIN 2501/PFA[4)] | B 3 0 | |
| Flange DN 50, PN 40 Form D, DIN 2501/316L | B 3 1 | |
| Flange DN 50, PN 40 Form D, DIN 2501/Alloy C22 (2.4602) | B 3 2 | |
| Flange DN 50, PN 40 Form F, DIN 2501/316L | B 3 3 | |
| Flange DN 50, PN 40 Form N, DIN 2501/316L | B 3 4 | |
| Flange DN 50, PN 40 Form N, DIN 2501/Alloy C22 (2.4602) | B 3 5 | |
| Flange DN 50, PN 40 Form E, DIN 2501/316L | B 3 6 | |
| Flange DN 50, PN 40 V13, DIN 2501/316L | B 3 7 | |
| Flange DN 50, PN 40 R13, DIN 2501/316L | B 3 8 | |
| Flange DN 50, PN 64 Form F, DIN 2501/316L | B 4 0 | |
| Flange DN 50, PN 64 Form N, DIN 2501/Alloy C22 (2.4602) | B 4 1 | |
| Flange DN 50, PN 64 Form C, DIN 2501/316L | B 4 2 | |
| Flange DN 50, PN 64 Form L, DIN 2501/316L | B 4 3 | |
| Flange DN 50, PN 100 Form E, DIN 2501/316L | B 4 4 | |
| Flange DN 50, PN 100 Form L, DIN 2501/316L | B 4 5 | |
| Flange DN 65, PN 40 Form C, DIN 2501/316L | B 4 6 | |
| Flange DN 65, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | B 4 7 | |
| Flange DN 65, PN 40 Form C, DIN 2501/ECTFE[4)] | B 4 8 | |
| Flange DN 65, PN 40 Form C, DIN 2501/PFA[4)] | B 5 0 | |
| Flange DN 65, PN 40 Form F, DIN 2501/316L | B 5 1 | |
| Flange DN 65, PN 64 Form E, DIN 2501/316L | B 5 2 | |
| Flange DN 80, PN 40 Form C, DIN 2501/316L | B 5 3 | |
| Flange DN 80, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | B 5 4 | |
| Flange DN 80, PN 40 Form C, DIN 2501/ECTFE[4)] | B 5 5 | |
| Flange DN 80, PN 40 Form C, DIN 2501/PFA[4)] | B 5 6 | |
| Flange DN 80, PN 40 Form C, DIN 2501/Enamelled[3)] | B 5 7 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| Flange DN 80, PN 40 Form F, DIN 2501/316L | B 5 8 | |
| Flange DN 80, PN 40 Form N, DIN 2501/316L | B 6 0 | |
| Flange DN 100, PN 16 Form C, DIN 2501/316L | B 6 2 | |
| Flange DN 100, PN 16 Form C, DIN 2501/Alloy C22 (2.4602) | B 6 3 | |
| Flange DN 100, PN 16 Form C, DIN 2501/ECTFE[4)] | B 6 4 | |
| Flange DN 100, PN 16 Form C, DIN 2501/PFA[4)] | B 6 5 | |
| Flange DN 100, PN 16 Form C, DIN 2501/Enamelled[3)] | B 6 6 | |
| Flange DN 100, PN 16 Form D, DIN 2501/316L | B 6 7 | |
| Flange DN 100, PN 16 Form F, DIN 2501/316L | B 6 8 | |
| Flange DN 100, PN 16 Form N, DIN 2501/316L | B 7 0 | |
| Flange DN 100, PN 40 Form C, DIN 2501/316L | B 7 1 | |
| Flange DN 100, PN 40 Form C, DIN 2501/ECTFE[4)] | B 7 2 | |
| Flange DN 100, PN 40 Form C, DIN 2501/PFA[4)] | B 7 3 | |
| Flange DN 100, PN 40 Form C, DIN 2501/Enamelled[3)] | B 7 4 | |
| Flange DN 100, PN 40 Form F, DIN 2501/316L | B 7 5 | |
| Flange DN 100, PN 40 Form N, DIN 2501/316L | B 7 6 | |
| Flange DN 100, PN 40 V13, DIN 2501/316L | B 7 7 | |
| Flange DN 100, PN 64 Form E, DIN 2501/316L | B 7 8 | |
| Flange DN 100, PN 100 Form E, DIN 2501/316L | B 8 0 | |
| Flange DN 100, PN 100 Form L, DIN 2501/316L | B 8 1 | |
| Flange DN 125, PN 16 Form F, DIN 2501/316L | B 8 2 | |
| Flange DN 125, PN 40 Form C, DIN 2501/316L | B 8 3 | |
| Flange DN 125, PN 40 Form N, DIN 2512/ 316L | B 8 4 | |
| Flange DN 150, PN 16 Form C, DIN 2501/316L | B 8 5 | |
| Flange DN 150, PN 16 Form C, DIN 2501/Alloy C22 (2.4602) | B 8 6 | |
| Flange DN 150, PN 16 Form C, DIN 2501/ECTFE[4)] | B 8 7 | |
| Flange DN 150, PN 16 Form C, DIN 2501/PFA[4)] | B 8 8 | |
| Flange DN 150, PN 16 Form D, DIN 2501/316L | C 0 0 | |
| Flange DN 150, PN 40 Form C, DIN 2501/316L | C 0 1 | |
| Flange DN 150, PN 40 Form C, DIN 2501/Alloy C22 (2.4602) | C 0 2 | |
| Flange DN 150, PN 40 Form F, DIN 2501/316L | C 0 3 | |
| Flange DN 150, PN 40 Form N, DIN 2512/316L | C 0 4 | |
| Flange DN 200, PN 10 Form C, DIN 2501/ECTFE[4)] | C 0 5 | |
| Flange DN 200, PN 16 Form C, DIN 2501/316L | C 0 6 | |
| Flange DN 25, PN 40 Form B1, EN 1092-1/316L | C 0 7 | |
| Flange DN 25, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) | C 0 8 | |
| Flange DN 25, PN 40 Form B1, EN/316L/PFA[4)] | C 1 0 | |
| Flange DN 25, PN 40 Form B1, EN 1092-1/Enamelled[3)] | C 1 1 | |
| Flange DN 25, PN 40 Form B2, EN 1092-1/316L | C 1 2 | |
| Flange DN 25, PN 40 Form F, EN 1092-1/316L | C 1 3 | |
| Flange DN 25, PN 63 Form B1, EN 1092-1/316L | C 1 4 | |
| Flange DN 25, PN 100 Form B2, EN 1092-1/316L | C 1 5 | |
| Flange DN 40, PN 40 Form B1, EN/316L | C 1 6 | |
| Flange DN 40, PN 40 Form B1, EN 1092-1/PFA[4)] | C 1 7 | |
| Flange DN 40, PN 40 Form B2, EN/316L | C 1 8 | |
| Flange DN 50, PN 40 Form B1, EN/316L | C 2 0 | |
| Flange DN 50, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) | C 2 1 | |
| Flange DN 50, PN 40 Form B1, EN 1092-1/Alloy 400 (2.4360) ZB2977 | C 2 2 | |
| Flange DN 50, PN 40 Form B1, EN 1092-1/ECTFE[4)] | C 2 3 | |
| Flange DN 50, PN 40 Form B1, EN/316L/PFA[4)] | C 2 4 | |
| Flange DN 50, PN 40 Form B1, EN 1092-1/Enamelled[3)] | C 2 5 | |
| Flange DN 50, PN 40 Form C, EN 1092-1/316L | C 2 6 | |
| Flange DN 50, PN 40 Form D, EN/316L | C 2 7 | |
| Flange DN 50, PN 40 Form D, EN 1092-1/Alloy C22 (2.4602) | C 2 8 | |
| Flange DN 50, PN 40 Form B2, EN 1092-1/316L | C 3 0 | |
| Flange DN 50, PN 40 Form E, EN 1092-1/316L | C 3 1 | |
| Flange DN 80, PN 40 Form B1, EN 1092-1/316L | C 3 2 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| Flange DN 80, PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) | C 3 3 | |
| Flange DN 80, PN 40 Form B1, EN 1092-1/ECTFE[4)] | C 3 4 | |
| Flange DN 80, PN 40 Form B1, EN 1092-1/Enamelled[3)] | C 3 5 | |
| Flange DN 80, PN 40 Form B2, EN 1092-1/316L | C 3 6 | |
| Flange DN 100, PN 16 Form B1, EN 1092-1/316L | C 3 7 | |
| Flange DN 100, PN 16 Form B1, EN 1092-1/Alloy C22 (2.4602) | C 3 8 | |
| Flange DN 100, PN 16 Form B1, EN 1092-1/Enamelled[3)] | C 4 0 | |
| Flange DN 100, PN 40 Form B1, EN 1092-1/316L | C 4 1 | |
| Flange DN 100, PN 40 Form B1, EN 1092-1/Enamelled[3)] | C 4 2 | |
| Flange DN 100, PN 40 Form C, EN 1092-1/316L | C 4 3 | |
| Flange DN 100, PN 63 Form B2, EN 1092-1/316L | C 4 4 | |
| Flange DN 150, PN 16 Form B1, EN 1092-1/316L | C 4 5 | |
| Flange DN 150, PN 16 Form B1, EN 1092-1/PFA[4)] | C 4 6 | |
| Flange DN 150, PN 40 Form B1, EN 1092-1/316L | C 4 7 | |
| Flange DN 150, PN 40 Form B1, EN 1092-1/ECTFE[4)] | C 4 8 | |
| Flange DN 150, PN 40 Form B2, EN 1092-1/316L | C 5 0 | |
| Flange 1" 150 lb RF, ASME B16.5/316L | C 5 1 | |
| Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | C 5 2 | |
| Flange 1" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 5 3 | |
| Flange 1" 150 lb RF, ASME B16.5/ECTFE[4)] | C 5 4 | |
| Flange 1" 150 lb RF, ASME B16.5/PFA[4)] | C 5 5 | |
| Flange 1" 150 lb RF, ASME B16.5/Enamelled[3] | C 5 6 | |
| Flange 1" 300 lb RF, ASME B16.5/316L | C 5 7 | |
| Flange 1" 300 lb RF, ASME B16.5/ECTFE[4)] | C 5 8 | |
| Flange 1" 600 lb RF, ASME B16.5/316L | C 6 0 | |
| Flange 1½" 150 lb RF, ASME B16.5/316L | C 6 1 | |
| Flange 1½" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | C 6 2 | |
| Flange 1½" 150 lb RF, ASME B16.5/ECTFE[4)] | C 6 3 | |
| Flange 1½" 150 lb RF, ASME B16.5/PFA[4)] | C 6 4 | |
| Flange 1½" 150 lb RF, ASME B16.5 Enamelled[3)] | C 6 5 | |
| Flange 1½" 150 lb FF, ASME B16.5/ECTFE[4)] | C 6 6 | |
| Flange 1½" 300 lb RF, ASME B16.5/316L | C 6 7 | |
| Flange 1½" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 6 8 | |
| Flange 1½" 300 lb RF, ASME B16.5/ECTFE[3)] | C 7 0 | |
| Flange 1½" 600 lb RF, ASME B16.5/316L | C 7 1 | |
| Flange 2" 150 lb RF, ASME B16.5/316L | C 7 2 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | C 7 3 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 7 4 | |
| Flange 2" 150 lb RF, ASME B16.5/ECTFE[4)] | C 7 5 | |
| Flange 2" 150 lb RF, ASME B16.5/PFA[4)] | C 7 6 | |
| Flange 2" 150 lb RF, ASME B16.5/Enamelled[3)] | C 7 7 | |
| Flange 2" 150 lb FF, ASME B16.5/316L | C 7 8 | |
| Flange 2" 150 lb FF, ASME B16.5/ECTF[4)] | C 8 0 | |
| Flange 2" 150 lb SG (small groove), ASME B16.5/316L | C 8 1 | |
| Flange 2" 300 lb RF, ASME B16.5/316L | C 8 2 | |
| Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) | C 8 3 | |
| Flange 2" 300 lb RF, ASME B16.5/ECTFE[4)] | C 8 5 | |
| Flange 2" 300 lb RF, ASME B16.5/PFA[4)] | C 8 6 | |
| Flange 2" 300 lb RF, ASME B16.5 Enamelled[3)] | C 8 7 | |
| Flange 2" 300 lb RJF, ASME B16.5/316L | C 8 8 | |
| Flange 2" 300 lb ST, ASME B16.5/316L | D 0 0 | |
| Flange 2" 300 lb LG (large groove), ASME B16.5/316L | D 0 1 | |
| Flange 2" 300 lb LT, ASME B16.5/316L | D 0 2 | |
| Flange 2" 600 lb RF, ASME B16.5/316L | D 0 3 | |
| Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | D 0 4 | |
| Flange 2" 600 lb RF, ASME B16.5/ECTFE[4)] | D 0 5 | |
| Flange 2" 600 lb RJF, ASME B16.5/316L | D 0 6 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| Flange 2" 600 lb LG, ASME B16.5/316L | D 0 7 | |
| Flange 2" 900 lb RJF, ASME B16.5/316L | D 0 8 | |
| Flange 2½" 150 lb RF, ASME B16.5/316L | D 1 0 | |
| Flange 2½" 300 lb RF, ASME B16.5/316L | D 1 1 | |
| Flange 3" 150 lb RF, ASME B16.5/316L | D 1 2 | |
| Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | D 1 3 | |
| Flange 3" 150 lb RF, ASME B16.5/ECTFE[4)] | D 1 4 | |
| Flange 3" 150 lb RF, ASME B16.5/PFA[4)] | D 1 5 | |
| Flange 3" 150 lb RF, ASME B16.5/Enamelled[3)] | D 1 6 | |
| Flange 3" 150 lb FF, ASME B16.5/316L | D 1 7 | |
| Flange 3" 150 lb FF, ASME B16.5/ECTFE[4)] | D 1 8 | |
| Flange 3" 150 lb FF, ASME B16.5/PFA[4)] | D 2 0 | |
| Flange 3" 300 lb RF, ASME B16.5/316L | D 2 1 | |
| Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) | D 2 2 | |
| Flange 3" 300 lb RF, ASME B16.5/ECTFE[4)] | D 2 3 | |
| Flange 3" 300 lb RF, ASME B16.5/PFA[4)] | D 2 4 | |
| Flange 3" 300 lb RF, ASME B16.5/Enamelled[3)] | D 2 5 | |
| Flange 3" 600 lb RF, ASME B16.5/316L | D 2 6 | |
| Flange 3½" 150 lb RF, ASME B16.5/316L | D 2 7 | |
| Flange 3½" 150 lb RF, ASME B16.5/ECTFE[4)] | D 2 8 | |
| Flange 4" 150 lb RF, ASME B16.5/316L | D 3 0 | |
| Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | D 3 1 | |
| Flange 4" 150 lb RF, ASME B16.5/ECTFE[4)] | D 3 2 | |
| Flange 4" 150 lb RF, ASME B16.5/PFA[4)] | D 3 3 | |
| Flange 4" 150 lb RF, ASME B16.5/Enamelled[3)] | D 3 4 | |
| Flange 4" 150 lb LT, ASME B16.5/316L | D 3 5 | |
| Flange 4" 300 lb RF, ASME B16.5/316L | D 3 6 | |
| Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) | D 3 7 | |
| Flange 4" 300 lb RF, ASME B16.5/ECTFE[4)] | D 3 8 | |
| Flange 4" 300 lb RJF, ASME B16.5/316L | D 4 0 | |
| Flange 4" 300 lb LG, ASME B16.5/316L | D 4 1 | |
| Flange 4" 300 lb LT, ASME B16.5/316L | D 4 2 | |
| Flange 4" 600 lb RF, ASME B16.5/316L | D 4 3 | |
| Flange 4" 600 lb RJF, ASME B16.5/316L | D 4 4 | |
| Flange 6" 150 lb RF, ASME B16.5/316L | D 4 5 | |
| Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) | D 4 6 | |
| Flange 6" 150 lb RF, ASME B16.5/ECTFE[4)] | D 4 7 | |
| Flange 6" 150 lb RF, ASME B16.5/PFA[4)] | D 4 8 | |
| Flange 6" 150 lb RJF, ASME B16.5/316L | D 5 0 | |
| Flange 6" 300 lb RF, ASME B16.5/316L | D 5 1 | |
| Flange 8" 150 lb RF, ASME B16.5/316L | D 5 2 | |
| Flange 8" 150 lb RF, ASME B16.5/ECTFE[4)] | D 5 3 | |
| Flange 1" BS.10 Table E/316L | D 5 4 | |
| Flange 1" BS.10 Table E/PFA[4)] | D 5 5 | |
| Flange 1½" BS.10 Table E/316L | D 5 6 | |
| Flange 3½" BS.10 Table E/316L | D 5 7 | |
| Flange 4" BS.10 Table E/ECTFE[4)] | D 5 8 | |
| Flange DN 40 10K, JIS/316L | D 6 0 | |
| Flange DN 50 10K, JIS/316L | D 6 1 | |
| Flange DN 80 10K, JIS/316L | D 6 2 | |
| Flange DN 100 10K, JIS/316L | D 6 3 | |
| Thread R1 PN 64, EN 10226-1/316L | D 6 5 | |
| Flange 2" 900 lb RF, ASME B16.5/316L | D 7 0 | |
| **Adapter/Process temperature** | | |
| Without adapter/-50 ... +150 °C (-58 ... +302 °F) | 1 | |
| With adapter/-50 ... +200 °C (-58 ... +392 °F)[13)] | 2 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, standard design<br>Detects level and material in liquids and slurries.<br>Short insertion. For hazardous applications. | Article No.<br>7ML5746- ● ● ● ● ● - ● ● A 0 | Ord. Code<br>● ● ● |
|---|---|---|
| With adapter/-50 .... +250 °C (-58 ... +482 °F) | 3 | |
| With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F) | 4 | |
| With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F) | 5 | |
| **Housing/Cable entry** | | |
| Aluminum IP66/IP67/M20 x 1.5 | A | |
| Aluminum IP66/IP67/½" NPT | B | |
| 316L stainless steel (electropolished) IP66/IP67/M20 x 1.5 | C | |
| 316L stainless steel (electropolished) IP66/IP67/½" NPT | D | |
| Plastic single chamber IP66/IP67/M20 x 1.5 | E | |
| Plastic single chamber IP66/IP67/½" NPT | F | |
| Stainless steel chamber (precision casting) IP66/IP67/M20 x 1.5 | G | |
| Stainless steel chamber (precision casting) IP66/IP67/½" NPT | H | |
| Aluminum IP66/IP67/M20 x 1.5 Special HARTING plug HAN 7D (bent) according to Tier One (ZB7555)[11] | V | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Switching status indication with colors red-green[12] | **A21** |
| Cleaning including Certificate (oil, grease, and silicone free) | **W01** |
| Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a coma ",," for line break. | **Y17** |
| Identification Label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a coma "," for line break. | **Y18** |
| NACE0175 to 3.1 Material Certificate for material (EN10204 NACE MR 0175)[8] Note: not available with Process Connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections. | **D07** |
| Material Inspection certificate 3.1 of EN 10204[8] | **C05** |
| 2.2-Factory certificate for material (EN 10204)[8] | **C15** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[8] | **C20** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204)[8] | **C13** |
| X-ray test + 3.1 certificate/instrument[8] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[8] | **C16** |
| Roughness test + 3.1 certificate/instrument[8] | **C18** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204)[8] | **C25** |
| Quality and test plan | **C26** |
| Inspection certificate 3.1 (EN 10204) - device and pressure test[8] | **C31** |
| Helium leak test + 3.1 certificate/instrument[8] | **C32** |
| Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument[8] | **C60** |
| Pressure test according to Norsok + 3.1 certificate/instrument[8] | **C61** |
| Factory declaration 2.1 (EN 10204) - certificate suitable for tropical regions with all attachment parts of metal | **C65** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

| Spare Parts and Accessories | Article No. |
|---|---|
| Electronics module SITRANS LVL200 Relay | **7ML1830-1NC** |
| Electronics module SITRANS LVL200 Contactless | **7ML1930-6AA** |
| NAMUR spare electronics module | **A5E35817107** |
| SITRANS SCSC single channel signal conditioner and remote test | **7ML5760** |
| SITRANS TCSC two channel signal conditioner and remote test | **7ML5761** |
| ***LVL200 Threaded Welded Socket*** | |
| • G¾" A/316L with FKM Seal | **7ML1930-1EE** |
| • G1" A/316L with FKM Seal | **7ML1930-1EF** |
| • M27 x 1.5/316L with FKM Seal | **7ML1930-1EG** |
| • G¾" A/316L with EPDM Seal | **7ML1930-1EH** |
| • G1" A/316L with EPDM Seal | **7ML1930-1EJ** |
| • M27 x 1.5/316L with EPDM Seal | **7ML1930-1EK** |

1) Available only with Adapter/Process temperature options 1, 3, 4, and 5.
2) Available only with Housing/Protection/Cable option B.
3) Available only with Adapter/Process Temperature options 1, 2, and 4.
4) Not available with Adapter/Process Temperature options 2, 3, and 5.
5) Not available with Adapter/Process Temperature options 2, 4, and 5.
6) Available only with Electronics options 4 and 6.
7) Not available with ECTFE coated probe options.
8) Listed Certificates are not available with all configurations please contact factory for more information.
9) Not available with Housing/Protection/Cable Option V.
10) Not available with PFA and ECTFE coating options.
11) Available only with Approval option A.
12) Available only with Relay Electronic options and Non-hazardous Approval options.
13) Available only with Enamelled Process connection options.
14) Available only with Electronic options 4, 5, and 6.
15) Available only with Aluminum Housing/Protection/Cable options.
16) Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
17) Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
18) Not available with Housing/Protection/Cable options D, and V.

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## Selection and ordering data (continued)

19) Not available with Plastic Housing/Protection/Cable options and certain glands.
20) Not available with Housing/Protection/Cable options A, E, G, and V.
21) Available only with Housing/Protection/Cable options B, D, F, and H.
22) Not available with Housing/Protection/Cable options C and V.
23) Available only with Housing/Protection/Cable options A, B, and H.
24) Not available with Approval options C, E, G, H, L, N, V, W, J1A, J1D, and J1E.
25) Not available with Approval options C, E, G, H, N, V, W, J1A, J1D, and J1E.
26) Available only with Electronic option 4.
27) Not available with EAC approval options.
28) Not available with Electronic option 6.

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | Ord. Code<br>● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Electronics** | | | | | | | | | | | | | | |
| Contactless electronic switch 20 ... 250 V AC/DC[1)9)14)] | | 1 | | | | | | | | | | | | |
| Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC[14)] | | 2 | | | | | | | | | | | | |
| NAMUR signal[9)] | | 4 | | | | | | | | | | | | |
| Transistor (NPN/PNP) 10 ... 55 V DC[1)15)] | | 5 | | | | | | | | | | | | |
| Two-wire (8/16 mA) 12 ... 36 V DC[25)] | | 6 | | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | | | | |
| CE | | | A | | | | | | | | | | | |
| Overfill protection (WHG)[9)] | | | B | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6[6)] | | | W | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG[6)9)] | | | C | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6 + WHG[5)7)16)] | | | D | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + shipping approvals[6)17)] | | | E | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6 + shipping approvals[5)7)16)] | | | F | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + ATEX II ½D IP6X T[6)8)10)18)] | | | G | | | | | | | | | | | |
| IECEx Ex ia IIC T6[6)19)] | | | H | | | | | | | | | | | |
| Shipping approvals[17)] | | | K | | | | | | | | | | | |
| ATEX II 3G Ex nA II T5 ... T1 X | | | L | | | | | | | | | | | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[6)20)] | | | N | | | | | | | | | | | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[2)5)] | | | P | | | | | | | | | | | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D[21)] | | | Q | | | | | | | | | | | |
| IECEx d IIC T6 ... T2 Ga/Gb[5)7)16)] | | | R | | | | | | | | | | | |
| CSA (XP) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G[2)5)7)] | | | S | | | | | | | | | | | |
| CSA (NI) Class I, II, III, Div. 2, Groups A, B, C, D, E, F, G[22)] | | | T | | | | | | | | | | | |
| BR-Ex d IIC T6 ... T2[5)18)] | | | U | | | | | | | | | | | |
| CSA (IS) Class I, II, III Div. 1, Groups A, B, C, D, E, F, G[6)9)] | | | V | | | | | | | | | | | |
| ATEX II ½D, 2D ExtD A20/21, A21 IP6 T...[6)10)23)] | | | X | | | | | | | | | | | |
| GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + WHG[9)24)] | | | Z | | | | | | | | | J | 1 | A |
| GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + WHG[5)7)16)26)] | | | Z | | | | | | | | | J | 1 | B |
| GOST-R/EAC + ATEX II ½G, Ex d IIC T2 ... T6 + Ship approval[5)7)16)26)] | | | Z | | | | | | | | | J | 1 | C |
| GOST-R/EAC + ATEX II 1G, ½G, 2G Ex ia IIC T6 + II ½D, 2D ExtD[10)18)24)] | | | Z | | | | | | | | | J | 1 | D |
| GOST-R/EAC + ATEX II ½D, 2D ExtD A20/21, A21 IP6 T...[10)18)24)] | | | Z | | | | | | | | | J | 1 | E |
| ***Note: When selecting a Process connection option, process connection coating must match the extension coating and the material and surface roughness type.*** | | | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | | |
| Thread G¾" A, PN 64/316L | | | | A | 0 | 0 | | | | | | | | |
| Thread G¾" A, PN 64/316L Ra < 0.8 µm | | | | A | 0 | 1 | | | | | | | | |
| Thread ¾" NPT, PN 64/316L | | | | A | 0 | 2 | | | | | | | | |
| Thread ¾" NPT, PN 64/316L Ra < 0.8 µm | | | | A | 0 | 3 | | | | | | | | |
| Thread ¾" NPT, PN 64/Alloy 400 (2.4360) | | | | A | 0 | 4 | | | | | | | | |
| Thread G¾" A, PN 64/Alloy C22 (2.4602) | | | | A | 0 | 5 | | | | | | | | |
| Thread ¾" NPT, PN 64/Alloy C22 (2.4602) | | | | A | 0 | 6 | | | | | | | | |
| Thread G1" A, PN 64/316L | | | | A | 0 | 7 | | | | | | | | |
| Thread G1" A, PN 64/316L ECTFE coated MB1982[4)] | | | | A | 0 | 8 | | | | | | | | |
| Thread G1" A, PN 64/316L PFA coated[4)] | | | | A | 1 | 0 | | | | | | | | |
| Thread G1" A, PN 64/Alloy 400 (2.4360) | | | | A | 1 | 1 | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Thread G1" A, PN 64/316L Ra < 0.8 µm | A 1 3 | |
| Thread 1" NPT, PN 64/316L | A 1 4 | |
| Thread 1" NPT, PN 64/316L ECTFE coated MB1982[4)] | A 1 5 | |
| Thread 1" NPT, PN 64/316L PFA coated[4)] | A 1 6 | |
| Thread 1" NPT, PN 64/Alloy 400 (2.4360) | A 1 7 | |
| Thread 1" NPT, PN 64/316L Ra < 0.8 µm | A 1 8 | |
| Thread G1" A, PN 64/Alloy C22 (2.4602) | A 2 0 | |
| Thread G1½" A, PN 64/316L | A 2 1 | |
| Thread G1½" A, PN 64/316L Ra <0.8 µm | A 2 2 | |
| Thread G1½" A, PN 64/Alloy C22 (2.4602) | A 2 3 | |
| Thread 1" NPT, PN 64/Alloy C22 (2.4602) | A 2 4 | |
| Thread 1½" NPT, PN 64/316L | A 2 5 | |
| Thread 1½" NPT, PN 64/316L Ra < 0.8 µm | A 2 6 | |
| Thread 1½" NPT, PN 64/Alloy C22 (2.4602) | A 2 7 | |
| Thread G2" A, PN 64/316L | A 2 8 | |
| Thread M27 x 1.5 PN 64/316L | A 3 0 | |
| Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984[4)] | A 3 1 | |
| Conus DN 25 PN 40/316L Ra < 0.3 µm | A 3 2 | |
| Conus DN 25 PN 40/316L Ra < 0.8 µm | A 3 3 | |
| Conus DN 25 PN 40/ECTFE (ZB3033)[4)] | A 3 4 | |
| Conus M52 PN 40/316L | A 3 5 | |
| Conus M52 PN 40/316L Ra < 0.3 µm | A 3 6 | |
| Conus M52 PN 40/316L Ra < 0.8 µm | A 3 7 | |
| Tri-Clamp 1" PN 16/316L Ra < 0.3 µm | A 3 8 | |
| Tri-Clamp 1" PN 16/Alloy C22 (2.4602) | A 4 0 | |
| Tri-Clamp 1" PN 16/316L Ra < 0.8 µm | A 4 1 | |
| Tri-Clamp 1½" PN 16/316L Ra < 0.3 µm | A 4 2 | |
| Tri-Clamp 1½" PN 16/Alloy C22 (2.4602) | A 4 3 | |
| Tri-Clamp 1½" PN 16/316L Ra < 0.8 µm | A 4 4 | |
| Tri-Clamp 2" PN 16/316L Ra < 0.3 µm | A 4 5 | |
| Tri-Clamp 2" PN 16/Alloy C22 (2.4602) | A 4 6 | |
| Tri-Clamp 2" PN 16/316L Ra < 0.8 µm | A 4 7 | |
| Tri-Clamp 2½" PN 10/316L Ra < 0.3 µm | A 4 8 | |
| Tri-Clamp 2½" PN 10/316L Ra < 0.8 µm | A 5 0 | |
| Tri-Clamp 3" PN 10/316L Ra < 0.3 µm | A 5 1 | |
| Clamp 3" PN16 (ø91 mm) DIN32676, ISO2852/ 316L (Ra < 0.8 µm) | A 5 2 | |
| Bolting DN 32 PN 40 DIN 11851/316L Ra < 0.3 µm | A 5 3 | |
| Bolting DN 32 PN 40 DIN 11851/316L Ra < 0.8 µm | A 5 4 | |
| Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.3 µm | A 5 5 | |
| Bolting DN 25 PN 40 DIN 11851/316L Ra < 0.8 µm | A 5 6 | |
| Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.3 µm | A 5 7 | |
| Bolting DN 40 PN 40 DIN 11851/316L Ra < 0.8 µm | A 5 8 | |
| Bolting DN 40 PN 40 DIN 11864-1 A/316L Ra < 0.8 µm ZB3052 | A 6 0 | |
| Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.3 µm | A 6 1 | |
| Bolting DN 50 PN 25 DIN 11851/316L Ra < 0.8 µm | A 6 2 | |
| Bolting DN 50 PN 25 DIN 11864-1 A/316L Ra < 0.8 µm ZB3052 | A 6 3 | |
| Hygienic w.compr.nut F40 PN 25/316L | A 6 4 | |
| Hygienic w.compr.nut F40 PN 25/316L Ra < 0.3 µm | A 6 5 | |
| Hygienic w.compr.nut F40 PN 25/316L Ra < 0.8 µm | A 6 6 | |
| Varivent N50-40/316L Ra < 0.3 µm | A 6 7 | |
| Varivent N50-40/316L Ra < 0.8 µm | A 6 8 | |
| Varivent N125/100/316L Ra < 0.8 µm | A 7 0 | |
| DRD flange PN 40/316L ZB3007 | A 7 1 | |
| SMS DN 38/316L Ra < 0.8 µm[4)] | A 7 2 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| SMS DN 51 PN 6/316L Ra < 0.8 µm[4] | A 7 3 | |
| Swagelok VCR screwing ZG2579 PN 64/316L | A 7 4 | |
| Neumo biocontrol size 25 PN 16/316L Ra < 0.8 µm | A 7 5 | |
| Neumo biocontrol size 50 PN 16/316L Ra < 0.8 µm | A 7 6 | |
| SÜDMO DN 50 PN 10/316L Ra < 0.8 µm | A 8 0 | |
| Small flange DN 25 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm | A 8 1 | |
| Small flange DN 40 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm | A 8 2 | |
| Ingold connection PN 16/316L Ra < 0.8 µm | A 8 3 | |
| Collar clamp connection DN 33,7 PN 40 Form A, DIN 11864-3/1.4435 (BN2, Ra < 0.8 µm) | A 8 4 | |
| Collar flange DN 50 PN 16 Form A, DIN 11864-2/316L (Ra < 0.8 µm) | A 8 5 | |
| Flange DN 25 PN 6 Form C, DIN 2501/316L | A 8 6 | |
| Flange DN 25 PN 6 Form C, DIN 2501/PFA[4] | A 8 7 | |
| Flange DN 25 PN 40 Form C, DIN 2501/316L | A 8 8 | |
| Flange DN 25 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 0 0 | |
| Flange DN 25 PN 40 Form C, DIN 2501/ECTFE[4] | B 0 1 | |
| Flange DN 25 PN 40 Form C, DIN 2501/PFA[4] | B 0 2 | |
| Flange DN 25 PN 40 Form D, DIN 2501/316L | B 0 3 | |
| Flange DN 25 PN 40 Form F, DIN 2501/316L | B 0 4 | |
| Flange DN 25 PN 40 Form N, DIN 2501/316L | B 0 5 | |
| Flange DN 25 PN 40 Form N, DIN 2501/Alloy 400 (2.4360) solid | B 0 7 | |
| Flange DN 25 PN 40 V13, DIN 2501/316L | B 0 8 | |
| Flange DN 32 PN 40 Form C, DIN 2501/316L | B 1 0 | |
| Flange DN 32 PN 40 Form C, DIN 2501/ECTFE[4] | B 1 1 | |
| Flange DN 40 PN 6 Form C, DIN 2501/316L | B 1 2 | |
| Flange DN 40 PN 6 Form C, DIN 2501/ECTFE[4] | B 1 3 | |
| Flange DN 40 PN 40 Form C, DIN 2501/316L | B 1 4 | |
| Flange DN 40 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 1 5 | |
| Flange DN 40 PN 40 Form C, DIN 2501/ECTFE[4] | B 1 6 | |
| Flange DN 40 PN 40 Form C, DIN 2501/PFA[4] | B 1 7 | |
| Flange DN 40 PN 40 Form C, DIN 2501/Enamelled[3] | B 1 8 | |
| Flange DN 40 PN 40 Form F, DIN 2501/316L | B 2 0 | |
| Flange DN 40 PN 40 Form N, DIN 2501/316L | B 2 1 | |
| Flange DN 40 PN 40 Form E, DIN 2501/316L | B 2 2 | |
| Flange DN 40 PN 40 V13, DIN 2501/316L | B 2 3 | |
| Flange DN 50 PN 40 Form C, DIN 2501/316L | B 2 4 | |
| Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 2 5 | |
| Flange DN 50 PN 40 Form C, DIN 2501/ECTFE[4] | B 2 6 | |
| Flange DN 50 PN 40 Form C, DIN 2501/ECTFE (ZB3108)[4] | B 2 7 | |
| Flange DN 50 PN 40 Form C, DIN 2501/PFA[4] | B 2 8 | |
| Flange DN 50 PN 40 Form D, DIN 2501/316L | B 3 0 | |
| Flange DN 50 PN 40 Form D, DIN 2501/Alloy C22 (2.4602) | B 3 1 | |
| Flange DN 50 PN 40 Form F, DIN 2501/316L | B 3 2 | |
| Flange DN 50 PN 40 Form N, DIN 2501/316L | B 3 3 | |
| Flange DN 50 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid | B 3 4 | |
| Flange DN 50 PN 40 Form E, DIN 2501/316L | B 3 5 | |
| Flange DN 50 PN 40 V13, DIN 2501/316L | B 3 6 | |
| Flange DN 50 PN 40 R13, DIN 2501/316L | B 3 7 | |
| Flange DN 50 PN 64 Form F, DIN 2501/316L | B 3 8 | |
| Flange DN 50 PN 64 Form C, DIN 2501/316L | B 4 1 | |
| Flange DN 50 PN 64 Form L, DIN 2501/316L | B 4 2 | |
| Flange DN 50 PN 100 Form E, DIN 2501/316L | B 4 3 | |
| Flange DN 50 PN 100 Form L, DIN 2501/316L | B 4 4 | |
| Flange DN 65 PN 40 Form C, DIN 2501/316L | B 4 5 | |
| Flange DN 65 PN 40 Form C, DIN 2501/ECTFE[4] | B 4 7 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange DN 65 PN 40 Form C, DIN 2501/PFA[4)] | B 4 8 | |
| Flange DN 65 PN 40 Form F, DIN 2501/316L | B 5 0 | |
| Flange DN 65 PN 64 Form E, DIN 2501/316L | B 5 1 | |
| Flange DN 80 PN 40 Form C, DIN 2501/316L | B 5 2 | |
| Flange DN 80 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 5 3 | |
| Flange DN 80 PN 40 Form C, DIN 2501/ECTFE[4)] | B 5 4 | |
| Flange DN 80 PN 40 Form C, DIN 2501/PFA[4)] | B 5 5 | |
| Flange DN 80 PN 40 Form F, DIN 2501/316L | B 5 6 | |
| Flange DN 80 PN 40 Form N, DIN 2501/316L | B 5 7 | |
| Flange DN 100 PN 16 Form C, DIN 2501/316L | B 6 0 | |
| Flange DN 100 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 6 1 | |
| Flange DN 100 PN 16 Form C, DIN 2501/ECTFE[4)] | B 6 2 | |
| Flange DN 100 PN 16 Form C, DIN 2501/PFA[4)] | B 6 3 | |
| Flange DN 100 PN 16 Form D, DIN 2501/316L | B 6 4 | |
| Flange DN 100 PN 16 Form F, DIN 2501/316L | B 6 5 | |
| Flange DN 100 PN 16 Form N, DIN 2501/316L | B 6 6 | |
| Flange DN 100 PN 40 Form C, DIN 2501/316L | B 6 7 | |
| Flange DN 100 PN 40 Form C, DIN 2501/ECTFE[4)] | B 6 8 | |
| Flange DN 100 PN 40 Form C, DIN 2501/PFA[4)] | B 7 0 | |
| Flange DN 100 PN 40 Form C, DIN 2501/Enamelled[3)] | B 7 1 | |
| Flange DN 100 PN 40 Form F, DIN 2501/316L | B 7 2 | |
| Flange DN 100 PN 40 Form N, DIN 2501/316L | B 7 3 | |
| Flange DN 100 PN 40 V13, DIN 2501/316L | B 7 4 | |
| Flange DN 100 PN 64 Form E, DIN 2501/316L | B 7 5 | |
| Flange DN 100 PN 100 Form E, DIN 2501/316L | B 7 6 | |
| Flange DN 100 PN 100 Form L, DIN 2501/316L | B 7 7 | |
| Flange DN 125 PN 16 Form F, DIN 2501/316L | B 7 8 | |
| Flange DN 125 PN 40 Form C, DIN 2501/316L | B 8 0 | |
| Flange DN 125 PN 40 Form N, DIN 2512/316L | B 8 1 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316L | B 8 2 | |
| Flange DN 150 PN 16 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 8 3 | |
| Flange DN 150 PN 16 Form C, DIN 2501/ECTFE[4)] | B 8 4 | |
| Flange DN 150 PN 16 Form C, DIN 2501/PFA[4)] | B 8 5 | |
| Flange DN 150 PN 16 Form D, DIN 2501/316L | B 8 6 | |
| Flange DN 150 PN 40 Form C, DIN 2501/316L | B 8 7 | |
| Flange DN 150 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) plated | B 8 8 | |
| Flange DN 150 PN 40 Form F, DIN 2501/316L | C 0 0 | |
| Flange DN 150 PN 40 Form N, DIN 2512/316L | C 0 1 | |
| Flange DN 200 PN 10 Form C, DIN 2501/ECTFE[4)] | C 0 2 | |
| Flange DN 200 PN 16 Form C, DIN 2501/316L | C 0 3 | |
| Flange DN 25 PN 40 Form B1, EN 1092-1/316L | C 0 4 | |
| Flange DN 25 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated | C 0 5 | |
| Flange DN 25 PN 40 Form B1, EN/316L/PFA[4)] | C 0 6 | |
| Flange DN 25 PN 40 Form B1, EN 1092-1/Enamelled[3] | C 0 7 | |
| Flange DN 25 PN 40 Form B2, EN 1092-1/316L | C 0 8 | |
| Flange DN 25 PN 40 Form F, EN 1092-1/316L | C 1 0 | |
| Flange DN 25 PN 63 Form B1, EN 1092-1/316L | C 1 1 | |
| Flange DN 25 PN 100 Form B2, EN 1092-1/316L | C 1 2 | |
| Flange DN 40 PN 40 Form B1, EN/316L | C 1 3 | |
| Flange DN 40 PN 40 Form B1, EN 1092-1/PFA[4)] | C 1 4 | |
| Flange DN 40 PN 40 Form B2, EN/316L | C 1 5 | |
| Flange DN 50 PN 40 Form B1, EN/316L | C 1 6 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated | C 1 7 | |
| Flange DN 50 PN 40 Form B1,EN 1092-1/Alloy 400 (2.4360) ZB2977 | C 1 8 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE[4] | C 2 0 | |
| Flange DN 50 PN 40 Form B1, EN/316L/PFA[4] | C 2 1 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/Enamelled[3] | C 2 2 | |
| Flange DN 50 PN 40 Form C, EN 1092-1/316L | C 2 3 | |
| Flange DN 50 PN 40 Form D, EN/316L | C 2 4 | |
| Flange DN 50 PN 40 Form B2, EN 1092-1/316L | C 2 6 | |
| Flange DN 50 PN 40 Form E, EN 1092-1/316L | C 2 7 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/316L | C 2 8 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) plated | C 3 0 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/ECTFE[4] | C 3 1 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/Enamelled[3] | C 3 2 | |
| Flange DN 80 PN 40 Form B2, EN 1092-1/316L | C 3 3 | |
| Flange DN 100 PN 16 Form B1, EN 1092-1/316L | C 3 4 | |
| Flange DN 100 PN 16 Form B1, EN 1092-1/Alloy C22 (2.4602) plated | C 3 5 | |
| Flange DN 100 PN 16 Form B1, EN 1092-1/Enamelled[3] | C 3 6 | |
| Flange DN 100 PN 40 Form B1, EN 1092-1/316L | C 3 7 | |
| Flange DN 100 PN 40 Form B1, EN 1092-1/Enamelled[3] | C 3 8 | |
| Flange DN 100 PN 40 Form C, EN 1092-1/316L | C 4 0 | |
| Flange DN 100 PN 63 Form B2, EN 1092-1/316L | C 4 1 | |
| Flange DN 150 PN 16 Form B1, EN 1092-1/316L | C 4 2 | |
| Flange DN 150 PN 16 Form B1, EN 1092-1/PFA[4] | C 4 3 | |
| Flange DN 150 PN 40 Form B1, EN 1092-1/316L | C 4 4 | |
| Flange DN 150 PN 40 Form B1, EN 1092-1/ECTFE[4] | C 4 5 | |
| Flange DN 150 PN 40 Form B2, EN 1092-1/316L | C 4 6 | |
| Flange 1" 150 lb ASME B16.5/316L | C 4 7 | |
| Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | C 4 8 | |
| Flange 1" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 5 0 | |
| Flange 1" 150 lb RF, ASME B16.5/ECTFE[4] | C 5 1 | |
| Flange 1" 150 lb RF, ASME B16.5/PFA[4] | C 5 2 | |
| Flange 1" 150 lb RF, ASME B16.5/Enamelled[3] | C 5 3 | |
| Flange 1" 300 lb RF, ASME B16.5/316L | C 5 4 | |
| Flange 1" 300 lb RF, ASME B16.5/ECTFE[4] | C 5 5 | |
| Flange 1" 600 lb RF, ASME B16.5/316L | C 5 6 | |
| Flange 1½" 150 lb RF, ASME B16.5/316L | C 5 7 | |
| Flange 1½" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | C 5 8 | |
| Flange 1½" 150 lb RF, ASME B16.5/ECTFE[4] | C 6 0 | |
| Flange 1½" 150 lb RF, ASME B16.5/PFA[4] | C 6 1 | |
| Flange 1½" 150 lb RF, ASME B16.5 Enamelled[3] | C 6 2 | |
| Flange 1½" 150 lb FF, ASME B16.5/ECTFE[4] | C 6 3 | |
| Flange 1½" 300 lb RF, ASME B16.5/316L | C 6 4 | |
| Flange 1½" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 6 5 | |
| Flange 1½" 300 lb RF, ASME B16.5/ECTFE[4] | C 6 6 | |
| Flange 1½" 600 lb RF, ASME B16.5/316L | C 6 7 | |
| Flange 2" 150 lb RF, ASME B16.5/316L | C 6 8 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | C 7 0 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | C 7 1 | |
| Flange 2" 150 lb RF, ASME B16.5/ECTFE[4] | C 7 2 | |
| Flange 2" 150 lb RF, ASME B16.5/PFA[4] | C 7 3 | |
| Flange 2" 150 lb RF, ASME B16.5/Enamelled[3] | C 7 4 | |
| Flange 2" 150 lb FF, ASME B16.5/316L | C 7 5 | |
| Flange 2" 150 lb FF, ASME B16.5/ECTFE[4] | C 7 6 | |
| Flange 2" 150 lb SG (small groove), ASME B16.5/316L | C 7 7 | |
| Flange 2" 300 lb RF, ASME B16.5/316L | C 7 8 | |
| Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | C 8 0 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange 2" 300 lb RF, ASME B16.5/ECTFE[4] | | C 8 2 |
| Flange 2" 300 lb RF, ASME B16.5/PFA[4] | | C 8 3 |
| Flange 2" 300 lb RJF, ASME B16.5/316L | | C 8 5 |
| Flange 2" 300 lb ST, ASME B16.5/316L | | C 8 6 |
| Flange 2" 300 lb LG (large groove), ASME B16.5/316L | | C 8 7 |
| Flange 2" 300 lb LT, ASME B16.5/316L | | C 8 8 |
| Flange 2" 600 lb RF, ASME B16.5/316L | | D 0 0 |
| Flange 2" 600 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | | D 0 1 |
| Flange 2" 600 lb RF, ASME B16.5/ECTFE[4] | | D 0 2 |
| Flange 2" 600 lb RJF, ASME B16.5/316L | | D 0 3 |
| Flange 2" 600 lb LG, ASME B16.5/316L | | D 0 4 |
| Flange 2" 900 lb RJF, ASME B16.5/316L | | D 0 5 |
| Flange 2½" 150 lb RF, ASME B16.5/316L | | D 0 6 |
| Flange 2½" 300 lb RF, ASME B16.5/316L | | D 0 7 |
| Flange 3" 150 lb RF, ASME B16.5/316L | | D 0 8 |
| Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | | D 1 0 |
| Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) ZB2977 | | D 1 1 |
| Flange 3" 150 lb RF, ASME B16.5/ECTFE[4] | | D 1 2 |
| Flange 3" 150 lb RF, ASME B16.5/PFA[4] | | D 1 3 |
| Flange 3" 150 lb RF, ASME B16.5/Enamelled[3] | | D 1 4 |
| Flange 3" 150 lb FF, ASME B16.5/316L | | D 1 5 |
| Flange 3" 150 lb FF, ASME B16.5/ECTFE[4] | | D 1 6 |
| Flange 3" 150 lb FF, ASME B16.5/PFA[4] | | D 1 7 |
| Flange 3" 300 lb RF, ASME B16.5/316L | | D 1 8 |
| Flange 3" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | | D 2 0 |
| Flange 3" 300 lb RF, ASME B16.5/ECTFE[4] | | D 2 1 |
| Flange 3" 300 lb RF, ASME B16.5/PFA[4] | | D 2 2 |
| Flange 3" 300 lb RF, ASME B16.5/Enamelled[3] | | D 2 3 |
| Flange 3" 600 lb RF, ASME B16.5/316L | | D 2 4 |
| Flange 3½" 150 lb RF, ASME B16.5/316L | | D 2 5 |
| Flange 3½" 150 lb RF, ASME B16.5/ECTFE[4] | | D 2 6 |
| Flange 4" 150 lb RF, ASME B16.5/316L | | D 2 7 |
| Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | | D 2 8 |
| Flange 4" 150 lb RF, ASME B16.5/ECTFE[4] | | D 3 0 |
| Flange 4" 150 lb RF, ASME B16.5/PFA[4] | | D 3 1 |
| Flange 4" 150 lb RF, ASME B16.5/Enamelled[3] | | D 3 2 |
| Flange 4" 150 lb LT, ASME B16.5/316L | | D 3 3 |
| Flange 4" 300 lb RF, ASME B16.5/316L | | D 3 4 |
| Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | | D 3 5 |
| Flange 4" 300 lb RF, ASME B16.5/ECTFE[4] | | D 3 6 |
| Flange 4" 300 lb RJF, ASME B16.5/316L | | D 3 7 |
| Flange 4" 300 lb LG, ASME B16.5/316L | | D 3 8 |
| Flange 4" 300 lb LT, ASME B16.5/316L | | D 4 0 |
| Flange 4" 600 lb RF, ASME B16.5/316L | | D 4 1 |
| Flange 4" 600 lb RJF, ASME B16.5/316L | | D 4 2 |
| Flange 5" 150 lb RF, ASME B16.5/316L | | D 4 3 |
| Flange 6" 150 lb RF, ASME B16.5/316L | | D 4 4 |
| Flange 6" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) plated | | D 4 5 |
| Flange 6" 150 lb RF, ASME B16.5/ECTFE[4] | | D 4 6 |
| Flange 6" 150 lb RF, ASME B16.5/PFA[4] | | D 4 7 |
| Flange 6" 150 lb RJF, ASME B16.5/316L | | D 4 8 |
| Flange 6" 300 lb RF, ASME B16.5/316L | | D 5 0 |
| Flange 8" 150 lb RF, ASME B16.5/316L | | D 5 1 |
| Flange 8" 150 lb RF, ASME B16.5/ECTFE[4] | | D 5 2 |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange 1" BS.10 Table E/316L | D 5 3 | |
| Flange 1" BS.10 Table E/PFA[4)] | D 5 4 | |
| Flange 1½" BS.10 Table E/316L | D 5 5 | |
| Flange 3½" BS.10 Table E/316L | D 5 6 | |
| Flange 4" BS.10 Table E/ECTFE[4)] | D 5 7 | |
| Flange DN 40 10K, JIS/316L | D 5 8 | |
| Flange DN 50 10K, JIS/316L | D 6 0 | |
| Flange DN 80 10K, JIS/316L | D 6 1 | |
| Flange DN 100 10K, JIS/316L | D 6 2 | |
| Thread R1 PN 64, EN10226-1/316L[11)] | D 6 5 | |
| Flange 2" 900 lb RF, ASME B16.5/316L | D 7 0 | |
| Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | D 7 1 | |
| Flange NPS 2" Class 1500 RJF, ASME B16.5 / 316/316L[26)] | D 7 2 | |
| **Adapter/Process temperature** | | |
| Without adapter/-50 ... +150 °C | 1 | |
| With adapter/-50 ... +200 °C[13)] | 2 | |
| With adapter/-50 ... +250 °C | 3 | |
| With gas-tight leadthrough/-50 ... +150 °C | 4 | |
| With gas-tight leadthrough/-50 ... +250 °C | 5 | |
| **Housing/Cable entry** | | |
| Aluminum IP66/IP67/M20 x 1.5 | A | |
| Aluminum IP66/IP67/½" NPT | B | |
| 316L stainless steel (electropolished) IP66/IP67/M20 x 1.5 | C | |
| 316L stainless steel (electropolished) IP66/IP67/½" NPT | D | |
| Plastic single chamber IP66/IP67/M20 x 1.5 | E | |
| Plastic single chamber IP66/IP67/½" NPT | F | |
| Stainless steel chamber (precision casting) IP66/IP67/M20 x 1.5 | G | |
| Stainless steel chamber (precision casting) IP66/IP67/½" NPT | H | |
| Aluminum IP66/IP67/M20 x 1.5 Special HARTING plug HAN 7D (bent) according to Tier One (ZB7555) | V | |
| ***NOTE: When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.*** | | |
| **Rigid Extension 316L** | | |
| 80 ... 500 mm | A 0 | |
| 501 ... 1 000 mm | A 1 | |
| 1 001 ... 1 500 mm | A 2 | |
| 1 501 ... 2 000 mm | A 3 | |
| 2 001 ... 2 500 mm | A 4 | |
| 2 501 ... 3 000 mm | A 5 | |
| 3 001 ... 3 500 mm | A 6 | |
| 3 501 ... 4 000 mm | A 7 | |
| **Rigid Extension ECTFE coated** | | |
| 80 ... 500 mm | B 0 | |
| 501 ... 1 000 mm | B 1 | |
| 1 001 ... 1 500 mm | B 2 | |
| 1 501 ... 2 000 mm | B 3 | |
| 2 001 ... 2 500 mm | B 4 | |
| 2 501 ... 3 000 mm | B 5 | |
| **Rigid Extension PFA coated** | | |
| 80 ... 500 mm | C 0 | |
| 501 ... 1 000 mm | C 1 | |
| 1 001 ... 1 500 mm | C 2 | |
| 1 501 ... 2 000 mm | C 3 | |
| 2 001 ... 2 500 mm | C 4 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, rigid extension design<br>Detects level and material in liquids and slurries. Top mount, with extension options to 6 m (19.69 ft). Ideal for hazardous applications. | Article No.<br>7ML5747- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| 2 501 ... 3 000 mm | C 5 | |
| 3 001 ... 3 500 mm | C 6 | |
| 3 501 ... 4 000 mm | C 7 | |
| **Rigid Extension 316L Ra ≤ 0.8 µm** | | |
| 80 ... 500 mm | D 0 | |
| 501 ... 1 000 mm | D 1 | |
| 1 001 ... 1 500 mm | D 2 | |
| 1 501 ... 2 000 mm | D 3 | |
| 2 001 ... 2 500 mm | D 4 | |
| 2 501 ... 3 000 mm | D 5 | |
| 3 001 ... 3 500 mm | D 6 | |
| 3 501 ... 4 000 mm | D 7 | |
| **Rigid Extension 316L Ra ≤ 0.3 µm** | | |
| 80 ... 500 mm | E 0 | |
| 501 ... 1 000 mm | E 1 | |
| 1 001 ... 1 500 mm | E 2 | |
| 1 501 ... 2 000 mm | E 3 | |
| 2 001 ... 2 500 mm | E 4 | |
| 2 501 ... 3 000 mm | E 5 | |
| 3 001 ... 3 500 mm | E 6 | |
| 3 501 ... 4 000 mm | E 7 | |
| **Rigid Extension Enamelled version** | | |
| 80 ... 250 mm | F 0 | |
| 251 ... 500 mm | F 1 | |
| 501 ... 750 mm | F 2 | |
| 751 ... 1 000 mm | F 3 | |
| 1 001 ... 1 250 mm | F 4 | |
| 1 251 ... 1 500 mm | F 5 | |
| **Rigid Extension Alloy C22 (2.4602)** | | |
| 80 ... 500 mm | G 0 | |
| 501 ... 1 000 mm | G 1 | |
| 1 001 ... 1 500 mm | G 2 | |
| 1 501 ... 2 000 mm | G 3 | |
| 2 001 ... 2 500 mm | G 4 | |
| 2 501 ... 3 000 mm | G 5 | |
| 3 001 ... 3 500 mm | G 6 | |
| 3 501 ... 4 000 mm | G 7 | |
| **Rigid Extension Alloy 400 (2.4360)** | | |
| 80 ... 500 mm | H 0 | |
| 501 ... 1 000 mm | H 1 | |
| 1 001 ... 1 500 mm | H 2 | |
| 1 501 ... 2 000 mm | H 3 | |
| 2 001 ... 2 500 mm | H 4 | |
| 2 501 ... 3 000 mm | H 5 | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Switching status indication with colors red-green[1,2)] | **A21** |

| Selection and Ordering data | Order code |
|---|---|
| Cleaning including Certificate (oil, grease, and silicone free) | **W01** |
| Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch) | **Y01** |
| Identification label (measurement loop) stainless steel: max. 40 characters, add in plain text. To add more than one line, use a coma "," for line break. | **Y17** |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Identification label (measurement loop) foil: max. 40 characters add in plain text. To add more than one line, use a coma "," for line break. | **Y18** |
| NACE0175 to 3.1 Material Certificate for material (EN 10204 NACE MR 0175)[8] Note: not available with Process connection and Rigid extension coatings PFA, ECTFE, and Enamel. NACE not available with Hygienic process connections. | **D07** |
| Material Inspection certificate 3.1 of EN 10204 | **C05** |
| 2.2-Factory certificate for material (EN 10204)[8] | **C15** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[8] | **C20** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204)[8] | **C13** |
| X-ray test + 3.1 certificate/instrument[8] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[8] | **C16** |
| Roughness test + 3.1 certificate/instrument[8] | **C18** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204) | **C25** |
| Quality and test plan | **C26** |
| Inspection certificate 3.1 (EN 10204) - device and pressure test[8] | **C31** |
| Helium leak test + 3.1 certificate/instrument[8] | **C32** |
| Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument[8] | **C60** |
| Pressure test according to Norsok + 3.1 certificate/instrument[8] | **C61** |
| Factory declaration 2.1 (EN 10204) - certificate suitable for tropical regions with all attachment parts of metal | **C65** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

| Spare Parts and Accessories | Article No. |
|---|---|
| Electronics module SITRANS LVL200 Relay | **7ML1830-1NC** |
| Electronics module SITRANS LVL200 Contactless | **7ML1930-6AA** |
| NAMUR spare electronics module | **A5E35817107** |
| SITRANS SCSC single channel signal conditioner and remote test | **7ML5760** |
| SITRANS TCSC two channel signal conditioner and remote test | **7ML5761** |
| Lock fitting, unpressurized, G1" A/316L | **7ML1930-1DQ** |

| Spare Parts and Accessories | Article No. |
|---|---|
| Lock fitting, unpressurized, 1" NPT/316L | **7ML1930-1DR** |
| Lock fitting, unpressurized, G1 ... 1/2" A/316L | **7ML1930-1DS** |
| Lock fitting, unpressurized, 1 ... 1/2" NPT/316L | **7ML1930-1DT** |
| Lock fitting, -1 ... 16 bar, G1" A/316L | **7ML1930-1DU** |
| Lock fitting, -1 ... 16 bar, 1" NPT/316L | **7ML1930-1DV** |
| Lock fitting, -1 ... 16 bar, G1 1/2" A/316L | **7ML1930-1DW** |
| Lock fitting, -1 ... 16 bar, 1 1/2" NPT/316L | **7ML1930-1DX** |
| Lock fitting, -1 ... 64 bar, G1" A/316L | **7ML1930-1EA** |
| Lock fitting, -1 ... 64 bar, 1" NPT/316L | **7ML1930-1EB** |
| Lock fitting, -1 ... 64 bar, G1 1/2" A/316L | **7ML1930-1EC** |
| Lock fitting, -1 ... 64 bar, 1 1/2" NPT/316L | **7ML1930-1ED** |

1) Available only with Adapter/Process temperature options 1, 3, 4, and 5.
2) Available only with Housing/Cable entry option B.
3) Available only with Adapter/Process temperature options 1, 2, and 4.
4) Not available with Adapter/Process temperature options 2, 3, and 5.
5) Not available with Adapter/Process temperature options 2, 4, and 5.
6) Available only with Electronics options 4 and 6.
7) Available only with rigid extension options less than 3 001 mm.
8) Listed Certificates are not available with all configurations please contact factory for more information.
9) Not available with Housing/Protection/Cable option V.
10) Not available with PFA, ECTFE, and enamelled coating options.
11) Available only with some 316L extensions.
12) Available only with relay electronic options and non-hazardous Approval options.
13) Available only with Enamelled Process connection/Material options.
14) Not available with Approval options C, E, G, H, L, N, V, and W.
15) Not available with Approval options C, E, G, H, N, and V.
16) Only available with Aluminum Housing/Protection/Cable options and certain glands.
17) Not available with Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.
18) Not available with Plastic or Stainless Steel Electropolish Housing/Protection/Cable options and certain glands.
19) Not available with Housing/Protection/Cable options D and V.
20) Not available with Housing/Protection/Cable options A, E, G, and V.
21) Not available with some Housing/Protection/Cable gland options.
22) Not available with Housing/Protection/Cable options A, C, and V.
23) Not available with Plastic Housing/Protection/Cable options.
24) Available only with Electronic option 4.
25) Not available with FM approval options.
26) Available only with Rigid extension options A0 ... A7.

| **SITRANS LVL200 Vibrating point level switch, high temperature and pressure design<br>Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft).** | **Article No.**<br>**7ML5748-** ● ● ● ● ● - ● ● ● ● | **Ord. Code**<br>● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Version/Material** | | |
| Compact version/Inconel 718 (2.4668)[1)2)] | 1 | |
| With tube extension/316L and Inconel 718 (2.4668)[1)3)] | 2 | |
| With tube extension/Alloy C22 (2.4602) and Inconel 718 (2.4668)[4)] | 3 | |
| **Approvals** | | |
| Europe CE | A | |
| Ship approval | B | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, high temperature and pressure design<br>Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft). | Article No.<br>7ML5748- ● | ● | ● | ● | ● | - | ● | ● | ● | ● | Ord. Code<br>● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overfill protection WHG[7] | | C | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6[6)9)] | | D | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6[5)9)] | | F | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + ship approval[5)9)10)] | | G | | | | | | | | | | | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + Overfill protection (WHG)[6)7)9)] | | H | | | | | | | | | | | |
| ATEX II ½G, 2G Ex d IIC T6 + Overfill protection (WHG)[6)7)9)] | | J | | | | | | | | | | | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D T6 ... T1[9)11)] | | N | | | | | | | | | | | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D T6 ... T1 + Ship approval[6)9)] | | P | | | | | | | | | | | |
| FM (IS) Class I, Div. 1, Groups A, B, C, D Zone 0, 0/1, 1, AEx ia IIC T6 ... T1 Ga, Ga/Gb, Gb[5)9)12)] | | Q | | | | | | | | | | | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D T6 ... T1, Zone 0/1, 1, AEx d IIC T6 ... T1 Ga/Gb, Gb[6)9)] | | R | | | | | | | | | | | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D T6 ... T1, Zone 0/1, 1, AEx d IIC T6 ... T1 Ga/Gb, Gb + Ship approval[6)9)] | | S | | | | | | | | | | | |
| IEC Ex d IIC T6[6)9)] | | E | | | | | | | | | | | |
| IEC Ex ia IIC T6 + Ship approval[5)9)10)] | | U | | | | | | | | | | | |
| IEC Ex ia IIC T6[5)9)] | | T | | | | | | | | | | | |
| $_{C}CSA_{US}$ (NI) Class I, Div. 2, Groups A, B , C, D, (DIP) Class II, III, Div. 1, Groups E, F, G[6)9)] | | V | | | | | | | | | | | |
| $_{C}CSA_{US}$ (NI) Class I, Div. 2, Groups A, B, C, D, (DIP) Class II, III, Div. 1, Groups E, F, G + Ship approval[6)9)] | | W | | | | | | | | | | | |
| $_{C}CSA_{US}$ (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[5)9)12)] | | X | | | | | | | | | | | |
| $_{C}CSA_{US}$ (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[5)9)13)] | | Y | | | | | | | | | | | |
| $_{C}CSA_{US}$ (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[6)9)] | | K | | | | | | | | | | | |
| $_{C}CSA_{US}$ (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[6)9)] | | L | | | | | | | | | | | |
| GOST-R/EAC Ga/Gb Ex ia IIC T6 ... T1 X, 0Ex ia IIC T6 ... T1 Ga, 1Ex ia IIC T6 ... T1 Gb X[5)9)] | | Z | | | | | | | | | J | 1 | A |
| GOST-R/EAC 1Ex db IIC T6 ... T1 Gb, Ga/Gb Ex db IIC T6 ... T1[6)9)] | | Z | | | | | | | | | J | 1 | B |
| **Process connection** | | | | | | | | | | | | | |
| Thread G1 PN 100, DIN 3852-A/316L | | | A | 0 | | | | | | | | | |
| Thread G1 PN 160, DIN 3852-A/Inconel 718 (2.4668) | | | A | 1 | | | | | | | | | |
| Thread 1" NPT PN 100, ASME B1.20.1/316L | | | A | 2 | | | | | | | | | |
| Thread 1" NPT PN 160, ASME B1.20.1/ Inconel 718 (2.4668) | | | A | 3 | | | | | | | | | |
| Flange DN 50 PN 40 Form C, DIN 2501/316/316 | | | A | 4 | | | | | | | | | |
| Flange DN 50 PN 40 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating | | | A | 5 | | | | | | | | | |
| Flange DN 50 PN 40 Form N, DIN 2501/316/316L | | | A | 6 | | | | | | | | | |
| Flange DN 50 PN 40 Form V13, DIN 2501/316/316L | | | A | 7 | | | | | | | | | |
| Flange DN 50 PN 40 Form V13, DIN 2501/Alloy C22 (2.4602) solid | | | A | 8 | | | | | | | | | |
| Flange DN 50 PN 40 Form V13, DIN 2501/316/316L, with Alloy C22 (2.4602) coating | | | B | 0 | | | | | | | | | |
| Flange DN 50 PN 64 Form E, DIN 2501/316/316L | | | B | 1 | | | | | | | | | |
| Flange DN 50 PN 100 Form C, DIN 2501/316/316L | | | B | 2 | | | | | | | | | |
| Flange DN 50 PN 100 Form F, DIN 2501/316/316L | | | B | 3 | | | | | | | | | |
| Flange DN 50 PN 100 Form V13, DIN 2501/316/316L | | | B | 4 | | | | | | | | | |
| Flange DN 50 PN 160 Form C, DIN 2501/316/316L | | | B | 5 | | | | | | | | | |
| Flange DN 50 PN 160 Form F, DIN 2501/316/316L | | | B | 6 | | | | | | | | | |
| Flange DN 65 PN 16 Form C, DIN 2501/316/316L | | | B | 7 | | | | | | | | | |
| Flange DN 65 PN 40 Form C, DIN 2501/316/316L | | | B | 8 | | | | | | | | | |
| Flange DN 65 PN 100 Form C, DIN 2501/316/316L | | | C | 0 | | | | | | | | | |
| Flange DN 80 PN 40 Form C, DIN 2501/316/316L | | | C | 1 | | | | | | | | | |
| Flange DN 80 PN 100 Form C, DIN 2501/316/316L | | | C | 2 | | | | | | | | | |
| Flange DN 80 PN 160 Form F, DIN 2501/316/316L | | | C | 3 | | | | | | | | | |
| Flange DN 80 PN 160 Form L, DIN 2501/316/316L | | | C | 4 | | | | | | | | | |
| Flange DN 80 PN 250 Form L, DIN 2501/316/316L | | | C | 5 | | | | | | | | | |
| Flange DN 80 PN 250 Form L, DIN 2501/Alloy C22 (2.4602) solid | | | C | 6 | | | | | | | | | |
| Flange DN 100 PN 16 Form C, DIN 2501/316/316L | | | C | 7 | | | | | | | | | |
| Flange DN 100 PN 40 Form C, DIN 2501/316/316L | | | C | 8 | | | | | | | | | |
| Flange DN 100 PN 100 Form E, DIN 2501/316/316L | | | D | 0 | | | | | | | | | |
| Flange DN 100 PN 160 Form L, DIN 2501/316/316L | | | D | 1 | | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, high temperature and pressure design<br>Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft). | Article No.<br>7ML5748- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange DN 125 PN 16 Form C, DIN 2501/316/316L | D 2 | |
| Flange DN 125 PN 40 Form C, DIN 2501/316/316L | D 3 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316/316L | D 4 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316/316L, with Alloy C22 (2.4602) coating | D 5 | |
| Flange DN 150 PN 40 Form C, DIN 2501/316/316L | D 6 | |
| Flange DN 150 PN 160 Form L, DIN 2501/316/316L | D 7 | |
| Flange DN 200 PN 16 Form C, DIN 2501/316/316L | D 8 | |
| Flange DN 200 PN 64 Form C, DIN 2501/316/316L | E 0 | |
| Flange DN 250 PN 16 Form C, DIN 2501/316/316L | E 1 | |
| Flange DN 250 PN 64 Form C, DIN 2501/316/316L | E 2 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/1.4435 | E 3 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L | E 4 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating | E 5 | |
| Flange DN 50 PN 40 Form B2, EN 1092-1/316/316L | E 6 | |
| Flange DN 50 PN 40 Form C, EN 1092-1/316/316L | E 7 | |
| Flange DN 50 PN 40 Form D, EN 1092-1/316/316L | E 8 | |
| Flange DN 50 PN 40 Form E, EN 1092-1/316/316L | F 0 | |
| Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L | F 1 | |
| Flange DN 50 PN 63 Form B2, EN 1092-1/316/316L, with Alloy C22 (2.4602) coating | F 2 | |
| Flange DN 50 PN 63 Form C, EN 1092-1/316/316L | F 3 | |
| Flange DN 50 PN 63 Form D, EN 1092-1/316/316L | F 4 | |
| Flange DN 50 PN 100 Form B1, EN 1092-01/316/316L | F 5 | |
| Flange DN 50 PN 100 Form C, EN 1092-1/316/316L | F 6 | |
| Flange DN 50 PN 160 Form B1, EN 1092-1/316/316L | F 7 | |
| Flange DN 50 PN 160 Form B2, EN 1092-1/316/316L | F 8 | |
| Flange DN 50 PN 250 Form B1, EN 1092-1/316/316L | G 0 | |
| Flange DN 50 PN 250 Form B2, EN 1092-1/316/316L | G 1 | |
| Flange DN 65 PN 40 Form B1, EN 1092-1/316/316L | G 2 | |
| Flange DN 65 PN 63 Form C, EN 1092-1/316/316L | G 3 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/316/316L | G 4 | |
| Flange DN 80 PN 40 Form B2, EN 1092-1/316/316L | G 5 | |
| Flange DN 80 PN 40 Form C, EN 1092-1/316/316L | G 6 | |
| Flange DN 80 PN 40 Form D, EN 1092-1/316/316L | G 7 | |
| Flange DN 80 PN 63 Form B2, EN 1092-1/316/316L | G 8 | |
| Flange DN 80 PN 160 Form B2, EN 1092-1/316/316L | H 0 | |
| Flange DN 80 PN 250 Form B1, EN 1092-1/316/316L | H 1 | |
| Flange DN 100 PN 16 Form D, EN 1092-1/316/316L | H 2 | |
| Flange DN 100 PN 40 Form B1, EN 1092-1/316/316L | H 3 | |
| Flange DN 100 PN 40 Form B2, EN 1092-1/316/316L | H 4 | |
| Flange DN 100 PN 40 Form C, EN 1092-1/316/316L | H 5 | |
| Flange DN 100 PN 40 Form D, EN 1092-1/316/316L | H 6 | |
| Flange DN 100 PN 160 Form B2, EN 1092-1/316/316L | H 7 | |
| Flange DN 125 PN 63 Form C, EN 1092-1/316/316L | H 8 | |
| Flange DN 125 PN 160 Form B2, EN 1092-1/316/316L | K 0 | |
| Flange DN 150 PN 40 Form B1, EN 1092-1/316/316L | K 1 | |
| Flange DN 150 PN 40 Form C, EN 1092-1/316/316L | K 2 | |
| Flange DN 150 PN 40 Form D, EN 1092-1/316/316L | K 3 | |
| Flange DN 40 PN 100, GOST 12815-80.7/316/316L | K 4 | |
| Flange DN 50 PN 100, GOST 12815-80.7/316/316L | K 5 | |
| Flange DN 80 PN 100, GOST 12815-80.7/316/316L | K 6 | |
| Flange DN 100 PN 100, GOST 12815-80.7/316/316L | K 7 | |
| Flange 1½" 150 lb RJF, ASME B16.5/316/316L | K 8 | |
| Flange 1½" 300 lb RJF, ASME B16.5/316/316L | L 1 | |
| Flange 1½" 1 500 lb RJF, ASME B16.5/316/316L | L 2 | |
| Flange 2" 150 lb RF, ASME B16.5/316/316L | L 3 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | L 4 | |
| Flange 2" 300 lb RF, ASME B16.5/316/316L | L 5 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, high temperature and pressure design<br>Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft). | Article No.<br>7ML5748- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | L 6 | |
| Flange 2" 300 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating | L 7 | |
| Flange 2" 300 lb ST (small tongue), ASME B16.5/316/316L | L 8 | |
| Flange 2" 300 lb RJF, ASME B16.5/316/316L | M 1 | |
| Flange 2" 300 lb LM (large male), ASME B16.5/316/316L | M 2 | |
| Flange 2" 300 lb SG, ASME B16.5/316/316L | M 3 | |
| Flange 2" 300 lb LG, ASME B16.5/316/316L | M 4 | |
| Flange 2" 600 lb RF, ASME B16.5/316/316L | M 5 | |
| Flange 2" 600 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating | M 6 | |
| Flange 2" 600 lb RJF, ASME B16.5/316/316L | M 7 | |
| Flange 2" 900 lb RF, ASME B16.5/316/316L | M 8 | |
| Flange 2" 900 lb RJF, ASME B16.5/316/316L | N 1 | |
| Flange 2" 1 500 lb RF, ASME B16.5/316/16L | N 2 | |
| Flange 2" 1 500 lb RJF, ASME B16.5/316/316L | N 3 | |
| Flange 2" 1 500 lb LT, ASME B16.5/Alloy C22 (2.4602) solid | N 4 | |
| Flange 2" 1 500 lb LM, ASME B16.5/316/316L | N 5 | |
| Flange 2" 2 500 lb RJF, ASME B16.5/316/316L | N 6 | |
| Flange 2½" 150 lb RF, ASME B16.5/316/316L | N 7 | |
| Flange 2½" 300 lb RF, ASME B16.5/316/316L | N 8 | |
| Flange 2½" 600 lb RF, ASME B16.5/316/316L | P 1 | |
| Flange 2½" 900 lb RF, ASME B16.5/316/316L | P 2 | |
| Flange 2½" 2 500 lb RJF, ASME B16.5/316/316L | P 3 | |
| Flange 3" 150 lb RF, ASME B16.5/316/316L | P 4 | |
| Flange 3" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | P 5 | |
| Flange 3" 300 lb RF, ASME B16.5/316/316L | P 6 | |
| Flange 3" 300 lb RJF, ASME B16.5/316/316L | P 7 | |
| Flange 3" 300 lb LT, ASME B16.5/316/316L | P 8 | |
| Flange 3" 600 lb RF, ASME B16.5/316/316L | R 1 | |
| Flange 3" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | R 2 | |
| Flange 3" 600 lb RF, ASME B16.5/316/316L, with Alloy C22 (2.4602) coating | R 3 | |
| Flange 3" 600 lb RJF, ASME B16.5/316/316L | R 4 | |
| Flange 3" 900 lb RF, ASME B16.5/316/316L | R 5 | |
| Flange 3" 900 lb RJF, ASME B16.5/316/316L | R 6 | |
| Flange 3" 1 500 lb RF, ASME B16.5/316/316L | R 7 | |
| Flange 3" 1 500 lb RJF, ASME B16.5/316/316L | R 8 | |
| Flange 3" 2 500 lb RF, ASME B16.5/316/316L | S 1 | |
| Flange 3" 2 500 lb RJF, ASME B16.5/316/316L | S 2 | |
| Flange 4" 150 lb RF, ASME B16.5/316/316L | S 3 | |
| Flange 4" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | S 4 | |
| Flange 4" 150 lb RJF, ASME B16.5/316/316L | S 5 | |
| Flange 4" 300 lb RF, ASME B16.5/316/316L | S 6 | |
| Flange 4" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | S 7 | |
| Flange 4" 300 lb LT, ASME B16.5/316/316L | S 8 | |
| Flange 4" 600 lb RF, ASME B16.5/316/316L | T 1 | |
| Flange 4" 600 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | T 2 | |
| Flange 4" 600 lb RJF, ASME B16.5/316/316L | T 3 | |
| Flange 4" 900 lb RF, ASME B16.5/316/316L | T 4 | |
| Flange 4" 900 lb RJF, ASME B16.5/316/316L | T 5 | |
| Flange 4" 900 lb LT, ASME B16.5/316/316L | T 6 | |
| Flange 4" 1 500 lb RF, ASME B16.5/316/316L | T 7 | |
| Flange 4" 1 500 lb RJF, ASME B16.5/316/316L | T 8 | |
| Flange 4" 1 500 lb LT, ASME B16.5/316/316L | U 1 | |
| Flange 5" 150 lb RF, ASME B16.5/316/316L | U 2 | |
| Flange 5" 300 lb RF, ASME B16.5/316/316L | U 3 | |
| Flange 5" 600 lb RJF, ASME B16.5/316/316L | U 4 | |
| Flange 6" 150 lb RF, ASME B16.5/316/316L | U 5 | |
| Flange 6" 300 lb RF, ASME B16.5/316/316L | U 6 | |

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## Selection and ordering data (continued)

| SITRANS LVL200 Vibrating point level switch, high temperature and pressure design<br>Detects level and material in liquids and slurries in extreme environments. Extension options to 3 m (9.84 ft). | Article No.<br>7ML5748- ● ● ● ● ● - ● ● ● ● | Ord. Code<br>● ● ● |
|---|---|---|
| Flange 6" 300 lb LT, ASME B16.5/316/316L | U 7 | |
| Flange DN 50 30K RF, JIS/316/316L | U 8 | |
| Flange DN 50 40K RF, JIS/316/316L | V 1 | |
| Flange DN 65 40 K RF, JIS/316/316L | V 2 | |
| Mobrey flange PN 16 Form A/316/316L | V 3 | |
| Mobrey flange PN 16 Form E/316/316L | V 4 | |
| Thread R1 PN 160, EN 10226-1/Inconel 718 (2.4668)[14)] | W 1 | |
| Thread R1 PN 100, EN 10226-1/316L[15)] | W 2 | |
| **Gas-tight seal/Process temperature** | | |
| With gas-tight seal/-196 ... +450 °C (-321 ... +842 °F) | 1 | |
| Without/-196 ... +450 °C (-321 ... +842 °F) | 2 | |
| **Electronics** | | |
| Relay (2 x SPDT) 20 .. 72 V DC/20 ... 253 V AC (5A) | 1 | |
| Transistor (NPN/PNP) 9.6 ... 55 V DC | 2 | |
| Two-wire (8/16 mA) 9.6 ... 35 V DC | 3 | |
| Relay (2 x SPDT) 20 ... 72 V DC/20 ... 253 V AC (5A), with SIL qualification | 4 | |
| Transistor (NPN/PNP) 9.6 ... 55 V DC, with SIL qualification | 5 | |
| Two-wire (8/16 mA) 9.6 ... 35 V DC, with SIL qualification | 6 | |
| **Housing/Cable entry** | | |
| Plastic single chamber/IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm) | A | |
| Plastic single chamber/IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm) | B | |
| Aluminum IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm) | C | |
| Aluminum IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm) | D | |
| Stainless steel single chamber (precision casting)/ IP66/IP67/M20 x 1.5 | E | |
| Stainless steel single chamber (precision casting)/ IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm) | F | |
| Stainless steel single chamber (electropolished)/ IP66/IP67/M20 x 1.5 gland PA black (ø5 ... 9 mm) | G | |
| Stainless steel single chamber (electropolished)/ IP66/IP67/½" NPT gland PA black (ø5 ... 9 mm) | H | |
| Aluminium IP66/IP67/M20 x 1.5 blind plug | J | |
| Aluminium IP66/IP67/½" NPT blind plug | K | |
| Stainless steel single chamber (precision casting)/IP66/IP67/M20 x 1.5 blind plug | L | |
| Stainless steel single chamber (precision casting)/ IP66/IP67/½" NPT blind plug | M | |
| Stainless steel single chamber (electropolished)/ IP66/IP67/M20 x 1.5 blind plug | N | |
| Stainless steel single chamber (electropolished)/ IP66/IP67/½" NPT blind plug | P | |
| **Rigid Extension Compact** | | |
| Compact version, 77 mm | C 1 | |
| **Rigid Extension 316L** | | |
| 200 ... 500 mm | A 0 | |
| 501 ... 1 000 mm | A 1 | |
| 1 001 ... 1 500 mm | A 2 | |
| 1 501 ... 2 000 mm | A 3 | |
| 2 001 ... 2 500 mm | A 4 | |
| 2 501 ... 3 000 mm | A 5 | |
| **Rigid Extension Alloy C22** | | |
| 200 ... 500 mm | B 0 | |
| 501 ... 1 000 mm | B 1 | |
| 1 001 ... 1 500 mm | B 2 | |
| 1 501 ... 2 000 mm | B 3 | |
| 2 001 ... 2 500 mm | B 4 | |
| 2 501 ... 3 000 mm | B 5 | |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Cleaning including Certificate(oil, grease, and silicone free). | **W01** |
| Enter the total insertion length in plain text description. | **Y01** |
| Identification label (measurement loop) stainless steel. | **Y17** |
| Identification Label (measurement loop) foil. | **Y18** |
| Output switching delay (1 ... 60 s)/default is 1 s | **Y36** |
| NACE0175 to 3.1 Material Certificate for material (EN 10204 NACE MR 0175) Note: not available with some Process connection options. | **D07** |
| Material Inspection 3.1-Inspection certificate for material (EN 10204) | **C05** |
| Acceptance test Certificate 2.2 for material (EN 10204) | **C15** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204) | **C13** |
| 3.1-Inspection certificate for instrument with test data (EN 10204) | **C25** |
| Quality and test plan | **C26** |
| Inspection certificate 3.1 (EN 10204) - device and pressure test | **C31** |
| Helium leak test + 3.1 certificate/instrument | **C32** |

| Spare Parts and Accessories | Article No. |
|---|---|
| SITRANS SCSC single channel signal conditioner and remote test | **7ML5760** |
| SITRANS TCSC two channel signal conditioner and remote test | **7ML5761** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

1) Not available with Process Connection options A0 and A2.
2) Available only with Rigid extension option C1.
3) Available only with 316L Process Connection and Rigid extension options.
4) Available only with Alloy C22 Rigid extension options.
5) Available only with Electronic options 3 and 6.
6) Available only with Housing/Cable entry options J, K, L, M.
7) Available only with Electronic option 6.
8) Available only with Electronic options 1, 2, and 4.
9) Available only with Gas tight seal/Process temperature option 1.
10) Not available with Housing/Cable entry options G, H, N, P.
11) Available only with Housing/Cable entry options J, K, L, M, N, P.
12) Not available with Housing/Cable entry options A and B.
13) Not available with Housing/Cable entry options A, B, G, H, N, P.
14) Available only with Version/material option 1.
15) Available only with Version/material option 2.

| **SITRANS SCSC, single channel, signal conditioner Provides power and relay output for one LVL200 vibrating switch, 8/16 mA electronics design. Provides remote test of any LVL200 device.** | **Article No. 7ML5760-** | ● | ● | A | ● | 1 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | |
| For Ex-free area | | 1 | A | | | | | | | | |
| ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I | | 1 | D | | | | | | | | |
| ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG | | 1 | E | | | | | | | | |
| IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I | | 1 | H | | | | | | | | |
| IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG | | 1 | J | | | | | | | | |
| Ex-free area (incl. EAC approval) | | 2 | A | | | | | | | | |
| **SIL qualification** | | | | | | | | | | | |
| Without | | | | | 1 | | | | | | |
| With | | | | | 2 | | | | | | |
| **Version** | | | | | | | | | | | |
| Single-channel (8/16 mA) for level detection | | | | | | | | 1 | | | |
| Single channel (8/16 mA), level detection with fail safe relay | | | | | | | | 2 | | | |
| **Housing/cable entry** | | | | | | | | | | | |
| Plastic/IP20 | | | | | | | | | A | | |
| **Terminal block connection** | | | | | | | | | | | |
| Detachable 2.5 mm²/ Ex sensor: 2 x blue; output and operating voltage: 2 x black | | | | | | | | | | A | |
| Detachable 2.5 mm²/ sensor: 2 x black; output and operating voltage: 2 x black | | | | | | | | | | B | |
| **Language** | | | | | | | | | | | |
| English | | | | | | | | | | | 0 |
| German | | | | | | | | | | | 1 |

| Selection and Ordering data |
|---|
| **Operating Instructions** |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation |

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## Selection and ordering data (continued)

| SITRANS TCSC, dual channel, signal conditioner<br>Provides power and relay output for two LVL200 vibrating switches, 8/16 mA electronics design. Provides remote test of any LVL200 device. | Article No.<br>7ML5761- | ● | ● | A | ● | 1 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | |
| For Ex-free area[1] | | 1 | A | | | | | | | | |
| ATEX II (1) G/D [Ex ia Ga/Da] IIC/IIIC, I (M1) [Ex ia Ma] I[2] | | 1 | D | | | | | | | | |
| ATEX II (1) G/D (Ex ia Ga/Da) IIC/IIIC, I (M1) (Ex ia Ma) I + WHG | | 1 | E | | | | | | | | |
| IEC [Ex ia Ga] IIC, [Ex ia Da] IIIC, [Ex ia Ma] I[2] | | 1 | H | | | | | | | | |
| IEC (Ex ia Ga) IIC, (Ex ia Da) IIIC, (Ex ia Ma) I + WHG | | 1 | J | | | | | | | | |
| Ex-free area (incl. EAC approval) | | 2 | A | | | | | | | | |
| **SIL qualification** | | | | | | | | | | | |
| Without | | | | | 1 | | | | | | |
| With | | | | | 2 | | | | | | |
| **Version** | | | | | | | | | | | |
| Double-channel (8/16 mA) for level detection | | | | | | | | 1 | | | |
| **Housing/cable entry** | | | | | | | | | | | |
| Plastic/IP20 | | | | | | | | | A | | |
| **Terminal block connection** | | | | | | | | | | | |
| Detachable 2.5 mm²/ Ex sensor: 2 x blue; output and operating voltage: 2 x black | | | | | | | | | | A | |
| Detachable 2.5 mm²/ sensor: 2 x black; output and operating voltage: 2 x black | | | | | | | | | | B | |
| **Language** | | | | | | | | | | | |
| English | | | | | | | | | | | 0 |
| German | | | | | | | | | | | 1 |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions**<br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

[1] Available only with terminal block connection option B.
[2] Available only with terminal block connection option A.

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## Technical specifications

| SITRANS LVL200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Vibrating point level switch |
| **Input** | |
| Measured variable | High and low and demand (via mode switch) |
| **Output** | |
| Output options | • Relay output (DPDT), 2 floating SPDTs<br>• Contactless electronic switch<br>• 2-wire Namur signal output<br>• Transistor (NPN/PNP) 10 ... 55 V DC<br>• 8/16 mA |
| **Measuring accuracy** | |
| Repeatability | 0.1 mm (0.004 inch) |
| Hysteresis | Approx. 2 mm (0.08 inch) with vertical installation |
| Switching delay | • Standard, Extended: approx. 500 ms (on/off)<br>• High temperature: approx. 1 s (optionally adjustable at factory) |
| Frequency | • Standard, Extended: Approx. 1 200 Hz<br>• High temperature: 1400 Hz |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +70 °C (-40 ... +158 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | III |
| • Pollution degree | 2 |
| Medium conditions | |
| • Temperature | |
| - LVL200S Standard | -50 ... +150 °C (-58 ... +302 °F) |
| - LVL200S High temperature option | -50 ... +250 °C (-58 ... +482 °F) |
| - LVL200E Standard: with 316L/ Alloy C22 | -50 ... +150 °C (-58 ... +302 °F) |
| - LVL200E High temperature option with 316L/Alloy C22 | -50 ... +250 °C (-58 ... +482 °F) |
| - LVL200H High temperature | -196 ... +450 °C (-321 ... +842 °F) |
| Pressure (vessel) | • Standard, Extended: -1 ... 64 bar g (-14.5 ... 928 psi g)<br>• High temperature: instrument version up to 160 bar (2 320 psi g): -1 ... 160 bar/-100 ... 16 000 kPa (-14.5 ... 2 320 psi g)<br>Note: The process pressure is dependent on configuration, including process fitting, e.g. flange |
| Density | 0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lb/in³); 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 lb/in³) by switching over<br>Density optionally starts at 0.47 cm³ (0.017 lb/in³) |
| **Design** | |
| Material | |
| • Enclosure | • Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester<br>• Stainless steel housing, electropolished 316L<br>• Stainless steel housing, precision casting 316L<br>• Plastic housing, plastic PBT (Polyester) |

## Technical specifications (continued)

| SITRANS LVL200 | |
|---|---|
| • Tuning fork | 316L (1.4404 or 1.4435), Alloy C22 |
| • Extension tube [ø 21.3 mm (0.839 inch)] | 316L (1.4404 or 1.4435), Alloy C22 |
| • Process connection: threaded | • Standard, Extended: 316L (1.4404 or 1.4435), Alloy C22<br>• High temperature: Inconel 718 |
| • Process connection: flange | 316L (1.4404 or 1.4435), 316L with Alloy C22, ECTFE, or PFA coating |
| • Process seal | Klingersil C-4400 |
| Process connection | |
| • Pipe thread, cylindrical (ISO 228 T1) | G ¾" A, G 1" A |
| • Pipe thread, tapered | ¾" NPT, 1" NPT, 1½" NPT |
| • Flanges | DIN from DN 25, ASME from 1" |
| • Hygienic fittings | Bolting DN 40 PN 40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN 25 PN 40, Tuchenhagen Varivent DN 50 PN 10, SMS |
| Degree of protection | Type 4X/NEMA 4X/IP66/IP67 |
| Conduit entry | • 1 x M20 x 1.5 (cable: ø 5 ... 9 mm), 1 x blind stopper M20 x 1.5; attached 1 x M20 x 1.5 cable entry<br>• 1 x ½" NPT cable entry, 1 x blind stopper ½" NPT, 1 x ½" NPT cable entry<br>• 1x M12 x 1; 1 x blind stopper M20 x 1.5 |
| Weight | |
| • Device weight (dependent on process fitting) | Approx. 0.8 ... 4 kg (0.18 ... 8.82 lb) |
| • Tube extension (extended version) | Approx. 920 g/m (10 oz/ft) |
| **Power supply** | |
| Supply voltage | |
| • Relay DPDT | 20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC |
| • Contactless | 20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC |
| • 2-wire NAMUR | |
| Operating voltage (characteristics according to standard) for connection to an amplifier according to NAMUR | IEC 60947-5-6, approx. 8.2 V<br>Off-load voltage $U_o$ approx. 8.2 V<br>Short-circuit current $I_U$ approx. 8.2 mA |
| Operating voltage 8/16 mA (via the signal conditioning instrument) | |
| • Non-Ex instrument | 12 ... 36 V DC |
| • Ex-d instrument (ATEX, FM, CSA) | 12 ... 36 V DC |
| • Ex-ia instrument (ATEX) | 12 ... 29 V DC |
| • Ex-ia instrument (FM, CSA) | 12 ... 31 V DC |
| Power consumption | • Standard, Extended: 1 ... 8 VA (AC), approx. 1.3 W (DC)<br>• High temperature: 3 VA (AC), 1 W (DC) |
| • Relay DPDT | 1 ... 8 VA (AC), approx. 1.3 W (DC) |
| • Contactless | Domestic current requirement approx. 3 mA (via load circuit)<br>Load current<br>• Min. 10 mA<br>• Max. 400 mA [with I > 300 mA the ambient temperature can be max. 60 °C (140 °F)]<br>• Max. 4 A up to 40 ms (not WHG specified) |

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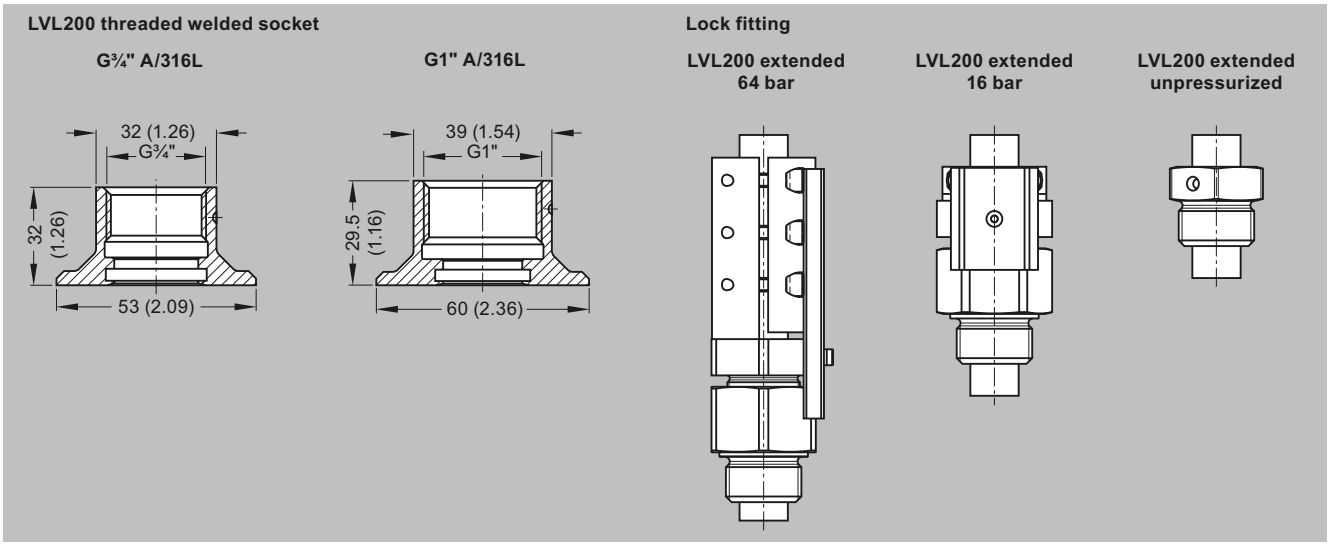
## Technical specifications (continued)

| SITRANS LVL200 | |
|---|---|
| • 8/16 mA, two-wire output | Output signal<br>• Empty (uncovered)<br>- 8 mA<br>• Full (covered)<br>- 16 mA<br>• Fault message<br>- < 1.8 mA<br>Possible signal conditioning instruments:<br>SITRANS SCSC,<br>SITRANS TCSC |
| • 2-wire Namur | Current consumption<br>• Falling characteristics ≥ 2.6 mA uncovered/≤ 0.6 mA covered<br>• ≤ 0.6 mA uncovered/≥ 2.6 mA covered<br>• Failure message ≤ 0.6 mA |
| • Transistor (NPN/PNP) 10 ... 55 V DC | Output<br>• Floating transistor output, permanently shortcircuit-proof<br>Load current<br>• < 400 mA<br>Voltage loss<br>• < 1 V<br>Switching voltage<br>• < 55 V DC<br>Blocking current<br>• < 10 µA |
| **Certificates and approvals** | • CE, CSA<br>• Overfill Protection WHG and VLAREM II<br>• FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D<br>• FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G1<br>• IECEx d IIC T6 ... T2 Ga/Gb EHEDG<br>• ATEX II 1/2G, 2G EEx d IIC T6<br>• ATEX II 1G, 1/2G, 2G EEx ia IIC T6<br>• Shipping approvals<br>• BR-Ex d IIC T6 ... T2<br>• FDA, 3A, EHEDG<br>• SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)]<br>Please see configuration section below for full list of approvals. |

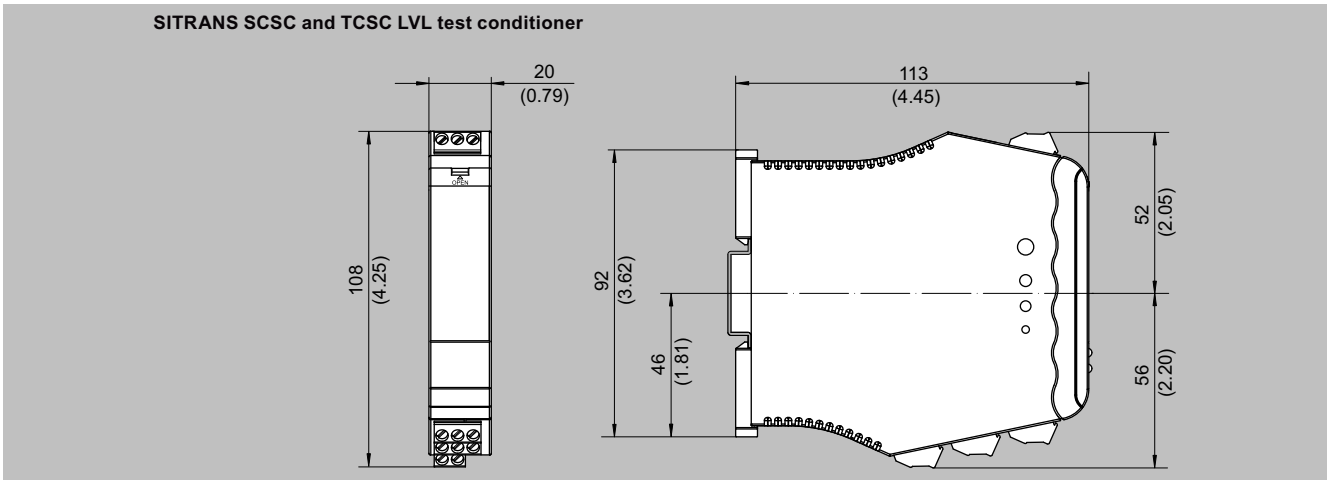
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## Options




SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

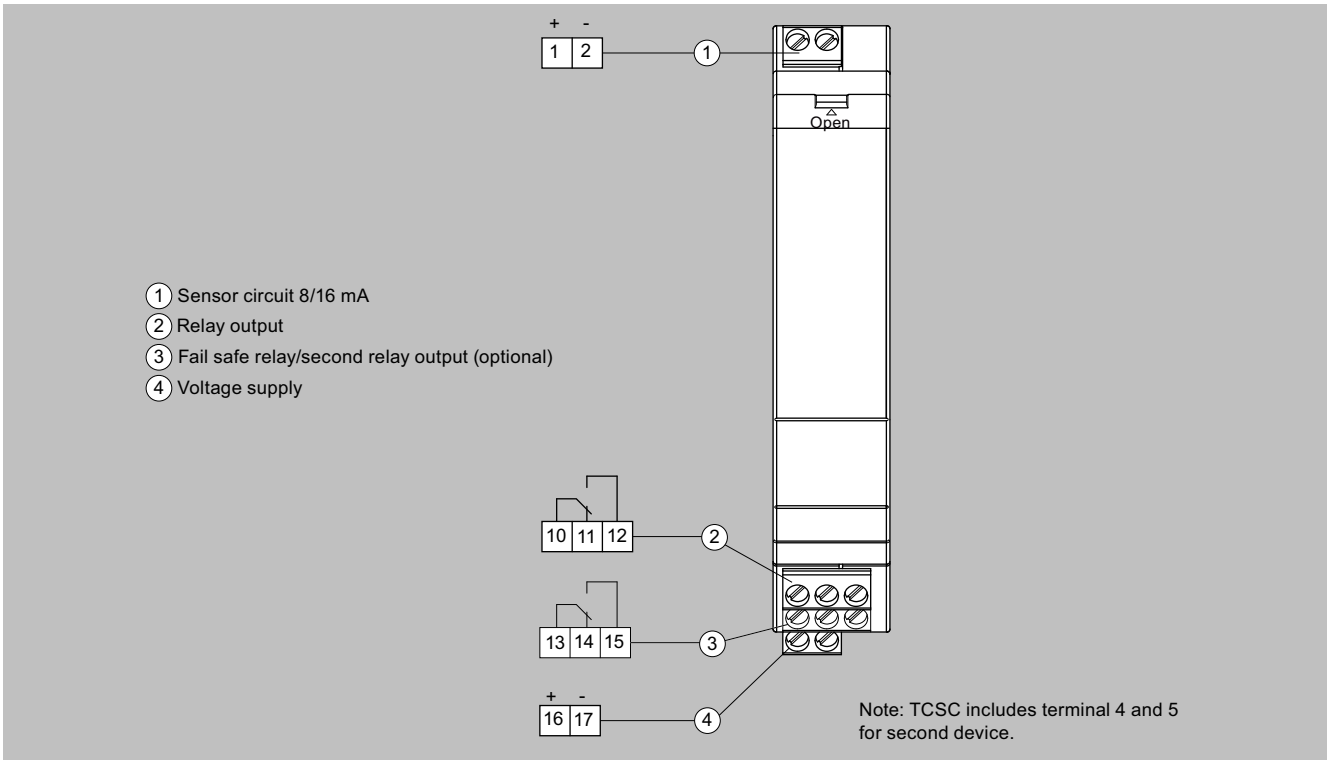



SITRANS SCSC and SITRANS TCSC LVL Test Conditioners, dimensions in mm (inch)

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**Options** (continued)

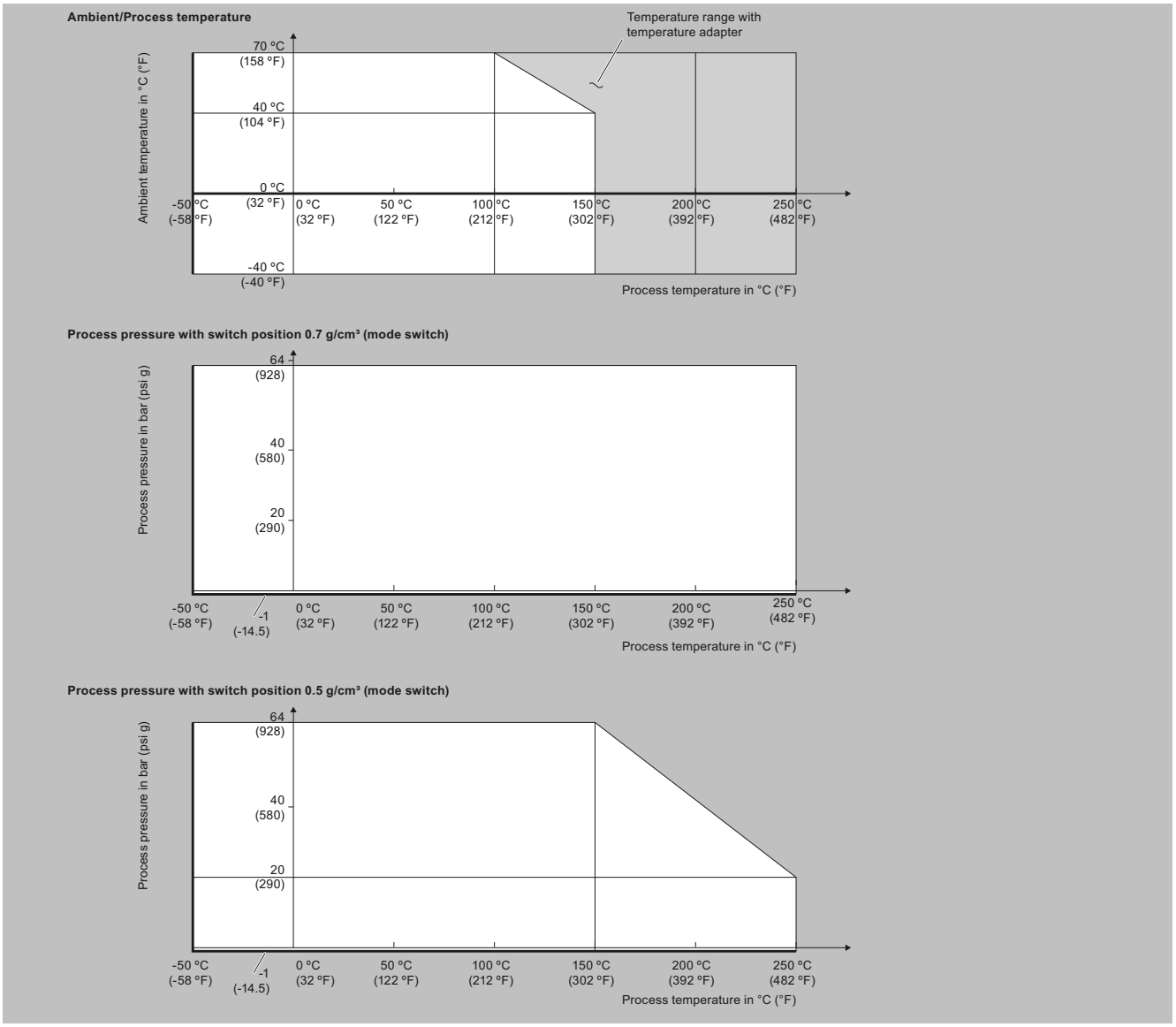



SITRANS SCSC and SITRANS TCSC LVL Test Conditioner connections

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## Characteristic curves

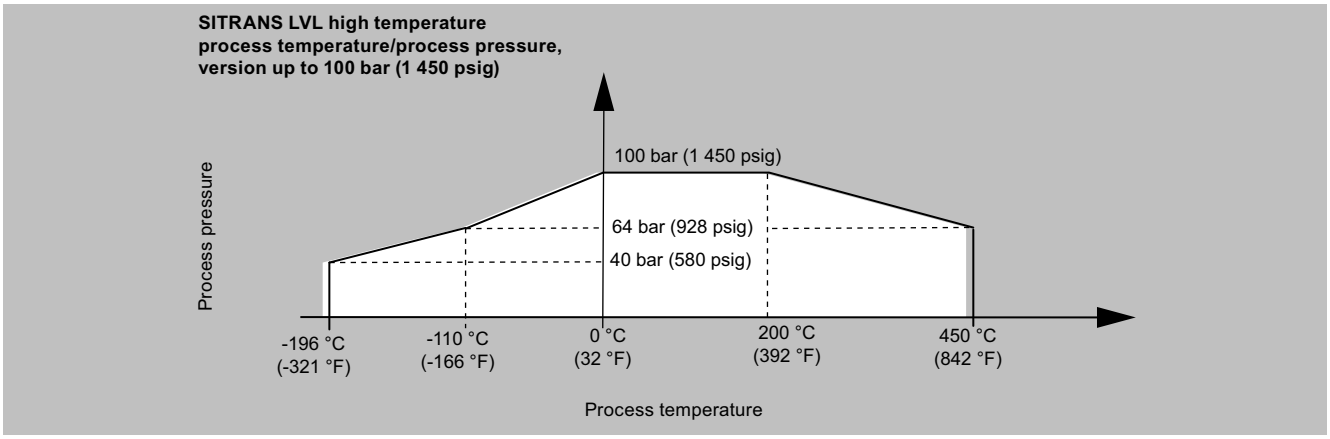



SITRANS LVL200 process pressure/process temperature/ambient temperature derating curves

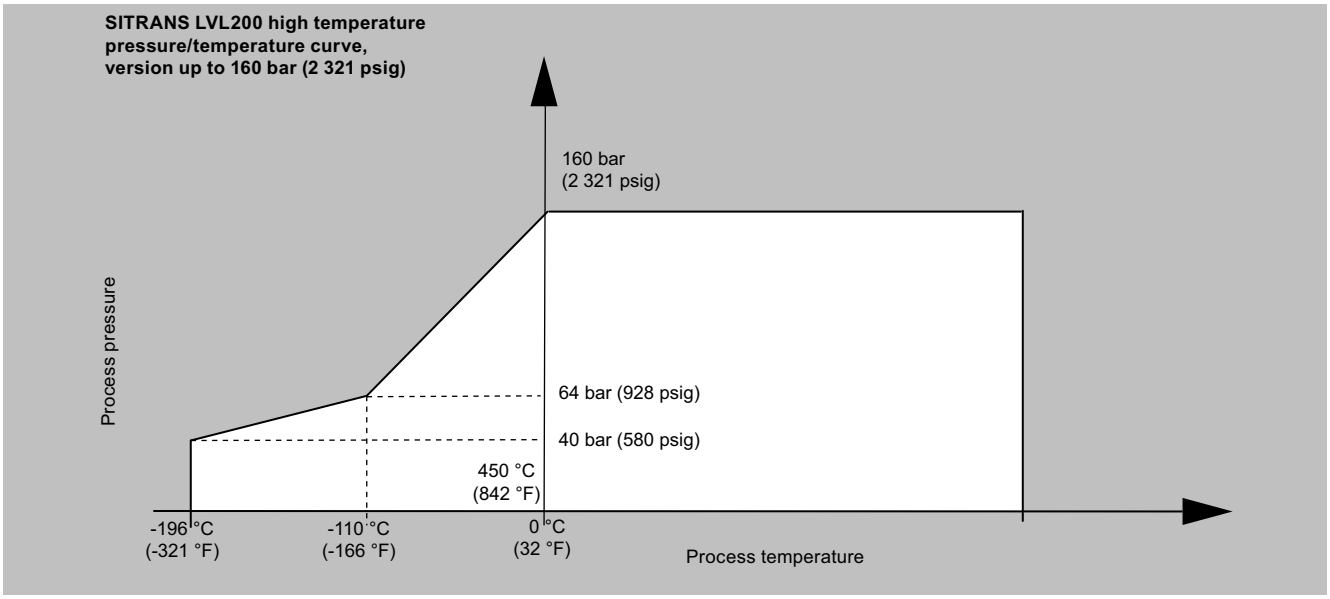
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## Characteristic curves (continued)




SITRANS LVL200 high temperature process temperature/process pressure curve, version up to 100 bar (1 450 psig)

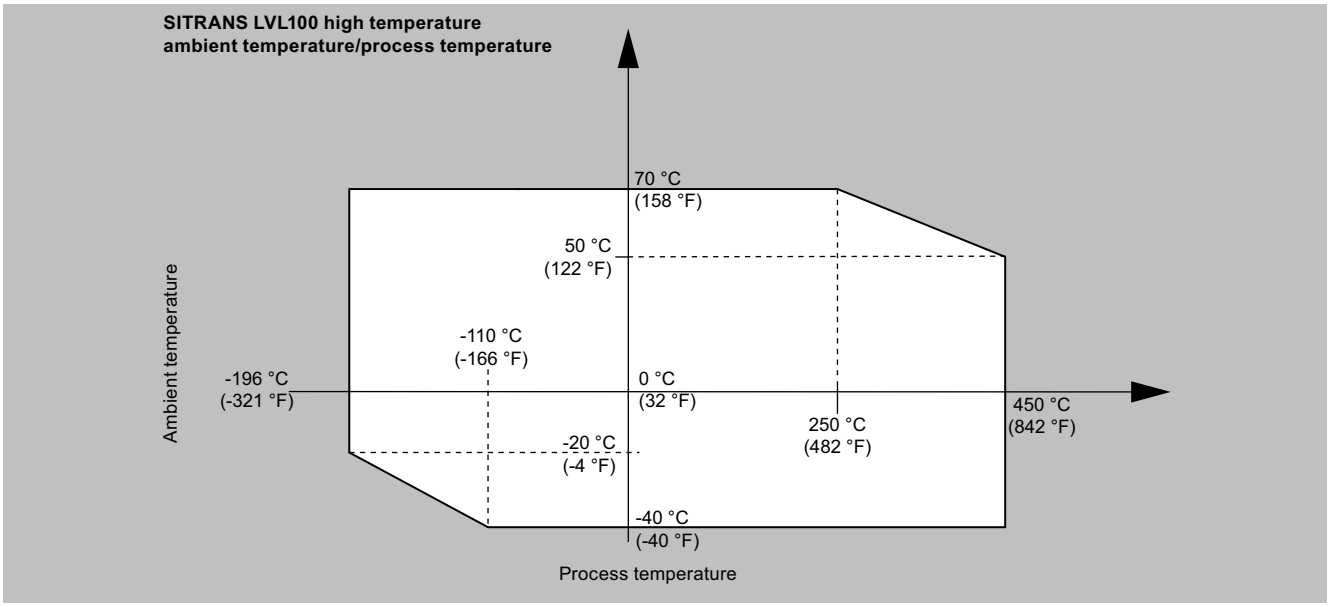



SITRANS LVL200 high temperature pressure/temperature curve, version up to 160 bar (2 321 psig)

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## Characteristic curves (continued)



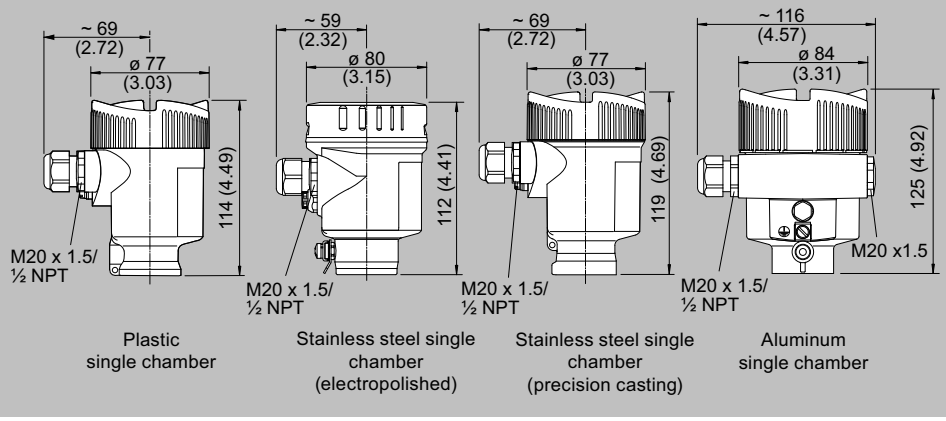

SITRANS LVL200 high temperature ambient temperature/process temperature

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## Dimensional drawings

**SITRANS LVL200, housing**

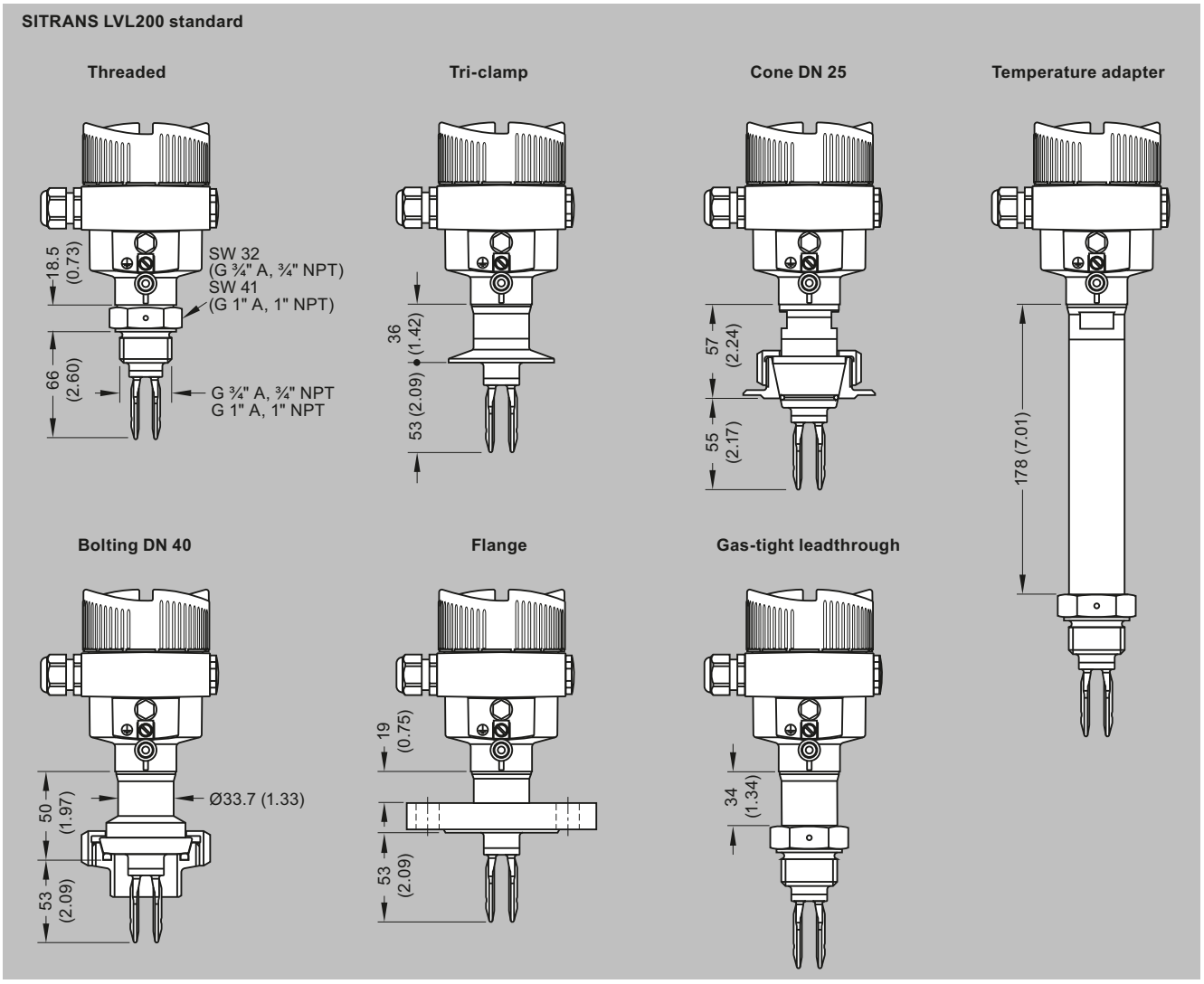



SITRANS LVL200 housing, dimensions in mm (inch)

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## Dimensional drawings (continued)



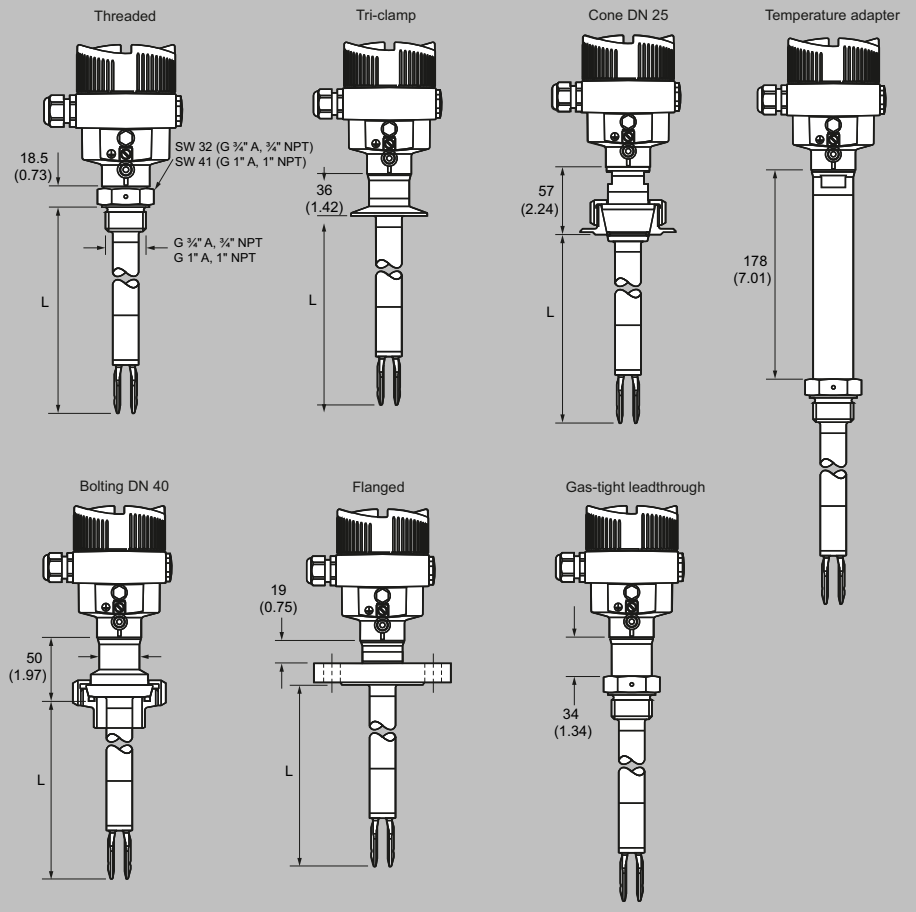

SITRANS LVL200 (standard), dimensions in mm (inch)

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## Dimensional drawings (continued)

**SITRANS LVL200 extended**




**Sensor length (L)**

| | |
|---|---|
| 316L, Alloy C22 (2.4602) | 80 ... 6 000 mm (3.15 ... 236.2 inch) |
| Enamelled | 80 ... 1 500 mm (3.15 ... 59.06 inch) |
| 316L, ECTFE coated | 80 ... 3 000 mm (3.15 ... 118.1 inch) |
| 316L, PFA coated | 80 ... 4 000 mm (3.15 ... 157.5 inch) |

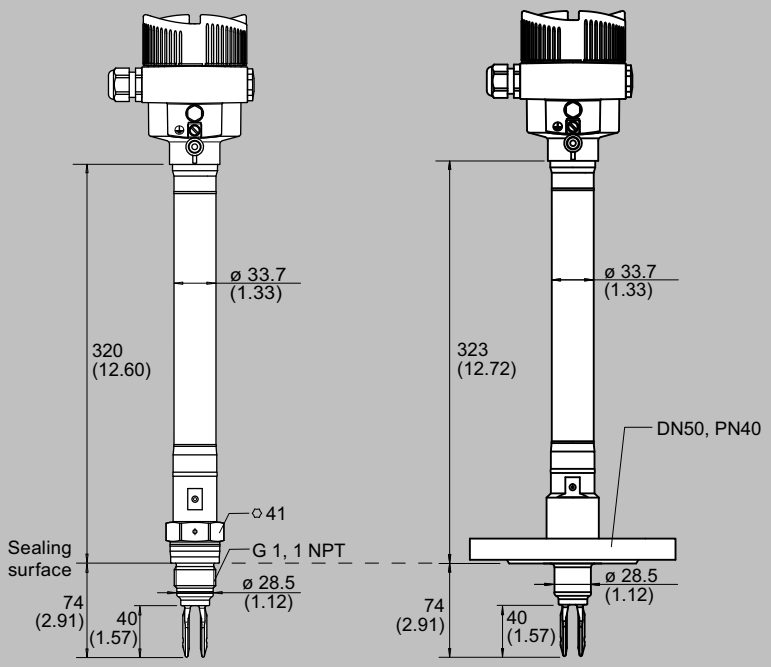
SITRANS LVL200 (extended), dimensions in mm (inch)

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## Dimensional drawings (continued)

**SITRANS LVL200 high temperature, compact version**



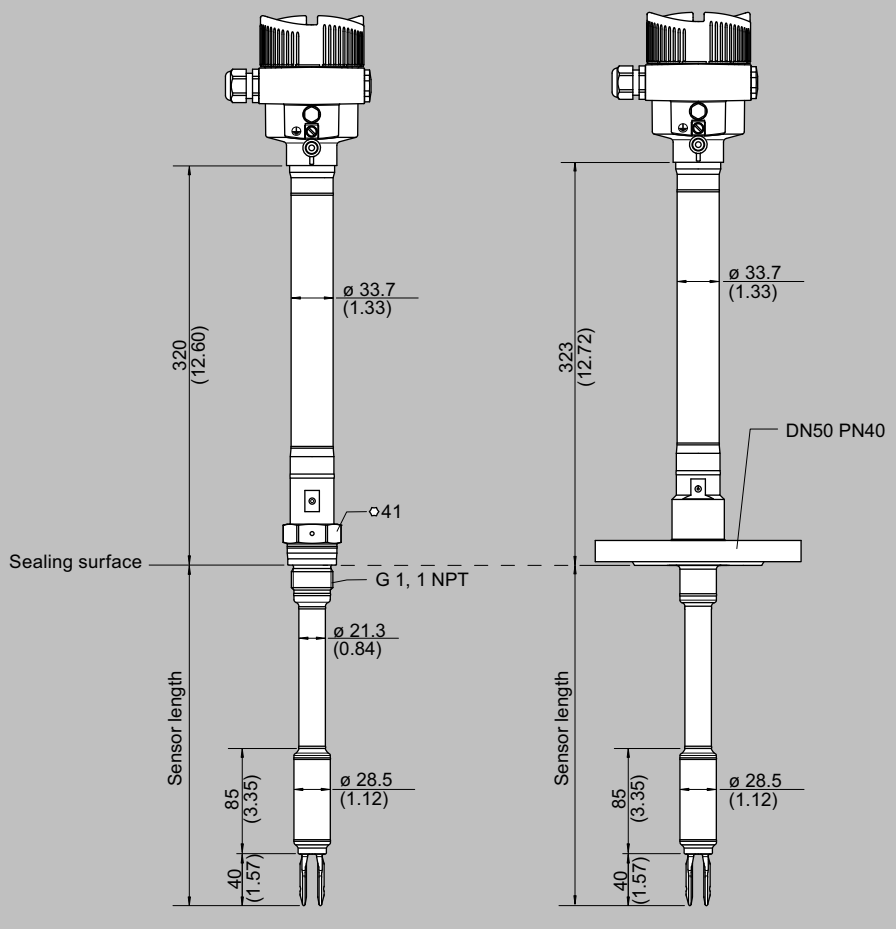

SITRANS LVL200 high temperature, compact version, dimensions in mm (inch)

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## Dimensional drawings (continued)

**SITRANS LVL200 high temperature, tube version**

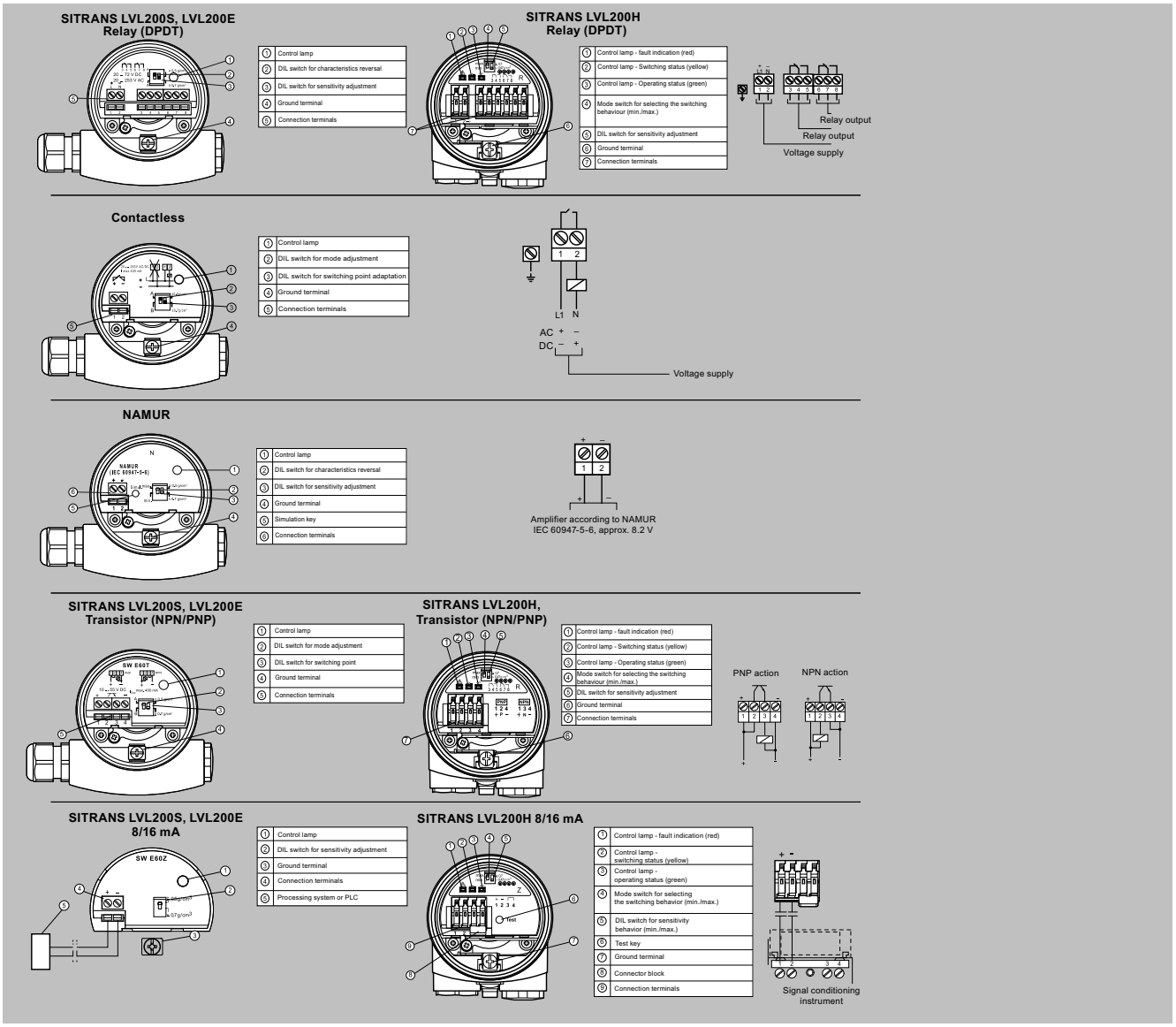



SITRANS LVL200 high temperature, tube version, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LVL200 connections

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## Overview



SITRANS LVS100 is a vibrating point level switch for material detection in bulk solids.

## Benefits

- High resistance to mechanical forces
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 30 g/l (1.9 lb/ft$^3$)
- Customer desired extensions up to 4 000 mm (157.48 inch)

## Application

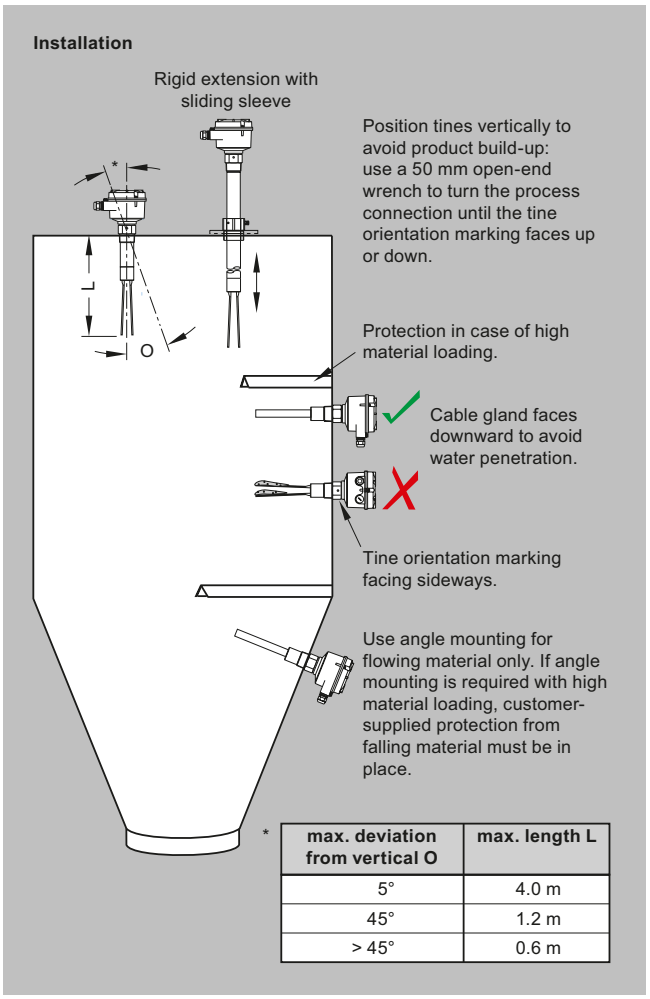
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers

## Configuration




| * max. deviation from vertical O | max. length L |
|---|---|
| 5° | 4.0 m |
| 45° | 1.2 m |
| > 45° | 0.6 m |

SITRANS LVS100 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LVS100 Vibrating fork point level switch<br>Level and material detection for dry bulk solids. Extension options to 4 m (13.12 ft). | Article No.<br>7ML5735- | ● | ● | ● | ● | ● | - | 0 | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Input Voltage** | | | | | | | | | | | |
| DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC | | 1 | | | | | | | | | |
| DPDT Relay: 19 ... 230 V AC, 19 ... 40 V DC (stocked version)[1)3)] | | 2 | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | |
| Up to 150 °C (302 °F) | | | A | | | | | | | | |
| Process connection | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | |
| R 1½" [(BSPT), EN 10226] | | | | A | | | | | | | |
| 1¼" NPT [(Taper), ANSI/ASME B1.20.1] | | | | B | | | | | | | |
| R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve [min. length 500 mm (19.69 inch)][2)] | | | | C | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] , sliding sleeve [min. length 500 mm (19.69 inch)][2)] | | | | D | | | | | | | |
| **Extension length** | | | | | | | | | | | |
| ***Stainless steel 316L (1.4404)*** | | | | | | | | | | | |
| Standard length, 170 mm (6.69 inch) | | | | | 1 | 1 | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| ***Stainless steel 304 (1.4301)*** | | | | | | | | | | | |
| 230 ... 500 mm (9.05 ... 19.69 inch) | | | | | 1 | 2 | | | | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | | | | | 1 | 3 | | | | | |
| 1 001 ... 1 500 mm (39.41 ... 59.06 inch) | | | | | 1 | 4 | | | | | |
| 1 501 ... 2 000 mm (59.09 ... 78.74 inch) | | | | | 1 | 5 | | | | | |
| 2 001 ... 2 500 mm (78.78 ... 98.43 inch) | | | | | 1 | 6 | | | | | |
| 2 501 ... 3 000 mm (98.46 ... 118.11 inch) | | | | | 1 | 7 | | | | | |
| 3 001 ... 3 500 mm (118.15 ... 137.80 inch) | | | | | 1 | 8 | | | | | |
| 3 501 ... 4 000 mm (137.83 ... 157.48 inch) | | | | | 2 | 0 | | | | | |
| **Approvals** | | | | | | | | | | | |
| CSA/FM General Purpose, CE, RCM | | | | | | | | | A | | |
| CSA/FM Class II, Div. 1, Groups E, F, G, Class III, ATEX II ½ D, RCM | | | | | | | | | B | | |
| IEC-Ex Ex t IIIC T-- Da/Db IP6X | | | | | | | | | C | | |
| EAC Ex ta/tb IIIC Da/Db | | | | | | | | | D | | |

1) Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0.
2) Not available with extension length options 11 and 12.
3) Input voltage 2 not allowed with extension length 16, 17, 18 or 20.

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Art. No. and specify Order code(s). | |
| Total insertion length: Enter the total insertion length in plain text description, max. (50 mm increments) | **Y01** |
| Signal bulb inserted in M20 cable gland[1)] | **A20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

1) Available only with Approval option A.

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement Electronics Module LVS100 DPDT Relay (19 ... 253 V AC, 19 ... 55 V DC) | **7ML1830-1NS** |
| R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve | **7ML1830-1NT** |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] | **7ML1830-1NU** |

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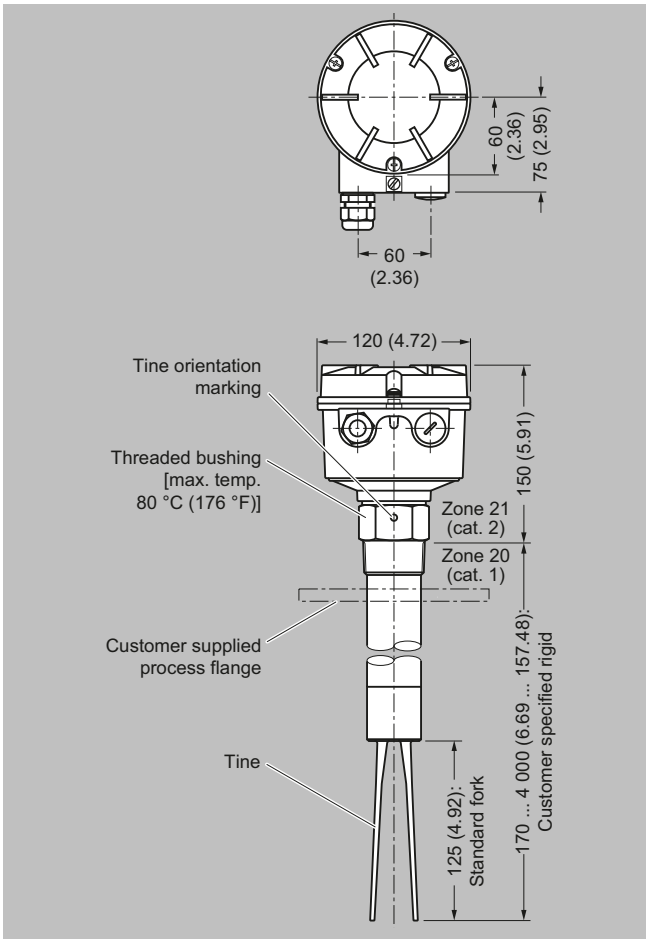
## Technical specifications

| SITRANS LVS100 | |
|---|---|
| **Mode of Operation** | |
| Measuring principle | Vibrating point level switch |
| **Input** | |
| Measured variable | High, low and demand |
| Measuring frequency | 200 Hz |
| **Output** | |
| Relays | DPDT relay |
| Relay delay | From loss of vibration: approximately 1 second |
| | From resumption of vibration: approximately 1 ... 2 s |
| Signal delay | Probe uncovered to covered: approximately 1 s |
| | Probe covered to uncovered: approximately 1 ... 2 s |
| Relay fail-safe | High or low, switch selectable |
| Alarm output | Relay 8 A at 250 V AC, non-inductive |
| | Relay 5 A at 30 V DC, non-inductive |
| **Sensitivity** | High or low, switch selectable |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | III |
| • Pollution degree | 2 |
| Medium conditions | |
| • Process temperature | -40 ... +150 °C (-40 ... +302 °F) |
| • Max. threaded bushing temperature | 80 °C (176 °F) |
| • Max. enclosure surface temperature (Category 2D) | 90 °C (194 °F) |
| • Max. extension surface temperature (Category 1D) | 150 °C (302 °F) |
| • Pressure (vessel) | Max. 10 bar g (145 psi g)<br>European Pressure Directive 2014/68/EU: Category 1 |
| Minimum material density | Approx. 30 g/l (1.9 lb/ft³) |
| **Design** | |
| Material | |
| • Enclosure | Epoxy coated aluminum |
| Process connection | • Thread 1¼" NPT [(Taper), ANSI/ASME B1.20.1],<br>R 1½" [(BSPT), EN 10226] |
| | • Thread R 1½" [(BSPT), EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] |
| | • Thread material: stainless steel 304 (1.4301) or 316L (1.4404) depending on configuration |
| Tine material | Stainless steel 316L (1.4404) |
| Degree of protection | IP66/Type 4/NEMA 4 |
| Conduit entry | 2 x M20 x 1.5 or 2 x ½" NPT (For FM and CSA approved versions only.) |
| Weight | Standard version, no extensions: approx. 1.7 kg (3.7 lb) |
| **Power supply** | • 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA |
| | • 19 ... 40 V DC, +10 %, 1.5 W |

## Technical specifications (continued)

| SITRANS LVS100 | |
|---|---|
| **Certificates and approvals** | • CSA/FM General Purpose |
| | • CE |
| | • CSA/FM Dust Ignition Proof |
| | • RCM |
| | • ATEX II 1/2 D |
| | • IECex |

## Dimensional drawings



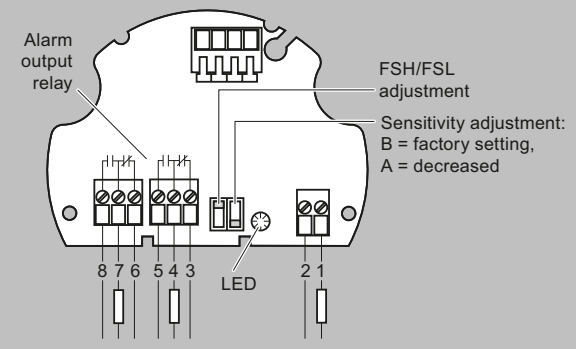

SITRANS LVS100, dimensions in mm (inch)

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## Circuit diagrams

**Universal voltage (DPDT relay)**




AC: Terminal 1: L
Terminal 2: N
19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA

DC: Terminal 1: +
Terminal 2: -
19 ... 50 V DC, +10 %, 2 W

SITRANS LVS100 connections

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## Overview



SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

## Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft$^3$); liquid/solid interface version, 50 g/l (3 lb/ft$^3$) and low density option min. 5 g/l (0.3 lb/ft$^3$)
- Customer desired extensions up to 20 000 mm (787 inch)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) insertion length

## Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1 inch pipe.

SITRANS LVS200 has an optional 4 to 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

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## Selection and ordering data

| SITRANS LVS200 Vibrating fork point level switch, standard design<br>Level and material detection in dry bulk solids. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options, including low bulk densities. | Article No. 7ML5731- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1] | | 1 | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1] | | 2 | | | | | | | | | |
| 18 ... 50 V DC PNP[1] | | 3 | | | | | | | | | |
| 19 ... 230 V AC/DC without contact, 2-wire loop powered[1] | | 4 | | | | | | | | | |
| 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2] | | 5 | | | | | | | | | |
| 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3] | | 6 | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version[4][5] | | 7 | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | |
| Without temperature isolator | | | A | | | | | | | | |
| With temperature isolator | | | B | | | | | | | | |
| Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)] | | | C | | | | | | | | |
| Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)] | | | D | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | |
| R 1½" [(BSPT), EN 10226] | | | | A | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | | | | B | | | | | | | |
| G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)][6] | | | | C | | | | | | | |
| 2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)][6] | | | | D | | | | | | | |
| ***Flanged*** | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[7] | | | | E | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | | F | | | | | | | |
| 2" ASME 150 lb B16.5, raised face | | | | G | | | | | | | |
| 3" ASME 150 lb B16.5, raised face | | | | H | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | | J | | | | | | | |
| 2" Tri-clamp (DN 50) ISO 2852 | | | | K | | | | | | | |
| **Extension length** | | | | | | | | | | | |
| ***Stainless steel 304 (1.4301)*** | | | | | | | | | | | |
| Standard length, 235 mm (9.25 inch) | | | | | 1 | 1 | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 300 ... 500 mm (11.81 ... 19.69 inch) | | | | | 1 | 2 | | | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 1 | 3 | | | | | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 1 | 4 | | | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 1 | 5 | | | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 1 | 6 | | | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 1 | 7 | | | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 1 | 8 | | | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 2 | 1 | | | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 2 | 2 | | | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 2 | 3 | | | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 2 | 4 | | | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 2 | 5 | | | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 2 | 6 | | | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 2 | 7 | | | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 2 | 8 | | | | | |
| ***Stainless steel 316L (1.4404)*** | | | | | | | | | | | |
| Standard length, 235 mm (9.25 inch) | | | | | 3 | 1 | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 300 ... 500 mm (11.81 ... 19.69 inch) | | | | | 3 | 2 | | | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 3 | 3 | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVS200 Vibrating fork point level switch, standard design<br>Level and material detection in dry bulk solids. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options, including low bulk densities. | Article No. 7ML5731- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 3 | 4 | | | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 3 | 5 | | | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 3 | 6 | | | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 3 | 7 | | | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 3 | 8 | | | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 4 | 1 | | | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 4 | 2 | | | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 4 | 3 | | | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 4 | 4 | | | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 4 | 5 | | | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 4 | 6 | | | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 4 | 7 | | | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 4 | 8 | | | | | |
| **Material process connection/extension** | | | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)[8] | | | | | | | | 1 | | | |
| Stainless steel 316L (1.4404)[9] | | | | | | | | 2 | | | |
| **Approvals** | | | | | | | | | | | |
| CSA/FM Dust Ignition Proof, RCM | | | | | | | | | A | | |
| ATEX II ½ D, RCM | | | | | | | | | B | | |
| CSA/FM General Purpose, RCM, CE | | | | | | | | | C | | |
| CE, RCM | | | | | | | | | D | | |
| CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM | | | | | | | | | E | | |
| ATEX II 1G and ½G Eex ia IIC; ATEX II 1D and ½D, RCM | | | | | | | | | F | | |
| IEC-Ex t IIIC Da/Db | | | | | | | | | G | | |
| EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | H | | |
| EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | J | | |

1) Available with Approval options A ... D, G only.
2) Available with Approval options D, E, F only.
3) Available with Approval options B, D, G only.
4) Available with configurations 7ML5731-7AA11-1BA0 or 7ML5731-7AB11-1AA0 only.
5) Basic version is cost effective and offers fast delivery.
6) Not available with extension length options 11, 12, 31, 32.
7) Max. 6 bar (87 psi).
8) Available with option extension length 11 ... 28.
9) Available with option extension length 31 ... 48.

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch) | **Y01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)[3] | **K05** |
| Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch), and increased aluminum fork width[1][3] | **G01** |
| Signal bulb inserted in M20 cable gland[2] | **A20** |
| NAMUR 8/16 mA switch amplifiers available, contact factory for pricing | |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KL** |
| Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)] | **A5E35525363** |
| Sliding sleeve, 2" BSP (ISO 228) | **7ML1830-1JM** |
| Sliding sleeve, 2" NPT (ASME B1.20.1) | **7ML1830-1JN** |
| Namur Isolator switch amplifier relay output KFD2-SR2-Ex1.W | **A5E35667901** |
| SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/extension 1, and approval B | **7ML5731-7AA11-1-BA0** |
| SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/extension 1, and approval A | **7ML5731-7AB11-1-AA0** |

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## Selection and ordering data (continued)

1) Available only with Power supply option 1 and Approval options C, D and with Process connection flange options E ... J.
2) Available with Approval option D only.
3) K05 and G01 are not available together.

| SITRANS LVS200 Vibrating fork point level switch, short fork and interface design<br>Level and material detection in dry bulk solids or solids interface within a liquid. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options. | Article No. 7ML5732- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[6] | | 1 | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[6] | | 2 | | | | | | | | | |
| 18 ... 50 V DC PNP[6] | | 3 | | | | | | | | | |
| 19 ... 230 V AC/DC without contact, 2-wire loop powered[6] | | 4 | | | | | | | | | |
| 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[1] | | 5 | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | |
| Without temperature isolator | | | A | | | | | | | | |
| With temperature isolator | | | B | | | | | | | | |
| Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)] | | | C | | | | | | | | |
| Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/max. temperature electronics 60 °C (140 °F)] | | | D | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | |
| R 1½" [(BSPT), EN 10226] | | | | A | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | | | | B | | | | | | | |
| G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)][2] | | | | C | | | | | | | |
| 2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)][2] | | | | D | | | | | | | |
| ***Flanged*** | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[3] | | | | E | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | | F | | | | | | | |
| 2" ASME 150 lb B16.5, raised face | | | | G | | | | | | | |
| 3" ASME 150 lb B16.5, raised face | | | | H | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | | J | | | | | | | |
| 2" Tri-clamp (DN 50) ISO 2852 | | | | K | | | | | | | |
| **Extension length** | | | | | | | | | | | |
| ***Stainless steel 304 (1.4301)*** | | | | | | | | | | | |
| Standard length, 165 mm (6.50 inch) | | | | | 1 | 1 | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 200 ... 500 mm (7.87 ... 19.69 inch) | | | | | 1 | 2 | | | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 1 | 3 | | | | | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 1 | 4 | | | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 1 | 5 | | | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 1 | 6 | | | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 1 | 7 | | | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 1 | 8 | | | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 2 | 1 | | | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 2 | 2 | | | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 2 | 3 | | | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 2 | 4 | | | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 2 | 5 | | | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 2 | 6 | | | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 2 | 7 | | | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 2 | 8 | | | | | |
| ***Stainless steel 316L (1.4404)*** | | | | | | | | | | | |
| Standard length, 165 mm (6.50 inch) | | | | | 3 | 1 | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVS200 Vibrating fork point level switch, short fork and interface design<br>Level and material detection in dry bulk solids or solids interface within a liquid. Extension options to 4 m (13.12 ft). With advanced testing, output, and durability options. | Article No.<br>7ML5732- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 200 ... 500 mm (7.87 ... 19.69 inch) | | | | | 3 | 2 | | | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 3 | 3 | | | | | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 3 | 4 | | | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 3 | 5 | | | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 3 | 6 | | | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 3 | 7 | | | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 3 | 8 | | | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 4 | 1 | | | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 4 | 2 | | | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 4 | 3 | | | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 4 | 4 | | | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 4 | 5 | | | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 4 | 6 | | | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 4 | 7 | | | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 4 | 8 | | | | | |
| **Material process connection/extension** | | | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)[4] | | | | | | | | 1 | | | |
| Stainless steel 316L (1.4404)[5] | | | | | | | | 2 | | | |
| **Approvals** | | | | | | | | | | | |
| CSA/FM Dust Ignition Proof, RCM | | | | | | | | | A | | |
| ATEX II ½ D, RCM | | | | | | | | | B | | |
| CSA/FM General Purpose, RCM, CE | | | | | | | | | C | | |
| CE, RCM | | | | | | | | | D | | |
| IEC-Ex t IIIC Da/Db | | | | | | | | | E | | |
| ATEX II 1G and ½G Eex ia IIC; ATEX II 1D and ½D, CE, RCM | | | | | | | | | F | | |
| EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | G | | |
| EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | H | | |

1) Available with Approval options B, D, E only.
2) Not available with Extension length options 11, 12, 31, 32.
3) Max. 6 bar (87 psi).
4) Available with Extension length options 11 ... 28.
5) Available with Extension length options 31 ... 48.
6) Power supply options 1, 2, 3, 4 not allowed with Approvals options F and H.

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (147.48 inch) | **Y01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Signal bulb inserted in M20 cable gland[1)3)] | **A20** |
| Note: G02 must be ordered for solids/liquids interface detection. | |
| Adjustable sensitivity (by potentiometer) for solids/liquids interface detection[1)2)4)] | **G02** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: the Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement Electronics Module (125 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)] | **A5E35525363** |
| Replacement Electronics Module (350 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KM** |
| Sliding sleeve, 2" BSP (ISO 228) | **7ML1830-1JM** |
| Sliding sleeve, 2" NPT (ASME B1.20.1) | **7ML1830-1JN** |

1) Available with Approval option D only.
2) Available with Power supply option 1 only.
3) A20 not allowed with Power supply options 4 or 5.
4) G02 not allowed with Process temperature options C or D.

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## Selection and ordering data (continued)

| SITRANS LVS200 Vibrating fork point level switch, pipe extension design<br>Level and material detection in dry bulk solids. Requires customer supplied pipe extension with insertion to 3.8 m (12.47 ft). With advanced testing, output, and durability options. | Article No. 7ML5733- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1] | | 1 | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1] | | 2 | | | | | | | | | |
| 18 ... 50 V DC PNP[1] | | 3 | | | | | | | | | |
| 19 ... 230 V AC/DC without contact, 2-wire loop powered[1] | | 4 | | | | | | | | | |
| 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2] | | 5 | | | | | | | | | |
| 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3] | | 6 | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | |
| Up to 150 °C (302 °F) | | | A | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | |
| R 1½" [(BSPT), EN 10226] | | | | A | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | | | | B | | | | | | | |
| ***Flanged*** | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[4] | | | | C | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | | D | | | | | | | |
| 2" ASME 150 lb B16.5, raised face | | | | E | | | | | | | |
| 3" ASME 150 lb B16.5, raised face | | | | F | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | | G | | | | | | | |
| 2" Tri-clamp (DN 50) ISO 2852 | | | | K | | | | | | | |
| **Process connection material** | | | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321(1.4541), Tri-clamp 304 (1.4301) | | | | | 1 | | | | | | |
| Stainless steel 316L (1.4404) | | | | | 2 | | | | | | |
| **Extension length** | | | | | | | | | | | |
| Customer supplied 1" pipe extension Length: 300 ... 3 800 mm (11.81 ... 149.61 inch) | | | | | | 1 | | | | | |
| **Application type** | | | | | | | | | | | |
| Dry bulk solids (125 Hz) | | | | | | | | 1 | | | |
| Liquids/solids interface (350 Hz) | | | | | | | | 2 | | | |
| **Approvals** | | | | | | | | | | | |
| CSA/FM Dust Ignition Proof, RCM | | | | | | | | | A | | |
| ATEX II ½D, RCM | | | | | | | | | B | | |
| CSA/FM General Purpose, RCM, CE | | | | | | | | | C | | |
| CE, RCM | | | | | | | | | D | | |
| CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM | | | | | | | | | E | | |
| ATEX II 1G and ½G Eex ia IIC; ATEX II 1D and ½D, RCM | | | | | | | | | F | | |
| IEC-Ex t IIIC Da/Db | | | | | | | | | G | | |
| EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | H | | |
| EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | J | | |

1) Available with Approval options A, B, C, D, G only.
2) Available with Approval options D, E, F, J and application type 1 only.
3) Available with Approval options B, D, F, G, H only.
4) Max. 6 bar (87 psi).

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Selection and Ordering data | Order code |
|---|---|
| Total insertion length: Enter the total insertion length in plain text description, max. 3 800 mm (149.61 inch) | **Y01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)[5] | **K05** |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width[1)4)5)] | **G01** |
| Adjustable sensitivity (by potentiometer) for solids/liquids interface detection[2)3)4)] | **G02** |
| Signal bulb inserted in M20 cable gland[2)6)] | **A20** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: the Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |

| Spare Parts | Article No. |
|---|---|
| **Spare Parts** | |
| Replacement Electronics Module (125 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KL** |
| Replacement Electronics Module (125 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)] | **A5E35525363** |
| Replacement Electronics Module (350 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KM** |
| NAMUR Isolated switch amplifier Relay output<br>KFD2-SR2-Ex1.W | **A5E35667901** |

1) Available only with Power supply option 1 and Approvals options C, D, and with Process connection flange options C ... G.
2) Available with Approval options D only.
3) Available with Power supply option 1 only and Application type option 2.
4) Not available with option K05.
5) Available with Application type option 1 only.
6) A20 not allowed with Power supply options 4, 5, and 6.

| **SITRANS LVS200 Vibrating fork point level switch, cable extended design<br>Level and material detection in dry bulk solids. Extension options to 20 m (65.62 ft). With advanced testing, output, and durability options. Measures bulk densities less than 5 g/l (0.3 lb/ft³).** | **Article No.**<br>**7ML5734-** | ● | ● | ● | ● | ● | - | ● | ● | **A** | **0** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1)] | | 1 | | | | | | | | | |
| 19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1)] | | 2 | | | | | | | | | |
| 18 ... 50 V DC PNP[1)] | | 3 | | | | | | | | | |
| 19 ... 230 V AC/DC without contact, 2-wire loop powered[1)] | | 4 | | | | | | | | | |
| 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2)5)] | | 5 | | | | | | | | | |
| 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3)] | | 6 | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | |
| Up to 80 °C (176 °F) | | | A | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | |
| R 1½" [(BSPT), EN 10226] (1.4301/304) | | | | A | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] (1.4301/304) | | | | B | | | | | | | |
| ***Flanged*** | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1 (1.4541/321), flat face[4)] | | | | C | | | | | | | |
| DN 100 PN 16, EN 1092-1 (1.4541/321), flat face | | | | D | | | | | | | |
| 2" ASME 150 lb B16.5 (1.4541/321), raised face | | | | E | | | | | | | |
| 3" ASME 150 lb B16.5 (1.4541/321), raised face | | | | F | | | | | | | |
| 4" ASME 150 lb B16.5 (1.4541/321), raised face | | | | G | | | | | | | |
| **Extension length** | | | | | | | | | | | |
| 750 ... 1 000 mm (29.5 ... 39.4 inch) [max. length 20 000 mm (787.4 inch), not with Power supply option 5 (max. 10 000 mm, 393.7 inch)][8)] | | | | | 1 | 0 | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | | 1 | 1 | | | | | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | | 1 | 2 | | | | | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | | 1 | 3 | | | | | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | | 1 | 4 | | | | | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | | | | | 1 | 5 | | | | | |
| 6 001 ... 7 000 mm (236.26 ... 275.59 inch) | | | | | 1 | 6 | | | | | |
| 7 001 ... 8 000 mm (275.63 ... 314.96 inch)[5)] | | | | | 1 | 7 | | | | | |
| 8 001 ... 9 000 mm (315 ... 354.33 inch)[5)] | | | | | 1 | 8 | | | | | |
| 9 001 ... 10 000 mm (354.37 ... 393.70 inch)[5)] | | | | | 2 | 0 | | | | | |
| 10 001 ... 11 000 mm (393.74 ... 433.07 inch)[5)6)] | | | | | 2 | 1 | | | | | |
| 11 001 ... 12 000 mm (433.11 ... 472.44 inch)[5)6)] | | | | | 2 | 2 | | | | | |
| 12 001 ... 13 000 mm (472.48 ... 511.81 inch)[5)6)] | | | | | 2 | 3 | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVS200 Vibrating fork point level switch, cable extended design<br>Level and material detection in dry bulk solids. Extension options to 20 m (65.62 ft). With advanced testing, output, and durability options. Measures bulk densities less than 5 g/l (0.3 lb/ft³). | Article No. 7ML5734- | ● | ● | ● | ● | ● | - | ● | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 001 ... 14 000 mm (511.85 ... 551.18 inch)[5][6] | | | | | 2 | 4 | | | | | |
| 14 001 ... 15 000 mm (551.22 ... 590.55 inch)[5][6] | | | | | 2 | 5 | | | | | |
| 15 001 ... 16 000 mm (590.59 ... 629.92 inch)[5][6] | | | | | 2 | 6 | | | | | |
| 16 001 ... 17 000 mm (629.96 ... 669.29 inch)[5][6] | | | | | 2 | 7 | | | | | |
| 17 001 ... 18 000 mm (669.33 ... 708.66 inch)[5][6] | | | | | 2 | 8 | | | | | |
| 18 001 ... 19 000 mm (708.70 ... 748.03 inch)[5][6] | | | | | 3 | 0 | | | | | |
| 19 001 ... 20 000 mm (748.07 ... 787.40 inch)[5][6] | | | | | 3 | 1 | | | | | |
| **Application type** | | | | | | | | | | | |
| Dry bulk solids (125 Hz) | | | | | | | | 1 | | | |
| Liquids/solids interface detection, short insertion or heavier materials (350 Hz)[7] | | | | | | | | 2 | | | |
| **Approvals** | | | | | | | | | | | |
| CSA/FM Dust Ignition Proof, RCM | | | | | | | | | A | | |
| ATEX II ½D, RCM | | | | | | | | | B | | |
| CSA/FM General Purpose, RCM, CE | | | | | | | | | C | | |
| CE, RCM | | | | | | | | | D | | |
| CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, RCM | | | | | | | | | E | | |
| ATEX II 1G and ½G Eex ia IIC; ATEX II 1D and ½D, RCM[6] | | | | | | | | | F | | |
| IEC-Ex t IIIC Da/Db | | | | | | | | | G | | |
| EAC Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | H | | |
| EAC Ex Ga/Gb Ex ia IIC, 0Ex ia IIC Ga; Ex ta/tb IIIC Da/Db, Ex ta IIIC Da | | | | | | | | | J | | |

1) Available with Approval options A, B, C, D, G only.
2) Available with Approval options D, E, and F only. Not available with Application type option 2.
3) Available with Approval option D only.
4) Max. 6 bar (87 psi).
5) Not available with Application type option 2.
6) Not available with Power supply option 5.
7) Cable length is limited to 7 000 mm (275.59 inch).
8) Available with Power supply options 1 ... 4, and 6.

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| Enter the total insertion length in plain text description, max. 20 000 mm (787.40 inch) | **Y01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)[5] | **K05** |
| Enhanced sensitivity < 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width[1][4] | **G01** |
| Adjustable sensitivity (by potentiometer) for solids/liquids interface detection[2][3][4] | **G02** |
| Signal bulb inserted in M20 cable gland[2][6] | **A20** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: the Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement Electronics Module (125 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KL** |
| Replacement Electronics Module (125 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)] | **A5E35525363** |
| Replacement Electronics Module (350 Hz)<br>[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] | **7ML1830-1KM** |
| NAMUR Isolated switch amplifier Relay output KFD2-SR2-Ex1.W | **A5E35667901** |

1) Available only with Power supply option 1 and Approvals C, D, and with process connection flange options C ... G.
2) Available with Approval options D only.
3) Available with Power supply option 1 and Application type 2 option only.
4) Not available with option K05.
5) Available with Application type option 1 only.
6) A20 not allowed with Power supply options 4, 5, or 6.

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## Technical specifications

| SITRANS LVS200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Vibrating point level switch |
| **Input** | |
| Measured variable | High, low, and demand |
| Measuring frequency | |
| • Standard | 125 Hz |
| • Liquid/solid interface and short fork version | 350 Hz |
| **Output** | |
| PNP | Open collector:<br>Permanent load max. 0.4 A,<br>short-circuit and overload protected<br>Turn-on voltage: max. 50 V (reverse protection) |
| 2-wire without contact | Load current:<br>• Min. 10 mA<br>• Max. 500 mA permanent<br>• Max. 2A < 200 ms<br>• Max. 5A < 50 ms<br>Voltage drop on the electronic module: max. 7 V with closed electric circuit<br>Cut-off current with open electric circuit: max. 5 mA |
| Relays | |
| • Version with 1 relay | SPDT relay |
| • Version with 2 relays | DPDT relay |
| Relay delay | • From loss of vibration: approximately 1 second<br>• From resumption of vibration: approximately 1 ... 2 seconds |
| Signal delay | • Probe uncovered to covered: approximately 1 second<br>• Probe covered to uncovered: approximately 1 ... 2 seconds |
| Relay fail-safe | High or low, switch selectable |
| Alarm output | • Relay 8 A at 250 V AC, non-inductive<br>• Relay 5 A at 30 V DC, non-inductive |
| mA output | 8/16 mA or 4 ... 20 mA |
| • Resolution | 4 ... 20 mA ± 0.1 mA |
| **Sensitivity** | High or low, switch selectable |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | III |
| • Pollution degree | 2 |
| Medium conditions | |
| • Process temperature | • All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F)<br>• CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T3B |
| • Max. threaded bushing temperature | 80 °C (176 °F) |
| • Max. enclosure surface temperature (Category 2D) | 90 °C (194 °F) |

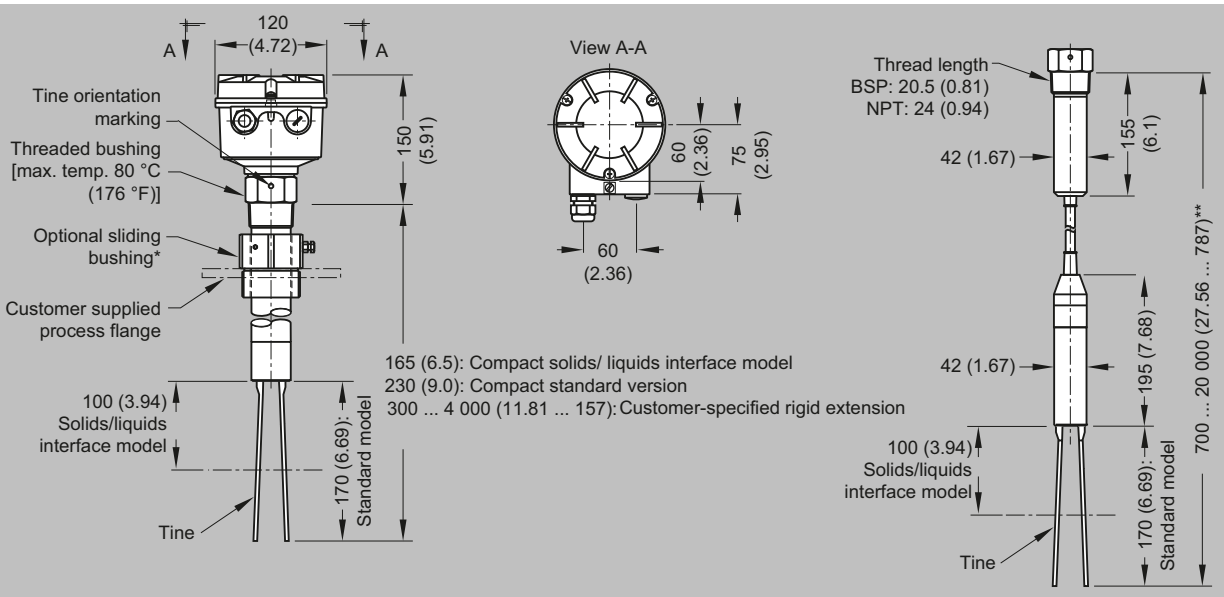
## Technical specifications (continued)

| SITRANS LVS200 | |
|---|---|
| • Max. extension surface temperature (Category 1D) | 150 °C (302 °F) |
| • Pressure (vessel) | Max. 30 bar g (435 psi g) European Pressure Directive 2014/68/EU: Category 1 |
| • Minimum material density | • Standard version: approx. 20 g/l (1.2 lb/ft³)<br>• Liquid/solid interface version: approx. 50 g/l (3 lb/ft³)<br>• Optional low density version: approx. 5 g/l (0.3 lb/ft³) |
| **Design** | |
| Material | |
| • Enclosure | Epoxy coated aluminum |
| Process connection | • Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226], and flange options<br>• Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread<br>• Thread material: stainless steel 303 (1.4301) |
| Tine material | Stainless steel 316L (1.4404),<br>PTFE-coated tines are available upon special request |
| Degree of protection | IP65/Type 4/NEMA 4 |
| Conduit entry | 2 x M20 x 1.5 or 2 x ½" NPT (For FM and CSA approved versions only.) |
| Weight | • Standard version, no extensions: approx. 2.0 kg (4.4 lb)<br>• Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb) |
| **Power supply** | • 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA<br>• 19 ... 55 V DC, +10 %, 1.5 W |
| **Certificates and approvals** | • CSA/FM General Purpose<br>• CE<br>• CSA/FM Dust Ignition Proof<br>• RCM<br>• ATEX II 1/2 D<br>• CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class I, Aex ia IIC, CSA Class I, Ex ia IIC, available only with power supply options 5 and 6<br>• ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5 |

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## Dimensional drawings




**Notes:**

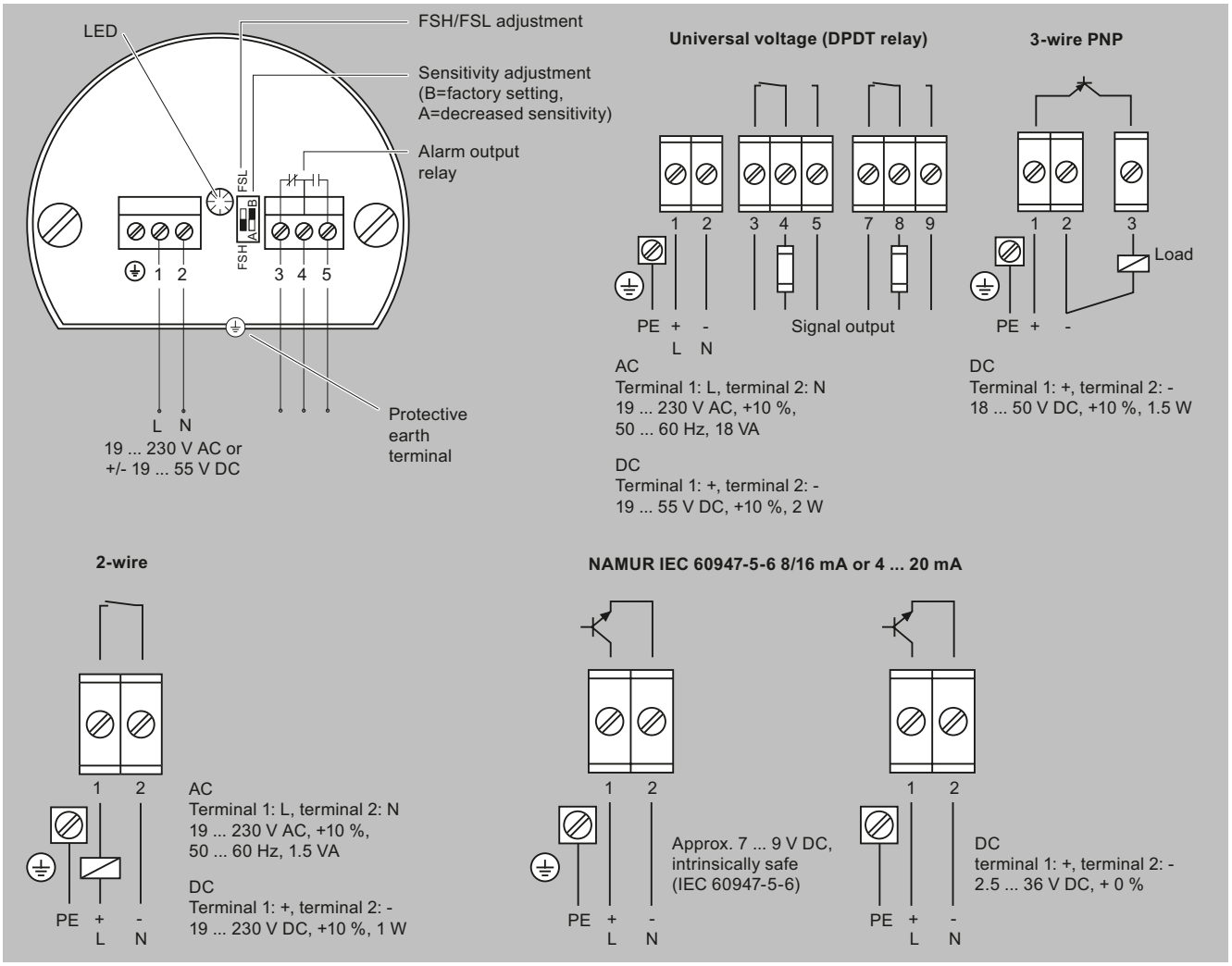
* The clamping screws of the sliding bushing must be tightened to 10 Nm.
** Cable version with liquids/solids interface model option length to 7 000 mm (275.59 inch)
Cable version with NAMUR electronics length to 10 000 mm (393.7 inch) tightened to 10 Nm.
See manual for pipe extended version details. (Pipe is customer supplied.)

SITRANS LVS200, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LVS200 connections

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## Overview



SITRANS LVS300 is a vibrating rod point level switch for high, low, or demand level detection of bulk solids.

## Benefits

- High resistance to mechanical forces.
- Adjustable sensitivity for varied applications including build-up.
- Rotatable enclosure for convenient wiring.
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft$^3$).
- Customer desired extensions up to 4 000 mm (157 inch).
- 160 mm (6.3 inch) insertion length.
- Flexible, customer supplied, rods to 4 meters.
- Process connections starting at 1 inch.

## Application

The standard LVS300 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers.

A pipe extension version is available, separated by a customer supplied 1 inch pipe.

The LVS300 has a compact design and can be top, side or angle mounted. The vibrating rod design ensures the product will not be impacted by bridging of traditional forks in applications with buildup potential. A durable probe design ensures the product will withstand heavier materials without damage or bending.

A signal from the electronic circuit excites a crystal in the probe causing the rod to vibrate. If the rod is covered by material, the change in vibration is detected by the electronic circuitry which causes the output to change state after a one second delay. When the probe is free from material, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry or bulk solids with buildup potential, in bins, silos, or hoppers, such as lime, molding sand, milk powder, flour, salt, and plastic granules.

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## Selection and ordering data

| SITRANS LVS300 Vibrating rod point level switch, compact design<br>Level and material detection in solids. Compact, with 160 mm (6.30 inch) insertion. | Article No.<br>7ML5736- | ● | ● | ● | ● | ● | - | ● | ● |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Power supply** | | | | | | | | | |
| Relays DPDT 21 ... 230 V AC 22 ... 45 V DC | | 1 | | | | | | | |
| PNP 20 ... 40 V DC | | 2 | | | | | | | |
| **Process temperature** | | | | | | | | | |
| Without temperature isolator [up to Tprocess = 150 °C (302 °F) at Tamb < 40 °C (104 °F)] | | | A | | | | | | |
| With temperature isolator [up to Tprocess = 150 °C (302 °F) at Tamb > 40 °C (104 °F)] | | | B | | | | | | |
| **Process connection** | | | | | | | | | |
| ***Threaded*** | | | | | | | | | |
| Thread G 1½" (BSPP) EN ISO 228-1 | | | | A | | | | | |
| Thread G 1¼" (BSPP) EN ISO 228-1 | | | | B | | | | | |
| Thread G 1" (BSPP) EN ISO 228-1 | | | | C | | | | | |
| Thread NPT 1½" (Taper) ANSI B1.20.1 | | | | D | | | | | |
| Thread NPT 1¼" (Taper) ANSI B1.20.1 | | | | E | | | | | |
| Thread NPT 1" (Taper) ANSI B1.20.1 | | | | F | | | | | |
| Tri-clamp 2" (DN50) ISO 2852 | | | | G | | | | | |
| ***Flanged*** | | | | | | | | | |
| Flange DN 100 PN6, EN1092-1[1] | | | | H | | | | | |
| Flange DN 100 PN16, EN1092-1 | | | | J | | | | | |
| 2" ASME 150 lb B16.5 | | | | K | | | | | |
| 3" ASME 150 lb B16.5 | | | | L | | | | | |
| 4" ASME 150 lb B16.5 | | | | M | | | | | |
| **Extension length** | | | | | | | | | |
| Standard length, 160 mm (6.3 inch) | | | | | 1 | 1 | | | |
| **Material process connection/extension** | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) | | | | | | | | 1 | |
| Stainless steel 316 L (1.4404) | | | | | | | | 2 | |
| **Approvals** | | | | | | | | | |
| CE | | | | | | | | | A |
| ATEX II 1/2D Ex ta/tb IIIC TI Da/Db IP6X | | | | | | | | | B |
| $FM_{US}$ and $FM_C$ General Purpose | | | | | | | | | C |
| $FM_{US}$ and $FM_C$ DIP Class II, III Div. 1 Groups E, F, G | | | | | | | | | D |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y14** |

| Selection and Ordering data | Order code |
|---|---|
| Signal bulb inserted in M20 cable gland[2] | **A20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

[1] Max. 6 bar (87 psi).
[2] Available only with Approval option A.

| SITRANS LVS300 Vibrating rod point level switch, pipe extended design<br>Level and material detection in solids. Extension options up to 4 m (13.12 ft). | Article No.<br>7ML5737- | ● | ● | ● | ● | ● | - | ● | ● |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Power supply** | | | | | | | | | |
| Relays DPDT 21 ... 230 V AC 22 ... 45 V DC | | 1 | | | | | | | |
| PNP 20 ... 40 V DC | | 2 | | | | | | | |
| **Process temperature** | | | | | | | | | |
| Without temperature isolator [up to Tprocess = 150 °C (302 °F) at Tamb < 40 °C (104 °F)] | | | A | | | | | | |
| With temperature isolator [up to Tprocess = 150 °C (302 °F) at Tamb > 40 °C (104 °F)] | | | B | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LVS300 Vibrating rod point level switch, pipe extended design<br>Level and material detection in solids. Extension options up to 4 m (13.12 ft). | Article No.<br>7ML5737- | ● | ● | ● | ● | ● | - | ● | ● |
|---|---|---|---|---|---|---|---|---|---|
| **Process connection** | | | | | | | | | |
| ***Threaded*** | | | | | | | | | |
| Thread G 1½" (BSPP) EN ISO 228-1 | | | | A | | | | | |
| Thread G 1¼" (BSPP) EN ISO 228-1 | | | | B | | | | | |
| Thread G 1" (BSPP) EN ISO 228-1 | | | | C | | | | | |
| Thread NPT 1½" (Taper) ANSI B1.20.1 | | | | D | | | | | |
| Thread NPT 1¼ " (Taper) ANSI B1.20.1 | | | | E | | | | | |
| Thread NPT 1" (Taper) ANSI B1.20.1 | | | | F | | | | | |
| Tri-clamp 2" (DN50) ISO 2852 | | | | G | | | | | |
| ***Flanged*** | | | | | | | | | |
| Flange DN 100 PN6, EN1092-1[1] | | | | H | | | | | |
| Flange DN 100 PN16, EN1092-1 | | | | J | | | | | |
| 2" ASME 150 lb B16.5 | | | | K | | | | | |
| 3" ASME 150 lb B16.5 | | | | L | | | | | |
| 4" ASME 150 lb B16.5 | | | | M | | | | | |
| **Extension length** | | | | | | | | | |
| ***Extension length Stainless steel threads 304 (1.4301), flanges 321 (1.4541)*** | | | | | | | | | |
| 200 ... 500 mm (7.87 ... 19.69 inch) | | | | | 1 | 2 | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 1 | 3 | | | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 1 | 4 | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 1 | 5 | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 1 | 6 | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 1 | 7 | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 1 | 8 | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 2 | 1 | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 2 | 2 | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 2 | 3 | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 2 | 4 | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 2 | 5 | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 2 | 6 | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 2 | 7 | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 2 | 8 | | | |
| ***Extension length Stainless steel 316 L (1.4404)*** | | | | | | | | | |
| 200 ... 500 mm (7.87 ... 19.69 inch) | | | | | 4 | 2 | | | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | | | | | 4 | 3 | | | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | | | | | 4 | 4 | | | |
| 1 001 ... 1 250 mm (39.41 ... 49.21 inch) | | | | | 4 | 5 | | | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | | | | | 4 | 6 | | | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | | | | | 4 | 7 | | | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | | | | | 4 | 8 | | | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | | | | | 5 | 1 | | | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | | | | | 5 | 2 | | | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | | | | | 5 | 3 | | | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | | | | | 5 | 4 | | | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | | | | | 5 | 5 | | | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | | | | | 5 | 6 | | | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | | | | | 5 | 7 | | | |
| 3 751 ... 4 000 mm (147.68 ... 157.48 inch) | | | | | 5 | 8 | | | |
| **Material process connection/extension** | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)[2] | | | | | | | | 1 | |
| Stainless steel 316 L (1.4404)[3] | | | | | | | | 2 | |
| **Approvals** | | | | | | | | | |
| CE | | | | | | | | | A |
| ATEX II 1/2D Ex ta/tb IIIC T! Da/Db IP6X | | | | | | | | | B |
| $FM_{US}$ and $FM_C$ General Purpose | | | | | | | | | C |
| $FM_{US}$ and $FM_C$ DIP Class II, III Div. 1, Groups E, F, G | | | | | | | | | D |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch) | **Y01** |
| Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y14** |
| Signal bulb inserted in M20 cable gland[4)] | **A20** |
| Sliding sleeve, for application without overpressure max. 150 °C (302 °F), min. length 501 mm (19.72 inch)[5)6)7)] | **P12** |
| Sliding sleeve, for application with overpressure, max. 16 bar (232 psi), max. 150 °C (302 °F), min. length 501 mm (19.72 inch)[6)] | **P13** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare parts** | |
| Replacement Electronics Modules are available. Contact factory for pricing. | |

1) Max. 6 bar (87 psi).
2) Available with extension length 12.
3) Available with extension length 42.
4) Available only with Approval option A.
5) Available only with Approval options A and C.
6) Available only with Process connection options A, D, H, J, K, L, M, not available with extension length 12 and 42.
7) Available only with Material Process connection/extension option 1.

| **SITRANS LVS300 Vibrating rod point level switch, customer supplied tube<br>Level and material detection in solids. Requires flexible, customer supplied, pipe extensions with insertion to 4 m (13.12 ft).** | **Article No.**<br>**7ML5738-** | ● | ● | ● | ● | ● | - | ● | ● |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Power supply** | | | | | | | | | |
| Relays DPDT 21 ... 230 V AC 22 ... 45 V DC | | 1 | | | | | | | |
| PNP 20 ... 40 V DC | | 2 | | | | | | | |
| **Process temperature** | | | | | | | | | |
| Without temperature isolator [up to Tprocess = 150 °C (302 °F) at Tamb < 40 °C (104 °F)] | | | A | | | | | | |
| **Process connection** | | | | | | | | | |
| ***Threaded*** | | | | | | | | | |
| Thread G 1½" (BSPP) EN ISO 228-1 | | | | A | | | | | |
| Thread NPT 1½" (Taper) ANSI B1.20.1 | | | | D | | | | | |
| Tri-clamp 2" (DN50) ISO 2852 | | | | G | | | | | |
| ***Flanged*** | | | | | | | | | |
| Flange DN 100 PN6, EN1092-1[1)] | | | | H | | | | | |
| Flange DN 100 PN16, EN1092-1 | | | | J | | | | | |
| 2" ASME 150 lb B16.5 | | | | K | | | | | |
| 3" ASME 150 lb B16.5 | | | | L | | | | | |
| 4" ASME 150 lb B16.5 | | | | M | | | | | |
| **Extension length** | | | | | | | | | |
| 1 500 mm (59 inch), adjustable cable length | | | | | 1 | 1 | | | |
| 4 000 mm (157 inch), adjustable cable length | | | | | 1 | 2 | | | |
| **Material process connection/extension** | | | | | | | | | |
| Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301) | | | | | | | | 1 | |
| Stainless steel 316 L (1.4404) | | | | | | | | 2 | |
| **Approvals** | | | | | | | | | |
| CE | | | | | | | | | A |
| ATEX II 1/2D Ex ta/tb IIIC T! Da/Db IP6X | | | | | | | | | B |
| $FM_{US}$ and $FM_C$ General Purpose | | | | | | | | | C |
| $FM_{US}$ and $FM_C$ DIP Class II, III Div.1, Groups E, F, G | | | | | | | | | D |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [(70 mm x 13 mm (2.76 x 0.51 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y14** |
| Signal bulb inserted in M20 cable gland[2)] | **A20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare parts** | |
| Replacement Electronics Modules are available. Contact factory for pricing. | |

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## Selection and ordering data (continued)

1) Max. 6 bar (87 psi).
2) Available only with Approval option A.

## Technical specifications

| SITRANS LVS300 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Vibrating point level switch |
| **Input** | |
| Measured variable | High, low, and demand |
| Measuring frequency | |
| • Standard | 330 Hz |
| **Output** | |
| PNP | Open collector: Permanent load max. 0.4 A, short-circuit and overload protected (reverse protection) |
| Relay | DPDT relay |
| Signal delay | • Probe uncovered to covered: approximately 1 second<br>• Probe covered to uncovered: approximately 1 ... 2 seconds |
| Relay fail-safe | High or low, switch selectable |
| Alarm output | • Relay 8 A at 250 V AC, non-inductive<br>• Relay 5 A at 30 V DC, non-inductive |
| **Sensitivity** | Four sensitivity settings, switch selectable |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | II |
| • Pollution degree | 2 |
| Medium conditions | |
| • Process temperature | -40 ... +150 °C (-40 ... +302 °F) |
| • Pressure (vessel) | Max. 16 bar g (232 psi g) European Pressure Directive 2014/68/EU: Category 1 |
| • Minimum material density | Approx. 20 g/l (1.2 lb/ft³) |
| **Design** | |
| Material | |
| • Enclosure | Aluminum powder coat |
| Process connection | • G 1", G 1 1/4", G 1 1/2" DIN 228; NPT 1", NPT 1 1/4", NPT 1 1/2" ANSI B 1.20.1<br>• Flange: according to selection 1.4541 (321) or 1.4404 (316L)<br>• Tri-clamp: stainless steel 1.4301 (304) or 1.4404 (316L)<br>• 2" (DN 50) ISO 2852 |
| Probe material | • Oscillator material: stainless steel 1.4404 (316L)<br>• Stainless steel 1.4301 (304)/1.4541 (321) or 1.4404 (316L) (process connection and tube extension) |
| Degree of protection | IP67 (EN 60529), NEMA Type 4X |
| Conduit entry | 2 x M20 x 1.5 or 2 x ½" NPT |
| Weight | • Standard version: 1.3 kg (2.9 lb) +1.3 kg/m (+2.9 lb per 39.3 inch) extension<br>• Customer supplied pipe: 1.8 kg (4.0 lb) +1.3 kg/m (+2.9 lb per 39.3 inch) extension |

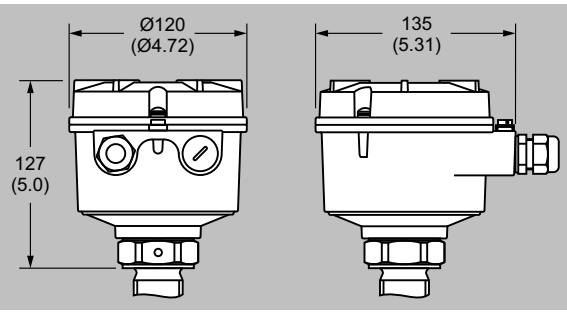
## Technical specifications (continued)

| SITRANS LVS300 | |
|---|---|
| **Power supply** | • Relay DPDT<br>21 ... 230 V, 50 ... 60 Hz, ± 10 %* 22 VA,<br>22 ... 45 V DC, ± 10 %* 2W *incl. ± 10 % of EN 61010<br>• 3-wire PNP 20 ... 40 V DC, ± 10 %*<br>*incl. ± 10 % of EN 61010 |
| **Certificates and approvals** | CE, ATEX, FM |

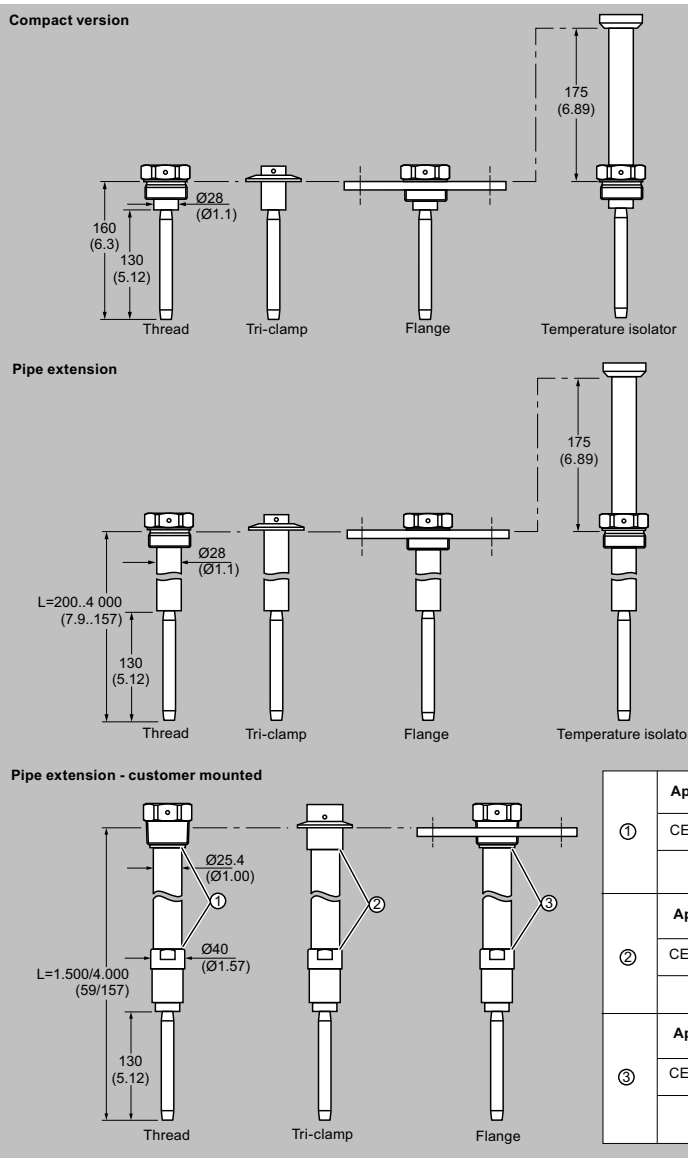
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## Dimensional drawings




SITRANS LVS300 enclosure, dimensions in mm (inch)



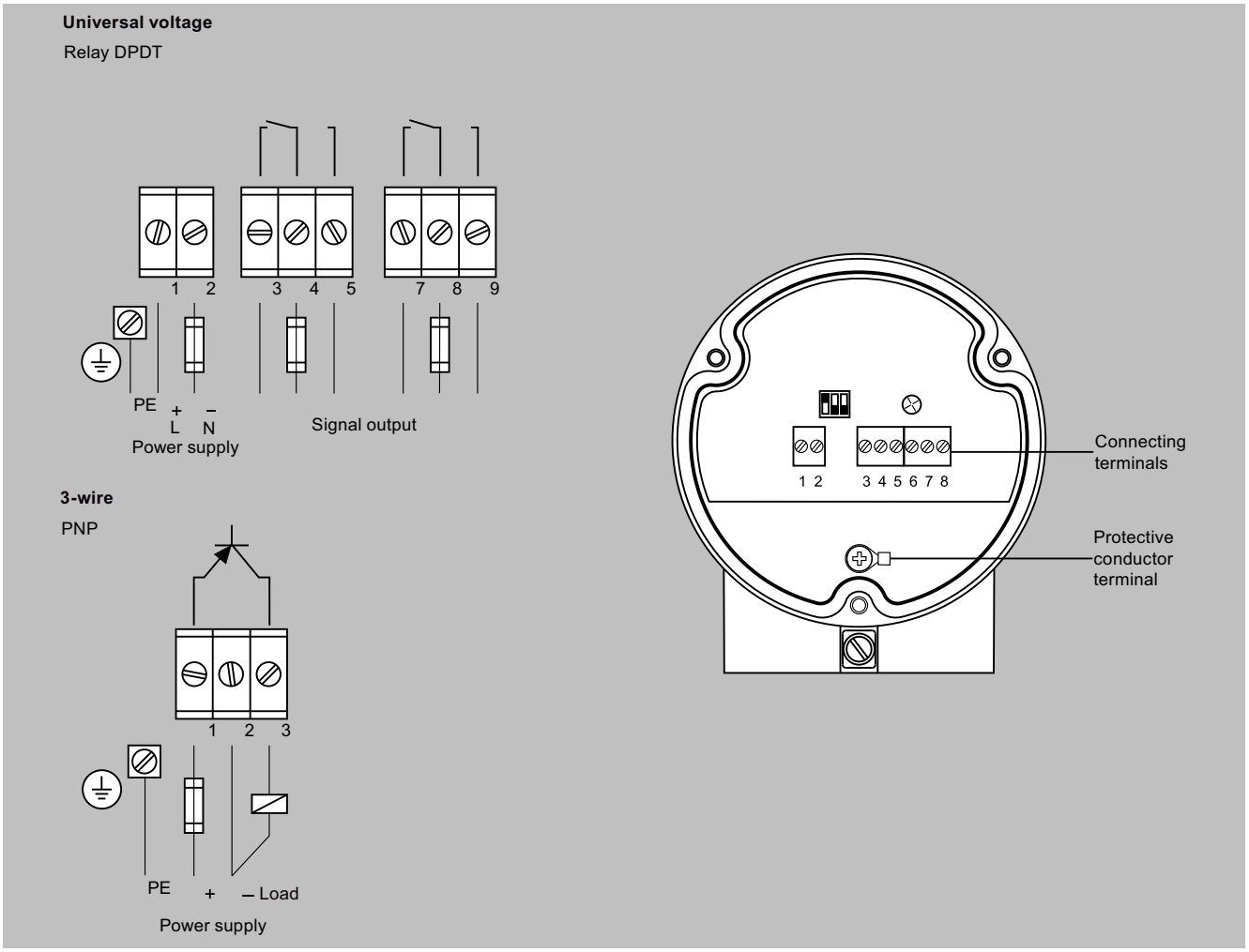

| | Approval | Process connection | Thread on extension pipe |
|---|---|---|---|
| ① | CE, ATEX | G 1½" | R 1" |
| | FM | NPT 1½" | NPT 1" |
| ② | Approval | Thread on extension pipe | |
| | CE, ATEX | R 1" | |
| | FM | NPT 1" | |
| ③ | Approval | Process connection | Thread on extension pipe |
| | CE, ATEX | Flange DN | R 1" |
| | | Flange ANSI | NPT 1" |
| | FM | Flange DN<br>Flange ANSI | NPT 1" |

SITRANS LVS300, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LVS300 connections

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## Overview



SITRANS LPS200 is a rotary paddle switch for point level and material detection in bulk solids.

## Benefits

- Proven paddle switch technology for bulk solids
- High integrity mechanical seal
- Universal power supply options available
- Unique friction clutch mechanism prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

## Application

The paddle switch technology detects full, empty, or demand conditions on materials such as grain, feed, cement, plastic granulate, and wood chips. The paddle switch can handle bulk densities as low as 15.06 g/l (0.94 lb/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition.

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

- Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

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## Selection and ordering data

| SITRANS LPS200 Rotary paddle point level switch, compact design<br>Level detection in solids. Compact, side or top mount with extension options to 300 mm (11.81 inch). | Article No.<br>7ML5725- | | | | | | | | | | | Ord. code | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 | | ● | ● | ● |
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | | | | |
| Up to 80 °C (176 °F) | 1 | | | | | | | | | | | | | |
| Up to 150 °C (302 °F) | 2 | | | | | | | | | | | | | |
| Up to 250 °C (482 °F) | 3 | | | | | | | | | | | | | |
| Up to 600 °C (1 112 °F)[1)2)] | 4 | | | | | | | | | | | | | |
| Up to 80 °C (176 °F) basic version aluminum[1)3)] | 5 | | | | | | | | | | | | | |
| Up to 80 °C (176 °F) basic version stainless steel[1)4)] | 6 | | | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | | | | |
| 230 V AC, 1 rev/min. | | A | | | | | | | | | | | | |
| 230 V AC, 5 rev/min. | | C | | | | | | | | | | | | |
| 115 V AC, 1 rev/min. | | E | | | | | | | | | | | | |
| 115 V AC, 5 rev/min. | | G | | | | | | | | | | | | |
| 48 V AC, 1 rev/min. | | J | | | | | | | | | | | | |
| 24 V AC, 1 rev/min. | | K | | | | | | | | | | | | |
| 24 V DC, 1 rev/min. | | L | | | | | | | | | | | | |
| 24 V DC, 5 rev/min. | | N | | | | | | | | | | | | |
| 48 V AC, 5 rev/min. | | Z | | | | | | | | | | J | 1 | B |
| 24 V AC, 5 rev/min. | | Z | | | | | | | | | | J | 1 | E |
| Universal Voltage, 1 rev/min. | | Z | | | | | | | | | | J | 2 | A |
| Universal Voltage, 1 rev/min., fail-safe | | Z | | | | | | | | | | J | 2 | B |
| Universal Voltage, 5 rev/min. | | Z | | | | | | | | | | J | 2 | C |
| Universal Voltage, 5 rev/min. fail-safe | | Z | | | | | | | | | | J | 2 | D |
| **Process connection** | | | | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | | | | |
| G 1¼" [(BSPP), EN ISO 228-1] | | | A | | | | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1] | | | B | | | | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1] | | | C | | | | | | | | | | | |
| 1" NPT [(Taper), ANSI/ASME B1.20.1] | | | D | | | | | | | | | | | |
| 1¼" NPT [(Taper), ANSI/ASME B1.20.1] | | | E | | | | | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | | | F | | | | | | | | | | | |
| ***Flanged*** | | | | | | | | | | | | | | |
| DN 32 PN 6, EN 1092-1, flat face[5)] | | | G | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[5)] | | | H | | | | | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | J | | | | | | | | | | | |
| 2" ASME 150 lb B16.5, raised face | | | K | | | | | | | | | | | |
| 3" ASME 150 lb B16.5, raised face | | | L | | | | | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | M | | | | | | | | | | | |
| 2" Tri-clamp (DN 50) ISO 2852[6)] | | | N | | | | | | | | | | | |
| **Process pressure** | | | | | | | | | | | | | | |
| Up to 0.5 bar (7.25 psi) | | | | 1 | | | | | | | | | | |
| Up to 5 bar (72.5 psi) | | | | 2 | | | | | | | | | | |
| Up to 10 bar (145 psi) | | | | 3 | | | | | | | | | | |
| **Process connection material** | | | | | | | | | | | | | | |
| Aluminum[7)] | | | | | 1 | | | | | | | | | |
| Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) | | | | | 2 | | | | | | | | | |
| Stainless steel 316L (1.4404)[8)] | | | | | 3 | | | | | | | | | |
| **Extension length** | | | | | | | | | | | | | | |
| 100 mm (3.94 inch)[9)] | | | | | | | 1 | | | | | | | |
| 150 mm (5.91 inch) | | | | | | | 2 | | | | | | | |
| 200 mm (7.87 inch) | | | | | | | 3 | | | | | | | |
| 250 mm (9.84 inch) | | | | | | | 4 | | | | | | | |
| 300 mm (11.81 inch) | | | | | | | 5 | | | | | | | |
| **Measuring vane** | | | | | | | | | | | | | | |
| Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)[10)] | | | | | | | | A | | | | | | |
| Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)[10)11)] | | | | | | | | B | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, compact design<br>Level detection in solids. Compact, side or top mount with extension options to 300 mm (11.81 inch). | Article No.<br>7ML5725- ● ● ● ● ● - ● ● ● 0 | Ord. code<br>● ● ● |
|---|---|---|
| Boot shaped, 28 x 98 mm (1.10 x 3.86 inch) | C | |
| Rectangular, 50 x 150 mm (1.97 x 5.91 inch)[12] | D | |
| Rectangular, 50 x 250 mm (1.97 x 9.84 inch)[12] | E | |
| Rectangular, 98 x 150 mm (3.86 x 5.91 inch)[11][12] | F | |
| Rectangular, 98 x 250 mm (3.86 x 9.84 inch)[11][12] | G | |
| Rectangular, 50 x 98 mm (1.97 x 3.86 inch)[12] | H | |
| **Approvals** | | |
| CSA/FM Dust Ignition Proof, RCM | A | |
| ATEX II ½ D, RCM | B | |
| CSA/FM General Purpose, RCM, CE | C | |
| CE, RCM | D | |
| IEC Ex ta/tb IIIC | E | |
| EAC Ex ta/tb IIIC Da/Db | F | |

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Heating of enclosure[13][14] | **A35** |
| Signal bulb inserted in M20 cable gland[13] | **A20** |
| Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[15] | **K01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[17][18] | **C20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Spare Parts and Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) | **7ML1830-1KH** |
| Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) | **7ML1830-1KJ** |
| **Rigid extension kit** | |
| (Includes spring coupling, rigid tube extension, and required pins) | |
| Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch)[16] | **7ML5711-0AA** |
| Extension: 1 000, 900, 800, 700, 600 mm (39.4, 35.4, 31.5, 27.6, 23.6 inch)[16] | **7ML5711-1AA** |
| Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch)[16] | **7ML5711-2AA** |
| Rope extension kit, 2 m (6.56 ft) | **7ML1830-1KK** |

| Spare Parts and Accessories | Article No. |
|---|---|
| SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C | **7ML5725-5EE11-2AC0** |
| SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B | **7ML5725-6ZC12-2AB0 J2A** |
| SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Z (J2A), process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A | **7ML5725-6ZE12-2AA0 J2A** |

1) Available with Approval options C and D only, up to 0.5 bar.
2) Not available with Process connections A, B, D, E, and G.
3) Only available with the following configurations 7ML5725-5AC11-2AD0 or 7ML5725-5EE11-2AC0.
4) Only available with the following configurations 7ML5725-6ZC12-2AB0 J2A or 7ML5725-6ZE12-2AA0 J2A.
5) Available with Process pressure options 1 and 2 only.
6) Available with Process temperature option 1 only.
7) Available with Process connection options A ... F only, Process pressure option 1 and Process temperature options 1 and 5 only.
8) Available with Process connection options C, F, H ... N and Measuring vane options A and B.
9) Available with Measuring vane options A, C, D, E, H only.
10) Add 16 mm (0.63 inch) to extension length.
11) Available with Extension lengths 2, 3, 4, 5.
12) Available with Process connection options H ... M only.
13) Available with Approval option D only.
14) Available only with Power supply options J2A, J2B, J2C, and J2D.
15) Available up to 250 °C (482 °F).
16) Pendulum shaft 500 mm/1 000 mm/1 500 mm should be selected with 150 mm standard length 2 and vane A (35 x 106) to get to the desired lengths.
17) Available with Power supply options J2A and J2C only.
18) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, shaft protected design<br>Level detection in aggressive solids. Compact, side or top mount, with enhanced shaft protection. Extension options to 300 mm (11.81 inch). | Article No. 7ML5726- ● ● ● ● ● - ● ● ● ● | Ord. code ● ● ● |
|---|---|---|
| **Process temperature** | | |
| Up to 80 °C (176 °F) | 1 | |
| Up to 150 °C (302 °F) | 2 | |
| Up to 250 °C (482 °F) | 3 | |
| Up to 600 °C (1 112 °F)[1)2)] | 4 | |
| Up to 80 °C (176 °F) basic version[3)] | 5 | |
| **Power supply** | | |
| 230 V AC, 1 rev/min. | A | |
| 230 V AC, 5 rev/min. | C | |
| 115 V AC, 1 rev/min. | E | |
| 115 V AC, 5 rev/min. | G | |
| 48 V AC, 1 rev/min. | J | |
| 24 V AC, 1 rev/min. | K | |
| 24 V DC, 1 rev/min. | L | |
| 24 V DC, 5 rev/min. | N | |
| 48 V AC, 5 rev/min. | Z | J 1 B |
| 24 V AC, 5 rev/min. | Z | J 1 E |
| Universal voltage, 1 rev/min. | Z | J 2 A |
| Universal voltage, 1 rev/min., fail-safe | Z | J 2 B |
| Universal voltage, 5 rev/min. | Z | J 2 C |
| Universal voltage, 5 rev/min., fail-safe | Z | J 2 D |
| **Process connection** | | |
| ***Threaded*** | | |
| G 1¼" [(BSPP), EN ISO 228-1] | A | |
| G 1½" [(BSPP), EN ISO 228-1] | B | |
| 1¼" NPT [(Taper), ANSI/ASME B1.20.1] | C | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | D | |
| ***Flanged*** | | |
| DN 32 PN 6, EN 1092-1, flat face[4)] | E | |
| DN 100 PN 6, EN 1092-1, flat face[4)] | F | |
| DN 100 PN 16, EN 1092-1, flat face | G | |
| 2" ASME 150 lb B16.5, raised face | H | |
| 3" ASME 150 lb B16.5, raised face | J | |
| 4" ASME 150 lb B16.5, raised face | K | |
| 2" Tri-clamp (DN 50) ISO 2852[5)] | L | |
| **Process pressure** | | |
| Up to 0.5 bar (7.25 psi) | 1 | |
| Up to 5 bar (72.5 psi) | 2 | |
| Up to 10 bar (145 psi) | 3 | |
| **Process connection material** | | |
| Aluminum[6)] | 1 | |
| Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)[18)] | 2 | |
| Stainless steel 316L (1.4404)[7)] | 3 | |
| **Extension length** | | |
| 150 mm (5.91 inch)[8)] | 1 | |
| 200 mm (7.87 inch) | 2 | |
| 250 mm (9.84 inch) | 3 | |
| 300 mm (11.81 inch) | 4 | |
| **Extension material (protection tube)** | | |
| Aluminum[9)] | A | |
| Stainless steel 303 (1.4305) | B | |
| Stainless steel 316L (1.4404)[10)] | C | |
| **Measuring vane** | | |
| Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)[11)] | A | |
| Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)[11)12)] | B | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, shaft protected design<br>Level detection in aggressive solids. Compact, side or top mount, with enhanced shaft protection. Extension options to 300 mm (11.81 inch). | Article No.<br>7ML5726- ● ● ● ● ● - ● ● ● ● | Ord. code<br>● ● ● |
|---|---|---|
| Rectangular, 50 x 150 mm (1.97 x 5.91 inch)[13] | D | |
| Rectangular, 50 x 250 mm (1.97 x 9.84 inch)[13] | E | |
| Rectangular, 98 x 150 mm (3.86 x 5.91 inch)[12][13] | F | |
| Rectangular, 98 x 250 mm (3.86 x 9.84 inch)[12][13] | G | |
| Rectangular, 50 x 98 mm (1.97 x 3.86 inch)[13] | H | |
| **Approvals** | | |
| CSA/FM Dust Ignition Proof, RCM | 1 | |
| ATEX II ½ D, RCM | 2 | |
| CSA/FM General Purpose, RCM, CE | 3 | |
| CE, RCM | 4 | |
| IEC Ex ta/tb IIIC | 5 | |
| EAC Ex ta/tb IIIC Da/Db | 6 | |

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Heating of enclosure[14][15] | **A35** |
| Signal bulb inserted in M20 cable gland[14] | **A20** |
| Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[16] | **K01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.[17][19] | **C20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: The Operating Instructions should be ordered as a separate line on the order. All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) | **7ML1830-1KH** |
| Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) | **7ML1830-1KJ** |

| Spare Parts | Article No. |
|---|---|
| SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 2 | **7ML5726-5ZB12-2BA2 J2A** |
| SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 1 | **7ML5726-5ZC12-2BA1 J2A** |

1) Available with Approval options 3 and 4 only and up to max 0.5 bar.
2) Not available with Process connection options A, C, E.
3) Only available with the following configurations 7ML5726-5ZB12-2BA2 J2A or 7ML5726-5ZC12-2BA1 J2A.
4) Available with Process pressure options 1 and 2 only.
5) Available with Process temperature option 1 only.
6) Available with Process connection options A ... E only, available with process pressure option 1 only, and process temperature option 1 only.
7) Extension and vane will also change to 316L, only for Process connection options B, D, F ... L and vane A.
8) Available with Measuring vane options A, D, E, H only.
9) Available with Process pressure option 1 and process temperature option 1 only.
10) Available with Process connection options B, D, F ... L and vane A.
11) Add 16 mm (0.63 inch) to extension length.
12) Available with Extension length options 2 ... 4 only.
13) Available with Process connection options F, G, H, J, K only.
14) Available with Approval option 4 only.
15) Available only with Power supply options J2A, J2B, J2C, and J2D.
16) Available up to 250 °C (482 °F).
17) Available with Power supply options J2A and J2C only.
18) Available with Extension material Stainless steel, threads 303 option B only.
19) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.

| SITRANS LPS200 Rotary paddle point level switch, cable extension design<br>Level detection in solids. Top mount, with extension options to 10 m (32.80 ft). | Article No.<br>7ML5727- ● ● ● ● ● - ● ● ● 0 | Ord. code<br>● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Process temperature** | | |
| Up to 80 °C (176 °F) | 1 | |
| Up to 150 °C (302 °F) | 2 | |
| Up to 250 °C (482 °F) | 3 | |
| Up to 600 °C (1 112 °F)[1][2] | 4 | |
| Up to 80 °C (176 °F) basic version[3] | 5 | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, cable extension design<br>Level detection in solids. Top mount, with extension options to 10 m (32.80 ft). | Article No. 7ML5727- ● ● ● ● ● - ● ● ● 0 | Ord. code ● ● ● |
|---|---|---|
| **Power supply** | | |
| 230 V AC, 1 rev/min. | A | |
| 230 V AC, 5 rev/min. | C | |
| 115 V AC, 1 rev/min. | E | |
| 115 V AC, 5 rev/min. | G | |
| 48 V AC, 1 rev/min. | J | |
| 24 V AC, 1 rev/min. | K | |
| 24 V DC, 1 rev/min. | L | |
| 24 V DC, 5 rev/min. | N | |
| 48 V AC, 5 rev/min. | Z | J 1 B |
| 24 V AC, 5 rev/min. | Z | J 1 E |
| Universal voltage, 1 rev/min. | Z | J 2 A |
| Universal voltage, 1 rev/min., fail-safe | Z | J 2 B |
| Universal voltage, 5 rev/min. | Z | J 2 C |
| Universal voltage, 5 rev/min., fail-safe | Z | J 2 D |
| **Process connection** | | |
| ***Threaded*** | | |
| G 1¼" [(BSPP), EN ISO 228-1] | A | |
| G 1½" [(BSPP), EN ISO 228-1] | B | |
| 1¼" NPT [(Taper), ANSI/ASME B1.20.1] | C | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | D | |
| ***Flanged*** | | |
| DN 32 PN 6, EN 1092-1, flat face[4)] | E | |
| DN 100 PN 6, EN 1092-1, flat face[4)] | F | |
| DN 100 PN 16, EN 1092-1, flat face | G | |
| 2" ASME 150 lb B16.5, raised face | H | |
| 3" ASME 150 lb B16.5, raised face | J | |
| 4" ASME 150 lb B16.5, raised face | K | |
| **Process pressure** | | |
| Up to 0.5 bar (7.25 psi) | 1 | |
| Up to 5 bar (72.5 psi) | 2 | |
| Up to 10 bar (145 psi) | 3 | |
| **Process connection material** | | |
| Aluminum[5)] | 1 | |
| Stainless steel, threads 303 (1.4305), flanges 321 (1.4541) | 2 | |
| **Cable extension length** | | |
| Standard cable length, 2 000 mm (78.74 inch) | 0 | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | |
| 500 ... 1 000 mm (19.69 ... 39.37 inch) | 1 | |
| Cable length 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 2 | |
| Cable length 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | 3 | |
| Cable length 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | 4 | |
| Cable length 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | 5 | |
| Cable length 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | 6 | |
| Cable length 6 001 ... 7 000 mm (236.26 ... 275.59 inch) | 7 | |
| Cable length 7 001 ... 10 000 mm (275.63 ... 393.70 inch) | 8 | |
| Without extension[12)] | 9 | N 1 A |
| **Measuring vane** | | |
| Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)[6)] | A | |
| Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)[6)] | B | |
| Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)[7)] | C | |
| Rectangular, 50 x 150 mm (1.97 x 5.91 inch)[7)] | D | |
| Rectangular, 50 x 250 mm (1.97 x 9.84 inch)[7)] | E | |
| Rectangular, 98 x 150 mm (3.86 x 5.91 inch)[7)] | F | |
| Rectangular, 50 x 98 mm (1.97 x 3.86 inch)[7)] | G | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, cable extension design<br>Level detection in solids. Top mount, with extension options to 10 m (32.80 ft). | Article No.<br>7ML5727- ● ● ● ● ● - ● ● ● 0 | Ord. code<br>● ● ● |
|---|---|---|
| **Approvals** | | |
| CSA/FM Dust Ignition Proof, RCM | A | |
| ATEX II ½ D, RCM | B | |
| CSA/FM General Purpose, RCM, CE | C | |
| CE, RCM | D | |
| IEC Ex ta/tb IIIC | E | |
| EAC Ex ta/tb IIIC Da/Db | F | |

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: | **Y01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Reinforced cable (max. 28 kN pulling force)[8)] | **P01** |
| Heating of enclosure[9)10)] | **A35** |
| Signal bulb inserted in M20 cable gland[9)] | **A20** |
| Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[11)] | **K01** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.[13)14)] | **C20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: The Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) | **7ML1830-1KH** |
| Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) | **7ML1830-1KJ** |

| Spare Parts | Article No. |
|---|---|
| SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B | **7ML5727-5ZB12-0-AB0 J2A** |
| SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Z (J2A), process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A | **7ML5727-5ZC12-0-AA0 J2A** |

1) Available with Approval options C and D up to max. 0.5 bar.
2) Not available with Process connections A, C, E.
3) Only available with the following configurations 7ML5727-5ZC12-0AA0 J2A or 7ML5727-5ZB12-0AB0 J2A.
4) Available with Process pressure options 1 and 2 only.
5) Available with Process connections A ... E only, Process pressure option 1 only and process temperature options 1 and 5 only.
6) Add 16 mm (0.63 inch) to extension length.
7) Available with Process connections F ... K only.
8) Available only for Process temperature up to 80 °C (176 °F) and Process connection material 2.
9) Available with Approval option D.
10) Available only with Power supply options J2A, J2B, J2C, and J2D.
11) Available up to 250 °C (482 °F).
12) Not available with P01 and available with Approval D, mounting kit for rope extension included.
13) Available with Power supply options J2A and J2C only.
14) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

| SITRANS LPS200 Rotary paddle point level switch, angled extension design<br>Level detection in aggressive applications. Bottom or side mount with enhanced shaft protection. Extension options to 300 mm (11.81 inch). | Article No.<br>7ML5728- ● ● ● ● ● - ● ● ● 0 | Ord. code<br>● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Process temperature** | | |
| Up to 80 °C (176 °F) | 1 | |
| Up to 150 °C (302 °F) | 2 | |
| Up to 250 °C (482 °F) | 3 | |
| **Power supply** | | |
| 230 V AC, 1 rev/min. | A | |
| 230 V AC, 5 rev/min. | C | |
| 115 V AC, 1 rev/min. | E | |
| 115 V AC, 5 rev/min. | G | |
| 48 V AC, 1 rev/min. | J | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, angled extension design<br>Level detection in aggressive applications. Bottom or side mount with enhanced shaft protection. Extension options to 300 mm (11.81 inch). | Article No. 7ML5728- ● | ● | ● | ● | ● | - | ● | ● | ● | 0 | Ord. code ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 V AC, 1 rev/min. | | K | | | | | | | | | | | |
| 24 V DC, 1 rev/min. | | L | | | | | | | | | | | |
| 24 V DC, 5 rev/min. | | N | | | | | | | | | | | |
| 48 V AC, 5 rev/min. | | Z | | | | | | | | | J | 1 | B |
| 24 V AC, 5 rev/min. | | Z | | | | | | | | | J | 1 | E |
| Universal voltage, 1 rev/min. | | Z | | | | | | | | | J | 2 | A |
| Universal voltage, 1 rev/min., fail-safe | | Z | | | | | | | | | J | 2 | B |
| Universal voltage, 5 rev/min. | | Z | | | | | | | | | J | 2 | C |
| Universal voltage, 5 rev/min., fail-safe | | Z | | | | | | | | | J | 2 | D |
| **Process connection** | | | | | | | | | | | | | |
| ***Flanged*** | | | | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[1] | | | A | | | | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | B | | | | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | C | | | | | | | | | | |
| **Process pressure** | | | | | | | | | | | | | |
| Up to 0.5 bar (7.25 psi) | | | | 1 | | | | | | | | | |
| Up to 5 bar (72.5 psi) | | | | 2 | | | | | | | | | |
| Up to 10 bar (145 psi) | | | | 3 | | | | | | | | | |
| **Process connection material** | | | | | | | | | | | | | |
| Stainless steel 303/321 (1.4305/1.4541) | | | | | 1 | | | | | | | | |
| **Extension length** | | | | | | | | | | | | | |
| 125 mm (4.92 inch) | | | | | | | 1 | | | | | | |
| 150 mm (5.91 inch) | | | | | | | 2 | | | | | | |
| 200 mm (7.87 inch) | | | | | | | 3 | | | | | | |
| 250 mm (9.84 inch) | | | | | | | 4 | | | | | | |
| 300 mm (11.81 inch) | | | | | | | 5 | | | | | | |
| **Measuring vane** | | | | | | | | | | | | | |
| Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch) | | | | | | | | A | | | | | |
| Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch) | | | | | | | | B | | | | | |
| Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch) | | | | | | | | C | | | | | |
| Rectangular vane, 98 x 150 mm (3.86 x 5.91 inch) | | | | | | | | D | | | | | |
| Rectangular vane, 98 x 250 mm (3.86 x 9.84 inch) | | | | | | | | E | | | | | |
| Hinged vane, 65 x 200 mm (2.56 x 7.87 inch) | | | | | | | | F | | | | | |
| **Approvals** | | | | | | | | | | | | | |
| CSA/FM Dust Ignition Proof, RCM | | | | | | | | | A | | | | |
| ATEX II ½ D, RCM | | | | | | | | | B | | | | |
| CSA/FM General Purpose, RCM, CE | | | | | | | | | C | | | | |
| CE, RCM | | | | | | | | | D | | | | |
| IEC Ex ta/tb IIIC | | | | | | | | | E | | | | |
| EAC Ex ta/tb IIIC Da/Db | | | | | | | | | F | | | | |

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Heating of enclosure[2)3)] | **A35** |
| Signal bulb inserted in M20 cable gland[2)] | **A20** |
| Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[4)] | **K01** |
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.[4)5)] | **C20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: The Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) | **7ML1830-1KH** |
| Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) | **7ML1830-1KJ** |

1) Available with Process pressure options 1 and 2 only.
2) Available with Approval option D only.

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## Selection and ordering data (continued)

3) Available only with Power supply options J2A, J2B, J2C, and J2D.
4) Available with Power supply options J2A and J2C only.
5) Available with Approval options A, B, C, D, and E only. Approvals A and C with FM only.

| SITRANS LPS200 Rotary paddle point level switch, rigid extension design<br>Level detection in solids. Top mount, with extension options to 4 m (13.12 ft). | Article No.<br>7ML5730- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | Ord. code<br>● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Process temperature** | | | | | | | | | | | | | | |
| Up to 80 °C (176 °F) | | 1 | | | | | | | | | | | | |
| Up to 150 °C (302 °F) | | 2 | | | | | | | | | | | | |
| Up to 250 °C (482 °F) | | 3 | | | | | | | | | | | | |
| Up to 600 °C (1 112 °F)[1)2)] | | 4 | | | | | | | | | | | | |
| **Power supply** | | | | | | | | | | | | | | |
| 230 V AC, 1 rev/min. | | | A | | | | | | | | | | | |
| 230 V AC, 5 rev/min. | | | C | | | | | | | | | | | |
| 115 V AC, 1 rev/min. | | | E | | | | | | | | | | | |
| 115 V AC, 5 rev/min. | | | G | | | | | | | | | | | |
| 48 V AC, 1 rev/min. | | | J | | | | | | | | | | | |
| 24 V AC, 1 rev/min. | | | K | | | | | | | | | | | |
| 24 V DC, 1 rev/min. | | | L | | | | | | | | | | | |
| 24 V DC, 5 rev/min. | | | N | | | | | | | | | | | |
| 48 V AC, 5 rev/min. | | | Z | | | | | | | | | J | 1 | B |
| 24 V AC, 5 rev/min. | | | Z | | | | | | | | | J | 1 | E |
| Universal voltage, 1 rev/min. | | | Z | | | | | | | | | J | 2 | A |
| Universal voltage, 1 rev/min., fail-safe | | | Z | | | | | | | | | J | 2 | B |
| Universal voltage, 5 rev/min. | | | Z | | | | | | | | | J | 2 | C |
| Universal voltage, 5 rev/min., fail-safe | | | Z | | | | | | | | | J | 2 | D |
| **Process connection** | | | | | | | | | | | | | | |
| ***Threaded*** | | | | | | | | | | | | | | |
| G 1¼" [(BSPP), EN ISO 228-1] | | | | A | | | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1] | | | | B | | | | | | | | | | |
| 1¼" NPT [(Taper), ANSI/ASME B1.20.1] | | | | C | | | | | | | | | | |
| 1½" NPT [(Taper), ANSI/ASME B1.20.1] | | | | D | | | | | | | | | | |
| ***Flanged*** | | | | | | | | | | | | | | |
| DN 32 PN 6, EN 1092-1, flat face[3)] | | | | E | | | | | | | | | | |
| DN 100 PN 6, EN 1092-1, flat face[3)] | | | | F | | | | | | | | | | |
| DN 100 PN 16, EN 1092-1, flat face | | | | G | | | | | | | | | | |
| 2" ASME 150 lb B16.5, raised face | | | | H | | | | | | | | | | |
| 3" ASME 150 lb B16.5, raised face | | | | J | | | | | | | | | | |
| 4" ASME 150 lb B16.5, raised face | | | | K | | | | | | | | | | |
| 2" Tri-clamp (DN 50) ISO 2852[4)] | | | | L | | | | | | | | | | |
| **Process pressure** | | | | | | | | | | | | | | |
| Up to 0.5 bar (7.25 psi) | | | | | 1 | | | | | | | | | |
| Up to 5 bar (72.5 psi) | | | | | 2 | | | | | | | | | |
| Up to 10 bar (145 psi) | | | | | 3 | | | | | | | | | |
| **Process connection material** | | | | | | | | | | | | | | |
| Aluminum[5)] | | | | | | 1 | | | | | | | | |
| Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301) | | | | | | 2 | | | | | | | | |
| Stainless steel 316L (1.4404)[6)] | | | | | | 3 | | | | | | | | |
| **Extension material (protection tube)** | | | | | | | | | | | | | | |
| Aluminum[7)8)] | | | | | | | | 0 | | | | | | |
| Stainless steel 303 (1.4305)[9)] | | | | | | | | 1 | | | | | | |
| Stainless steel 316L (1.4404)[10)11)22)] | | | | | | | | 2 | | | | | | |
| **Extension length** | | | | | | | | | | | | | | |
| ***Aluminum*** | | | | | | | | | | | | | | |
| 250 ... 500 mm (9.84 ... 19.69 inch) | | | | | | | | | A | | | | | |

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## Selection and ordering data (continued)

| SITRANS LPS200 Rotary paddle point level switch, rigid extension design<br>Level detection in solids. Top mount, with extension options to 4 m (13.12 ft). | Article No.<br>7ML5730- ● ● ● ● ● - ● ● ● ● | Ord. code<br>● ● ● |
|---|---|---|
| 501 ... 750 mm (19.72 ... 29.53 inch) | B | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | C | |
| 1 001 ... 1 250 mm (39.41 ... 42.21 inch) | D | |
| 1 251 ... 1 500 mm (49.25 ... 59.06 inch) | E | |
| 1 501 ... 1 750 mm (59.09 ... 68.90 inch) | F | |
| 1 751 ... 2 000 mm (68.94 ... 78.74 inch) | G | |
| 2 001 ... 2 250 mm (78.78 ... 88.58 inch) | H | |
| 2 251 ... 2 500 mm (88.62 ... 98.43 inch) | J | |
| 2 501 ... 2 750 mm (98.46 ... 108.27 inch) | K | |
| 2 751 ... 3 000 mm (108.31 ... 118.11 inch) | **L** | |
| 3 001 ... 3 250 mm (118.15 ... 127.95 inch) | **M** | |
| 3 251 ... 3 500 mm (127.99 ... 137.80 inch) | **N** | |
| 3 501 ... 3 750 mm (137.83 ... 147.64 inch) | **P** | |
| 3 751 ... 4 000 mm (147.67 ... 157.48 inch) | Q | |
| ***Stainless steel 303 (1.4305)*** | | |
| 250 ... 500 mm (9.84 ... 19.69 inch) | R | |
| 501 ... 750 mm (19.72 ... 29.53 inch) | S | |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | T | |
| 1 001 ... 1 500 mm (39.41 ... 59.05 inch) | U | |
| 1 501 ... 2 000 mm (59.09 ... 78.74 inch) | V | |
| 2 001 ... 2 500 mm (78.78 ... 98.42 inch) | W | |
| 2 501 ... 3 000 mm (98.46 ... 118.11 inch) | X | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | Y | |
| ***Stainless steel 316L (1.4404)*** | | |
| 250 ... 500 mm (9.84 ... 19.69 inch) | Z | P 1 A |
| 501 ... 750 mm (19.72 ... 29.53 inch) | Z | P 1 B |
| 751 ... 1 000 mm (29.57 ... 39.37 inch) | Z | P 1 C |
| 1 001 ... 1 500 mm (39.41 ... 59.05 inch) | Z | P 1 D |
| 1 501 ... 2 000 mm (59.09 ... 78.74 inch) | Z | P 1 E |
| 2 001 ... 2 500 mm (78.78 ... 98.42 inch) | Z | P 1 F |
| 2 501 ... 3 000 mm (98.46 ... 118.11 inch) | Z | P 1 G |
| 3 001 ... 4 000 mm (118.5 ... 157.48 inch) | Z | P 1 H |
| **Measuring vane** | | |
| Boot shaped, 35 x 106 mm (1.34 x 4.17 inch)[12] | A | |
| Hinged vane, 65 x 200 mm (2.56 x 7.87 inch)[12] | B | |
| Rectangular, 50 x 150 mm (1.97 x 5.91 inch)[13] | C | |
| Rectangular, 50 x 250 mm (1.97 x 9.84 inch)[13] | D | |
| Rectangular, 98 x 150 mm (3.86 x 5.91 inch)[13] | E | |
| Rectangular, 98 x 250 mm (3.86 x 9.84 inch)[13] | F | |
| Rectangular, 50 x 98 mm (1.97 x 3.86 inch)[13] | G | |
| **Approvals** | | |
| CSA/FM Dust Ignition Proof, RCM | 1 | |
| ATEX II ½ D, RCM | 2 | |
| CSA/FM General Purpose, RCM, CE | 3 | |
| CE, RCM | 4 | |
| IEC Ex ta/tb IIIC | 5 | |
| EAC Ex ta/tb IIIC Da/Db | 6 | |

| Selection and Ordering data | Order code |
|---|---|
| **Further Designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch) | **Y01** |

| Selection and Ordering data | Order code |
|---|---|
| Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y14** |
| Heating of enclosure[14][15] | **A35** |
| Signal bulb inserted in M20 cable gland[14] | **A20** |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[16)17)] | **K01** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511.[20)21)] | **C20** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| ***Optional end of shaft seal for stability and ingress protection*** | |
| Max. temperature 80 °C (176 °F) | **P06** |
| Max. temperature 150 °C (302 °F) | **P07** |
| Max. temperature 250 °C (482 °F) | **P08** |
| Max. temperature 600 °C (1 112 °F) | **P09** |
| Sliding sleeve: standard, max. pressure 0.5 bar[14)18)] | **P12** |
| Sliding sleeve: pressure tight, for over-pressure application, dependent on pressure option ordered)[19)] | **P13** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| Note: The Operating Instructions should be ordered as a separate line on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch) | **7ML1830-1KH** |
| Hinged vane, 98 x 200 mm (3.86 x 7.87 inch) | **7ML1830-1KJ** |

1) Available with Approval options 3 and 4, up to max 0.5 bar.
2) Not available with Process connections A, C, E.
3) Available with Process pressure options 1 and 2 only.
4) Available with Process temperature 1 only.
5) Available with Process connections A ... E only, with process pressure option 1 and process temperature option 1 only.
6) Available with Process connection options B, D, F ... L and measuring vane option A.
7) Available with Process pressure 1 and process temperature 1 only.
8) Available with Extension length options A ... Q only.
9) Available with Extension length options R ... Y only.
10) Available with Process connection options B, D, F ... L and Measuring vane A, Process connection material 3. Available only with Extension length options P1A ... P1H only.
11) Only available with Seal at tube end options P06 ... P09.
12) Add 16 mm (0.63 inch) to extension length.
13) Available with Process connections F, G, H, J, K only.
14) Available with Approval option 4 only.
15) Available only with Power supply options J2A, J2B, J2C, and J2D.
16) Available when ordered with Ingress protection seal options P06 ... P09 only.
17) Available up to 250 °C (482 °F).
18) Available with Process pressure option 1 only.
19) Available up to 250 °C (482 °F).
20) Available with Power supply options J2A and J2C only.
21) Available with Approval options 1, 2, 3, 4, and 5 only. Approvals 1 and 3 with FM only.
22) Internal probe construction is 1.4305, add seal option P09 to prevent ingress.

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## Technical specifications

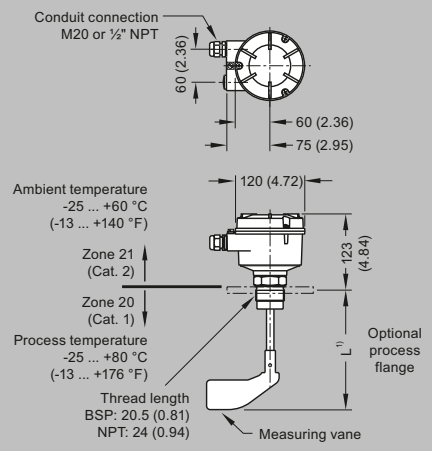
| SITRANS LPS200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Rotating point level switch |
| **Input** | |
| Measured variable | High and low and demand |
| **Output** | |
| Output signal | |
| • Alarm output | Microswitch 5 A at 250 V AC, non-inductive<br>Microswitch SPDT contact 4 A at 30 V DC, non-inductive |
| • Pickup delay | Standard (1 rpm model): approx. 1.3 seconds<br>Optional process applications (5 rpm model): approx. 0.26 seconds |
| **Sensitivity** | Adjustable via reset force of spring or geometry of measuring vane |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions | |
| • Ambient temperature | -25 ... +60 °C (-13 ... +140 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | III |
| • Pollution degree | 2 |
| Medium conditions | Bulk solids |
| • Temperature | |
| - Standard | -25 ... +80 °C (-13 ... +176 °F) |
| - Optional | -25 ... +600 °C (-13 ... +1 112 °F)<br>Higher temperature version is available. Consult a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app. |
| • Pressure (vessel) | |
| - Standard | Max. 0.5 bar g (7.25 psi g) |
| - Optional | Max. 10 bar g (145 psi g) |
| • Minimum material density | |
| - Standard measuring vane | Can detect down to 100 g/l (6.25 lb/ft³) |
| - Optional measuring vane | Can detect down to 15.06 g/l (0.94 lb/ft³) |
| **Design** | |
| Material | |
| • Enclosure | Epoxy coated aluminum |
| • Process connection, measuring shaft and vane | Stainless steel or aluminum |
| Process connection | Thread NPT, BSP, and flange options |
| Degree of protection | IP65/Type 4/NEMA 4 |
| Conduit entry | 2 x M20 x 1.5 or 2 x ½" NPT (For FM and CSA approved versions only) |
| **Power supply** | |
| AC or DC versions | 115 V AC, ± 15 %, 50 ... 60 Hz, 4 VA<br>or 230 V AC, ± 15 %, 50 Hz, 6 VA,<br>or 48 V AC, or 24 V AC,<br>or 24 V DC, ± 15 %, 2.5 W |
| Universal voltage (DPDT replay) | 24 V DC ± 15 % 50 ... 60 Hz, 22 ... 230 V AC, ± 10 %, max. 10 VA |
| **Certificates and approvals** | • CSA/FM General Purpose<br>• CE<br>• CSA/FM Dust Ignition Proof<br>• ATEX II 1/2 D<br>• RCM<br>• IECex |

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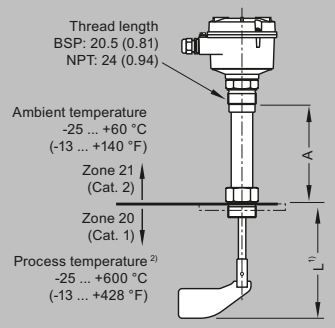


## Dimensional drawings

**Standard model: compact version**



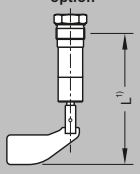

**High temperature model: compact version**



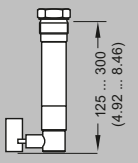

| Process temperature | A |
|---|---|
| 150/250 °C (302/482 °F) | 200 (7.87) |
| 350 °C (662 °F) | 300 (11.81) |
| 600 °C (1 112 °F) | 400 (15.74) |

| L= Length |
|---|
| 100 (3.94) |
| 150 (5.91) |
| 200 (7.87) |
| 250 (9.84) |
| 300 (11.81) |

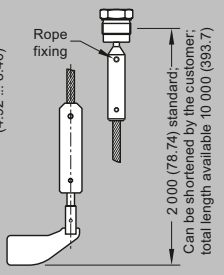
**Shaft protected option**




**Angle option**

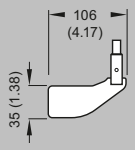



**Rope option**

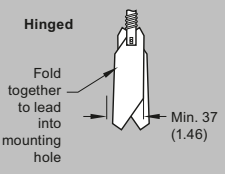


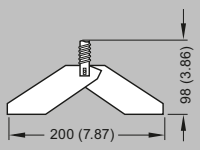

**Measuring vanes**

**Standard**

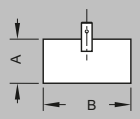



**Hinged**




**Rectangular**




**Rectangular vane options**

| A | B |
|---|---|
| 50 (1.97) | 98 (3.86) |
| 50 (1.97) | 150 (5.90) |
| 50 (1.97) | 250 (9.84) |
| 98 (3.86) | 150 (5.90) |
| 98 (3.86) | 250 (9.84) |

| Vane | Completely covered with material | | Covered up to 10 cm (3.93 inch) with material | |
|---|---|---|---|---|
| | Spring adjustment | | Spring adjustment | |
| | Light | Central (factory setting) | Light | Central (factory setting) |
| Boot shaped 35 x 106 mm | 200 g/l (12.5 lb/ft³) | 300 g/l (18.7 lb/ft³) | 100 g/l (6.2 lb/ft³) | 150 g/l (9.4 lb/ft³) |
| Boot shaped 28 x 98 mm | 300 g/l (18.7 lb/ft³) | 500 g/l (31.2 lb/ft³) | 150 g/l (9.4 lb/ft³) | 150 g/l (9.4 lb/ft³) |
| Rectangular 50 x 98 mm | 300 g/l (18.7 lb/ft³) | 500 g/l (31.2 lb/ft³) | 150 g/l (9.4 lb/ft³) | 250 g/l (15.6 lb/ft³) |
| Rectangular 50 x 150 mm | 80 g/l (5.0 lb/ft³) | 120 g/l (7.5 lb/ft³) | 40 g/l (2.5 lb/ft³) | 60 g/l (3.7 lb/ft³) |
| Rectangular 50 x 250 mm | 30 g/l (1.9 lb/ft³) | 50 g/l (3.1 lb/ft³) | 15 g/l (0.9 lb/ft³) | 25 g/l (1.6 lb/ft³) |
| Rectangular 98 x 150 mm | 30 g/l (1.9 lb/ft³) | 50 g/l (3.1 lb/ft³) | 15 g/l (0.9 lb/ft³) | 25 g/l (1.6 lb/ft³) |
| Rectangular 98 x 250 mm | 20 g/l (1.2 lb/ft³) | 30 g/l (1.9 lb/ft³) | 15 g/l (0.9 lb/ft³) | 15 g/l (0.9 lb/ft³) |
| Hinged 98 x 200 mm | 70 g/l (4.4 lb/ft³) | 100 g/l (6.2 lb/ft³) | 35 g/l (2.2 lb/ft³) | 50 g/l (3.1 lb/ft³) |

1. For 35 x 106 mm boot shaped and 98 x 200 mm hinged measuring vanes, add 16 mm to extension length.
2. For use with all approval options except CSA class II. See manual for more details.

**Notes**
For heavy material, only top mounting of paddle switch is recommended.
Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

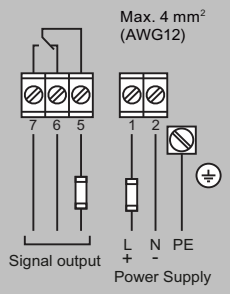
SITRANS LPS200, dimensions in mm (inch)

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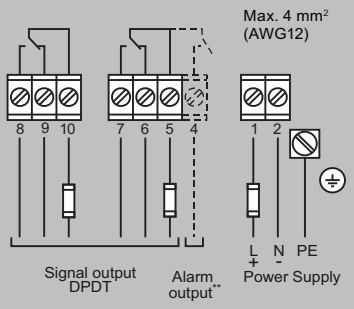


## Circuit diagrams

**AC or DC version**




**Universal voltage (DPDT relay)***




* See manual for universal voltage with SIL.

** With option Fail safe alarm (rotation control).
Contact open when de-energised.
Fail safe alarm switching and timing behaviour:
If the vane is not covered, the rotating vane shaft will send pulses at 20 second intervals.
In case of fault, the pulses are missed.
After 30 seconds, the alarm relay will open.

**Power supply:**

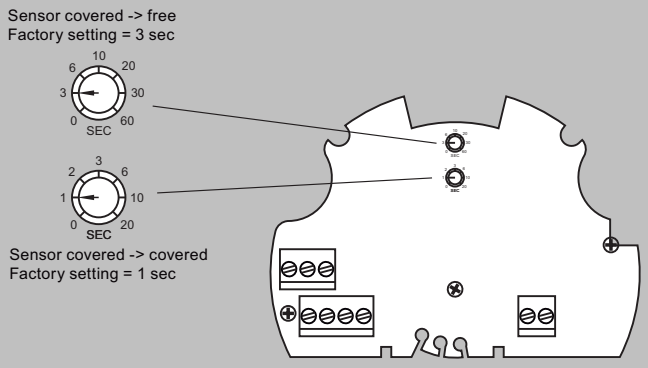
**AC version:**
24 V or 48 V or 115 V or 230 V 50/60 Hz max. 4 VA
All voltages ± 10 %[1)]
Supply voltage as selected.
External fuse: max 10 A, fast or slow, HBC, 250 V

**DC version:**
24 V DC ± 15 %[1)] max. 2.5 W
External fuse: not required

[1)] Including ±10% of EN 61010

**Signal output:**
Micro switch, SPDT contact
max. 250 V AC, 5 A, non inductive
max. 30 V DC, 4 A, non inductive
External fuse: max 10 A, fast or slow, HBC, 250 V

**Signal output: delay**




SITRANS LPS200 connections

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## Overview



The Pointek ULS200 is an ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

## Benefits

- 2 switch outputs for high-high, high, low, and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate enclosure, Type 6/NEMA 6/IP67
- Easy, two-button programming

## Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage, and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime, and equipment replacement costs.

- Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

## Design

***Installation***

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives.

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

***Mounting and Interconnection***

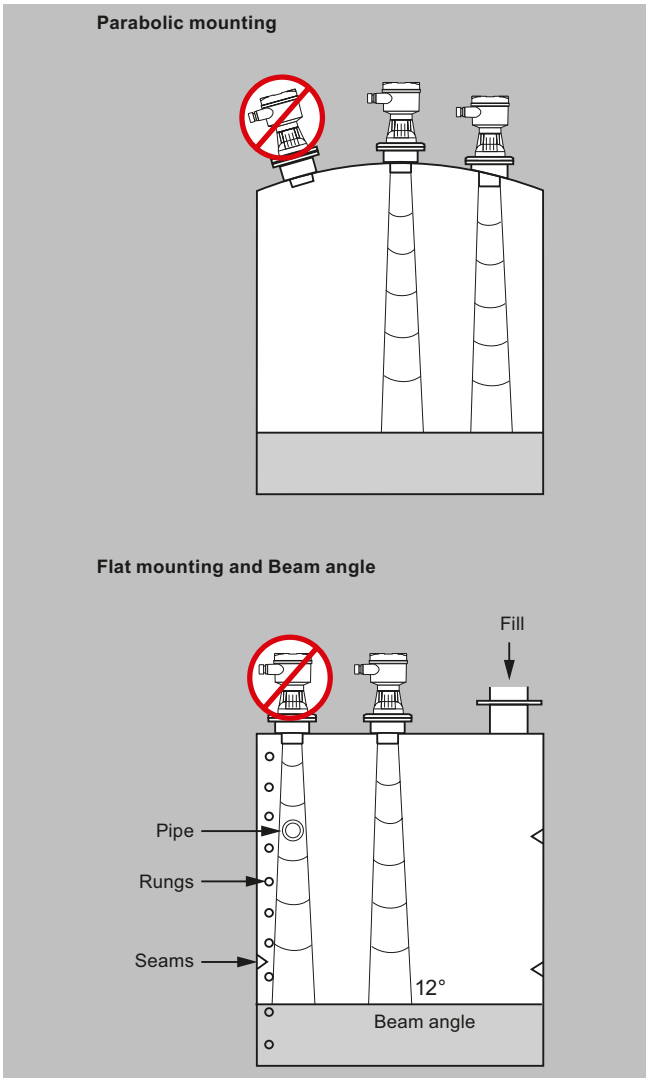
The Pointek ULS200 is available in three thread types: 2" NPT, R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3 inch) flange adapter for mating to 3" ASME, DN 65, PN 10, and JIS 10K 3B sized flanges.

Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

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## Configuration




Pointek ULS200 mounting

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## Selection and ordering data

| Pointek ULS200 Ultrasonic point level switch<br>Non-contact, 5 m (16.4 ft) range, for bulk solids, liquids, and slurries. | Article No.<br>7ML1510- | ● | ● | ● | 0 | ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Power supply** | | | | | | |
| 24 V DC, relay output | | 1 | | | | |
| 24 V DC, transistor output | | 2 | | | | |
| 100 ... 230 V AC, relay output | | 3 | | | | |
| **Approvals** | | | | | | |
| CE, UKCA, RCM, CSA Class I, II, Div. 2[1] | | | J | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, $_{C}CSA_{US}$, FM | | | K | | | |
| **Transducer/Process connection** | | | | | | |
| ETFE, 2" NPT [(Taper), ASME B1.20.1] | | | | A | | |
| EFTE, R 2" [(BSPT), EN 10226] | | | | B | | |
| EFTE, G 2" [(BSPP), EN ISO 228-1] | | | | C | | |
| PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1] | | | | E | | |
| PVDF copolymer, R 2" [(BSPT), EN 10226] | | | | F | | |
| PVDF copolymer, G [(BSPP), EN ISO 228-1] | | | | G | | |
| PVDF copolymer, 4" sanitary mounting[2] | | | | J | | |
| **Enclosure/cable inlet** | | | | | | |
| ***Polycarbonate*** | | | | | | |
| • Cable inlet PG 13.5 | | | | | | 1 |
| • Cable inlet ½" NPT | | | | | | 2 |
| ***Aluminum*** | | | | | | |
| Aluminum housing, Cable inlet PG 13.5 | | | | | | 3 |
| Aluminum housing, Cable inlet 1/2" NPT | | | | | | 4 |

[1] Available with Enclosure/cable inlet option 2 only.
[2] Available with Approvals option K only.

| Selection and ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s) | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures | **7ML1930-1AC** |
| Universal Box Bracket Mounting Kit | **7ML1830-1BK** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT | **7ML1830-1BT** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT | **7ML1830-1BU** |
| 2" BSP nylon plastic locknut | **7ML1830-1DQ** |
| 2" NPT nylon plastic locknut | **7ML1830-1DT** |
| 4" sanitary mounting clamp | **7ML1830-1BR** |
| **Spare Parts** | |
| Polycarbonate Lid | **7ML1830-1LG** |

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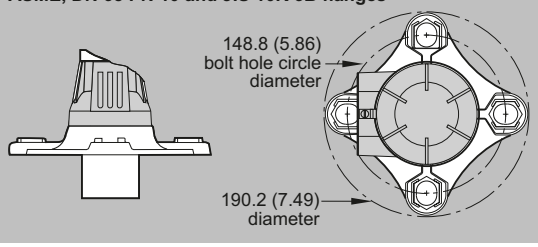


## Technical specifications

| Pointek ULS200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Ultrasonic level switch |
| **Measuring range** | |
| Measuring range in liquids | 0.25 ... 5 m (0.8 ... 16.4 ft) |
| Measuring range in bulk solids | 0.25 ... 3 m (0.8 ... 9.8 ft) |
| **Output** | |
| AC Version (relay) | 2 SPDT Form C contacts, rated 5 A at 250 V AC or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load |
| DC Version (relay) | 2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load |
| DC Version (transistor) | 2 switches, rated max. 100 mA, 48 V DC |
| **Accuracy** | |
| AC/DC version | |
| • Resolution | 3 mm (0.1 inch) |
| • Repeatability | 0.25 % of measuring range |
| **Rated operation conditions** | |
| Installation conditions | |
| • Location | Indoors/outdoors |
| • Beam angle | 12° |
| Ambient conditions | |
| • Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • Storage temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • If mounted in metal threads | -20 ... +60 °C (-5 ... +140 °F) |
| Medium conditions | |
| • Process pressure | 0.5 bar (7.25 psi) max. |
| **Design** | |
| Material | Polycarbonate with gasket |
| Weight | Approx. 1.5 kg (3.3 lb) |
| Transducer material | PVDF or ETFE copolymer |
| Threaded mounting | 2" NPT [(Taper), ASME B1.20.1]<br>R 2" [(BSPT), EN 10226]<br>or G 2" [(BSPP), EN ISO 228-1] |
| • Optional flange adapter | For 3" ASME, DN 65, PN 10, and JIS 10 K3B |
| Sanitary mounting | 4" sanitary fitting clamp |
| **Power supply** | |
| AC version | 100 ... 230 V AC, ± 15 %, 50/60 Hz, max. 12 VA, 5 W |
| DC version | 18 ... 30 V DC, 3 W |
| **Displays and controls** | |
| Display | LCD, three digits, 9 mm (0.35 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state |
| Memory | EEPROM, non-volatile |
| Programming | 2 keys |
| **Electronics/enclosure** | Connection: terminal block, max. 2.5 mm² (14 AWG) solid/1.5 mm² (16 AWG) stranded |
| Degree of protection | IP67/Type 6/NEMA 6 |
| Cable inlet | 2 x ½" NPT or 2 x PG 13.5 |
| **Certificates and approvals** | CE, UKCA, $_{C}CSA_{US}$, FM |

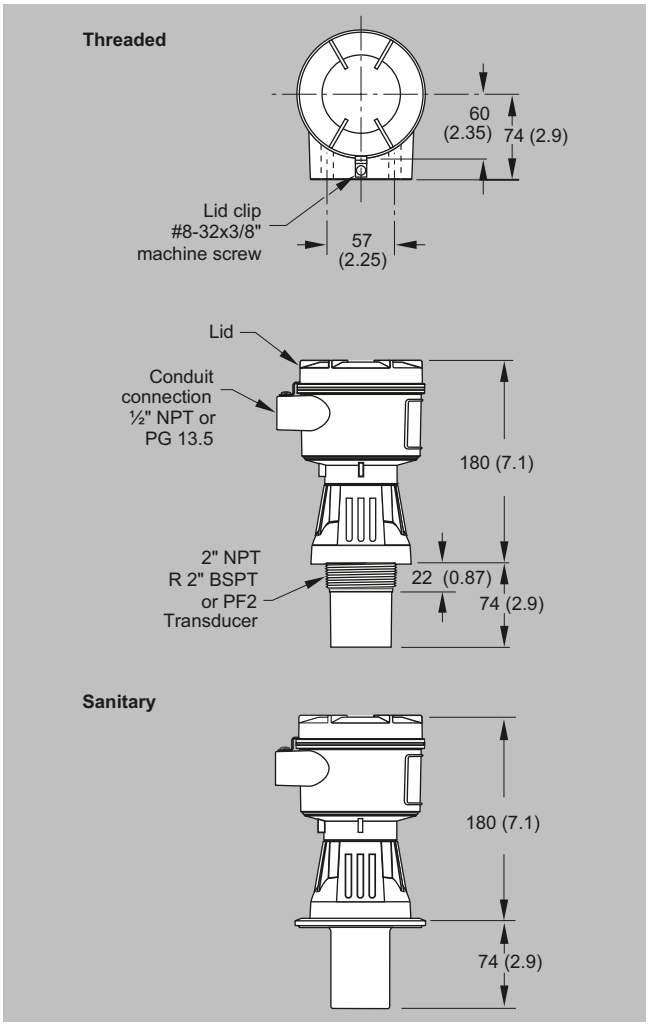
## Options

**Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges**




Pointek ULS200 optional flange adapter, dimensions in mm (inch)

## Dimensional drawings



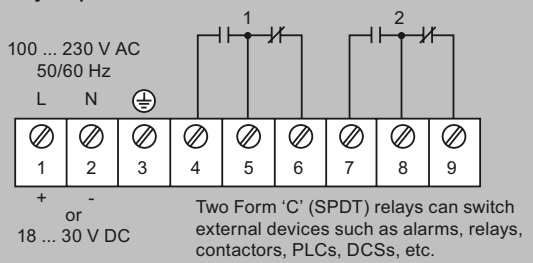

Pointek ULS200, dimensions in mm (inch)

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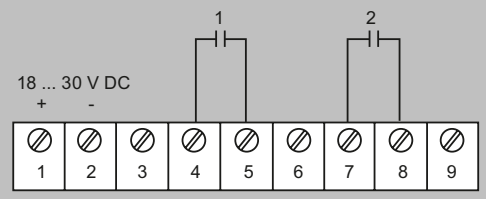
## Circuit diagrams

**Relay output**




Two Form 'C' (SPDT) relays can switch external devices such as alarms, relays, contactors, PLCs, DCSs, etc.

**Transistor output: DC version only**




Two non-polarized transistor outputs are suitable for connection to PLCs, DCSs, or customer supplied relays.

Pointek ULS200 connections

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## Overview

After driving the market in ultrasonic level controllers for the past 40 years, Siemens has evolved its industry leading solutions to include control for 80 GHz radar sensors.

Siemens level controller portfolio provides high-accuracy open channel monitoring, flexible control for multiple-relay ultrasonics, and reliable controllers for long-range, high frequency radar.

## Technical specifications

***Controller Selection Guide***

| Criteria | SITRANS LT500 | SITRANS LUT400 | HydroRanger 200 | MultiRanger 100/200 |
|---|---|---|---|---|
| Range | Sensor dependent | 0.3 ... 60 m (1 ... 196 ft), transducer and application dependent | 15 m (50 ft) transducer and application dependent | 15 m (50 ft) transducer and application dependent |
| Typical applications | Single or dual point, wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage | Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage | Wet wells, flumes/weirs, bar screen control | Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage |
| Output | 1, 3, 6 relays,<br>two 4 ... 20 mA outputs (isolated) | 4 ... 20 mA/HART<br>3 relays | 6 relays standard, two 4 ... 20 mA outputs (isolated) | 1 relay (option on MultiRanger 100)<br>3 relays standard<br>6 relays (option)<br>Two 4 ... 20 mA outputs (isolated) |
| Communications | Options:<br>• HART (additional 4 ... 20 mA output)<br>• PROFIBUS PA<br>• PROFIBUS DP<br>• Modbus RTU<br>• PROFINET | HART 7.0, USB, SIMATIC PDM | Built-in Modbus RTU/ASCII via RS 485<br>Options:<br>• SIMATIC PDM<br>• SmartLinx (PROFIBUS DP, DeviceNet) | • Built-in Modbus RTU or ASCII via RS 485<br>Options:<br>• SIMATIC PDM<br>• SmartLinx (PROFIBUS DP, DeviceNet) |
| Power specifications | AC version:<br>100 ... 230 V AC ± 15 %,<br>50/60 Hz, 36 VA/17 W<br>DC version:<br>12 ... 30 V DC, 20 W | AC version:<br>100 ... 230 V AC ± 15 %,<br>50/60 Hz, 36 VA<br>Fuse: 5 x 20 mm,<br>Slow Blow, 0.25 A, 250 V<br>DC version:<br>10 ... 32 V DC, 10 W<br>Fuse: 5 x 20 mm,<br>Slow Blow, 1.6 A,<br>125 V | AC version:<br>100 ... 230 V AC ± 15 %,<br>50/60 Hz,<br>36 VA/17 W<br>DC version:<br>12 ... 30 V DC, 20 W | AC version:<br>100 ... 230 V AC ± 15 %,<br>50/60 Hz,<br>36 VA/17 W<br>DC version:<br>12 ... 30 V DC, 20 W |
| Approvals | CE, $CSA_{US/C}$, UL Listed, FM, RCM | CE, $CSA_{US/C}$,<br>UL Listed, FM,<br>RCM, LR, ABS, MCERTS | CE, $CSA_{US/C}$, UL Listed, FM, RCM, MCERTS | CE, $CSA_{US/C}$, UL Listed, FM, RCM |

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## Overview




SITRANS LT500 is a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

## Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications.
- English, German, French, Spanish, Chinese, Italian, Portuguese, Japanese, Danish, Dutch, Swedish, Finnish, Polish, Russian, and Korean texts on the HMI.
- Removable terminal blocks for ease of wiring.
- Digital input for back-up level override from point level device.
- Communication options for HART, Modbus RTU, PROFIBUS PA, PROFIBUS DP, and PROFINET.
- Single or dual point level monitoring.
- Auto False-Echo Suppression for fixed obstruction avoidance.
- Up to 6 independent programmable relays for pump control, alarms, or remote totalization.
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions.
- Wall, panel, and remote panel mounting options.
- Remote configuration via EDD with SIMATIC PDM and SITRANS DTM via USB.
- MCERTS Certified for open channel flow.

## Application

SITRANS LT500 mA HART version can be used with SITRANS LR110, LR120, Probe LU240 or any level device generating a mA signal. The ultrasonic version can connect any EchoMax or legacy transducer. SITRANS LT500 offers true dual point monitoring and digital communications. SITRANS LT500 is low maintenance and economical. With its advanced control functions, it can operate pumps during lower cost time periods and manage pump rosters for efficiency.

SITRANS LT500 will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

## Design

SITRANS LT500 is available in wall, panel, or remote panel mounting options.

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## Selection and ordering data

| SITRANS LT500 mA Hart version<br>Continuous, non-contact, for liquids, slurries, and solids. Monitors level, volume, and volume flow, for virtually any application in a wide range of process industries. | Article No.<br>7ML60 ● ● - ● ● ● ● ● - ● A A ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Product type** | |
| HydroRanger | 0 |
| MultiRanger | 1 |
| **Feature set** | |
| Level, volume, and flow | 3 |
| Level, Volume & Flow (Mcerts certified) | 4 |
| **Sensor input type** | |
| 4 ... 20 mA input(s) | 0 |
| **Number of measurement points** | |
| Single point version | A |
| Dual point version | B |
| **Relay output** | |
| 1 relay (1 Form A), 250 V AC | A |
| 3 relays (2 Form A, 1 Form C), 250 V AC | B |
| 6 relays (4 Form A, 2 Form C), 250 V AC | C |
| **Mounting, enclosure design** | |
| Wall mount, standard enclosure | 0 |
| Wall mount, 4 entries, M20 cable glands included | 1 |
| Panel mount | 2 |
| Remote panel mount | 3 |
| **Type of protection** | |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}CSA_{US}$, $_{C}UL_{US}$ FM, CE, UKCA, RCM, EAC | 0 |
| Ex rated[1)] | 1 |
| **Removable data storage** | |
| Included, (8 GB micro SD) | 1 |
| **Input voltage** | |
| 12 ... 30 V DC | 2 |
| 100 ... 230 V AC | 3 |

| Selection and ordering data | |
|---|---|
| **Further designs** | **Order code** |
| Please add "-Z" to Article No. and specify Order code(s). | |
| ***Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301*** | **Y15** |
| ***Approvals*** | |
| CSA (USA & Canada) | |
| CSA Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III | **E21** |
| ***Certificates*** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Factory certificate 2.2 (EN 10204) | **C14** |
| ***Communication*** | |
| 4 ... 20 mA, active output, with HART | **F01** |
| Modbus RTU | **F04** |
| PROFIBUS PA | **F05** |
| PROFIBUS DP | **F06** |
| PROFINET | **F07** |

| Selection and ordering data | |
|---|---|
| ***Specials*** | |
| Special design<br>For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app | **Y99** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

| Selection and ordering data | |
|---|---|
| **Optional equipment** | **Article No.** |
| Tag, stainless steel, 12 x 45 mm, one text line, (max. 16 characters) | **7ML1930-1AC** |
| Barriers in a NEMA 4X/IP65 enclosure | **A5E50255823** |
| Barrier suitable for LR1xx & LU240 (STAHL: 9001/01-280-110-101) | **A5E50113513** |
| Sunshield/pipe mount plate, 304 Stainless steel | **7ML1930-1GA** |
| USB cable, 2 m (6.56 ft), standard USB-B to USB-mini B | **7ML1930-1GD** |

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## Selection and ordering data (continued)

| Selection and ordering data | |
|---|---|
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| **Spare parts** | |
| Replacement motherboard, single point, includes DC power module | **A5E50113558** |
| Replacement motherboard, dual point, includes DC power module | **A5E50113557** |
| Replacement motherboard, single point, includes AC power module | **A5E50113542** |
| Replacement motherboard, dual point, includes AC power module | **A5E50113543** |
| Replacement lid with 4 button HMI | **A5E50113559** |

| Selection and ordering data | |
|---|---|
| Replacement lid with 4 button HMI panel mount version | **A5E50113560** |
| Replacement lid with 4 button HMI remote panel mount version | **A5E52897553** |
| Replacement lid with blind remote panel mount version | **A5E53276261** |
| Retrofit kit for wall mount to panel mount version | **A5E50114010** |
| Retrofit kit for wall mount to remote panel mount version | **A5E53276259** |
| Panel mount cable extension, 2.5 m (8.2 ft) | **7ML1930-1GF** |
| Remote panel mount gasket and fastener kit | **7ML1830-1PK** |
| Replacement terminal blocks for 4 ... 20 mA input(s) sensor type version | **A5E38824197** |
| Replacement SD card | **A5E50113554** |
| HART communications module | **A5E50113564** |
| PROFIBUS PA communications module | **A5E50113568** |
| Modbus RTU communications module | **A5E50113565** |
| PROFIBUS DP communications module | **A5E50113567** |
| PROFINET communications module | **A5E50113569** |

1) Available only with order code E21 and Mounting, enclosure design option 0 or 1.
2) Available only with Sensor input type option 1.

| **SITRANS LT500 Ultrasonic version**<br>**Continuous, non-contact, for liquids, slurries, and solids. Monitors level, volume, and volume flow, for virtually any application in a wide range of process industries.** | **Article No.**<br>**7ML60** ● ● - ● ● ● ● ● - ● A A ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Product type** | |
| HydroRanger | 0 |
| MultiRanger | 1 |
| **Feature set** | |
| Level, volume, and flow | 3 |
| Level, Volume & Flow (Mcerts certified) | 4 |
| **Sensor input type** | |
| Ultrasonic transducer input(s) | 1 |
| **Number of measurement points** | |
| Single point version | A |
| Dual point version | B |
| **Relay output** | |
| 1 relay (1 Form A), 250 V AC | A |
| 3 relays (2 Form A, 1 Form C), 250 V AC | B |
| 6 relays (4 Form A, 2 Form C), 250 V AC | C |
| **Mounting, enclosure design** | |
| Wall mount, standard enclosure | 0 |
| Wall mount, 4 entries, M20 cable glands included | 1 |
| Panel mount | 2 |
| Remote panel mount | 3 |
| **Type of protection** | |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}CSA_{US}$, $_{C}UL_{US,}$ FM, CE, UKCA, RCM, EAC | 0 |
| Ex rated[1)] | 1 |
| **Removable data storage** | |
| Included, (8 GB micro SD) | 1 |
| **Input voltage** | |
| 12 ... 30 V DC | 2 |
| 100 ... 230 V AC | 3 |

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## Selection and ordering data (continued)

| Selection and ordering data | |
|---|---|
| **Further designs** | **Order code** |
| Please add "-Z" to Article No. and specify Order code(s). | |
| ***Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301*** | **Y15** |
| ***Approvals*** | |
| CSA (USA & Canada) | |
| CSA Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III | **E21** |
| ***Certificates*** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Factory certificate 2.2 (EN 10204) | **C14** |
| ***Mass storage (SD card access via USB)*** | |
| Disable mass storage function with SD card (Required for USA)[2] | **J07** |
| ***Communication*** | |
| 4 ... 20 mA, active output, with HART | **F01** |
| Modbus RTU | **F04** |
| PROFIBUS PA | **F05** |
| PROFIBUS DP | **F06** |
| PROFINET | **F07** |
| ***Specials*** | |
| Special design | **Y99** |
| For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app | |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

| Selection and ordering data | |
|---|---|
| **Optional equipment** | **Article No.** |
| Tag, stainless steel, 12 x 45 mm, one text line, (max. 16 characters) | **7ML1930-1AC** |
| Coaxial cable converter in IP65 enclosure | **A5E53332217** |
| Sunshield/pipe mount plate, 304 Stainless steel | **7ML1930-1GA** |
| USB cable, 2 m (6.56 ft), standard USB-B to USB-mini B | **7ML1930-1GD** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |

| Selection and ordering data | |
|---|---|
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| **Spare parts** | |
| Replacement motherboard, single point, US comes with DC power module | **A5E52897550** |
| Replacement motherboard, dual point, US comes with DC power module | **A5E52897552** |
| Replacement motherboard, single point, US comes with AC power module | **A5E52897548** |
| Replacement motherboard, dual point, US comes with AC power module | **A5E52897549** |
| Replacement lid with 4 button HMI | **A5E50113559** |
| Replacement lid with 4 button HMI panel mount version | **A5E50113560** |
| Replacement lid with 4 button HMI remote panel mount version | **A5E52897553** |
| Replacement lid with blind remote panel mount version | **A5E53276261** |
| Retrofit kit for wall mount to panel mount version | **A5E50114010** |
| Retrofit kit for wall mount to remote panel mount version | **A5E53276259** |
| Replacement terminal blocks for Ultrasonic transducer input(s) sensor type version | **A5E52897545** |
| Panel mount cable extension, 2.5 m (8.2 ft) | **7ML1930-1GF** |
| Remote panel Mount Gasket and Fastener Kit | **7ML1830-1PK** |
| Replacement SD card | **A5E50113554** |
| HART communications module | **A5E50113564** |
| PROFIBUS PA communications module | **A5E50113568** |
| Modbus RTU communications module | **A5E50113565** |
| PROFIBUS DP communications module | **A5E50113567** |
| PROFINET communications module | **A5E50113569** |

[1] Available only with order code E21 and Mounting, enclosure design option 0 or 1.
[2] Available only with Sensor input type option 1.

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## Technical specifications

| SITRANS LT500 mA HART version | |
|---|---|
| Mode of operation | Level, space, distance, volume, flow, head, difference, average, totalization |
| Sensor input, mA HART version | |
| Number of inputs | 1 or 2 |
| Terminal voltage | Max. 26 V, Min. 18 V (0 ... 22.6 mA) |
| Wiring | 2 conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG) |
| Max. cable length | 500 m (1 640.42 ft) |
| Sensor input communication | • 4 ... 20 mA<br>• HART protocol, for supported sensors: SITRANS LR110, LR120, SITRANS Probe LU240 |
| 4 ... 20 mA sensor input | |
| • Resolution | 0.025 % of full scale |
| • Accuracy | 0.1 % of full scale |
| HART sensor input | Resolution, range, and accuracy are dependent on connected sensor |
| Digital input | |
| Quantity | 2 |
| Switching threshold, low | 0 ... 0.5 V DC |
| Switching threshold, high | 10 ... 50 V DC |
| Input current | Max. 3 mA |
| Bias voltage | 24 V |
| Analog output | |
| Quantity | 1 or 2 |
| Range | 0 ... 20 mA or 4 ... 20 mA isolated |
| • Max. load | 750 W |
| • Resolution | 0.1 % of range |
| Accuracy | ±20 µA |
| Startup current | 3.6 mA |
| Fail-safe | Programmable as high, low, last reliable, set value, or hold per NAMUR NE43 |
| Wiring | 2 conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG) |
| Relay output | |
| Quantity | Up to 6, 4 form A and 2 form C |
| Rating | 5 A at 250 V AC, 5 A at 30 V DC, non-inductive |
| Durability | 50 000 operations min. per relay (5 A at 30 V DC, resistive load) |
| Fail-safe | Programmable as energized, de-energized, or hold |
| Wiring | Copper conductors per local requirements to meet 250 V 5 A contact rating |
| Rated operating conditions | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| • Altitude | 2 000 m (6 565 ft) maximum |
| • Vibration resistence | 0.5 g at frequencies from 10 hz to 100 hz |
| • Bump/shock resistence | 25 g |
| Design | |
| Weight | |
| • Wall mount | 1.22 kg (2.68 lb) |
| • Panel mount | 1.35 kg (2.97 lb) |
| • Remote panel mount | 1.73 kg (3.80 lb) |
| Enclosure | |
| • Material | Polycarbonate |
| • Degree of protection | |
| • Wall mount | IP65/Type 4X |
| • Panel mount | IP54/Type 3 |
| • Remote panel mount | IP65/Type 3 (front panel), IP20 (enclosure) |
| Display and control | |
| LCD display | 60 x 40 mm (2.36 x 1.57 inch) LCD, 240 x 160 pixels resolution |
| Menu navigation | 4 push button keys |
| Update time | 1 second or less |
| Memory | Program and parameters stored in non-volatile Flash memory |
| Real time clock memory retention without power | 48 hours |
| CPU speed | 96 MHz |
| Memory card | 8 GB Industrial micro SD |
| Power supply | |
| AC version | 100 ... 230 V AC, ±15 %, 50/60 Hz, 36 VA (17 W) |
| DC version | 12 ... 30 V DC (20 W) |
| Certificates and approvals | • CE, UKCA, RCM, EAC, FM, $_{c}$CSA$_{US}$, $_{c}$UL$_{US}$<br>• $_{c}$CSA$_{US}$ Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III<br>• Mcerts |
| Communication | |
| Service interface | USB 2.0 mini A cable |
| Optional Fieldbus | • HART 7, with Active/Passive 4 ... 20 mA<br>• Modbus RTU<br>• PROFIBUS PA per profile 4.01<br>• PROFIBUS DP<br>• PROFINET |
| Remote configuration via service interface | • EDD via SIMATIC PDM<br>• SITRANS DTM via PACTware |

| SITRANS LT500 Ultrasonic version | |
|---|---|
| Mode of operation | Level, space, distance, volume, flow, head, difference, average, totalization |
| Sensor input, ultrasonic version | |
| Number of inputs | 1 or 2 |
| Measuring range | 0.3 ... 60 m (1 ... 196 ft), transducer dependent |
| Transducer frequency | 10 ... 52 kHz |
| Ultrasonic transducer | Compatible transducers: all EchoMax and ST-H series transducers, legacy coaxial cable connections via converter |
| Accuracy | |
| • Error in measurement | • Standard operation: ±1 mm (0.04 inch) plus 0.17 % of measured distance<br>• High accuracy OCM: ±1 mm (0.04 inch), within 3 m (9.84 ft) range |
| • Resolution | • Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater<br>• High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range |

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## Technical specifications (continued)

| SITRANS LT500 Ultrasonic version | |
|---|---|
| • Temperature compensation | • -40 ... +150 °C (-40 ... +300 °F)<br>• Integral temperature sensor in t-ransducer<br>• External TS-3 temperature sensor (optional)<br>• Programmable fixed temperature values |
| Wiring | Transducer:<br>2 copper conductors, twisted, with foil shield/drain wire, 300 V<br>0.5 ... 0.75 mm² (22 ... 18 AWG) |
| • Max. cable length | 365 m (1 200 ft) |
| Digital input | |
| Quantity | 2 |
| Switching threshold, low | 0 ... 0.5 V DC |
| Switching threshold, high | 10 ... 50 V DC |
| Input current | Max. 3 mA |
| Bias voltage | 24 V |
| Analog output | |
| Quantity | 1 or 2 |
| Range | 0 ... 20 mA or 4 ... 20 mA isolated |
| • Max. load | 750 W |
| • Resolution | 0.1 % of range |
| Accuracy | ±20 µA |
| Startup current | 3.6 mA |
| Fail-safe | Programmable as high, low, last reliable, set value, or hold per NAMUR NE43 |
| Wiring | 2 conductor, twisted, shielded,<br>0.5 ... 0.75 mm² (22 ... 18 AWG) |
| Relay output | |
| Quantity | Up to 6, 4 form A and 2 form C |
| Rating | 5 A at 250 V AC, 5 A at 30 V DC, non-inductive |
| Durability | 50 000 operations min. per relay<br>(5 A at 30 V DC, resistive load) |
| Fail-safe | Programmable as energized, de-energized, or hold |
| Wiring | Copper conductors per local requirements to meet 250 V 5 A contact rating |
| Rated operating conditions | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| • Altitude | 2 000 m (6 565 ft) maximum |
| • Vibration resistence | 0.5 g at frequencies from 10 hz to 100 hz |
| • Bump/shock resistence | 25 g |
| Design | |
| Weight | |
| • Wall mount | 1.22 kg (2.68 lb) |
| • Panel mount | 1.35 kg (2.97 lb) |
| • Remote panel mount | 1.73 kg (3.80 lb) |
| Enclosure | |
| • Material | Polycarbonate |
| • Degree of protection | |
| • Wall mount | IP65/Type 4X |
| • Panel mount | IP54/Type 3 |

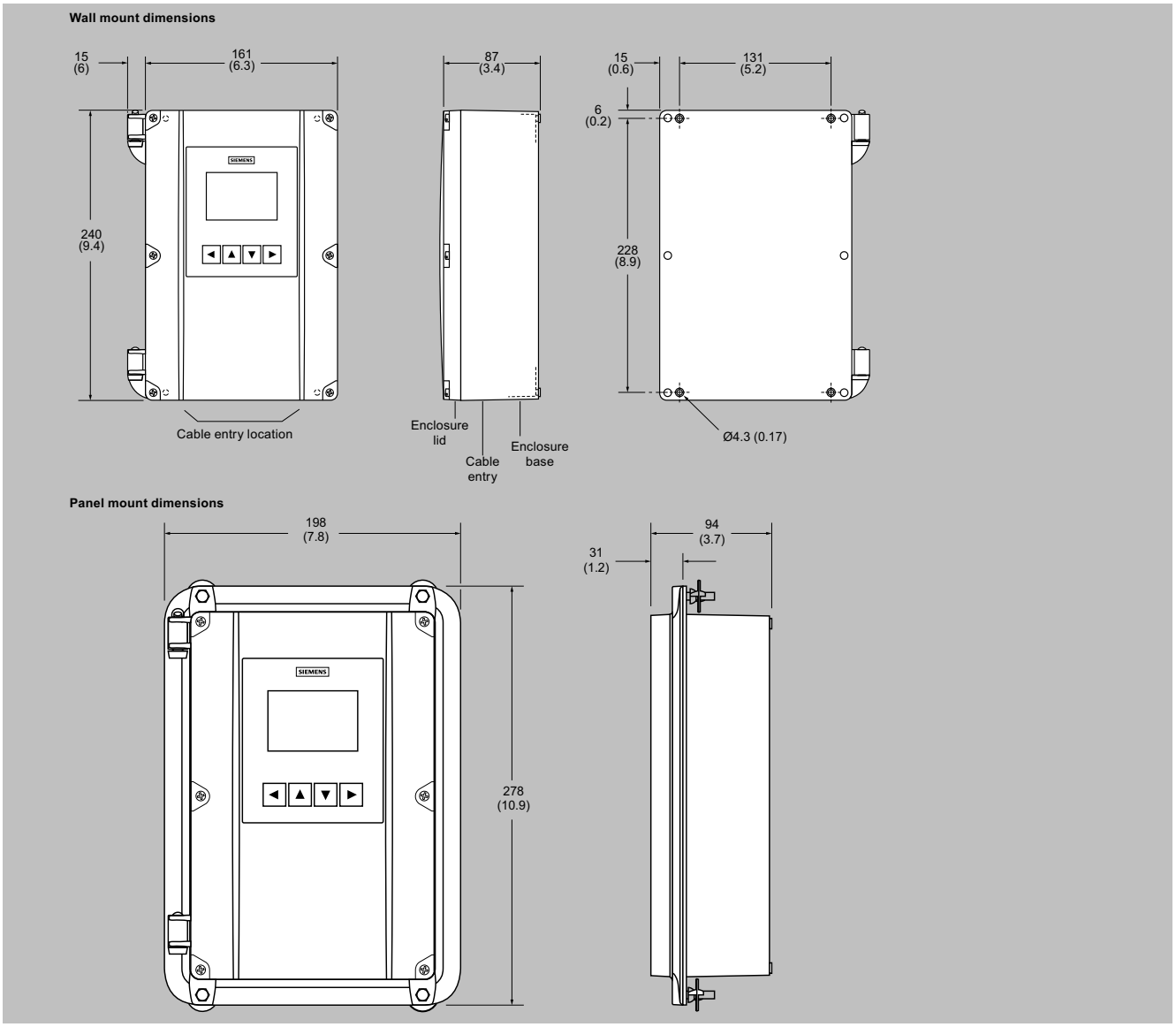
## Technical specifications (continued)

| SITRANS LT500 Ultrasonic version | |
|---|---|
| • Remote panel mount | IP65/Type 3 (front panel), IP20 (enclosure) |
| Display and control | |
| LCD display | 60 x 40 mm (2.36 x 1.57 inch) LCD,<br>240 x 160 pixels resolution |
| Menu navigation | 4 push button keys |
| Update time | 1 second or less |
| Memory | Program and parameters stored in non-volatile Flash memory |
| Real time clock memory retention without power | 48 hours |
| CPU speed | 96 MHz |
| Memory card | 8 GB Industrial micro SD |
| Power supply | |
| AC version | 100 ... 230 V AC, ±15 %, 50/60 Hz, 36 VA (17 W) |
| DC version | 12 ... 30 V DC (20 W) |
| Certificates and approvals | • CE, UKCA, RCM, EAC, FM, $_{C}CSA_{US}$, $_{C}UL_{US}$<br>• $_{C}CSA_{US}$ Class I, Div. 2, Group A, B, C and D; Class II, Div 2, Group F & G; Class III<br>• Mcerts |
| Communication | |
| Service interface | USB 2.0 mini A cable |
| Optional Fieldbus | • HART 7, with Active/Passive 4 ... 20 mA<br>• Modbus RTU<br>• PROFIBUS PA per profile 4.01<br>• PROFIBUS DP<br>• PROFINET |
| Remote configuration via service interface | • EDD via SIMATIC PDM<br>• SITRANS DTM via PACTware |

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## Dimensional drawings



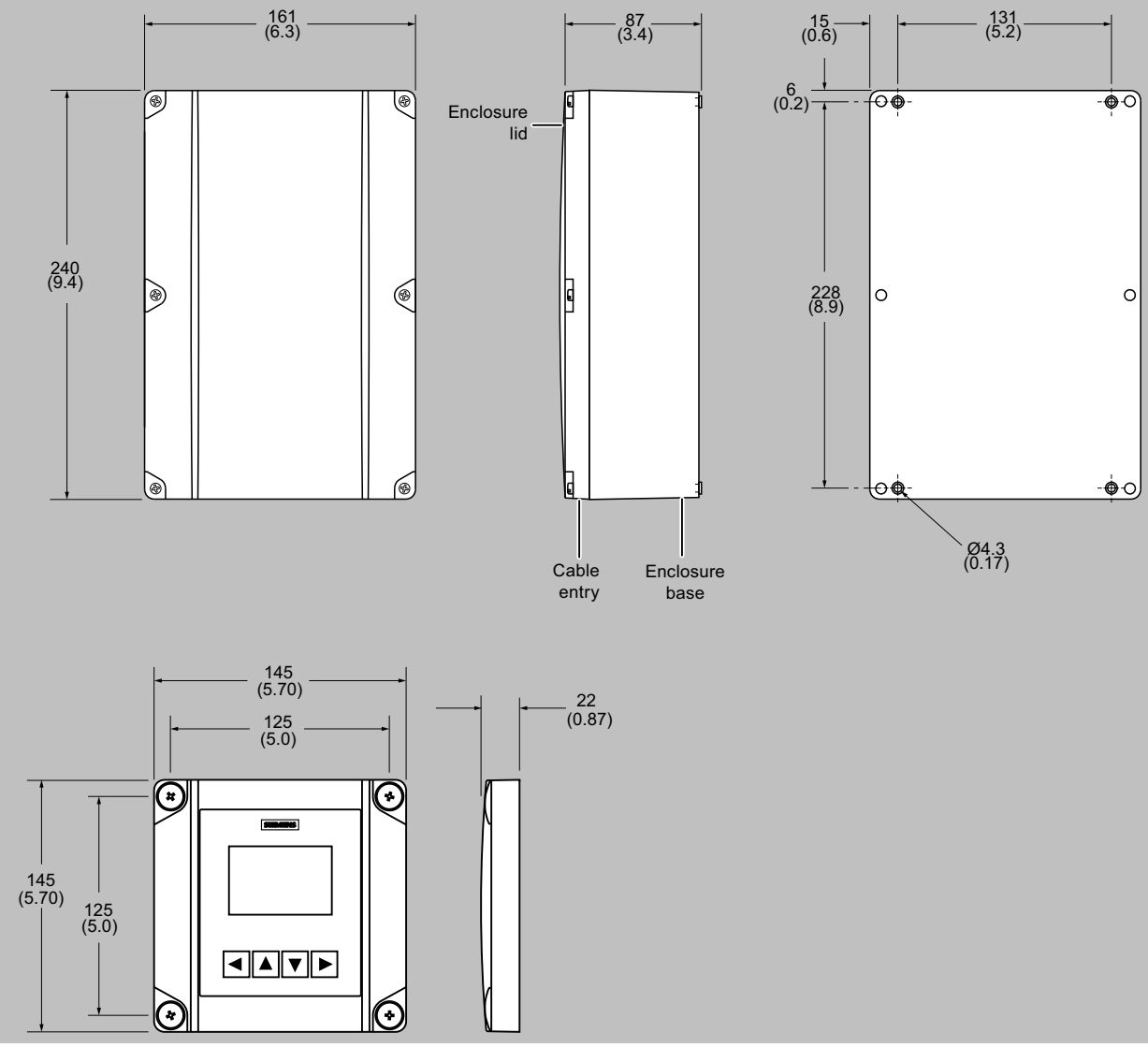

SITRANS LT500, dimensions in mm (inch)

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## Dimensional drawings (continued)

**SITRANS LT500 Remote panel unit**

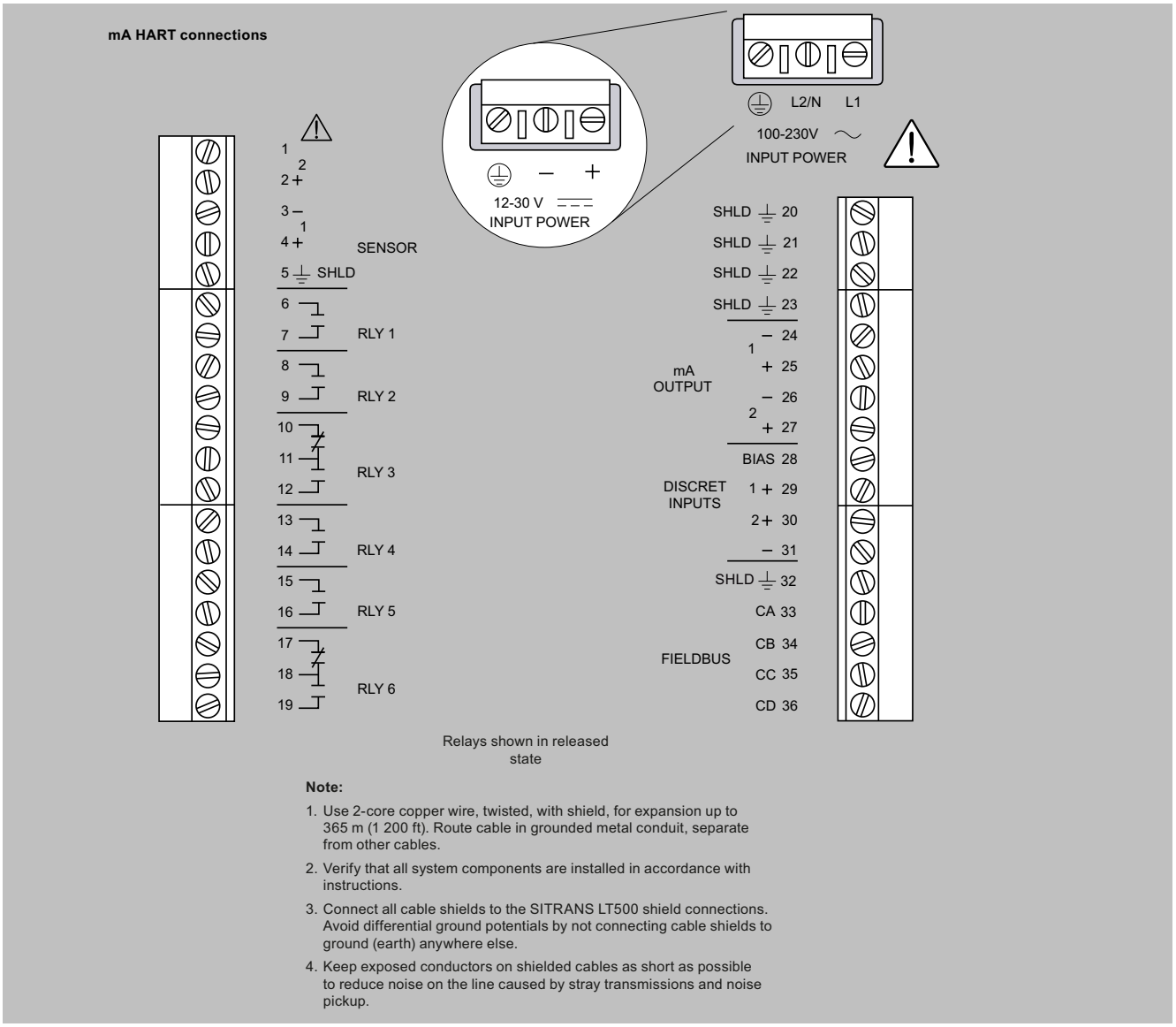



SITRANS LT500 Remote panel unit, dimensions in mm (inch)

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## Circuit diagrams



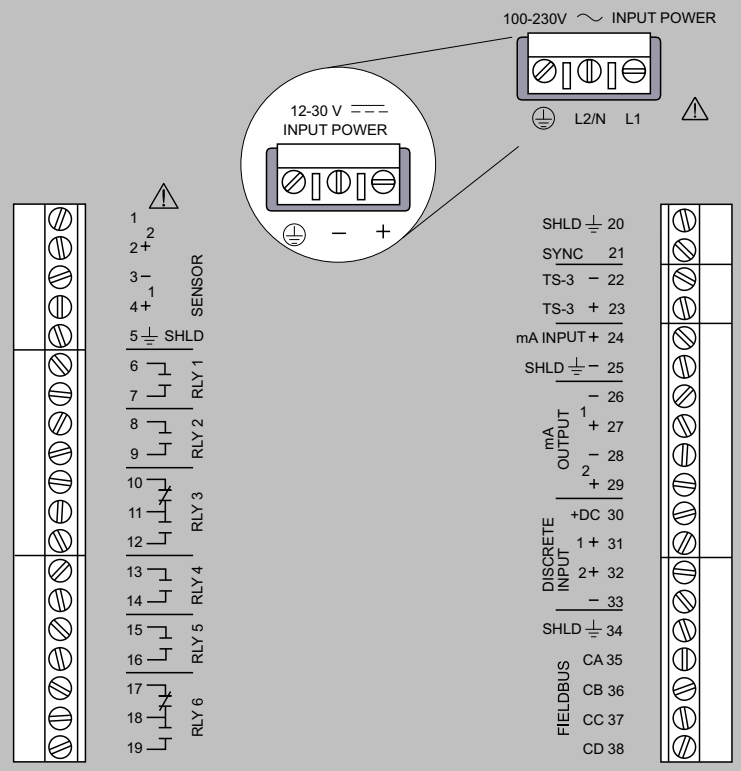

SITRANS LT500 mA HART connections

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## Circuit diagrams (continued)

**Ultrasonic transducer connections**




Relays shown in released state

**Note:**

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the SITRANS LT500 shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

SITRANS LT500 Ultrasonic transducer connections

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## Overview




MultiRanger 200 HMI is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

## Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, PROFINET (cyclic access of process values only), DeviceNet, Modbus TCP/IP, and EtherNet/IP
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- Level, volume, and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

## Application

MultiRanger 200 HMI can be used with various materials, including, water, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger 200 HMI offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and set-up. MultiRanger 200 HMI features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 200 HMI will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that are approved for hostile environments.

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

## Design

The MultiRanger 200 HMI is available in wall or panel mounting options.

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## Selection and ordering data

| MultiRanger 200 Ultrasonic level controller<br>Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids. | Article No.<br>7ML5033- ● | ● | ● | ● | ● | - | ● | ● |
|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | |
| **Versions** | | | | | | | | |
| MultiRanger 200, level, volume, flow, and differential measurements | | 2 | | | | | | |
| **Mounting, enclosure design** | | | | | | | | |
| 4 button HMI, Wall mount, standard enclosure | | | D | | | | | |
| 4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included | | | E | | | | | |
| 4 button HMI, Panel Mount | | | F | | | | | |
| **Input voltage** | | | | | | | | |
| 100 ... 230 V AC | | | | A | | | | |
| 12 ... 30 V DC | | | | B | | | | |
| **Number of measurement points** | | | | | | | | |
| Single point version | | | | | 0 | | | |
| Dual point version | | | | | 1 | | | |
| **Data communications (SmartLinx)** | | | | | | | | |
| Without module | | | | | | 0 | | |
| SmartLinx PROFIBUS DP V0 module | | | | | | 2 | | |
| SmartLinx DeviceNet module | | | | | | 3 | | |
| SmartLinx PROFIBUS DP V1 module | | | | | | 4 | | |
| SmartLinx PROFINET module[2] | | | | | | 5 | | |
| SmartLinx EtherNet/IP module | | | | | | 6 | | |
| SmartLinx Modbus TCP/IP module<br>See SmartLinx product page for more information. | | | | | | 7 | | |
| **Output relays** | | | | | | | | |
| 6 relays (4 Form A, 2 Form C), 250 V AC | | | | | | | 2 | |
| **Approvals** | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, $_{C}$CSA$_{US}$, UL Listed, RCM, EAC, KC | | | | | | | | A |
| CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III[1] | | | | | | | | B |

1) Available with Mounting/Enclosure design options D or E.
2) SmartLinx PROFINET module is certified per standard V2.2.4.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C11** |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Optional equipment** | |
| Tag, stainless steel, 12 x 45 mm, one text line, suitable for enclosures | **7ML1930-1AC** |
| Sunshield, 304 Stainless steel | **7ML1930-1GA** |

| Spare parts and accessories | Article No. |
|---|---|
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-...** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-...** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-...** |
| **Spare parts** | |
| Power Supply Board (100 ... 230 V AC) | **7ML1830-1MD** |
| Power Supply Board (12 ... 30 V DC) | **7ML1830-1ME** |
| Removable terminal blocks | **A5E38824197** |
| Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall | **A5E35778738** |
| Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel | **A5E35778740** |
| SmartLinx DeviceNet module | **7ML1830-1HT** |
| SmartLinx PROFIBUS DP V1 module | **A5E35778741** |
| Smartlinx PROFINET IO module | **7ML1830-1PM** |
| SmartLinx Modbus TCP/IP, EtherNet/IP module | **7ML1830-1PN** |

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## Technical specifications

| MultiRanger 200 HMI | |
|---|---|
| **Mode of Operation** | |
| Measuring principle | Ultrasonic level measurement |
| Measuring range | 0.3 ... 15 m (1 ... 50 ft) |
| Measuring points | 1 or 2 |
| **Input** | |
| Analog | 0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable |
| Discrete | 10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA |
| **Output** | |
| EchoMax transducer | 44 kHz |
| Ultrasonic transducer | Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5 |
| Relays | Rating 5 A at 250 V AC, non-inductive |
| mA output | 0 ... 20 mA or 4 ... 20 mA |
| • Max. load | 750 Ω, isolated |
| • Resolution | 0.1 % of range |
| **Accuracy** | |
| Error in measurement | • 0.25 % of range or 6 mm (0.24 inch), whichever is greater<br>• ± 4 mm (0.16 inch) in combination with an XRS-5 transducer on ranges 4 m (13 ft) or less |
| Resolution | 0.1 % of measuring range[1] or 2 mm (0.08 inch), whichever is greater |
| Temperature compensation | • -50 ... +150 °C (-58 ... +302 °F)<br>• Integral temperature sensor<br>• External TS-3 temperature sensor (optional)<br>• Programmable fixed temperature values |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature (housing) | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| **Design** | |
| Weight | |
| • Wall mount | 1.22 kg (2.68 lb) |
| • Panel mount | 1.35 kg (2.97 lb) |
| Material (enclosure) | Polycarbonate |
| Degree of protection (enclosure) | |
| • Wall mount | IP65/Type 4X/NEMA 4X |
| • Panel mount | IP54/Type 3/NEMA 3 |
| Electrical connection | |
| • Transducer and mA output signal | 2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable |
| • Max. separation between transducer and transceiver | 365 m (1 200 ft) |
| **Displays and controls** | 60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution |
| **Power supply** | |
| AC version | 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W) |
| DC version | 12 ... 30 V DC (20 W) |

## Technical specifications (continued)

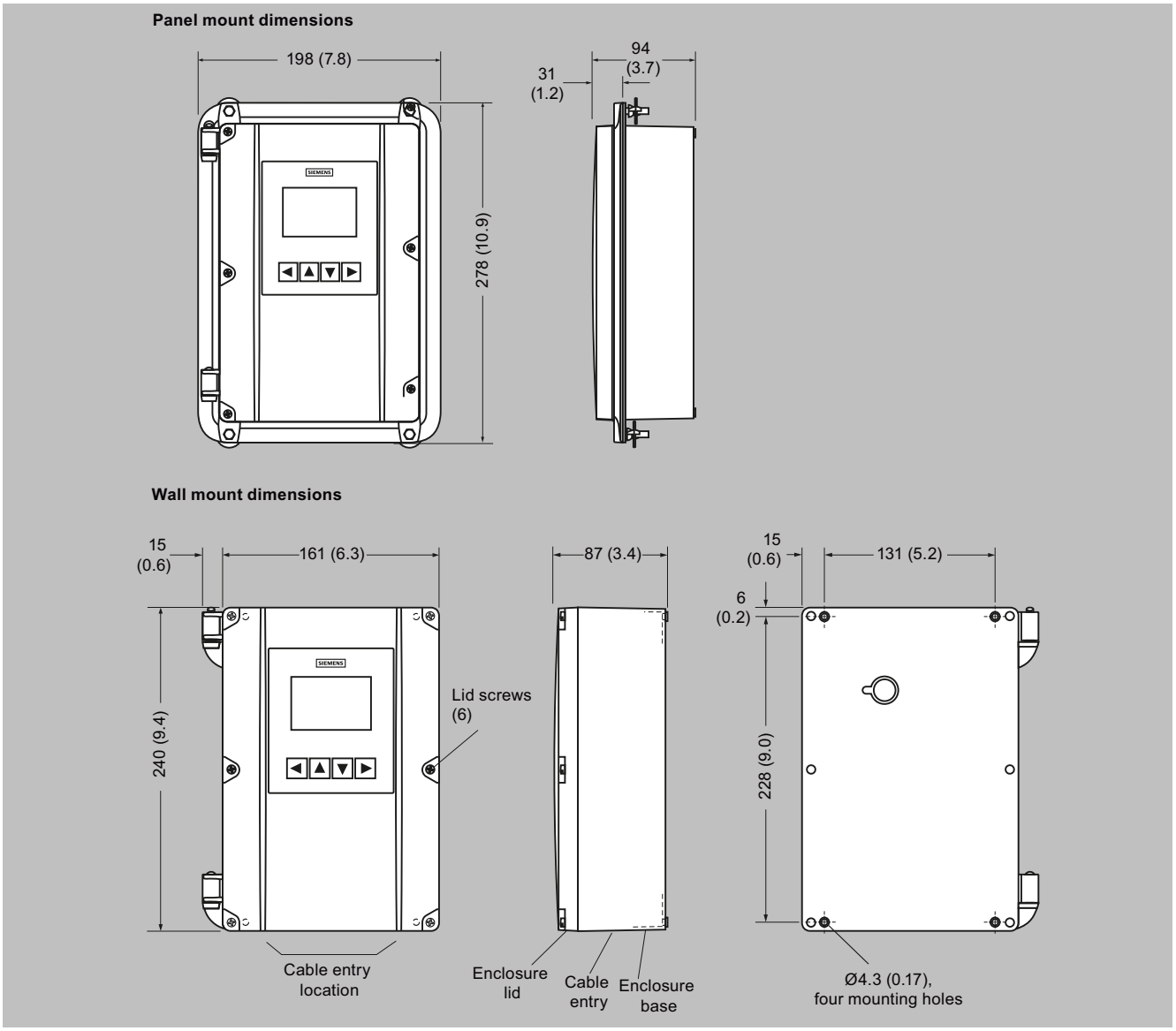
| MultiRanger 200 HMI | |
|---|---|
| **Certificates and approvals** | • CE, UKCA, RCM, EAC, KC[2]<br>• FM, $_{C}$CSA$_{US}$, UL listed<br>• CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III (wall mount only) |
| **Communication** | • RS 232 with Modbus RTU or ASCII via RJ-11 connector<br>• RS 485 with Modbus RTU or ASCII via terminal strips<br>• Optional: SmartLinx cards for<br>- PROFIBUS DP-V1, PROFINET (cyclic access of process values only)<br>- DeviceNet, Modbus TCP/IP, EtherNet/IP |

1) Program range is defined as the empty distance to the face of the transducer plus any range extension
2) EMC performance available on request

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## Dimensional drawings

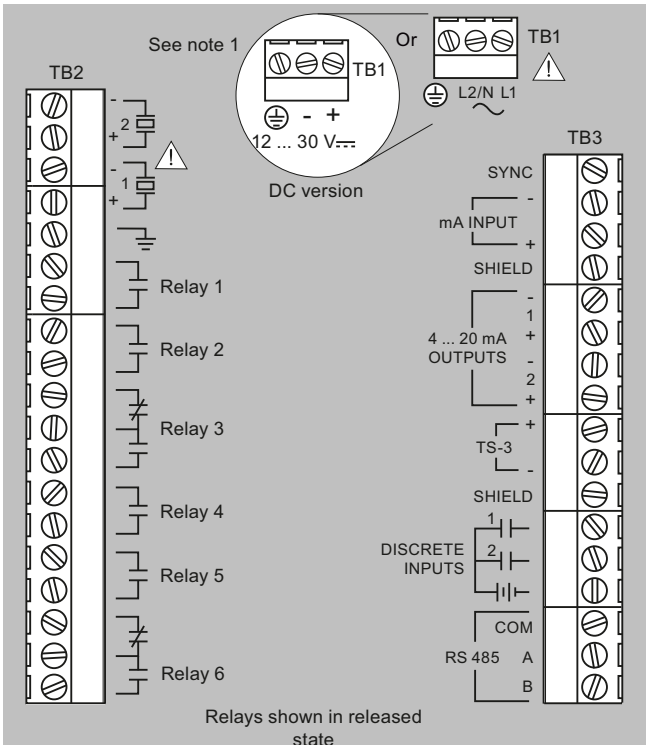



MultiRanger 200 HMI, dimensions in mm (inch)

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## Circuit diagrams




**Note:**

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger 200 HMI connections

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## Overview



HydroRanger 200 HMI is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

## Benefits

- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI
- Removable terminal blocks for ease of wiring
- Monitors wet wells, weirs, and flumes
- Communication using built-in Modbus RTU via RS 485 and SIMATIC PDM configuration software
- Compatible with SmartLinx system: PROFIBUS DP, PROFINET (cyclic access of process values only), DeviceNet, Modbus TCP/IP, and EtherNet/IP
- Single or dual point level monitoring
- 6 relays
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

## Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 HMI is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 HMI will monitor open channel flow and features advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and set-up. Sonic Intelligence advanced echo-processing software provides increased reading reliability.

HydroRanger 200 HMI uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 HMI is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

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## Selection and ordering data

| HydroRanger 100/200 Ultrasonic level controller Continuous, non-contact, 15 m (50 ft) range. Monitors level, volume, and open channel flow in liquids, slurries, and solids. | Article No. 7ML5034- | ● | ● | ● | ● | ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Mounting, enclosure design** | | | | | | |
| 4 button HMI, Wall mount, standard enclosure | | 4 | | | | |
| 4 button HMI, Wall mount, 4 entries, 4 M20 cable glands included | | 5 | | | | |
| 4 button HMI, Panel Mount | | 6 | | | | |
| **Input voltage** | | | | | | |
| 100 ... 230 V AC | | | A | | | |
| 12 ... 30 V DC | | | B | | | |
| **Number of measurement points** | | | | | | |
| Single point model, 6 relays | | | | A | | |
| Dual point model, 6 relays | | | | B | | |
| **Communication (SmartLinx)** | | | | | | |
| Without module | | | | | 0 | |
| SmartLinx PROFIBUS DP-V0 module | | | | | 2 | |
| SmartLinx DeviceNet module | | | | | 3 | |
| SmartLinx PROFIBUS DP-V1 module | | | | | 4 | |
| SmartLinx PROFINET module[2] | | | | | 5 | |
| SmartLinx EtherNet/IP module | | | | | 6 | |
| SmartLinx Modbus TCP/IP module<br>See SmartLinx product page for more information | | | | | 7 | |
| **Approvals** | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, $_{C}$CSA$_{US}$, UL Listed, RCM, EAC, KC | | | | | | 1 |
| CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III[1] | | | | | | 2 |

1) Available with Mounting/Enclosure design options 4 or 5.
2) SmartLinx PROFINET module is certified per standard V2.2.4.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters), specify in plain text | **Y15** |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C11** |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure | **7ML1930-1AC** |
| Sunshield kit, 304 stainless steel | **7ML1930-1GA** |

| Spare parts and accessories | Article No. |
|---|---|
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-...** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-...** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-...** |
| **Spare parts** | |
| Power Supply Board (100 ... 230 V AC) | **7ML1830-1MD** |
| Power Supply Board (12 ... 30 V DC) | **7ML1830-1ME** |
| Removable terminal blocks | **A5E38824197** |
| Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, wall | **A5E35778738** |
| Spare lid with HMI, MultiRanger 200 HMI/HydroRanger 200 HMI, panel | **A5E35778740** |
| SmartLinx DeviceNet module | **7ML1830-1HT** |
| SmartLinx PROFIBUS DP-V1 module | **A5E35778741** |
| Smartlinx PROFINET IO module | **7ML1830-1PM** |
| SmartLinx Modbus TCP/IP, EtherNet/IP module | **7ML1830-1PN** |

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## Technical specifications

| HydroRanger 200 HMI | |
|---|---|
| **Mode of Operation** | |
| Measuring principle | Ultrasonic level measurement |
| Measuring range | 0.3 ... 15 m (1 ... 50 ft), transducer dependent |
| Measuring points | 1 or 2 |
| **Input** | |
| Analog | 0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model) |
| Discrete | 10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC max. 3 mA |
| **Output** | |
| EchoMax transducer | 44 kHz |
| Ultrasonic transducer | Compatible transducers: ST-H and EchoMax series XPS-10, XPS-15/15F, and XRS-5 |
| Relays[1)] | Rating 5 A at 250 V AC, non-inductive |
| • Model with 6 relays | 4 SPST Form A/2 SPDT Form |
| mA output | 0 ... 20 mA or 4 ... 20 mA |
| • Max. load | 750 Ω, isolated |
| • Resolution | 0.1 % of range |
| **Accuracy** | |
| Error in measurement | • 0.25 % of range or 6 mm (0.24 inch), whichever is greater<br>• ± 4 mm (0.16 inch) in combination with an XRS-5 transducer on ranges 4 m (13 ft) or less |
| Resolution | 0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater[2)] |
| Temperature compensation | • -50 ... +150 °C (-58 ... +302 °F)<br>• Integral temperature sensor in transducer<br>• External TS-3 temperature sensor (optional)<br>• Programmable fixed temperature values |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor / outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature (enclosure) | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| **Design** | |
| Weight | |
| • Wall mount | 1.22 kg (2.68 lb) |
| • Panel mount | 1.35 kg (2.97 lb) |
| Material (enclosure) | Polycarbonate |
| Degree of protection (enclosure) | |
| • Wall mount | IP65/Type 4X/NEMA 4X |
| • Panel mount | IP54/Type 3/NEMA 3 |
| Cable | |
| • Transducer and mA output signal | 2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm² (18 AWG), Belden 8 760 or equivalent is acceptable |
| • Max. separation between transducer and transceiver | 365 m (1 200 ft) |
| **Displays and controls** | 60 x 40 mm (2.36 x 1.57 inch) LCD 240 x 160 pixels resolution |
| **Power supply[3)]** | |
| AC version | 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W) |
| DC version | 12 ... 30 V DC (20 W) |

## Technical specifications (continued)

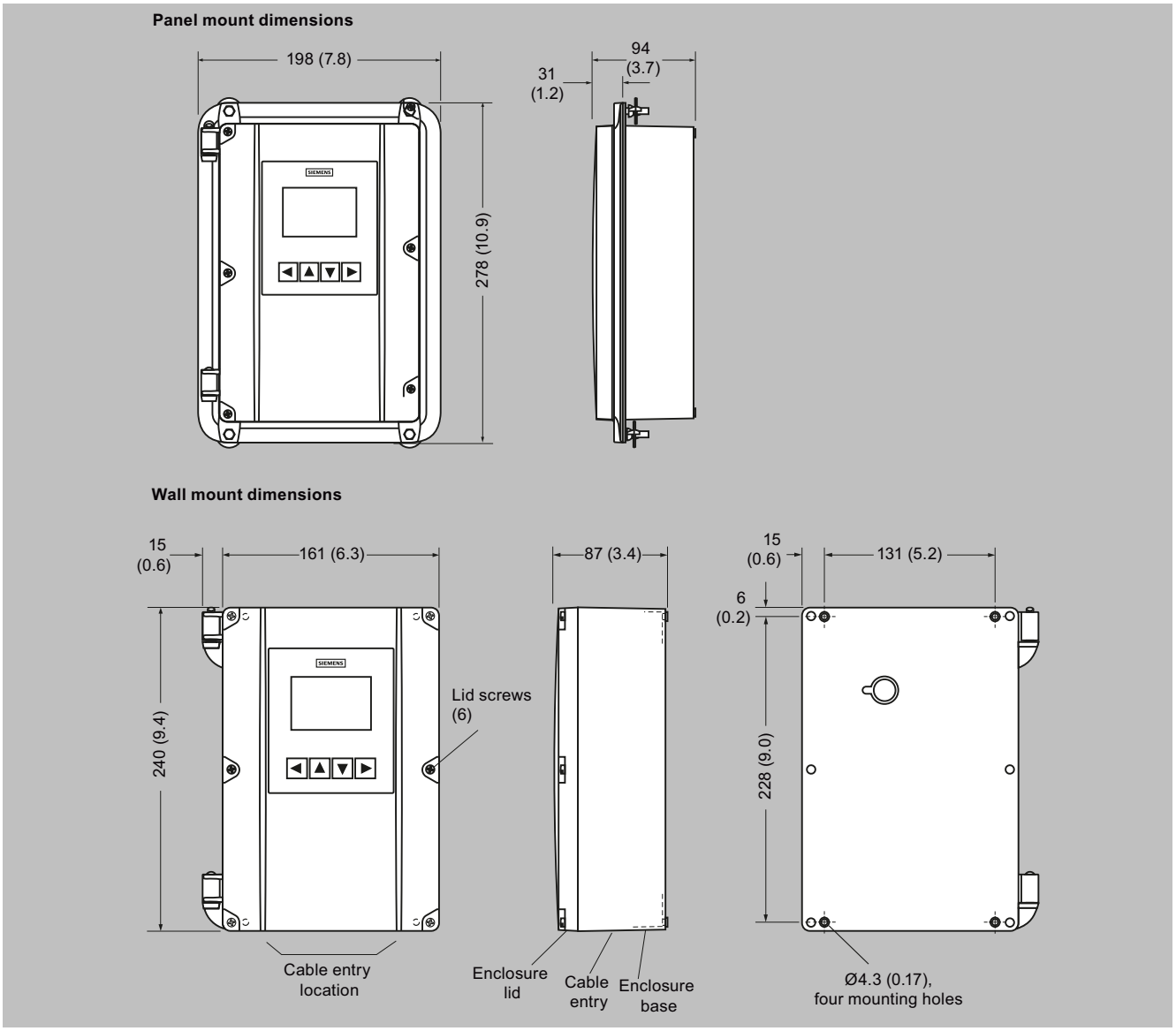
| HydroRanger 200 HMI | |
|---|---|
| **Certificates and approvals** | • CE, UKCA, RCM, EAC, KC[4)]<br>• FM, $_{C}CSA_{US}$, UL listed<br>• $_{C}CSA_{US}$ Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G, Class III (wall mount only)<br>• MCERTS Class 2 approved for Open Channel Flow |
| **Communication** | • RS 232 with Modbus RTU or ASCII via RJ-11 connector<br>• RS 485 with Modbus RTU or ASCII via terminal blocks<br>• Optional: SmartLinx cards for<br>- PROFIBUS DPV1, PROFINET (cyclic access of process values only)<br>- DeviceNet, Modbus TCP/IP, EtherNet/IP |

1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays.[2)] Program range is defined as the empty distance to the face of the transducer plus any range extension.[3)] Maximum power consumption is listed [4)] EMC performance available upon request

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## Dimensional drawings

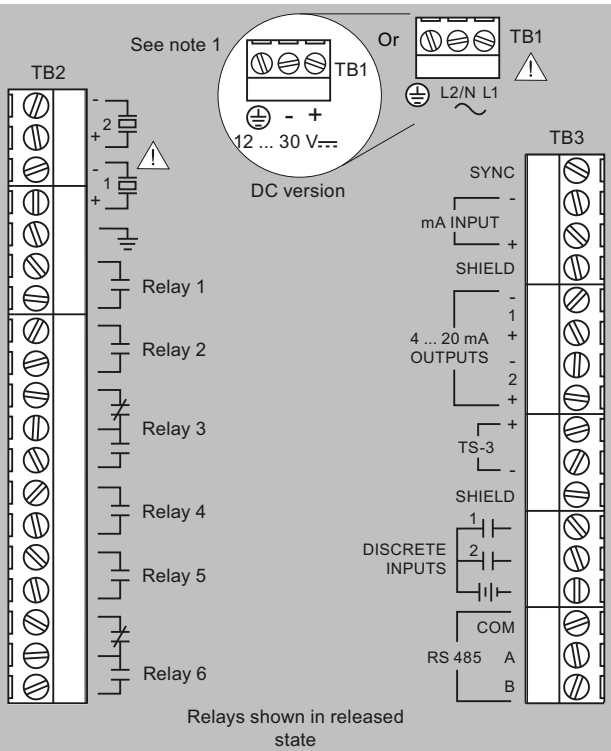



HydroRanger 200 HMI, dimensions in mm (inch)

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## Circuit diagrams




**Note:**

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the HydroRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 HMI connections

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## Overview




The SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, solids, and high accuracy monitoring of open channel flow.

## Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

## Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key Applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

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## Selection and ordering data

| SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging. | Article No. 7ML5050- | 0 | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Model** | | | | | | | | | | | |
| SITRANS LUT420 - Level controller | | | A | | | | | | | | |
| SITRANS LUT430 - Level, Pump & Flow controller | | | B | | | | | | | | |
| **Enclosure display options** | | | | | | | | | | | |
| With display | | | | A | | | | | | | |
| With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)] | | | | B | | | | | | | |
| No display (blank lid provided) | | | | C | | | | | | | |
| Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715 | | | | | | | | | | | |
| **Input voltage** | | | | | | | | | | | |
| 100 ... 230 V AC ± 15 % | | | | | 1 | | | | | | |
| 10 ... 32 V DC | | | | | 2 | | | | | | |
| **Cable inlet** | | | | | | | | | | | |
| 3 cable inlets, cable glands not supplied | | | | | | 1 | | | | | |
| 3 cable inlets, 3 M20 plastic cable glands supplied | | | | | | 2 | | | | | |
| **Number of measurement points** | | | | | | | | | | | |
| Single point system (includes one transducer input, one mA output, and one external temperature sensor input) | | | | | | | | 1 | | | |
| **Communications and I/O** | | | | | | | | | | | |
| HART, 2 discrete inputs, 3 relays | | | | | | | | | D | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, $_{C}$CSA$_{US}$, UL, RCM, EAC, KC | | | | | | | | | | A | |
| Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G | | | | | | | | | | C | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C11** |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA | **N07** |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure | **7ML1930-1AC** |
| TS-3 Temperature Sensor | **7ML1813-...** |
| Panel mount cable extension, 2.5 m (8.2 ft) | **7ML1930-1GF** |
| Qty 3 cable glands and retaining nuts | **7ML1930-1GB** |
| USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B | **7ML1930-1GD** |
| HART modem with USB interface | **7MF4997-1DB** |
| Sunshield, 304 stainless steel | **7ML1930-1GE** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-...** |

| Spare parts and accessories | Article No. |
|---|---|
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-...** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-...** |
| **Spare parts** | |
| Panel mount retrofit kit (convert standard unit with display to panel mount version) | **7ML1830-1PA** |
| Terminal block replacement kit (5 piece kit with one of each removable terminal) | **7ML1830-1PB** |
| Wall/Pipe mount plate | **7ML1830-1PC** |
| Enclosure (include blank label) | **7ML1830-1PD** |
| SITRANS LUT400 Lid (with Display) | **7ML1830-1PE** |
| SITRANS LUT400 Lid (blank) | **7ML1830-1PF** |
| Fuse - AC (0.25 A, 250 V, Slow Blow) | **7ML1830-1PG** |
| Fuse - DC (1.6 A, 125 V, Slow Blow) | **7ML1830-1PH** |
| Panel mount gasket and fastener kit | **7ML1830-1PK** |
| DIN-rail clip | **7ML1830-1PL** |
| LUT420, assembly, DC, board stack with cradle, general purpose | **A5E42824483** |
| LUT420, assembly, AC, board stack with cradle, general purpose | **A5E42824562** |
| LUT430, assembly, DC, board stack with cradle, general purpose | **A5E42824564** |
| LUT430, assembly, AC, board stack with cradle, general purpose | **A5E42824568** |

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## Selection and ordering data (continued)

| Spare parts and accessories | Article No. |
|---|---|
| LUT420, assembly, DC, board stack with cradle, hazardous | A5E42824561 |
| LUT420, assembly, AC, board stack with cradle, hazardous | A5E42824563 |
| LUT430, assembly, DC, board stack with cradle, hazardous | A5E42824565 |
| LUT430, assembly, AC, board stack with cradle, hazardous | A5E42824570 |

| SITRANS LUT400 Series Ultrasonic level controller Continuous, non-contact, 60 m (197 ft) range. Monitors level, volume, and volume flow in liquids, slurries, and solids. With high accuracy volume flow and built in data logging. | Article No. 7ML5050- | 0 | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Model** | | | | | | | | | | | |
| SITRANS LUT440 - High accuracy Open Channel Monitor[1] | | | C | | | | | | | | |
| **Enclosure display options** | | | | | | | | | | | |
| With display | | | | A | | | | | | | |
| With remote panel mount display [includes panel mount cable extension, 2.5 m (8.2 ft)] | | | | B | | | | | | | |
| No display (blank lid provided) | | | | C | | | | | | | |
| Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715 | | | | | | | | | | | |
| **Input voltage** | | | | | | | | | | | |
| 100 ... 230 V AC ± 15 % | | | | | 1 | | | | | | |
| 10 ... 32 V DC | | | | | 2 | | | | | | |
| **Cable inlet** | | | | | | | | | | | |
| 3 cable inlets, cable glands not supplied | | | | | | 1 | | | | | |
| 3 cable inlets, 3 M20 plastic cable glands supplied | | | | | | 2 | | | | | |
| **Number of measurement points** | | | | | | | | | | | |
| Single point system (includes one transducer input, one mA output, and one external temperature sensor input) | | | | | | | | 1 | | | |
| **Communications and I/O** | | | | | | | | | | | |
| HART, 2 discrete inputs, 3 relays | | | | | | | | | D | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, FM, CCSAUS, UL, RCM, EAC, KC | | | | | | | | | | A | |
| Hazardous locations CSA Class I, II, III, Div. 2, Groups A, B, C, D, F, G | | | | | | | | | | C | |

[1] Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C11** |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA | **N07** |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure | **7ML1930-1AC** |
| TS-3 Temperature Sensor | **7ML1813-...** |

| Spare parts and accessories | Article No. |
|---|---|
| Panel mount cable extension 2.5 m (8.2 ft) | **7ML1930-1GF** |
| Qty 3 cable glands and retaining nuts | **7ML1930-1GB** |
| USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B | **7ML1930-1GD** |
| HART modem with USB interface | **7MF4997-1DB** |
| Sunshield, 304 stainless steel | **7ML1930-1GE** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-...** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-...** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-...** |
| **Spare parts** | |
| Panel mount retrofit kit (convert standard unit with display to panel mount version) | **7ML1830-1PA** |
| Terminal block replacement kit (5 piece kit with one of each removable terminal) | **7ML1830-1PB** |
| Wall/Pipe mount plate | **7ML1830-1PC** |
| Enclosure (include blank label) | **7ML1830-1PD** |
| SITRANS LUT400 Lid (with Display) | **7ML1830-1PE** |

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## Selection and ordering data (continued)

| Spare parts and accessories | Article No. |
|---|---|
| SITRANS LUT400 Lid (blank) | **7ML1830-1PF** |
| Fuse - AC (0.25 A, 250 V, Slow Blow) | **7ML1830-1PG** |
| Fuse - DC (1.6 A, 125 V, Slow Blow) | **7ML1830-1PH** |

| Spare parts and accessories | Article No. |
|---|---|
| Panel mount gasket and fastener kit | **7ML1830-1PK** |
| DIN-rail clip | **7ML1830-1PL** |
| LUT440, assembly, DC, board stack with cradle, general purpose | **A5E42847453** |
| LUT440, assembly, AC, board stack with cradle, general purpose | **A5E42847455** |
| LUT440, assembly, DC, board stack with cradle, hazardous | **A5E42847454** |
| LUT440, assembly, AC, board stack with cradle, hazardous | **A5E42847456** |

## Technical specifications

| SITRANS LUT400 series | |
|---|---|
| **Mode of Operation** | Ultrasonic level, volume, pump, and open channel flow |
| Measuring range | 0.3 ... 60 m (1 ... 196 ft), transducer dependent |
| **Input** | |
| Discrete | 0 ... 50 V DC switching level<br>Logical 0 ≤ 10 V DC<br>Logical 1 = 10 ... 50 V DC<br>Max. 3 mA |
| **Output** | |
| Transducer frequency | 10 ... 52 kHz |
| Ultrasonic transducer | Compatible transducers: All EchoMax and ST-H series transducers |
| Relays | • 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC<br>• 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC |
| mA output | 4 ... 20 mA, isolated |
| Max. load | 600 Ω max. in ACTIVE mode,<br>750 Ω max. in PASSIVE mode |
| Resolution | 0.1 % of range |
| **Accuracy** | |
| Error in measurement | • Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance<br>• High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range |
| Resolution | • Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater<br>• High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range |
| Temperature compensation | • -40 ... +150 °C (-40 ... +300 °F)<br>• Integral temperature sensor in transducer<br>• External TS-3 temperature sensor (optional)<br>• Programmable fixed temperature values |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Installation category | II |
| • Pollution degree | 4 |
| Ambient conditions | |
| • Ambient temperature (enclosure) | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| **Design** | |
| Weight | |
| • Enclosure with display lid | 1.3 kg (2.87 lb) |
| • Enclosure with blank lid | 1.2 kg (2.65 lb) |

| SITRANS LUT400 series | |
|---|---|
| Material (enclosure) | Polycarbonate |
| Degree of protection | |
| • Enclosure with display or blank lid | IP65/Type 4X/NEMA 4X |
| • Enclosure with blank lid and knock-out removed | IP20 |
| Remote display lid | IP65/Type 3/NEMA 3 |
| **Cable** | |
| Transducer and mA output signal | • Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG)<br>• Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating |
| Max. separation between transducer and transceiver | 365 m (1 200 ft) |
| **Displays and controls** | 60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base |
| Programming | |
| • Primary | 4 Local push buttons |
| • Secondary | • PC running SIMATIC PDM<br>• PC running Emerson AMS Device Manager<br>• PC running a web browser<br>• PC running a Field Device Tool (FDT)<br>• Field Communicator 375/475 (FC375/FC475) |
| Memory | • 512 kB flash EPROM<br>• 1.5 MB flash for data logging |
| **Power supply** | |
| AC version | 100 ... 230 V AC ± 15 %,<br>50/60 Hz, 36 VA<br>Fuse: 5 x 20 mm, Slow Blow,<br>0.25 A, 250 V |
| DC version | 10 ... 32 V DC, 10 W<br>Fuse: 5 x 20 mm, Slow Blow,<br>1.6 A, 125 V |
| **Certificates and approvals** | |
| General | $_{C}$CSA$_{US}$,CE, UKCA, FM, UL Listed, RCM, EAC, KC, MCERTS |
| Hazardous | |
| • Non-incendive (Canada) | CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III |
| • Shipping | Lloyd's Register, ABS |
| **Communication** | HART 7.0, USB |

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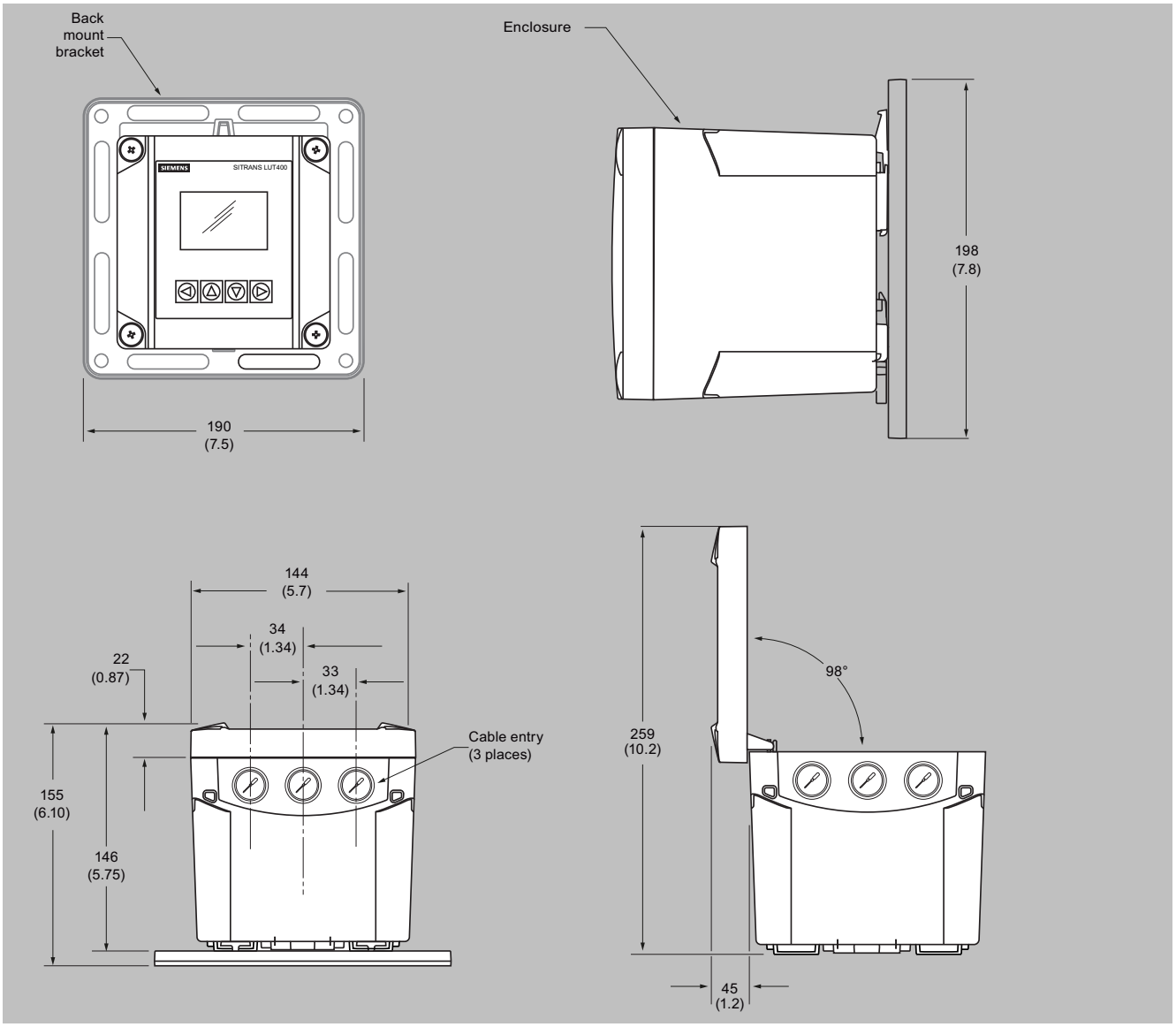
## Technical specifications (continued)

| Category | Feature | SITRANS LUT420 Level Controller | SITRANS LUT430 Level, pump and flow controller | SITRANS LUT440 High accuracy OCM controller |
|---|---|---|---|---|
| **Operations** | Level, space, and distance measurement | ✓ | ✓ | ✓ |
| | Open channel flow measurement | | ✓ | ✓ |
| | Volume conversion | ✓ | ✓ | ✓ |
| **Specifications** | Compatible with EchoMax and ST-H transducers | ✓ | ✓ | ✓ |
| | Standard accuracy: ± 1 mm + 0.17 % of measured distance | ✓ | ✓ | ✓ |
| | High accuracy: ± 1 mm within 3 meters | | | ✓ |
| | Mounting options: wall or panel, pipe, DIN-rail | ✓ | ✓ | ✓ |
| **Data logging and communications** | HART communications | ✓ | ✓ | ✓ |
| | 4 ... 20 mA output (active and passive) | ✓ | ✓ | ✓ |
| | Integrated datalogger for measurement value and alarms | ✓ | ✓ | ✓ |
| | Integrated datalogger for fixed rate flow logging | | ✓ | ✓ |
| | Integrated datalogger for variable rate flow logging triggered by changes in flow condition | | | ✓ |
| | Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature | | ✓ | ✓ |
| **Flow monitoring** | High accuracy open channel flow measurement | | | ✓ |
| | 9 digit daily and running flow totalizers | | ✓ | ✓ |
| | High and low flowrate alarms | | ✓ | ✓ |
| | External totalizer and sampler control | | ✓ | ✓ |
| | MCERTS Class 1 Certification | | | ✓ |
| | MCERTS Class 2 Certification | | ✓ | |
| **Pump control** | Energy saving algorithms for pump control | | ✓ | ✓ |
| | Wall cling reduction | ✓ | ✓ | ✓ |
| | Pump run-on functionality | | ✓ | ✓ |
| | Pump start and power resumption delays | | ✓ | ✓ |
| | Alternate duty pump routines | ✓ | ✓ | ✓ |
| | Fixed duty and service ratio pump routines | | ✓ | ✓ |
| | Pumped volume totalizer | | ✓ | ✓ |
| | Submergence detection | ✓ | ✓ | ✓ |
| | Discrete input pump interlocks | | ✓ | ✓ |
| | Time to spill calculation | | ✓ | ✓ |

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## Dimensional drawings

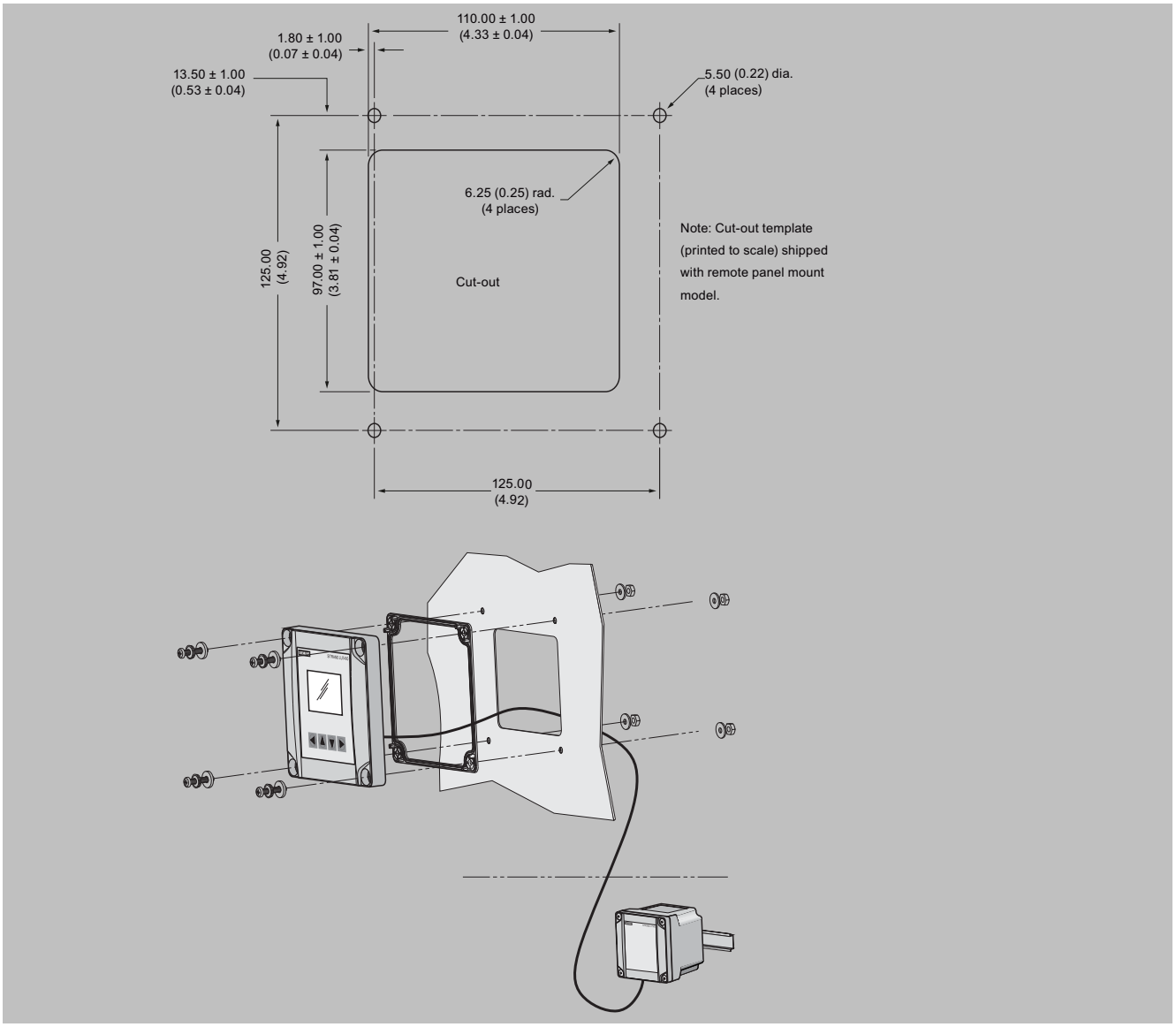



SITRANS LUT400, dimensions in mm (inch)

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## Dimensional drawings (continued)

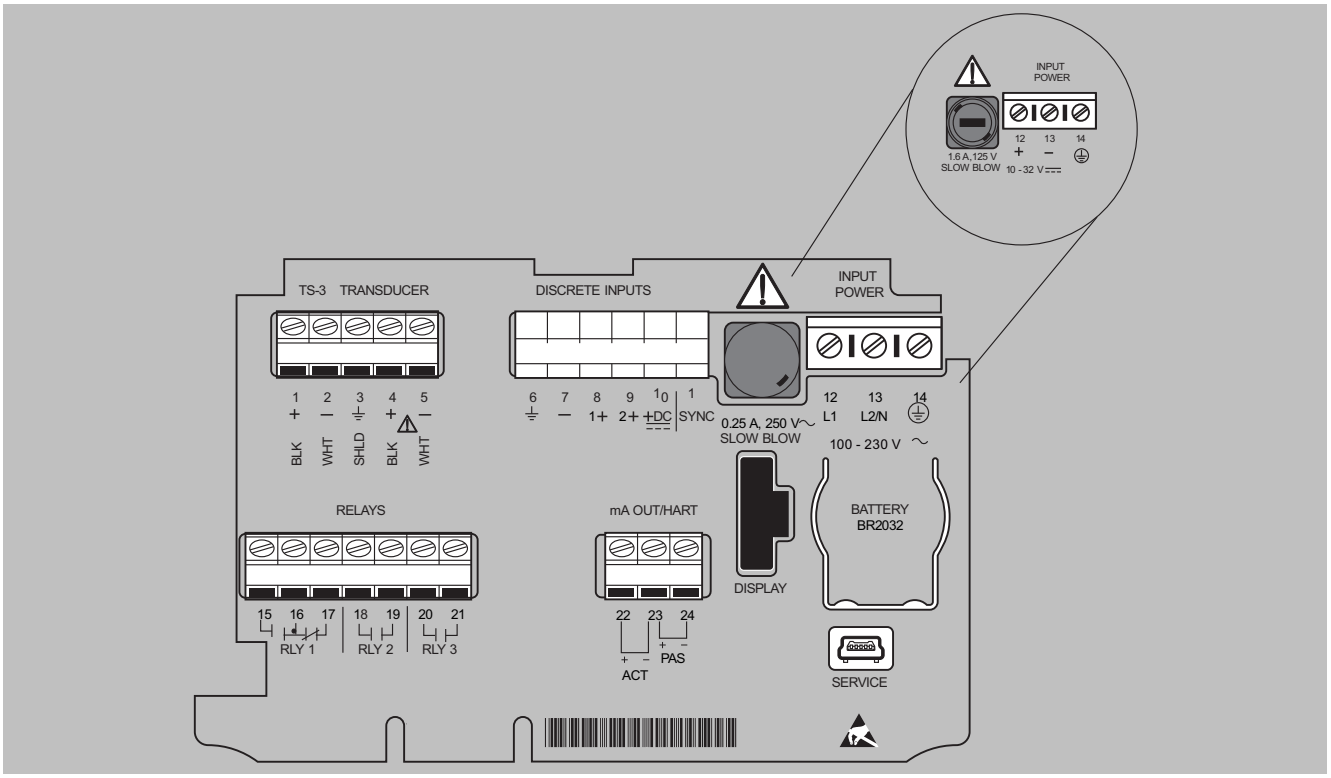



SITRANS LUT400, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LUT400 connections

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## Overview

***Introduction***

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20 000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

***Typical System***

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

***Principle of Operation***

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation:
Distance = (Velocity of Sound x Time)/2.

## Mode of operation

***Common Terms***

Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

Echo confidence

The recognition of the validity of the echo as material level. A measure of echo reliability.

Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

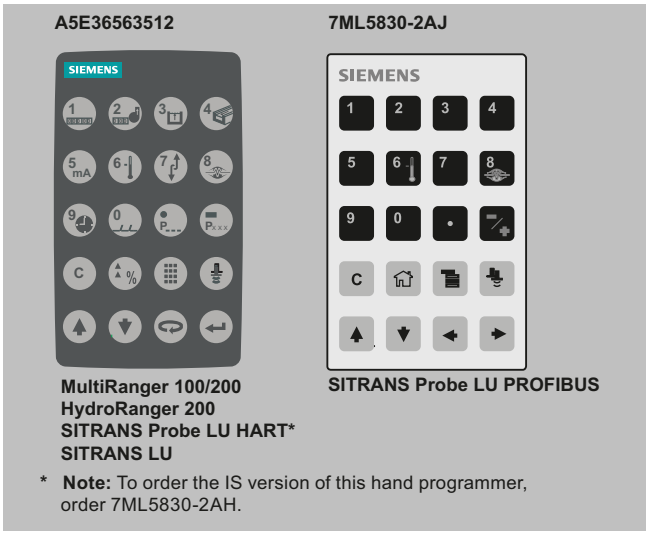
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## Technical specifications

### *Ultrasonic Transmitter Selection Guide*

| Criteria | SITRANS Probe LU240 | SITRANS LU150/LU180 |
|---|---|---|
| **Range** | 0.2 ... 6 m (8 inch ... 20 ft)<br>0.2 ... 12 m (8 inch ... 40 ft) | 0.25 ... 5 m (0.8 ... 16.4 ft) |
| **Typical applications** | Chemical storage vessels, filter beds, liquid storage vessels | Chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications |
| **Output** | 4 ... 20 mA/HART | 4 ... 20 mA loop powered |
| **Communications** | HART, SIMATIC PDM | N/A |
| **Power specifications** | HART: 4 ... 20 mA, 10.5 ... 30 V DC | 12 ... 30 V DC, 0.1 A surge, max. 600 Ω in the loop at 24 V DC |
| **Approvals** | FM, CSA$_{US/C}$, CE, RCM ATEX, IECEx, FM, INMETRO, NEPSI, SABS | CE, CSA$_{US/C}$, FM, ATEX, RCM, NEPSI, IECEx |




Handheld programmer selection guide

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## Overview

***SITRANS LU150***

- Application
  - General purpose, 2 wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels.
- Device description
  - Sanitary models available
  - Patented Sonic Intelligence echo processing
  - Integral temperature compensation

***SITRANS LU180***

- Application
  - Intrinsically safe (ATEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).
- Device description
  - Sanitary models available
  - Patented Sonic Intelligence echo processing
  - Integral temperature compensation

***SITRANS Probe LU240***

- Application
  - 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.
- Device description
  - Continuous level measurement up to 12 m (40 ft) range
  - Next generation Process Intelligence signal processing
  - Fast and easy configuration with quick start wizards

***The Probe***

- Application
  - Compact level transmitter with integrated transducer for accurate level measurement for liquid applications.
- Device description
  - Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility:
  - Three-wire system with 5 m model 24 V DC
  - Two-wire system with current loop

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## Overview



SITRANS LU150 is a short-range integrated ultrasonic level transmitter. This general purpose, 2-wire, 4 to 20 mA loop powered transmitter is ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 m (16.4 ft).

## Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

## Application

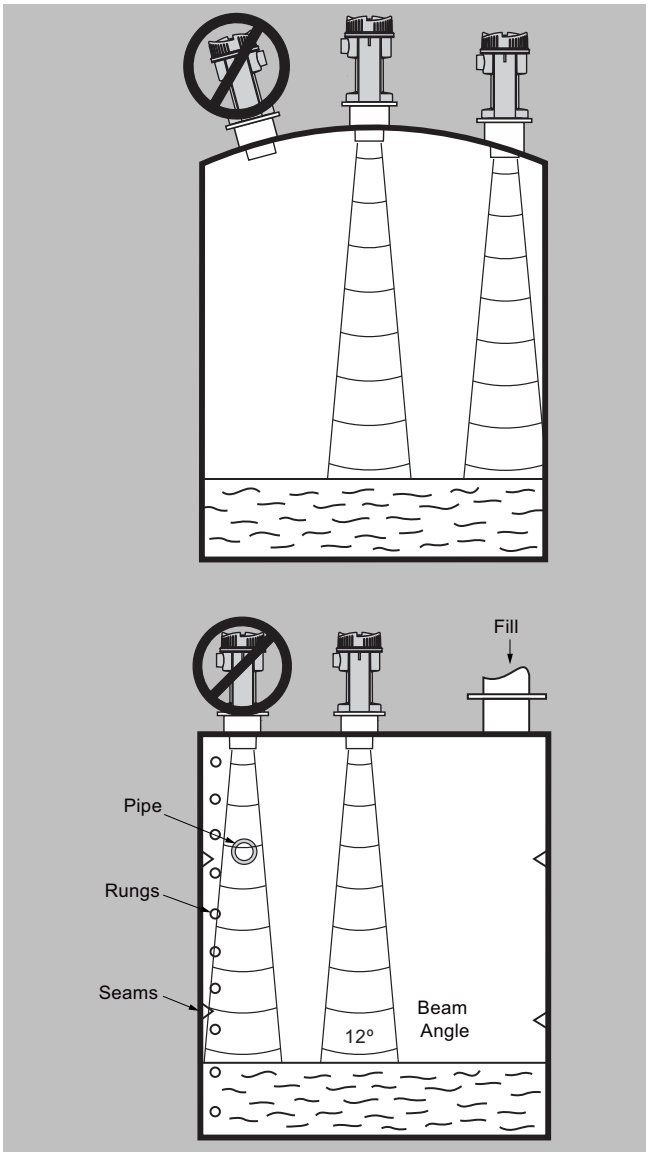
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications.

SITRANS LU150 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

## Configuration




SITRANS LU150 mounting

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## Selection and ordering data

| SITRANS LU150 Ultrasonic level transmitter Continuous, non-contact, 5 m (16.4 ft) range. Monitors level in liquids and slurries. Basic level performance. | Article No. 7ML5201- 0 | ● | ● | 0 |
|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | |
| **Transducer/Process connection (PVDF)** | | | | |
| PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1] | | E | | |
| PVDF copolymer, R 2" [(BSPT), EN 10226] | | F | | |
| PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] | | G | | |
| PVDF copolymer, 4" Sanitary mounting | | J | | |
| **Cable inlet** | | | | |
| M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included] | | | B | |
| 1/2" NPT stainless steel entry (no cable gland included) | | | C | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text | **Y15** |
| Declaration of Compliance, EN 10204, 2.1, Delivery meets Order Requirements | **C11** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line | **7ML1930-1AC** |
| Universal Box Bracket Mounting kit | **7ML1830-1BK** |
| Sanitary 4" mounting clamp | **7ML1830-1BR** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT | **7ML1830-1BT** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT | **7ML1830-1BU** |
| 2" BSP nylon plastic locknut | **7ML1830-1DQ** |
| 2" NPT nylon plastic locknut | **7ML1830-1DT** |
| Cable Gland - General Purpose -20 ... +60 °C (-4 ... +140 °F) | **A5E34457564** |

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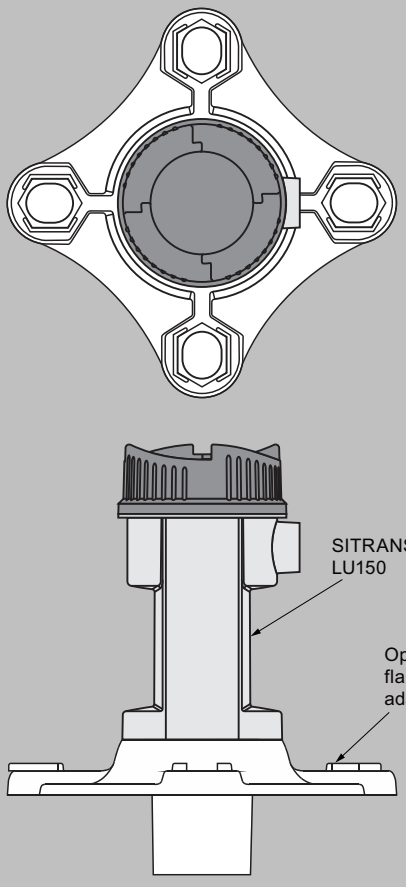
## Technical specifications

| SITRANS LU150 | |
|---|---|
| **Mode of Operation** | |
| Measuring principle | Ultrasonic level measurement |
| **Input** | |
| Measuring range | 0.25 ... 5 m (0.8 ... 16.4 ft) |
| Frequency | 54 kHz |
| **Output** | |
| mA | 4 ... 20 mA |
| • Span | Proportional/ inversely proportional |
| • Max. load | 600 Ω in the loop at 24 V DC |
| **Power supply** | |
| Supply voltage | 12 ... 30 V DC, 0.1 A surge |
| Max. power consumption | 0.75 W (25 mA at 24 V DC) |
| **Certificates and approvals** | $_{c}$CSA$_{US}$, CE, UKCA |
| **Accuracy** | |
| Error in measurement | 0.25 % of measuring range (in air) |
| Resolution | 3 mm (0.125 inch) |
| Temperature compensation | Built in |
| Echo processing | Sonic Intelligence |
| **Rated operation conditions** | |
| Beam angle | 12° |
| Ambient temperature | |
| • Standard | -30 ... +60 °C (-22 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | |
| • Standard | -30 ... +60 °C (-22 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Max. static operating pressure | Normal atmospheric pressure |
| **Design** | |
| Weight | 1.3 kg (2.9 lb) |
| Material | |
| • Electronics enclosure | PBT |
| • Transducer | PVDF copolymer |
| Degree of protection | IP68 / NEMA 6 / TYPE 6 |
| Process connection | • 2" NPT [(Taper), ASME B1.20.1]<br>• R 2" [(BSPT), EN 10226]<br>• G 2" [(BSPP), EN ISO 228-1]<br>• 4" sanitary |
| Flange adapter | 3" Universal, (fits DN 65, PN 10 and 3" ASME) |
| Cable inlet | 1 inlet for M20, optional 1/2" NPT |

## Options

**SITRANS LU150, Flange Adapter**

The SITRANS LU150 can be fitted with the optional 75 (3) flange adapter for mating to 3" ANSI, DIN 65 PN10 and JIS 10K3B flanges.

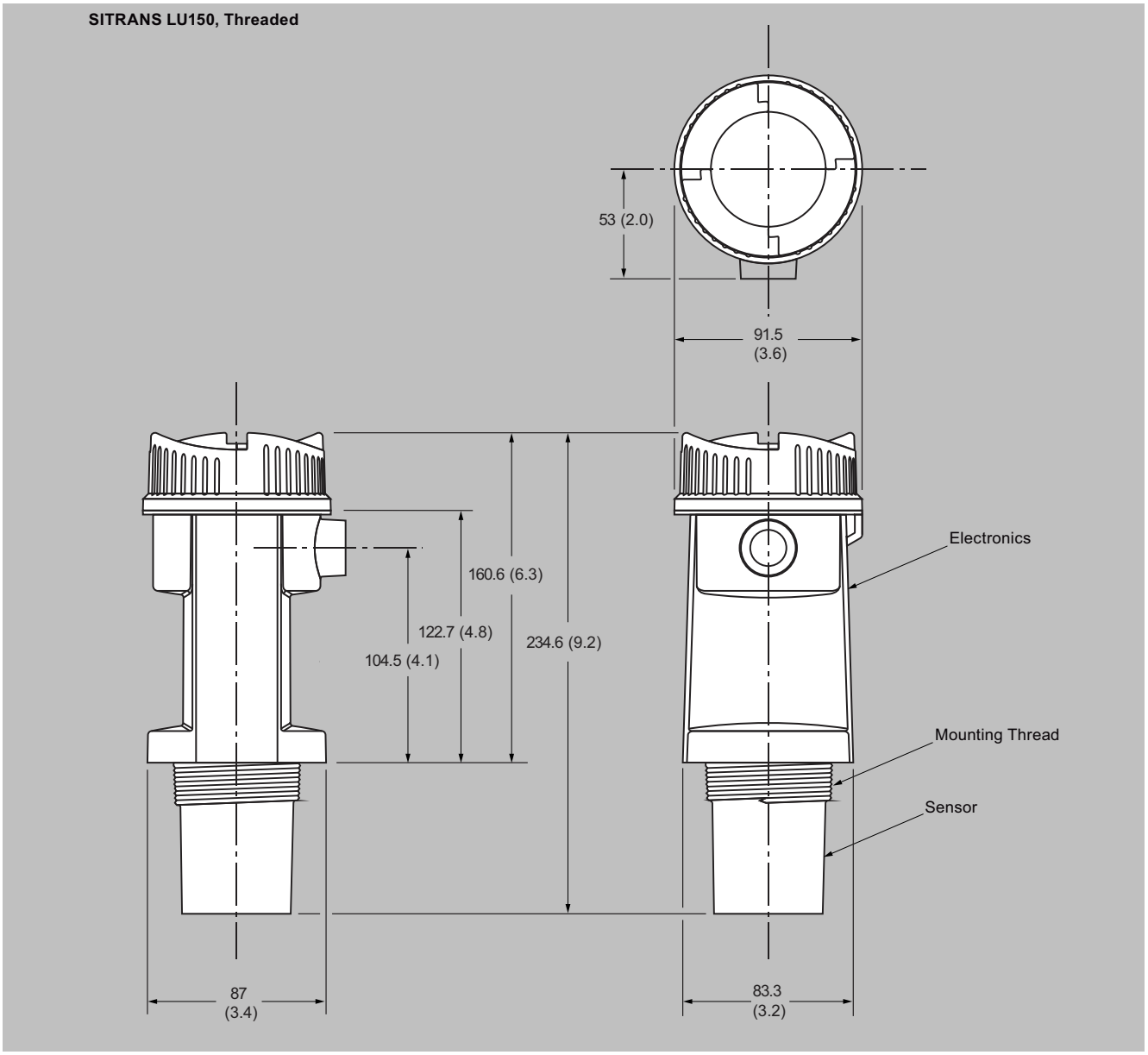



SITRANS LU150 optional flange adapter, dimensions in mm (inch)

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## Dimensional drawings

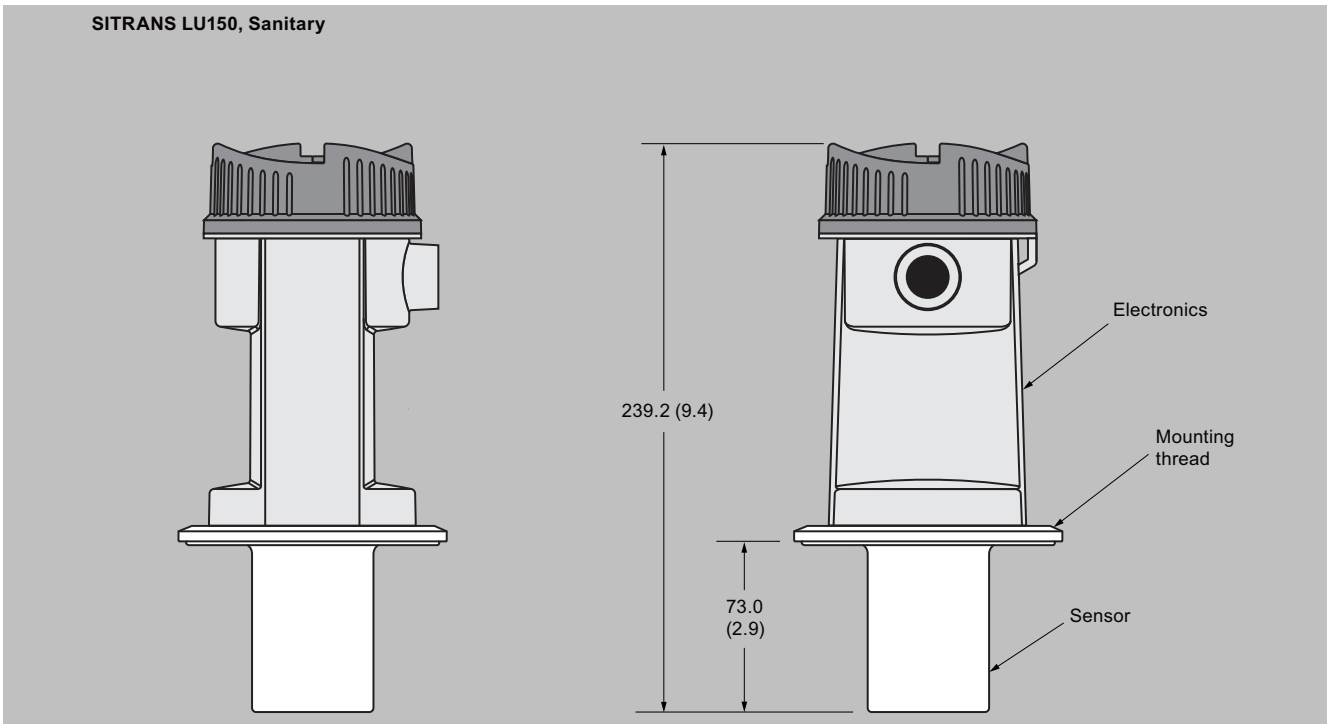



SITRANS LU150, dimensions in mm (inch)

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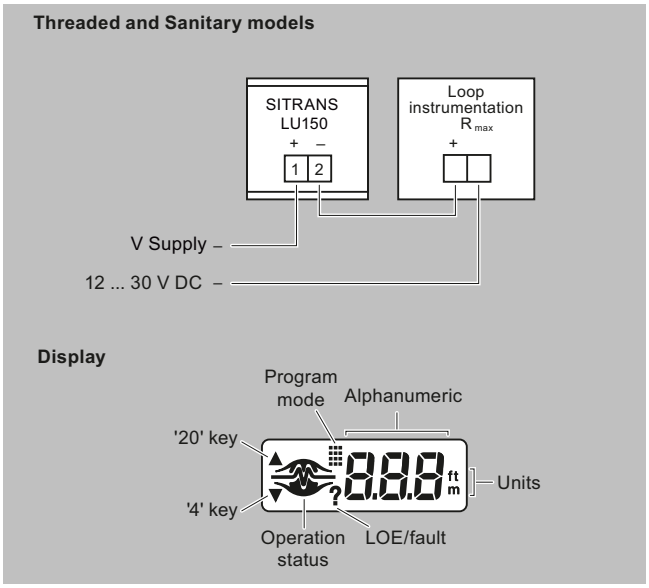


## Dimensional drawings (continued)




SITRANS LU150, dimensions in mm (inch)

## Circuit diagrams




SITRANS LU150 connections

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## Overview



SITRANS LU180 is a short-range integrated ultrasonic level transmitter. It is intrinsically safe (ATEX, UKEX, CSA, FM, IECEx, NEPSI), 2 wire, 4 to 20 mA loop-powered, ideal for liquids, slurries, and bulk materials in open or closed vessels to 5 meters (16.4 feet).

## Benefits

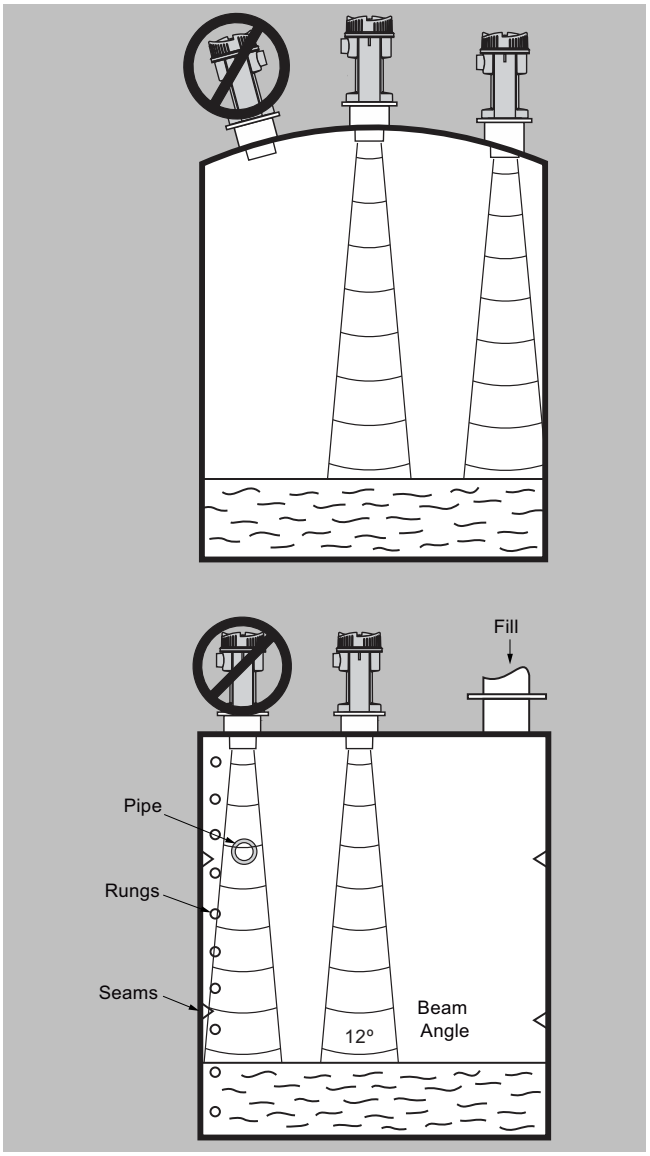
- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Patented Sonic Intelligence echo processing
- Integral temperature compensation

## Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. SITRANS LU180 is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries. The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature compensated and converted into distance for display, analog output.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

## Configuration




SITRANS LU180 mounting

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## Selection and ordering data

| SITRANS LU180 Ultrasonic level transmitter Continuous, non-contact, 5 m (16.4 ft) range. Monitors level in liquids and slurries. Basic level performance for intrinsically safe applications. | Article No. 7ML5202- | 0 | ● | ● | 0 |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Transducer/Process connection** | | | | | |
| PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] | | | E | | |
| PVDF copolymer, R 2" [(BSPT), EN 10226] | | | F | | |
| PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] | | | G | | |
| PVDF copolymer, 4" Sanitary mounting | | | J | | |
| **Cable inlet** | | | | | |
| M20 x 1.5 [General Purpose cable gland -20 ... +60 °C (-4 ... +140 °F) included] | | | | B | |
| 1/2" NPT stainless steel entry (no cable gland included) | | | | C | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text | **Y15** |
| Declaration of Compliance, EN 10204, 2.1, Delivery meets Order Requirements | **C11** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line | **7ML1930-1AC** |
| Universal box bracket mounting kit | **7ML1830-1BK** |
| Sanitary 4" mounting clamp | **7ML1830-1BR** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT | **7ML1830-1BT** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT | **7ML1830-1BU** |
| 2" BSP nylon plastic locknut | **7ML1830-1DQ** |
| 2" NPT nylon plastic locknut | **7ML1830-1DT** |
| Cable Gland, General Purpose -20 ... +60 °C (-4 ... +140 °F) | **A5E34457564** |

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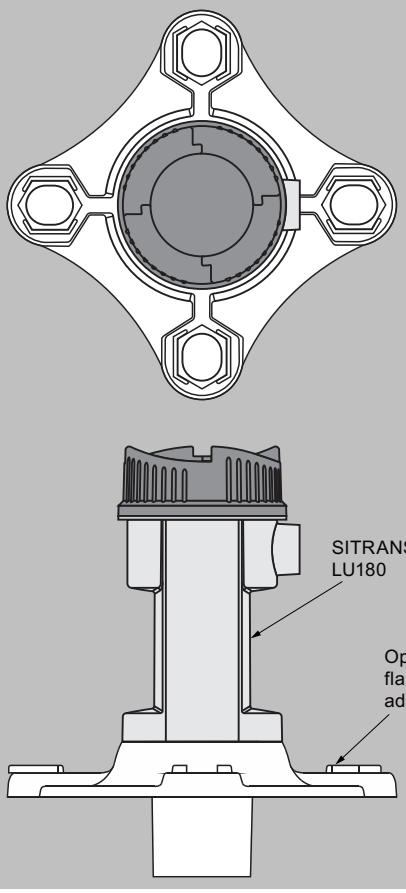
## Technical specifications

| SITRANS LU180 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Ultrasonic level measurement |
| **Input** | |
| Measuring range | 0.25 ... 5 m (0.8 ... 16.4 ft) |
| Frequency | 54 kHz |
| **Output** | |
| mA | 4 ... 20 mA |
| • Span | Proportional/ inversely proportional |
| • Max. load | 600 Ω in the loop at 24 V DC |
| **Power supply** | |
| Supply voltage | 12 ... 30 V DC, 0.1 A surge |
| Max. power consumption | 0.75 W (25 mA at 24 V DC) |
| **Certificates and approvals** | CSA IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4<br>FM IS/ Class I, II, III, Div. 1, Groups: A, B, C, D, E, F, G T4<br>ATEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C;<br>UKEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C;<br>IECEx Ex ia IIC T4 Ga, Ta = -40 °C to +60 °C;<br>NEPSI Ex ia IIC T4 Ga |
| **Accuracy** | |
| Error in measurement | 0.25 % of measuring range (in air) |
| Resolution | 3 mm (0.125 inch) |
| Temperature compensation | Built in |
| Echo processing | Sonic Intelligence |
| **Rated operation conditions** | |
| Beam angle | 12° |
| Ambient temperature | |
| • Standard | -40 ... +60 °C (-40 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | |
| • Standard | -40 ... +60 °C (-40 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Max. static operating pressure | Normal atmospheric pressure |
| **Design** | |
| Weight | 1.3 kg (2.9 lb) |
| Material | |
| • Electronics enclosure | PBT |
| • Transducer | PVDF copolymer |
| Degree of protection | IP68 / NEMA 6 / TYPE 6 |
| Process connection | • 2" NPT [(Taper), ASME B1.20.1]<br>• R 2" [(BSPT), EN 10226]<br>• G 2" [(BSPP), EN ISO 228-1]<br>• 4" sanitary |
| Flange adapter | 3" Universal (fits DN 65, PN 10 and 3" ASME) |
| Cable inlet | 1 inlet for M20, optional 1/2" NPT |

## Options

**SITRANS LU180, Flange Adapter**

The SITRANS LU180 can be fitted with the optional 75 (3) flange adapter for mating to 3" ASME, DIN 65 PN10 and JIS 10K3B flanges.

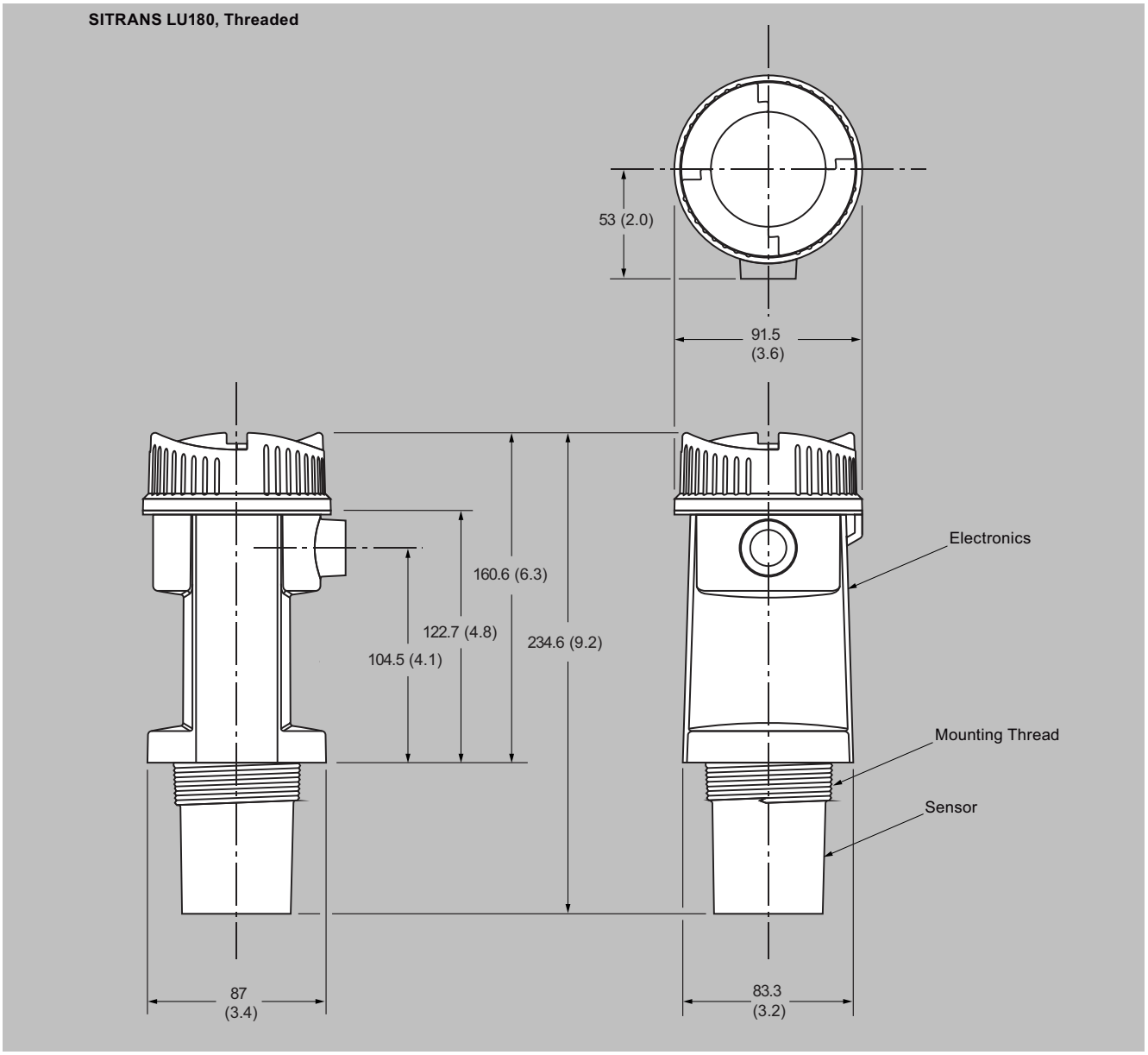



SITRANS LU180 optional flange adapter, dimensions in mm (inch)

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## Dimensional drawings

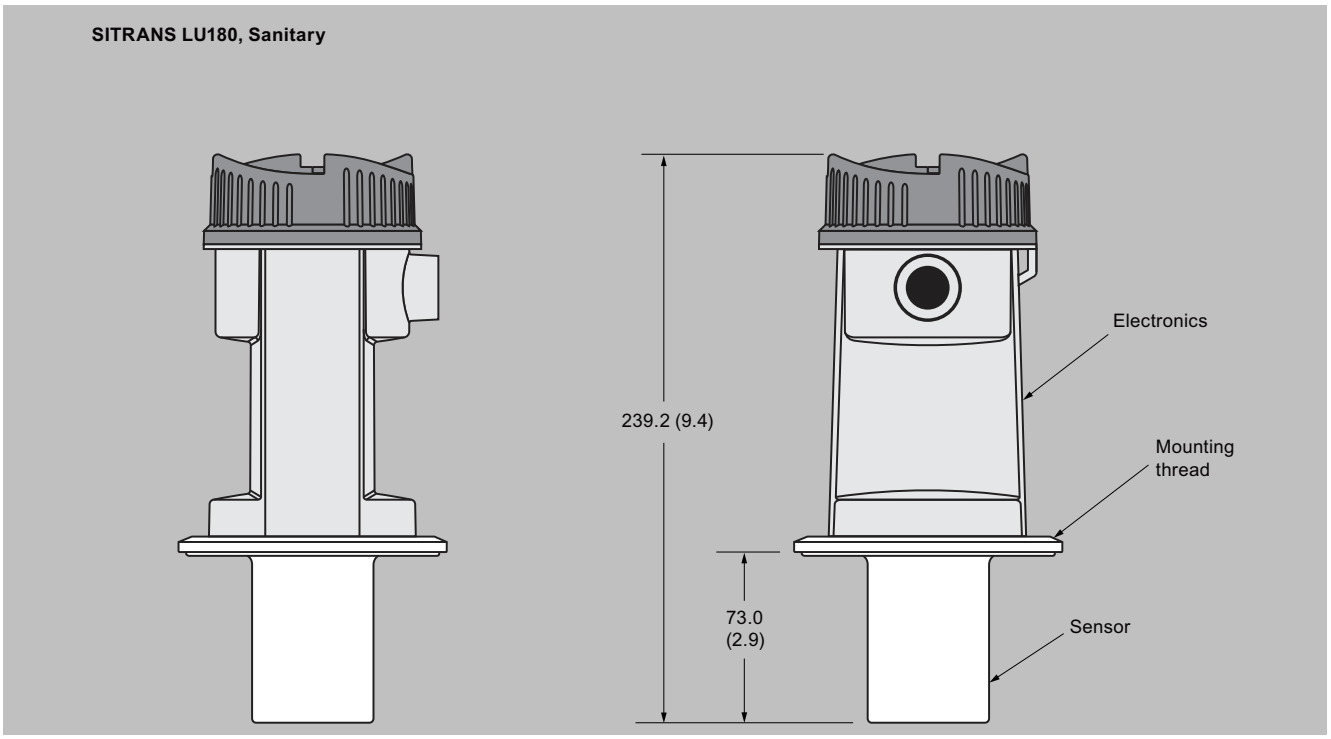



SITRANS LU180, dimensions in mm (inch)

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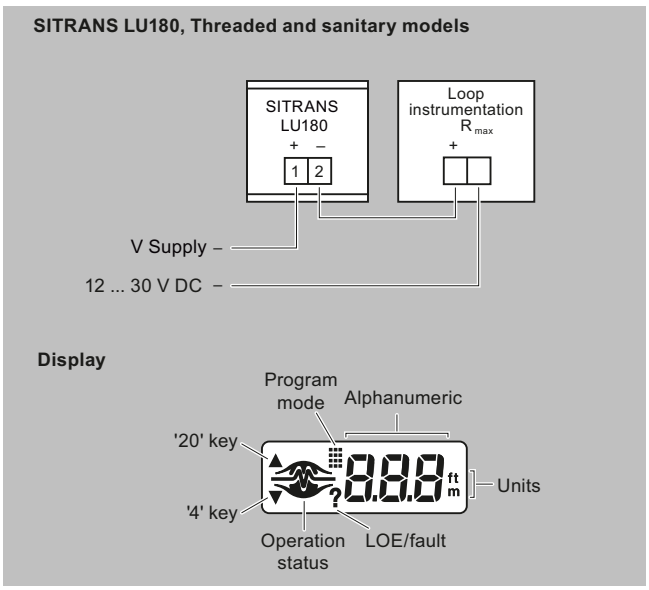


## Dimensional drawings (continued)




SITRANS LU180, dimensions in mm (inch)

## Circuit diagrams




SITRANS LU180 connections

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## Overview



SITRANS Probe LU240 ultrasonic level transmitter, ideal for level, volume, and volume flow measurements. It works with liquids, slurries, and bulk materials up to 12 m (40 ft).

## Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple startup
- Programming using 4-button HMI or SIMATIC PDM
- Communication using HART
- ETFE or PVDF transducers for chemical compatibility
- Process Intelligence signal processing
- Auto False Echo Suppression for fixed obstruction avoidance
- Low power and current startup
- Optional Bluetooth configuration and monitoring via SITRANS mobile IQ

## Application

SITRANS Probe LU240 is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

The range of SITRANS Probe LU240 is 3, 6, or 12 m (10, 20, or 40 ft). Probe LU240 provides unmatched reliability, using Process Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch) (on 6 m and 12 m models only).

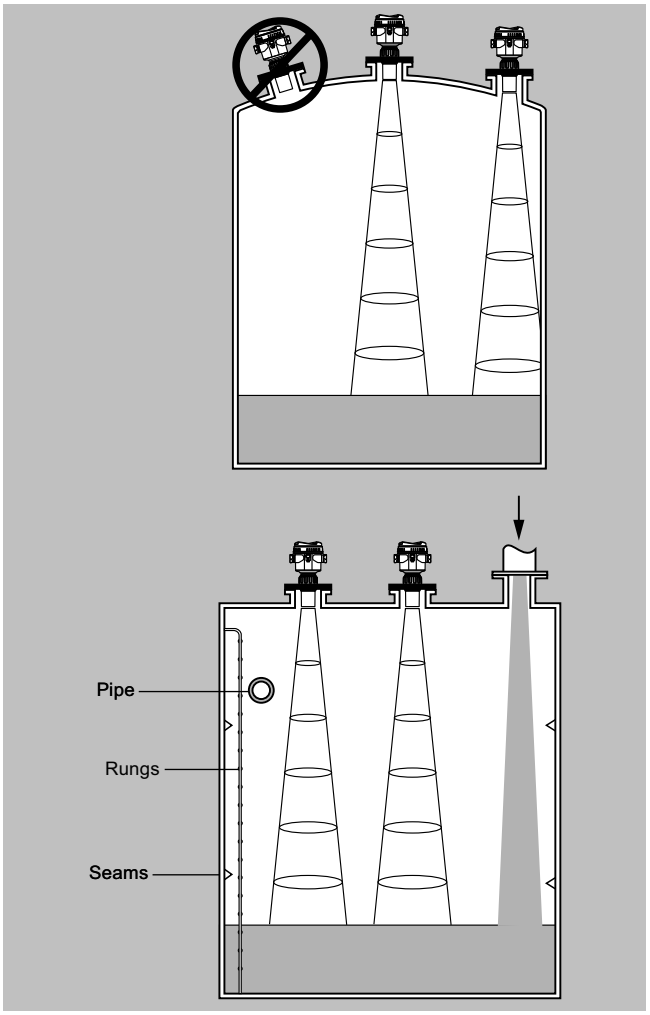
SITRANS Probe LU240 offers HART communication on certain models and mA output on all models.

SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up, and monitor SITRANS Probe LU240 series (available for Android, Apple, and Windows devices). For more information: http://www.siemens.com/mobileIQ.

The transducer on the Probe LU240 is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, Probe LU240 incorporates an internal temperature sensor to compensate for temperature changes.

- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

## Configuration




SITRANS Probe LU240 mounting

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## Selection and ordering data

| SITRANS Probe LU240 Ultrasonic level transmitter Continuous, non-contact, up to 12 m (40 ft) range. Monitors level, volume, and volume flow (model dependent) in liquids, slurries, and solids. With easy-to-use-quick-start wizards. | Article No. 7ML51 1 ● - ● ● ● 0 ● - 4 ● ● ● |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Communications** | |
| HART (4 ... 20 mA) level, volume, volume flow[5)] | 0 |
| 4 ... 20 mA[1)] level only | 7 |
| **Ingress protection** | |
| IP66, IP68, Type 4X, 6 | 1 |
| **Measurement range/wetted parts** | |
| 200 ... 3 000 mm (7.87 ... 118.11 inch), PVDF Copolymer | B |
| 200 ... 3 000 mm (7.87 ... 118.11 inch), ETFE | C |
| 200 ... 6 000 mm (7.87 ... 236.22 inch), PVDF Copolymer | D |
| 200 ... 6 000 mm (7.87 ... 236.22 inch), ETFE | E |
| 200 ... 12 000 mm (7.87 ... 472.44 inch), PVDF Copolymer | G |
| 200 ... 12 000 mm (7.87 ... 472.44 inch), ETFE | H |
| **Process connection** | |
| 2" NPT [(Taper), ASME B1.20.1] | D |
| R 2" [(BSPT), EN 10226] | E |
| G 2" [(BSPP), EN ISO 228-1] | F |
| **Non-wetted parts** | |
| Plastic (PBT/PC material) | 7 |
| **Type of protection** | |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}CSA_{US}$, CE, UKCA, KC, RCM, EAC | A |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}CSA_{US}$, FM, CE, UKCA, KC, RCM, EAC[2)] | B |
| Ex i (ia) (Ex-Zone 0/Div. 1)/IS, FM NI (Class I, Div. 2)[3)] | C |
| **Electrical connections/cable entries** | |
| 2 x M20 x 1.5 (one general purpose Polyamide cable gland and one Polyamide blocking plug provided) | F |
| 1 x 1/2" NPT (no gland cable provided) | K |
| For custom electrical connections/cable entries, contact a local sales person. For more information please visit: http://www.automation.siemens.com/aspa_app | |
| **Local HMI** | |
| Without display (blind lid of PBT/PC material) | 0 |
| With display (blind lid of PBT/PC material) | 1 |
| With display (clear lid of PC material) | 3 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 32 characters) specify in plain text | **Y15** |
| ***Certificates*** | |
| Declaration of compliance 2.1 (EN 10204) - delivery meets order requirements | **C19** |
| Certificate EN 10204-2.2 | **C14** |
| ***Wireless communication*** [6)] | |
| Bluetooth | **F50** |
| ***Approvals*** [4)] | |
| ATEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C;<br>UKEX II 1G Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C;<br>IECEx Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C;<br>EAC Ex 0Ex ia IIC T4 Ga, IP67/IP68;<br>SABS Ex ia IIC T4 Ga, Ta = -40 °C to +80 °C | **E31** |
| FM non-incendive - Class I, Div. 2, Groups A, B, C, D T5 (Ta = 80 °C), T6 (Ta = 40 °C)[2)] | **E32** |
| NEPSI, KCs, IECEx - Ex ia IIC T4 Ga | **E33** |

| Selection and Ordering data | Order code |
|---|---|
| $_{C}CSA_{US}$, KCs, FM - Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T4, INMETRO, IECEx - Ex ia IIC T4 Ga[2)] | **E34** |
| For customs, contact a local sales person. For more information please visit http://www.automation.siemens.com/aspa_app. | |

| Spare parts and accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel, 12 x 45 mm, one text line (max. 16 characters) | **7ML1930-1AC** |
| Stainless steel FMS200 universal box bracket mounting kit | **7ML1830-1BK** |
| 3" ASME/DIN Universal mounting adapter, 2" NPT, ETFE | **7ML1830-1BT** |
| 3" ASME/DIN Universal mounting adapter, 2" BSP, ETFE | **7ML1830-1BU** |
| 2" NPT nylon plastic locknut | **7ML1830-1DT** |

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## Selection and ordering data (continued)

| Spare parts and accessories | Article No. |
|---|---|
| 2" BSP nylon plastic locknut | 7ML1830-1DQ |
| Over-voltage protection up to 6 kV (external), M20 x 1.5 | 7MF7903-7AB |
| Over-voltage protection up to 6 kV (external), ½" NPT | 7MF7903-7AC |
| Cable Gland Polyamide - General Purpose (-20 ... +60 °C) | A5E34457564 |
| Bluetooth kit | A5E50514198 |
| SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries. | 7ML60..-.....-.... |
| **Spare Parts** | |
| Spare lid, clear | A5E44267491 |
| Spare lid, blind | A5E44267497 |

| Spare parts and accessories | Article No. |
|---|---|
| Spare o-ring for lid | A5E44267501 |
| Spare segmented display and 4-button HMI | A5E44809382 |

1) For use only with Measurement range/wetted parts options B, C, D, and E.
2) Available only with Electrical connections/cable entries option K only.
3) Available only with order codes E31, E32, E33, and E34.
4) Order codes E31, E32, E33, E34 only available with Type of protection option C.
5) For use only with Measurement range/wetted parts option D, E, G, and H.
6) For use only with Type of protection options A and B, and Communications option 0.

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## Technical specifications

| SITRANS Probe LU240 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Ultrasonic level measurement |
| Typical application | Level measurement in storage vessels and simple process vessels |
| **Inputs** | |
| Measuring range | |
| • 3 m (10 ft) | 0.2 ... 3 m (8 inch ... 10 ft) |
| • 6 m (20 ft) model | 0.2 ... 6 m (8 inch ... 20 ft) |
| • 12 m (40 ft) model | 0.2 ... 12 m (8 inch ... 40 ft) |
| Frequency | 54 kHz |
| **Outputs** | |
| mA/HART | |
| • Range | 4 ... 20 mA |
| • Accuracy | ± 0.0096 mA |
| • HART version | 7 |
| • Startup current | 3.6 mA |
| • Fail-safe | Programmable as high, low, or hold (loss of echo) per NAMUR NE43 |
| **Performance** | |
| Resolution | ≤ 3 mm (0.12 inch) |
| Accuracy | |
| 3 m (10 ft) version | 10 mm (0.39 inch) |
| 6 m (20 ft), 12 m (40 ft) version | • ± the greater of 0.15 % of range or 6 mm (0.25 inch) [valid from 0.25 m (0.82 ft)]<br>• ± 2 mm (0.08 inch) on ranges 4 m (13 ft) or less |
| Non-repeatability | ≤ 3 mm (0.12 inch) |
| Blanking distance | 0.2 m (0.66 ft) |
| Update time | ≤ 4 s |
| Temperature compensation | Built-in to compensate over temperature range |
| Beam angle | 10° |
| **Rated operating conditions** | |
| Ambient conditions | |
| • Location | Indoor/outdoor |
| • Ambient temperature | • Storage: -40 ... +85 °C (-40 ... +185 °F)<br>• Operating: -40 ... +80 °C (-40 ... +176 °F) |
| • Relative humidity/ingress protection | Suitable for outdoor |
| • Installation category | I |
| • Pollution degree | 4 |
| Medium conditions | |
| • Temperature at flange or threads | -40 ... +85 °C (-40 ... +185 °F) |
| • Pressure (vessel) | 0.5 bar g (7.25 psi g) |
| Display | -20 ... +80 °C (-4 ... +176 °F) |
| **Design** | |
| Material (enclosure) | PBT (Polybutylene Terephthalate) |
| Degree of protection | Type 4X, Type 6, IP66, IP68 |
| Weight | 0.93 kg (2.1 lb) |
| Cable inlet | 2 x M20 x 1.5 cable gland or 1 x ½" NPT thread |
| Material (transducer) | ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride) Buna-N seal |
| **Process connection** | |
| Threaded connection | 2" NPT [(Taper), ASME B1.20.1]<br>R 2" [(BSPT), EN 10226]<br>or<br>G 2" [(BSPP), EN ISO 228-1] |
| Flange connection | 3 inch (80 mm) universal flange |

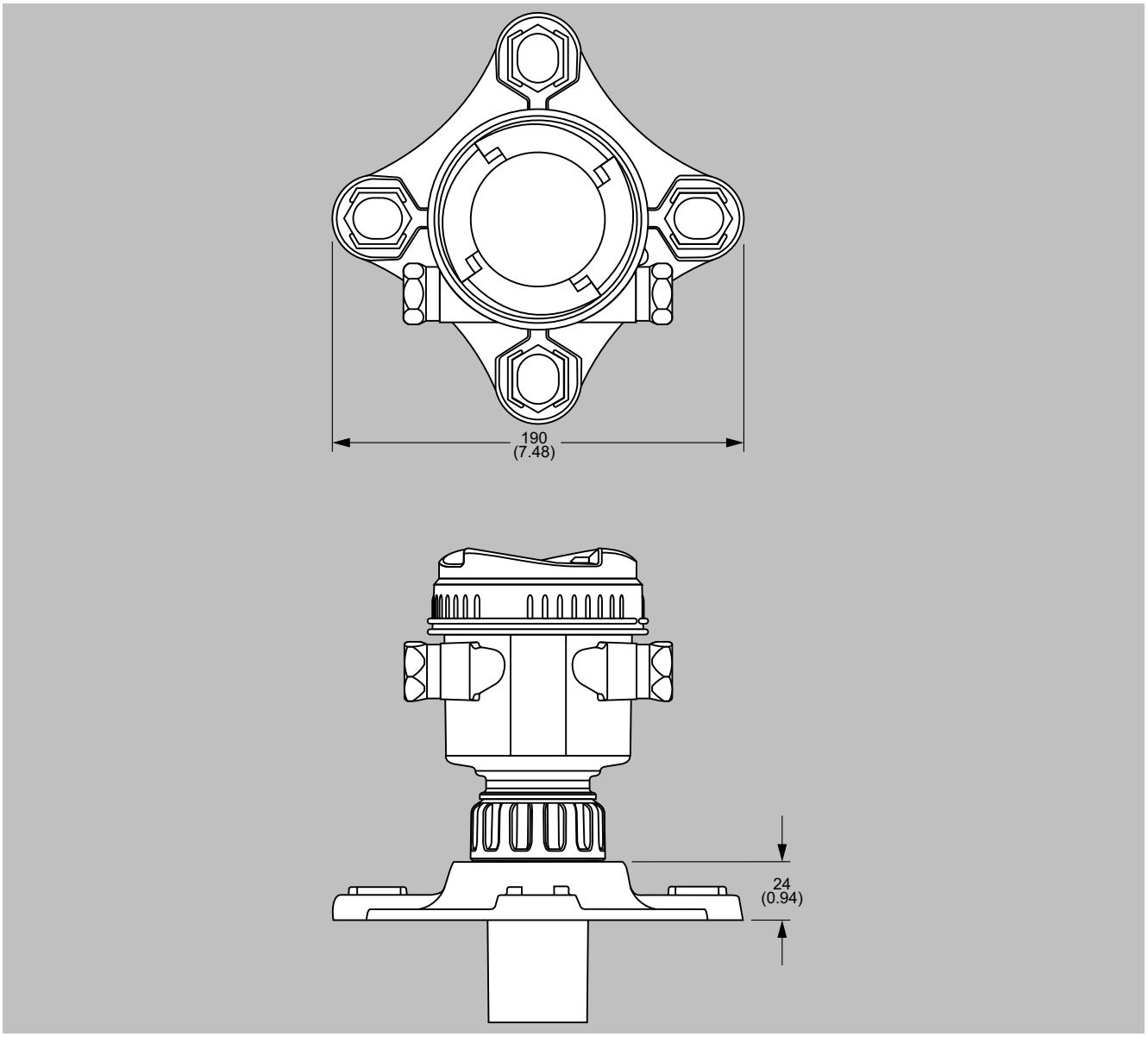
## Technical specifications (continued)

| SITRANS Probe LU240 | |
|---|---|
| Other connection | FMS 200 mounting bracket (see FMS mounting bracket product page for more information) or customer supplied mount. |
| **Display and Controls** | |
| Interface | Local: LCD display<br>Remote: Available via HART or Bluetooth |
| Configuration | 4-button HMI |
| Memory | Non-volatile EEPROM, no battery required |
| **Power supply** | |
| 4 ... 20 mA/HART | 10.5 ... 30 V DC |
| **Certificates and Approvals** | |
| General | FM, $_{C}$CSA$_{US}$, CE, UKCA, RCM, EAC, KC, VLAREM II |
| Hazardous | |
| • Intrinsically Safe | |
| - Europe | ATEX II 1G Ex ia IIC T4 Ga |
| - UK | UKEX II 1G Ex ia IIC T4 Ga |
| - International | IECEx SIR 18.0013X Ex ia IIC T4 Ga |
| - USA/Canada | FM/$_{C}$CSA$_{US}$ Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 |
| - Brazil | INMETRO Ex ia IIC T4 Ga |
| - China | NEPSI Ex ia IIC T4 Ga |
| - South Africa | SABS Ex ia IIC Tx Ga |
| - Russia | EAC Ex 1G Ex ia IIC T4 Ga |
| - Korea | KCs Ex ia IIC T4 |
| • Non-incendive | |
| - USA | FM, Class I, Div. 2, Groups A, B, C, D Tx |
| Metrological | MCERTS, CPA, Kazakhstan patterna approval |
| Radio (Bluetooth) | USA, Canada, EU, China |

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## Options

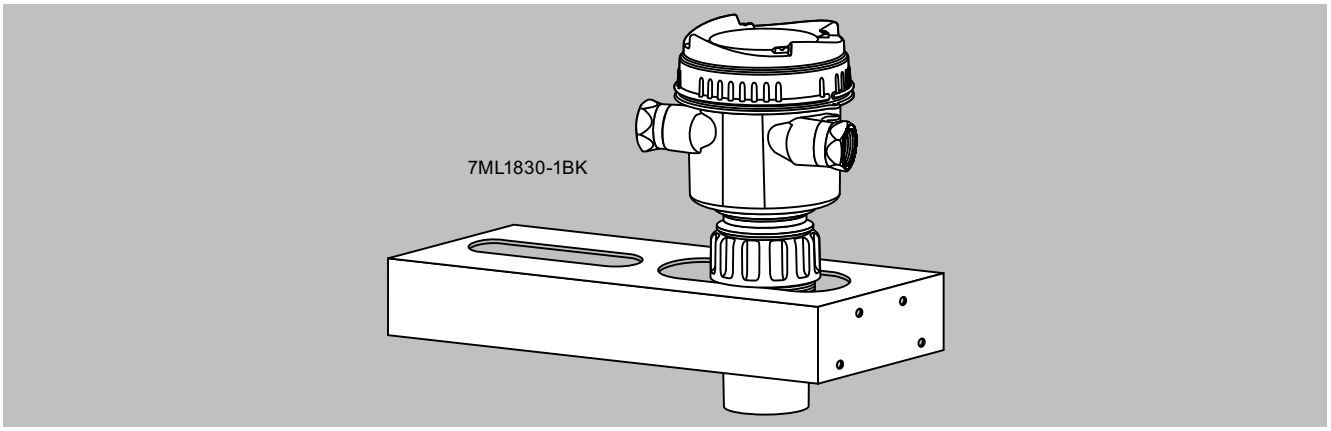



SITRANS Probe LU240 optional flange adapter, dimensions in mm (inch)

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**Options** (continued)

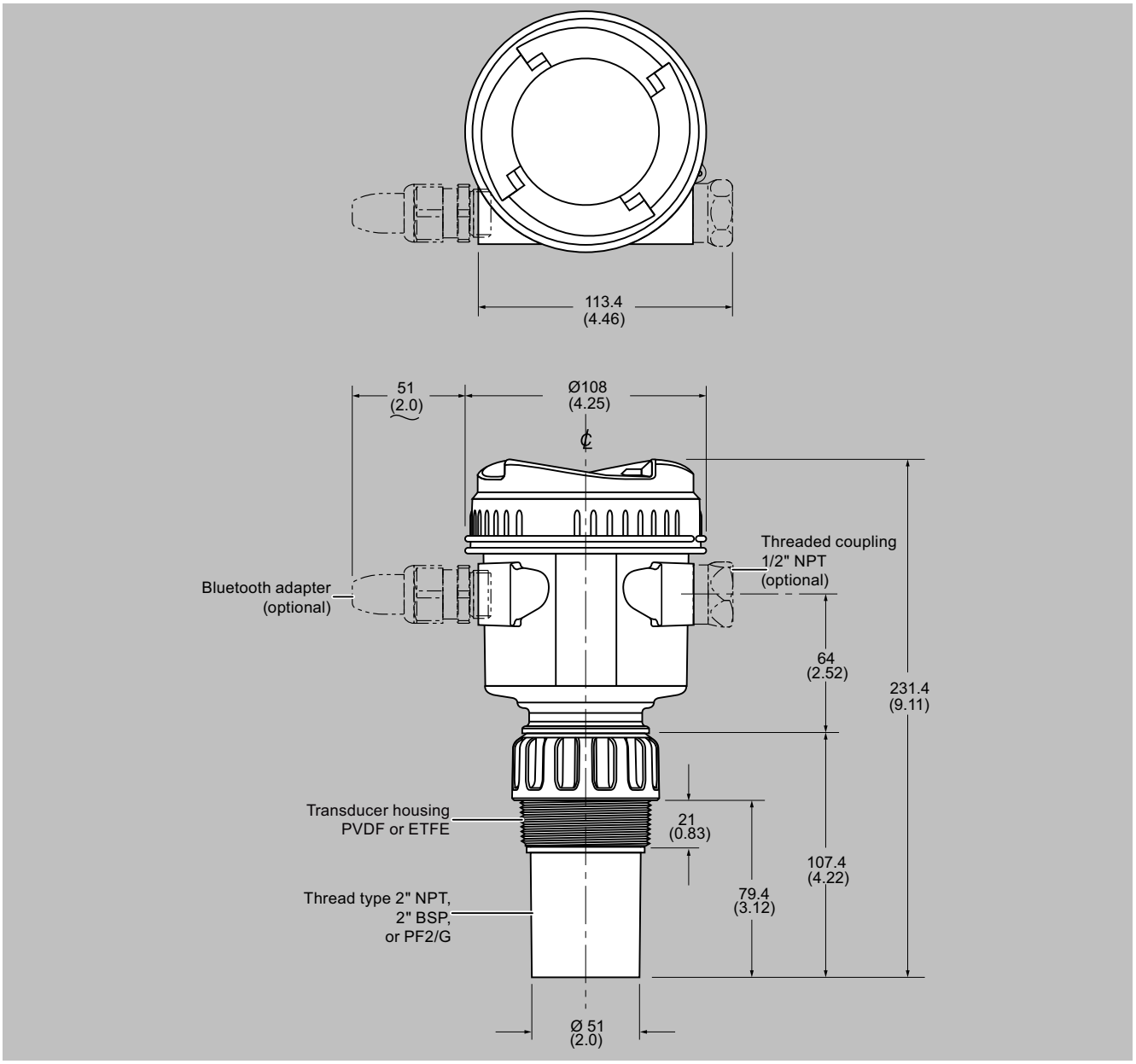



SITRANS Probe LU240 with optional FMS 200 universal box bracket

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## Dimensional drawings

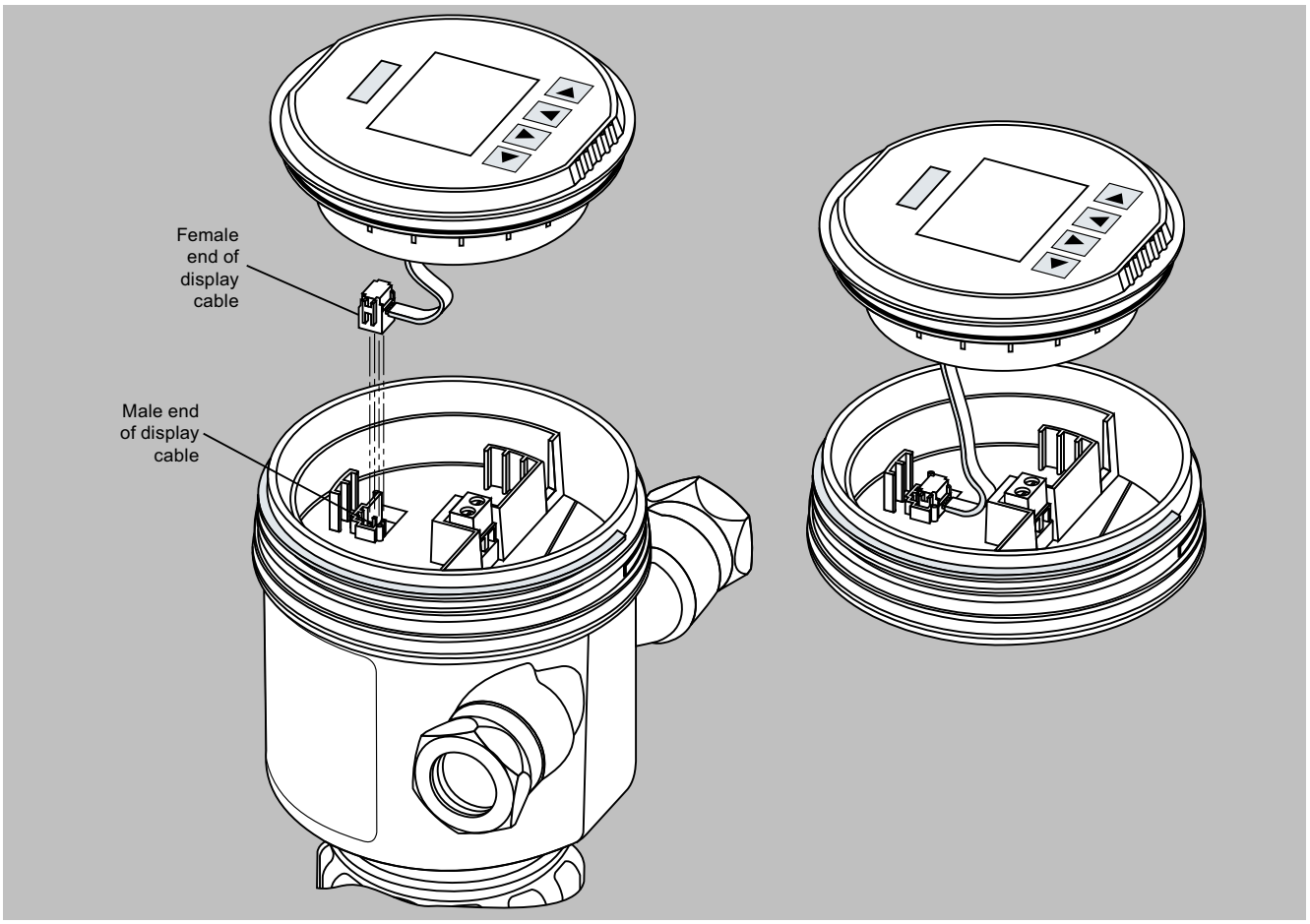



SITRANS Probe LU240 with optional Bluetooth adapter, dimensions in mm (inch)

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## Circuit diagrams




SITRANS Probe LU240 connections

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## Overview




The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

## Benefits

- Easy to install, program, and maintain
- Accurate and reliable
- Sanitary models available
- Sonic Intelligence echo processing
- Integral temperature compensation

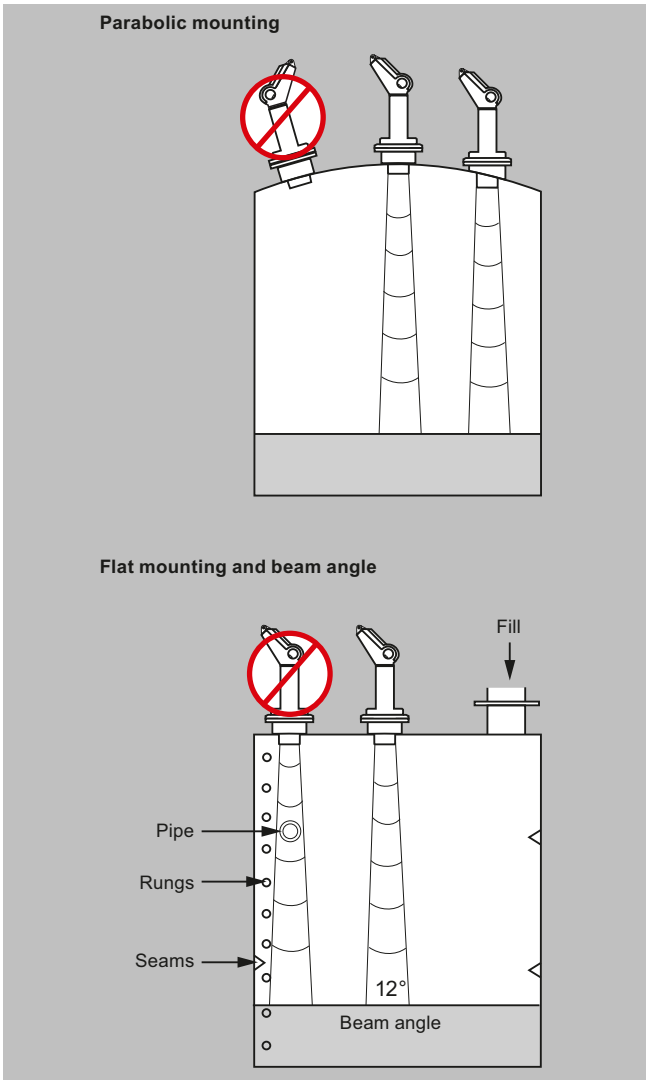
## Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

## Configuration




The Probe mounting

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## Selection and ordering data

| The Probe Ultrasonic level transmitter<br>Continuous, non-contact, 5 m (16.4 ft) range. Monitors level for liquids and slurries. With 3-wire relay output. | Article No.<br>7ML1201- ● | ● | ● | 0 | 0 |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Measuring range** | | | | | |
| 5 m (16.40 ft) | | 1 | | | |
| **Transducer/Process connection** | | | | | |
| PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1] | | | E | | |
| PVDF copolymer, R 2" [(BSPT), EN 10226] | | | F | | |
| PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] | | | G | | |
| PVDF copolymer, 4" Sanitary mounting | | | J | | |
| **Model/Approval** | | | | | |
| 3-wire, 24 V DC, CE, UKCA, RCM, CSA, FM | | | | E | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 20 characters) specify in plain text | **Y17** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Universal Box Bracket Mounting kit | **7ML1830-1BK** |
| Sanitary 4" mounting clamp | **7ML1830-1BR** |

| Selection and ordering data | Article No. |
|---|---|
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT | **7ML1830-1BT** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT | **7ML1830-1BU** |
| 2" NPT nylon plastic locknut | **7ML1830-1DT** |
| 2" BSP nylon plastic locknut | **7ML1830-1DQ** |
| Plastic M20 cable gland with metal locknut | **7ML1930-1DB** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch see point level measurement section. | |

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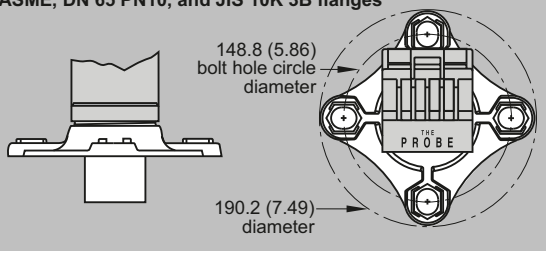


## Technical specifications

| The Probe | |
|---|---|
| | **3-wire version** |
| **Mode of operation** | |
| Measuring principle | Ultrasonic level measurement |
| **Input** | |
| Measuring range | 0.25 ... 5 m (0.8 ... 16.4 ft) |
| Frequency | 54 kHz |
| **Output** | |
| mA | 4 ... 20 mA |
| • Span | Proportional/ inversely proportional |
| • Max. load | 750 Ω at 24 V DC |
| Relay | For level alarm or fault |
| **Power supply** | |
| Supply voltage | 18 ... 30 V DC, max. 0.2 A |
| Max. power consumption | 5 W (200 mA at 24 V DC) |
| **Certificates and approvals** | CE, UKCA, RCM, $_{C}CSA_{US}$, FM |
| **Accuracy** | |
| Error in measurement | 0.25 % of measuring range (in air) |
| Resolution | 3 mm (0.125 inch) |
| Temperature compensation | Built in |
| Echo processing | Sonic Intelligence |
| **Rated operation conditions** | |
| Beam angle | 12° |
| Ambient temperature | |
| • Standard | -40 ... +60 °C (-40 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | |
| • Standard | -40 ... +60 °C (-40 ... +140 °F) |
| • Metallic mounting | -20 ... +60 °C (-4 ... +140 °F) |
| Max. static operating pressure | Normal atmospheric pressure |
| Degree of protection | IP65 |
| **Design** | |
| Weight | |
| • Without flange adapter | 1.5 kg (3.3 lb) |
| • With flange adapter | 1.7 kg (3.7 lb) |
| Material | |
| • Electronics enclosure | PVC |
| • Transducer | PVDF copolymer |
| Degree of protection | IP65 |
| Process connection | • 2" NPT [(Taper), ASME B1.20.1]<br>• R 2" [(BSPT), EN 10226]<br>• G 2" [(BSPP), EN ISO 228-1]<br>• 4" sanitary |
| Flange adapter | 3" Universal (fits DN 65, PN 10 and 3" ASME) |
| Cable inlet | 2 inlets for PG 16 or ½" NPT cable glands |

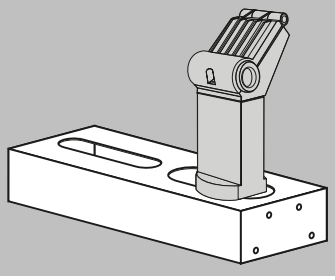
## Options

**Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10, and JIS 10K 3B flanges**




The Probe optional flange adapter, dimensions in mm (inch)

**The Probe with FMS 200 mounting bracket**

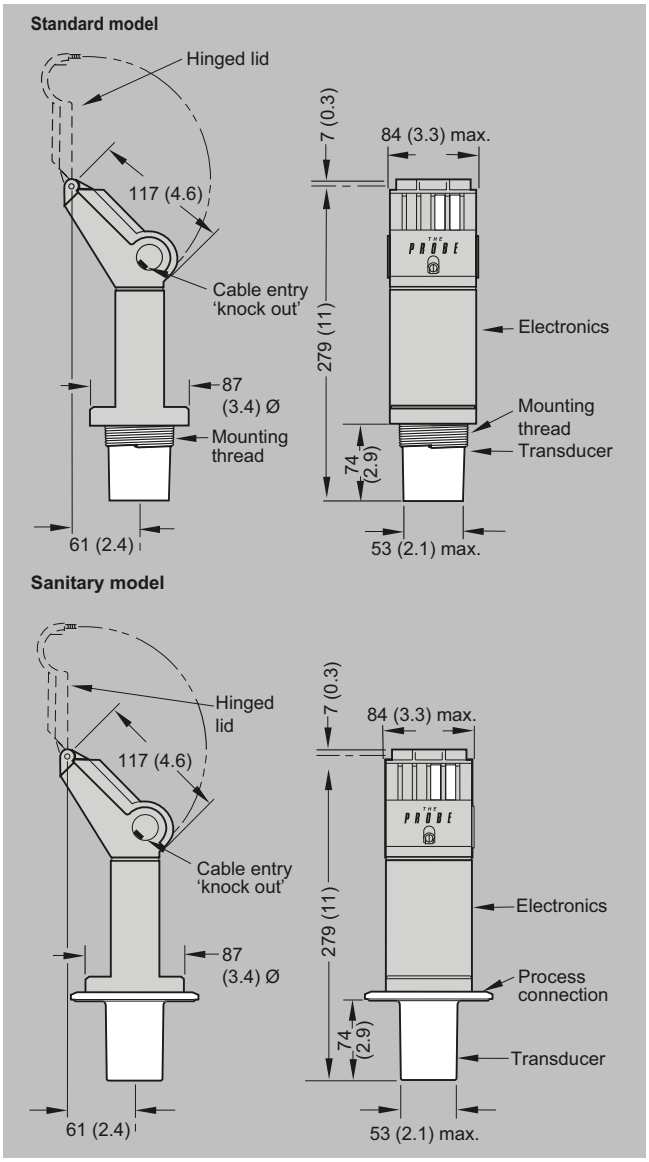


The Probe with optional mounting bracket

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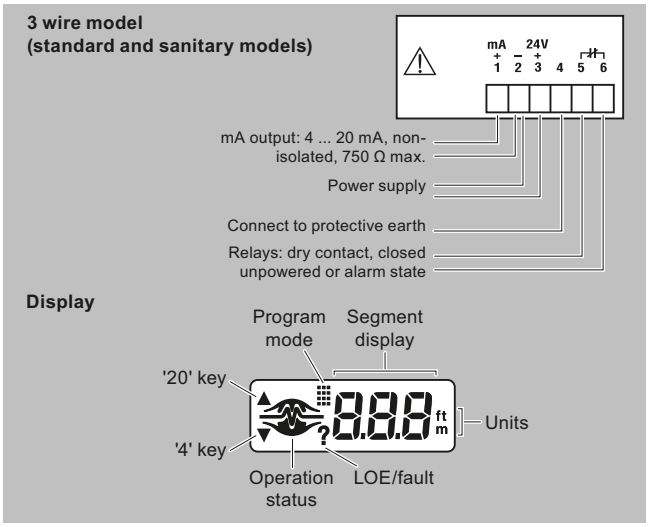


## Dimensional drawings




The Probe, dimensions in mm (inch)

## Circuit diagrams




The Probe connections

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## Overview

***Ultrasonic Transducers***

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

## Technical specifications

| EchoMax Transducers | Liquids | | Liquids and Solids Standard | | |
|---|---|---|---|---|---|
| | XRS-5 | ST-H | XPS-10 | XPS-15 | XPS-30 |
| **Max. range**[1)] | 8 m (26 ft) | 10 m (33 ft) | 10 m (33 ft) | 15 m (50 ft) | 30 m (100 ft) |
| **Min. range** | 0.3 m (1 ft) | 0.3 m (1 ft) | 0.3 m (1 ft) | 0.3 m (1 ft) | 0.6 m (2 ft) |
| **Max. temperature** | 65 °C (149 °F) | 73 °C (164 °F) | 95 °C (203 °F) | 95 °C (203 °F) | 95 °C (203 °F) |
| **Min. temperature** | -20 °C (-4 °F) | -40 °C (-40 °F) | -40 °C (-40 °F) | -40 °C (-40 °F) | -40 °C (-40 °F) |
| **Typical Applications** | Wet wells and open channels | Chemical storage and liquid tanks | Dusty solids and slurries | Deep wet wells and solids | Powders, pellets and solids |
| **Frequency** | 44 kHz | 44 kHz | 44 kHz | 44 kHz | 30 kHz |
| **Beam angle (-3dB)** | 10° | 12° | 12° | 6° | 6° |
| **Thread size** | R 1" [(BSPT), EN 10226]<br>1" NPT | 1" and 2" NPT<br>R 2" [(BSPT), EN 10226]<br>2" [(BSPP), EN ISO 228-1] | R 1" [(BSPT), EN 10226]<br>1" NPT | R 1" [(BSPT), EN 10226]<br>1" NPT | R 1.5" [(BSPT), EN 10226]<br>Universal thread<br>1.5" NPT |
| **Enclosure** | • PVDF Copolymer<br>• CSM<br>• Option: Flange with PTFE facing | • ETFE<br>• Option: PVDF | • PVDF<br>• Option: foam facing<br>• Flange with PTFE facing | • PVDF<br>• Option: foam facing<br>• Flange with PTFE facing | • PVDF<br>• Option: foam facing<br>• Flange with PTFE facing |
| **Compatible with:** | | | | | |
| ***SITRANS LUT400*** | • | • | • | • | • |
| **HydroRanger 200** | • | • | • | • | |
| **MultiRanger 100/200** | • | • | • | • | |

1) Max range is rated for measurement of liquids, recommended range for solids is 50 % of maximum. Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult a local sales person for more details.

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## Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

## Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

## Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- Key Applications: chemical storage, liquid tanks

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## Selection and ordering data

| ST-H Ultrasonic level transducer<br>Continuous, non-contact, 0.3 m (1 ft) range, for liquids. | Article No.<br>7ML1100- | ● | ● | A | ● | 0 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Process connection** | | | | | | |
| ETFE, 2" NPT [(Taper), ASME B1.20.1] | | 0 | | | | |
| ETFE, R 2" [(BSPT), EN 10226] | | 1 | | | | |
| ETFE, G 2" [(BSPP), EN ISO 228-1] | | 2 | | | | |
| PVDF copolymer, 2" NPT [(Taper), ASME B1.20.1] | | 3 | | | | |
| PVDF copolymer, R 2" [(BSPT), EN 10226] | | 4 | | | | |
| PVDF copolymer, G 2" [(BSPP), EN ISO 228-1] | | 5 | | | | |
| **Cable length** | | | | | | |
| 5 m (16.40 ft) | | | A | | | |
| 10 m (32.81 ft) | | | B | | | |
| 30 m (98.43 ft) | | | C | | | |
| 50 m (164.04 ft) | | | D | | | |
| 100 m (328.08 ft) | | | E | | | |
| **Approvals** | | | | | | |
| CE, UKCA, FM Class I, II, Div. 1, Groups C, D, E, F, G T4A [3] | | | | | 2 | |
| CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3;<br>ATEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;<br>UKEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;<br>INMETRO Ex mb IIC T5 Gb, -20 °C ≤Ta ≤+60 °C;<br>RCM, KC [1] | | | | | 3 | |
| ATEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;<br>UKEX II 2G Ex mb IIC T5 Gb, Ta = -20°C to +60°C;<br>INMETRO Ex mb IIC T5 Gb, -20 °C ≤Ta ≤+60 °C;<br>CE, UKCA, RCM, KC [2] | | | | | 4 | |

1) Available with Process connection options 0 ... 2 only.
2) Available with Process connection options 3 ... 5 only.
3) Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text | **Y17** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation | |
| **Accessories** | |
| Universal box bracket, mounting kit | **7ML1830-1BK** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT | **7ML1830-1BT** |
| 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT | **7ML1830-1BU** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |

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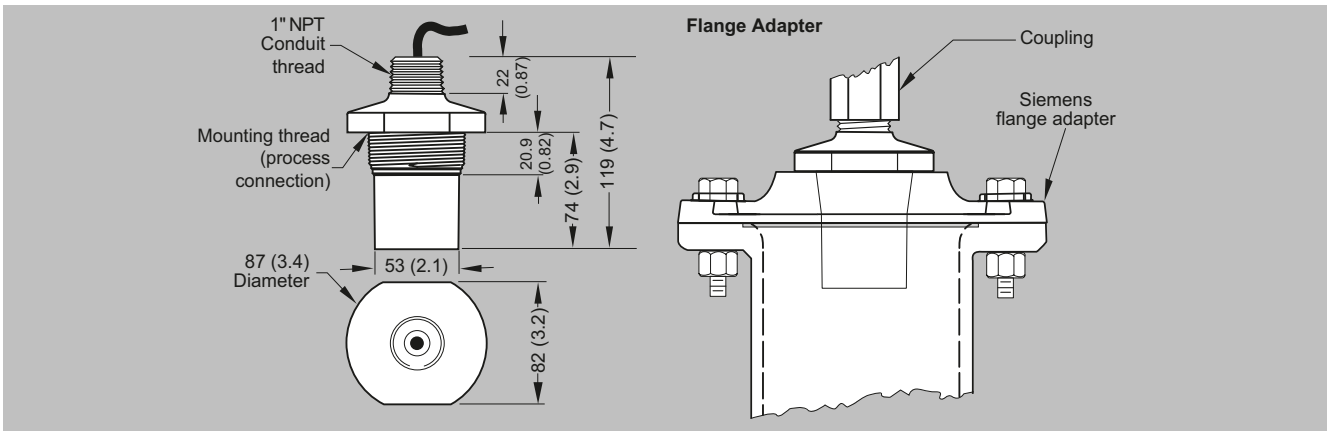


## Technical specifications

| ST-H | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Ultrasonic transducer |
| **Input** | |
| Measuring range | 0.3 ... 10 m (1 ... 33 ft) |
| **Output** | |
| Frequency | 44 kHz |
| Beam angle | 12° |
| **Accuracy** | |
| Temperature compensation | Compensated by integral temperature sensor |
| **Rated operating conditions** | |
| Pressure | Normal atmospheric pressure |
| **Ambient conditions** | |
| Ambient temperature | -20 ... +60 °C (-5 ... +140 °F) (ATEX and UKEX approved model)<br>-40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model) |
| Storage temperature | -20 ... +60 °C (-5 ... +140 °F) |
| **Design** | |
| Weight[1)] | 1.4 kg (3 lb) |
| Material (enclosure) | Base and lid made of ETFE or PVDF (epoxy fitted joint)[2)] |
| Process connection | 2" NPT [(Taper), ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1] |
| Degree of protection | IP68 |
| Cable connection | 2-core shielded/twisted, 0.519 mm² (20 AWG), PVC sheath |
| Cable (max. length) | 365 m (1 200 ft) with RG 62 A/U coaxial cable |
| **Options** | |
| Flange adapter | 3" Universal (fits DN 65, PN 10 and 3" ASME) |
| **Certificates and approvals** | CE, UKCA, RCM, KC,<br>CSA Class I, II, III, Div. 1,<br>Groups A, B, C, D, E, F, G T3 (ETFE only);<br>FM Class I, II, Div. 1,<br>Groups C, D, E, F, G T4A;<br>ATEX II 2G Ex mb IIC T5 Gb;<br>UKEX II 2G Ex mb IIC T5 Gb;<br>INMETRO Ex mb IIC T5 Gb |

1) Approximate shipping weight of transducer with standard cable length
2) When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

## Dimensional drawings

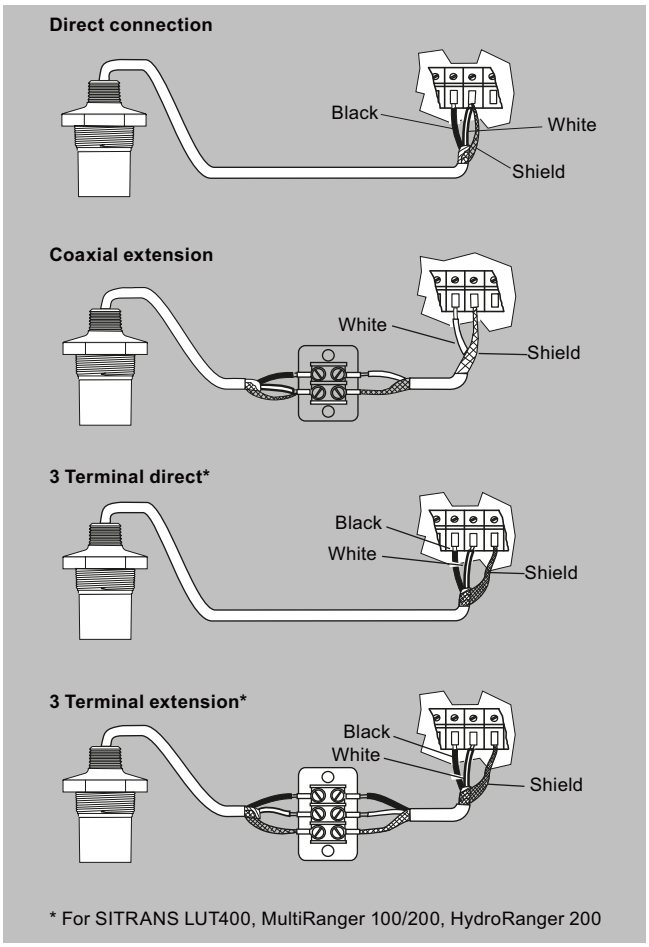



ST-H ultrasonic transducer, dimensions in mm (inch)

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## Circuit diagrams




ST-H ultrasonic transducer connections

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## Overview



EchoMax XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

## Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

## Application

The XRS-5 is non-contacting with a measuring range from 0.3 to 8 m (1 to 26 ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence, and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics, and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

- Key Applications: wet wells, flumes, weirs, filter beds

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## Selection and ordering data

| EchoMax XRS-5 Ultrasonic level transducer Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries. | Article No. 7ML1106- | ● | ● | ● | ● | 0 | - | 0 | ● |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Process connection** | | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 1 | | | | | | | |
| R 1" [(BSPT), EN 10226] | | 2 | | | | | | | |
| **Cable length** | | | | | | | | | |
| 5 m (16.40 ft) | | | A | | | | | | |
| 10 m (32.81 ft) | | | B | | | | | | |
| 30 m (98.43 ft) | | | C | | | | | | |
| **Facing** | | | | | | | | | |
| Standard (CSM rubber) | | | | A | | | | | |
| PTFE (flange versions) | | | | B | | | | | |
| **Approvals** | | | | | | | | | |
| CSA Class I, Div. 2, Groups A, B, C, D; CSA Class II, Div. 1, Groups E, F, G; FM Class I, Zone 1, AEx m IIC, T6; FM Class II, III, Div. 1, Groups E, F, G T6; ATEX II 2GD Ex mb IIC T6 Gb, Ta = -20°C to +65°C; ATEX II 2GD Ex tb IIIC T85°C Db; UKEX II 2GD Ex mb IIC T6 Gb, Ta = -20°C to +65°C; UKEX II 2GD Ex tb IIIC T85°C Db; IECEx Ex mb IIC T6 Gb, Ta = -20°C to +65°C; IECEx Ex tb IIIC T85°C Db; INMETRO Ex mb IIC T6 Gb, IP66/IP68, -20°C ≤ Ta ≤ +65°C; INMETRO Ex tb IIIC T85°C Db, IP66/IP68; CE, UKCA, RCM, KC | | | | | 2 | | | | |
| **Mounting flange (flush mount)** | | | | | | | | | |
| None | | | | | | | | | A |
| 3" ASME, 150 lb, flat faced | | | | | | | | | B |
| 4" ASME, 150 lb, flat faced | | | | | | | | | C |
| 6" ASME, 150 lb, flat faced | | | | | | | | | D |
| DN 80, PN 10/16, Type A, flat faced | | | | | | | | | J |
| DN 100, PN 10/16, Type A, flat faced | | | | | | | | | K |
| DN 150, PN 10/16, Type A, flat faced | | | | | | | | | L |
| JIS10K 3B style | | | | | | | | | Q |
| JIS10K 4B style | | | | | | | | | R |
| JIS10K 6B style | | | | | | | | | S |
| Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard. | | | | | | | | | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text | **Y17** |

| Selection and ordering data | Article No. |
|---|---|
| **Accessories** | |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors | **7ML1930-1BJ** |
| Submergence shield kit | **7ML1830-1BH** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| FMS-200 universal box bracket, mounting kit | **7ML1830-1BK** |
| FMS-210 channel bracket, wall mount | **7ML1830-1BL** |

| Selection and ordering data | Article No. |
|---|---|
| FMS-220 extended channel bracket, wall mount | **7ML1830-1BM** |
| FMS-310 channel bracket, floor mount | **7ML1830-1BN** |
| FMS-320 extended channel bracket, floor mount | **7ML1830-1BP** |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| 1" BSP locknut, flanged, plastic | **7ML1830-1DN** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

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## Selection and ordering data (continued)

| EchoMax XRS-5C Ultrasonic level transducer Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries. | Article No. 7ML1105- | ● | ● | ● | ● | 1 | - | 0 | ● |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Process connection** | | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 1 | | | | | | | |
| **Cable length** | | | | | | | | | |
| 5 m (16.40 ft) | | | A | | | | | | |
| 10 m (32.81 ft) | | | B | | | | | | |
| 30 m (98.43 ft) | | | C | | | | | | |
| **Facing** | | | | | | | | | |
| Standard (CSM rubber) | | | | A | | | | | |
| PTFE (flange versions) | | | | B | | | | | |
| **Approvals** | | | | | | | | | |
| CSA Class I Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III | | | | | 1 | | | | |
| **Mounting flange (flush mount)** | | | | | | | | | |
| None | | | | | | | | | A |
| 3" ASME, 150 lb, flat faced | | | | | | | | | B |
| 4" ASME, 150 lb, flat faced | | | | | | | | | C |
| 6" ASME, 150 lb, flat faced | | | | | | | | | D |
| Note: flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard. | | | | | | | | | |
| **Operating Instructions** | | | | | | | | | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | | | | | | | | | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters) specify in plain text | **Y17** |

| Selection and ordering data | Article No. |
|---|---|
| **Accessories** | |
| Submergence shield kit | **7ML1830-1BH** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| FMS-200 universal box bracket, mounting kit | **7ML1830-1BK** |
| FMS-210 channel bracket, wall mount | **7ML1830-1BL** |
| FMS-220 extended channel bracket, wall mount | **7ML1830-1BM** |
| FMS-310 channel bracket, floor mount | **7ML1830-1BN** |
| FMS-320 extended channel bracket, floor mount | **7ML1830-1BP** |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |

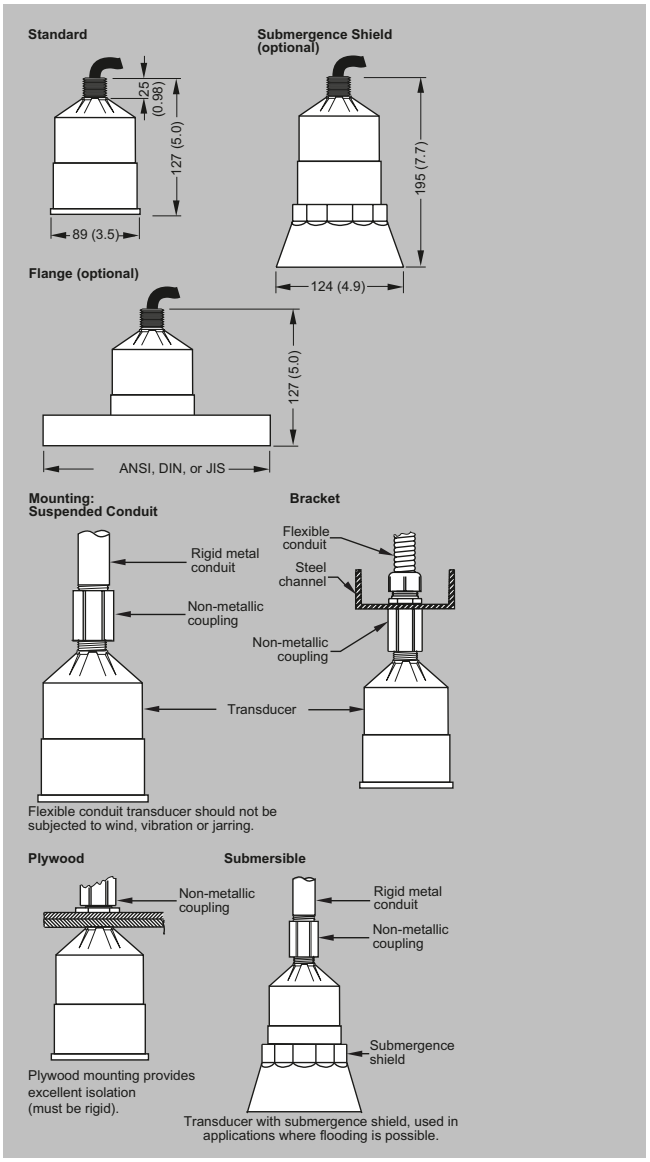
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## Technical specifications

| EchoMax XRS-5 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Ultrasonic transducer |
| **Input** | |
| Measuring range | 0.3 ... 8 m (1 ... 26 ft), dependent on application |
| **Output** | |
| Frequency | 44 kHz |
| Beam angle | 10° |
| **Accuracy** | |
| Temperature error | Compensated by integral temperature sensor |
| **Rated operating conditions** | |
| Vessel pressure | Normal atmospheric pressure |
| Ambient Conditions | |
| • Ambient temperature | -20 ... +65 °C (-4 ... +149 °F) |
| • Storage temperature | -20 ... +65 °C (-4 ... +149 °F) |
| **Design** | |
| Weight (approximate shipping weight of sensor with standard cable length) | 1.2 kg (2.6 lb) |
| Material (enclosure) | PVDF copolymer enclosure and CSM face |
| Process connection | 1" NPT [(Taper), ANSI/ASME B1.20.1] or R 1" [(BSPT), EN 10226] |
| Degree of protection | IP65/IP68 |
| Cable connection | 2-core shielded/twisted, 0.5 mm² (20 AWG), PVC sheath |
| Cable (max. length) | • 365 m (1 200 ft) with RG 62 A/U coaxial cable<br>• 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for MultiRanger 100/200 |
| **Options** | |
| Flange version | Factory flange with PTFE face for ASME, EN or JIS configuration |
| Submergence shield | For applications with flooding possible |
| **Certificates and approvals** | CE, UKCA, RCM, KC<br>CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1 Groups E, F, G<br>FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E, F, G T6<br>ATEX II 2GD / UKEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb,<br>Ex tb IIIC T85°C Db |

## Dimensional drawings



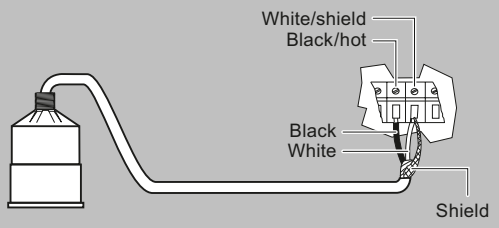

XRS-5 ultrasonic transducer, dimensions in mm (inch)

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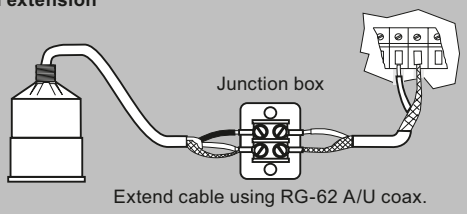


## Circuit diagrams

**Direct connection**



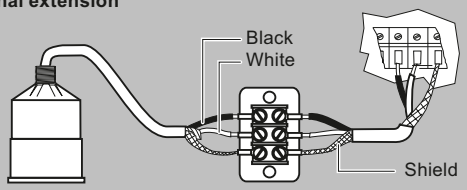

**Coaxial extension**




**3 terminal direct***




**3 terminal extension***




* For SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

XRS-5 ultrasonic transducer connections

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## Overview



EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

## Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

## Application

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

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## Selection and ordering data

| EchoMax XPS-10 Ultrasonic level transducer Continuous, non-contact, 10 m (32.80 ft), for liquids and solids. | Article No. 7ML1115- ● | ● | ● | ● | 0 |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Mounting thread and facing** | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | 0 | | | | |
| 1" NPT [(Taper), ASME B1.20.1] with foam facing[1] | 1 | | | | |
| 1" NPT [(Taper), ASME B1.20.1] with PTFE facing[2] | 2 | | | | |
| R 1" [(BSPT), EN 10226] | 3 | | | | |
| R 1" [(BSPT), EN 10226] with foam facing[1] | 4 | | | | |
| R 1" [(BSPT), EN 10226] with PTFE facing[2] | 5 | | | | |
| **Cable length** | | | | | |
| 5 m (16.40 ft) | | B | | | |
| 10 m (32.81 ft) | | C | | | |
| 30 m (98.43 ft) | | E | | | |
| 50 m (164.04 ft) | | F | | | |
| 100 m (328.08 ft) | | K | | | |
| **Mounting flange** | | | | | |
| None | | | A | | |
| 3" ASME, 150 lb, flat faced | | | C | | |
| 4" ASME, 150 lb, flat faced | | | D | | |
| 6" ASME, 150 lb, flat faced | | | E | | |
| 8" ASME, 150 lb, flat faced | | | F | | |
| DN 80, PN 10/16, Type A, flat faced | | | G | | |
| DN 100, PN 10/16, Type A, flat faced | | | J | | |
| DN 150, PN 10/16, Type A, flat faced | | | L | | |
| JIS10K3B Style | | | M | | |
| JIS10K4B Style | | | P | | |
| JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.) | | | R | | |
| **Approvals** | | | | | |
| ATEX II 2GD Ex mb IIC T4 Gb, ATEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; UKEX II 2GD Ex mb IIC T4 Gb, UKEX II 2GD Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; IECEx SIR 13.0009X Ex mb IIC T4 Gb, IECEx SIR 13.0009X Ex tb IIIC T135°C Db, Ta = -40°C to +95°C; FM Class I, Div. 2, Groups A, B, C, D; FM Class II, Div. 1, Groups E, F, G; FM Class III | | | | 3 | |
| CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III [3] | | | | 4 | |

1) Not available with flanged versions.
2) Available with flanged versions only.
3) Valid with mounting thread and facing options 0 ... 2 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/identification (max. 27 characters) specify in plain text | **Y15** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors | **7ML1930-1BJ** |
| Submergence shield kit | **7ML1830-1BH** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |

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## Selection and ordering data (continued)

| Selection and ordering data | Article No. |
|---|---|
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Universal box bracket, mounting kit | **7ML1830-1BK** |
| Channel bracket, wall mount | **7ML1830-1BL** |
| Extended channel bracket, wall mount | **7ML1830-1BM** |
| Channel bracket, floor mount | **7ML1830-1BN** |
| Extended channel bracket, floor mount | **7ML1830-1BP** |

| Selection and ordering data | Article No. |
|---|---|
| Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| 1" BSP locknut, flanged, plastic | **7ML1830-1DN** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |

| **EchoMax XPS-15 Ultrasonic level transducer Continuous, non-contact, 15 m (49.21 ft), for liquids and solids.** | **Article No. 7ML1118-** ● | ● | ● | ● | 0 |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Mounting thread and facing** | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | | | |
| 1" NPT [(Taper), ASME B1.20.1] with foam facing[1] | | 1 | | | |
| 1" NPT [(Taper), ASME B1.20.1] with PTFE facing[2] | | 2 | | | |
| R 1" [(BSPT), EN 10226] | | 3 | | | |
| R 1" [(BSPT), EN 10226] with foam facing[1] | | 4 | | | |
| R 1" [(BSPT), EN 10226] with PTFE facing[2] | | 5 | | | |
| **Cable length** | | | | | |
| 5 m (16.40 ft) | | | B | | |
| 10 m (32.81 ft) | | | C | | |
| 30 m (98.43 ft) | | | E | | |
| 50 m (164.04 ft) | | | F | | |
| 100 m (328.08 ft) | | | K | | |
| **Mounting flange** | | | | | |
| None | | | | A | |
| 6" ASME, 150 lb, flat faced | | | | D | |
| 8" ASME, 150 lb, flat faced | | | | E | |
| DN 150, PN 10/16, Type A, flat faced | | | | J | |
| DN 200, PN 10, Type A, flat faced | | | | K | |
| JIS10K 6B | | | | N | |
| JIS10K 8B<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.) | | | | P | |
| **Approvals** | | | | | |
| ATEX II 2GD Ex mb IIC T4 Gb,<br>ATEX II 2GD Ex tb IIIC T135°C Db,<br>Ta = -40°C to +95°C;<br>UKEX II 2GD Ex mb IIC T4 Gb,<br>UKEX II 2GD Ex tb IIIC T135°C Db,<br>Ta = -40°C to +95°C;<br>IECEx SIR 13.0009X Ex mb IIC T4 Gb<br>IECEx SIR 13.0009X Ex tb IIIC T135°C Db,<br>Ta = -40°C to +95°C;<br>FM Class I, Div. 2, Groups A, B, C, D;<br>FM Class II, Div. 1, Groups E, F, G;<br>FM Class III | | | | | 3 | |
| CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III [3] | | | | | 4 | |

[1] Not available with flanged versions.
[2] Available with flanged versions only.
[3] Available with mounting options 0 ... 2 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text | **Y15** |

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## Selection and ordering data (continued)

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors | **7ML1930-1BJ** |
| Submergence shield kit | **7ML1830-1BJ** |
| Universal box bracket, mounting kit | **7ML1830-1BK** |
| Channel bracket, wall mount | **7ML1830-1BL** |
| Extended channel bracket, wall mount | **7ML1830-1BM** |

| Selection and ordering data | Article No. |
|---|---|
| Channel bracket, floor mount | **7ML1830-1BN** |
| Extended channel bracket, floor mount | **7ML1830-1BP** |
| Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| 1" BSP locknut, flanged, plastic | **7ML1830-1DN** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |

| **EchoMax XPS-15F Ultrasonic level transducer Continuous, non-contact, 15 m (49.21 ft), for liquids and solids.** | **Article No. 7ML1171-** ● | ● | ● | ● | **0** |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Mounting thread and facing** | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 1 | | | |
| **Cable length** | | | | | |
| 5 m (16.40 ft) | | | B | | |
| 10 m (32.81 ft) | | | C | | |
| 30 m (98.43 ft) | | | D | | |
| 50 m (164.04 ft) | | | E | | |
| 100 m (328.08 ft) | | | F | | |
| **Mounting flange, flush mount** | | | | | |
| None | | | | A | |
| 6" ASME, 150 lb, flat faced | | | | B | |
| 8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.) | | | | C | |
| **Approvals** | | | | | |
| FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III | | | | | 1 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text | **Y15** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors | **7ML1930-1BJ** |
| Submergence shield kit | **7ML1830-1BJ** |
| Universal box bracket, mounting kit | **7ML1830-1BK** |
| Channel bracket, wall mount | **7ML1830-1BL** |
| Extended channel bracket, wall mount | **7ML1830-1BM** |
| Channel bracket, floor mount | **7ML1830-1BN** |
| Extended channel bracket, floor mount | **7ML1830-1BP** |
| Bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |

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## Selection and ordering data (continued)

| Selection and ordering data | Article No. |
|---|---|
| 1" NPT locknut, plastic | 7ML1830-1DS |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | 7ML1830-1AQ |
| Easy Aimer 304, NPT with 1" stainless steel coupling | 7ML1830-1AU |

| EchoMax XPS-30 Ultrasonic level transducer<br>Continuous, non-contact, 30 m (98.42 ft) for liquids and solids. | Article No.<br>7ML1123- | ● | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Mounting thread and facing** | | | | | | |
| 1½" universal thread | | 0 | | | | |
| 1½" universal thread, foam facing[1] | | 1 | | | | |
| 1½" universal thread, PTFE facing[2] | | 2 | | | | |
| **Cable length** | | | | | | |
| 5 m (16.40 ft) | | | B | | | |
| 10 m (32.81 ft) | | | C | | | |
| 30 m (98.43 ft) | | | E | | | |
| 50 m (164.04 ft) | | | F | | | |
| 100 m (328.08 ft) | | | K | | | |
| **Mounting flange** | | | | | | |
| None | | | | A | | |
| 6" ASME, 150 lb, flat faced | | | | D | | |
| 8" ASME, 150 lb, flat faced | | | | E | | |
| DN 150, PN 10/16, Type A, flat faced | | | | J | | |
| DN 200, PN 10, Type A, flat faced | | | | K | | |
| JIS10K 6B | | | | N | | |
| JIS10K 8B<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.) | | | | P | | |
| **Approvals** | | | | | | |
| ATEX II 1D, 2G Ex mb IIC T4 Gb,<br>ATEX II 1D, 2G Ex tb IIIC T135°C Da,<br>Ta = -40°C to +95°C;<br>UKEX II 1D, 2G Ex mb IIC T4 Gb,<br>UKEX II 1D, 2G Ex tb IIIC T135°C Da,<br>Ta = -40°C to +95°C;<br>IECEx SIR 13.0009X Ex mb IIC T4 Gb,<br>IECEx SIR 13.0009X Ex tb IIIC T135°C Da,<br>Ta = -40°C to +95°C | | | | | 5 | |

[1] Not available with flanged versions.
[2] Available with flanged versions only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors | 7ML1930-1BJ |
| 1½" BSPT locknut, plastic | 7ML1830-1DP |
| Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling | 7ML1830-1AN |
| Easy Aimer 304, NPT with 1½" stainless steel coupling | 7ML1830-1AT |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | 7ML1830-1AX |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | 7ML1830-1GN |
| Adapter 1½" BSP | 7ML1830-1EB |

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## Selection and ordering data (continued)

| EchoMax XPS-30C Ultrasonic level transducer<br>Continuous, non-contact, 30 m (98.42 ft) for liquids and solids. | Article No.<br>7ML1155- | ● | ● | ● | ● | 1 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Mounting thread and facing** | | | | | | |
| 1½" universal thread | | 0 | | | | |
| 1½" universal thread, foam facing[1] | | 1 | | | | |
| 1½" universal thread, PTFE facing[2] | | 2 | | | | |
| **Cable length** | | | | | | |
| 5 m (16.40 ft) | | | B | | | |
| 10 m (32.81 ft) | | | C | | | |
| 30 m (98.43 ft) | | | E | | | |
| 50 m (164.04 ft) | | | F | | | |
| 100 m (328.08 ft) | | | K | | | |
| **Mounting flange** | | | | | | |
| None | | | | A | | |
| 6" ASME, 150 lb, flat faced | | | | D | | |
| 8" ASME, 150 lb, flat faced | | | | E | | |
| DN 150, PN 10/16, Type A, flat faced | | | | J | | |
| DN 200, PN 10, Type A, flat faced | | | | K | | |
| JIS10K 6B | | | | N | | |
| JIS10K 8B<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.) | | | | P | | |
| **Approvals** | | | | | | |
| CSA, Class I, Div. 2, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III | | | | | 4 | |

[1] Not available with flanged version.
[2] Available for flanged versions only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling | **7ML1830-1AN** |
| Easy Aimer 304, NPT with 1½" stainless steel coupling | **7ML1830-1AT** |
| 1½" BSPT locknut, plastic | **7ML1830-1DP** |
| Adapter 1½" BSP | **7ML1830-1EB** |

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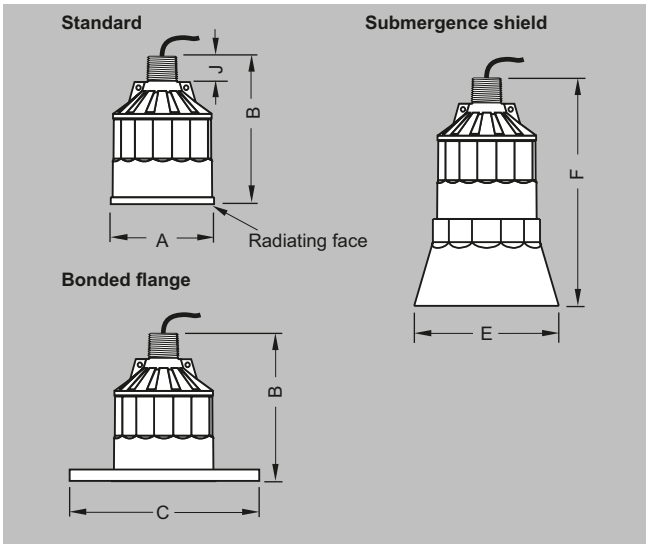
## Technical specifications

| Input | XPS-10 | XPS-15 (standard and F models) | XPS-30 |
|---|---|---|---|
| Measuring range[1)] | 0.3 ... 10 m (1 ... 33 ft) | ***Standard:***<br>0.3 ... 15 m (1 ... 50 ft)<br>XPS-15F:<br>0.45 ... 15 m (1.5 ... 50 ft) | 0.6 ... 30 m (2 ... 100 ft) |
| **Output** | | | |
| Frequency | 44 kHz | 44 kHz | 30 kHz |
| Beam angle | 12° | 6° | 6° |
| **Environmental** | | | |
| Location | Indoors/outdoors | Indoors/outdoors | Indoors/outdoors |
| Ambient temperature | -40 ... +95 °C (-40 ... +203 °F) | ***Standard:***<br>-40 ... +95 °C (-40 ... +203 °F)<br>***XPS-15F:***<br>-20 ... +95 °C (-4 ... +203 °F) | -40 ... +95 °C (-40 ... +203 °F) |
| Storage temperature | -40 ... +95 °C (-40 ... +203 °F) | ***Standard:***<br>-40 ... +95 °C (-40 ... +203 °F)<br>***XPS-15F:***<br>-20 ... +95 °C (-4 ... +203 °F) | -40 ... +95 °C (-40 ... +203 °F) |
| Pollution degree | 4 | 4 | 4 |
| Pressure | 8 bar g (120 psi g)<br>Flanged:<br>0.5 bar g (7.25 psi g) | 8 bar g (120 psi g)<br>Flanged:<br>0.5 bar g (7.25 psi g) | 0.5 bar g (7.25 psi g)<br>Flanged:<br>0.5 bar g (7.25 psi g) |
| **Design** | | | |
| Weight | 0.8 kg<br>(1.8 lb) | 1.3 kg (2.8 lb)<br>Flanged:<br>2 kg (4.4 lb) | 4.3 kg<br>(9.5 lb) |
| Power supply | Operation of transducer only with approved Siemens controllers | Operation of transducer only with approved Siemens controllers | Operation of transducer only with approved Siemens controllers |
| Material | Standard: PVDF<br>Flanged: PVDF with CPVC flange<br>Option: PTFE face with CPVC flange | Standard: PVDF<br>Flanged: PVDF with CPVC flange<br>Option: PTFE face with CPVC flange | Standard: PVDF<br>Flanged: PVDF with CPVC flange<br>Option: PTFE face with CPVC flange |
| Color | Blue | Standard: Blue<br>XPS-15F: Gray | Blue |
| Process connection | 1" NPT or 1" BSPT | Standard: 1" NPT or 1" BSPT<br>XPS-15F: 1" NPT | 1.5" universal thread (NPT or BSPT) |
| Degree of protection | IP66/68 | IP66/68 | IP66/68 |
| Cable | 2-wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) PVC jacket | 2-wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) PVC jacket | 2-wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) PVC jacket |
| Separation | Max. 365 m (1 200 ft) | Max. 365 m (1 200 ft) | Max. 365 m (1 200 ft) |
| **Certificates and approvals** | Standard:<br>CE, UKCA, CSA, FM, ATEX, UKEX, IECEx | Standard:<br>CE, UKCA, CSA, FM, ATEX, UKEX, IECEx<br>XPS-15F:<br>FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III | CE, UKCA, CSA, FM, ATEX, UKEX, IECEx |

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## Dimensional drawings




XPS ultrasonic transducer

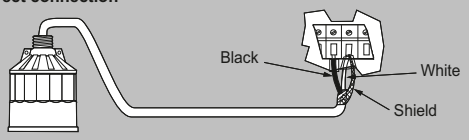
| Version<br>Dimension | XPS-10 | XPS-15 | XPS-30 |
|---|---|---|---|
| A | 88 mm<br>(3.464 inch) | 121 mm<br>(4.764 inch) | 175 mm<br>(6.890 inch) |
| B | 122 mm<br>(4.803 inch) | 132 mm<br>(5.197 inch) | 198 mm<br>(7.795 inch) |
| C | According to ASME, DIN, and JIS | According to ASME, DIN, and JIS | According to ASME, DIN, and JIS |
| E | 124 mm<br>(4.882 inch) | 158 mm<br>(6.220 inch) | n/a |
| F | 152 mm<br>(5.984 inch) | 198 mm<br>(7.795 inch) | n/a |
| J | 28 mm (1.1 inch) | 28 mm (1.1 inch) | 28 mm (1.1 inch) |

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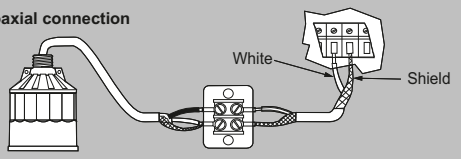


## Circuit diagrams

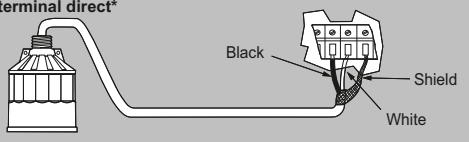
**Direct connection**



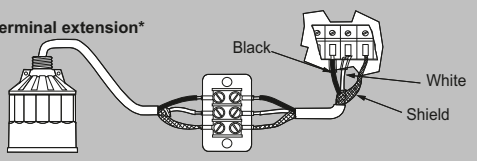

**Coaxial connection**




**3 terminal direct***




**3 terminal extension***




* For SITRANS LT500, SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

**Mounting**
Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, an Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

**Interconnection**
Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS ultrasonic transducer connections

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## Overview

***Accessories for ultrasonic transducers***

- EA aiming devices
- FMS mounting brackets
- TS-3 temperature sensor

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## Application

***EA 304 aiming device***

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens level sensors used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

***EA 2 aiming device***

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens level sensors.

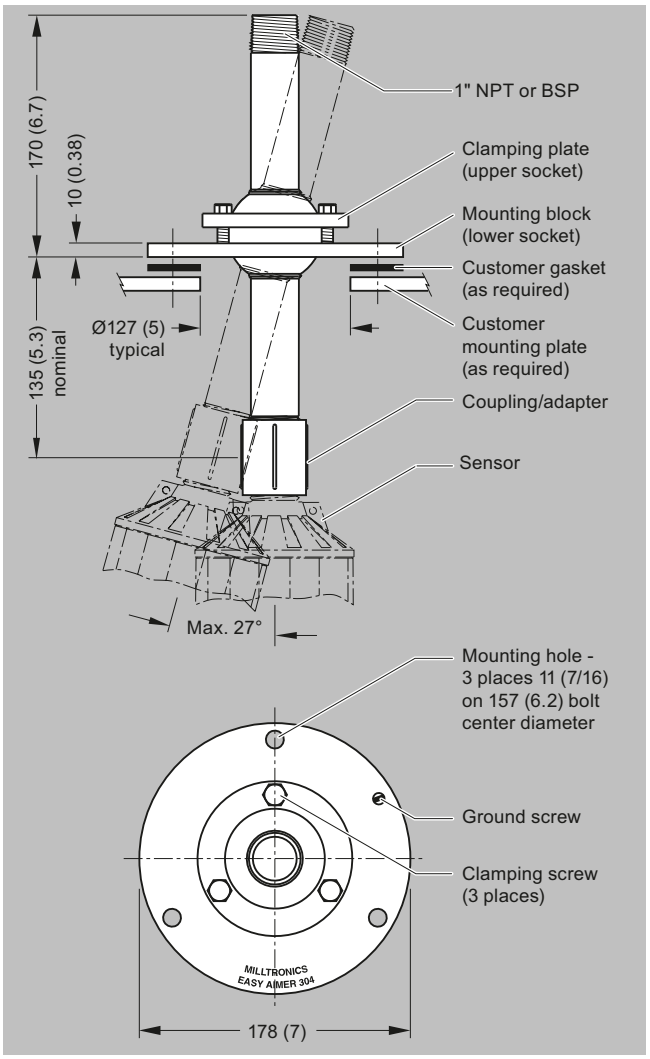
The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

## Selection and ordering data

| **Easy aimer**<br>**Used on solids applications to aim level sensors for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.** | **Article No.** |
|---|---|
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Easy Aimer 2, aluminum, BSPT conduit | **7ML1830-1AL** |
| Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling[1)] | **7ML1830-1AN** |
| Easy Aimer 2, aluminum, NPT with 1" galvanized coupling | **7ML1830-1AP** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 304, BSPT conduit | **7ML1830-1AS** |
| Easy Aimer 304, NPT with 1½" stainless steel coupling[1)] | **7ML1830-1AT** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

1) For use with XPS-30 transducers only.

## Dimensional drawings

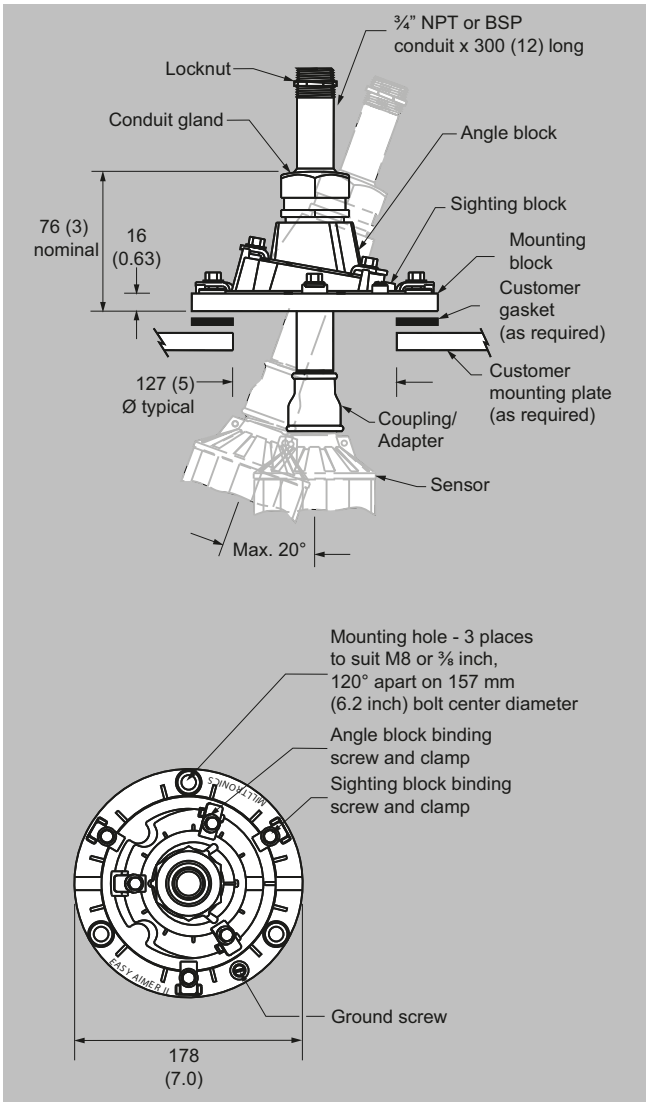



EA 304 aiming device, dimensions in mm (inch)

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## Dimensional drawings (continued)




EA 2 aiming device, dimensions in mm (inch)

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## Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

***FMS-200***
***universal box bracket system***

Mounting of units with 1 inch or 2 inch threaded connection.

Distance from sensor to wall or beam: 20 ... 31 cm (8 ... 12 inch).

The unique box design also acts as a sun shield for transducers with 1 inch threaded connections.

***FMS-210***
***wall mounting set***

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 12 ... 48 cm (5 ... 19 inch).

***FMS-220***
***extended wall mounting set***

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 32 ... 98 cm (13 ... 39 inch).

***FMS-310***
***floor mounting set***

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 5 ... 57 cm (2 ... 22 inch).

***FMS-320***
***extended floor mounting set***

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 41 ... 108 cm (16 ... 43 inch).

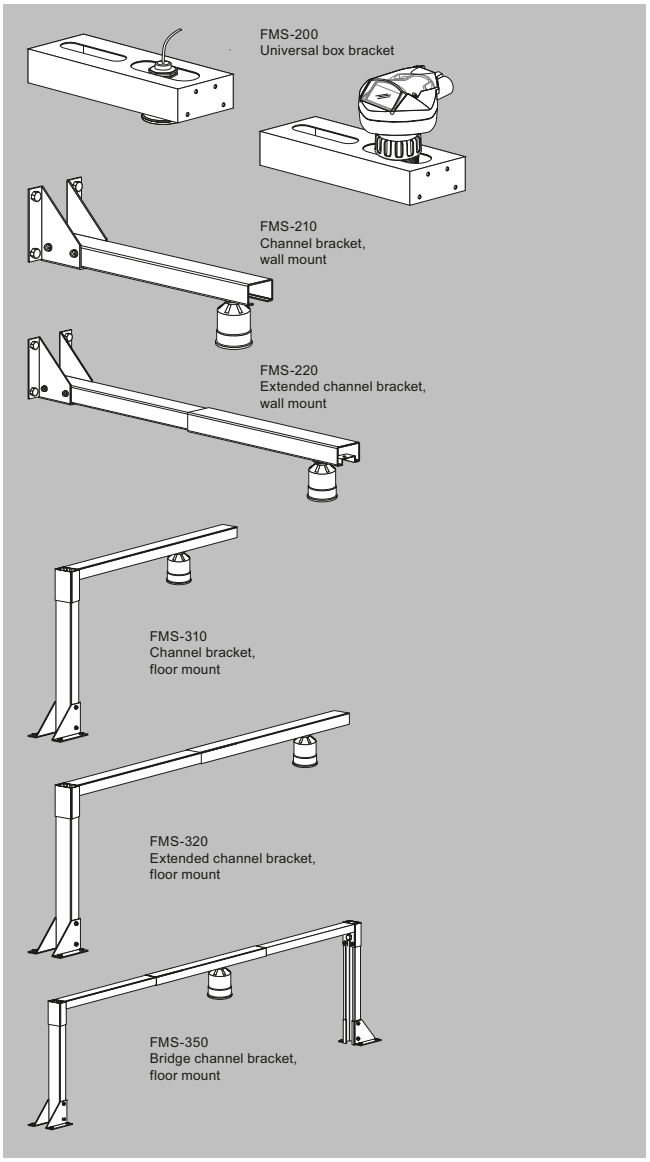
***FMS-350***
***floor mounting set, bridge***

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch), anywhere along the complete width of the bridge [166 cm (65 inch)].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

## Integration




FMS mounting brackets

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## Selection and ordering data

| Selection and Ordering data | Article No. |
|---|---|
| Mounting brackets for XPS-10 sensors | |
| FMS-200 universal box bracket set | **7ML1830-1BK** |
| FMS-210 wall mounting set | **7ML1830-1BL** |
| FMS-220 extended wall mounting set | **7ML1830-1BM** |
| FMS-310 floor mounting set | **7ML1830-1BN** |
| FMS-320 extended floor mounting set | **7ML1830-1BP** |
| FMS-350 floor mounting set, bridge | **7ML1830-1BQ** |
| **Additional Operating Instructions** | |
| FMS-200 | **7ML1998BK61** |
| FMS-210 | **7ML19985BL61** |
| FMS-220 | **7ML19985BM61** |
| FMS-310 | **7ML19985BN61** |
| FMS-320 | **7ML19985BP61** |
| FMS-350<br>Note: The Operating Instructions should be ordered as a separate line item on the order.<br>All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | **7ML19985BQ61** |

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## Overview



The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

## Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

## Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

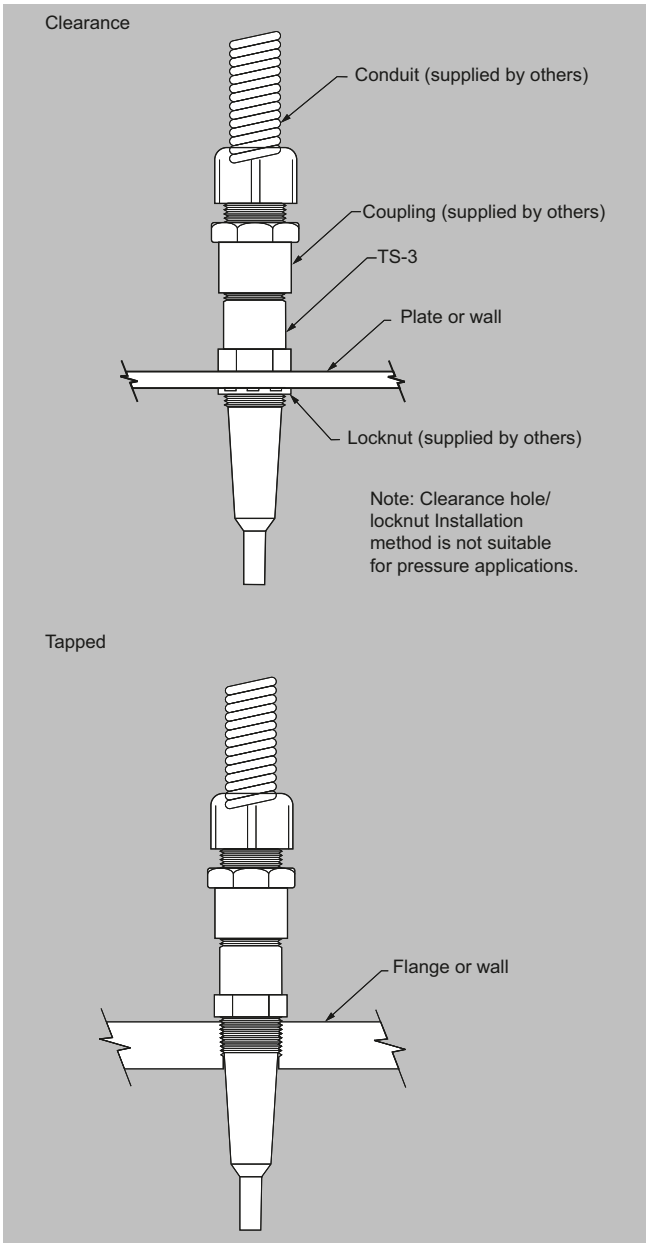
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

- Key Applications: for use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

## Design




TS-3 temperature sensor

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## Selection and ordering data

| TS-3 Temperature sensor<br>Continuous, non-contact, sensor for use with ultrasonic level controllers. | Article No.<br>7ML1813- ● | ● | B | ● |
|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | |
| **Cable length** | | | | |
| 1 m (3.28 ft) | | 1 | | |
| 5 m (16.40 ft) | | 2 | | |
| 10 m (32.81 ft) | | 3 | | |
| 30 m (98.43 ft) | | 4 | | |
| 50 m (164.04 ft) | | 5 | | |
| 70 m (229.66 ft) | | 6 | | |
| 90 m (295.28 ft) | | 7 | | |
| **Process connection** | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | | A | |
| R ¾" [(BSPT), EN 10226] | | | B | |
| **Approvals** | | | | |
| CSA Class I, Groups A, B, C and D; Class II, Groups E, F and G; Class III; T3C, FM<br>Class I, Div. 1 Groups C and D; Class II, Div. 1 Groups E, F and G; Class III FM | | | | 3 |
| CE, UKCA, ATEX/IEC ExUKEX II 2 G Ex mb IIC T4 GbTa = -40 °C to +100 °C, EAC Ex | | | | 4 |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| ¾" NPT locknut, aluminum | **7ML1930-1BE** |
| Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch) for fastening on sensors | **7ML1930-1BJ** |

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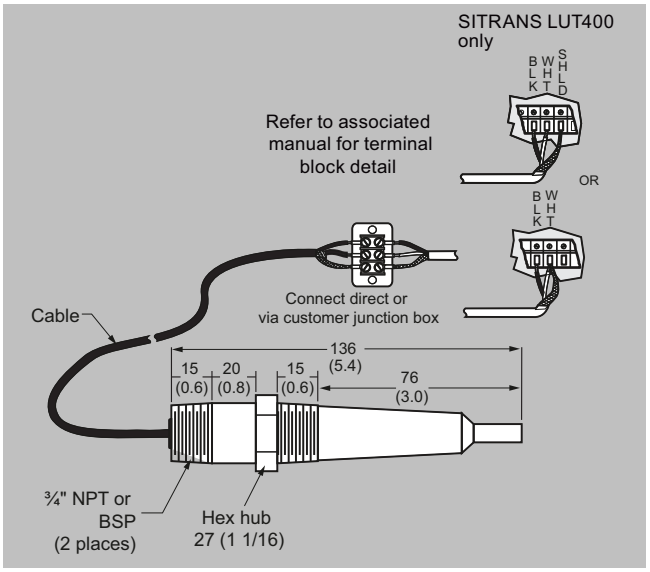


## Technical specifications

| TS-3 temperature sensor | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Temperature sensor |
| **Input** | |
| Measuring range | -40 ... +100 °C (-40 ... +212 °F) |
| **Output** | |
| Response time | |
| • Forced circulation (temperature variation: 63 %) | 55 s |
| • Flange, forced circulation | 90 s |
| • Natural convection | 150 s |
| **Rated operating conditions** | |
| Installation instructions | Mounted indoors/outdoors, but not exposed to direct sunlight |
| Pressure | Max. 4 bar (60 psi/400 kPa) |
| **Design** | |
| Material (enclosure) | ETFE[1)] |
| Cable connection | 2-core, 0.5 mm² (20 AWG), shielded, silicone sheath |
| Process connection | ¾" NPT [(Taper), ASME B1.20.1] R ¾" [(BSPT), EN 10226], totally encapsulated |
| **Certificates and approvals** | CE, UKCA, ATEX, UKEX, IECEx, CSA, FM |

1) ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

## Dimensional drawings




TS-3 temperature sensor, dimensions in mm (inch)

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## Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS LR100 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

SITRANS LR110 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft).

SITRANS LR120 is a compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft).

SITRANS LR140 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

SITRANS LR150 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft), with optional HMI.

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence, to a range of 20 m (65 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids, up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature applications.

SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids, to a range of 100 m (328 ft). It is easy to install, plug and play, and there is virtually no maintenance.

***Auto False-Echo Suppression***

SITRANS LR instruments offer the unique advantage of Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

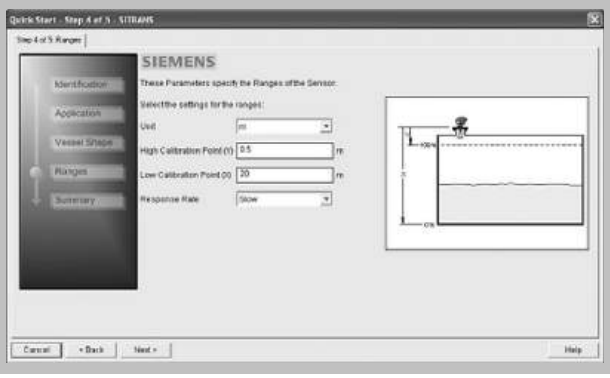
A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART or PROFIBUS PA.

## Overview (continued)



Local display interface – graphically displays echo profiles and diagnostic information (available with LR200, LR250, and LR560)

Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup



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## Mode of operation

***Principle of Operation***

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 78 GHz.

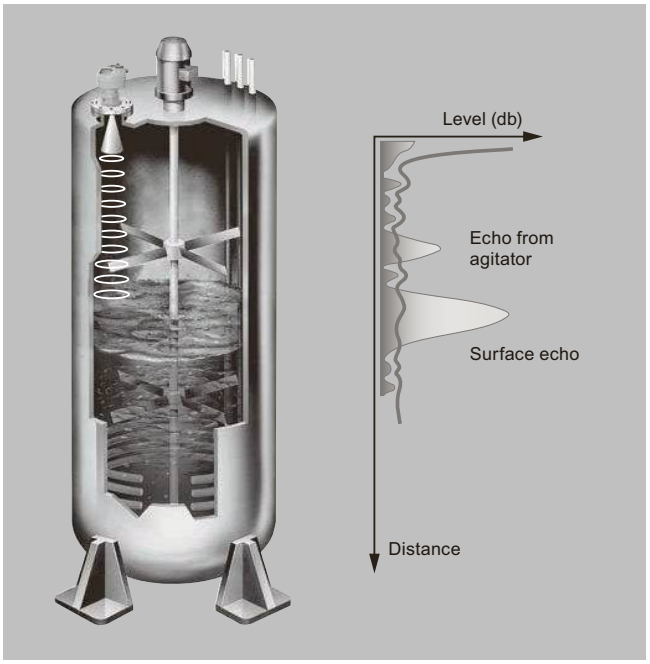
Siemens offers pulse radar transmitters (SITRANS LR200, SITRANS LR250) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR100, SITRANS LR110, SITRANS LR120, SITRANS LR140, SITRANS LR150, SITRANS LR460, SITRANS LR560).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored).

The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.




Radar operation in a reactor vessel

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## Technical specifications

### *Radar Selection Guide*

| Criteria | SITRANS LR100 | SITRANS LR110 | SITRANS LR120 | SITRANS LR140 | SITRANS LR150 | SITRANS LR200 | SITRANS LR250 | SITRANS LR460 | SITRANS LR560 |
|---|---|---|---|---|---|---|---|---|---|
| **Typical industries** | Chemicals, petrochemicals, mining, food and beverage | Chemicals, petrochemicals, mining, food and beverage | Chemicals, petrochemicals, mining, food and beverage | Chemicals, petrochemicals, mining, food and beverage | Chemicals, petrochemicals, mining, food and beverage | Chemicals, petrochemicals, aluminum, wastewater | Chemicals, petrochemicals, oil and gas, mining, marine, food and beverage, pharmaceutical | Cement, power generation, food processing, mineral processing, mining | Cement, chemical, power generation, grain, food processing, mineral processing, mining |
| **Typical applications** | Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates | Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates | Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates | Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates | Liquid storage vessels, non-intrusively through plastic tanks, chemicals, aggregates | Liquids, process vessels with agitators, buildup, high temperatures | Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media, crude oil produced water | Cement, fly ash, grain, coal, flour, plastics | Cement, fly ash, chemical fertilizer, grain, coal, flour, plastics, environmental water level monitoring |
| **Range** | 0 ... 8 m (0 ... 26 ft) | 0 ... 15 m (0 ... 49.2 ft) | 0 ... 30 m (0 ... 98.4 ft) | 8 m (26.2 ft) | 15 m (49.2 ft) | 0.4 ... 20 m (1.3 ... 65 ft) | 50 mm (2 inch) from end of horn to 20 m (65 ft), horn dependent | 100 m (328 ft) | 40 m (131 ft) 100 m (328 ft) |
| **Frequency** | 80 GHz nominal | 80 GHz nominal | 80 GHz nominal | 80 GHz nominal | 80 GHz nominal | 6.3 GHz | K-band (25.0 GHz) | 24 ... 25 GHz FMCW | 78 ... 79 GHz |
| **Performance accuracy** | ± 5 mm | ± 2 mm | ± 2 mm | 5 mm | 2 mm | 0.1 % of range or 10 mm (0.4 inch) | ≤ 3 mm (0.118 inch) | 0.25 % | 5 mm (0.2 inch) |
| **Temperature** | Ambient: -40 ... +60 °C (-40 ... +140 °F) Process: -40 ... +60 °C (-40 ... +140 °F) | Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F) | Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F) | Ambient: -40 ... +60 °C (-40 ... +140 °F) Process: -40 ... +60 °C (-40 ... +140 °F) | Ambient: -40 ... +70 °C (-40 ...+158 °F) Process: -40 ... +80 °C (-40 ... +176 °F) | Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type | Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type | Ambient: 65 °C (149 °F) Process: 200 °C (392 °F) | Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +100 °C (-40 ... 212 °F) Optional: 200 °C (392 °F) |
| **Output/communications/remote configuration and diagnostics** | • 4 ... 20 mA<br>• SITRANS mobile IQ | • 4 ... 20 mA/HART<br>• Modbus RTU<br>• SITRANS mobile IQ<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM/-FDT for PACTware, Fieldcare | • 4 ... 20 mA/HART<br>• Modbus RTU<br>• SITRANS mobile IQ<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM/FDT for PACTware, Fieldcare | • 4 ... 20 mA<br>• SITRANS mobile IQ | • 4 ... 20 mA/HART<br>• SITRANS mobile IQ<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM-/FDT for PACTware, Fieldcare | • 4 20 mA/HART<br>• PROFIBUS PA<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM/FDT for PACTware, Fieldcare, etc. | • 4 ... 20 mA/HART<br>• PROFIBUS PA<br>• FOUNDATION Fieldbus<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM/FDT for PACTware, Fieldcare, etc. | • 4 ... 20 mA/HART<br>• PROFIBUS PA<br>• SIMATIC PDM | • 4 ... 20 mA/HART<br>• PROFIBUS PA<br>• SIMATIC PDM<br>• AMS<br>• SITRANS DTM/FDT for PACTware, Fieldcare, etc. |
| **Power** | • 12 ... 35 V DC<br>• Loop powered | HART:<br>• 12 ... 35 V DC<br>• Loop powered<br>Modbus:<br>• 8 ... 30 V DC<br>• Loop powered | HART:<br>• 12 ... 35 V DC<br>• Loop powered<br>Modbus:<br>• 12 ... 35 V DC<br>• Loop powered | • 12 ... 35 V DC<br>• Loop powered | HART:<br>• 12 ... 35 V DC<br>• Loop powered | • 24 V DC nominal<br>• Loop powered | • 24 V DC nominal<br>• Loop powered | • 100 ... 230 V AC, ± 15 %, 50/60 Hz, 6 W<br>• 24 V DC, +25/-20 %, 6 W | • 24 V DC nominal<br>• Loop powered |
| **Approvals** | General Purpose CE, CSA, FM, RCM | Hazardous ATEX, IECEx, CE, CSA, FM, RCM | Hazardous ATEX, IECEx, CE, CSA, FM, RCM | General purpose CE, CSA, FM, RCM | Hazardous ATEX, IECEx, CE, CSA, FM, RCM | CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, ANZEx, TIIS, NEPSI | CE, RCM, Lloyds Register of Shipping, ABS, BV, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, EAC, IECEx, TIIS, NEPSI Functional safety SIL-2, EHEDG, 3-A, USP Class VI | CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, EAC | CE, RCM, FCC, Industry Canada, RED ATEX, CSA, FM, INMETRO, IECEx, NEPSI, EAC |

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## Overview




SITRANS LR100 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

## Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ
- Chemically resistant PVDF enclosure
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications
- Approved for open air applications outside of a tank
- Compact design fits in limited space installations

## Application

SITRANS LR100 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered, it provides accurate level measurement to ranges of 8 m (26 ft). Measurement is possible non-intrusively through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

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## Selection and ordering data

| SITRANS LR100 Radar level transmitter<br>Continuous, non-contact, 8 m (26 ft) range, for liquids and slurries, 8 m (26 ft) integrated cable connection. | Article No.<br>7ML530 7 - 1 A ● 0 6 - 0 A A 0 |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Process connection** | |
| 1-½" NPT [(Taper), ASME B1.20.1]/electrical connection 1" NPT | A |
| R 1-½" [(BSPT), EN 10226]/electrical connection 1" BSPT | B |
| G 1-½" [(BSPP), EN ISO 228-1]/electrical connection 1" BSPT | C |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301 | **Y15** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Bracket, 316L stainless steel,1 inch mount, 80 mm (3.1 inch) offset | **A5E50507509** |
| Bracket, 316L stainless steel,1 inch mount, 200 mm (7.9 inch) offset | **A5E50507511** |
| Bracket, 316 L stainlsess steel, 1.5 inch mount, 80 mm (3.1 inch) offset | **A5E50507514** |
| Bracket, 316 L stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | **A5E50507516** |

| Accessories | Article No. |
|---|---|
| FMS-200 universal box bracket, mounting kit | **7ML1830-1BK** |
| FMS-210 channel bracket, wall mount | **7ML1830-1BL** |
| FMS-220 extended channel bracket, wall mount | **7ML1830-1BM** |
| FMS-310 channel bracket, floor mount | **7ML1830-1BN** |
| FMS-320 extended channel bracket, floor mount | **7ML1830-1BP** |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| 1-½ BSP locknut, plastic | **7ML1830-1DP** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |
| SIMATIC RTU3010C compact, remote data manager with alarming | **6NH3112-0BA00-0-XX0** |
| SIMATIC RTU3030C compact, remote data manager with alarming | **6NH3112-3BA00-0-XX0** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

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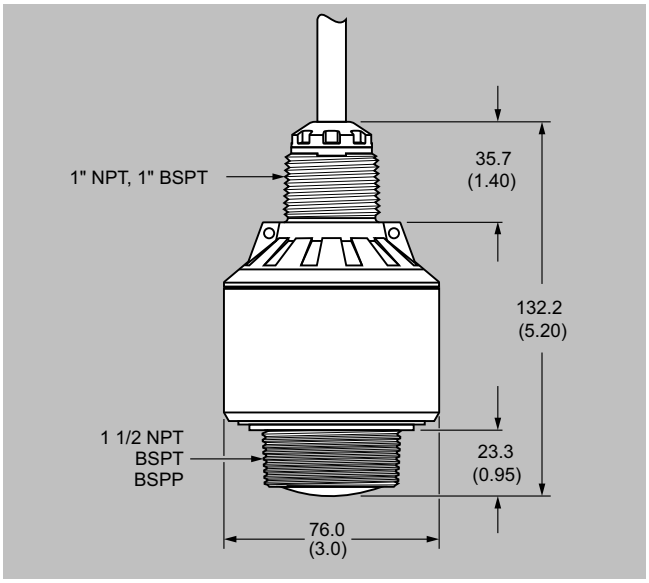
## Technical specifications

| SITRANS LR100 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 8 m (0 ... 26 ft) |
| Frequency | 80 GHz nominal |
| Beam angle | 8° |
| **Power Supply** | |
| Voltage | 12 ... 35 V DC |
| Current | 4 ... 20 mA |
| **Accuracy** | ± 5 mm |
| **Rated operating conditions** | |
| Vessel pressure | -1 ... +3 bar (14.50 ... 43.51 psi g) |
| Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Process temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | 0.5 kg (1.1 lb),<br>plus 0.1 kg/m (0.2 lb/ft) cable length |
| Material (enclosure) | PVDF |
| Process connection | 1-½" NPT, 1-½" BSPT, or 1-½" BSPP |
| Degree of protection | IP66/IP68 |
| Cable connection | • 8 m (26 ft) long, 2 conductor, twisted with shield 18 AWG, PVC jacket<br>• 1" NPT or 1" BSPT threaded connection |
| **Certificates and approvals** | |
| General | Ordinary locations, CE, $_{C}FM_{US}$, $_{C}CSA_{US}$, RCM, EAC |
| Radio | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Canadian Registration Number (CRN) | |
| • British Columbia | 0F22218.51 |
| • Alberta | 0F20596.2 |
| • Saskatchewan | 0F2002.3 |
| • Manitoba | 0F7032.4 |
| • Ontario | 0F22218.5 |
| • Quebec | 0F05183.6 |
| • New Brunswick | 0F1490.07 |
| • Nova Scotia | 0F1490.08 |
| • Prince Edward Island | 0F1490.09 |
| • Newfoundland and Labrador | 0F1490.0 |
| • Yukon | 0F1490.0Y |
| • Northwest Territories | 0F1490.0T |
| • Nunavut | 0F1490.0N |
| **Programming** | |
| SITRANS mobile IQ App | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series.<br>For more information: http://www.siemens.com/mobileIQ |

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## Dimensional drawings

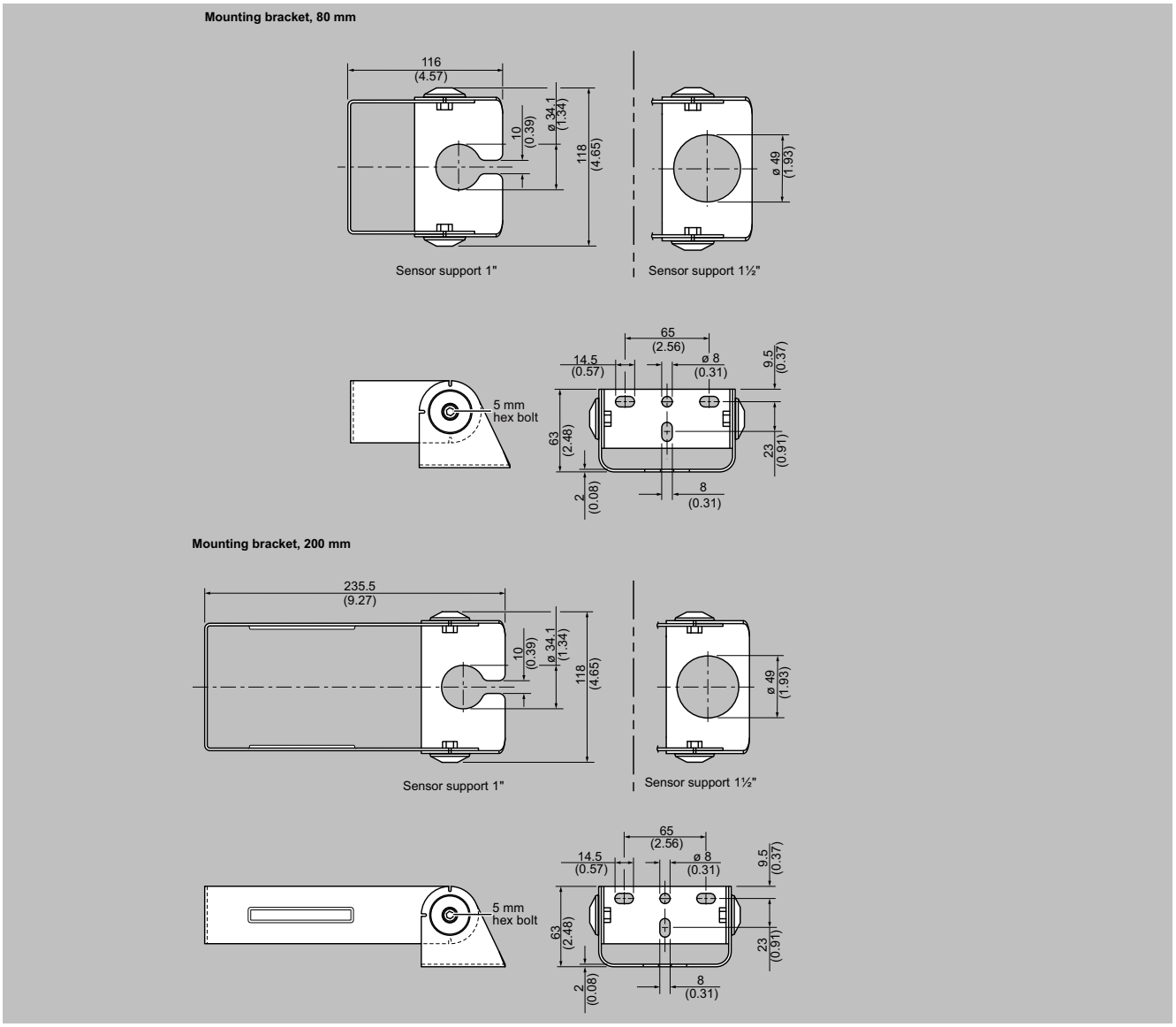



SITRANS LR100, dimensions in mm (inch)

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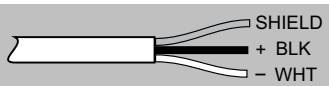


## Dimensional drawings (continued)




SITRANS LR100 mounting brackets, dimensions in mm (inch)

## Circuit diagrams




12 ... 35 V DC
4 ... 20 mA
Loop powered

SITRANS LR100 connections

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## Overview




SITRANS LR110 is a compact radar transmitter for continuous level measurement of liquids, slurries, or solids to a range of 15 m (49.2 ft).

## Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF enclosure.
- HART 7.0 or Modbus RTU communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Compact design fits in limited space installations.
- Hazardous area variants available for safe use in explosive gas or dust environments.

## Application

SITRANS LR110 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered with HART [optional 4-wire Modbus RTU], providing accurate level measurement to ranges of 15 m (49.2 ft). Measurement is possible non-intrusively through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

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## Selection and ordering data

| SITRANS LR110 Radar level transmitter<br>Continuous, non-contact, 15 m (49.2 ft) range, for liquids, slurries, or solids, integrated cable connection | Article No.<br>7ML531 | ● | - | ● | ● | ● | 0 | 6 | - | 0 | ● | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communications** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| Modbus RTU[4)6)] | | 3 | | | | | | | | | | | |
| **Bluetooth function** | | | | | | | | | | | | | |
| Without | | | | 0 | | | | | | | | | |
| With | | | | 1 | | | | | | | | | |
| **Cable length** | | | | | | | | | | | | | |
| 5 m | | | | | A | | | | | | | | |
| 10 m | | | | | B | | | | | | | | |
| 30 m | | | | | C | | | | | | | | |
| 50 m | | | | | D | | | | | | | | |
| 100 m | | | | | E | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| 1-½" NPT [(Taper), ASME B1.20.1]/electrical connection 1" NPT | | | | | | A | | | | | | | |
| R 1-½" [(BSPT), EN 10226]/electrical connection 1" BSPT | | | | | | B | | | | | | | |
| G 1-½" [(BSPP), EN ISO 228-1]/electrical connection 1" BSPT | | | | | | C | | | | | | | |
| **Type of protection** | | | | | | | | | | | | | |
| Non-Ex (ordinary locations) CE, $_{C}FM_{US}$, $_{C}CSA_{US}$, RCM[2)] | | | | | | | | | | | A | | |
| Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1) Dust Ex-Zone 20, 21, Class II & III Div. 1[1)] | | | | | | | | | | | B | | |
| Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1) Dust Ex-Zone 20, 21, Class II & III Div. 1[1)3)] | | | | | | | | | | | G | | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301 | **Y15** |
| Inspection certificate 3.1 (EN 10204) - device with test data | **C25** |
| $_{C}FM_{US}$, $_{C}CSA_{US}$, ATEX, UKEX, IECEx | **E49** |
| INMETRO, IA MASC | **E25** |
| NEPSI, CCOE | **E27** |
| ATEX, IECEx | **E47** |
| CSA-Japan-Ex | **E29** |
| EACEx[5)] | **E24** |
| WHG and VLAREM II | **E61** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |
| Bracket, 316L Stainless steel,1 inch mount, 80 mm (3.1 inch) offset | **A5E50507509** |

| Accessories | Article No. |
|---|---|
| Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset | **A5E50507511** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset | **A5E50507514** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | **A5E50507516** |
| FMS-200 universal box bracket, mounting kit | **7ML1830-1BK** |
| FMS-210 channel bracket, wall mount | **7ML1830-1BL** |
| FMS-220 extended channel bracket, wall mount | **7ML1830-1BM** |
| FMS-310 channel bracket, floor mount | **7ML1830-1BN** |
| FMS-320 extended channel bracket, floor mount | **7ML1830-1BP** |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| 1-½ BSP locknut, plastic | **7ML1830-1DP** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |
| SIMATIC RTU3010C compact, remote data manager with alarming | **6NH3112-0BA00-0-XX0** |
| SIMATIC RTU3030C compact, remote data manager with alarming | **6NH3112-3BA00-0-XX0** |
| Intrinsically Safe barrier | **7NG4124-1AA00** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries. | **7ML60..-.....-....** |
| For applicable back up point level switch - see point level measurement section | |

1) Must be ordered in combination with order codes E49, E25, E27, E47, E29, or E24.

2) Not available in combination with order codes E49, E25, E27, E47, E29, or E24.

3) When ordered in combination with NPT thread types, this option is available with any order code. When ordered in combination with BSPP or BSPT thread types, this option is only available with order codes E49, E25, E27, E47, E29.

4) Available only with Type of protection options A and G.

5) Available only with Type of protection option B.

6) Available only with Bluetooth option 1.

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## Technical specifications

| SITRANS LR110 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 15 m (0 ... 49.2 ft) |
| Frequency | 80 GHz nominal |
| Beam angle | 8° |
| **Power Supply** | |
| HART | |
| • Voltage | 12 ... 35 V DC |
| • Current | 4 ... 20 mA |
| Modbus | |
| • Voltage | 8 ... 30 V DC |
| • Current | 38 mA at 8 V DC/17 mA at 30 V DC |
| **Communications** | |
| 4 ... 20 mA | HART 7.0 |
| Modbus (4-wire option) | RTU |
| **Accuracy** | ± 2 mm (range 0.25 ... 015 m),<br>± 10 mm (range 0 ... 0.25 m) |
| **Rated operating conditions** | |
| Vessel pressure | -1 ... +3 bar (14.50 ... 43.51 psi g) |
| Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Process temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | 0.5 kg (1.1 lb),<br>plus 0.1 kg/m (0.2 lb/ft) cable length |
| Material (enclosure) | PVDF |
| Process connection | 1-½" NPT, 1-½" BSPT or 1-½" BSPP |
| Degree of protection | IP66/IP68 |
| Cable connection | 1" NPT or 1" BSPT threaded connection |
| • HART | Length options: 5 ... 100 m<br>(16.4 ... 328.1 ft), 2 conductor, twisted with shield 18 AWG, PVC jacket |
| • Modbus version | Length options: 5 ... 100 m<br>(16.4 ... 328.1 ft), 4 conductor, twisted pairs, 22 AWG, polyurethane jacket |
| **Certificates and approvals** | |
| | CE, $_{c}$FM$_{US}$, $_{c}$CSA$_{US}$, ATEX, IECEx, EACEx, CSA-Japan-Ex, RCM, INMETRO, NEPSI, CCOE, PESO, FDA/(EG)1935/2004 |
| Radio | CE, UKCA, FCC, IC, ANATEL, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC, ACB |
| Marine | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Water monitoring, flow | MCERTS Class 1 |
| Canadian Registration Number (CRN) | |
| • British Columbia | 0F22218.51 |
| • Alberta | 0F20596.2 |
| • Saskatchewan | 0F2002.3 |
| • Manitoba | 0F7032.4 |
| • Ontario | 0F22218.5 |
| • Quebec | 0F05183.6 |
| • New Brunswick | 0F1490.07 |
| • Nova Scotia | 0F1490.08 |
| • Prince Edward Island | 0F1490.09 |
| • Newfoundland and Labrador | 0F1490.0 |
| • Yukon | 0F1490.0Y |
| • Northwest Territories | 0F1490.0T |
| • Nunavut | 0F1490.0N |

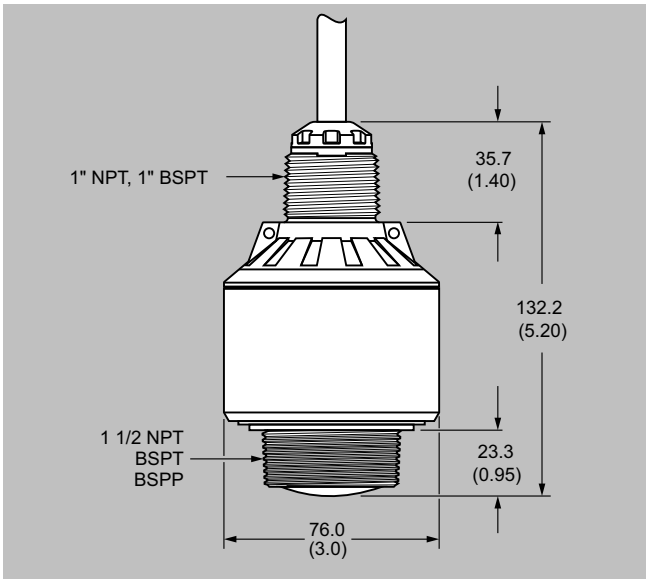
## Technical specifications (continued)

| SITRANS LR110 | |
|---|---|
| **Programming** | |
| SITRANS mobile IQ App | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series.<br>For more information: http://www.siemens.com/mobileIQ |
| SIMATIC PDM | SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network). |
| SITRANS DTM | |

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## Dimensional drawings

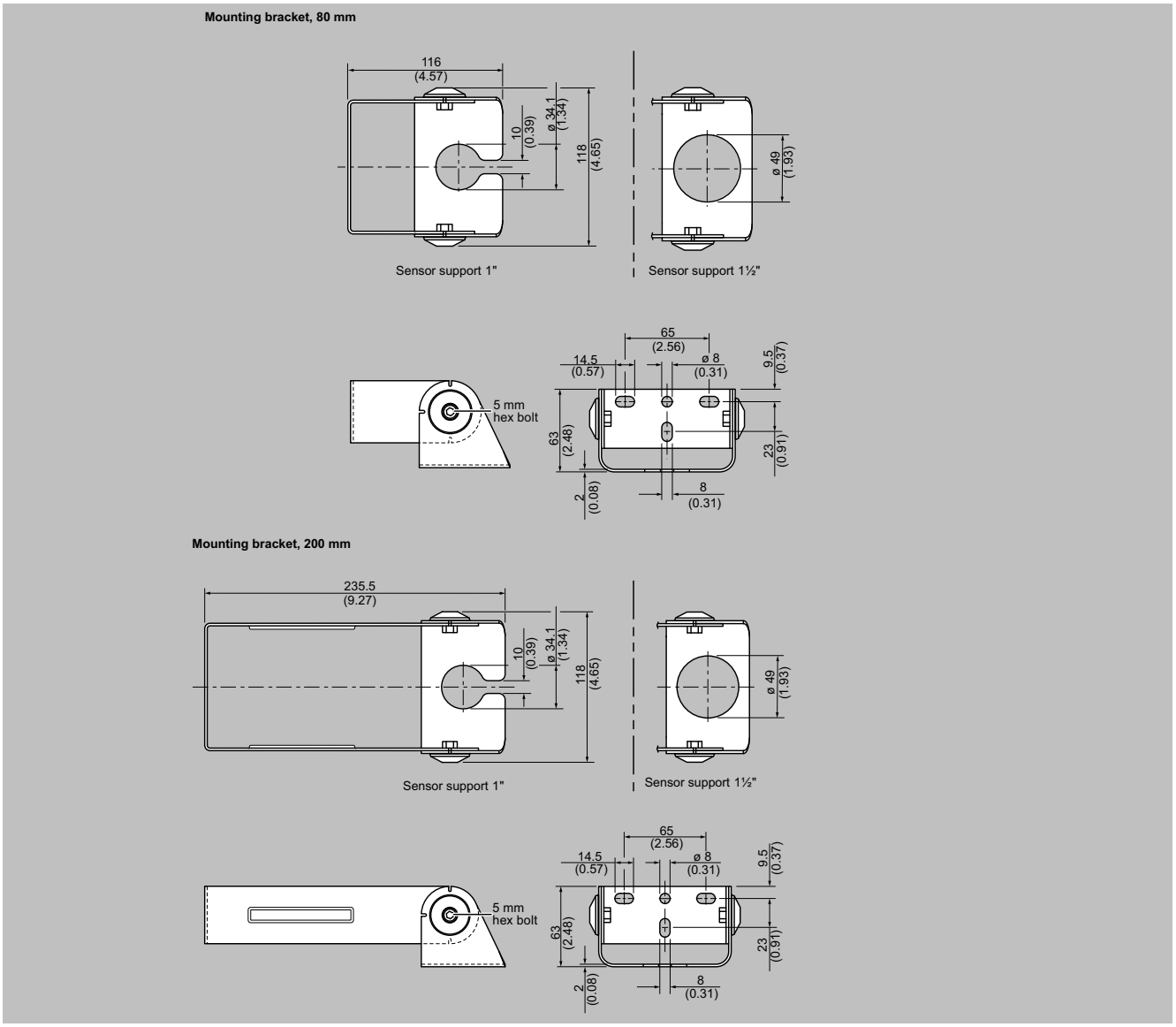



SITRANS LR110, dimensions in mm (inch)

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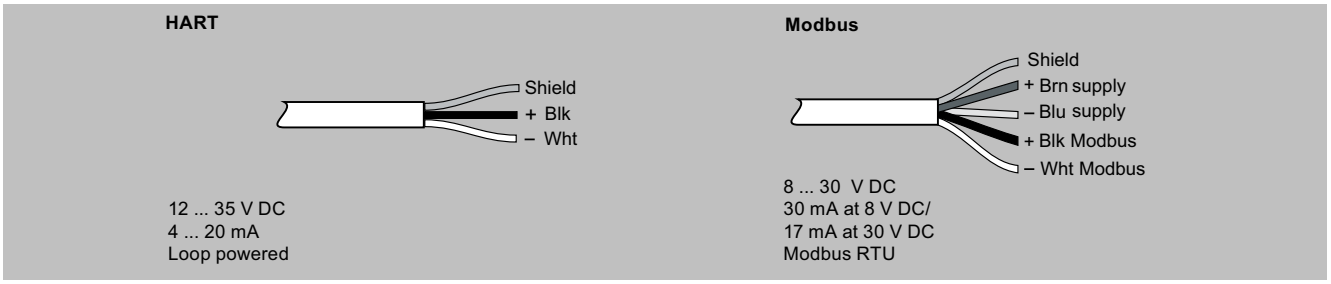


## Dimensional drawings (continued)




SITRANS LR110 mounting brackets, dimensions in mm (inch)

## Circuit diagrams




SITRANS LR110 connections

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## Overview




SITRANS LR120 is a compact radar transmitter for continuous level measurement of liquids and solids to a range of 30 m (98.4 ft).

## Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF enclosure.
- HART 7.0 or Modbus RTU communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in applications with obstructions.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Submergence shield accessory prevents build up on sensor during flooding conditions.
- Hazardous area variants available for safe use in explosive gas or dust environments.

## Application

SITRANS LR120 is a W band FMCW radar level transmitter, packaged in a hermetically sealed PVDF enclosure for years of trouble-free reliable measurement service.

4 to 20 mA loop powered with HART [optional 4-wire Modbus RTU], providing accurate level measurement to ranges of 30 m (98.4 ft). Its long range, narrow beam make LR120 suitable for wet wells with obstructions or solids level measurement, for example aggregates or plastic pellets. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

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## Selection and ordering data

| SITRANS LR120 Radar level transmitter<br>Continuous, non-contact, 30 m (98.4 ft) range, for liquids, slurries, and solids, integrated cable connection | Article No.<br>7ML532 | ● | - | ● | ● | A | 0 | 6 | - | 0 | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Communications** | | | | | | | | | | | | | |
| HART (4 ... 20 mA) | | 0 | | | | | | | | | | | |
| Modbus RTU[4)6)] | | 3 | | | | | | | | | | | |
| **Bluetooth function** | | | | | | | | | | | | | |
| Without | | | | 0 | | | | | | | | | |
| With | | | | 1 | | | | | | | | | |
| **Cable length** | | | | | | | | | | | | | |
| 5 m | | | | | A | | | | | | | | |
| 10 m | | | | | B | | | | | | | | |
| 30 m | | | | | C | | | | | | | | |
| 50 m | | | | | D | | | | | | | | |
| 100 m | | | | | E | | | | | | | | |
| **Type of protection** | | | | | | | | | | | | | |
| Non Ex (ordinary locations) $_{C}FM_{US}$, $_{C}CSA_{US}$, CE, RCM[2)] | | | | | | | | | | | A | | |
| Ex i (ia) (Gas Ex-Zone 0/Class I, Div. 1) Dust Ex-Zone 20, 21, Class II & III Div. 1[1)] | | | | | | | | | | | B | | |
| Ex ib mb, Ex ta, ta/tb, Zone 1, 1/2, Zone 20, 21, 22, (Class I, Div. 2), Class II & III, Div. 1[1)3)] | | | | | | | | | | | G | | |
| **Electrical connection of the cable entry** | | | | | | | | | | | | | |
| 1" BSPT | | | | | | | | | | | | H | |
| 1" NPT | | | | | | | | | | | | P | |

| Selection and ordering data | Order Code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301 | **Y15** |
| Inspection certificate 3.1 (EN 10204) - device with test data | **C25** |
| CFMUS, $_{C}CSA_{US}$, ATEX, IECEx | **E49** |
| INMETRO, IA MASC | **E25** |
| NEPSI, CCOE | **E27** |
| ATEX, IECEx | **E47** |
| CSA-Japan-Ex | **E29** |
| EACEx[5)] | **E24** |
| WHG and VLAREM II | **E61** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Submergence shield kit | **A5E49069764** |
| Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling | **7ML1830-1AQ** |
| Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings | **7ML1830-1AX** |
| Easy Aimer 304, NPT with 1" stainless steel coupling | **7ML1830-1AU** |
| Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings | **7ML1830-1GN** |

| Accessories | Article No. |
|---|---|
| Bracket, 316L Stainless steel,1 inch mount, 80 mm (3.1 inch) offset | **A5E50507509** |
| Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset | **A5E50507511** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset | **A5E50507514** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | **A5E50507516** |
| FMS-200 universal box bracket, mounting kit | **7ML1830-1BK** |
| FMS-210 channel bracket, wall mount | **7ML1830-1BL** |
| FMS-220 extended channel bracket, wall mount | **7ML1830-1BM** |
| FMS-310 channel bracket, floor mount | **7ML1830-1BN** |
| FMS-320 extended channel bracket, floor mount | **7ML1830-1BP** |
| FMS-350 bridge channel bracket, floor mount (see Mounting Brackets catalog page for more information) | **7ML1830-1BQ** |
| 1" NPT locknut, plastic | **7ML1830-1DS** |
| 1" BSP locknut, plastic | **7ML1830-1DR** |
| Plastic adapter 1" BSP - 20 mm | **7ML1830-1EA** |
| Plastic adapter 1" NPT | **7ML1930-1FX** |
| Plastic adapter 1" NPT/M20 | **7ML1830-1EF** |
| SIMATIC RTU3010C compact, remote data manager with alarming | **6NH3112-0BA00-0-XX0** |
| SIMATIC RTU3030C compact, remote data manager with alarming | **6NH3112-3BA00-0-XX0** |
| Intrinsically Safe barrier | **7NG4124-1AA00** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| SITRANS LT500, a versatile, single and multi-vessel level monitor/controller for virtually any application in a wide range of industries. | **7ML60..-.....-....** |
| For applicable back up point level switch - see point level measurement section | |

1) Must be ordered in combination with order codes E49, E25, E27, E47 E29, or E24.

2) Not available in combination with order codes E49, E25, E27, E47, E29, or E24
3) When ordered in combination with NPT thread types, this option is available with any order code. When ordered in combination with BSPP or BSPT thread types, this option is only available with order codes E49, E25, E27 or E47, E29
4) Available only with Type of protection options A and G.
5) Available only with Type of protection option B.
6) Available only with Bluetooth option 1.

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## Technical specifications

| SITRANS LR120 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 30 m (0 ... 98.4 ft) |
| Frequency | 80 GHz nominal |
| Beam angle | 4° |
| **Power Supply** | |
| HART | |
| • Voltage | 12 ... 35 V DC |
| • Current | 4 ... 20 mA |
| Modbus | |
| • Voltage | 8 ... 30 V DC |
| • Current | 38 mA at 8 V DC/17 mA at 30 V DC |
| **Communications** | |
| 4 ... 20 mA | HART 7.0 |
| Modbus (4-wire option) | RTU |
| **Accuracy** | ± 2 mm (range 0.25 ... 30 m),<br>± 10 mm (range 0 ... 0.25 m) |
| **Rated operating conditions** | |
| Vessel pressure | -1 ... +3 bar (14.50 ... 43.51 psi g) |
| Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Process temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | 0.7 kg (1.5 lb), plus 0.1 kg/m (0.2 lb/ft) cable length |
| Material | |
| • Enclosure | PVDF |
| • Submergence shield | • Polypropylene<br>• Silicone O-ring |
| Degree of protection | IP66/IP68 |
| Cable connection | 1" NPT or 1" BSPT threaded connection |
| • HART | Length options: 5 ... 100 m (16.4 ... 328.1 ft), 2 conductor, twisted with shield 18 AWG, PVC jacket |
| • Modbus version | Length options: 5 ... 100 m (16.4 ... 328.1 ft), 4 conductor, twisted pairs, 22 AWG, polyurethane jacket |
| **Certificates and approvals** | |
| | CE, $_{C}$FM$_{US}$, $_{C}$CSA$_{US}$, ATEX, IECEx, EACEx, CSA-Japan-Ex, RCM, INMETRO, NEPSI, CCOE, PESO, FDA/(EG)1935/2004 |
| Radio | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Marine | ABS, CCS, DNV-GL, LR, NK, RINA |
| Canadian Registration Number (CRN) | |
| • British Columbia | 0F22218.51 |
| • Alberta | 0F20596.2 |
| • Saskatchewan | 0F2002.3 |
| • Manitoba | 0F7032.4 |
| • Ontario | 0F22218.5 |
| • Quebec | 0F05183.6 |
| • New Brunswick | 0F1490.07 |
| • Nova Scotia | 0F1490.08 |
| • Prince Edward Island | 0F1490.09 |
| • Newfoundland and Labrador | 0F1490.0 |
| • Yukon | 0F1490.0Y |
| • Northwest Territories | 0F1490.0T |
| • Nunavut | 0F1490.0N |

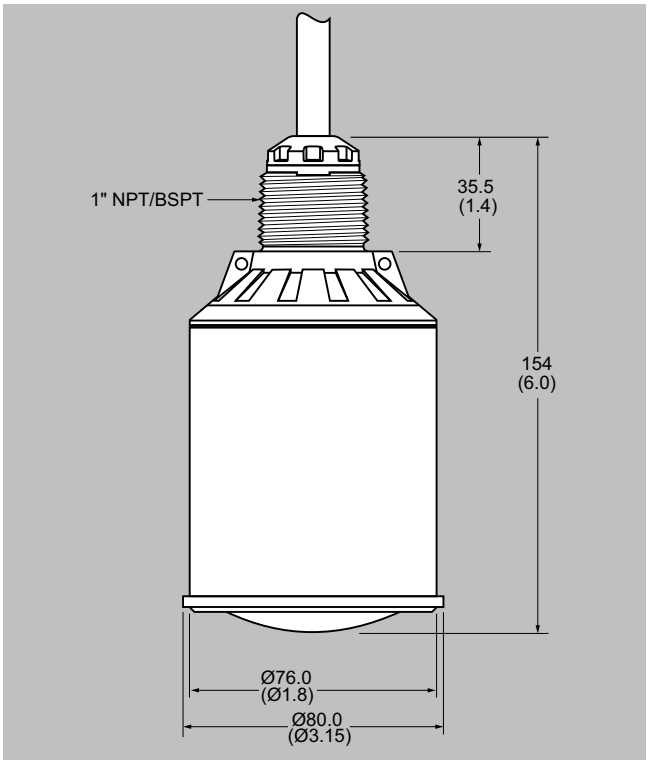
## Technical specifications (continued)

| SITRANS LR120 | |
|---|---|
| **Programming** | |
| SITRANS mobile IQ app | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series.<br>For more information: http://www.siemens.com/mobileIQ |
| SIMATIC PDM | SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network). |
| SITRANS DTM | |

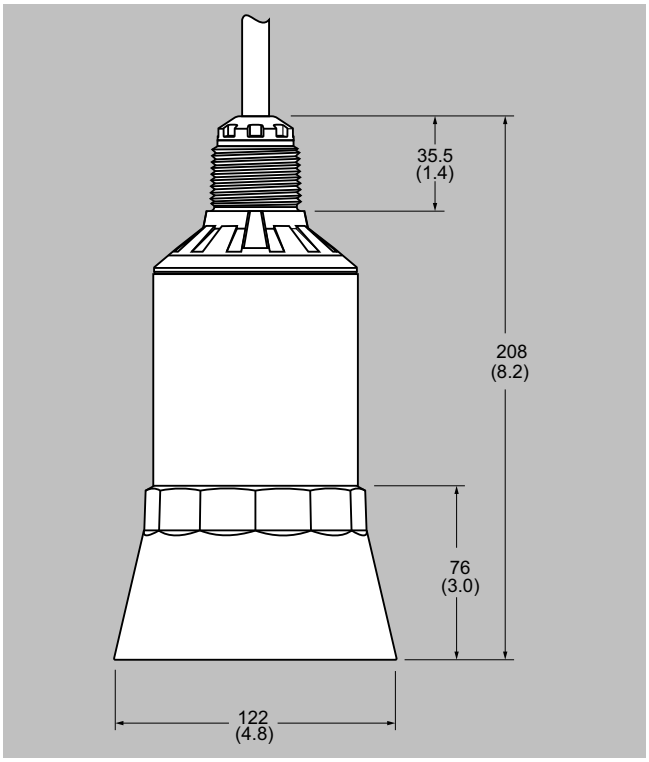
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## Dimensional drawings




SITRANS LR120, dimensions in mm (inch)

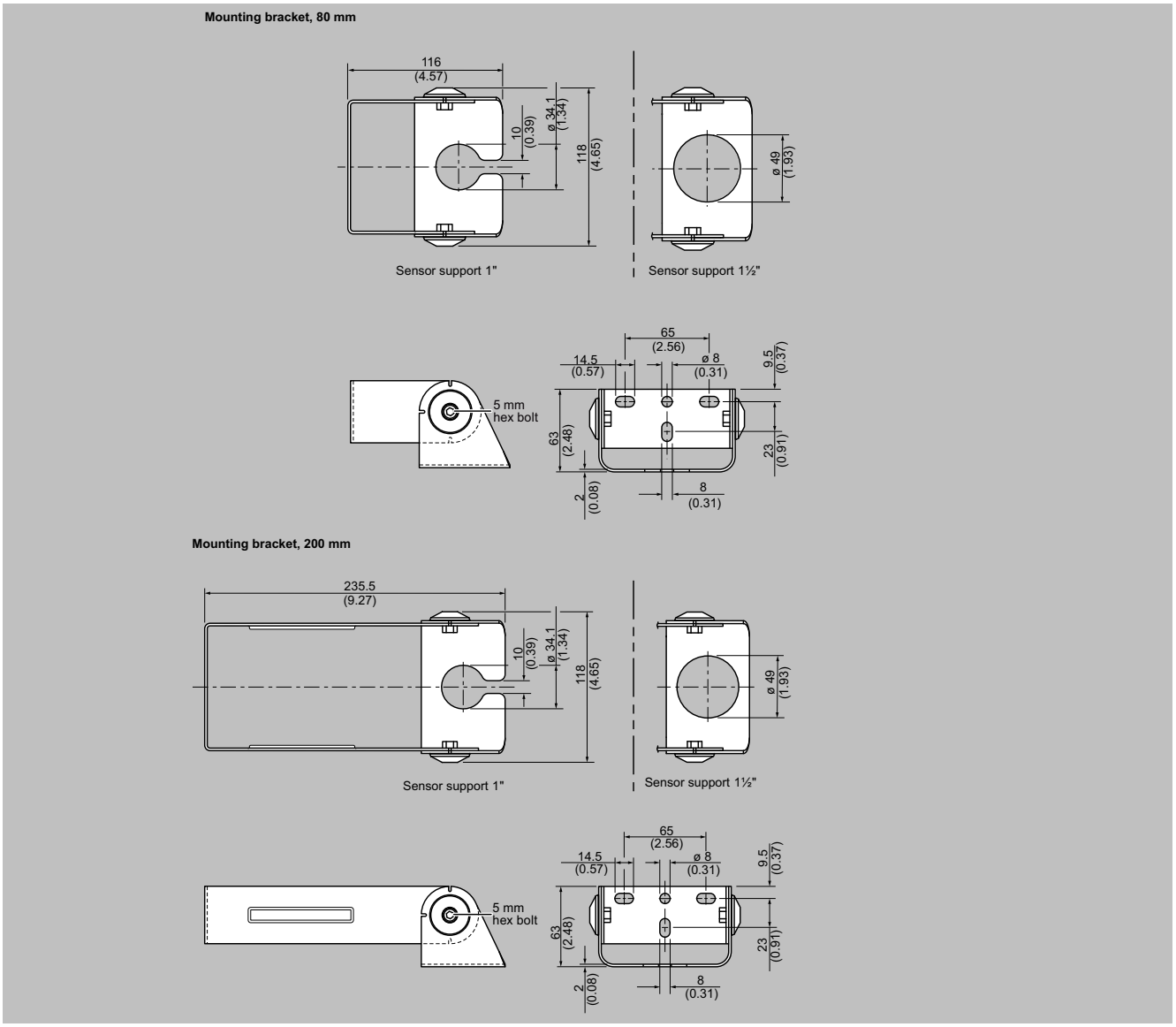



SITRANS LR120 Submergence shield accessory, dimensions in mm (inch)

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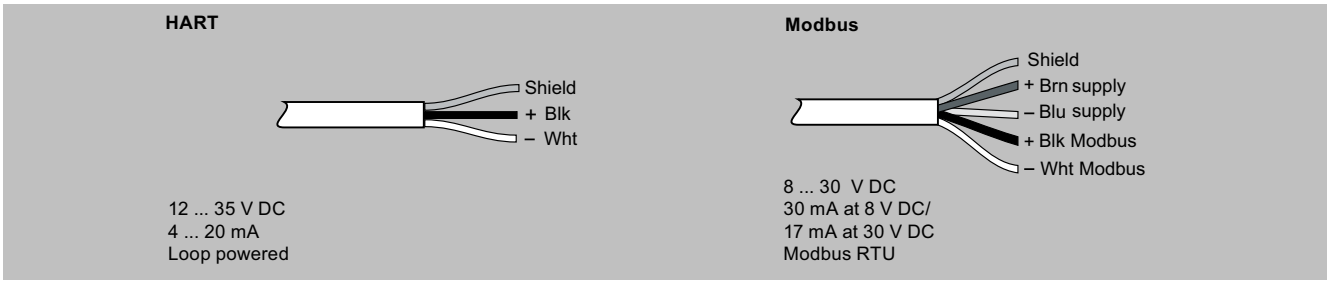


## Dimensional drawings (continued)




SITRANS LR120 mounting brackets, dimensions in mm (inch)

## Circuit diagrams




SITRANS LR120 connections

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## Overview




SITRANS LR140 is a 2 wire loop powered radar transmitter for continuous level measurement of liquids and slurries to a range of 8 m (26 ft).

## Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Chemically resistant PVDF sensor.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- Compact design fits in limited space installations.

## Application

SITRANS LR140 is a W band FMCW radar level transmitter, packaged in a chemically resistant enclosure with PVDF sensor for years of trouble-free reliable measurement service.

4 to 20 mA loop powered, it provides accurate level measurement to ranges of 8 m (26 ft). Measurement is possible, non-intrusively, through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device.

## Selection and ordering data

| SITRANS LR140 Radar level transmitter<br>Non-contact, 8 m (26.2 ft) range, for liquids and solids. | Article No.<br>7ML533 | 7 | - | 1 | A | ● | 0 | 7 | - | 4 | A | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| 1-½" NPT | | | | | | A | | | | | | | |
| R 1-½" (BSPT) | | | | | | B | | | | | | | |
| G 1-½" (BSPP) | | | | | | C | | | | | | | |
| **Electrical connections/Cable entry** | | | | | | | | | | | | | |
| M20 | | | | | | | | | | | | F | |
| ½" NPT | | | | | | | | | | | | K | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301 | **Y15** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Bracket, 316L Stainless steel,1 inch mount, 80 mm (3.1 inch) offset | **A5E50507509** |
| Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset | **A5E50507511** |

| Accessories | Article No. |
|---|---|
| Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset | **A5E50507514** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | **A5E50507516** |
| SITRANS LR140/LR150 Blind lid with o-ring | **A5E50822955** |
| Flat gasket, FKM, for G1.5 inch sensor | **A5E50822967** |
| 1-½ BSP locknut, plastic | **7ML1830-1DP** |
| SIMATIC RTU3010C compact, remote data manager with alarming | **6NH3112-0BA00-0-XX0** |
| SIMATIC RTU3030C compact, remote data manager with alarming | **6NH3112-3BA00-0-XX0** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

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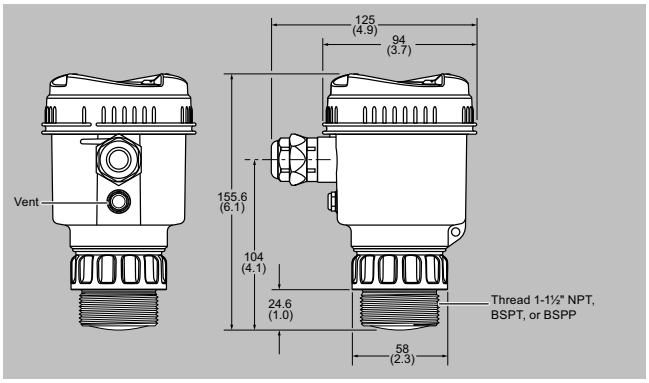
## Technical specifications

| SITRANS LR140 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 8 m (0 ... 26 ft) |
| Frequency | 80 GHz nominal |
| Beam angle | 8° |
| **Power Supply** | |
| Voltage | 12 ... 35 V DC |
| Current | 4 ... 20 mA |
| **Accuracy** | ± 5 mm |
| **Rated operating conditions** | |
| Vessel pressure | -1 ... +3 bar (14.50 ... 43.51 psi g) |
| Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Process temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | 0.5 kg (1.1 lb) |
| Material (sensor) | PVDF |
| Material (enclosure) | PBT |
| Process connection | 1-½" NPT, 1-½" BSPT, or 1-½" BSPP |
| Degree of protection | IP66/IP67 |
| **Certificates and approvals** | |
| General | CE, $_{C}$FM$_{US}$, $_{C}$CSA$_{US}$, RCM, EAC |
| Radio | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Canadian Registration Number (CRN) | |
| British Columbia | 0F22218.51 |
| Alberta | 0F20596.2 |
| Saskatchewan | 0F2002.3 |
| Manitoba | 0F7032.4 |
| Ontario | 0F22218.5 |
| New Brunswick | 0F05183.6 |
| Nova Scotia | 0F1490.07 |
| Prince Edward Island | 0F1490.08 |
| Newfoundland and Labrador | 0F1490.09 |
| Yukon | 0F1490.0 |
| Northwest Territories | 0F1490.0Y |
| Nunavut | 0F1490.0T |
| **Programming** | 0F1490.0N |
| SITRANS mobile IQ App | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series.<br>For more information:<br>http://www.siemens.com/mobileIQ |

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## Dimensional drawings

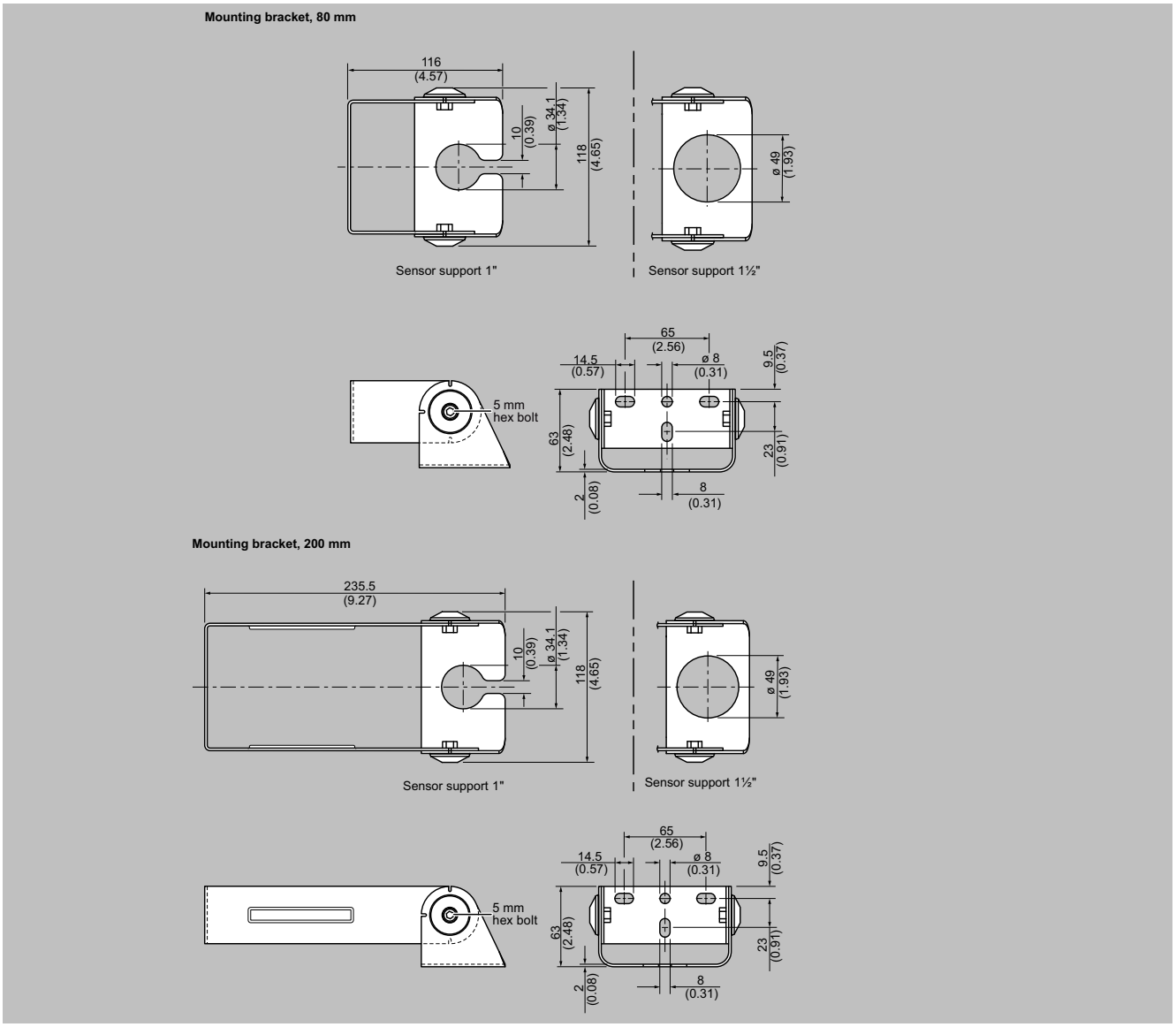



SITRANS LR140, dimensions in mm (inch)

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## Dimensional drawings (continued)

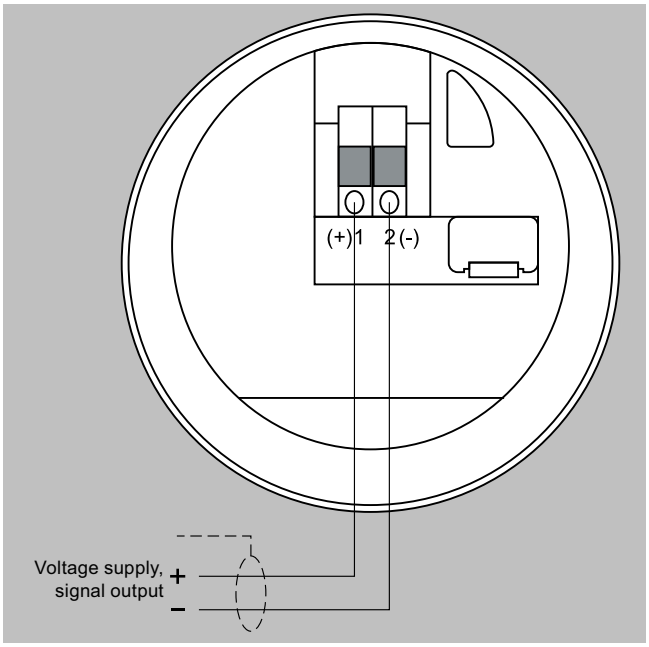



SITRANS LR140 mounting brackets, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LR140 connections

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## Overview




SITRANS LR150 is a compact radar transmitter for continuous level measurement of liquids, slurries, and solids to a range of 15 m (49.2 ft).

## Benefits

- Bluetooth connectivity for easy setup with SITRANS mobile IQ.
- Optional HMI with pushbutton programming and local diagnostic data.
- Chemically resistant PVDF sensor.
- HART 7.0 communication for intelligent integration into your application.
- W band FMCW radar yields narrow beam with small antenna for superior performance in short range applications.
- Approved for open air applications outside of a tank.
- 2 mm accuracy and zero near range distance yields optimum inventory management capability.
- Compact design fits in limited space installations.
- Hazardous area variants available for safe use in explosive gas or dust environments (pending).

## Application

SITRANS LR150 is a W band FMCW radar level transmitter, with a chemically resistant PVDF sensor, for years of trouble-free, reliable measurement service.

4 to 20 mA loop powered with HART, providing accurate level measurement to ranges of 15 m (49.2 ft). Measurement is possible, non-intrusively, through plastic vessel tops for easy installation. Programming is convenient using the Bluetooth connection and SITRANS mobile IQ application on your smart device or locally with an optional HMI.

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## Selection and ordering data

| SITRANS LR150 Radar level transmitter<br>Non-contact, HART, 15 m (49.2 ft) range, for liquids and solids. | Article No.<br>7ML534 | 0 | - | ● | A | ● | 0 | 7 | - | 4 | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | |
| **Bluetooth function** | | | | | | | | | | | | | |
| Without | | | | 0 | | | | | | | | | |
| With | | | | 1 | | | | | | | | | |
| **Process connection** | | | | | | | | | | | | | |
| 1-½" NPT | | | | | | A | | | | | | | |
| R 1-½" (BSPT) | | | | | | B | | | | | | | |
| G 1-½" (BSPP) | | | | | | C | | | | | | | |
| **Type of protection** | | | | | | | | | | | | | |
| Non Ex (ordinary locations)[2] | | | | | | | | | | | A | | |
| Ex i (ia) (Gas Ex-Zone 0/Class 1, Div. 1 & Div. 2)[1] | | | | | | | | | | | C | | |
| **Electrical connections/cable entry** | | | | | | | | | | | | | |
| M20 | | | | | | | | | | | | F | |
| ½" NPT | | | | | | | | | | | | K | |
| **Local HMI** | | | | | | | | | | | | | |
| Without display (closed lid of PBT/PC material) | | | | | | | | | | | | | 0 |
| With display (closed lid of PBT/PC material) | | | | | | | | | | | | | 1 |
| With display (clear lid with plastic window of PC material) | | | | | | | | | | | | | 3 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Tag (device parameter, max. 32 characters) plate stainless steel 304/1.4301 | **Y15** |
| Inspection certificate 3.1 (EN 10204) - device with test data | **C25** |
| INMETRO, IA MASC | **E25** |
| NEPSI, CCOE | **E27** |
| EACEx | **E24** |
| ATEX, IECEx, $_{C}FM_{US}$, $_{C}CSA_{US}$ | **E49** |
| CSA-Japan-Ex | **E29** |
| WHG and VLAREM II | **E61** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Bracket, 316L Stainless steel,1 inch mount, 80 mm (3.1 inch) offset | **A5E50507509** |
| Bracket, 316L Stainless steel, 1 inch mount, 200 mm (7.9 inch) offset | **A5E50507511** |

| Accessories | Article No. |
|---|---|
| Bracket, 316L Stainless steel, 1.5 inch mount, 80 mm (3.1 inch) offset | **A5E50507514** |
| Bracket, 316L Stainless steel, 1.5 inch mount, 200 mm (7.9 inch) offset | **A5E50507516** |
| SITRANS LR150 HMI with connection cable | **A5E50812988** |
| SITRANS LR140/LR150 Blind lid with o-ring | **A5E50822955** |
| SITRANS LR150 clear lid with o-ring | **A5E50822960** |
| Flat gasket, FKM, for G1.5 inch sensor | **A5E50822967** |
| 1-½ BSP locknut, plastic | **7ML1830-1DP** |
| SIMATIC RTU3030C compact, remote data manager with alarming | **6NH3112-3BA00-0-XX0** |
| Intrinsically Safe barrier | **7NG4124-1AA00** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 to 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion- see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch -see point level measurement section | |

1) Must be ordered in combination with order code E24, E25, E27, E49. or E29.
2) Not available with order code E24, E25, E27, E49. or E29.

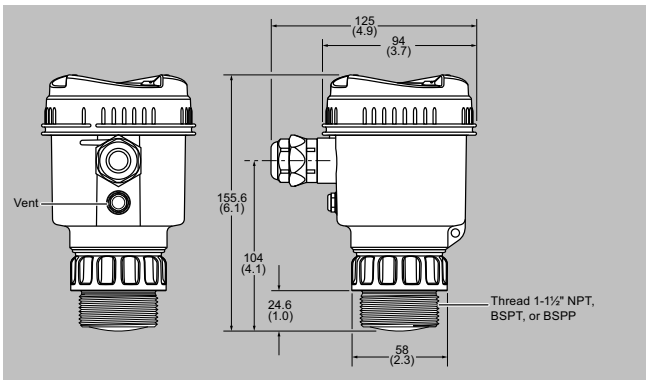
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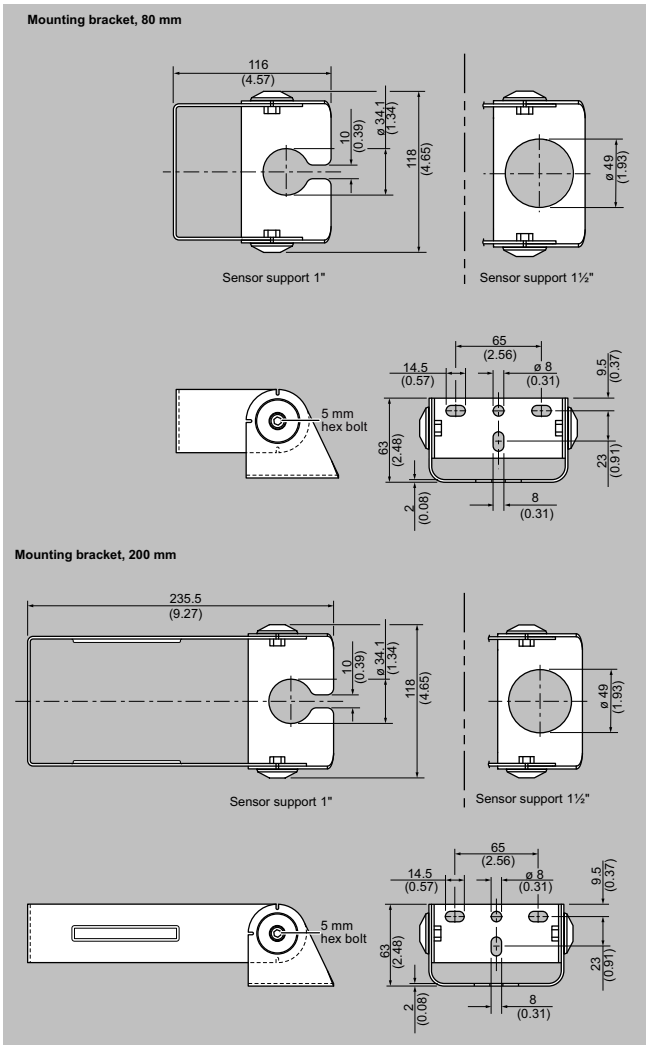
## Technical specifications

| SITRANS LR150 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | W band FMCW radar |
| Measuring range | 0 ... 15 m (0 ... 49.2 ft) |
| Frequency | 80 GHz nominal |
| Beam angle | 8° |
| **Power Supply** | |
| HART | |
| • Voltage | 12 ... 35 V DC |
| • Current | 4 ... 20 mA |
| **Communications** | |
| 4 ... 20 mA | HART 7.0 |
| **Accuracy** | ± 2 mm |
| **Rated operating conditions** | |
| Vessel pressure | -1 ... +3 bar (14.50 ... 43.51 psi g) |
| Ambient temperature | -40 ... +70 °C (-40 ... +158 °F) |
| Process temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | 0.5 kg (1.1 lb) |
| Material (sensor) | PVDF |
| Material (enclosure) | PBT |
| Process connection | 1-½" NPT, 1-½" BSPT or 1-½" BSPP |
| Degree of protection | IP66/IP67 |
| Cable inlet | M20 or ½" NPT |
| **Certificates and approvals** | |
| | CE, ATEX, IECEx, $_{C}FM_{US}$, $_{C}CSA_{US}$, EAC, NEPSI, FDA/EG 1935/2004 |
| Radio | CE, FCC, IC, Anatel, ICASA, NCC, KC, CITC, RCM, WPC, Telec, NBTC, MCMC |
| Water monitoring, flow | MCERTS Class 1 |
| Canadian Registration Number (CRN) | |
| British Columbia | 0F22218.51 |
| Alberta | 0F20596.2 |
| Saskatchewan | 0F2002.3 |
| Manitoba | 0F7032.4 |
| Ontario | 0F22218.5 |
| New Brunswick | 0F05183.6 |
| Nova Scotia | 0F1490.07 |
| Prince Edward Island | 0F1490.08 |
| Newfoundland and Labrador | 0F1490.09 |
| Yukon | 0F1490.0 |
| Northwest Territories | 0F1490.0Y |
| Nunavut | 0F1490.0T |
| **Programming** | |
| SITRANS mobile IQ App | SITRANS mobile IQ is a Bluetooth app that provides an intuitive interface to quickly configure, set up and monitor SITRANS LR100 series (available for Android, Apple and Windows devices). For more information: http://www.siemens.com/mobileIQ |
| Optional HMI | 4 button with display of variables and diagnostic data |
| SIMATIC PDM | SIMATIC PDM allows for remote PC configuration and diagnostics (for installation on a network). |
| SITRANS DTM | |

## Dimensional drawings




SITRANS LR150, dimensions in mm (inch)

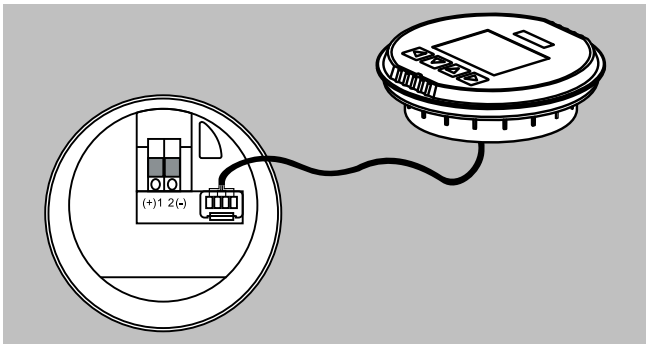



SITRANS LR150 mounting brackets, dimensions in mm (inch)

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## Circuit diagrams




SITRANS LR150 connections

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## Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

## Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

## Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alphanumeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference.

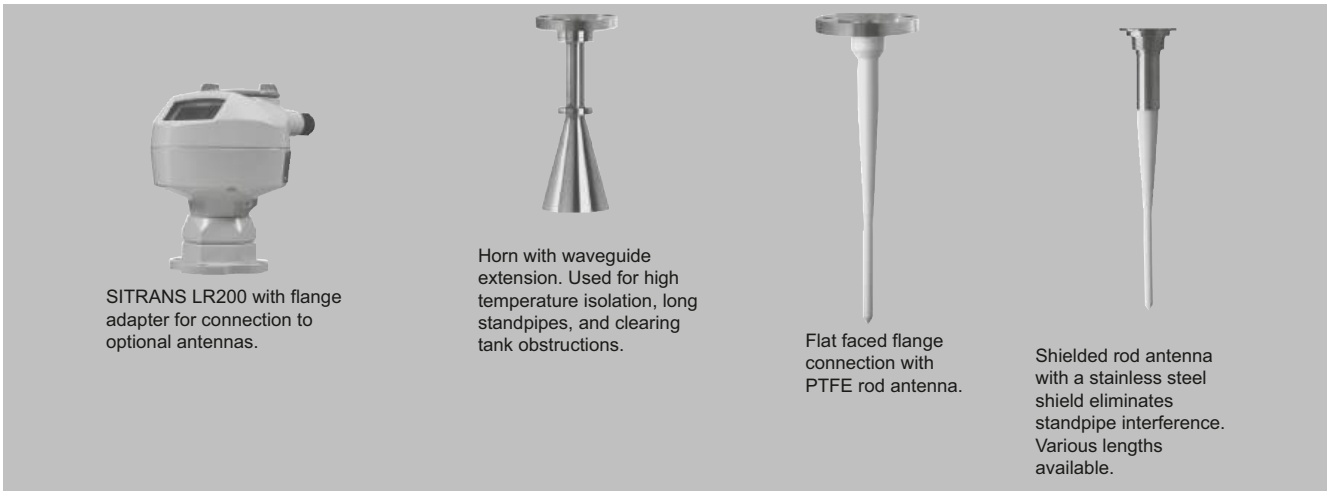
Startup is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features Process Intelligence signal-processing technology for superior reliability.

- Key Applications: liquid process vessels with agitators, vaporous liquids, high temperatures, asphalt

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## Integration




Antenna configurations for SITRANS LR200

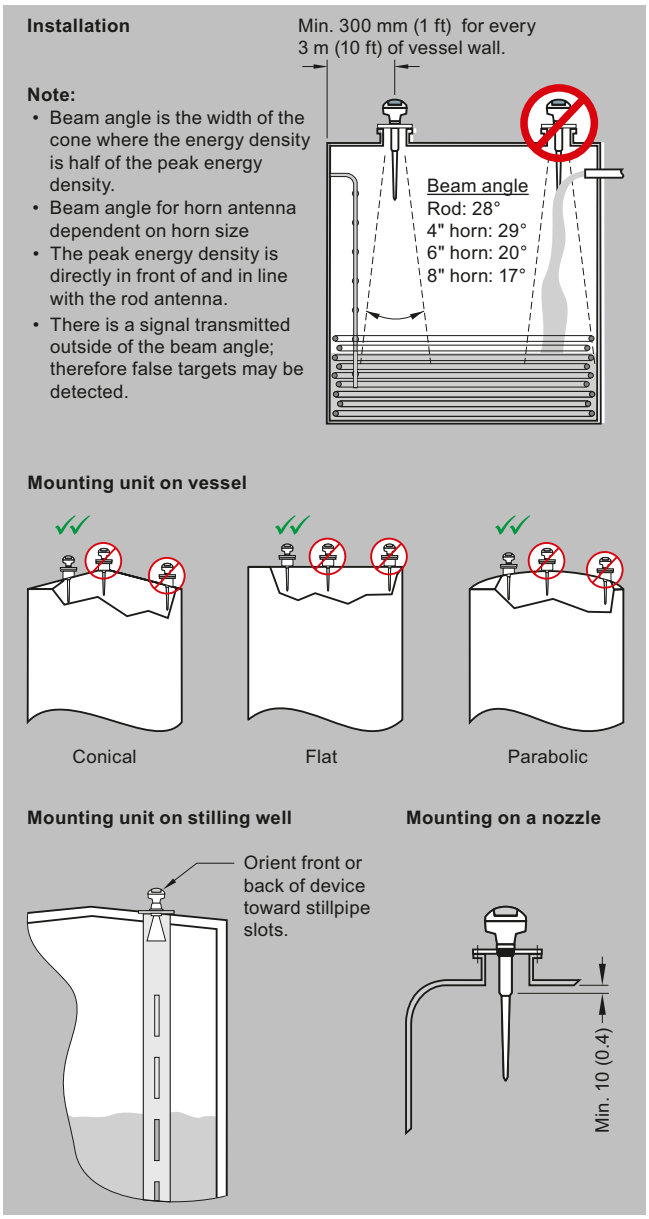
| Antenna types | Flat Faced Flange with Rod | Shielded Rod | Horn (4", 6", 8" sizes available) |
|---|---|---|---|
| **Connection type** | Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch) | Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch) | Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch) |
| **Wetted parts** | PTFE | PTFE, 316L stainless steel, FKM O-ring | 316L stainless steel PTFE, FKM O-ring |
| **Extensions** | 50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE | 100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) standard shield length | Use waveguide for extensions to 6 m (20 ft) long |
| **Dielectric constant** | > 3 | > 3 | > 3 |
| **Insertion length (max.)** | 41 cm (16.3 inch) | Variable | Variable with extension |
| **Purging option (liquid or gas)** | No | No | Yes |
| **Sliding waveguide option for digesters**[1] | Yes | No | Yes |
| **Weight**[2] | 6.5 kg (14.3 lb) | 5.0 kg (11 lb) | 7.5 kg (16.5 lb) |

[1] Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)
[2] Not including extensions, includes SITRANS LR200 and smallest process connection

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## Configuration




SITRANS LR200 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR200 Radar level transmitter with polypropylene rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5422- | ● | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Enclosure/Cable inlet** | | | | | | |
| Aluminum, epoxy painted | | | | | | |
| 2 x ½" NPT | | 2 | | | | |
| 2 x M20 x 1.5 | | 3 | | | | |
| **Polypropylene antenna type - (Max. 3 Bar pressure and 80 °C)** | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1], c/w integral 100 mm shield | | | A | | | |
| R 1½" [(BSPT), EN 10226], c/w integral 100 mm shield | | | B | | | |
| G 1½" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield | | | C | | | |
| 1½" NPT [(Taper), ASME B1.20.1], c/w integral 250 mm shield | | | D | | | |
| R 1½" [(BSPT), EN 10226], c/w integral 250 mm shield | | | E | | | |
| G 1½" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield | | | F | | | |
| **Approvals** | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM | | | | A | | |
| General Purpose, CSA, FM, Industry Canada, FCC Ordinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC | | | | B | | |
| Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada | | | | C | | |
| Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC | | | | D | | |
| Intrinsically Safe;<br>ATEX II 1G Ex ia IIC T4 Ga;<br>UKEX II 1G Ex ia IIC T4 Ga;<br>IECEx Ex ia IIC T4 Ga;<br>INMETRO Ex ia IIC T4 Ga, IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X;<br>CE, UKCA, RED, RCM, EAC | | | | E | | |
| Non incendive, FM Class I, Div. 2,Groups A, B, C, D, FCC[1] | | | | F | | |
| Increased Safety:<br>ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[2][3] | | | | G | | |
| Flameproof:<br>ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[3] | | | | H | | |
| Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[1][3] | | | | J | | |
| **Communication/Output** | | | | | | |
| PROFIBUS PA | | | | | 2 | |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | | | | | 3 | |

[1] Available with enclosure option 2 only.
[2] Available with enclosure option 3 only.
[3] Available with communication option 3 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[1] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **Article No.** |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[2] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[2] | **7ML1930-1AQ** |
| One general purpose polymeric cable gland M20 x 1.5, rated -20 ... + 80 °C (-40 ... +176 °F) | **7ML1930-1AM** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| SITRANS RD100, loop powered display - see Chapter 7 | 7ML5741-.....-. |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | 7ML5742-.....-.... |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | 7ML5740-.....-.. |

| Accessories | Article No. |
|---|---|
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | 7ML5744-.....-.. |
| For applicable back up point level switch - see point level measurement section | |

1) Available with communication option 3 only.
2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

| SITRANS LR200 Radar level transmitter with PTFE rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5423- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Antenna material (uses antenna adapter)** | | | | | | | | | | | |
| PTFE, uses antenna adapter and additional process connection below | | 1 | | | | | | | | | |
| **Process connection (refer to LR200 Pressure/Temperature curves)** | | | | | | | | | | | |
| Flanges (316L stainless steel) | | | | | | | | | | | |
| DN 50 PN 16, Type A, flat faced | | | A | A | | | | | | | |
| DN 80 PN 16, Type A, flat faced | | | B | A | | | | | | | |
| DN 100 PN 16, Type A, flat faced | | | C | A | | | | | | | |
| DN 150 PN 16, Type A, flat faced | | | D | A | | | | | | | |
| 2" ASME 150 lb, flat faced | | | F | B | | | | | | | |
| 3" ASME 150 lb, flat faced | | | G | B | | | | | | | |
| 4" ASME 150 lb, flat faced | | | H | B | | | | | | | |
| 6" ASME 150 lb, flat faced | | | J | B | | | | | | | |
| DN 50 PN 40, flat faced | | | A | C | | | | | | | |
| DN 80 PN 40, flat faced | | | B | C | | | | | | | |
| DN 100 PN 40, flat faced | | | C | C | | | | | | | |
| DN 150 PN 40, flat faced | | | D | C | | | | | | | |
| 2" ASME 300 lb, flat faced, available with Pressure rating option 1 only due to flange hole spacing | | | F | D | | | | | | | |
| 3" ASME 300 lb, flat faced | | | G | D | | | | | | | |
| 4" ASME 300 lb, flat faced | | | H | D | | | | | | | |
| 6" ASME 300 lb, flat faced | | | J | D | | | | | | | |
| JIS DN 50 10K | | | A | E | | | | | | | |
| JIS DN 80 10K | | | B | E | | | | | | | |
| JIS DN 100 10K | | | C | E | | | | | | | |
| JIS DN 150 10K<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.) | | | D | E | | | | | | | |
| Threaded connection (316L stainless steel) | | | | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | | L | A | | | | | | | |
| 2" NPT [(Taper), ASME B1.20.1] | | | M | A | | | | | | | |
| R 1½" [(BSPT), EN 10226] | | | L | C | | | | | | | |
| R 2" [(BSPT), EN 10226] | | | M | C | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1] | | | L | E | | | | | | | |
| G 2" [(BSPP), EN ISO 228-1] | | | M | E | | | | | | | |
| **Antenna extensions or Inactive shield length** | | | | | | | | | | | |
| No antenna extension | | | | | 0 | | | | | | |
| 50 mm (2 inch) extension, PTFE | | | | | 1 | | | | | | |
| 100 mm (4 inch) extension, PTFE | | | | | 2 | | | | | | |
| 100 mm (4 inch) extension, 316L stainless steel shield[1)] | | | | | 3 | | | | | | |
| 150 mm (6 inch) extension, 316L stainless steel shield[1)] | | | | | 4 | | | | | | |
| 200 mm (8 inch) extension, 316L stainless steel shield[1)] | | | | | 5 | | | | | | |
| 250 mm (10 inch) extension, 316L stainless steel shield[1)] | | | | | 6 | | | | | | |
| **Process seal/gasket** | | | | | | | | | | | |
| Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 ... 6 | | | | | | 0 | | | | | |
| FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2 | | | | | | 1 | | | | | |

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## Selection and ordering data (continued)

| SITRANS LR200 Radar level transmitter with PTFE rod Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5423- ● ● ● ● ● - ● ● ● ● |
|---|---|
| **Enclosure/Cable inlet** | |
| Aluminum, Epoxy painted | |
| 2 x ½" NPT | 2 |
| 2 x M20 x 1.5 | 3 |
| **Communication/Output** | |
| PROFIBUS PA | B |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | C |
| **Approvals** | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM | A |
| General Purpose, CSAOrdinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC | B |
| Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada | C |
| Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC | D |
| Intrinsically Safe;<br>ATEX II 1G Ex ia IIC T4 Ga;<br>UKEX II 1G Ex ia IIC T4 Ga;<br>IECEx Ex ia IIC T4 Ga;<br>INMETRO Ex ia IIC T4 Ga, IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X;<br>CE, UKCA, RED, RCM, EAC | E |
| Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC[2] | F |
| Increased Safety:<br>ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[2)3)] | G |
| Flameproof:<br>ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[3)] | H |
| Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[2)4)] | J |
| **Pressure rating** | |
| Rating per Pressure/Temperature curves in manual | 0 |
| 0.5 bar g (7.25 psi g) maximum | 1 |

1) Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only.
2) Available with enclosure option 2 only.
3) Available with enclosure option 3 only.
4) Available with communication option C only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[3)] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| Antenna, rod, PTFE | **7ML1830-1HC** |

| Accessories | Article No. |
|---|---|
| Antenna extension, 50 mm (2 inch), PTFE | **7ML1830-1CH** |
| Antenna extension, 100 mm (4 inch), PTFE | **7ML1830-1CG** |
| HART modem with USB interface | **7MF4997-1DB** |
| Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), HART (two are required) | **7ML1930-1AP** |
| Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), PROFIBUS PA (two required) | **7ML1930-1AQ** |
| One General Purpose polymeric cable gland M20 x 1.5, rating for -20 °C (-4°F) ... + 80 °C (176 °F) | **7ML1930-1AM** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

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## Selection and ordering data (continued)

| SITRANS LR200 Radar level transmitter with horn Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5425- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Antenna material (uses antenna adapter)** | | | | | | | | | | | |
| 316L stainless steel with PTFE cone emitter | | 0 | | | | | | | | | |
| 316L stainless steel with PTFE cone emitter and purge connection with ⅛" NPT inlet[1)] | | 1 | | | | | | | | | |
| **Process connection (refer to LR200 Pressure/Temperature curves)** | | | | | | | | | | | |
| Flanges (316L stainless steel) | | | | | | | | | | | |
| DN 50 PN 16 EN 1092-1 Type A flat faced[1)] | | | A | A | | | | | | | |
| DN 80 PN 16 EN 1092-1 Type A flat faced | | | B | A | | | | | | | |
| DN 100 PN 16 EN 1092-1 Type A flat faced | | | C | A | | | | | | | |
| DN 150 PN 16 EN 1092-1 Type A flat faced | | | D | A | | | | | | | |
| DN 200 PN 16 EN 1092-1 Type A flat faced | | | E | A | | | | | | | |
| DN 80 PN 10/16 DIN EN 1092-1 Type B1 raised face[2)] | | | B | F | | | | | | | |
| DN 100 PN 10/16 DIN EN 1092-1 Type B1 raised face[3)] | | | C | F | | | | | | | |
| DN 150 PN 10/16 DIN EN 1092-1 Type B1 raised face[3)] | | | D | F | | | | | | | |
| DN 200 PN 16 DIN EN 1092-1 Type B1 raised face[3)] | | | E | F | | | | | | | |
| 2" ASME 150 lb, flat faced[1)] | | | F | B | | | | | | | |
| 3" ASME 150 lb, flat faced | | | G | B | | | | | | | |
| 4" ASME 150 lb, flat faced | | | H | B | | | | | | | |
| 6" ASME 150 lb, flat faced | | | J | B | | | | | | | |
| 8" ASME 150 lb, flat faced | | | K | B | | | | | | | |
| DN 50 PN 40, flat faced[3)] | | | A | C | | | | | | | |
| DN 80 PN 40, flat faced[3)] | | | B | C | | | | | | | |
| DN 100 PN 40, flat faced[3)] | | | C | C | | | | | | | |
| DN 80 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)] | | | C | G | | | | | | | |
| DN 100 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)] | | | D | G | | | | | | | |
| DN 150 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)] | | | E | G | | | | | | | |
| 2" ASME 300 lb, flat faced[1)3)] | | | F | D | | | | | | | |
| 3" ASME 300 lb, flat faced[3)] | | | G | D | | | | | | | |
| 4" ASME 300 lb, flat faced[3)] | | | H | D | | | | | | | |
| JIS DN 50 10K[1)] | | | A | E | | | | | | | |
| JIS DN 80 10K | | | B | E | | | | | | | |
| JIS DN 100 10K | | | C | E | | | | | | | |
| JIS DN 150 10K | | | D | E | | | | | | | |
| JIS DN 200 10K<br>(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.) | | | E | E | | | | | | | |
| **Communication/Output** | | | | | | | | | | | |
| PROFIBUS PA | | | | | 1 | | | | | | |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | | | | | 2 | | | | | | |
| **Process seal/gasket** | | | | | | | | | | | |
| FKM (-40 ... +200 °C) | | | | | | 0 | | | | | |
| **Enclosure/Cable inlet** | | | | | | | | | | | |
| Aluminum, Epoxy painted | | | | | | | | | | | |
| 2 x ½" NPT | | | | | | | | 2 | | | |
| 2 x M20 x 1.5 | | | | | | | | 3 | | | |
| **Horn size/Waveguide options** | | | | | | | | | | | |
| 80 mm (3 inch) horn[3)] | | | | | | | | | B | | |
| 100 mm (4 inch) horn[4)] | | | | | | | | | C | | |
| 150 mm (6 inch) horn | | | | | | | | | D | | |
| 200 mm (8 inch) horn | | | | | | | | | E | | |
| 100 mm (4 inch) horn with 100 mm (4 inch) waveguide extension[4)] | | | | | | | | | F | | |
| 100 mm (4 inch) horn with 150 mm (6 inch) waveguide extension[4)] | | | | | | | | | G | | |
| 100 mm (4 inch) horn with 200 mm (8 inch) waveguide extension[4)] | | | | | | | | | H | | |
| 100 mm (4 inch) horn with 250 mm (10 inch) waveguide extension[4)] | | | | | | | | | J | | |
| 150 mm (6 inch) horn with 100 mm (4 inch) waveguide extension | | | | | | | | | K | | |
| 150 mm (6 inch) horn with 150 mm (6 inch) waveguide extension | | | | | | | | | L | | |
| 150 mm (6 inch) horn with 200 mm (8 inch) waveguide extension | | | | | | | | | M | | |

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## Selection and ordering data (continued)

| SITRANS LR200 Radar level transmitter with horn Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5425- ● ● ● ● ● - ● ● ● ● |
|---|---|
| 150 mm (6 inch) horn with 250 mm (10 inch) waveguide extension | N |
| 200 mm (8 inch) horn with 100 mm (4 inch) waveguide extension | P |
| 200 mm (8 inch) horn with 150 mm (6 inch) waveguide extension | Q |
| 200 mm (8 inch) horn with 200 mm (8 inch) waveguide extension | R |
| 200 mm (8 inch) horn with 250 mm (10 inch) waveguide extension | S |
| **Approvals** | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RED, RCM | A |
| Ordinary Locations/General Purpose (Non-Ex), CSA, FM, IC, FCC | B |
| Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada | C |
| Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC | D |
| Intrinsically Safe;<br>ATEX II 1G Ex ia IIC T4 Ga;<br>UKEX II 1G Ex ia IIC T4 Ga;<br>IECEx Ex ia IIC T4 Ga;<br>INMETRO Ex ia IIC T4 Ga, IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X;<br>CE, UKCA, RED, RCM, EAC | E |
| Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC[4] | F |
| Increased Safety:<br>ATEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex eb mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[2)3)] | G |
| Flameproof:<br>ATEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2G Ex db mb ia IIC T4 Ga/Gb;<br>CE, UKCA, RED, RCM, EAC[3)] | H |
| Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[5)7)] | J |
| **Pressure rating** | |
| Rating per Pressure/Temperature curves in manual | 0 |
| 0.5 bar g (7.25 psi g) maximum | 1 |

1) Available with pressure rating option 1 only.
2) Available with Antenna Material options 0 and 1 only.
3) For stillpipe applications only.
4) Available with enclosure option 2 only.
5) Available with enclosure option 3 only.
6) Available with communication option 2 only.
7) Available with Communication/Output option 2 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[1)] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | **Article No.** |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |

| Accessories | Article No. |
|---|---|
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[2)] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[3)] | **7ML1930-1AQ** |
| One general purpose polymeric cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F) | **7ML1930-1AM** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available with communication option 2 only.
2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.
3) Available with enclosure option 2 only.

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## Selection and ordering data (continued)

### *SITRANS LR200 Specials*

| | Order No. |
|---|---|
| **SITRANS LR200 PROFIBUS PA aluminum enclosure kit with electronics and covers (7ML5423, 7ML5425), calibrated for use with standard rod antenna** |  |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection. | **A5E01483420** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection. | **A5E01483440** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection. | **A5E01483456** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection. | **A5E01483547** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection. | **A5E01483559** |
| **SITRANS LR200 HART aluminum enclosure kit with electronics and covers (7ML5423, 7ML5425), calibrated for use with standard rod antenna** |  |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection. | **A5E02956419** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. | **A5E02956420** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection. | **A5E02956421** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection. | **A5E02956422** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection. | **A5E03617085** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection. | **A5E03617086** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection. | **A5E03617087** |
| SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection. | **A5E03617088** |
| **Sun shield for SITRANS LR200 enclosure, stainless steel** | **A5E39142556**  |

| | Order No. |
|---|---|
| **SITRANS LR200 horn antenna kits with mounting screws (no emitter supplied)** |  |
| 80 mm (3 inch) horn antenna kit | **PBD-25500K02A** |
| 100 mm (4 inch) horn antenna kit | **PBD-25500K03A** |
| 150 mm (6 inch) horn antenna kit | **PBD-25500K05A** |
| **SITRANS LR200 Extension Kits for Horn Antenna with mounting screw** | |
| 100 mm (4 inch) extension kit for horn antenna | **PBD-25501K0100A** |
| 150 mm (6 inch) extension kit for horn antenna | **PBD-25501K0150A** |
| 200 mm (8 inch) extension kit for horn antenna | **PBD-25501K0200A** |
| 250 mm (10 inch) extension kit for horn antenna | **PBD-25501K0250A** |
| 500 mm (20 inch) extension kit for horn antenna | **PBD-25501K0500A** |
| 1 000 mm (40 inch) extension kit for horn antenna | **PBD-25501K1000A** |
| **SITRANS LR200 flanged rod antenna kit with 316L stainless steel flat faced flanges** |  |
| Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on http://www.siemens.com/radar.[1)4)] | **PBD-51003K020AAAA** |
| Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on http://www.siemens.com/radar.[1)4)] | **PBD-51003K050AJAA** |
| Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar.[1)4)] | **PBD-51003K050AOAA** |
| **SITRANS LR200 PTFE rod antenna kit with 316L stainless steel 1½" pipe thread process connection** |  |
| PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring. See drawing 51004 on http://www.siemens.com/radar.[4)] | **PBD-51004K2AAA** |
| PTFE rod antenna kit, 1½" G 316L stainless steel process connection, FKM O-ring. See drawing 51004 on http://www.siemens.com/radar.[4)] | **PBD-51004K3AAA** |
| **SITRANS LR200 PTFE rod antenna kit with 316L stainless steel 2" pipe thread process connection** |  |
| PTFE rod antenna kit, 2" NPT 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar.[4)] | **PBD-51005K1AAA** |
| PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar.[4)] | **PBD-51005K2AAA** |
| PTFE rod antenna kit, 2" G 316L stainless steel process connection, FKM O-ring. See drawing 51005 on http://www.siemens.com/radar.[4)] | **PBD-51005K3AAA** |

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## Selection and ordering data (continued)

| | Order No. |
|---|---|
| **SITRANS LR200 PTFE rod antenna kit (100 mm shield) with 316L stainless steel 2" pipe thread process connection**  | |
| PTFE rod antenna shielded kit, 2" NPT 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield.See drawing 51002 on http://www.siemens.com/radar.[3)4)] | **PBD-51002K0100AAA** |
| PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar.[3)4)] | **PBD-51002K0100BAA** |
| PTFE rod antenna shielded kit, 2" G 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar.[3)4)] | **PBD-51002K0100CAA** |
| **SITRANS LR200 horn antenna kit with 316L stainless steel flat faced flange, with PTFE emitter (without waveguide)**  | |
| Horn antenna kit, 2" ASME 316L stainless steel flange 3" horn, PTFE emitter [1)4)] | **PBD-51006K020AAAA** |
| Horn antenna kit, 2" ASME 316L stainless steel flange 4" horn, PTFE emitter [1)2)] | **PBD-51006K020AABA** |
| Horn antenna kit, 2" ASME 316L stainless steel flange 6" horn, PTFE emitter [1)2)] | **PBD-51006K020AACA** |
| Horn antenna kit, 2 " ASME 316L stainless steel flange 8" horn, PTFE emitter [1)2)] | **PBD-51006K020AADA** |
| Horn antenna kit, DN 50 PN 16 316L stainless steel flange 80 mm horn, PTFE emitter [1)2)] | **PBD-51006K050AJAA** |
| Horn antenna kit, DN 50 PN 16 316L stainless steel flange 100 mm horn, PTFE emitter[1)2)] | **PBD-51006K050AJBA** |
| Horn antenna kit, DN 50 PN 16 316L stainless steel flange 150 mm horn, PTFE emitter[1)2)] | **PBD-51006K050AJCA** |
| Horn antenna kit, DN 50 PN 16 316L stainless steel flange 200 mm horn, PTFE emitter[1)2)] | **PBD-51006K050AJDA** |

| | Order No. |
|---|---|
| **SITRANS LR200 PTFE flanged rod antenna kit with 316L stainless steel shield and 316L stainless steel flat faced flange**  | |
| PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 100 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0100AAA** |
| PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 100 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0100EJA** |
| PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 150 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0150AAA** |
| PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 150 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0150EJA** |
| PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 200 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0200AAA** |
| PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 200 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0200EJA** |
| PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 250 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0250AAA** |
| PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 250 mm 316L stainless steel shield.[1)4)] | **PBD-51014K0250EJA** |
| **PTFE paste** | |
| Kit, PTFE paste, Tube, 250 mL | **PBD-51036065** |
| **Cable gland** | |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA | **7ML1930-1AQ** |

1) Available in flange sizes including ASME, DIN and JIS. Please consult a local sales person for details.
2) Available with no pressure rating. Please consult a local sales person for details.
3) Available in other shield lengths. Please consult a local sales person for details.
4) Available with Pressure rating. Please consult a local sales person for details.

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

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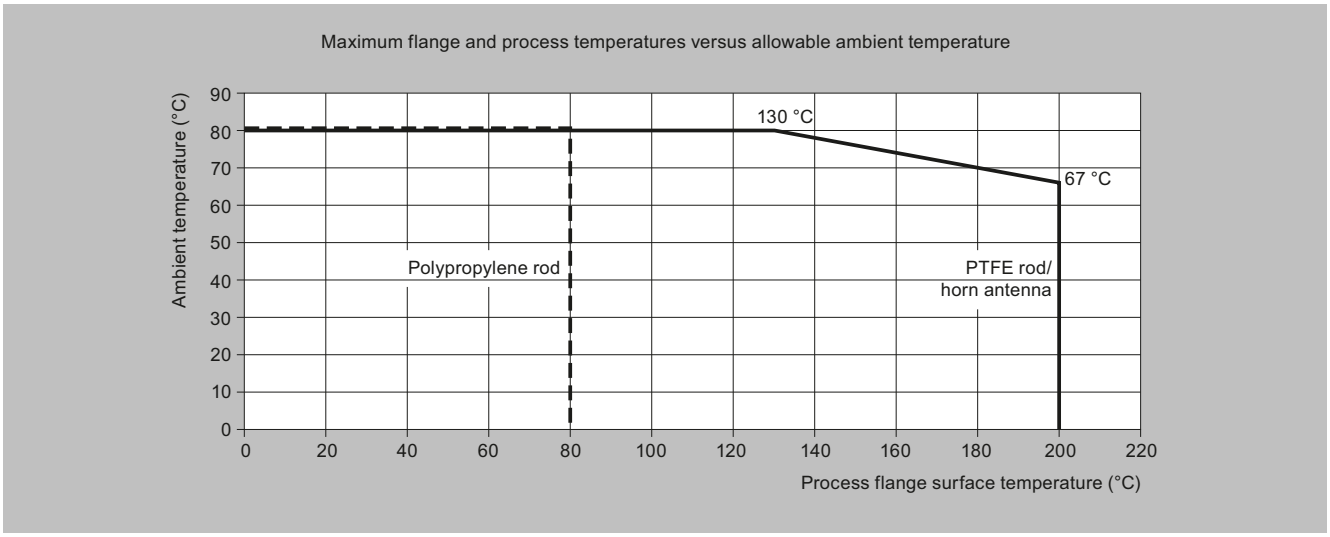
## Technical specifications

| SITRANS LR200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Radar level measurement |
| Frequency | C-band, approx. 6 GHz |
| Measuring range | 0.3 ... 20 m (1.0 ... 65 ft) |
| **Output** | |
| Analog output | 4 ... 20 mA |
| Accuracy | ± 0.02 mA |
| Span | Proportional or inversely proportional |
| Communications | HART<br>Optional: PROFIBUS PA (Profile 3.0, Class B) |
| Fail-safe | Programmable as high, low or hold (Loss of Echo) |
| **Performance (according to reference conditions IEC60770-1)** | |
| From end of antenna to 600 mm | 40 mm (1.57 inch) |
| Remainder of range | 10 mm (0.4 inch) or 0.1 % of span (whichever is greater) |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | $\epsilon_r > 1.6$ (for $\epsilon_r < 3$, use stillpipe) |
| Vessel temperature and pressure | Varies with connection type; see Pressure/Temperature curves for more information |
| **Design** | |
| Enclosure | |
| • Material | Aluminum, polyester powder coated |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Degree of protection | Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68 |
| Weight | < 2.82 kg (6.21 lb) (polypropylene rod antenna) |
| Display (local) | Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages |
| Antenna | |
| • Material | Polypropylene rod, hermetically sealed construction, optional PTFE |
| • Dimensions | Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or optional 250 mm (10 inch) long shield |
| • Optional rods and horn | Refer to SITRANS LR200 Antennas for optional rods and horns |
| Process connections | |
| • Process connection | 1½" NPT [(Taper), ASME B1.20.1]<br>R 1½" [(BSPT), EN 10226],<br>or<br>G 1½" [(BSPP), EN ISO 228-1]<br>(polypropylene rod antenna) |
| • Flange connection | Refer to SITRANS LR200 Antennas for more connections |
| **Power supply** | |
| 4 ... 20 mA/HART | |
| • General Purpose, Non-incendive, Intrinsically Safe | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| • Flame proof, Increased safety, Explosion proof | Nominal 24 V DC (max. 30 V DC) with max. 250 Ω |
| PROFIBUS PA | • 10.5 mA<br>• Per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $CSA_{US/C}$, CE, FM, RCM |
| Marine | • Lloyd's Register of Shipping<br>• ABS Type Approval |
| Radio | FCC, Industry Canada, and European (RED), RCM |
| Hazardous | |
| • Intrinsically Safe (Brazil) | INMETRO Ex ia IIC T4 Ga |
| • Explosion Proof (Canada/USA) | CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4 |
| • Intrinsically Safe (Canada/USA) | CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4 |
| • Non-incendive (USA) | FM, Class I, Div. 2, Groups A, B, C, D, T5 |
| • Flame Proof/Increased Safety (China) | NEPSI Ex d mb ia IIC T4/ Ex e mb ia IIC T4 |
| • Flame Proof (Europe) | ATEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb |
| • Flame Proof (UK) | UKEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb |
| • Increased Safety (Europe) | ATEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb |
| • Increased Safety (UK) | UKEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb |
| • Intrinsically Safe (Europe) | ATEX II 1G Ex ia IIC T4 Ga |
| • Instrinsically Safe (UK) | UKEX II 1G Ex ia IIC T4 Ga |
| • Intrinsically Safe (International) | IECEx Ex ia IIC T4 |
| • Intrinsically Safe (Russia/Kazakhstan) | EAC Ex ia |
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga,<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da,<br>Ta = -20°C to +50°C;<br>UKEX II 1 GD Ex ia op is IIC T4 Ga,<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da,<br>Ta = -20°C to +50°C;<br>CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6,<br>Ta = 50°C;<br>IECEx SIR 09.0073 |
| Handheld communicator | HART communicator 375 |
| PC | • SIMATIC PDM<br>• AMS<br>• SITRANS DTM (for connecting to FDT such as PACTware or Fieldcare) |
| Display (local) | Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages |

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## Characteristic curves

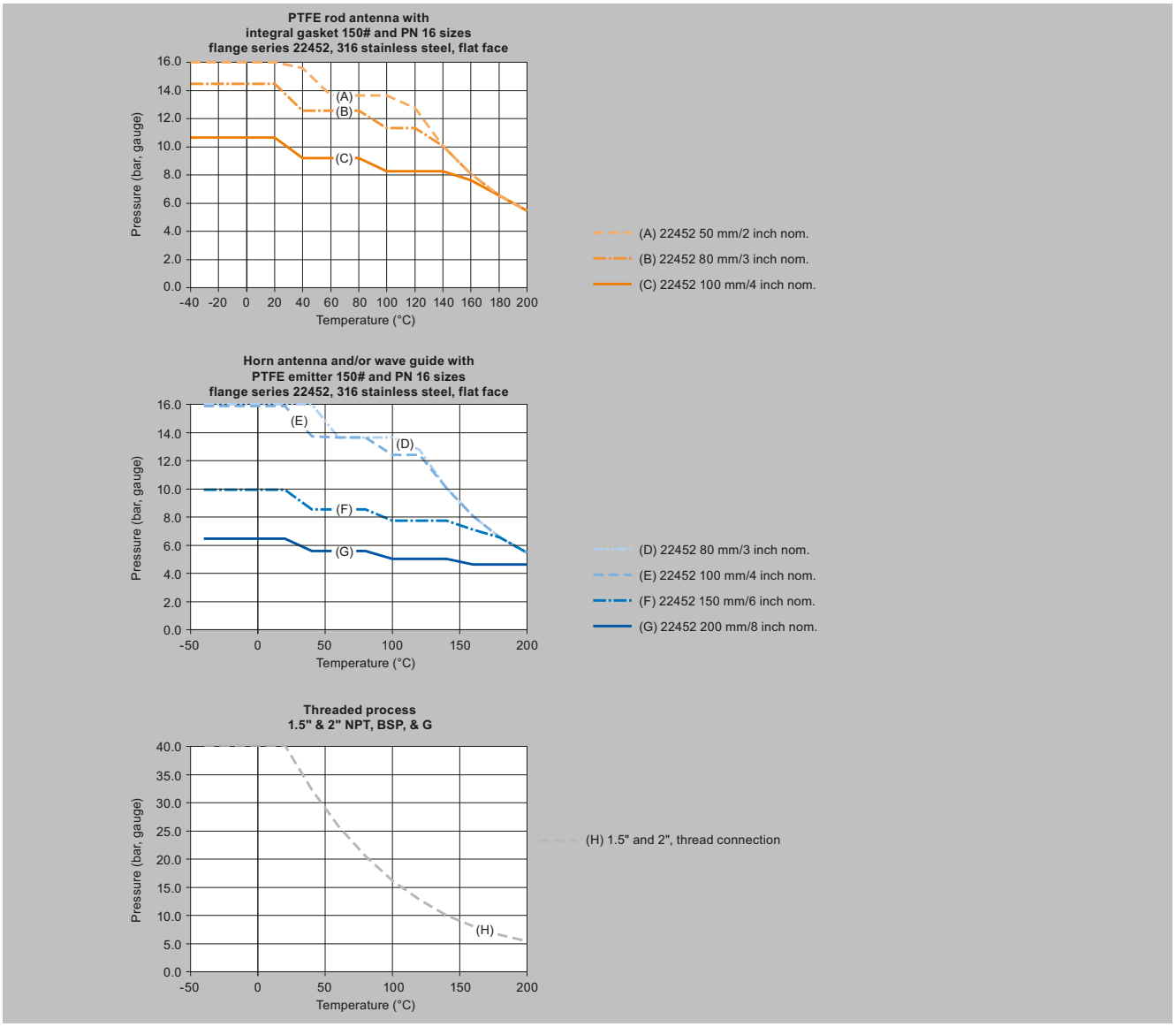



SITRANS LR200 ambient/process flange surface temperature curve

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## Characteristic curves (continued)

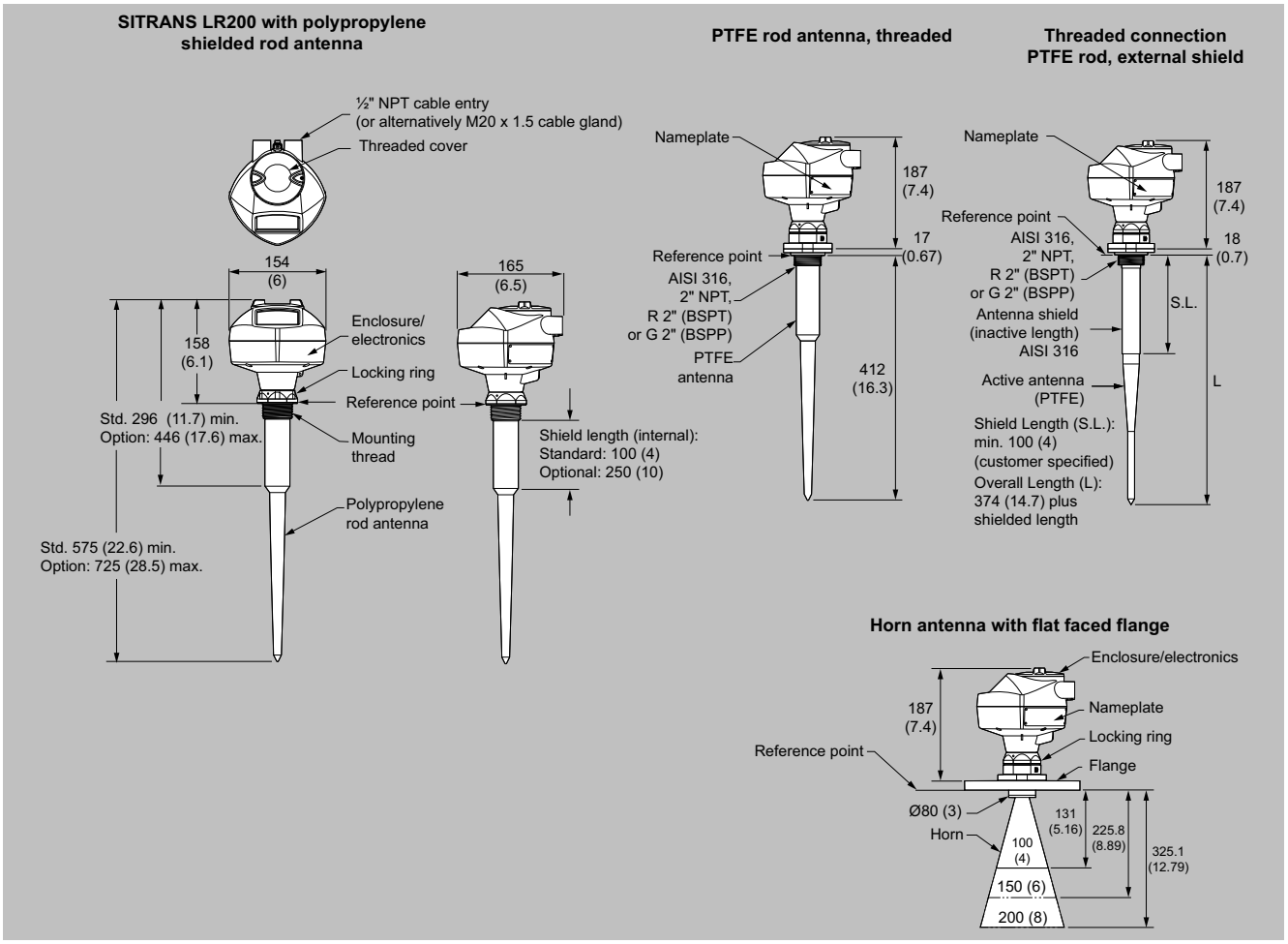



SITRANS LR200 process pressure/temperature derating curves

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## Dimensional drawings

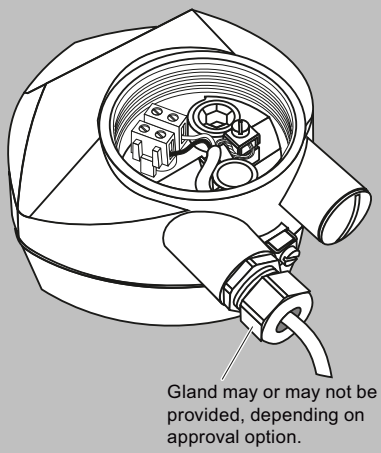


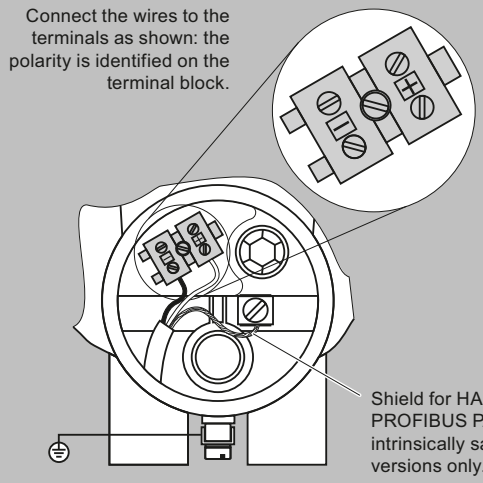

SITRANS LR200, dimensions in mm (inch)

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## Circuit diagrams




**Hand programmer**




Part number:
7ML1930-1BK

**Notes:**

1. DC terminal shall be supplied from an SELV source in accordance with IEC 61010-1 Annex H.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR200 connections

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## Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

## Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1
- Suitable for API 2350

## Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without saving to open the instrument's lid.

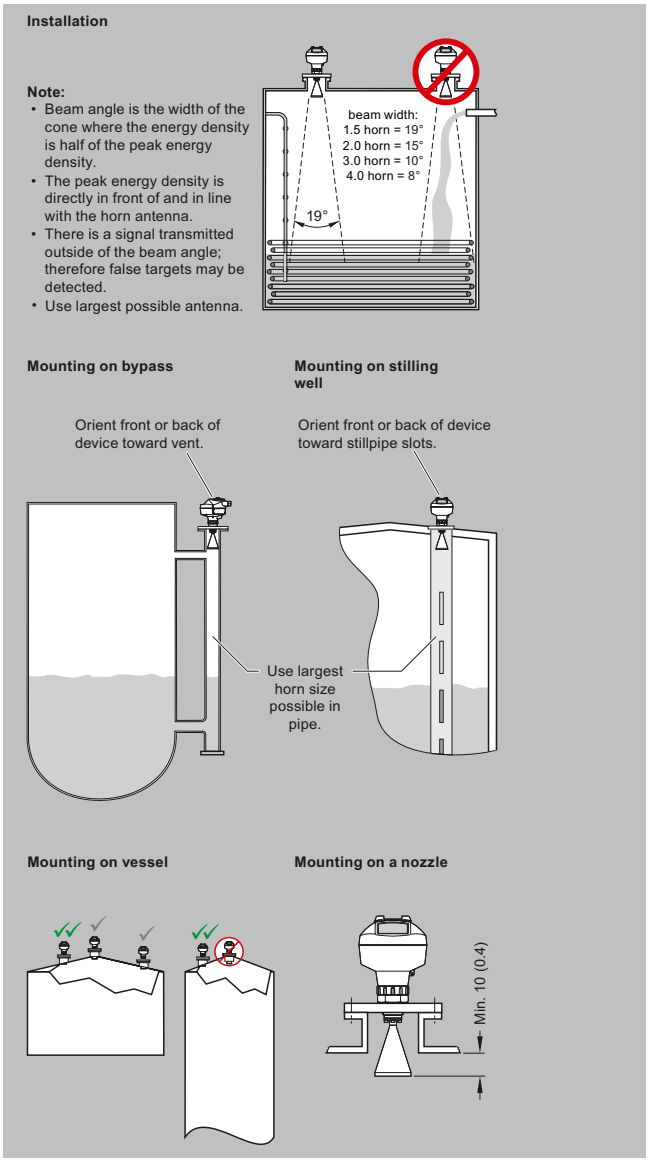
SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

- Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

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## Configuration




SITRANS LR250 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR250 Radar level transmitter<br>Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No.<br>7ML5431- | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process Connection and Antenna Material** | | | | | | | | | | | |
| 316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal[1)] | | 0 | | | | | | | | | |
| 316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal[1)] | | 1 | | | | | | | | | |
| **Process Connection Type** | | | | | | | | | | | |
| ***Threaded connection 316L*** | | | | | | | | | | | |
| 1½" NPT (ASME B1.20.1) (tapered thread)[3)] | | | A | A | | | | | | | |
| R 1½" [(BSPT), EN 10226-1] (tapered thread)[3)] | | | A | B | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1] (parallel thread)[3)] | | | A | C | | | | | | | |
| 2" NPT (ASME B1.20.1) (tapered thread)[4)] | | | A | D | | | | | | | |
| R 2" [(BSPT), EN 10226-1] (tapered thread)[4)] | | | A | E | | | | | | | |
| G 2" [(BSPP), EN ISO 228-1] (parallel thread)[4)] | | | A | F | | | | | | | |
| 3" NPT (ASME B1.20.1) (tapered thread)[4)] | | | A | G | | | | | | | |
| R 3" [(BSPT), EN 10226-1] (tapered thread)[4)] | | | A | H | | | | | | | |
| G 3" [(BSPP), EN ISO 228-1] (parallel thread)[4)] | | | A | J | | | | | | | |
| ***Flanged connection 316L*** | | | | | | | | | | | |
| 2" Class 150 ASME B16.5, raised face[4)] | | | B | D | | | | | | | |
| 3" Class 150 ASME B16.5, raised face[4)] | | | B | E | | | | | | | |
| 4" Class 150 ASME B16.5, raised face[4)] | | | B | F | | | | | | | |
| 2" Class 300 ASME B16.5, raised face[4)] | | | C | D | | | | | | | |
| 3" Class 300 ASME B16.5, raised face[4)] | | | C | E | | | | | | | |
| 4" Class 300 ASME B16.5, raised face[4)] | | | C | F | | | | | | | |
| 50A 10K JIS B 2220 flat face[4)] | | | F | A | | | | | | | |
| 80A 10K JIS B 2220 flat face[4)] | | | F | B | | | | | | | |
| 100A 10K JIS B 2220 flat face[4)] | | | F | C | | | | | | | |
| DN 50 PN 16 EN 1092-1 Type B1 raised face[4)] | | | G | A | | | | | | | |
| DN 80 PN 16 EN 1092-1 Type B1 raised face[4)] | | | G | B | | | | | | | |
| DN 100 PN 16 EN 1092-1 Type B1 raised face[4)] | | | G | C | | | | | | | |
| DN 150 PN 16 EN 1092-1 Type B1 raised face[4)] | | | G | D | | | | | | | |
| DN 50 PN 40 EN 1092-1 Type B1 raised face[4)] | | | H | A | | | | | | | |
| DN 80 PN 40 EN 1092-1 Type B1 raised face[4)] | | | H | B | | | | | | | |
| DN 100 PN 40 EN 1092-1 Type B1 raised face[4)] | | | H | C | | | | | | | |
| DN 150 PN 40 EN 1092-1 Type B1 raised face[4)] | | | H | D | | | | | | | |
| **Communication/Output** | | | | | | | | | | | |
| PROFIBUS PA[5)] | | | | | 1 | | | | | | |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | | | | | 2 | | | | | | |
| **Enclosure/Cable inlet** | | | | | | | | | | | |
| ***Aluminum, Epoxy painted*** | | | | | | | | | | | |
| 2 x ½" NPT | | | | | | | | 0 | | | |
| 2 x M20 x 1.5 | | | | | | | | 1 | | | |
| **Antenna** | | | | | | | | | | | |
| 1½" horn | | | | | | | | | A | | |
| 2" horn (fits 2" ASME or DN 50 nozzles) | | | | | | | | | B | | |
| 3" horn (fits 3" ASME or DN 80 nozzles) | | | | | | | | | C | | |
| 4" horn (fits 4" ASME or DN 100 nozzles) | | | | | | | | | D | | |
| 1½" horn with 100 mm extension | | | | | | | | | E | | |
| 2" horn with 100 mm extension | | | | | | | | | F | | |
| 3" horn with 100 mm extension | | | | | | | | | G | | |
| 4" horn with 100 mm extension | | | | | | | | | H | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM | | | | | | | | | | A | |
| Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada | | | | | | | | | | B | |

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## Selection and ordering data (continued)

| SITRANS LR250 Radar level transmitter<br>Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No.<br>7ML5431- | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrinsically Safe:<br>ATEX II 1G Ex ia IIC T4 Ga,<br>ATEX II 1D Ex ia ta IIIC T100°C Da;<br>UKEX II 1G Ex ia IIC T4 Ga,<br>UKEX II 1D Ex ia ta IIIC T100°C Da;<br>IECEx Ex ia IIC T4 Ga,<br>IECEx 1D Ex ia ta IIIC T100°C Da;<br>INMETRO Ex ia IIC T4 Ga,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X,<br>EAC Ex 0Ex ia ta IIIC T100°C Da X;<br>CE, UKCA, RED, RCM | | | | | | | | | | C | |
| Non-incendive: CSA/FM Class I, Div. 2,<br>Groups A, B, C, D T5, FCC, Industry Canada | | | | | | | | | | D | |
| Increased Safety / Non Sparking:<br>ATEX II 3G Ex ec IIC T4 Gc;<br>UKEX II 3G Ex ec IIC T4 Gc;<br>EAC Ex 2Ex nA IIC T4 Gc X;<br>CE, UKCA, RED, RCM | | | | | | | | | | E | |
| Increased Safety:<br>ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>IECEx Ex eb ia mb IIC T4 Ga/Gb;<br>INMETRO Ex e ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X;<br>CE, UKCA, RED, RCM[6] | | | | | | | | | | F | |
| Flameproof:<br>ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>IECEx Ex db mb ia IIC T4 Ga/Gb,<br>IECEx Ex ia ta IIIC T100°C Da;<br>INMETRO Ex d ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X,<br>EAC Ex Ex ia ta IIIC T100°C Da;<br>CE, UKCA, RED, RCM[6] | | | | | | | | | | G | |
| Explosion proof: CSA/FM Class I, II, and III, Div. 1,<br>Groups A, B, C, D, E, F, G, FCC, Industry Canada[6] | | | | | | | | | | H | |
| Non Sparking: NEPSI Ex nA IIC T4 Gc | | | | | | | | | | K | |
| Intrinsically Safe: NEPSI Ex ia IIC T4 Ga,<br>Ex iaD tD A20 IP67 T100 °C | | | | | | | | | | L | |
| Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[6] | | | | | | | | | | M | |
| Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[6] | | | | | | | | | | N | |
| **Pressure rating** | | | | | | | | | | | |
| Rating per Pressure/Temperature curves in manual | | | | | | | | | | | 0 |
| 0.5 bar g (7.25 psi g) maximum[7] | | | | | | | | | | | 1 |

1) Available with process connection options AA ... HD and Antenna Versions A ... H only.
2) Available with process connection options JA ... MH and Antenna Versions J ... P only.
3) Not available with Antenna options B, C, D, F, G, H.
4) Not available with Antenna options A and E.
5) Available with Approval options A, B, C, D, K, and L.
6) Available only with Communications option 2.
7) Available with Process Connection and Antenna Material 0, 1, 2, and 3 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Plug M12 with mating Connector[1)2)3)] | **A50** |

| Selection and Ordering data | Order code |
|---|---|
| Plug 7/8" with mating Connector[2)3)4)] | **A55** |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]:<br>Measuring-point number/identification<br>(max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's Test Certificate: M to DIN 55350,<br>Part 18 and to ISO 9000 | **C11** |

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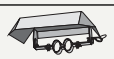
## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Material inspection certificate 3.1 of EN 10204 | **C12** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[3)5)] | **C20** |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[5)] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required) | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (two are required)[6)] | **7ML1930-1AQ** |
| FDA approved FKM O-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F) | **7ML1830-3AN** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available with enclosure option 1 only.
2) To be used with communication options 1 and 3 only. Connector has IP67 rating.
3) Available with approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.
4) Available with enclosure option 0 only.
5) Applicable to communication option 2 only.
6) For use with communication options 1 and 3 only.

### *Selection and Ordering Data*

| SITRANS LR250 Spare parts | |
|---|---|
| **SITRANS LR250 horn version enclosures (PROFIBUS PA models)** |  |
| SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E01156836** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E01156838** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection | **A5E01156841** |
| SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection | **A5E01156843** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection | **A5E01156844** |
| SITRANS LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS communication, no process connection | **A5E01156846** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection | **A5E01156848** |
| **SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)** |  |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E02956317** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection | **A5E02956319** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection | **A5E02956320** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection | **A5E02956322** |
| SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection | **A5E02956323** |
| LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E03441096** |
| LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection | **A5E03441097** |
| LR250 horn version enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection | **A5E03441099** |
| **Sun shield for SITRANS LR250 enclosure, stainless steel** |  **A5E39142556** |
| **SITRANS LR250 horn antenna and extension kits** |  |
| 38 mm (1.5 inch) horn antenna kit, 1.5 inch Process Connections only | **A5E01151539** |
| 100 mm (4 inch) horn antenna extension kit, 1.5 inch process connections only | **A5E01151553** |
| 50 mm (2 inch) stainless steel 316L horn antenna kit | **A5E01151569** |
| 75 mm (3 inch) stainless steel 316L horn antenna kit | **A5E01151571** |
| 100 mm (4 inch) stainless steel 316L horn antenna kit | **A5E01151573** |
| 100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch), and 100 mm (4 inch) process connection | **A5E01151577** |
| 5 Dupont 1Gr Polyback, PTFE grease kit | **A5E01151626** |
| SITRANS LR250 lid with O-ring | **A5E02465410** |
| **Ex-proof plugs** | |
| Ex-proof plugs kit, 1/2" NPT, qty 5 | **A5E39979991** |
| Ex-proof plugs kit, M20, qty 5 | **A5E39979992** |
| **Emitter kit for SITRANS LR250 horn antenna** | |
| Emitter kit for horn antenna | **A5E39242718** |

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## Selection and ordering data (continued)

For special requests please consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

## Technical specifications

| SITRANS LR250 Horn Antenna | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Radar level measurement |
| Frequency | K-band (25.0 GHz) |
| Minimum measuring range | 50 mm (2 inch) from end of antenna |
| Maximum measuring range | 20 m (65 ft), antenna dependent |
| **Output** | |
| HART | Version 5.1 |
| • Analog output | 4 ... 20 mA |
| • Accuracy | ± 0.02 mA |
| • Fail-safe | • Programmable as high low or hold (loss of echo)<br>• NE 43 programmable |
| PROFIBUS PA | Profile 3.01 |
| • Function blocks | 2 Analog Input (AI) |
| **Performance (according to reference conditions IEC60770-1)** | |
| Maximum measured error | 3 mm (0.118 inch) |
| Influence of ambient temperature | < 0.003 %/K |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | > 1.6, antenna and application dependent |
| Process temperature | -40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM O-ring)<br>-20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM O-ring) |
| Process pressure | Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information |
| **Design** | |
| Enclosure | |
| • Material | Aluminum, polyester powder-coated |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 |
| Weight | < 3 kg (6.6 lb) 3.75 mm (1½ inch) threaded connection with 1½" horn antenna |
| Display (local) | Graphic local user interface including quick start wizard and echo profile display |
| Antenna | |
| • Material | 316L stainless steel |
| • Dimensions (nominal horn sizes) | Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn, and optional 100 mm (4 inch) horn extension |
| Process connections | |
| • Process connection | 1½", 2" or 3" NPT [(Taper), ASME B1.20.1]<br>R 1½", 2" or 3" [(BSPT), EN 10226]<br>G 1½", 2" or 3" [(BSPP), EN ISO 228-1] |

## Technical specifications (continued)

| SITRANS LR250 Horn Antenna | |
|---|---|
| • Flange connection | 2", 3", 4" (ASME 150, 300 lb),<br>50, 80, 100 mm (PN 16, 40, JIS 10K) |
| **Power supply** | |
| 4 ... 20 mA/HART | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| PROFIBUS PA | • 15 mA<br>• Per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $_{C}$CSA$_{US}$, CE, UKCA, FM, RCM |
| Radio | FCC, Industry Canada, RED, RCM |
| Hazardous | |
| • Explosion Proof (Brazil) | INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Increased Safety (Brazil) | INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Intrinsically Safe (Brazil) | INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da |
| • Explosion Proof (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Intrinsically Safe (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Non-incendive (Canada/USA) | CSA/FM Class I, Div. 2, Groups A, B, C, D T5 |
| • Flame Proof/Increased Safety (China) | NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C |
| • Intrinsically Safe (China) | NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C |
| • Non-sparking (China) | NEPSI Ex nA IIC T4 Gc |
| • Intrinsically Safe (EU) | ATEX II 1G Ex ia IIC T4 Ga,<br>ATEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (UK) | UKEX II 1G Ex ia IIC T4 Ga,<br>UKEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (International) | IECEx Ex ia IIC T4 Ga,<br>IECEx Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 2 (EU) | ATEX II 3G Ex ec IIC T4 Gc; |
| • Increased Safety - Zone 2 (UK) | UKEX II 3G Ex ec IIC T4 Gc; |
| • Non-sparking (EAC) | EAC Ex 2Ex nA IIC T4 Gc; |
| • Flameproof (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (International) | IECEx Ex db mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (International) | IECEx<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da |
| • Explosion Proof (Russia/Kazakhstan) | EAC Ex d |
| • Increased Safety (Russia/Kazakhstan) | EAC Ex e |

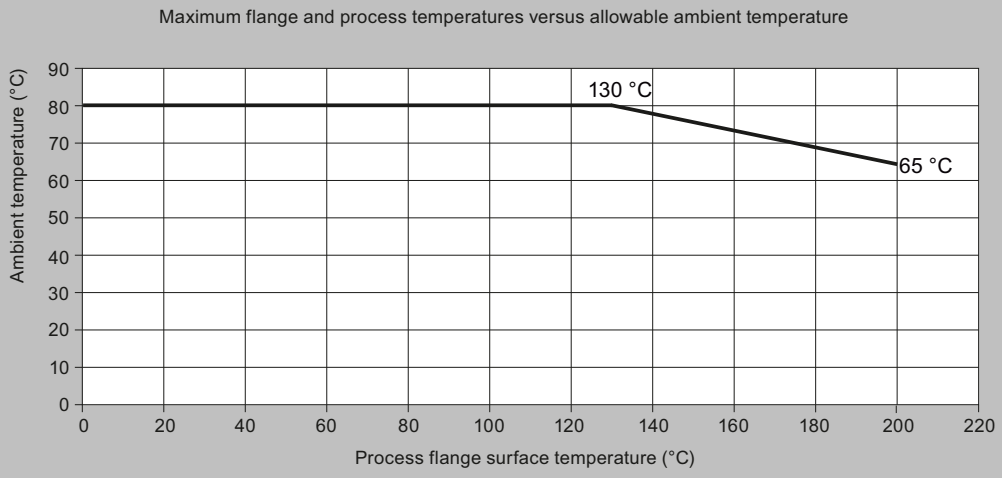
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## Technical specifications (continued)

| SITRANS LR250 Horn Antenna | |
|---|---|
| • Intrinsically Safe (Russia/Kazakhstan) | EAC Ex ia |
| • Marine | • Lloyd's Register of Shipping<br>• ABS Type Approval<br>• Bureau Veritas |
| • Functional Safety | SIL-2 suitable in accordance with IEC 61508/61511 |
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da<br>UKEX II 1 GD Ex ia op is IIC T4 Ga<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da<br>Ta = -20 ... +50°C<br>CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6<br>Ta = 50°C<br>IECEx SIR 09.0073 |
| Handheld communicator | HART communicator 375/475 |
| PC | • SIMATIC PDM<br>• Emerson AMS<br>• SITRANS DTM (for connection into FDT such as PACTware or Fieldcare) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile displays |

## Characteristic curves



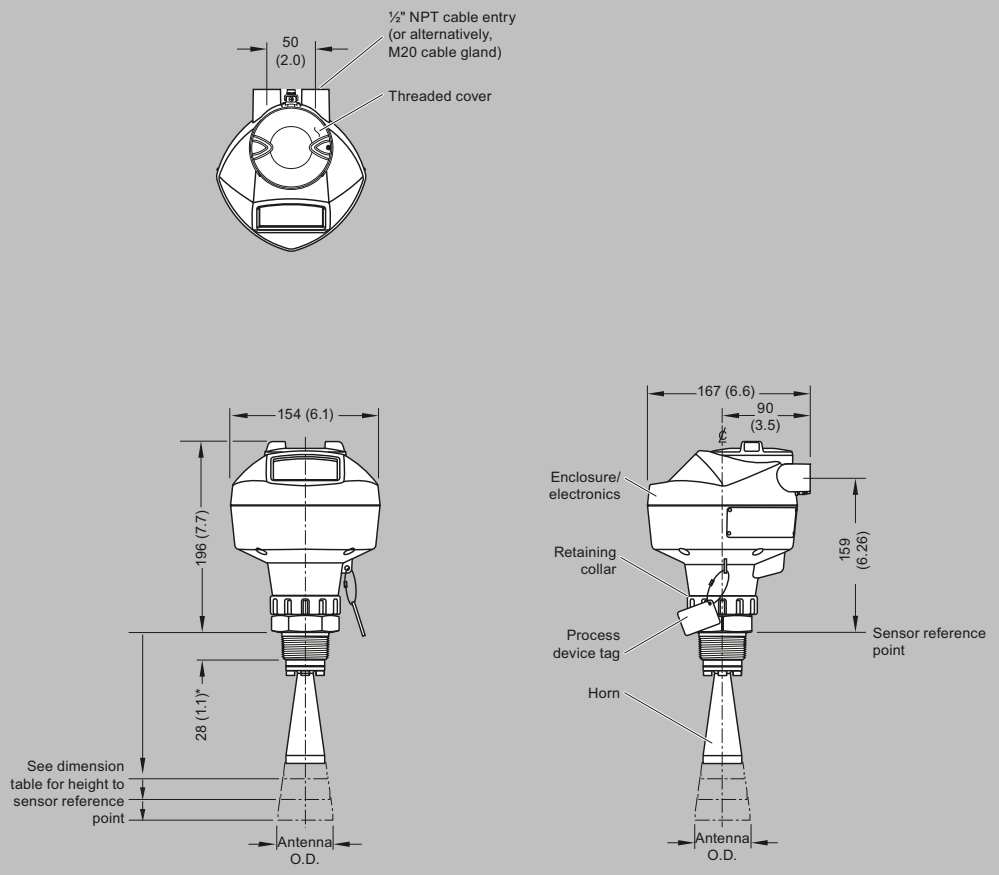

SITRANS LR250 ambient/process flange surface temperature curve

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## Dimensional drawings

**Threaded Horn Antenna**




*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

| Antenna Type | Antenna O.D. | Height to sensor reference point | | | Beam angle | Measurement range |
|---|---|---|---|---|---|---|
| | | 1-1/2" threaded connection | 2" threaded connection | 3" threaded connection | | |
| 1.5" horn | 39.8 (1.57) | 135 (5.3) | N/A | N/A | 19 degrees | 10 m (32.8 ft) |
| 2" horn | 47.8 (1.88) | N/A | 166 (6.55) | 180 (7.09) | 15 degrees | 20 m (65.6 ft) |
| 3" horn | 74.8 (2.94) | N/A | 199 (7.85) | 213 (8.39) | 10 degrees | 20 m (65.6 ft) |
| 4" horn | 94.8 (3.73) | N/A | 254 (10) | 268 (10.55) | 8 degrees | 20 m (65.6 ft) |

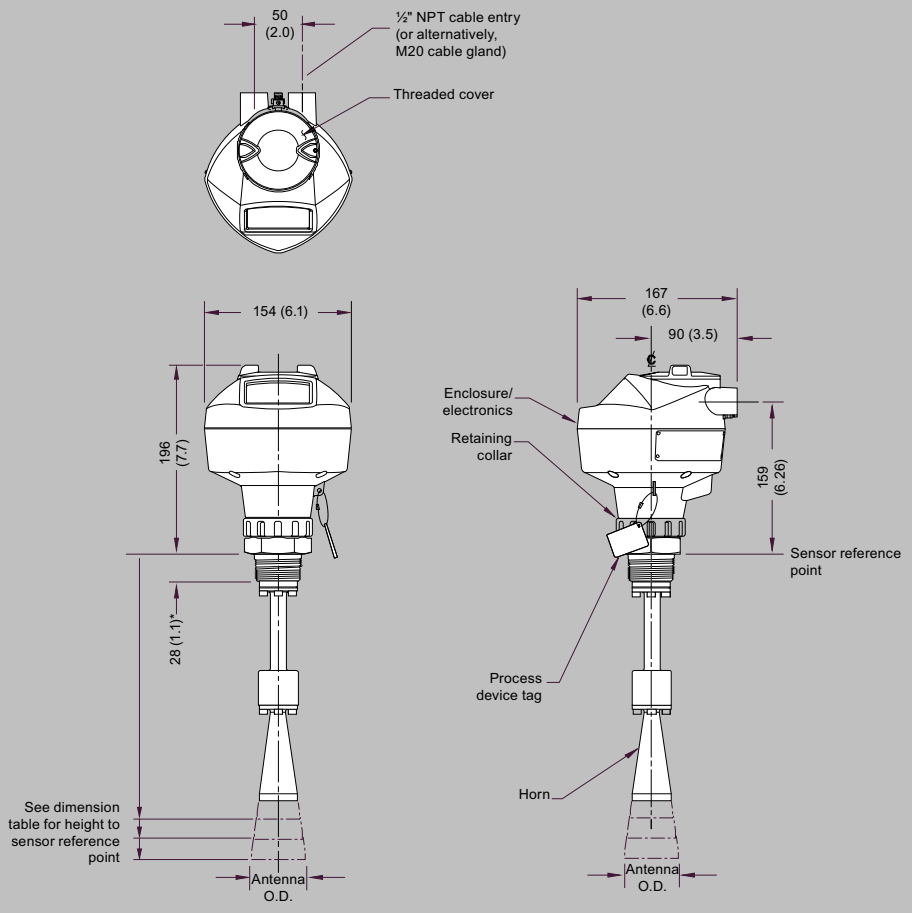
SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

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## Dimensional drawings (continued)

**Threaded Horn Antenna with Extension**




*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

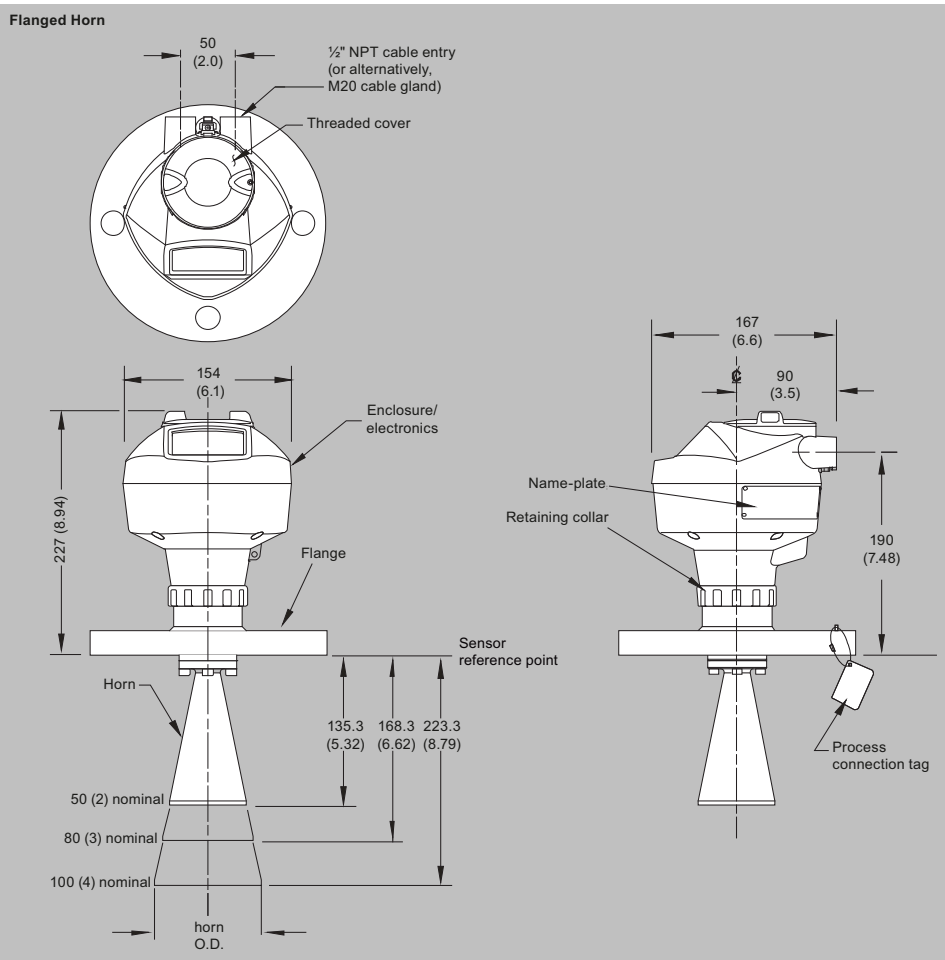
| Antenna Type | Antenna O.D. | Height to sensor reference point | | | Beam angle | Measurement range |
|---|---|---|---|---|---|---|
| | | 1-1/2" threaded connection | 2" threaded connection | 3" threaded connection | | |
| 1.5" horn | 39.8 (1.57) | 235 (9.3) | N/A | N/A | 19 degrees | 10 m (32.8 ft) |
| 2" horn | 47.8 (1.88) | N/A | 266 (10.47) | 280 (11.02) | 15 degrees | 20 m (65.6 ft) |
| 3" horn | 74.8 (2.94) | N/A | 299 (11.77) | 313 (12.32) | 10 degrees | 20 m (65.6 ft) |
| 4" horn | 94.8 (3.73) | N/A | 354 (13.94) | 368 (14.49) | 8 degrees | 20 m (65.6 ft) |

SITRANS LR250 Threaded Horn Antenna with extension, dimensions in mm (inch)

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## Dimensional drawings (continued)




| Nominal Horn Size | Horn O.D. | Height to sensor reference point | | Beam angle | Measurement range |
|---|---|---|---|---|---|
| | | Stainless steel flange raised or flat-faced | Optional alloy flange | | |
| 50 (2) | 47.8 (1.88) | 135.3 (5.32) | 138.3 (5.44) | 15 degrees | 20 m (65.6 ft) |
| 80 (3) | 74.8 (2.94) | 168.3 (6.62) | 171.3 (6.74) | 10 degrees | 20 m (65.6 ft) |
| 100 (4) | 94.8 (3.73) | 223.3 (8.79) | 226.3 (8.90) | 8 degrees | 20 m (65.6 ft) |

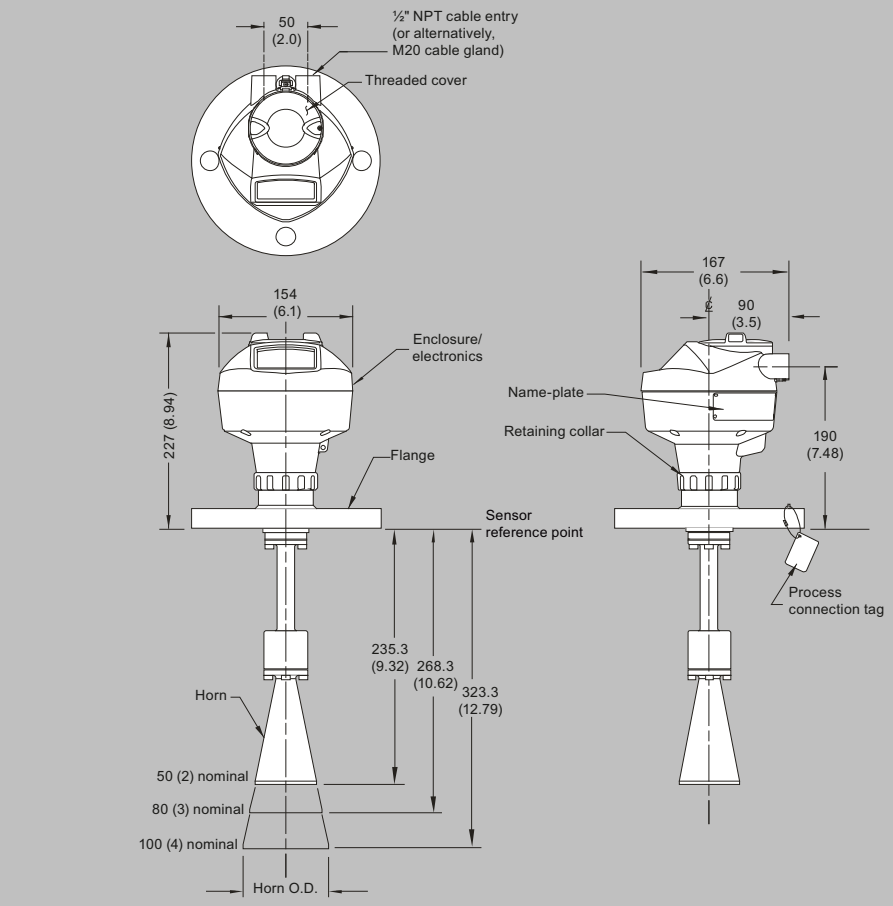
SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

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## Dimensional drawings (continued)

**Flanged Horn with Extension**



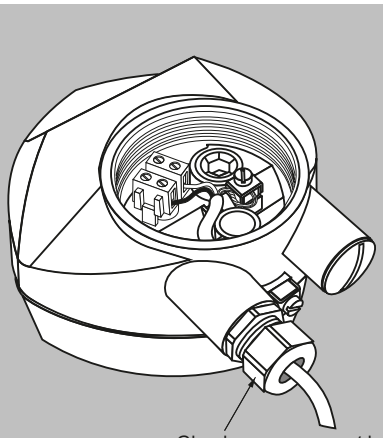

| Nominal Horn Size | Horn O.D. | Height to sensor reference point | | Beam angle | Measurement range |
|---|---|---|---|---|---|
| | | Stainless steel flange raised or flat-faced | Optional alloy flange | | |
| 50 (2) | 47.8 (1.88) | 235.3 (9.26) | 238.3 (9.38) | 15 degrees | 20 m (65.6 ft) |
| 80 (3) | 74.8 (2.94) | 268.3 (10.56) | 271.3 (10.68) | 10 degrees | 20 m (65.6 ft) |
| 100 (4) | 94.8 (3.73) | 323.3 (12.73) | 326.3 (12.85) | 8 degrees | 20 m (65.6 ft) |

SITRANS LR250 Flanged Horn Antenna with extension, dimensions in mm (inch)

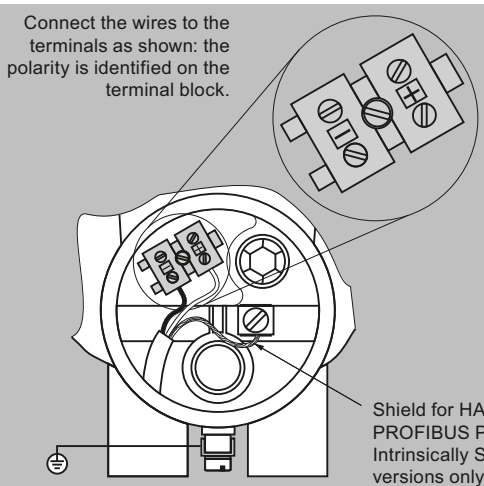
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## Circuit diagrams



Gland may or may not be provided depending on approval option.




**Hand Programmer**




Part number:
7ML1930-1BK

**Notes:**

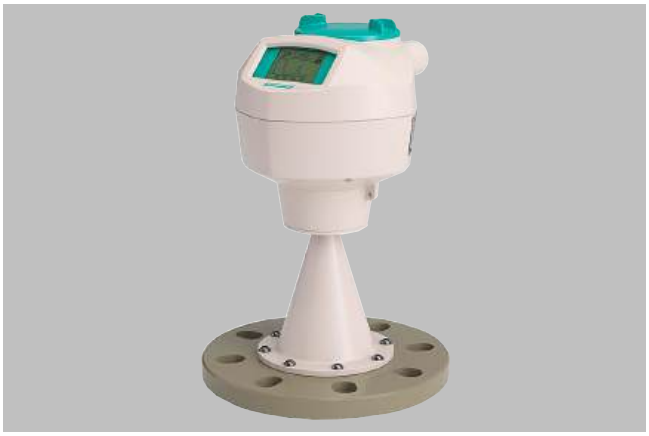
1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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## Overview



SITRANS LR250 Polypropylene lens antenna is a 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosive materials to a range of 20 m (65.6 ft).

## Benefits

- For use in chemical environments where aggressive and corrosive materials are present.
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared, Intrinsically Safe, handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

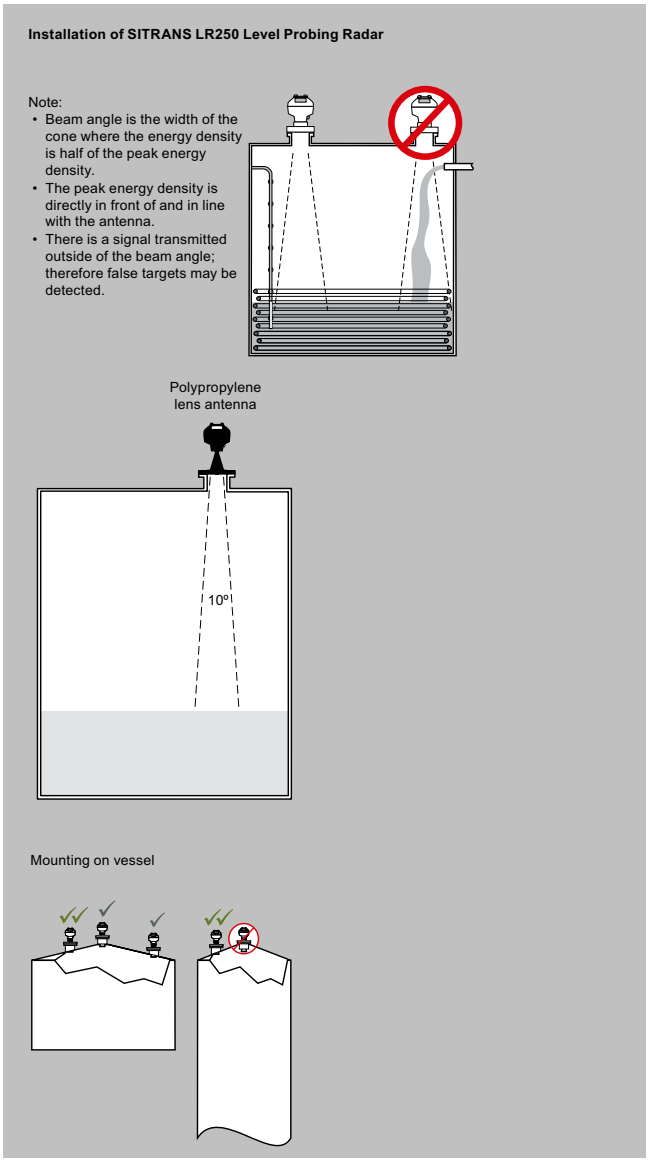
## Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, corrosive and aggressive materials.

## Configuration

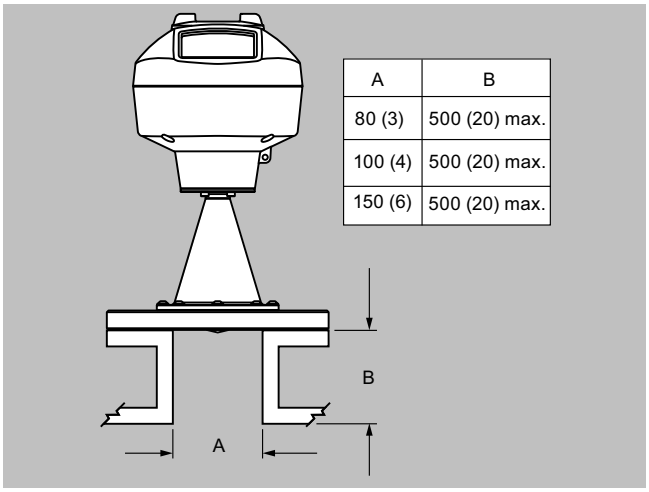



SITRANS LR250 Polypropylene lens antenna installation

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## Configuration (continued)




| A | B |
|---|---|
| 80 (3) | 500 (20) max. |
| 100 (4) | 500 (20) max. |
| 150 (6) | 500 (20) max. |

SITRANS LR250 Polypropylene lens antenna, mounting on a nozzle, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR250 Radar level transmitter<br>Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No.<br>7ML5431- | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process Connection and Antenna Material** | | | | | | | | | | | |
| Painted aluminum 3" horn antenna[1)] | | 5 | | | | | | | | | |
| **Process Connection Type** | | | | | | | | | | | |
| ***Engineered polymer flange connections*** | | | | | | | | | | | |
| Without flange, without mounting bracket, no polypropylene lens | | | Q | A | | | | | | | |
| Without flange, with mounting bracket, no polypropylene lens | | | Q | B | | | | | | | |
| ***Universal polymeric flange, flat face, with polypropylene lens, FKM seal*** | | | | | | | | | | | |
| DN80 PN16, ANSI 3", 150 lb, DN80 PN16/10K | | | Q | C | | | | | | | |
| DN100 PN16, ANSI 4", 150 lb, DN100 PN16/10K | | | Q | D | | | | | | | |
| DN150 PN16, ANSI 6", 150 lb, DN150 PN16/10K | | | Q | E | | | | | | | |
| **Communication/Output** | | | | | | | | | | | |
| PROFIBUS PA | | | | | 1 | | | | | | |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | | | | | 2 | | | | | | |
| **Enclosure/Cable inlet** | | | | | | | | | | | |
| ***Aluminum, Epoxy painted*** | | | | | | | | | | | |
| 2 x ½" NPT | | | | | | | | 0 | | | |
| 2 x M20 x 1.5 | | | | | | | | 1 | | | |
| **Antenna** | | | | | | | | | | | |
| 3 inch (80 mm) polypropylene lens antenna | | | | | | | | | S | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM | | | | | | | | | | A | |
| Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada | | | | | | | | | | B | |
| Intrinsically Safe:<br>ATEX II 1G Ex ia IIC T4 Ga,<br>ATEX II 1D Ex ia ta IIIC T100°C Da;<br>UKEX II 1G Ex ia IIC T4 Ga,<br>UKEX II 1D Ex ia ta IIIC T100°C Da;<br>IECEx Ex ia IIC T4 Ga,<br>IECEx 1D Ex ia ta IIIC T100°C Da;<br>INMETRO Ex ia IIC T4 Ga,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X,<br>EAC Ex 0Ex ia ta IIIC T100°C Da X;<br>CE, UKCA, RED, RCM | | | | | | | | | | C | |
| Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada | | | | | | | | | | D | |
| Increased Safety / Non Sparking:<br>ATEX II 3G Ex ec IIC T4 Gc;<br>UKEX II 3G Ex ec IIC T4 Gc;<br>EAC Ex 2Ex nA IIC T4 Gc X;<br>CE, UKCA, RED, RCM | | | | | | | | | | E | |
| Increased Safety:<br>ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>IECEx Ex eb ia mb IIC T4 Ga/Gb;<br>INMETRO Ex e ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X;<br>CE, UKCA, RED, RCM[2)] | | | | | | | | | | F | |
| Flameproof:<br>ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>IECEx Ex db mb ia IIC T4 Ga/Gb,<br>IECEx Ex ia ta IIIC T100°C Da;<br>INMETRO Ex d ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X,<br>EAC Ex Ex ia ta IIIC T100°C Da;<br>CE, UKCA, RED, RCM[2)] | | | | | | | | | | G | |
| Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[2)] | | | | | | | | | | H | |

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## Selection and ordering data (continued)

| SITRANS LR250 Radar level transmitter Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries. | Article No. 7ML5431- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● | |
| Non Sparking: NEPSI Ex nA IIC T4 Gc | | | | | | | | | | K | |
| Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 $T_A$90 °C | | | | | | | | | | L | |
| Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 $T_A$90 °C[2] | | | | | | | | | | M | |
| Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 $T_A$90 °C[2] | | | | | | | | | | N | |
| **Pressure rating** | | | | | | | | | | | |
| 0.5 bar (7.25 psi g) max. | | | | | | | | | | | 1 |
| Rating per Pressure/Temperature curves in manual[3] | | | | | | | | | | | 2 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Plug M12, incl. cable socket, IP68[4][5][6] | **A50** |
| Plug 7/8", incl. cable socket, IP68[5][6][7] | **A55** |
| Long tag (device parameter, max. 27 characters) plate stainless steel 304/1.4301 | **Y15** |
| Factory test certificate - M to DIN 55350, Part 18 | **C11** |
| Inspection certificate 3.1 (EN 10204) - material of pressure-containing and wetted parts | **C12** |
| Namur NE43 compliant: device preset to failsafe < 3.6 mA[2] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Mounting bracket suitable for wall or ceiling mounting, for aluminum painted horn versions only | **A5E46342367** |
| Polypropylene lens replacement kit, polypropylene lens antenna and polymeric flange versions | **A5E46342366** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[9] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA | **7ML1930-1AQ** |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |
| FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F) | **7ML1830-3AN** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available only with Process connection options QA ... QE and Antenna option S.
2) Available only with Communication option 2 and Process connection and antenna material option 4.
3) Available only with Process connection and Antenna material option 5 and Process connection type option QC.
4) Available only with Enclosure option 1.
5) Available only with Communication options 1 and 3.
6) Available only with Approval options A, B, C, and L.
7) Available only with Enclosure option 0.
8) Available only with Approval options A, B, C, D, E, K, and L.
9) Product shipped with plastic cable gland, rated to -20 °C (-4 °F). If -40 °C (-40 °F) rating required, then metallic cable gland is recommended.

| SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials | Article No. |
|---|---|
| **SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)** | |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E03588171** |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E03588253** |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection | **A5E03588512** |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection | **A5E03589260** |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection | **A5E03589262** |
| SITRANS LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection | **A5E03589264** |
| SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models) | |
| SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models) | |
| SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E03569747** |
| SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E03586807** |
| SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection | **A5E03586854** |
| SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection | **A5E03586887** |
| SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection | **A5E03586961** |
| SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection | **A5E03587012** |

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## Selection and ordering data (continued)

| SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials | |
|---|---|
| SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection | **A5E03587132** |
| SITRANS LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection | **A5E03587223** |
| SITRANS LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection | **A5E03588125** |

| SITRANS LR250 Polypropylene Lens Antenna and Threaded PVDF Specials | |
|---|---|
| SITRANS LR250 threaded PVDF antenna kits | |
| Antenna kit 2" NPT threaded PVDF | **A5E03528941** |
| Antenna kit 2" R (BSPT) threaded PVDF | **A5E03528943** |
| Antenna kit 2" G (BSPP) threaded PVDF | **A5E03528947** |
| Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher, and loctite | **A5E03528948** |
| Ex-proof plugs | |
| Ex-proof plugs kit, 1/2" NPT, qty 5 | **A5E39979991** |
| Ex-proof plugs kit, M20, qty 5 | **A5E39979992** |

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## Technical specifications

| SITRANS LR250 Polypropylene Lens Antenna | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Radar level measurement |
| Frequency | K-band (25.0 GHz) |
| Minimum measuring range | 50 mm (2 inch) from end of antenna |
| Maximum measuring range | 20 m (66 ft) |
| **Output** | |
| HART | Version 5.1 |
| • Analog output | 4 ... 20 mA |
| • Accuracy | ± 0.02 mA |
| • Fail-safe | • Programmable as high, low or, hold (loss of echo)<br>• NE 43 programmable |
| PROFIBUS PA | Profile 3.1 |
| • Function blocks | 2 Analog Input (AI) |
| **Performance (according to reference conditions IEC 60770-1)** | |
| Maximum measured error | • > 500 mm from sensor reference point: 3 mm (0.118 inch)<br>• < 500 mm from sensor reference point: 25 mm (1 inch) |
| Influence of ambient temperature | < 0.003 %/K |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | > 1.6 |
| Process temperature | -40 ... +80 °C (-40 ... +176 °F) at process connection |
| Process pressure | Up to 5 bar g (72 psi g) temperature dependent. |
| **Design** | |
| Enclosure | |
| • Material | Aluminum, polyester powder-coated |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 |
| Weight | Polypropylene lens antenna with 3 inch (80 mm) polypropylene flange<br>• Approximately 3.4 kg (7.5 lb) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile display |
| Polypropylene lens antenna | |
| • Materials | • Polyester powder coated exterior<br>• 3 inch cast aluminum<br>• Polypropylene lens<br>• FKM seal |
| • Process connections | |
| - Material | Polypropylene |
| - Dimensions | Universal flange: 3 inch (80 mm), 4 inch (100 mm), 6 inch (150 mm) |

## Technical specifications (continued)

| SITRANS LR250 Polypropylene Lens Antenna | |
|---|---|
| **Power supply** | |
| 4 ... 20 mA/HART | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| PROFIBUS PA | • 15 mA<br>• per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $_{c}CSA_{US}$, CE, UKCA, FM, RCM |
| Radio | FCC, Industry Canada, RED, RCM |
| Hazardous | |
| • Explosion Proof (Brazil) | INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Increased Safety (Brazil) | INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Intrinsically Safe (Brazil) | INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da |
| • Explosion Proof (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Intrinsically Safe (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Non-incendive (Canada/USA) | CSA/FM Class I, Div. 2, Groups A, B, C, D T5 |
| • Flame Proof/Increased Safety (China) | Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 $T_A$90 °C |
| • Intrinsically Safe (China) | Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 $T_A$ 90 °C |
| • Non-sparking (China) | NEPSI Ex nA IIC T4 Gc |
| • Intrinsically Safe (EU) | ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (UK) | UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (International) | IECEx Ex ia IIC T4 Ga, IECEx Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 2 (EU) | ATEX II 3G Ex ec IIC T4 Gc; |
| • Increased Safety - Zone 2 (UK) | UKEX II 3G Ex ec IIC T4 Gc; |
| • Non-sparking (EAC) | EAC Ex 2Ex nA IIC T4 Gc; |
| • Flameproof (EU) | ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da; |
| • Flameproof (UK) | UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC Ga/Gb, Ex ia ta IIIC T100°C Da |
| • Flameproof (International) | IECEx Ex db mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (EU) | ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (UK) | UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (International) | IECEx Ex eb mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100°C Da |
| • Explosion Proof (Russia/Kazakhstan) | EAC Ex d |
| • Increased Safety (Russia/Kazakhstan) | EAC Ex e |
| • Intrinsically Safe (Russia/Kazakhstan) | EAC Ex ia |
| • Marine | • Lloyd's Register of Shipping<br>• ABS Type Approval<br>• Bureau Veritas |

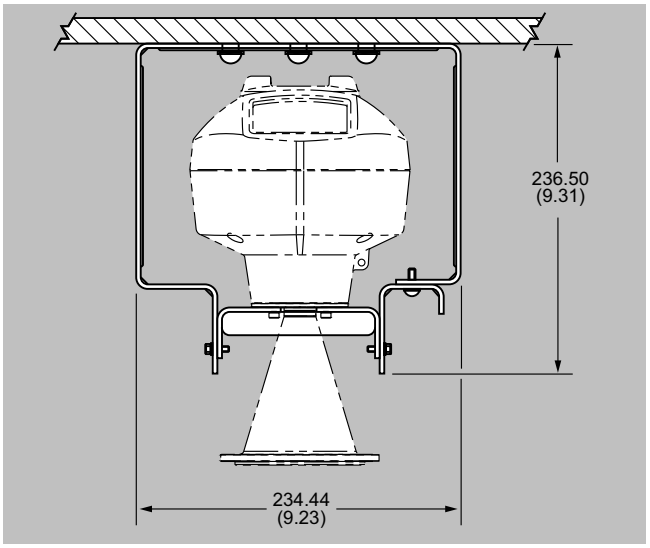
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## Technical specifications (continued)

| SITRANS LR250 Polypropylene Lens Antenna | |
|---|---|
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da<br>UKEX II 1 GD Ex ia op is IIC T4 Ga<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da<br>Ta = -20 ... +50°C<br>CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6<br>Ta = 50°C<br>IECEx SIR 09.0073 |
| Handheld communicator | HART communicator 375/475 |
| PC | • SIMATIC PDM<br>• Emerson AMS<br>• SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile displays. |

## Options

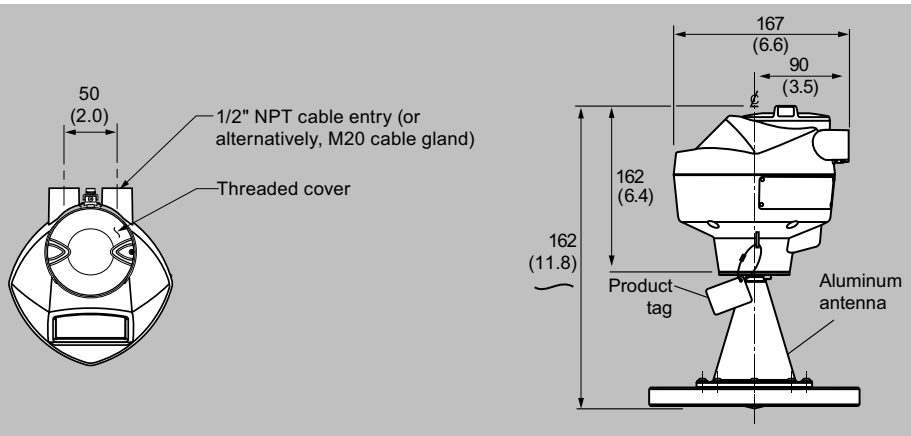



SITRANS LR250 Polypropylene lens antenna, wall/ceiling mount

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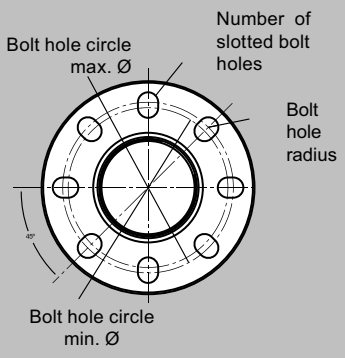


## Dimensional drawings




| Nominal pipe size | OD ± 1 | B.C.D. max. for slotted holes (bmax.) ± 0.75 | B.C.D. min. for slotted holes (bmin.) ± 0.75 | Bolt hole radius ± 0.25 | Number of slotted holes |
|---|---|---|---|---|---|
| 3 | 200 | 160 | 150 | R 9.5 | 8 |
| 4 | 229 | 191 | 175 | R 9.5 | 8 |
| 6 | 285 | 242 | 240 | R 11.5 | 8 |

**Polypropylene Flange**

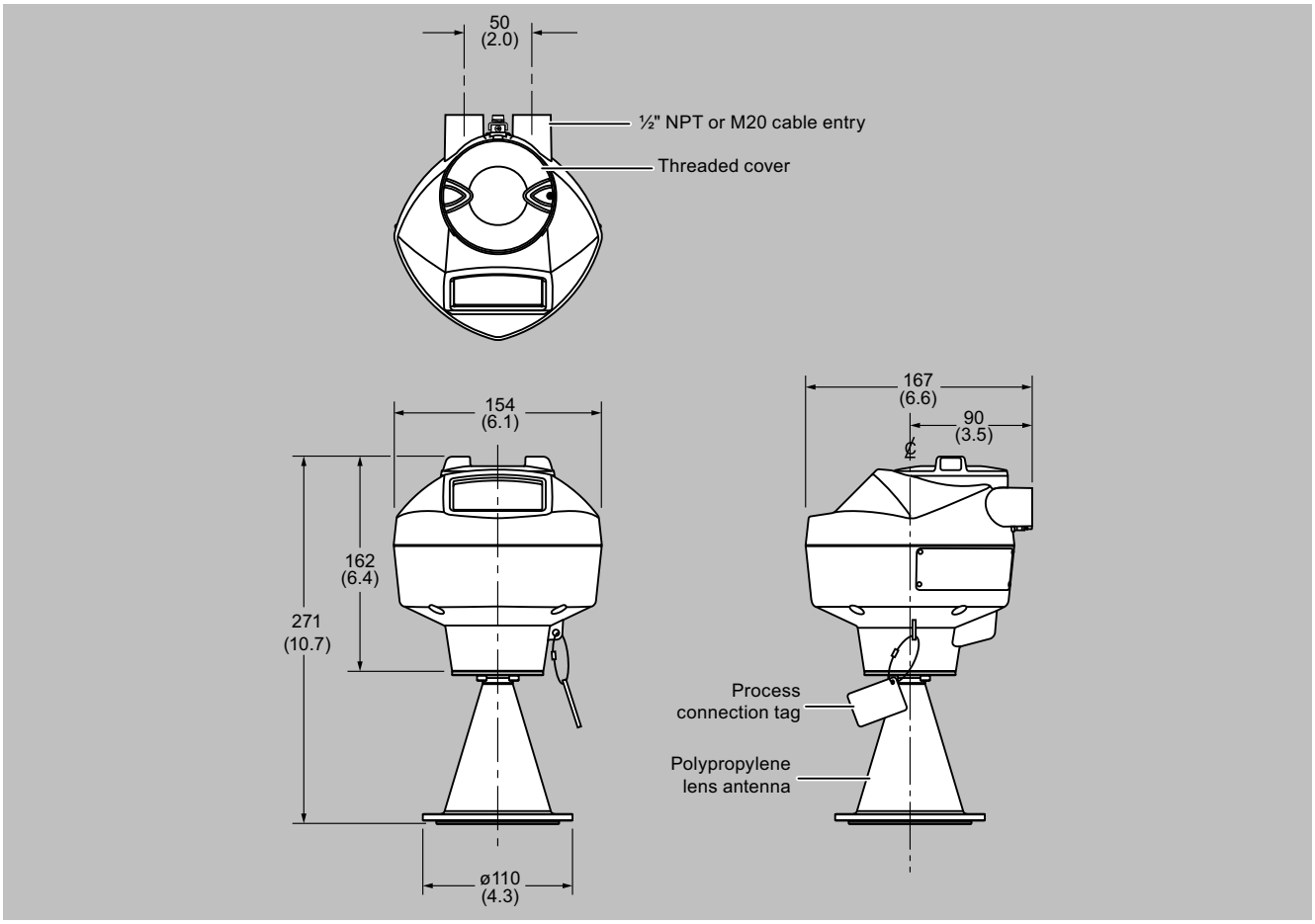



SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

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## Dimensional drawings (continued)

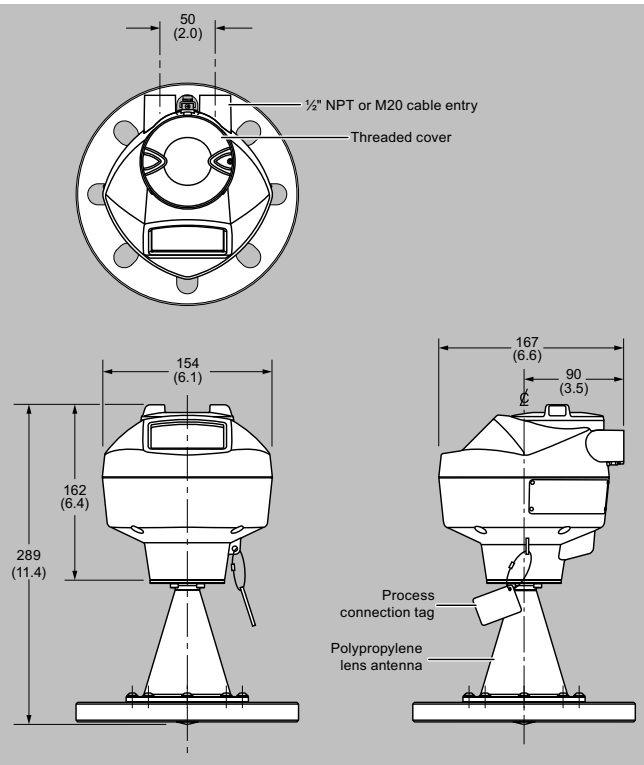



SITRANS LR250 Polypropylene lens antenna, dimensions in mm (inch)

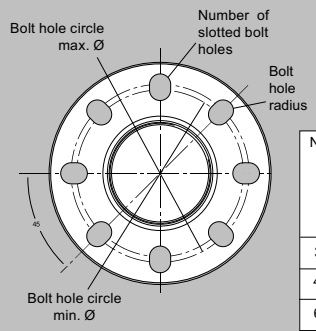
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## Dimensional drawings (continued)




**Universal polymeric flange**



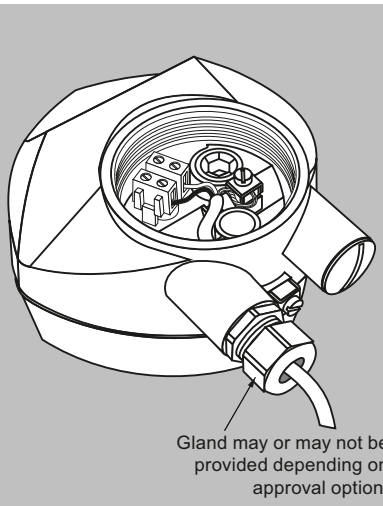

| Nominal pipe size | OD ± 1 | B.C.D. max. for slotted holes (bmax.) ± 0.75 | B.C.D. min. for slotted holes (bmin.) ± 0.75 | Bolt hole radius ± 0.25 | # of slotted holes |
|---|---|---|---|---|---|
| 3 (80) | 7.87 (200) | 6.30 (160) | 5.91 (150) | 0.37 (9.5) | 8 |
| 4 (100) | 9.00 (229) | 17.52 (191) | 6.89 (175) | 0.37 (9.5) | 8 |
| 6 (150) | 11.22 (285) | 9.53 (242) | 9.45 (140) | 0.45 (11.5) | 8 |

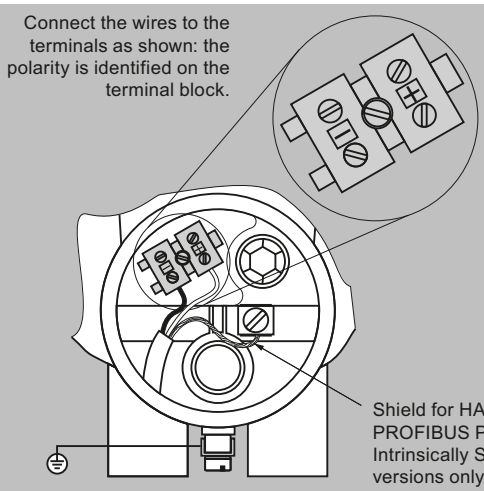
SITRANS LR250 Polypropylene lens antenna with universal polymeric flange, dimensions in mm (inch)

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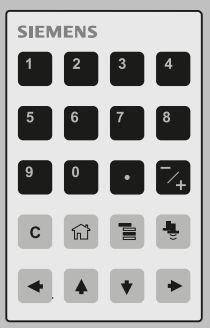


## Circuit diagrams




**Hand Programmer**




Part number:
7ML1930-1BK

**Notes:**

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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## Overview



SITRANS LR250 with flanged encapsulated antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

## Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Suitable for API 2350

## Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

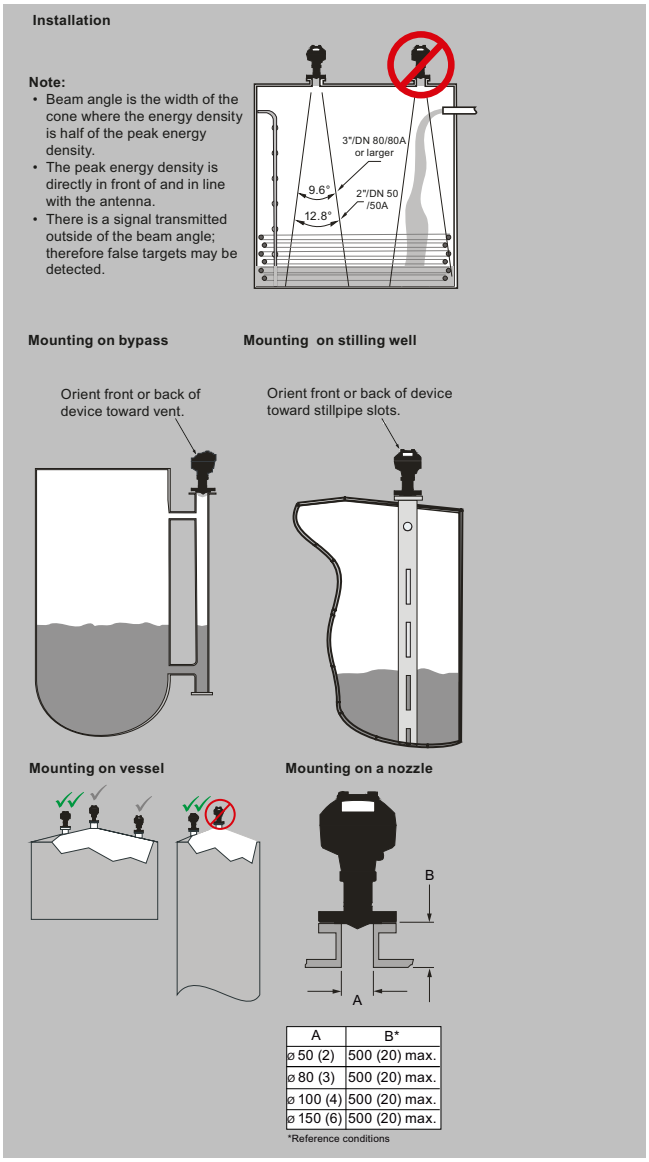
SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required such as food or fine chemicals

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## Configuration




SITRANS LR250 Flanged Encapsulated Antenna installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens<br>Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries in the chemical industry. | Article No.<br>7ML5432- | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process Connection Material** | | | | | | | | | | | |
| Stainless steel 1.4404/1.4435 | | 0 | | | | | | | | | |
| **Process Connection Type** | | | | | | | | | | | |
| ***Flanged Process Connection Types (stainless steel 1.4404/1.4435)*** | | | | | | | | | | | |
| 2" Class 150 ASME B16.5 raised face[1)] | | | B | F | | | | | | | |
| 3" Class 150 ASME B16.5 raised face | | | B | G | | | | | | | |
| 4" Class 150 ASME B16.5 raised face | | | B | H | | | | | | | |
| 6" Class 150 ASME B16.5 raised face | | | B | J | | | | | | | |
| 50A 10K JIS B 2220 raised face[1)] | | | F | D | | | | | | | |
| 80A 10K JIS B 2220 raised face | | | F | E | | | | | | | |
| 100A 10K JIS B 2220 raised face | | | F | F | | | | | | | |
| 150A 10K JIS B 2220 raised face | | | F | G | | | | | | | |
| DN 50 PN 10/16 EN 1092-1 type B1 raised face[1)] | | | G | A | | | | | | | |
| DN 80 PN 10/16 EN 1092-1 type B1 raised face | | | G | B | | | | | | | |
| DN 100 PN 10/16 EN 1092-1 type B1 raised face | | | G | C | | | | | | | |
| DN 150 PN 10/16 EN 1092-1 type B1 raised face | | | G | D | | | | | | | |
| **Communication/Output** | | | | | | | | | | | |
| PROFIBUS PA | | | | | 1 | | | | | | |
| 4 ... 20 mA, HART, start-up at < 3.6 mA | | | | | 2 | | | | | | |
| **Enclosure/Cable inlet** | | | | | | | | | | | |
| Aluminum, Epoxy painted | | | | | | | | | | | |
| 2 x ½" NPT | | | | | | | | 0 | | | |
| 2 x M20 x 1.5 | | | | | | | | 1 | | | |
| **Antenna lens material** | | | | | | | | | | | |
| TFM 1600 PTFE Flush Lens | | | | | | | | | A | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM | | | | | | | | | | A | |
| Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada | | | | | | | | | | B | |
| Intrinsically Safe: ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; IECEx Ex ia IIC T4 Ga, IECEx 1D Ex ia ta IIIC T100°C Da; INMETRO Ex ia IIC T4 Ga, INMETRO Ex ia ta IIIC T100°C Da, IP67/IP68; EAC Ex 0Ex ia IIC T4 Ga X, EAC Ex 0Ex ia ta IIIC T100°C Da X; CE, UKCA, RED, RCM | | | | | | | | | | C | |
| Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada | | | | | | | | | | D | |
| Increased Safety / Non Sparking: ATEX II 3G Ex ec IIC T4 Gc; UKEX II 3G Ex ec IIC T4 Gc; EAC Ex 2Ex nA IIC T4 Gc X; CE, UKCA, RED, RCM | | | | | | | | | | E | |

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## Selection and ordering data (continued)

| SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens<br>Continuous, non-contact, 20 m (66 ft) range, for liquids and slurries in the chemical industry. | Article No.<br>7ML5432- | ● | ● | ● | ● | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Increased Safety:<br>ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>IECEx Ex eb ia mb IIC T4 Ga/Gb;<br>INMETRO Ex e ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X;<br>CE, UKCA, RED, RCM[2] | | | | | | | | | | F | |
| Flameproof:<br>ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>IECEx Ex db mb ia IIC T4 Ga/Gb,<br>IECEx Ex ia ta IIIC T100°C Da;<br>INMETRO Ex d ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X,<br>EAC Ex Ex ia ta IIIC T100°C Da;<br>CE, UKCA, RED, RCM[2] | | | | | | | | | | G | |
| Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[2] | | | | | | | | | | H | |
| Non Sparking: NEPSI Ex nA IIC T4 Gc | | | | | | | | | | K | |
| Intrinsically Safe: NEPSI Ex ia IIC T4 Ga,<br>Ex iaD tD A20 IP67 T100 °C | | | | | | | | | | L | |
| Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[2] | | | | | | | | | | M | |
| Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[2] | | | | | | | | | | N | |
| **Pressure rating** | | | | | | | | | | | |
| Rating per Pressure/Temperature curves in instruction manual | | | | | | | | | | | 0 |

1) Maximum range 10 m (32.8 ft), dk > 3 [20 m (66 ft)] and dk > 1.6 when mounted in stillpipe].
2) Applicable with communication option 2 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Plug M12 with mating Connector[1)2)3)] | **A50** |
| Plug 7/8" with mating Connector[2)3)4)] | **A55** |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[5)6)] | **C20** |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[5)] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Handheld programmer, Intrinsically safe, EEx ia | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |

| Accessories | Article No. |
|---|---|
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (2 are required)[6)] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (2 are required)[2)] | **7ML1930-1AQ** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available with enclosure option 1 only.
2) Available with communication options 1 and 3 only.
3) Available with approval options A, B, C, and L only.
4) Available with enclosure option 0 only.
5) Applicable with communication option 2 only.
6) Available with approval options A, B, C, D, E, K, and L only.

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## Selection and ordering data (continued)

| SITRANS LR250 flanged encapsulated Specials | |
|---|---|
| **SITRANS LR250 flanged encapsulated antenna version enclosures (PROFIBUS PA models)** |  |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E32462853** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection | **A5E32462854** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection | **A5E32462855** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection | **A5E32462856** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection | **A5E32462857** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection | **A5E32462858** |
| **SITRANS LR250 flanged encapsulated antenna version enclosures (< 3.6 mA start-up HART models)** |  |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462865** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462866** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462867** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462868** |

| SITRANS LR250 flanged encapsulated Specials | |
|---|---|
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462869** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462830** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462831** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462832** |
| SITRANS LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection | **A5E32462833** |
| **SITRANS LR250 flanged encapsulated antenna lens kits** | |
| Replacement TFM 1600 Lens and Spring Washer Kit for 2 inch Class 150 ASME B16.5 raised faced | **A5E32462817** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 3 inch Class 150 ASME B16.5 raised faced | **A5E32462819** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 4 inch Class 150 ASME B16.5 raised faced | **A5E32462820** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 6 inch Class 150 ASME B16.5 raised faced | **A5E32462821** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 50A 10K JIS B 2220 raised Face | **A5E32462822** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised Face | **A5E32462823** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised Face | **A5E32462824** |
| Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised Face | **A5E32462825** |
| Replacement TFM 1600 Lens and Spring Washer Kit for DN50 PN10/16 EN 1092-1 type B1 raised face | **A5E32462826** |
| Replacement TFM 1600 Lens and Spring Washer Kit for DN80 PN10/16 EN 1092-1 type B1 raised face | **A5E32462827** |
| Replacement TFM 1600 Lens and Spring Washer Kit for DN100 PN10/16 EN 1092-1 type B1 raised face | **A5E32462828** |
| Replacement TFM 1600 Lens and Spring Washer Kit for DN150 PN10/16 EN 1092-1 type B1 raised face | **A5E32462829** |
| **Ex-proof plugs** | |
| Ex-proof plugs kit, 1/2" NPT, qty 5 | **A5E39979991** |
| Ex-proof plugs kit, M20, qty 5 | **A5E39979992** |

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## Technical specifications

| SITRANS LR250 Flanged Encapsulated Antenna | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Radar level measurement |
| Frequency | K-band (25.0 GHz) |
| Minimum measuring range | 50 mm (2 inch) from end of antenna |
| Maximum measuring range | 20 m (66 ft) |
| **Output** | |
| HART | Version 5.1 |
| • Analog output | 4 ... 20 mA |
| • Accuracy | ± 0.02 mA |
| • Fail-safe | • Programmable as high low or hold (loss of echo)<br>• NE 43 programmable |
| PROFIBUS PA | Profile 3.01 |
| • Function blocks | 2 Analog Input (AI) |
| **Performance (according to reference conditions IEC60770-1)** | |
| Maximum measured error | • > 500 mm from sensor reference point: 3 mm (0.118 inch)<br>• < 500 mm from sensor reference point: 25 mm (1 inch) |
| Influence of ambient temperature | < 0.003 %/K |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | ≥ 1.6 (antenna dependent) |
| Process temperature | -40 ... +170 °C (-40 ... +338 °F) at process connection |
| Process pressure | See LR250 Flanged Encapsulated Antenna Pressure/Temperature curves for more information. |
| **Design** | |
| Enclosure | |
| • Material | Aluminum, polyester powder-coated |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 |
| Weight (dependent on process connection) | • Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size)<br>• Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile display |
| Antenna | |
| • Material | Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part) |
| • Dimensions (nominal sizes) | 48 mm (2 inch), 80 mm (3 inch), 100 mm (4 inch), 150 mm (6 inch) |
| **Process connections** | |
| Flanged connection | Raised Face<br>• 2, 3, 4, 6" Class 150 ASME B16.5<br>• 50A, 80A, 100A, 150A 10K JIS B 2220<br>• DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1 |

## Technical specifications (continued)

| SITRANS LR250 Flanged Encapsulated Antenna | |
|---|---|
| **Power supply** | |
| 4 ... 20 mA/HART | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| PROFIBUS PA | • 15 mA<br>• Per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $_{C}CSA_{US}$, CE, UKCA, FM, RCM |
| Radio | FCC, Industry Canada, RED, RCM |
| Hazardous | |
| • Explosion Proof (Brazil) | INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Increased Safety (Brazil) | INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Intrinsically Safe (Brazil) | INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da |
| • Explosion Proof (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Intrinsically Safe (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Non-incendive (Canada/USA) | CSA/FM Class I, Div. 2, Groups A, B, C, D T5 |
| • Flame Proof/Increased Safety (China) | NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C |
| • Intrinsically Safe (China) | NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C |
| • Non-sparking (China) | NEPSI Ex nA IIC T4 Gc |
| • Intrinsically Safe (EU) | ATEX II 1G Ex ia IIC T4 Ga,<br>ATEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (UK) | UKEX II 1G Ex ia IIC T4 Ga,<br>UKEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (International) | IECEx Ex ia IIC T4 Ga,<br>IECEx Ex ia ta IIIC T100°C Da |
| • Increased Safety - Zone 2 (EU) | ATEX II 3G Ex ec IIC T4 Gc; |
| • Increased Safety - Zone 2 (UK) | UKEX II 3G Ex ec IIC T4 Gc; |
| • Non-sparking (EAC) | EAC Ex 2Ex nA IIC T4 Gc; |
| • Flameproof (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (International) | IECEx Ex db mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (International) | IECEx<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da |
| • Explosion Proof (Russia/Kazakhstan) | EAC Ex d |
| • Increased Safety (Russia/Kazakhstan) | EAC Ex e |
| • Intrinsically Safe (Russia/Kazakhstan) | EAC Ex ia |
| • Marine | • Lloyd's Register of Shipping<br>• ABS Type Approval<br>• Bureau Veritas |
| • Functional Safety | SIL-2 suitable in accordance with IEC 61508/61511 |

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## Technical specifications (continued)

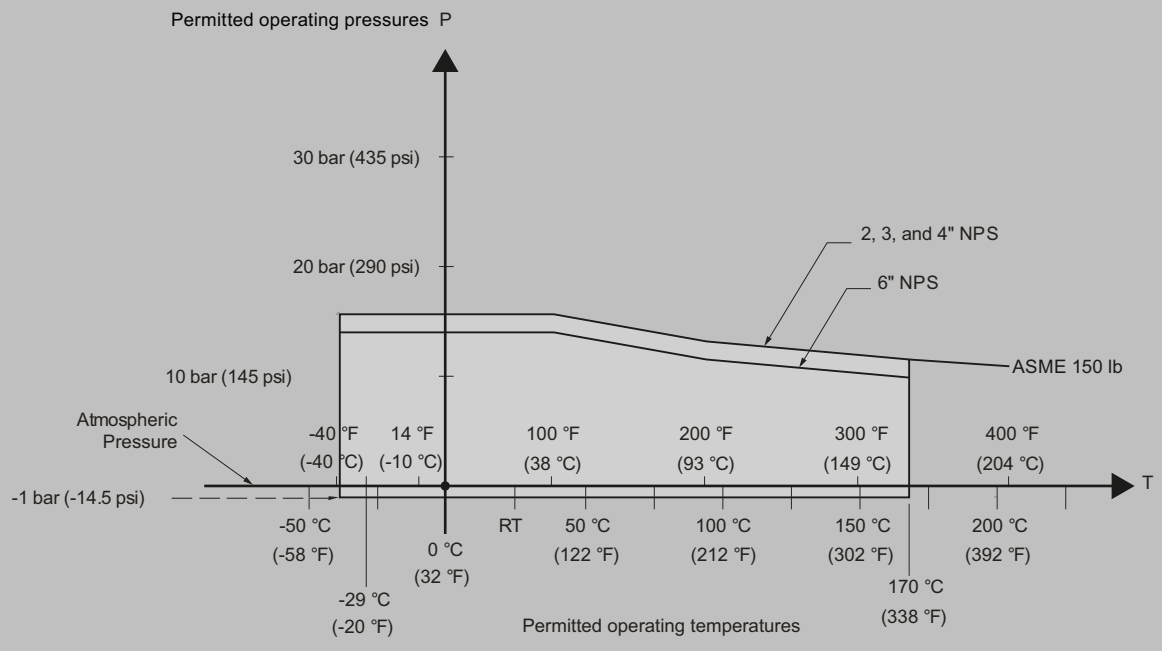
| SITRANS LR250 Flanged Encapsulated Antenna | |
|---|---|
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld-programmer | IS model: ATEX II 1 GD Ex ia op is IIC T4 Ga<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da<br>UKEX II 1 GD Ex ia op is IIC T4 Ga<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da<br>Ta = -20 ... +50°C<br>CSA/FM Class I, II, III, Div. 1,<br>Groups A, B, C, D, E, G, T6<br>Ta = 50°C<br>IECEx SIR 09.0073 |
| Handheld communicator | HART communicator 375/475 |
| PC | • SIMATIC PDM<br>• Emerson AMS<br>• SITRANS DTM (for connection into FDT such as PACTware or Fieldcare) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile displays |

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## Characteristic curves

**Pressure/ temperature curve**
**LR250 Flanged Encapsulated Antenna**
**ASME flanged process connections**
**(7ML5432)**



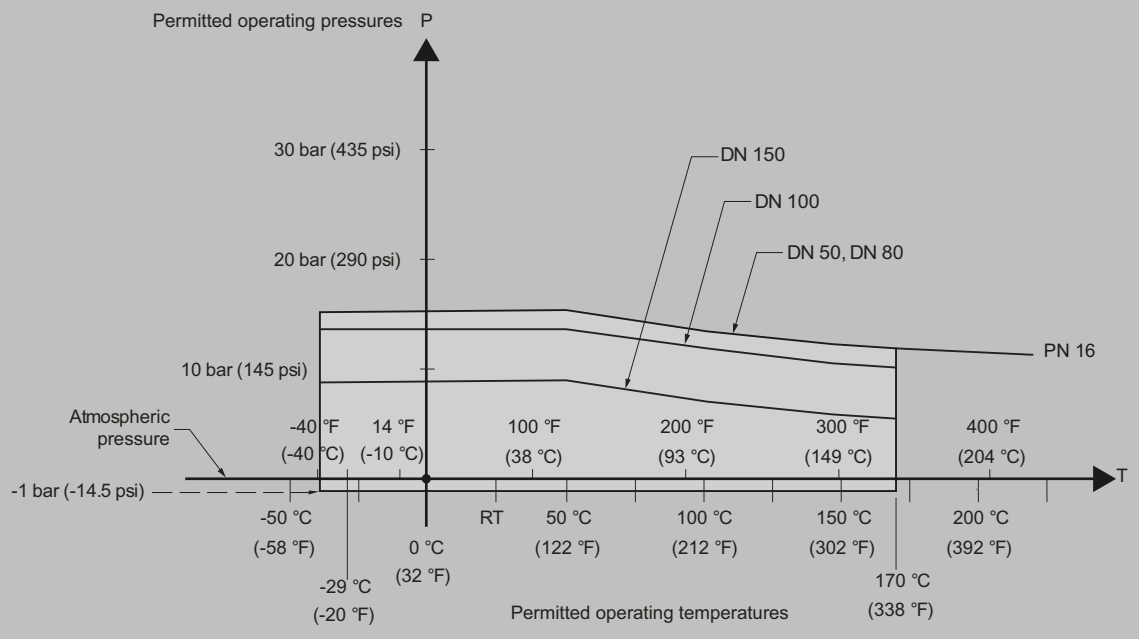

SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

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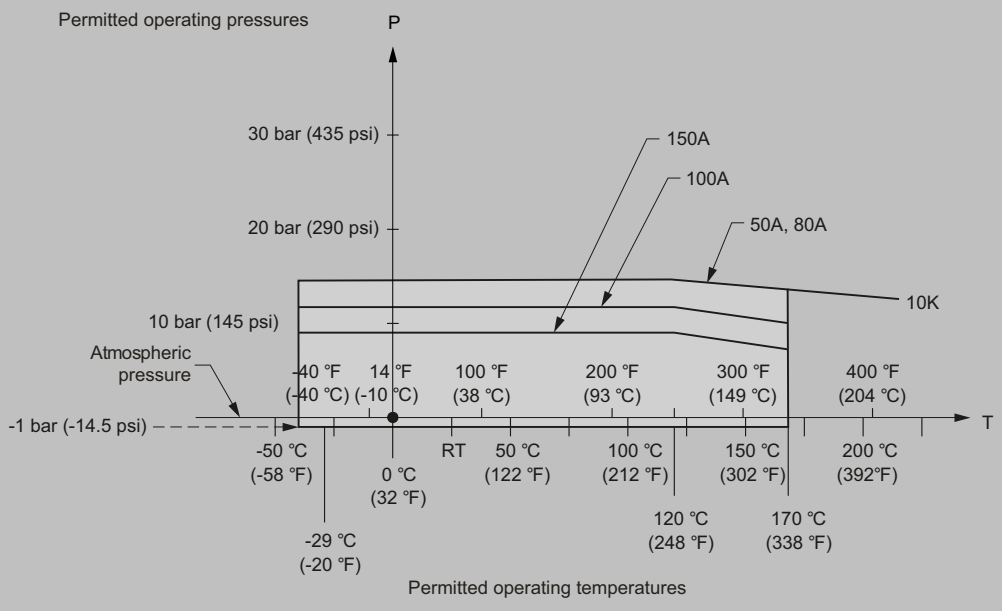
## Characteristic curves (continued)

**Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
EN 1092-1 flanged process connections
(7ML5432)**




SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

**Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
JIS B 2220 flanged process connections
(7ML5432)**

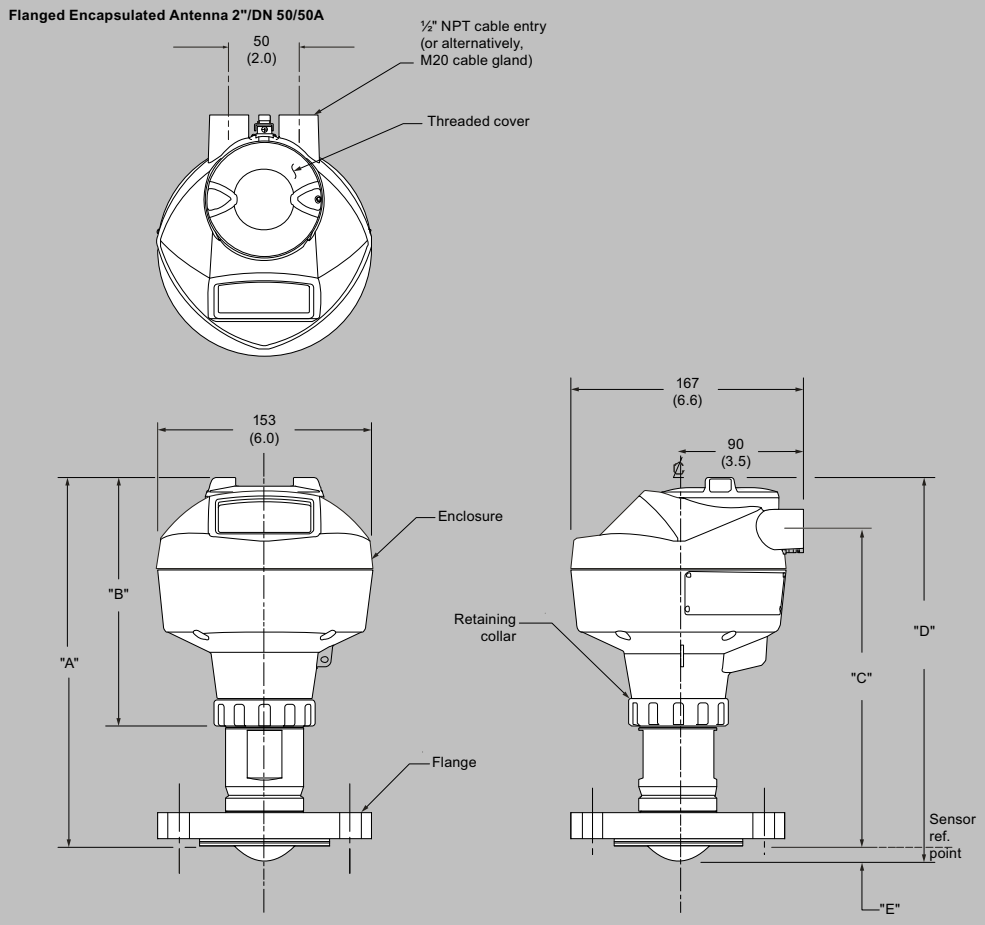



SITRANS LR250 Flanged Encapsulated Antenna pressure/temperature curve

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## Dimensional drawings




| Flange Size | Flange Class | Flange O.D. | Antenna aperture size | Height to Sensor reference point dimension E[1] | Beam angle | Measurement Range | Dimension A | Dimension B | Dimension C | Dimension D |
|---|---|---|---|---|---|---|---|---|---|---|
| 2" | 150 lb | 152 (5.98) | 50 (1.97) | 11 (0.43) | 12.8° | 10 m (32.8 ft) | 263 (10.35) | 178 (7) | 223 (8.78) | 274 (10.79) |
| DN 50 | PN 10/16 | 165 (6.50) | | | | | | | | |
| 50A | 10K | 155 (6.10) | | | | | | | | |

[1] Height from tip of lens to sensor reference point as shown.

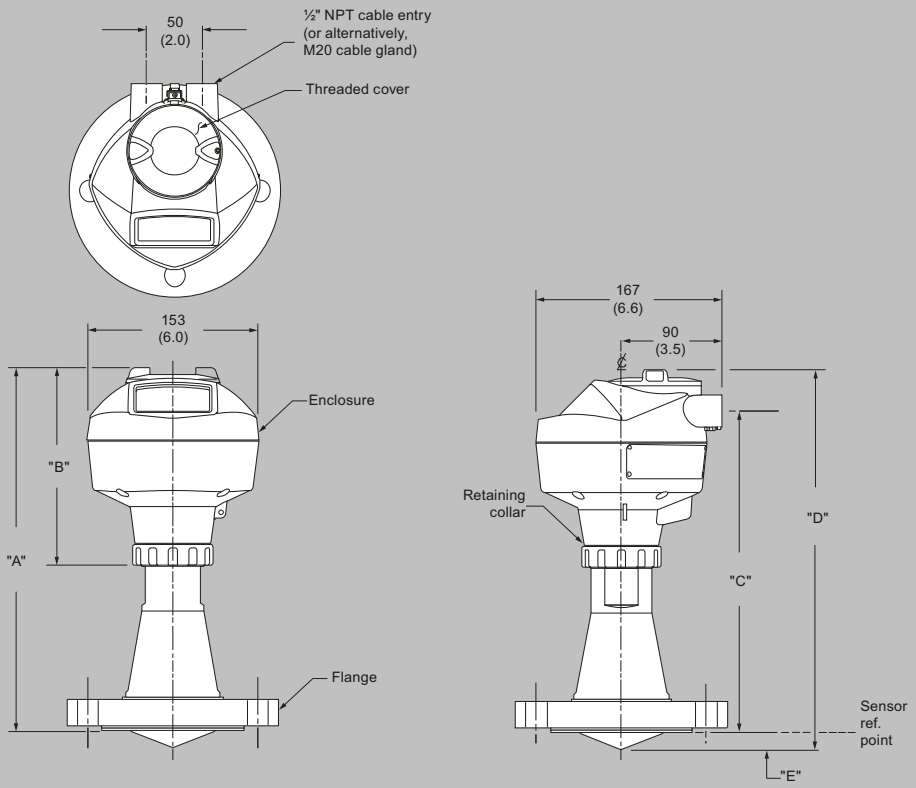
SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

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## Dimensional drawings (continued)

**Flanged Encapsulated Antenna 3"/DN 50/80A or greater**




| Flange Size | Flange Class | Flange O.D. | Antenna aperture size | Height to Sensor reference point dimension E[1] | Beam angle | Measurement Range | Dimension A | Dimension B | Dimension C | Dimension D |
|---|---|---|---|---|---|---|---|---|---|---|
| 3" | 150 lb | 190 (7.48) | 75 (2.95) | 15 (0.59) | 9.6° | 20 m (65.6 ft) | 328 (12.91) | 178 (7) | 288 (11.34) | 343 (13.54) |
| DN 80 | PN 10/16 | 200 (7.87) | | | | | | | | |
| 80A | 10K | 185 (7.28) | | | | | | | | |
| 4" | 150 lb | 230 (9.06) | 75 (2.95) | 13 (0.51) | 9.6° | 20 m (65.6 ft) | 328 (12.91) | 178 (7) | 288 (11.34) | 343 (13.50) |
| DN 100 | PN 10/16 | 220 (8.66) | | | | | | | | |
| 100A | 10K | 210 (8.27) | | | | | | | | |
| 6" | 150 lb | 280 (11.02) | 75 (2.95) | 15 (0.59) | 9.6° | 20 m (65.6 ft) | 333 (13.11) | 178 (7) | 293 (11.54) | 348 (13.70) |
| DN 150 | PN 10/16 | 285 (11.25) | | | | | | | | |
| 150A | 10K | 280 (11.02) | | | | | | | | |

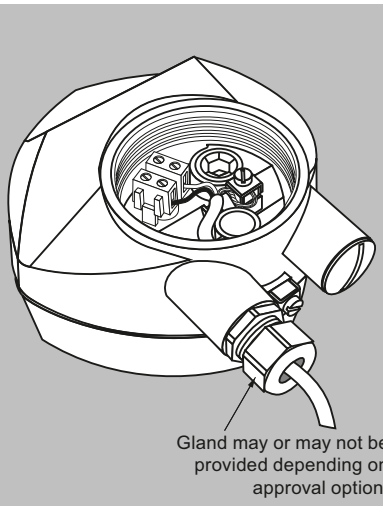
[1] Height from tip of lens to sensor reference point as shown.

SITRANS LR250 Flanged Encapsulated Antenna, dimensions in mm (inch)

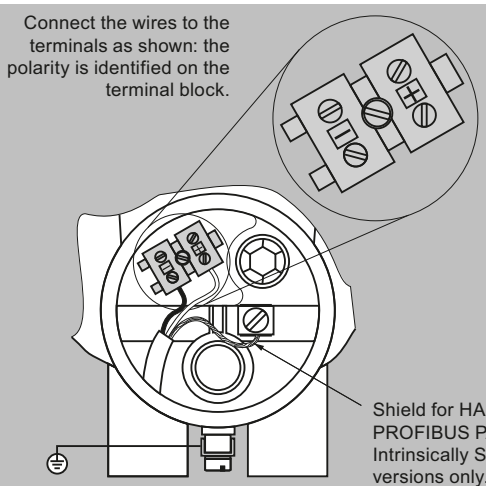
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## Circuit diagrams



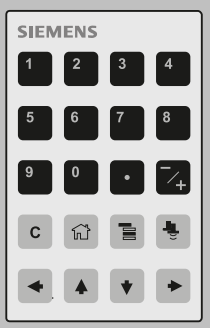
Gland may or may not be provided depending on approval option.



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

**Hand Programmer**




Part number:
7ML1930-1BK

**Notes:**

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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## Overview



The SITRANS LR250 Hygienic Encapsulated Antenna is a 2-wire 25 GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries, and pastes within the food, beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) (antenna dependent).

Picture shown with accessories sold separately.

## Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens
- < 0.8 µ Ra surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3, and Tuchenhagen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

## Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with few parameters required for basic operation.

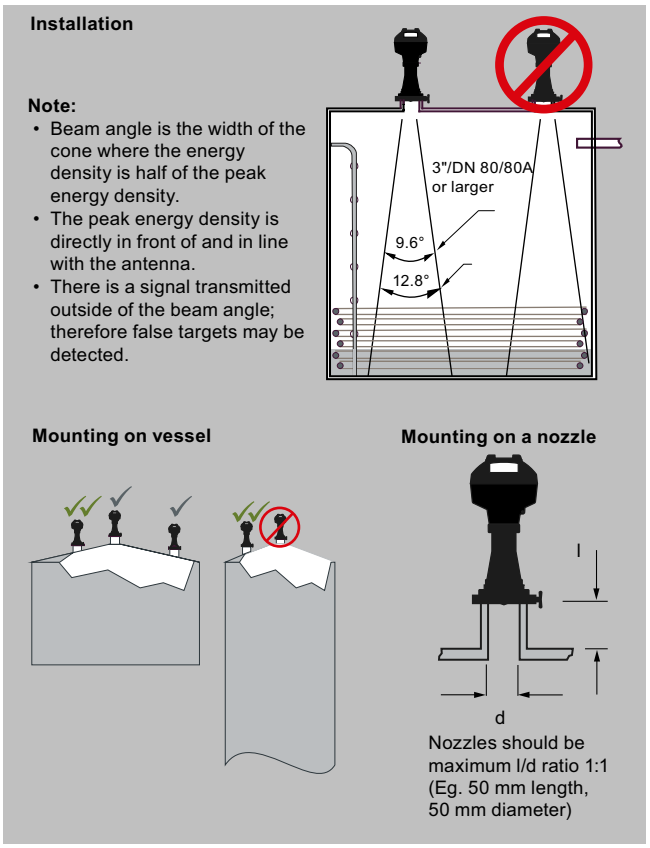
The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

- Key Applications: applications within the food, beverage, chemical and pharmaceutical industries where sanitary, aseptic, or hygienic approvals are required or easy install/clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer, and pharmaceutical or chemical additives and ingredients.

## Configuration




LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens<br>Continuous, non-contact, 20 m (66 ft) range, for liquids, solids, and slurries. For use in hygienic applications. | Article No.<br>7ML5433- | ● | ● | ● | ● | 0 | - | ● | A | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Hygienic/Sanitary Approvals** | | | | | | | | | | | |
| EHEDG EL Class I[1] | | 1 | | | | | | | | | |
| EHEDG EL Aseptic Class I[1] | | 2 | | | | | | | | | |
| 3-A (Tuchenhagen connections only - FC ... FF)[2][3] | | 3 | | | | | | | | | |
| EHEDG EL Class I & 3-A (excludes Tuchenhagen connections)[2][4] | | 4 | | | | | | | | | |
| **Process Connection Types (all types have TFM1600 PTFE lens)** | | | | | | | | | | | |
| ***316L st/st [1.4435 or 1.4404]*** | | | | | | | | | | | |
| 2" Sanitary Clamp according to ISO 2852[5] | | | A | A | | | | | | | |
| 3" Sanitary Clamp according to ISO 2852 | | | A | B | | | | | | | |
| 4" Sanitary Clamp according to ISO 2852 | | | A | C | | | | | | | |
| ***316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)*** | | | | | | | | | | | |
| DN 50 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A][5] | | | B | A | | | | | | | |
| DN 80 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A] | | | B | B | | | | | | | |
| DN 100 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A] | | | B | C | | | | | | | |
| ***316L st/st [1.4435 or 1.4404]*** | | | | | | | | | | | |
| DN 50 Aseptic/Hygienic flanged to DIN 11864-2 [Form A][5] | | | C | A | | | | | | | |
| DN 80 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] | | | C | B | | | | | | | |
| DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A] | | | C | C | | | | | | | |
| ***316L st/st [1.4435 or 1.4404]*** | | | | | | | | | | | |
| DN 50 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A][5] | | | D | A | | | | | | | |
| DN 80 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] | | | D | B | | | | | | | |
| DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A] | | | D | C | | | | | | | |
| ***316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)*** | | | | | | | | | | | |
| DN 50 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851[5] | | | E | A | | | | | | | |
| DN 80 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851 | | | E | B | | | | | | | |
| DN 100 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851 | | | E | C | | | | | | | |
| ***316L st/st [1.4435 or 1.4404]*** | | | | | | | | | | | |
| Type F (50 mm) Tuchenhagen Varivent (EHEDG only)[5] | | | F | A | | | | | | | |
| Type N (68 mm) Tuchenhagen Varivent (EHEDG only)[5] | | | F | B | | | | | | | |
| Type F (50 mm) Tuchenhagen Varivent<br>[3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F )][5] | | | F | C | | | | | | | |
| Type N (68 mm) Tuchenhagen Varivent<br>[3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)][5] | | | F | D | | | | | | | |
| Type F (50 mm) Tuchenhagen Varivent<br>[3-A only & FKM process seal -20 ... 170 °C<br>(-4 ... 338 °F)][5] | | | F | E | | | | | | | |
| Type N (68 mm) Tuchenhagen Varivent<br>[3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)][5] | | | F | F | | | | | | | |
| **Communication** | | | | | | | | | | | |
| PROFIBUS PA | | | | | 1 | | | | | | |
| 4 ... 20 mA HART, start-up at < 3.6 mA | | | | | 2 | | | | | | |
| **Enclosure** | | | | | | | | | | | |
| Aluminum, Epoxy paint, 2 X ½" NPT | | | | | | | | 0 | | | |
| Aluminum, Epoxy paint, 2 X M20 x 1.5 | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, CSA, FM, FCC, RED, RCM | | | | | | | | | | A | |
| Intrinsically Safe: CSA/FM Class I, Div. 1,<br>Groups A, B, C, D, Class II, Div. 1, Groups E, F, G,<br>Class III T4 FCC, Industry Canada | | | | | | | | | | B | |

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## Selection and ordering data (continued)

| SITRANS LR250 Radar level transmitter with encapsulated horn and PTFE lens<br>Continuous, non-contact, 20 m (66 ft) range, for liquids, solids, and slurries. For use in hygienic applications. | Article No.<br>7ML5433- | ● | ● | ● | ● | 0 | - | ● | A | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Intrinsically Safe:<br>ATEX II 1G Ex ia IIC T4 Ga,<br>ATEX II 1D Ex ia ta IIIC T100°C Da;<br>UKEX II 1G Ex ia IIC T4 Ga,<br>UKEX II 1D Ex ia ta IIIC T100°C Da;<br>IECEx Ex ia IIC T4 Ga,<br>IECEx 1D Ex ia ta IIIC T100°C Da;<br>INMETRO Ex ia IIC T4 Ga,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex 0Ex ia IIC T4 Ga X,<br>EAC Ex 0Ex ia ta IIIC T100°C Da X;<br>CE, UKCA, RED, RCM | | | | | | | | | | C | |
| Non-incendive: CSA/FM Class I, Div. 2,<br>Groups A, B, C, D T5, FCC, Industry Canada | | | | | | | | | | D | |
| Increased Safety / Non Sparking:<br>ATEX II 3G Ex ec IIC T4 Gc;<br>UKEX II 3G Ex ec IIC T4 Gc;<br>EAC Ex 2Ex nA IIC T4 Gc X;<br>CE, UKCA, RED, RCM | | | | | | | | | | E | |
| Increased Safety:<br>ATEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex eb mb ia IIC T4 Ga/Gb;<br>IECEx Ex eb ia mb IIC T4 Ga/Gb;<br>INMETRO Ex e ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/e+mb IIC T4 X;<br>CE, UKCA, RED, RCM[6)] | | | | | | | | | | F | |
| Flameproof:<br>ATEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>ATEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>UKEX II 1/2 GD, 1D, 2D, Ex db mb ia IIC T4 Ga/Gb;<br>UKEX II 1/2 GD, 1D, 2D, Ex ia ta IIIC T100°C Da;<br>IECEx Ex db mb ia IIC T4 Ga/Gb,<br>IECEx Ex ia ta IIIC T100°C Da;<br>INMETRO Ex d ia mb IIC T4 Ga/Gb,<br>INMETRO Ex ia ta IIIC T100°C Da,<br>IP67/IP68;<br>EAC Ex Ga/Gb Ex ia/db+mb IIC T4 X,<br>EAC Ex Ex ia ta IIIC T100°C Da;<br>CE, UKCA, RED, RCM[6)] | | | | | | | | | | G | |
| Explosion proof: CSA/FM Class I, II and III, Div. 1,<br>Groups A, B, C, D, E, F, G, FCC, Industry Canada[6)] | | | | | | | | | | H | |
| Non Sparking: NEPSI Ex nA IIC T4 Gc | | | | | | | | | | K | |
| Intrinsically Safe: NEPSI Ex ia IIC T4 Ga,<br>Ex iaD tD A20 IP67 T100 °C | | | | | | | | | | L | |
| Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[6)] | | | | | | | | | | M | |
| Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb,<br>Ex iaD tD A20 IP67 T100 °C[6)] | | | | | | | | | | N | |
| **Pressure Rating** | | | | | | | | | | | |
| Rating per pressure/temperature curves in instruction manual | | | | | | | | | | | 0 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| ***Electrical Connection cable entry:*** | |
| Plug M12 (IP 67 rating) with mating connector[2)7)8)] | **A50** |
| Plug 7/8" (IP 67 rating) with mating connector[2)8)9)] | **A55** |
| ***Test Certificates*** | |
| Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate 3.1 of EN 10204 | **C12** |
| ***Functional Safety*** | |
| Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[6)10)] | **C20** |
| ***Namur*** | |
| Namur NE43 compliant, device preset to failsafe < 3.6 mA[6)] | **N07** |
| ***Tagging*** | |
| Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)] | |
| Measuring-point number / identification (max. 27 characters) specify in plain text | **Y15** |

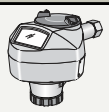
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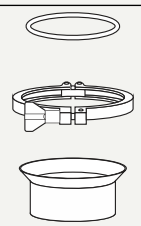


## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Handheld programmer, Intrinsically safe, EEx ia (LUI enabled) | **7ML1930-1BK** |
| HART modem with USB interface | **7MF4997-1DB** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)[6] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA (two are required)[8] | **7ML1930-1AQ** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available with Process connection options AA ... FB & FF only.
2) Available with Approval options A, B, C, L only.
3) Available with Process connections FC ... FF only.
4) Available with Process connection options AA ... EC & FF only.
5) Max. range 10 m (32.8 ft), dk > 3 [20 m (66 ft) and dk > 1.6 if installed in a stillpipe].
6) Applicable with Communication option 2 only.
7) Available with Enclosure option 1 only.
8) Available with Communication options 1 and 3 only.
9) Available with Enclosure option 0 only.
10) Available with Approval options A, B, C, D, E, K, L only.

| SITRANS LR250 hygienic encapsulated Specials | Order code |
|---|---|
| **For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number.<br>For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following:<br>EHEDG EL Class 1 approval, 4 ... 20 mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.** |  |
| **Spare Lens Kits (Lens and O-ring)** |  |
| Kit, 2 inch, ISO 2852, HEA, Lens, silicone secondary O-ring | **A5E32572731** |
| Kit, 3 inch, ISO 2852, HEA, Lens, silicone secondary O-ring | **A5E32572745** |
| Kit, 4 inch, ISO 2852, HEA, Lens, silicone secondary O-ring | **A5E32572747** |
| Kit, DN 50, DIN 11851, HEA, Lens, silicone secondary O-ring | **A5E32572758** |
| Kit, DN 80, DIN 11851, HEA, Lens, silicone secondary O-ring | **A5E32572770** |
| Kit, DN 100, DIN 11851, HEA, Lens, silicone secondary O-ring | **A5E32572772** |
| Kit, DN 50, DIN 11864-1, HEA, Lens, silicone secondary O-ring | **A5E32572773** |
| Kit, DN 80, DIN 11864-1, HEA, Lens, silicone secondary O-ring | **A5E32572779** |
| Kit, DN 100, DIN 11864-1, HEA, Lens, silicone secondary O-ring | **A5E32572782** |
| Kit, DN 50, DIN 11864-2/3, HEA, Lens, silicone secondary O-ring | **A5E32572785** |
| Kit, DN 80, DIN11864-2/3, HEA, Lens, silicone secondary O-ring | **A5E32572790** |
| Kit, DN 100, DIN11864-2/3, HEA, Lens, silicone secondary O-ring | **A5E32572791** |

| SITRANS LR250 hygienic encapsulated Specials | Order code |
|---|---|
| Kit, Tuchenhagen, Type F, HEA, Lens, silicone secondary O-ring | **A5E32572794** |
| Kit, Tuchenhagen, Type N, HEA, Lens, silicone secondary O-ring | **A5E32572795** |
| **Accessories (customer side process connection and FKM and EPDM seal for each size and type)** |  |
| Kit DN50 DIN11864-1 GS Form A tank connection, EPDM Seal Class II | **A5E32910638** |
| Kit, DN80 DIN11864-1 GS Form A tank connection, EPDM Seal Class II | **A5E32910649** |
| Kit, DN100 DIN11864-1 GS Form A tank connection, EPDM Seal Class II | **A5E32910657** |
| Kit DN50 DIN11864-1 GS Form A tank connection, FKM Seal Class I | **A5E32910658** |
| Kit, DN80 DIN11864-1 GS Form A tank connection, FKM Seal Class I | **A5E32910671** |
| Kit, DN100 DIN11864-1 GS Form A tank connection, FKM Seal Class I | **A5E32910681** |
| Kit 2" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II | **A5E32910686** |
| Kit 3" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II | **A5E32910697** |
| Kit 4" ISO2852 tank connection, Clamp, Cleanable EPDM Seal Class II | **A5E32910708** |
| Kit 2" ISO2852 tank connection, Clamp, Cleanable FKM Seal | **A5E32910718** |
| Kit 3" ISO2852 tank connection, Clamp, Cleanable FKM Seal | **A5E32910723** |
| Kit 4" ISO2852 tank connection, Clamp, Cleanable FKM Seal | **A5E32910734** |
| Kit DN50 DIN11851 SC Tank connection, EPDM Seal Class II[11] | **A5E32910746** |
| Kit DN80 DIN11851 SC Tank connection, EPDM Seal Class II[11] | **A5E32910771** |
| Kit DN100 DIN11851 SC Tank connection, EPDM Seal Class II[11] | **A5E32910780** |
| Kit DN50 DIN11851 SC Tank connection, FKM Seal Class II | **A5E32910784** |
| Kit DN80 DIN11851 SC Tank connection, FKM Seal Class II | **A5E32910789** |
| Kit DN100 DIN11851 SC Tank connection, FKM Seal Class II | **A5E32910790** |
| Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II | **A5E32910791** |
| Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II | **A5E32910793** |
| Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II | **A5E32910799** |
| Kit DN50 DIN11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I | **A5E32910805** |
| Kit DN80 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I | **A5E32910809** |
| Kit DN100 DIN11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I | **A5E32910812** |
| Kit DN50 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II | **A5E32910813** |
| Kit DN80 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II | **A5E32910814** |
| Kit DN100 DIN11864-3 Form A tank connection, Clamp, EPDM Seal Class II | **A5E32910815** |
| Kit DN50 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I | **A5E32910816** |
| Kit DN80 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I | **A5E32910817** |
| Kit DN100 DIN11864-3 Form A tank connection, Clamp, FKM Seal Class I | **A5E32910818** |
| Kit Type F, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection | **A5E33489537** |

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## Selection and ordering data (continued)

| SITRANS LR250 hygienic encapsulated Specials | Order code |
|---|---|
| Kit Type N, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection | **A5E33489543** |
| Kit Type F, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection | **A5E33489828** |
| Kit Type N, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection | **A5E33489830** |

| SITRANS LR250 hygienic encapsulated Specials | Order code |
|---|---|
| **Ex-proof plugs** | |
| Ex-proof plugs kit, 1/2" NPT, qty 5 | **A5E39979991** |
| Ex-proof plugs kit, M20, qty 5 | **A5E39979992** |

[11] Class II for low fat applications when EPDM seal used on DIN11851

## Technical specifications

| SITRANS LR250 Hygienic Encapsulated Antenna | |
|---|---|
| **Mode of Operation** | |
| Measuring principle | Radar level measurement |
| Frequency | K-band (25.0 GHz) |
| Minimum measuring range | 50 mm (2 inch) from end of antenna |
| Maximum measuring range | 20 m (66 ft) |
| **Output** | |
| HART | Version 5.1 |
| • Analog output | 4 ... 20 mA |
| • Accuracy | ± 0.02 mA |
| • Fail-safe | • Programmable as high low or hold (loss of echo)<br>• NE 43 programmable |
| PROFIBUS PA | Profile 3.01 |
| • Function blocks | 2 Analog Input (AI) |
| **Performance (according to reference conditions IEC60770-1)** | |
| Maximum measured error | • > 500 mm from sensor reference point: 3 mm (0.118 inch)<br>• < 500 mm from sensor reference point: 25 mm (1 inch) |
| Influence of ambient temperature | < 0.003 %/K |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | ≥ 1.6 (antenna dependent) |
| Process temperature | -40 ... +170 °C (-40 ... +338 °F) at process connection |
| Process pressure | See Pressure/Temperature curves for more information |
| **Design** | |
| Enclosure | |
| • Material | Aluminum, polyester powder coated |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68 |
| Weight (dependent on process connection) | • Approx. 4.7 kg (10.4 lb) for 2" ISO 2852 (smallest size)<br>• Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size) |

## Technical specifications (continued)

| SITRANS LR250 Hygienic Encapsulated Antenna | |
|---|---|
| Display (local) | Graphic local user interface including quick start wizard and echo profile display |
| Antenna | |
| • Material | Stainless steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part) |
| • Lens surface finish ($R_a$) | 0.8 µm |
| **Process connections** | |
| Hygienic/Sanitary connections | • 2", 3" & 4" Sanitary Clamp according to ISO 2852<br>• DN 50, DN 80 & DN 100 Aseptic/Hygienic threaded to DIN 11864-1 [Form A]<br>• DN 50, DN 80 & DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]<br>• DN 50, DN 80 & DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]<br>• DN 50, DN 80 & DN 100 Hygienic Union according to DIN 11851<br>• Type F (50 mm) & Type N (68 mm) Tuchenhagen Varivent |
| **Power supply** | |
| 4 ... 20 mA/HART | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| PROFIBUS PA | • 15 mA<br>• Per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $_{C}CSA_{US}$, CE, UKCA, FM, RCM |
| Radio | FCC, Industry Canada, RED, RCM |
| Hazardous | |
| • Explosion Proof (Brazil) | INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Increased Safety (Brazil) | INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da |
| • Intrinsically Safe (Brazil) | INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da |
| • Explosion Proof (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Intrinsically Safe (Canada/USA) | CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 |
| • Non-incendive (Canada/USA) | CSA/FM Class I, Div. 2, Groups A, B, C, D T5 |
| • Flame Proof/Increased Safety (China) | NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD tD A20 IP67 T100 °C |
| • Intrinsically Safe (China) | NEPSI Ex ia IIC T4 Ga, Ex iaD tD A20 IP67 T100 °C |
| • Non-sparking (China) | NEPSI Ex nA IIC T4 Gc |
| • Intrinsically Safe (EU) | ATEX II 1G Ex ia IIC T4 Ga, ATEX II 1D Ex ia ta IIIC T100°C Da; |
| • Intrinsically Safe (UK) | UKEX II 1G Ex ia IIC T4 Ga, UKEX II 1D Ex ia ta IIIC T100°C Da; |

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## Technical specifications (continued)

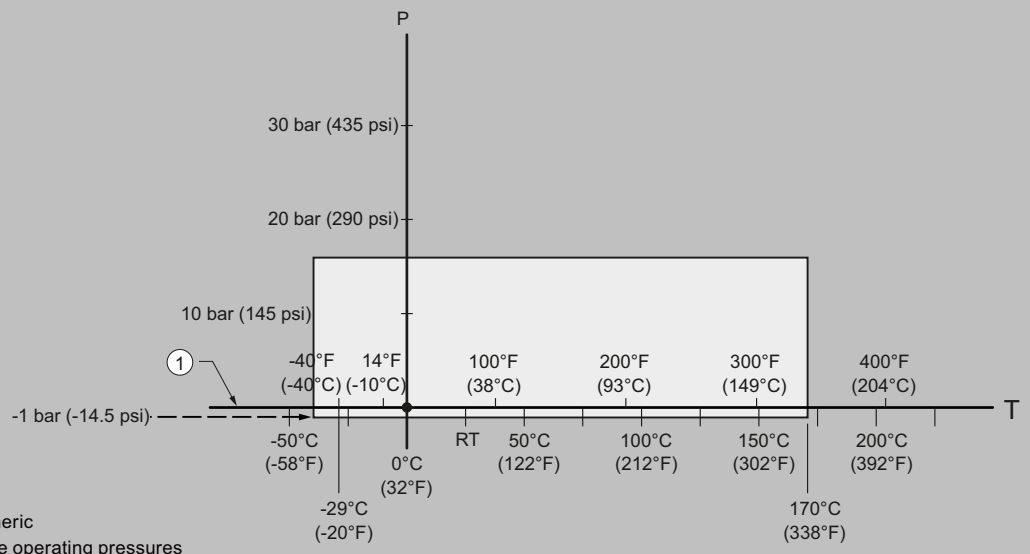
| SITRANS LR250 Hygienic Encapsulated Antenna | |
|---|---|
| • Intrinsically Safe (International) | IECEx Ex ia IIC T4 Ga,<br>IECEx Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 2 (EU) | ATEX II 3G Ex ec IIC T4 Gc; |
| • Increased Safety - Zone 2 (UK) | UKEX II 3G Ex ec IIC T4 Gc; |
| • Non-sparking (EAC) | EAC Ex 2Ex nA IIC T4 Gc; |
| • Flameproof (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex db mb ia IIC Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Flameproof (International) | IECEx Ex db mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (EU) | ATEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (UK) | UKEX II 1/2 GD, 1D, 2D,<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da; |
| • Increased Safety - Zone 1 (International) | IECEx<br>Ex eb mb ia IIC T4 Ga/Gb,<br>Ex ia ta IIIC T100°C Da |
| • Explosion Proof (Russia/Kazakhstan) | EAC Ex d |
| • Increased Safety (Russia/Kazakhstan) | EAC Ex e |
| • Intrinsically Safe (Russia/Kazakhstan) | EAC Ex ia |
| Hygienic/Sanitary | EHEDG EL Class I<br>EHEDG EL Aseptic Class I |
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da<br>UKEX II 1 GD Ex ia op is IIC T4 Ga<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da<br>Ta = -20 ... +50°C<br>CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, G, T6<br>Ta = 50°C<br>IECEx SIR 09.0073 |
| Handheld communicator | HART communicator 375/475 |
| PC | • SIMATIC PDM<br>• Emerson AMS<br>• SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare) |
| Display (local) | Graphic local user interface including quick start wizard and echo profile displays |

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## Characteristic curves

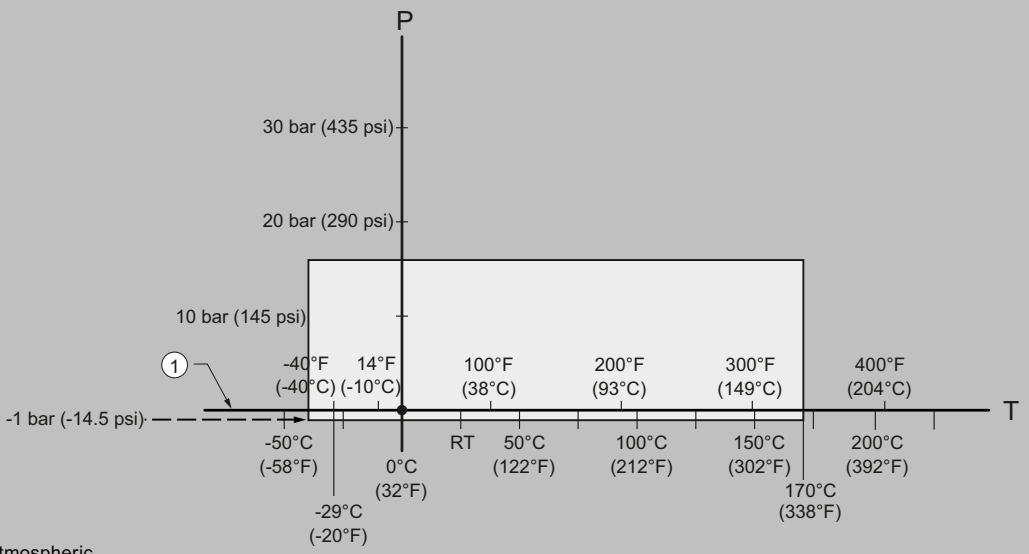
DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100
DIN 11864-1 Aseptic/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100




1 Atmospheric
P Allowable operating pressures
T Allowable operating temperatures

SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100




1 Atmospheric
P Allowable operating pressures
T Allowable operating temperatures

Note: For pressure applications, all attachment hardware must be suitably rated.

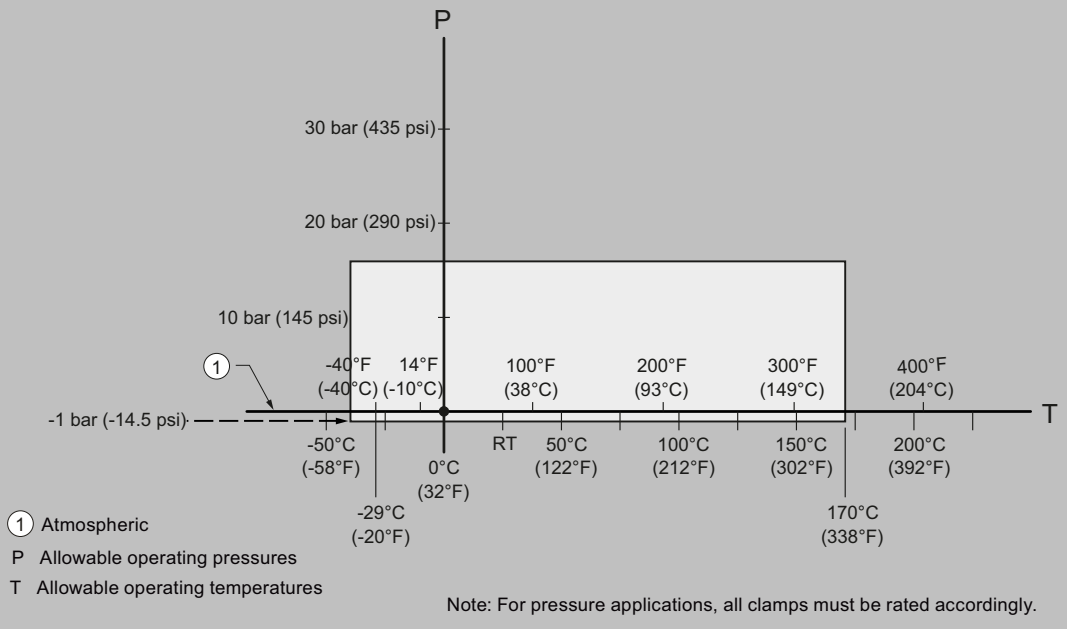
SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

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## Characteristic curves (continued)

DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100
IS0 2852 Sanitary/Hygienic clamp: 2", 3", and 4"
Tuchenhagen Varivent face seal clamp: Type N (68 mm) and Type F (50 mm)

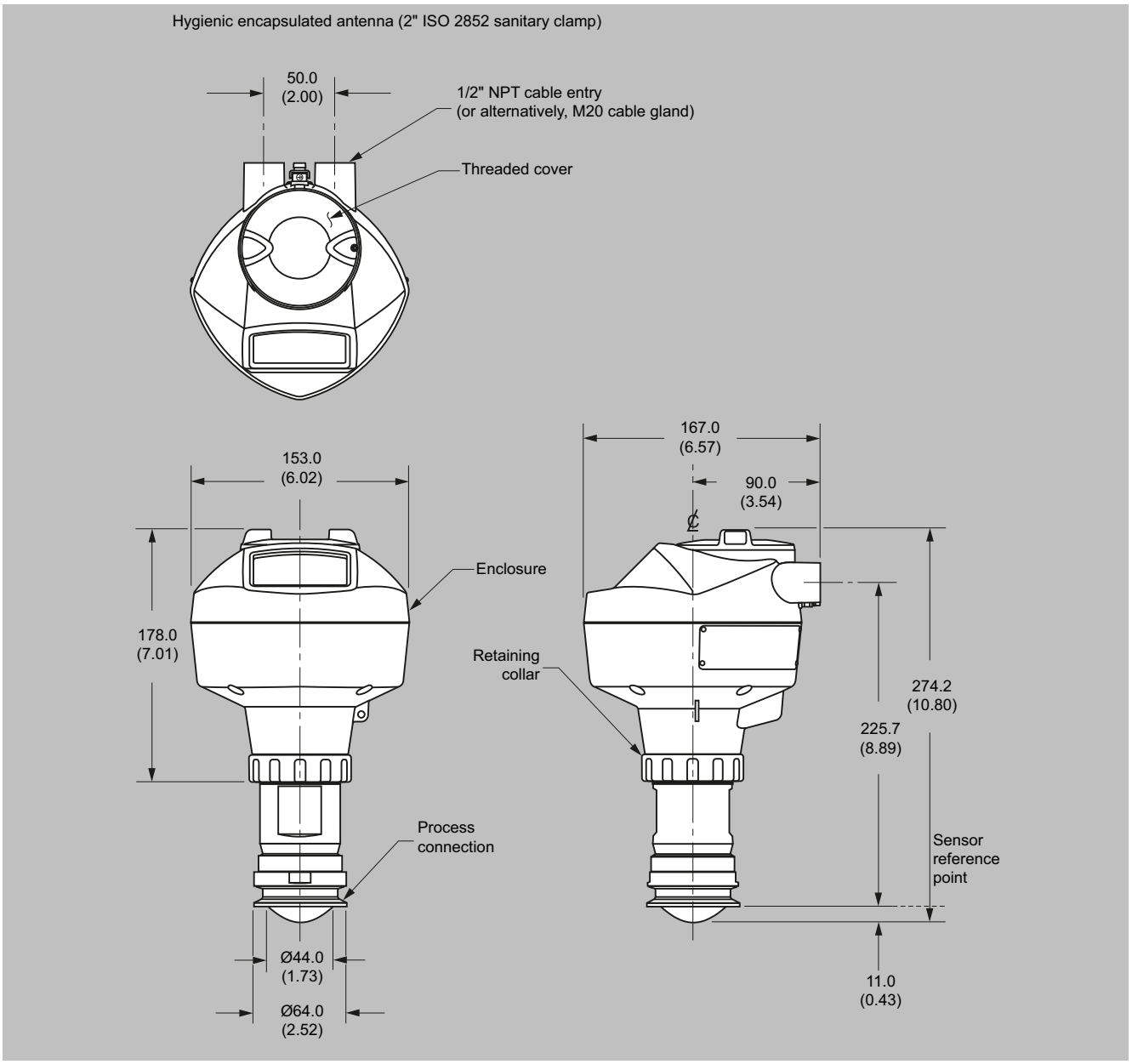



SITRANS LR250 Hygienic Encapsulated Antenna, process pressure/temperature rating curve

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## Dimensional drawings

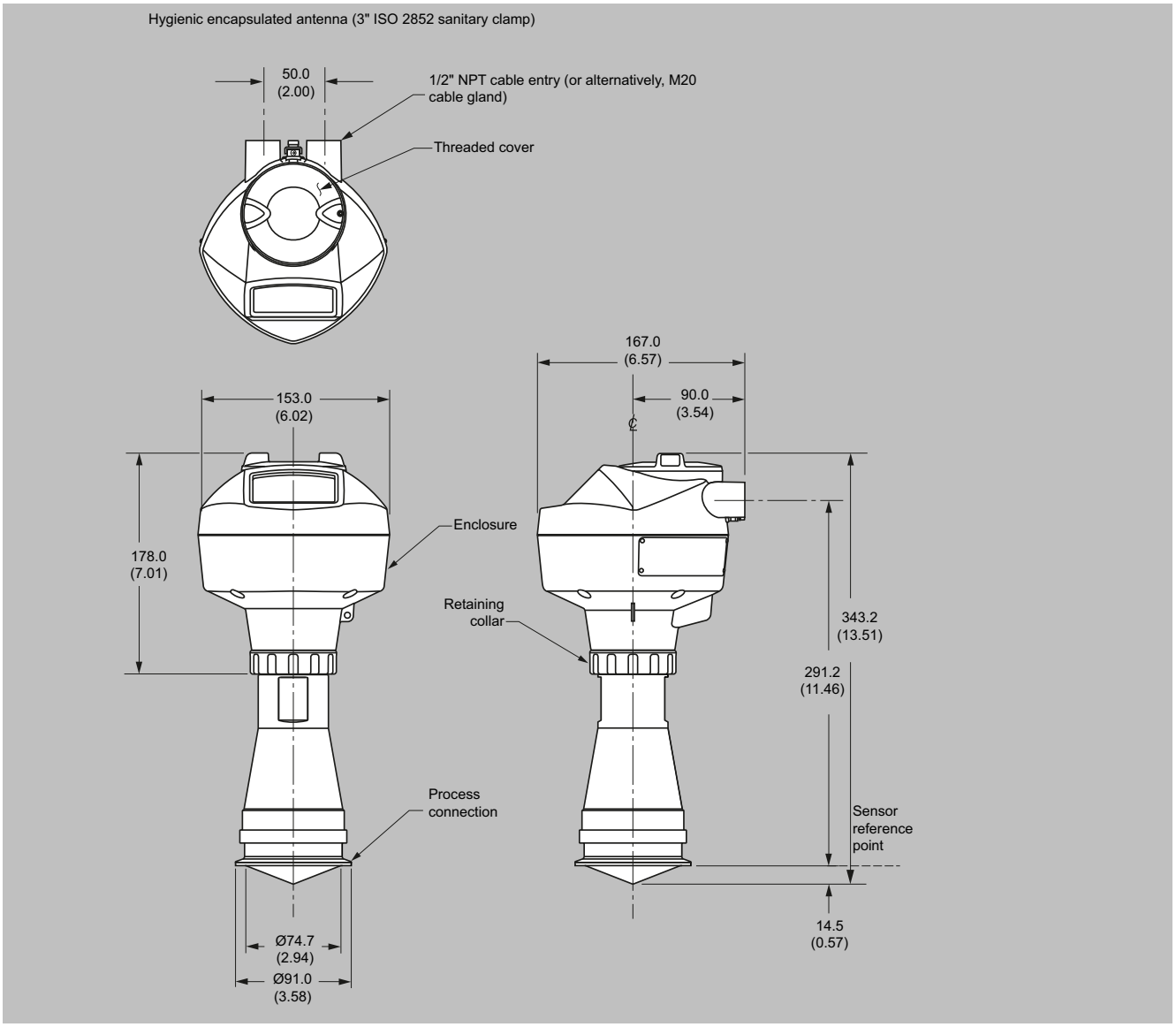



SITRANS LR250 Hygienic Encapsulated Antenna (2" ISO 2852 sanitary clamp), dimensions in mm (inch)

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## Dimensional drawings (continued)

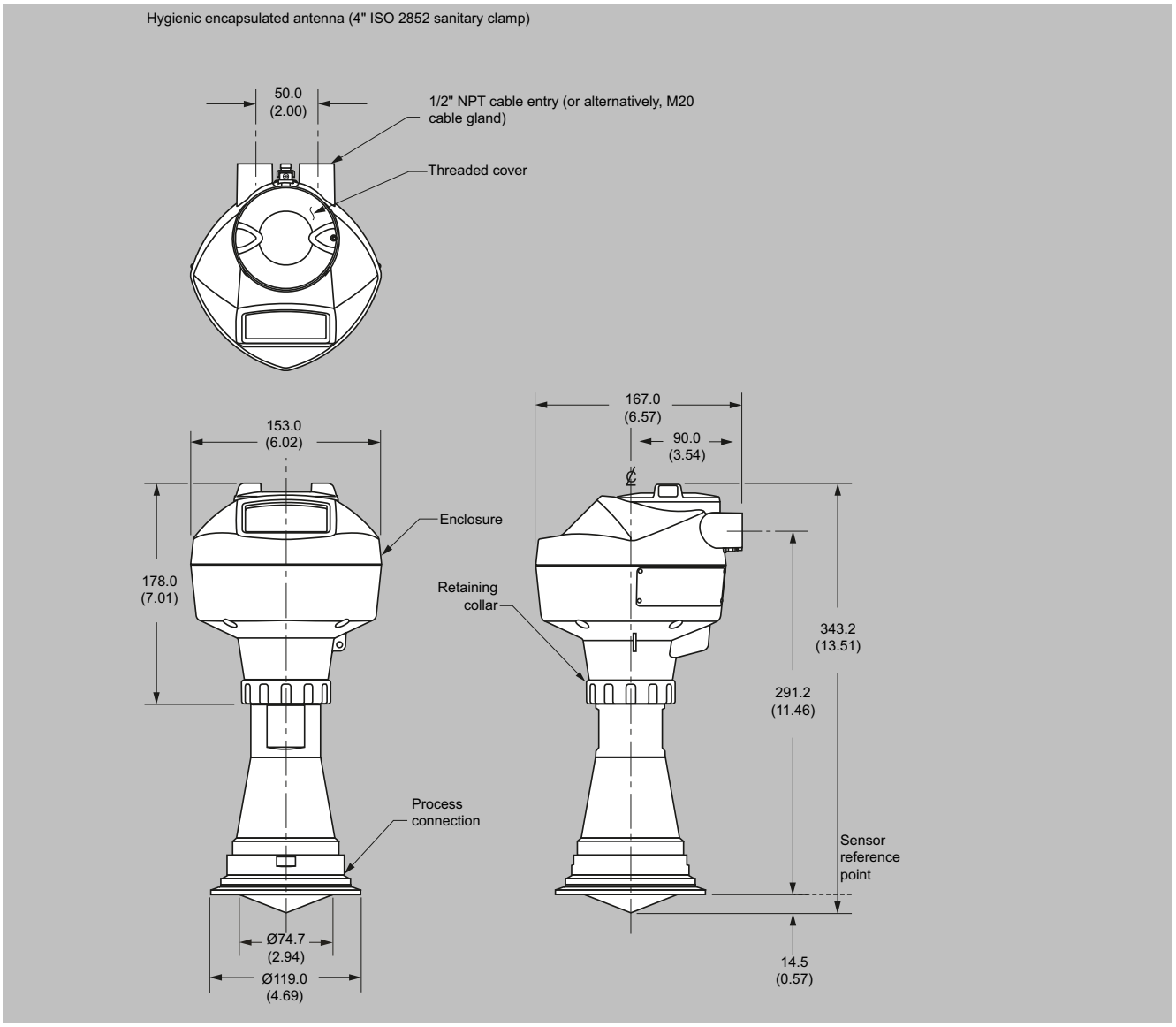



SITRANS LR250 Hygienic Encapsulated Antenna (3" ISO 2852 sanitary clamp), dimensions in mm (inch)

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## Dimensional drawings (continued)



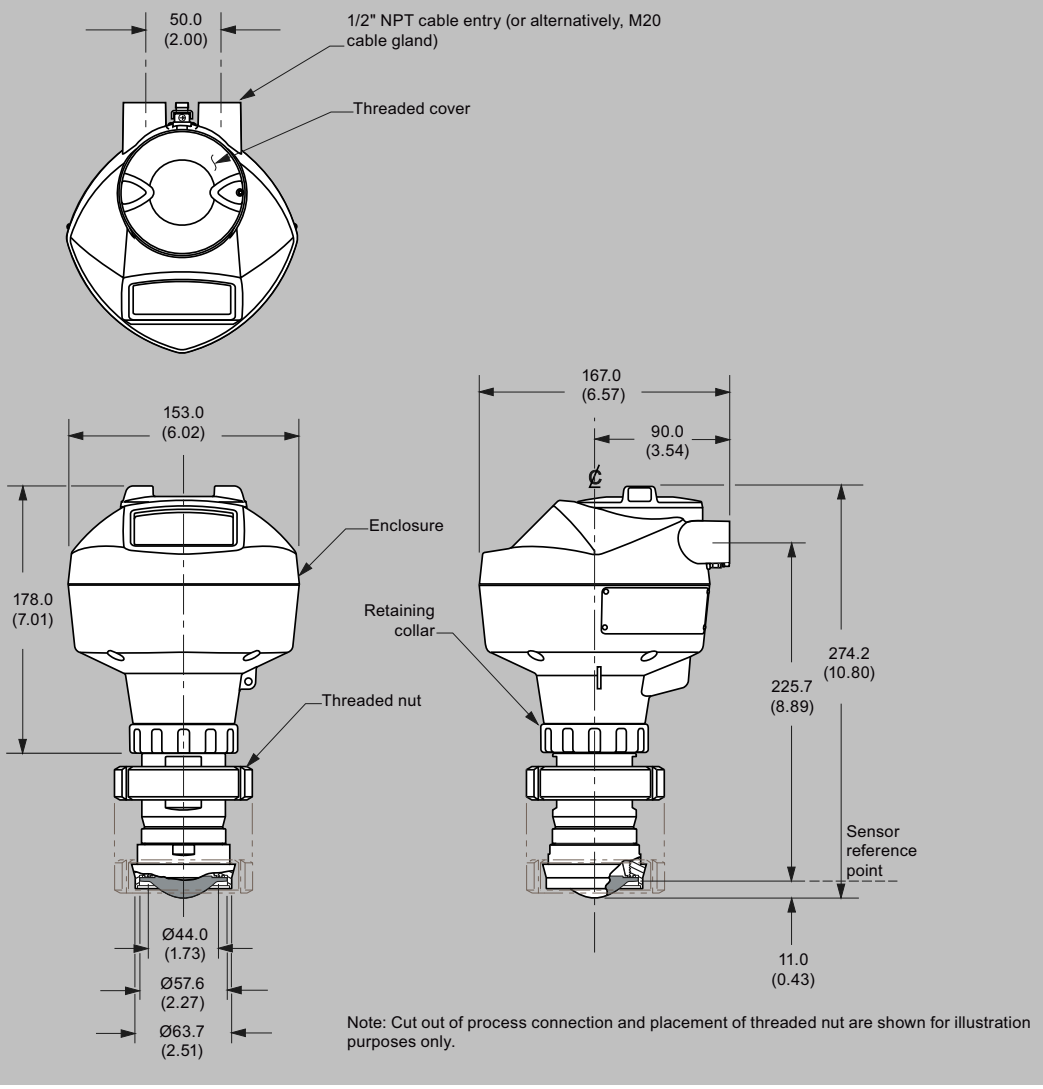

SITRANS LR250 Hygienic Encapsulated Antenna (4" ISO 2852 sanitary clamp), dimensions in mm (inch)

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## Dimensional drawings (continued)

Hygienic encapsulated antenna (DN 50 nozzle/slotted nut to DIN 11851)

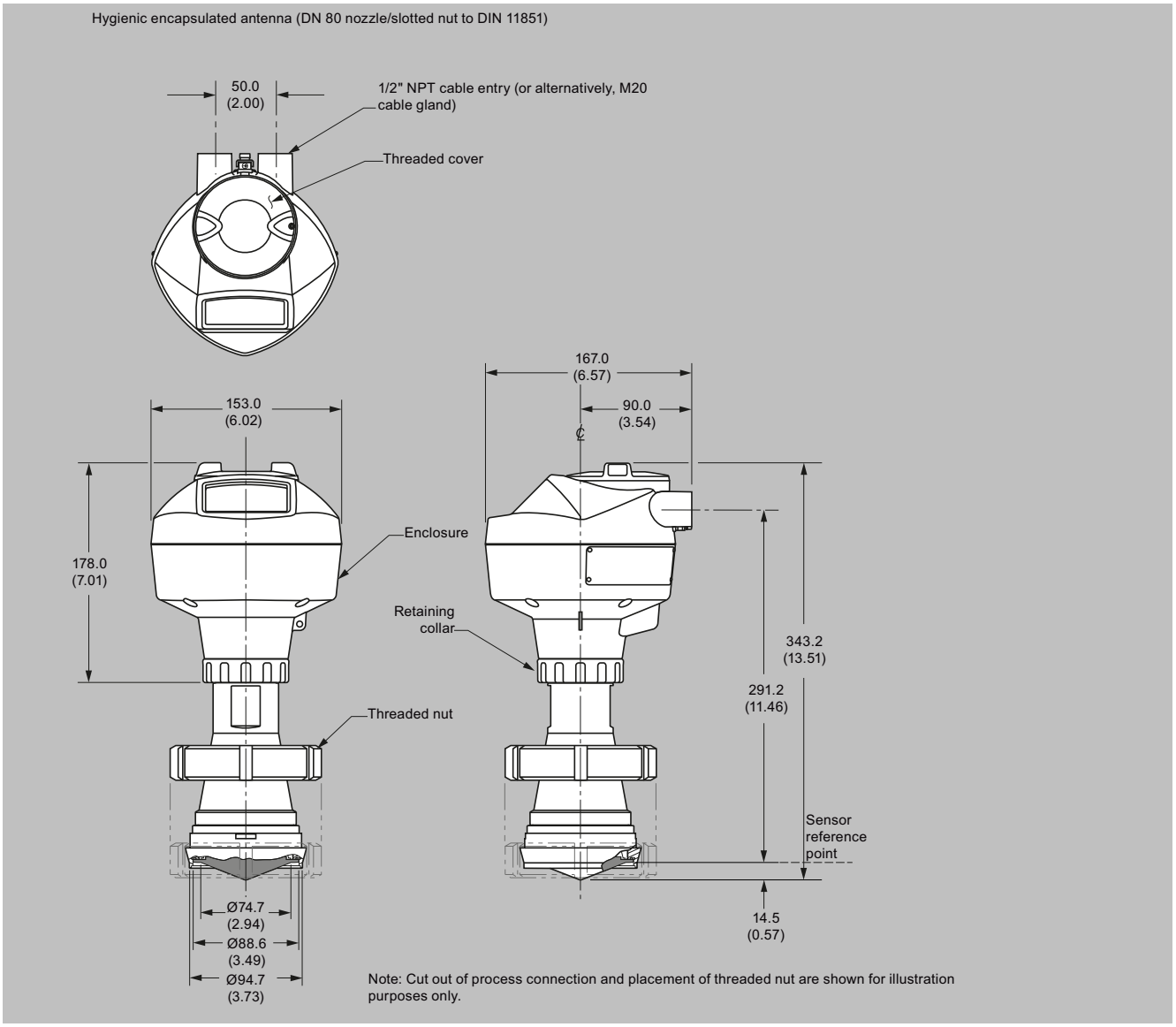



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

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## Dimensional drawings (continued)

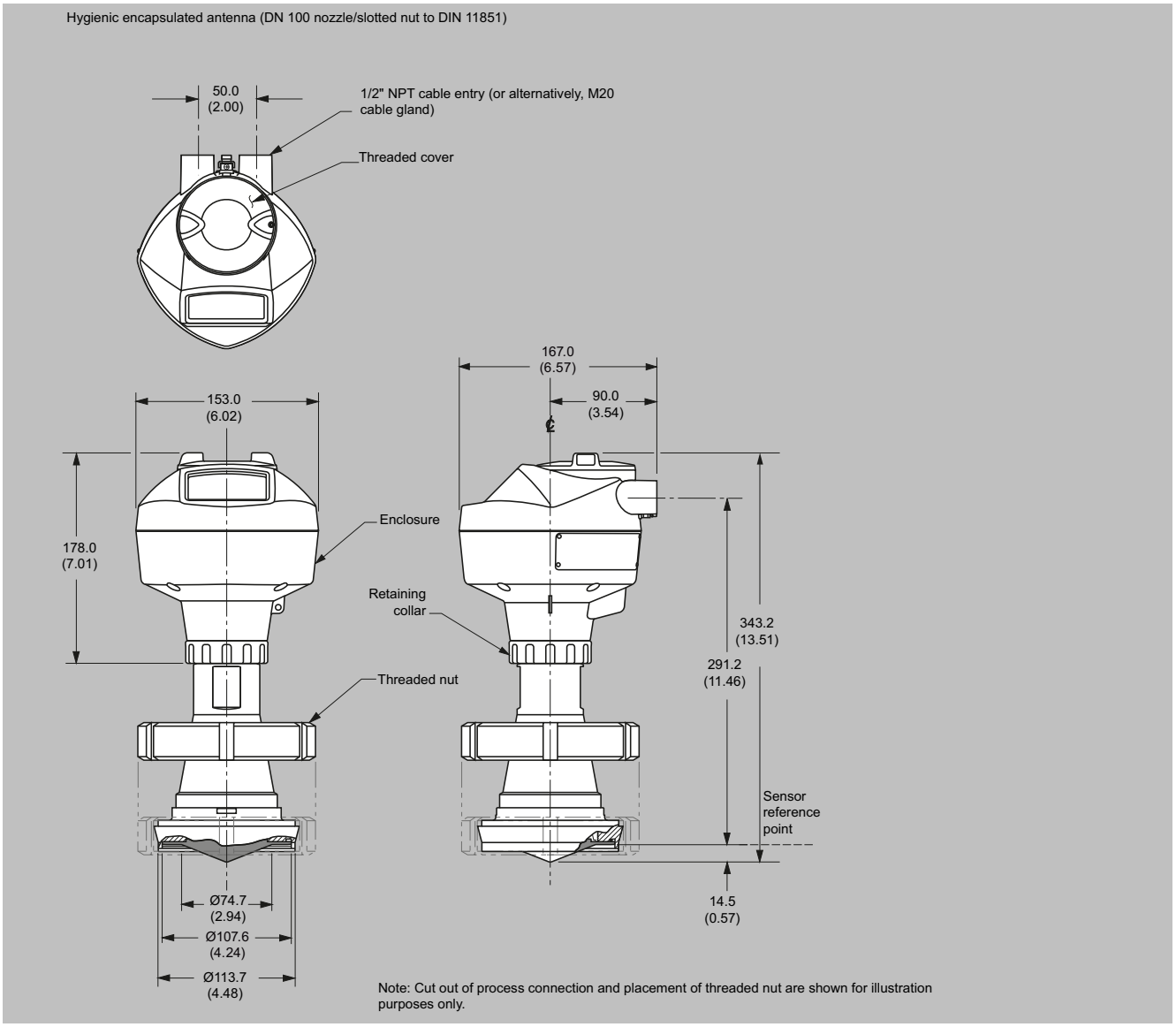



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

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## Dimensional drawings (continued)

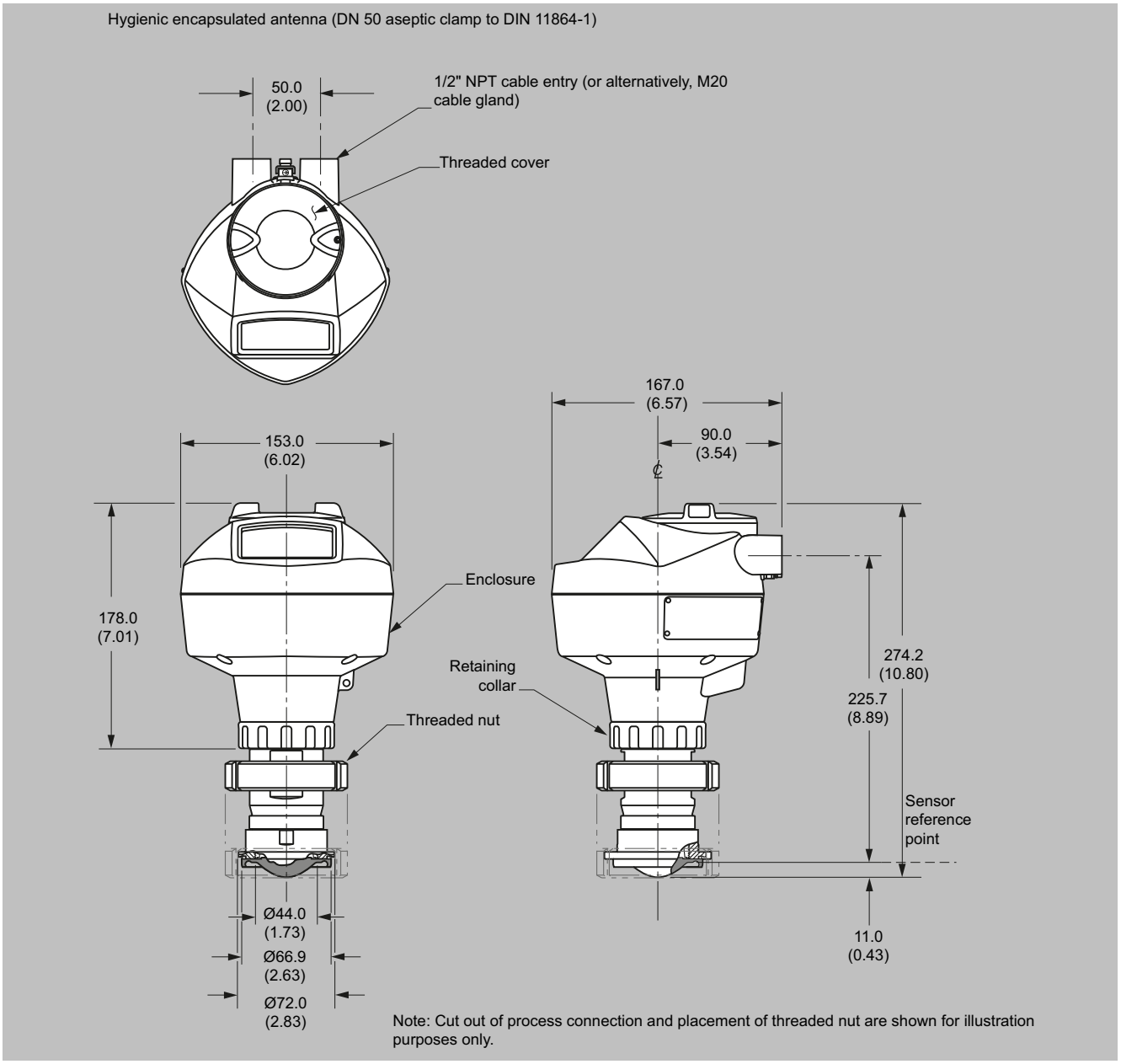



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 nozzle/slotted nut to DIN 11851), dimensions in mm (inch)

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## Dimensional drawings (continued)

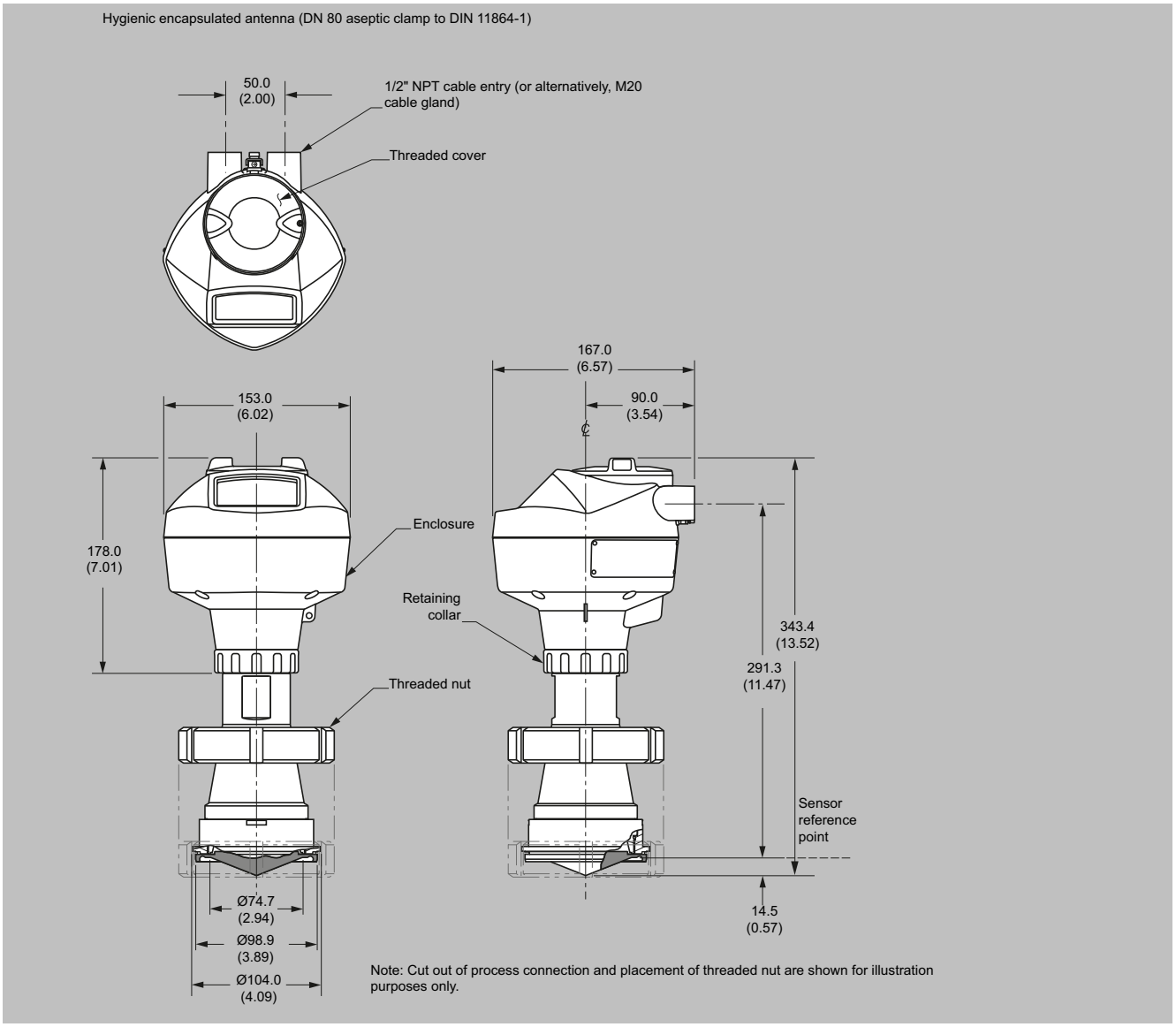



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

© Siemens AG 2024



## Dimensional drawings (continued)

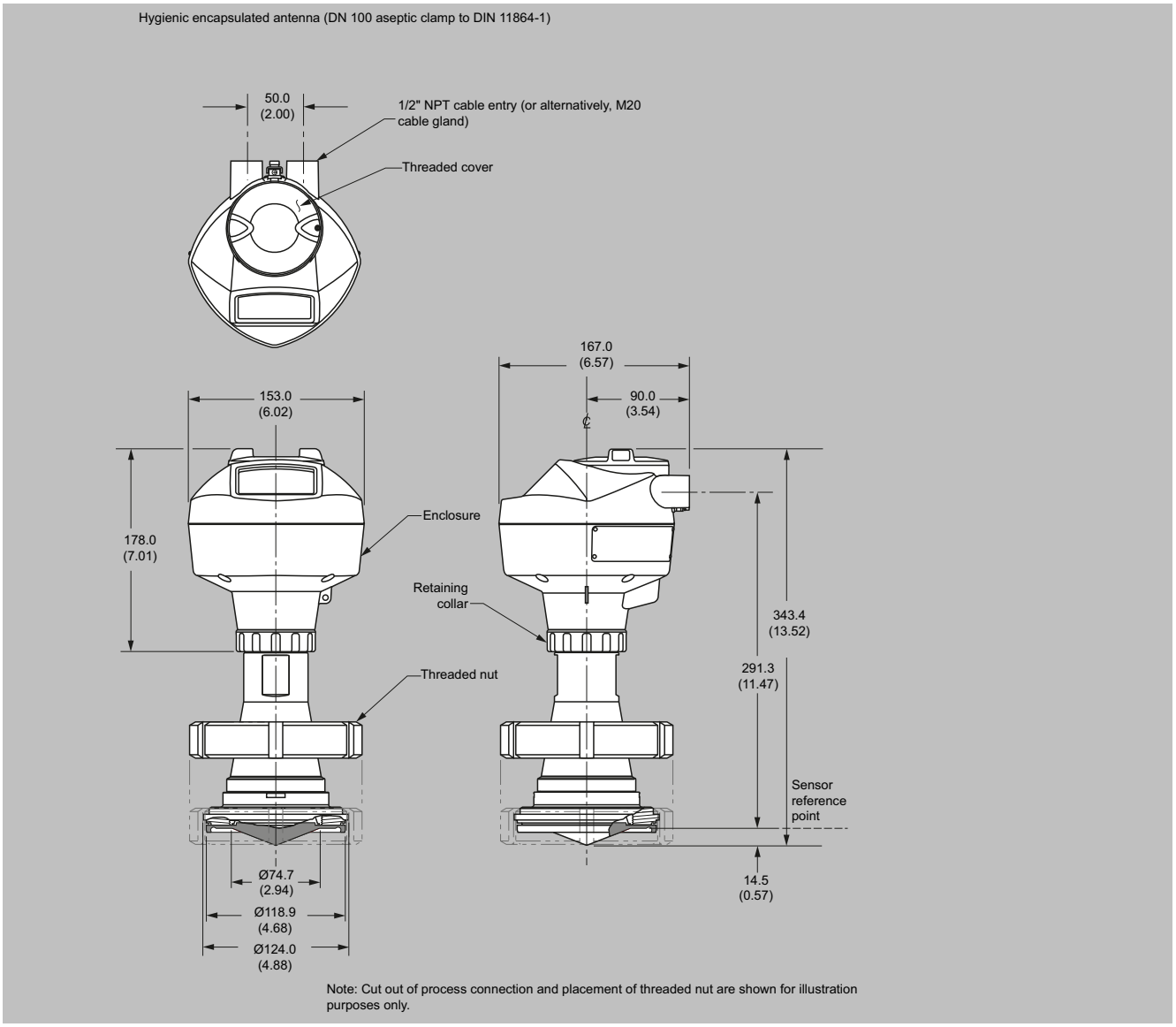



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

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## Dimensional drawings (continued)

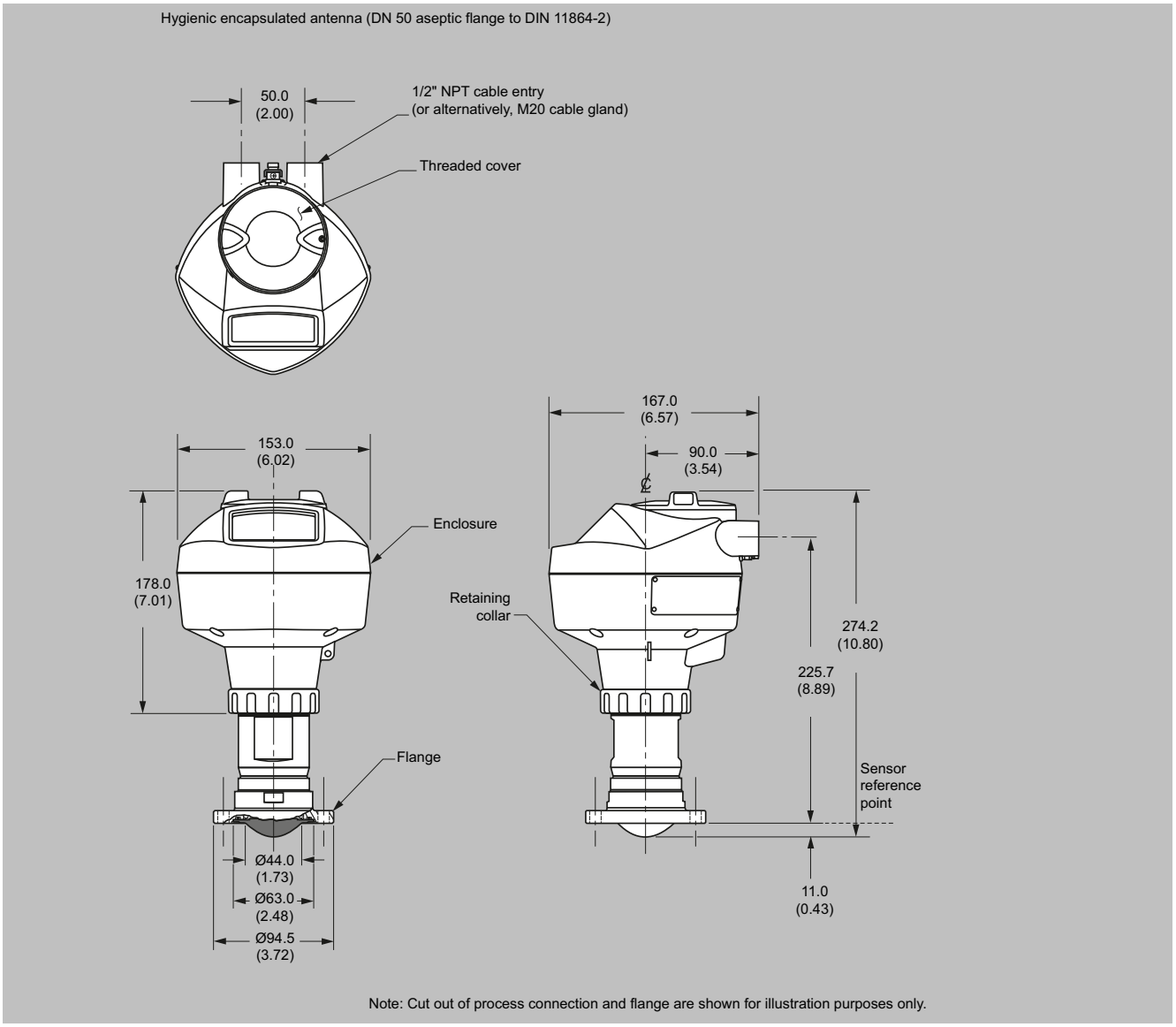



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-1), dimensions in mm (inch)

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## Dimensional drawings (continued)

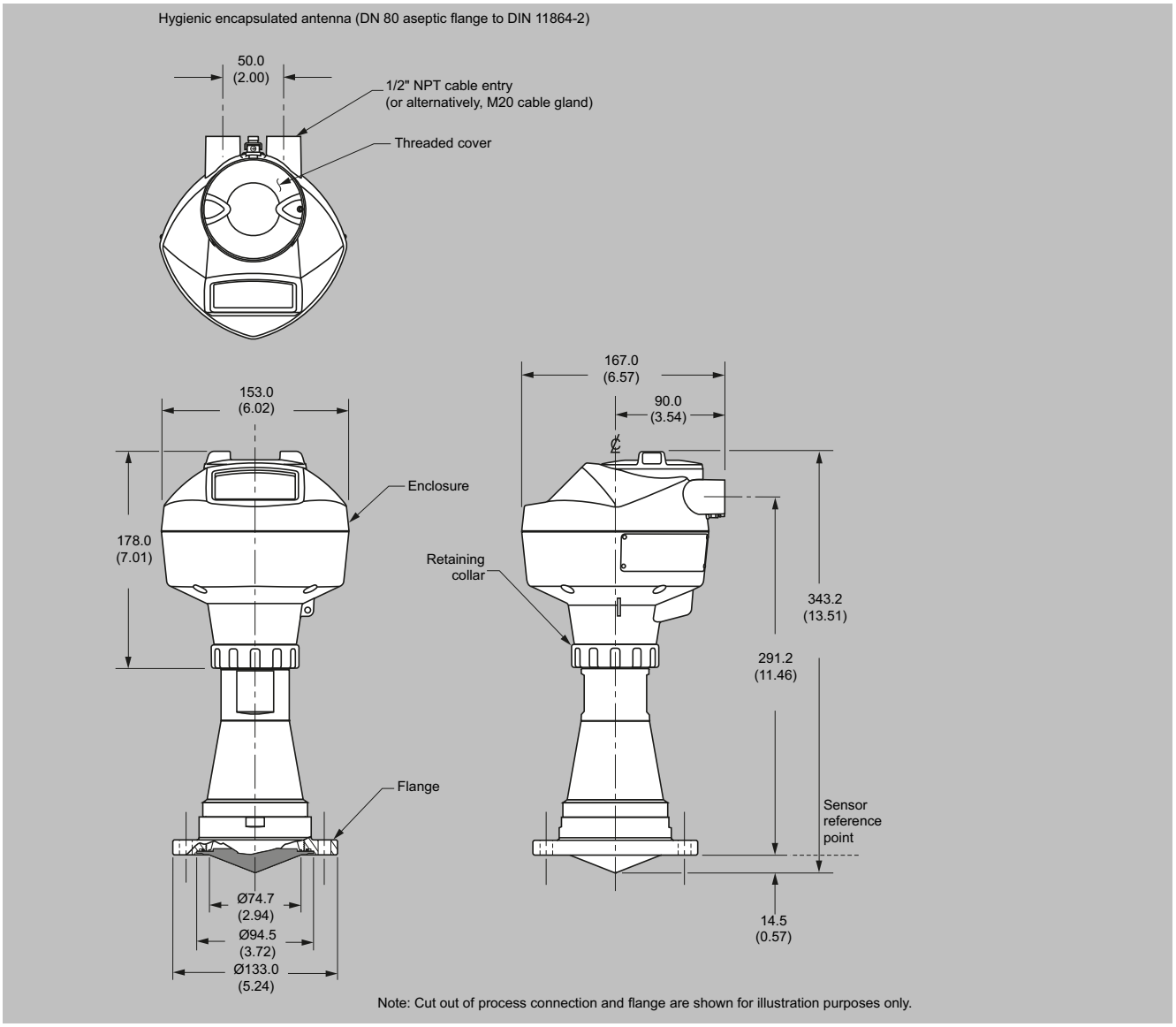



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic flange to DIN 11864-2), dimensions in mm (inch)

© Siemens AG 2024



## Dimensional drawings (continued)

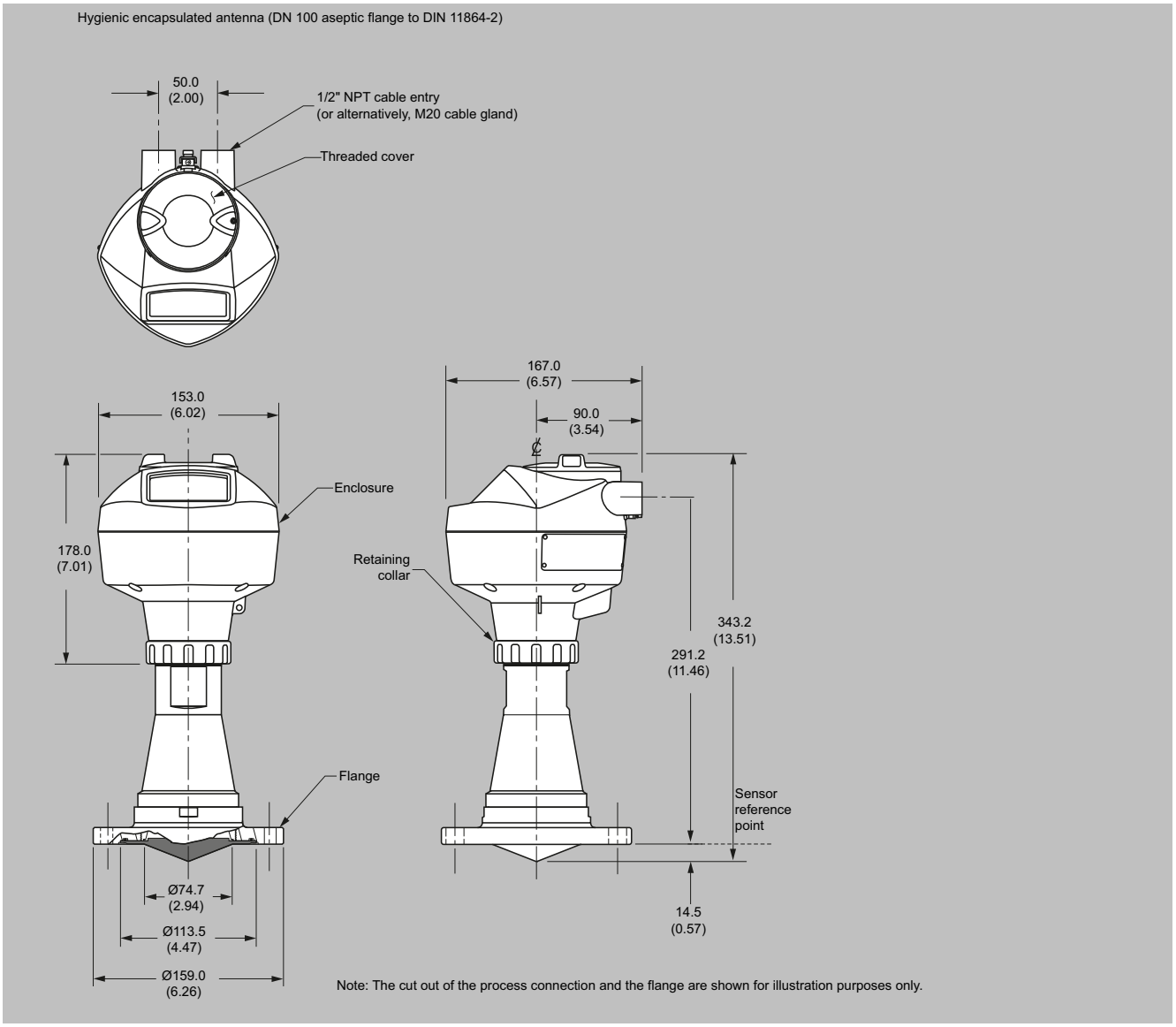



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic flange to DIN 11864-2), dimensions in mm (inch)

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## Dimensional drawings (continued)

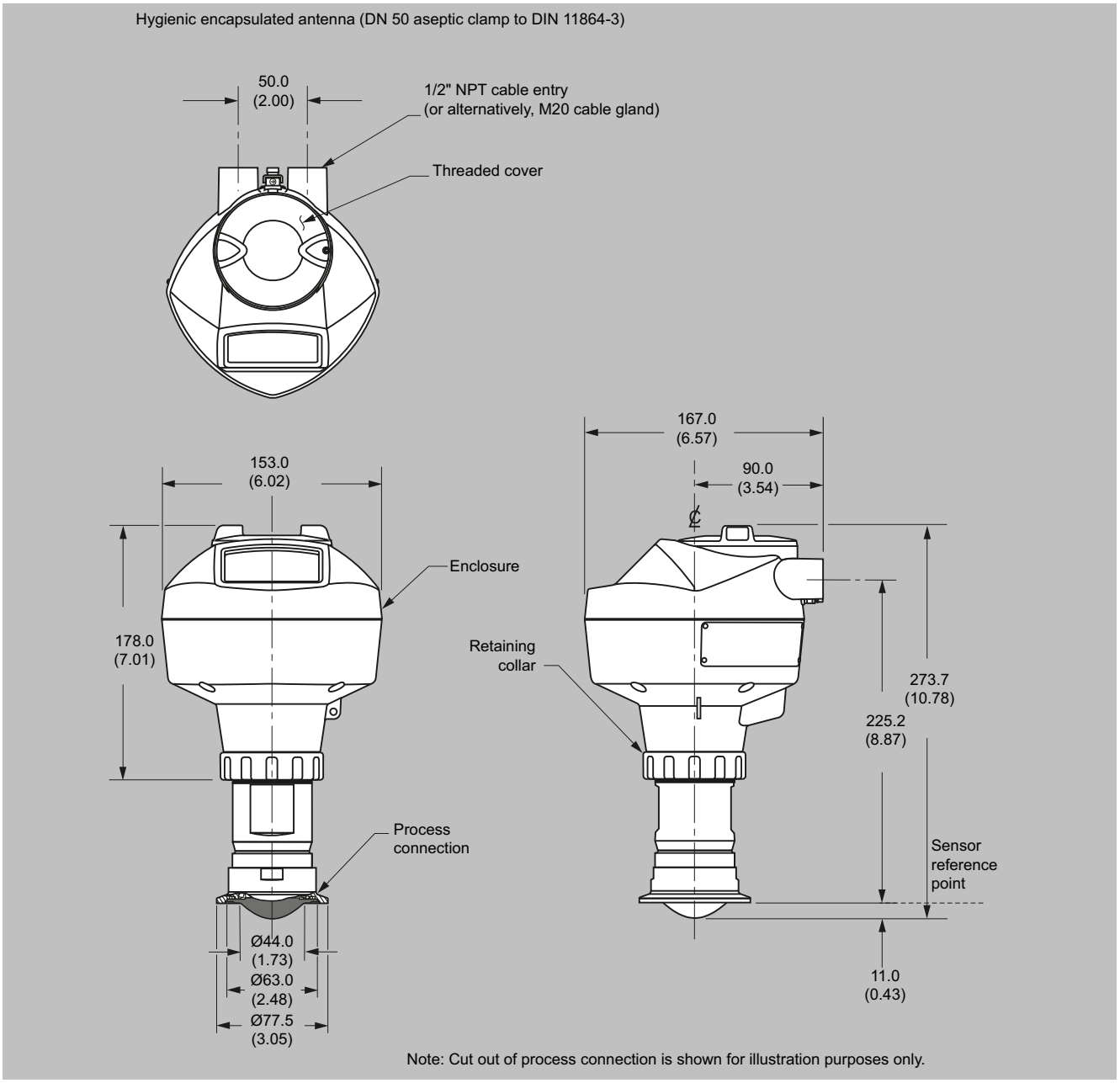



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic flange to DIN 11864-2), dimensions in mm (inch)

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## Dimensional drawings (continued)

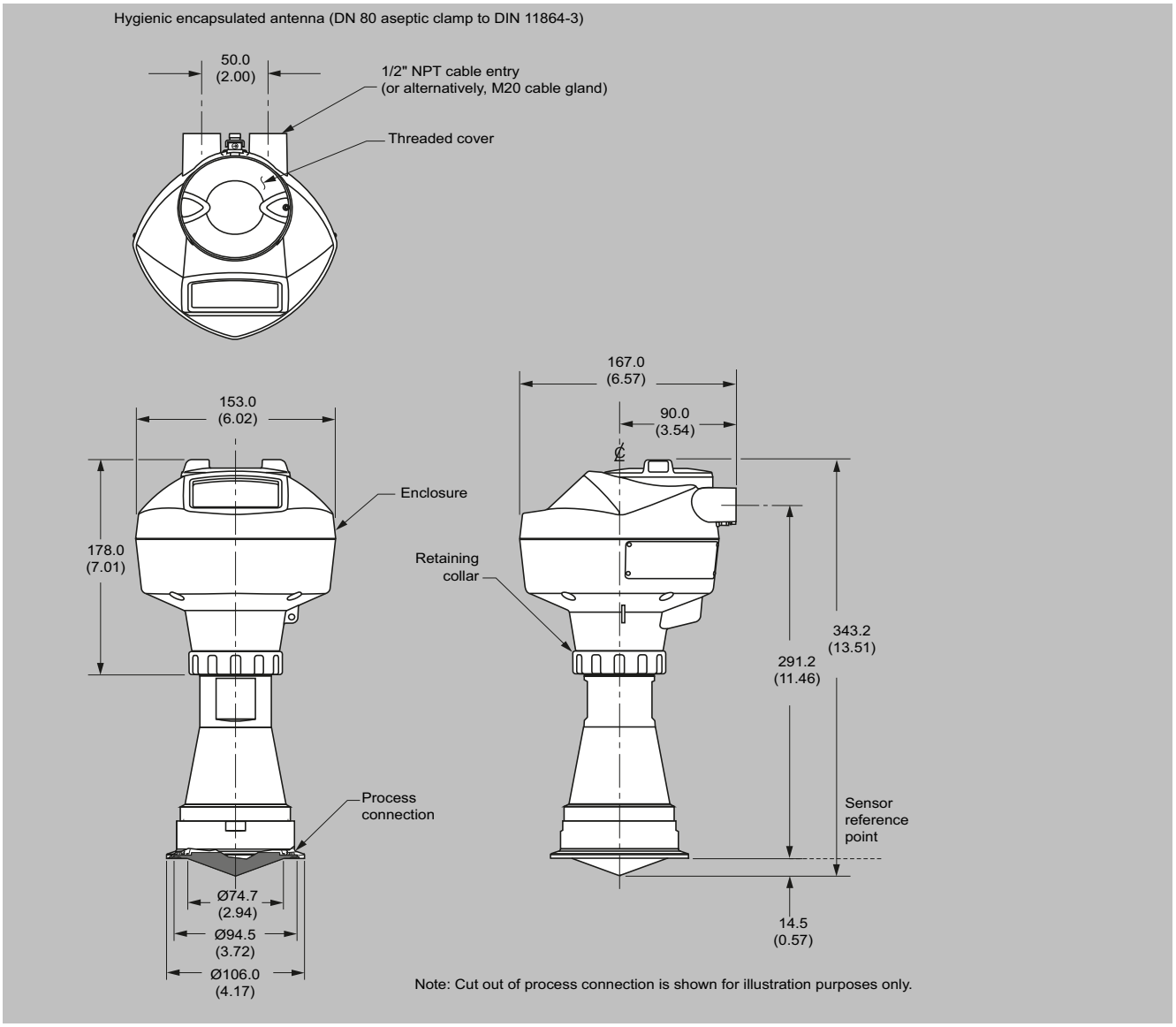



SITRANS LR250 Hygienic Encapsulated Antenna (DN 50 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

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## Dimensional drawings (continued)

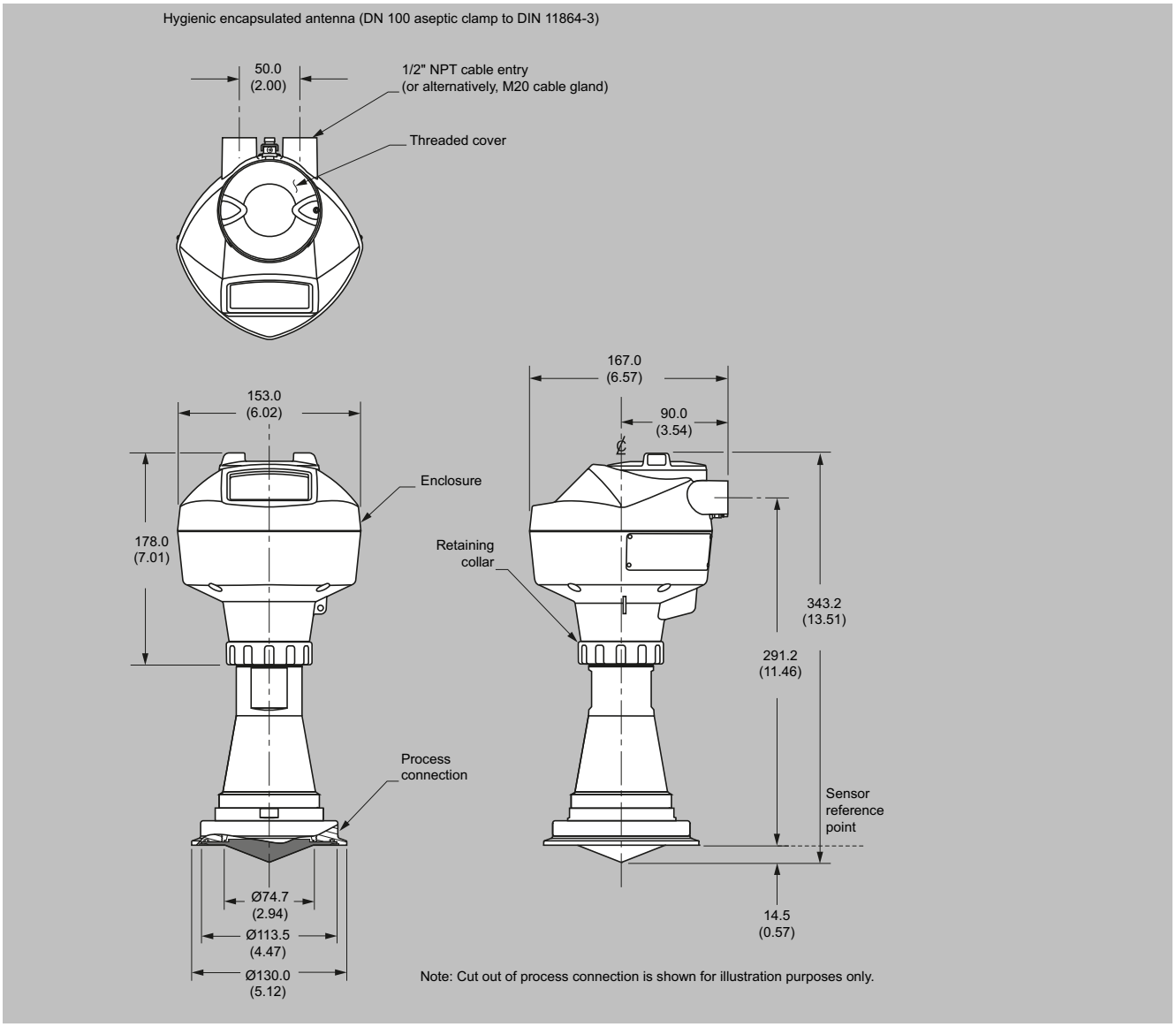



SITRANS LR250 Hygienic Encapsulated Antenna (DN 80 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

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## Dimensional drawings (continued)

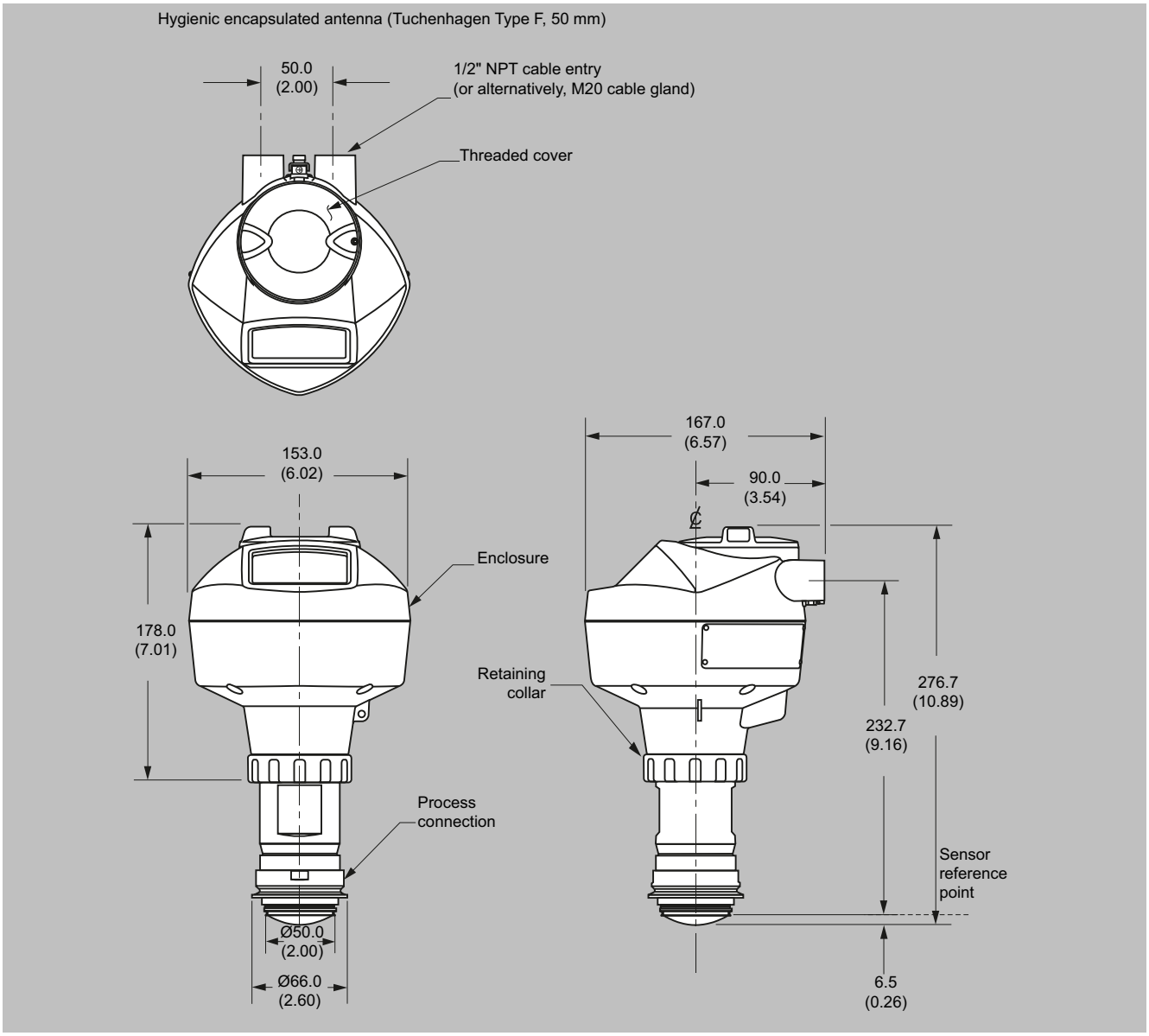



SITRANS LR250 Hygienic Encapsulated Antenna (DN 100 aseptic clamp to DIN 11864-3), dimensions in mm (inch)

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## Dimensional drawings (continued)

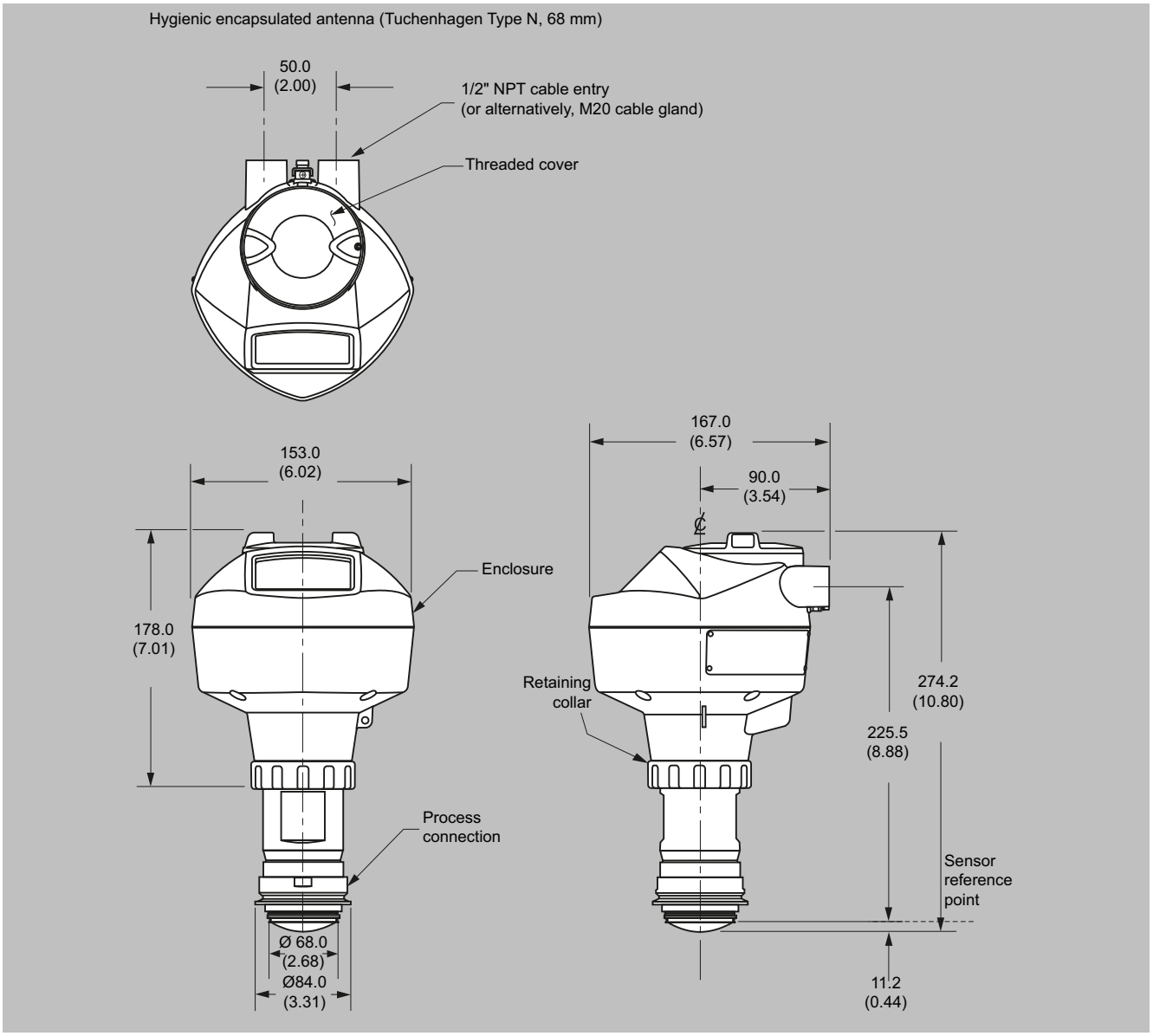



SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type F), dimensions in mm (inch)

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## Dimensional drawings (continued)

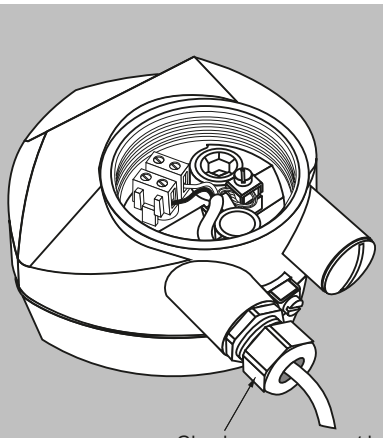



SITRANS LR250 Hygienic Encapsulated Antenna (Tuchenhagen Type N), dimensions in mm (inch)

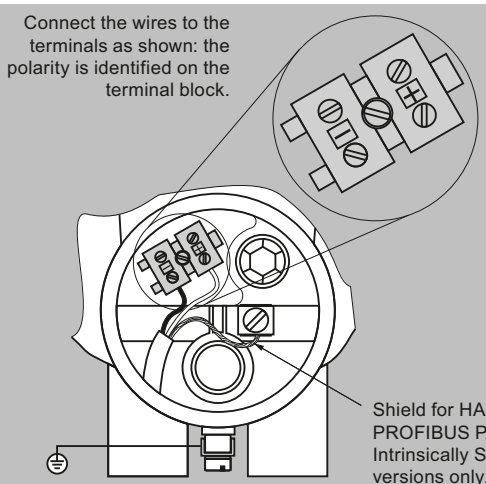
© Siemens AG 2024



## Circuit diagrams



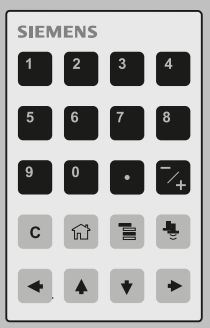
Gland may or may not be provided depending on approval option.



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

**Hand Programmer**




Part number:
7ML1930-1BK

**Notes:**

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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## Overview



The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust and high temperature.

## Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play startup
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

## Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

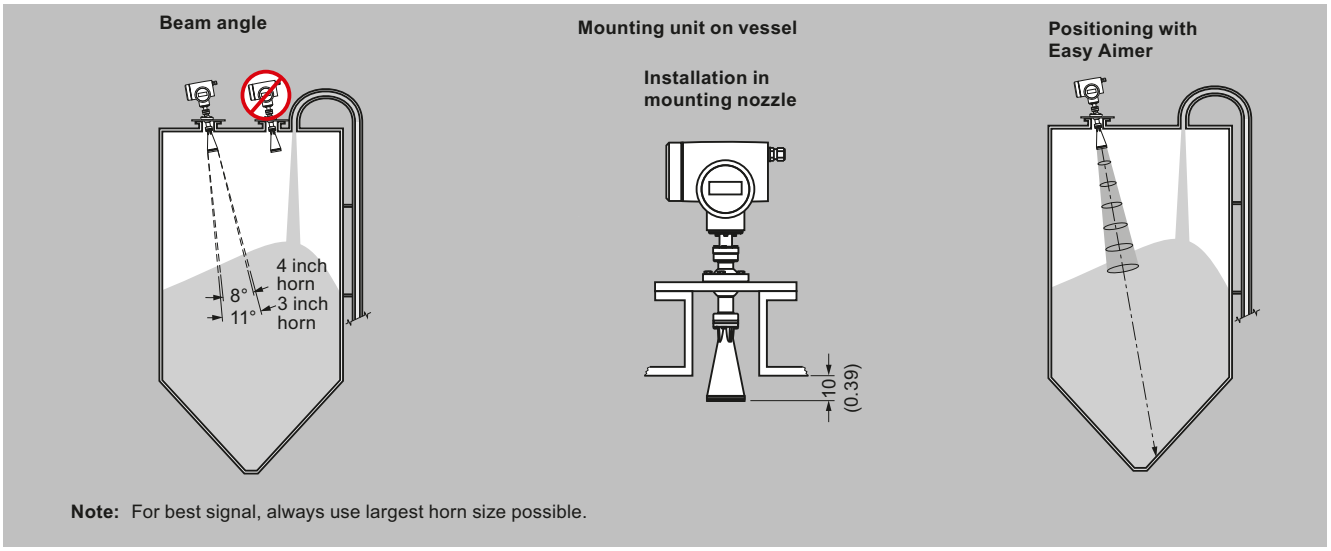
An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

## Configuration




SITRANS LR460 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR460 Radar level transmitter with horn Continuous, non-contact, 100 m (328 ft) range, for challenging solids applications. | Article No. 7ML5426- | 0 | ● | ● | ● | 0 | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball | | | | | | | | | | | |
| 3 inch (80 mm) | | | A | | | | | | | | |
| 4 inch (100 mm) | | | B | | | | | | | | |
| 6 inch (150 mm) | | | C | | | | | | | | |
| **Antenna** | | | | | | | | | | | |
| 3" horn antenna, fits 80 mm (3 inch) nozzles | | | | A | | | | | | | |
| 3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension | | | | B | | | | | | | |
| 3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension | | | | C | | | | | | | |
| 3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension[1] | | | | D | | | | | | | |
| 3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension[1] | | | | E | | | | | | | |
| 4" horn antenna, fits 100 mm (4 inch) nozzles | | | | F | | | | | | | |
| 4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension | | | | G | | | | | | | |
| 4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension | | | | H | | | | | | | |
| 4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension[1] | | | | J | | | | | | | |
| 4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension[1] | | | | K | | | | | | | |
| **Purge (self-cleaning) connection** | | | | | | | | | | | |
| No purge connection | | | | | 0 | | | | | | |
| Purge connection | | | | | 1 | | | | | | |
| **Output/Communication** | | | | | | | | | | | |
| 4 ... 20 mA, HART | | | | | | | | 0 | | | |
| PROFIBUS PA | | | | | | | | 1 | | | |
| **Power supply/cable inlet** | | | | | | | | | | | |
| 100 ... 230 V AC | | | | | | | | | | | |
| • 2 x M20 x 1.5 | | | | | | | | | A | | |
| • 2 x ½" NPT | | | | | | | | | B | | |
| 24 V DC | | | | | | | | | | | |
| • 2 x M20 x 1.5 | | | | | | | | | C | | |
| • 2 x ½" NPT | | | | | | | | | D | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}$CSA$_{US}$, FM, IC, FCC, CE, UKCA, RED, RCM | | | | | | | | | | A | |
| CSA/FM Class II, Div. 1, Groups E, F, and G, Class III | | | | | | | | | | B | |
| ATEX II 1 D Ex ta IIIC $T_{200}$ 85°C Da; UKEX II 1 D Ex ta IIIC $T_{200}$ 85°C Da; IECEx SIR 06.0058X, IECEx Ex ta IIIC $T_{200}$ 85°C Da; INMETRO DNV 12.0089 X, INMETRO Ex ta IIIC $T_{200}$ 85°C Da; EAC Ex Ex ta IIIC T85°C Da X; CE, UKCA, RED | | | | | | | | | | C | |

[1] Available with Purge option 0 only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| For applicable back up point level switch - see point level measurement section | |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Handheld programmer, Infra-red, Intrinsically Safe, EEx ia | **7ML5830-2AJ** |
| Dust cap, PTFE, for 3 inch/80 mm horn | **7ML1930-1BL** |
| Dust cap, PTFE, for 4 inch/100 mm horn | **7ML1930-1BM** |
| HART modem with USB interface | **7MF4997-1DB** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[1] | **7ML1930-1AP** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[1)] | 7ML1930-1AQ |
| SITRANS RD100, loop powered display -see Chapter 7 | 7ML5741-.....-. |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | 7ML5742-.....-.... |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | 7ML5740-.....-.. |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | 7ML5744-.....-.. |
| For applicable back up point level switch - see point level measurement section | |

1) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

| SITRANS LR460 Specials | Article No. |
|---|---|
| **Process connection part kits - non-pressure-rated** | |
| SITRANS LR460,100 mm extension for horn antenna, no purge[1)] | A5E01087872 |
| SITRANS LR460, 200 mm extension for horn antenna, no purge[1)] | A5E01091262 |
| SITRANS LR460,100 mm extension for horn antenna with purge[1)] | A5E01261979 |
| SITRANS LR460, 200 mm extension for horn antenna with purge[1)] | A5E01261981 |
| SITRANS LR460, horn 2", no purge, no emitter[1)] | A5E02083905 |
| SITRANS LR460, horn 3", no purge, no emitter[1)] | A5E01623511 |
| SITRANS LR460, horn 4", no purge, no emitter[1)] | A5E01623512 |
| SITRANS LR460, horn 2", with purge, no emitter[1)] | A5E02083906 |
| SITRANS LR460, horn 3", with purge, no emitter[1)] | A5E01623513 |
| SITRANS LR460, horn 4", with purge, no emitter[1)] | A5E01623514 |
| SITRANS LR460, 3" universal flat faced flange[1)] | A5E02303897 |
| SITRANS LR460, 4" universal flat faced flange[1)] | A5E01259467 |
| SITRANS LR460, 6" universal flat faced flange[1)] | A5E01261834 |
| SITRANS LR460 O-Rings for Easy Aimer[1)] | A5E01261836 |
| Kit, Emitter for LR460[1)] | A5E02360694 |

| SITRANS LR460 Specials | Article No. |
|---|---|
| **Purge conversion kit - non-pressure-rated (no flange or extension included)** | |
| SITRANS LR460 purge conversion, 2" horn[1)] | A5E02083914 |
| SITRANS LR460 purge conversion, 3" horn[1)] | A5E02083915 |
| SITRANS LR460 purge conversion, 4" horn[1)] | A5E02083916 |
| **Enclosure with electronics (LR460)**  | |
| SITRANS LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection | A5E02182085 |
| SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection | A5E02212422 |
| SITRANS LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection | A5E02212423 |
| SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection | A5E02212424 |
| SITRANS LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection | A5E02212425 |
| SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection | A5E02212426 |
| SITRANS LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection | A5E02212428 |
| SITRANS LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection | A5E02212429 |

1) Available with no pressure rating, 0.5 bar g maximum. Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

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## Technical specifications

| SITRANS LR460 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | FMCW radar level measurement |
| Frequency | 24.2 ... 25.2 GHz FMCW |
| Measuring range | 0.35 ... 100 m (1.15 ... 328.08 ft) |
| **Output** | |
| Analog output (HART) | |
| • Signal range | Optically isolated |
| • Load | Max. 600 Ω |
| • Fail-safe | mA signal programmable as high, low or hold (LOE) |
| Communication | HART, optional PROFIBUS PA |
| Digital output | Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W |
| PROFIBUS PA protocol | Layer 1 and 2, Class A, Profile 3.01 |
| **Performance (Reference conditions according to IEC 60770-1)** | |
| Non-linearity | Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range |
| Non-repeatability | ≤ 10 mm (0.4 inch) |
| **Rated operating conditions** | |
| Amb. temperature for enclosure | -40 ... +65 °C (-40 ... +149 °F) |
| Storage temperature | -40 ... +65 °C (-40 ... +149 °F) |
| Location | Indoor/outdoor |
| Installation category | II |
| Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant | $\epsilon_r > 1.4$ |
| Process temperature range | -40 ... +200 °C (-40 ... +392 °F) |
| Vessel pressure | 0.5 bar g (7.25 psi g) maximum |
| **Design** | |
| Weight | Approx. 6.1 kg (13.4 lb) with 3 inch universal flange |
| Materials | |
| • Enclosure | Die-cast aluminum, painted |
| • Degree of protection | IP67/Type 4X/NEMA 4X/Type 6/NEMA 6 |
| • Cable inlet | 2 x M20 x 1.5 or ½" NPT |
| Process connections | |
| • Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer | 3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure |
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer (ordered separately) | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga,<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da;<br>UKEX II 1 GD Ex ia op is IIC T4 Ga,<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da<br>CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40°C (104°F) |
| Handheld communicator | HART Communicator 375 |
| PC | SIMATIC PDM |
| Display (local) | Alphanumeric LCD for readout and entry |
| **Power supply** | 100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA)<br>or<br>24 V DC +25/-20 %, 6 W (optional) |
| **Certificates and approvals** | |
| General | $_{C}CSA_{US}$, CE, UKCA, FM, RCM |
| Radio | European Radio (RED), Industry Canada, FCC, RCM |

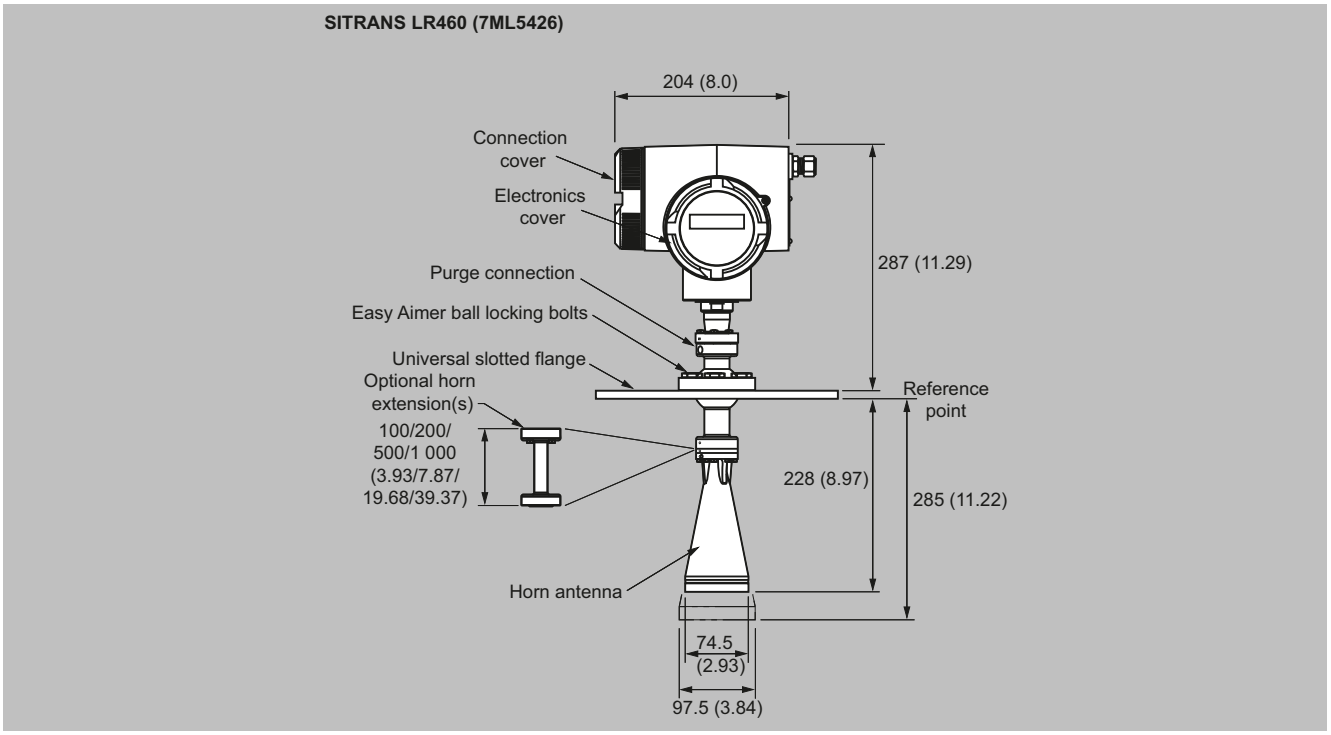
## Technical specifications (continued)

| SITRANS LR460 | |
|---|---|
| Hazardous Areas | ATEX II 1 D Ex ta IIIC $T_{200}$ 85°C Da;<br>UKEX II 1 D Ex ta IIIC $T_{200}$ 85°C Da;<br>IECEx Ex ta IIIC $T_{200}$ 85°C Da;<br>INMETRO Ex ta IIIC $T_{200}$ 85°C Da;<br>EAC Ex Ex ta IIIC T85°C Da X |
| **Optional equipment** | |
| Dust cap | PTFE |
| Air purge connection | 1/8" NPT |

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## Dimensional drawings



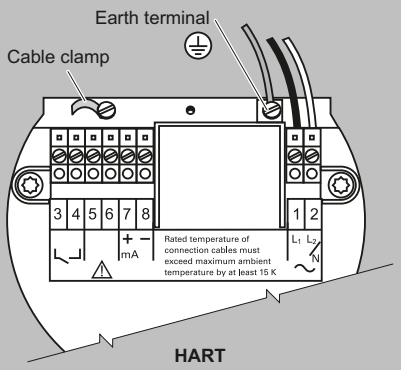

SITRANS LR460, dimensions in mm (inch)

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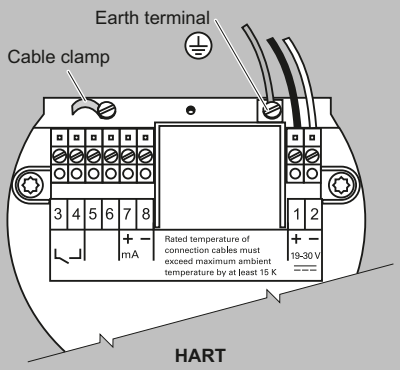


## Circuit diagrams

**AC version**



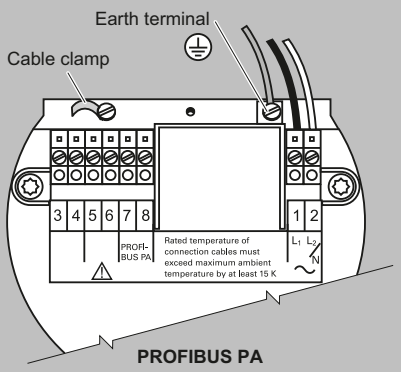

**DC version**

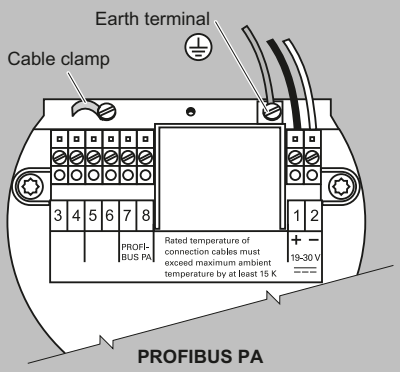



**Hand programmer**




**SITRANS LR460**
Part number:
7ML5830-2AJ




**Notes**

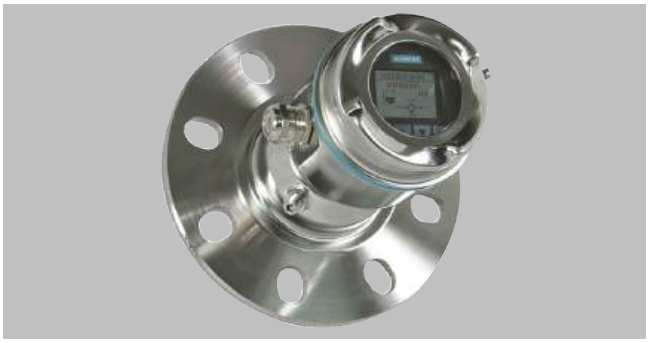
- Recommended torque on terminal clamping screws, 0.5 ... 0.6 Nm
- 4 ... 20 mA, PROFIBUS PA, DC input circuits, 14 ... 20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation

SITRANS LR460 connections

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## Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids and liquids to a range of 100 m (328 ft).

## Benefits

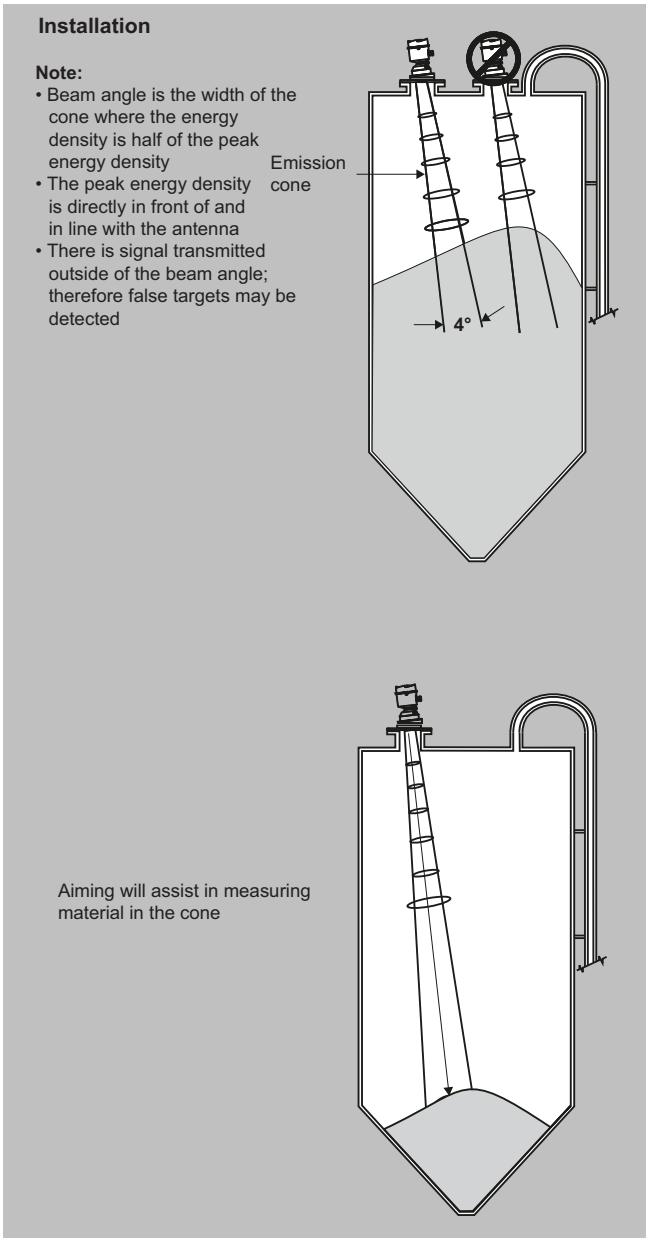
- Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product buildup
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

## Application

SITRANS LR560's plug and play performance is ideal for most solids applications and long range liquid applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.
SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.
SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

## Configuration




SITRANS LR560 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LR560 Radar level transmitter with flush lens antenna<br>Continuous, non-contact, 100 m (328 ft) range, for general solids applications.<br>Order handheld programmer separately | Article No.<br>7ML5440- | ● | ● | ● | 0 | 0 | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Measurement and process temperature range** | | | | | | | | | | | |
| 40 m (131 ft) max range, -40 ... +100 °C | | 0 | | | | | | | | | |
| 100 m (328 ft) max range, -40 ... +200 °C | | 1 | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| ***Universal flat-faced flange fits ANSI/DIN/JIS flanges*** | | | | | | | | | | | |
| 80 mm/3 inch, 304 stainless steel | | | A | | | | | | | | |
| 100 mm/4 inch, 304 stainless steel | | | B | | | | | | | | |
| 150 mm/6 inch, 304 stainless steel | | | C | | | | | | | | |
| 80 mm/3 inch, 316L stainless steel | | | D | | | | | | | | |
| 100 mm/4 inch, 316L stainless steel | | | E | | | | | | | | |
| 150 mm/6 inch, 316L stainless steel | | | F | | | | | | | | |
| 80 mm/3 inch, painted aluminum, with integral aimer[1] | | | G | | | | | | | | |
| 100 mm/4 inch, painted aluminum, with integral aimer[1] | | | H | | | | | | | | |
| 150 mm/6 inch, painted aluminum, with integral aimer[1] | | | J | | | | | | | | |
| **Enclosure (with cable inlet)** | | | | | | | | | | | |
| Stainless steel, 1 x ½" NPT | | | | A | | | | | | | |
| Stainless steel, 1 x M20 x 1.5 (plastic gland included) | | | | B | | | | | | | |
| **Pressure rating** | | | | | | | | | | | |
| 0.5 bar g (7.5 psi g) maximum | | | | | | | | 0 | | | |
| 3 bar g (40 psi g) maximum | | | | | | | | 1 | | | |
| **Output/communication** | | | | | | | | | | | |
| 4 ... 20 mA, HART | | | | | | | | | A | | |
| PROFIBUS PA | | | | | | | | | B | | |
| **Approvals** | | | | | | | | | | | |
| General Purpose, FM, $CSA_{US/C}$, Industry Canada, FCC, CE, RED, RCM | | | | | | | | | | A | |
| CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC | | | | | | | | | | B | |
| ATEX II 3G Ex nA/nL, 1D, ½D, 2D Ex ta, INMETRO, CE, RED, RCM | | | | | | | | | | C | |
| **Local display interface** | | | | | | | | | | | |
| Without | | | | | | | | | | | 1 |
| With | | | | | | | | | | | 2 |

[1] Rated to 120 °C max. when used with Pressure rating option 1.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Plug M12 with mating connector[1)2)3)] | **A50** |
| Plug 7/8" with mating connector[1)3)4)] | **A55** |
| Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text | **Y15** |
| Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204[5)] | **C12** |
| NAMUR NE43 compliant, device preset to failsafe < 3.6 mA[6)] | **N07** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Hand Programmer, Intrinsically safe | **7ML1930-1BK** |
| Local display interface | **7ML1930-1FJ** |
| Sun Shield Cover, 304 stainless steel | **7ML1930-1FK** |
| Housing lid with window | **7ML1930-1FL** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[7)] | **7ML1930-1AP** |
| One metallic cable gland M20 x 1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[7)] | **7ML1930-1AQ** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available with Approval option A only.
2) Available with Enclosure option B only.
3) Available with Output/communication options B and C only.
4) Only available with enclosure option A (NPT thread).
5) Available with Pressure rating option 1 only.
6) Available with Output/communication option A only.
7) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

| SITRANS LR560 Specials | Article No. |
|---|---|
| **SITRANS LR560 Electronics Modules** | |
| SITRANS LR560 Electronics Module, HART, 100 m range, compatible with 7ML54401XX00XAXX, no enclosure or process connection included. | **7ML1830-3AC** |
| SITRANS LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML54401XX00XBXX, no enclosure or process connection included. | **7ML1830-3AH** |
| SITRANS LR560 Electronics Module, HART, 40 m range, compatible with 7ML54400XX00XAXX, no enclosure or process connection included. | **7ML1830-3AK** |
| SITRANS LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML54400XX00XBXX, no enclosure or process connection included. | **7ML1830-3AL** |
| **SITRANS LR560 Miscellaneous Spare Kits** | |
| Kit, lid gasket, EPDM | **7ML1830-3AA** |
| Kit, wrench for 4 inch and 6 inch Aimers | **7ML1830-3AB** |
| Kit, O-rings for 3 inch Aimer | **7ML1830-3AD** |
| Kit, O-rings for 4 inch Aimer | **7ML1830-3AE** |
| Kit, O-rings for 6 inch Aimer | **7ML1830-3AF** |
| Kit, lid screw and purge plug set with hex keys | **7ML1830-3AG** |
| Kit, lid, no Window | **7ML1830-3AP** |

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

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## Technical specifications

| SITRANS LR560 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Radar level measurement |
| Frequency | 78 GHz FMCW |
| Minimum detectable distance | 400 mm (15.75 inch) from sensor reference point |
| Maximum measuring range[1] | • 40 m (131 ft) version<br>• 100 m (328 ft) version |
| **Output** | |
| Analog output | 4 ... 20 mA |
| Communications | • HART<br>• Optional: PROFIBUS PA |
| Fail-safe | • Programmable as high, low or hold (Loss of Echo)<br>• NE43 programmable |
| **Performance (according to reference conditions IEC60770-1)** | |
| Maximum measured error (including hysteresis and non-repeatability)[2] | 5 mm (0.2 inch) |
| **Rated operating conditions (according to reference conditions IEC60770-1)** | |
| Installation conditions | |
| • Location | Indoor/outdoor |
| Ambient conditions (enclosure) | |
| • Ambient temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| **Medium conditions** | |
| Dielectric constant $\epsilon_r$ | > 1.6 |
| Process temperature and pressure | See chart below |
| **Design** | |
| Enclosure | |
| • Construction | 316L/1.4404 stainless steel |
| • Conduit entry | M20 x 1.5, or ½" NPT via adapter |
| • Purge inlet | 1/8" NPT, 30 cfm at max. 100 psi |
| • Lens material | • 40 m version: PEI<br>• 100 m version: PEEK<br>Damage to lens could result from continuous purging/cleaning (due to abrasive solids). Recommended to purge/clean only a few seconds every hour. |
| • Degree of protection | Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 |
| • Weight | 3.15 kg (6.94 lb) including 3 inch flange |
| • Optional local display interface | Graphic LCD, with bar graph representing level |
| Process connections | |
| • Universal flat-faced flanges[3] | • 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel<br>• 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel |
| • Aimer flanges[3] | 3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum |
| **Power supply** | |
| 4 ... 20 mA/HART | Nominal 24 V DC (max. 30 V DC) with max. 550 Ω |
| PROFIBUS PA | 13.5 mA<br>9 ... 32 V DC, per IEC 61158-2 |
| **Certificates and approvals** | |
| General | $_{C}CSA_{US}$, CE, UKCA, FM |
| Radio | Europe (RED), FCC, Industry Canada, RCM |
| Hazardous | |
| • Europe / UK / International | ATEX II 1 D 1/2 D 2 D Ex ta IIIC T139°C Da,<br>ATEX II 3 G Ex ic IIC T4 Gc,<br>ATEX II 3 G Ex ec IIC T4 Gc;<br>UKEX II 1D 1/2D 2D Ex ta IIIC T139°C Da,<br>UKEX II 3G Ex ic IIC T4 Gc,<br>UKEX II 3G Ex ec IIC T4 Gc;<br>IECEx SIR 09.0149X,<br>IECEx Ex ec IIC T4 Gc,<br>IECEx Ex ic IIC T4 Gc,<br>IECEx Ex ta IIIC T139°C Da, IP68; |
| • US/Canada | FM/CSA Class II, Div. 1, Groups E, F, G Class III T4<br>FM/CSA Class I, Div. 2, Groups A, B, C, D, T4 |
| • China | NEPSI<br>Ex nA II T4<br>Ex nL IIC T4<br>DIP A20 TA, T139 °C |
| • Brazil | INMETRO<br>Ex nA IIC T4 Gc, Ex ta IIIC T139°C Da |
| **Programming** | |
| Intrinsically Safe Siemens handheld programmer | Infrared receiver |
| • Approvals for handheld programmer | IS model:<br>ATEX II 1 GD Ex ia op is IIC T4 Ga,<br>ATEX II 1 GD Ex ia op is IIIC T135°C Da,<br>Ta = -20°C to +50°C;<br>UKEX II 1 GD Ex ia op is IIC T4 Ga,<br>UKEX II 1 GD Ex ia op is IIIC T135°C Da,<br>Ta = -20°C to +50°C |
| Handheld communicator | HART communicator 375/475 |
| PC | SIMATIC PDM, AMS, PACTware |
| Display (local) | Graphic local user interface including quick start wizard and echo profile displays |

1) From sensor reference point
2) Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)
3) Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/JIS 2220 (10K) bolt hole pattern.

### *Process temperature and pressure*

| Version | Stainless steel<br>-1 ... 0.5 bar<br>-1 ... 3.0 bar | Aimer flange:<br>-1 ... 0.5 bar | Aimer flange:<br>-1 ... 3.0 bar |
|---|---|---|---|
| 40 m | -40 ... +100 °C<br>(-40 ... +212 °F) | -40 ... +100 °C<br>(-40 ... +212 °F) | -40 ... +100 °C<br>(-40 ... +212 °F) |
| 100 m | -40 ... +200 °C<br>(-40 ... +392 °F) | -40 ... +200 °C<br>(-40 ... +392 °F) | -40 ... +120 °C<br>(-40 ... +248 °F) |

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## Options

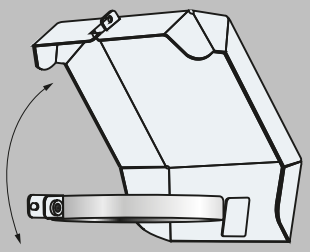
**Handheld programmer**

**Article number:**
7ML1930-1BK




**Sun shield cover**
(304 stainless steel)

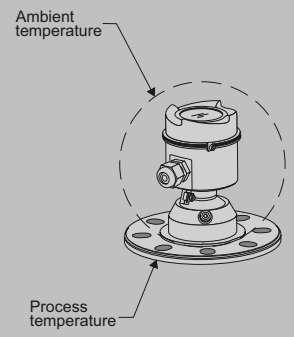
**Article number:**
7ML1930-1FK

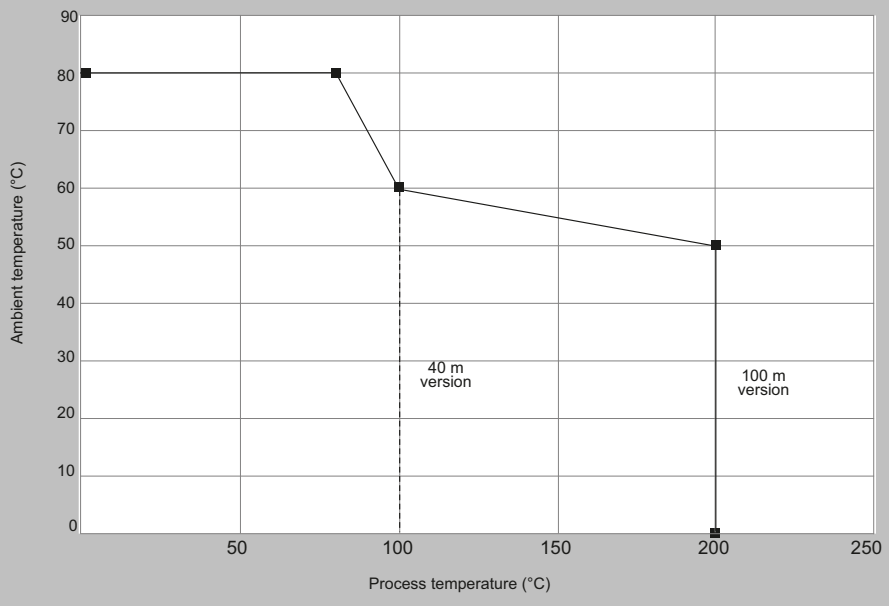


SITRANS LR560 handheld programmer and sun shield cover

## Characteristic curves

**Temperature derating curve**



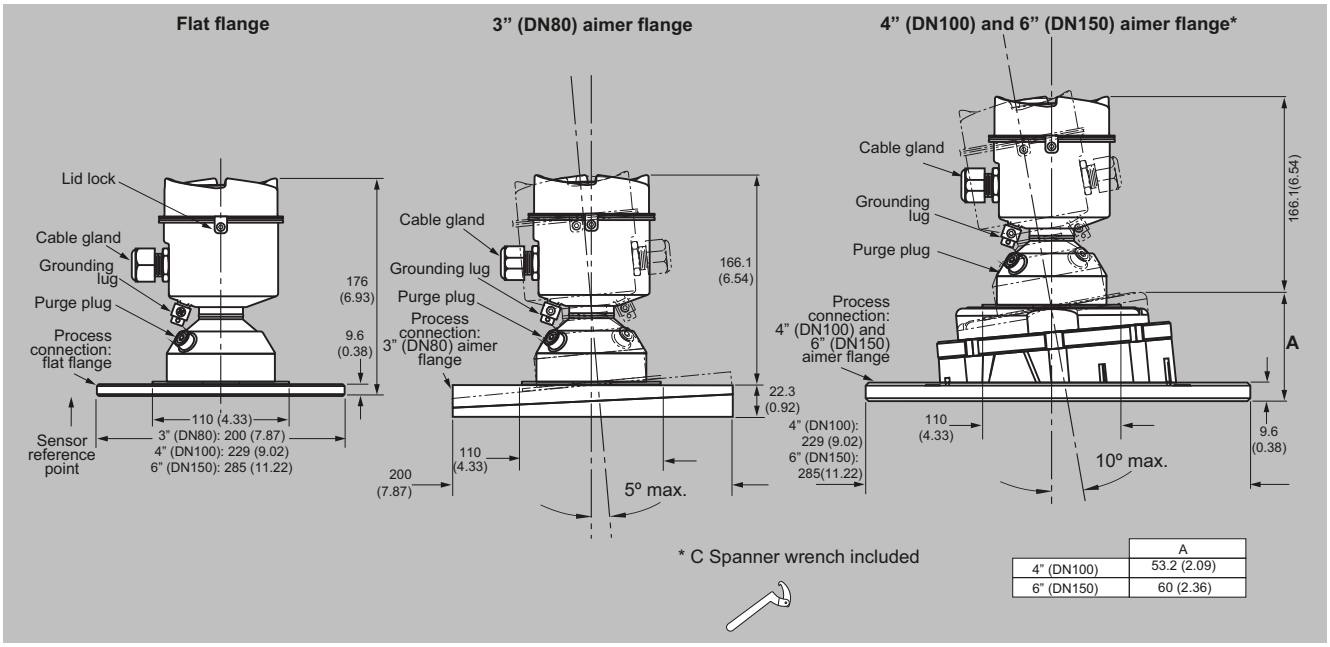




SITRANS LR560 temperature derating curve

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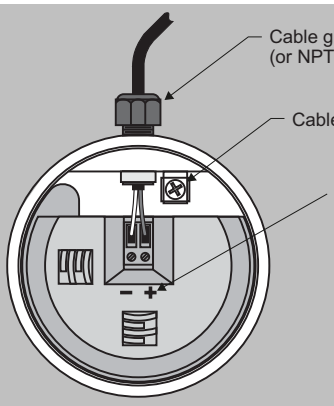
## Dimensional drawings




| | A |
|---|---|
| 4" (DN100) | 53.2 (2.09) |
| 6" (DN150) | 60 (2.36) |

SITRANS LR560, dimensions in mm (inch)

## Circuit diagrams




**Notes:**
1. Depending on the approval rating, glands and plugs may be supplied with your instrument.
2. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
3. All field wiring must have insulation suitable for rated input voltages.
4. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
5. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections

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## Overview

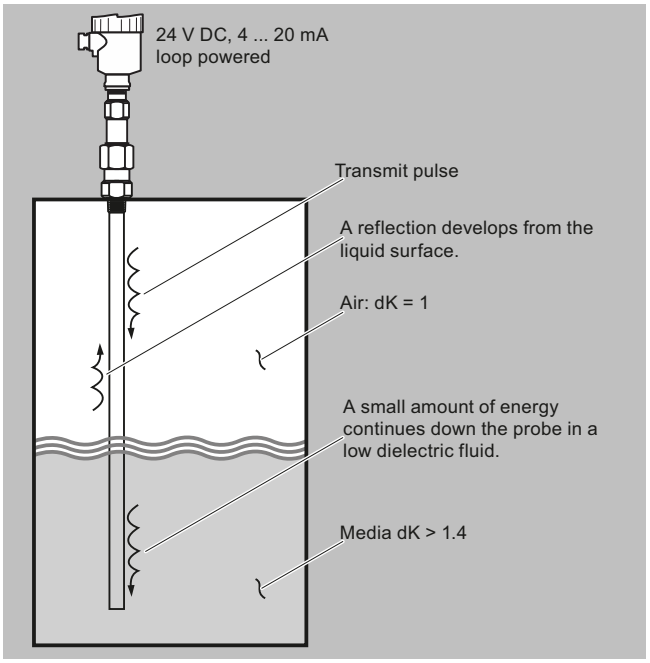
***Introduction***

Guided Wave Radar transmitters use TDR (time domain reflectometry).

***Time Domain Reflectometry (TDR)***

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

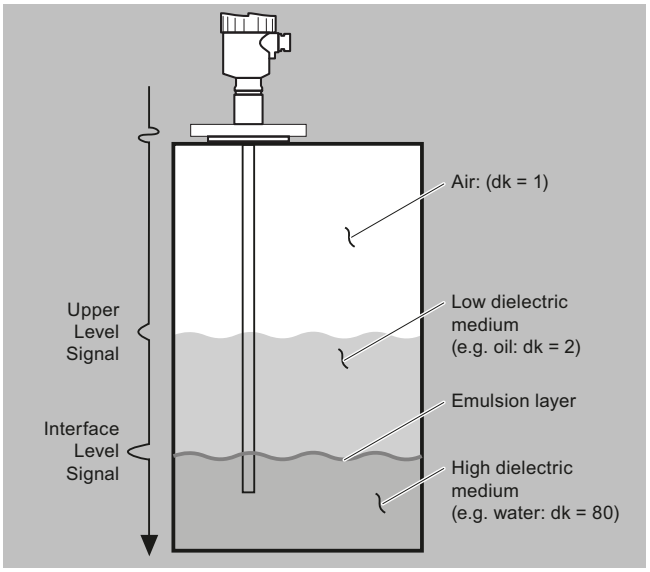
The SITRANS LG includes a transmitter and waveguide that has a characteristic impedance in air and is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.




## Mode of operation

***Interface Detection***

The SITRANS LG, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.6 and 10 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



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## Overview



The Siemens SITRANS LG series are guided wave radar transmitters for level, level/interface, and volume measurement of liquids and solids. The SITRANS LG product line can handle changes in process conditions, high temperatures and pressures, and steam.

## Benefits

- High accuracy to +/- 2 mm
- Advanced Diagnostics available for high degree of safety
- Simple menu driven display offers ease of setup
- Large range of options offers reliability in most continuous level measurement applications
- Ease of maintenance through module design and field replaceable and adjustable probe options
- Perfect solution for wide range of applications from storage to interface with options for extreme pressure and temperature conditions
- Universally applicable in liquids, interface, slurries and solids
- Highly immune to buildup using auto learn function
- Ability to measure in loss of echo situations with probe end tracking
- Suitable for API 2350
- Convenient access using USB and remote interface accessories

## Application

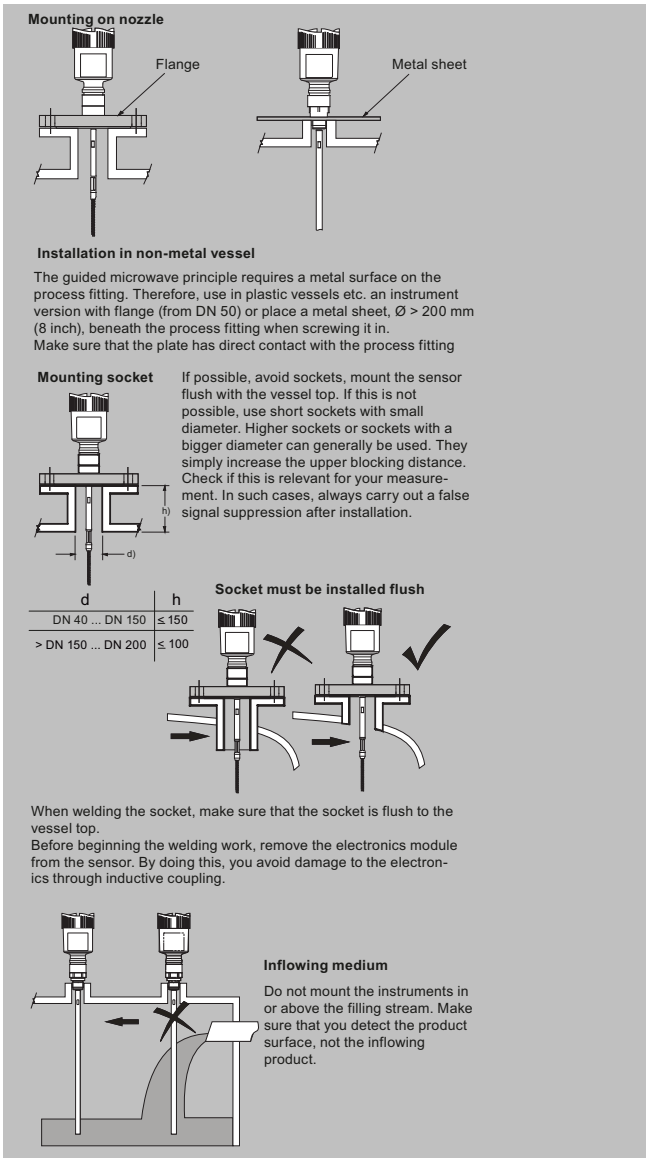
The SITRANS LG series comes in four different models, depending on the applications, level of performance, and functionality required:

- SITRANS LG240 offers configuration options for your hygienic and corrosive application requirements
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile offering solutions for storage, separation of materials or difficult ammonia applications
- SITRANS LG260 Ideal for measuring level in medium range solids applications including; grains, plastics, and cement
- SITRANS LG270 offers configuration options for extreme conditions including high temperature and high pressure applications such as: harsh applications found in chemical, HPI and energy industries for example, LPG gas tanks, steam boilers and distillation columns

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## Configuration

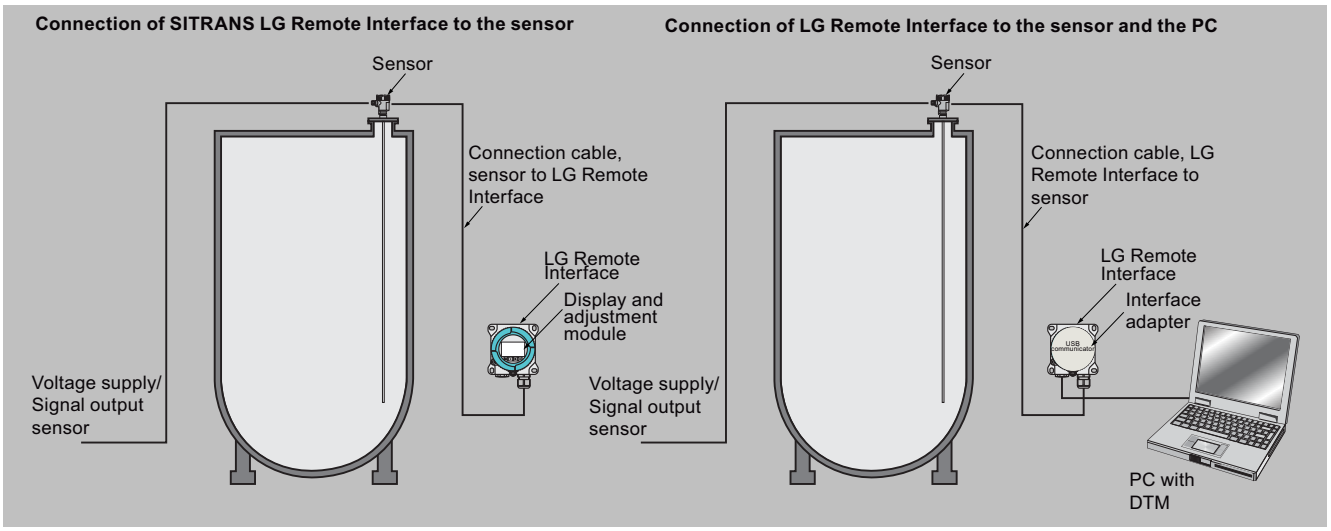



SITRANS LG Series installation

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## Configuration (continued)




SITRANS LG Remote Interface installation

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## Selection and ordering data

| SITRANS LG240 Guided radar level transmitter Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications. | Article No. 7ML5880- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Approvals** | | |
| General purpose (CSA, FM, CE) | 0 A | |
| Overfill protection (WHG; VLAREM)[11] | 0 C | |
| ATEX II 1G, ½G, 2G Ex ia IIC T6[14] | 0 E | |
| ATEX II 1G, ½G, 2G Ex ia IIC + Overfill (WHG; VLAREM)[11] | 0 F | |
| ATEX II 1G, ½G 2G Ex ia IIC + ATEX II 1D, ½D, 2D IP6x[1)15)17] | 0 H | |
| ATEX II ½G, 2G Ex d ia IIC T6[3)13)16] | 0 J | |
| ATEX II ½G, 2G Ex d ia IIC + ATEX II ½D, 2D IP6x[3)13)16)17] | 0 K | |
| ATEX II 1D, ½D, 2D IP6x[1)17)18] | 0 N | |
| ATEX II 1G, II ½G, II 2G Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb[1)14] | 0 W | |
| IEC Ex ia IIC T6[14] | 0 P | |
| IEC Ex ia IIC T6 + IEC IP6x T tD[1)15)17] | 0 Q | |
| IEC Ex d ia IIC T6[3)13)16] | 0 R | |
| IEC Ex d ia IIC T6 + IEC IP6x T tD[3)13)16] | 0 S | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D2[9)12)16] | 1 A | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[9)15] | 1 B | |
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[3)13)16] | 1 C | |
| CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[1)17] | 1 E | |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[14] | 1 F | |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[3)13)16] | 1 G | |
| NEPSI Ex ia IIC T6[14] | 2 A | |
| NEPSI Ex ia IIC T6 + DIP A20/21 TA T*[1)15] | 2 B | |
| NEPSI Ex d ia IIC T6[9)10)13)16] | 2 C | |
| NEPSI Ex d ia IIC T6 + DIP A20/21 TA T*[9)10)13)16] | 2 D | |
| NEPSI DIP A20/21 TA T*[1)16] | 2 G | |
| INMETRO Ex ia IIC T6 ... T1[14] | 3 A | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb[1)10)15] | 3 B | |
| INMETRO Ex d ia IIC T6 ... T1[9)10)13)16] | 3 C | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb[9)10)13)16] | 3 D | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db[1)10)13)16] | 3 G | |
| Korea KC ex free area | 6 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X[14] | 5 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[1)15] | 5 B | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X[9)10)13)16] | 5 C | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[9)10)13)16] | 5 D | |
| Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type. | | |
| **Probe version/Material** | | |
| Probe cable ø 4 mm (0.16 inch) with gravity weight/PFA[17] | A | |
| Probe exchangeable rod ø 8 mm (0.31 inch)/1.4435 (Basle standard)[17] | B | |
| Probe exchangeable rod ø 8 mm (0.31 inch)/ 1.4435 (Basle standard) can be autoclaved[17] | C | |
| Probe rod ø 10 mm (0.39 inch)/PFA[17] | D | |
| Probe exchangeable rod (ø 8 mm) /1.4435 (BN2), electropolished (Ra < 0.38 µm)[17] | E | |
| **Process fitting/Material** | | |
| Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/1.4435 (BN2) | 0 0 | |
| Clamp 2" PN 16 (ø 64 mm) DIN 32676, ISO2852/PTFE-TFM 1600 | 0 1 | |
| Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/1.4435 (BN2) | 0 2 | |
| Clamp 2 1/2" PN 10 (ø 77.5 mm) DIN 32676, ISO2852/PTFE-TFM 1600 | 0 3 | |
| Clamp 3" PN 10 (ø 91 mm) D N 32676, ISO2852/1.4435 (BN2) | 0 4 | |
| Clamp 3" PN 10 (ø 91 mm) DIN 32676, ISO2852/PTFE-TFM 1600 | 0 5 | |
| Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/1.4435(BN2) | 0 6 | |
| Clamp 4" PN 6 (ø 119 mm) DIN 32676, ISO2852/PTFE-TFM 1600 | 0 7 | |
| Clamp 1½" PN 16 (ø 50.5 mm) DIN 32676, ISO2852/1.4435 (BN2) | 4 0 | |
| Bolting DN 32, PN 40 DIN 11851/1.4435(BN2) | 0 8 | |
| Bolting DN 32, PN 40 DIN 11851/PTFE-TFM 1600 | 1 0 | |

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## Selection and ordering data (continued)

| SITRANS LG240 Guided radar level transmitter Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications. | Article No. 7ML5880- ● ● ● ● ● - ● ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Bolting DN 40, PN 40 DIN 11851/1.4435 (BN2) | 1 1 | |
| Bolting DN 40, PN 40 DIN 11851/PTFE-TFM 1600 | 1 2 | |
| Bolting DN 50, PN 25 DIN 11851/1.4435(BN2) | 1 3 | |
| Bolting DN 50, PN 25 DIN 11851/PTFE-TFM 1600 | 1 4 | |
| Bolting DN 65, PN 25 DIN 11851/PTFE-TFM 1600 | 1 5 | |
| Flange DN 25, PN 40 Form C, DIN 2501/PTFE-TFM 1600 | 2 0 | |
| Flange DN 40, PN 40 Form C, DIN 2501/PTFE-TFM 1600 | 2 1 | |
| Flange DN 50, PN 40 Form C, DIN 2501/PTFE-TFM 1600 | 2 2 | |
| Flange DN 50, PN 40 Form V13, DIN 2513/PTFE-TFM 1600 | 2 3 | |
| Flange DN 65, PN 40 Form C, DIN 2513/PTFE-TFM 1600 | 2 4 | |
| Flange DN 80, PN 40 Form C, DIN 2501/PTFE-TFM 1600 | 2 5 | |
| Flange DN 100, PN 16 Form C, DIN 2501/PTFE-TFM 1600 | 2 6 | |
| Flange DN 80, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600 | 2 7 | |
| Flange DN 100, PN 40 EN 1092-1 Form B1/PTFE-TFM 1600 | 2 8 | |
| Flange 2" 150 lb RF, ASME B16.5/PTFE-TFM 1600 | 3 0 | |
| Flange 2" 300 lb RF, ASME B16.5/PTFE-TFM 1600 | 3 1 | |
| Flange 3" 150 lb RF, ASME B16.5/PTFE-TFM 1600 | 3 2 | |
| Flange 4" 150 lb RF, ASME B16.5/PTFE-TFM 1600 | 3 3 | |
| Note: The pressure limit for all PTFE coated versions is 16 bar (per manual). | | |
| **Electronics** | | |
| Two-wire 4 ... 20 mA/HART | 0 | |
| Four-wire Modbus[3)13)] | 1 | |
| Two-wire 4 ... 20 mA/HART with SIL qualification[9)] | 2 | |
| Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz[3)13)] | 3 | |
| Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC[3)13)] | 4 | |
| PROFIBUS PA[9)] | 5 | |
| FOUNDATION Fieldbus[9)] | 6 | |
| **Seal/Process temperature** | | |
| Without glass seal/-40 ... +150 °C (-40 ... +302 °F)[2)] | A | |
| FFKM (Kalrez 6221)/-20 ... 150 °C (-4 ... +302 °F)[4)] | B | |
| EPDM (Freudenberg 70 EPDM 291)/ -20 ... 130 °C (-4 ... +266 °F)[4)] | C | |
| **Housing/Protection/Cable** | | |
| Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC | | |
| Plastic IP66/IP67 M20 x 1.5/blind stopper | A | |
| Plastic IP66/IP67 1/2" NPT/blind stopper | B | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | C | |
| Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | D | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | E | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | F | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | G | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | H | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | J | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | K | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | L | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | M | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | N | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | P | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | Q | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | R | |
| Aluminum single chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | W | |
| Aluminum double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | X | |
| Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20 x 1.5/ cable gland brass nickel-plated | Y | |

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## Selection and ordering data (continued)

| SITRANS LG240 Guided radar level transmitter Continuous, contact, 32 m (105 ft) range. Monitors level and interface in aggressive liquids. Ideal for hygienic applications. | Article No. 7ML5880- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Stainless steel double chamber / IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | S | |
| Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable);M20 x 1.5/blind plug[10] | Z | Q 2 A |
| Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[10] | Z | Q 2 B |
| **Lengths** | | |
| ***Rod ø 8 mm (0.31 inch)/1.4435 (Basle standard 300 ... 4 000 mm)*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[6] | 0 | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[6] | 1 | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[6] | 2 | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[6] | 3 | |
| ***Rod ø 10 mm (0.24 inch)/PFA (300 ... 4 000 mm)*** | | |
| 300 mm (11.81 inch)[6] | 9 | R 1 A |
| 500 mm (19.69 inch)[6] | 9 | R 1 B |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[6] | 9 | R 1 C |
| 1 001 ... 5 000 mm (39.41 ... 78.74 inch)[6] | 9 | R 1 D |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[6] | 9 | R 1 E |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[6] | 9 | R 1 F |
| ***Cable ø 4 mm (0.16 inch)/PFA (500 ... 32 000 mm)*** | | |
| 500 mm (9.69 inch) | 9 | R 1 G |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 1 H |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 9 | R 1 J |
| 2 001 ... 4 000 mm (78.78 ... 157.40 inch) | 9 | R 1 K |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | 9 | R 1 L |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 1 M |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 1 N |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 1 P |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 1 Q |
| 25 001 ... 32 000 mm (984.29 ... 1 259.52 inch) | 9 | R 1 R |
| ***Exchange. rod ø 8 mm (0.31 inch)/1.4435 (BN2), electropolished (Ra < 0.38 µm)*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[6] | 9 | R 2 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[6] | 9 | R 2 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[6] | 9 | R 2 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[6] | 9 | R 2 D |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs (mandatory)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Supplementary electronics** | |
| Without | **A00** |
| Additional current output 4 ... 20 mA[10] | **A01** |
| **Indicating/adjustment module** | |
| Without | **E00** |
| Mounted | **E01** |
| Laterally mounted | **E02** |

| Selection and Ordering data | Order code |
|---|---|
| **Language of display** | |
| German | **L00** |
| English | **L01** |
| French | **L02** |
| Dutch | **L03** |
| Italian | **L04** |
| Spanish | **L05** |
| Portuguese | **L06** |
| Russian | **L07** |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Chinese | **L08** |
| Japanese | **L09** |
| No language pre-set | **L10** |
| **Operating instructions** | |
| German | **M00** |
| English | **M01** |
| French | **M02** |
| Spanish | **M03** |
| **Further designs (optional)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description | **Y01** |
| Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm | **Y02** |
| Cleaning included certificate: oil, grease and silicone free | **W01** |
| Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B | **Y10** |
| Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B | **Y11** |
| Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B | **Y12** |
| Identification label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y17** |
| Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y18** |
| Material Inspection certificate 3.1 of EN 10204 | **C05** |
| 3.1-Inspection Certificate for instrument (EN 10204)[8)] | **C12** |
| Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material[8)19)] Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate. | **D07** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204)[8)] | **C25** |
| 2.2-Factory certificate for material (EN 10204)[8)] | **C15** |
| Quality and test plan[8)] | **C26** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN 10204)[8)] | **C13** |
| X-ray test + 3.1 certificate/instrument[8)] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[8)] | **C16** |
| Roughness test + 3.1 certificate/instrument[8)] | **C18** |
| Pressure test + 3.1 certificate/instrument[8)] | **C31** |
| Helium leak test + 3.1 certificate/instrument[8)] | **C32** |
| Ferrite measuring accuracy to DIN 32514-1 + 3.1 certificate/instrument[8)] | **C60** |
| Pressure test according to NORSOK + 3.1 certificate/instrument[8)] | **C61** |
| 5 point calibration certificate (min. length 300 mm)[8)] | **C62** |

| Selection and Ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SITRANS LG series/SITRANS RD150 sensor display module | **A5E34143449** |
| SITRANS LG, two-wire 4 ... 20 mA/HART electronic | **A5E35637821** |
| SITRANS LG, USB communicator | **A5E35192015** |
| SITRANS LG, Mounting eye M12 x 20 | **PBD:51041448** |
| SITRANS LG, Mounting spring | **PBD:51041449** |
| Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia | **7NG4124-0AA00** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

1) Some approvals are not available with Plastic and Stainless steel (electro-polished) Housing/Protection/Cable options and certain glands.
2) Available only with Rod ø 10 mm/PFA and Cable ø 4 mm/PFA Length options.
3) Available only with Supplementary electronic option A00 and Indicating/adjustment module options E00, E01.
4) Not available with Remote Housing/Protection/Cable options Q2A and Q2B.
5) Not available with Electronic option 5.
6) Not available with Y02.
7) Available only with Electronic options 0, 2, and 6.
8) Listed Certificates are not available with all configurations, please contact factory for more information.
9) Available only with Supplementary electronic option A00.
10) Not available with Indicating/adjustment module option E02.
11) Available only with Electronics options 0, 2, and 5.
12) Some approvals are not available with Remote or Stainless steel (electro-polished) Housing/Protection/Cable options and certain glands.
13) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
14) Available only with Electronics options 0, 2, 5, 6.
15) Available only with Electronics options 0 and 2.
16) Available only with Electronics options 0 ... 4.
17) Not available with some Seal/Process Temperature options.
18) Available only with Electronic options 0, 2, 3, and 4.
19) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.

Note: Please consult manual for further detail.

| SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No. 7ML5881- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Approvals** | | |
| General purpose (CSA, FM, CE) | 0 A | |
| Shipping approval[4)6)7)8)13)] | 0 B | |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter<br>Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No.<br>7ML5881- ● ● ● ● ● - ● ● ● ● ● ● ● | Order Code |
|---|---|---|
| Overfill protection (WHG; VLAREM)[9)10)13)] | 0 | C |
| ATEX II 1G, ½G, 2G Ex ia IIC T6[10)13)] | 0 | E |
| ATEX II 1G, ½G, 2G Ex ia IIC + Overfill (WHG; VLAREM)[10)13)] | 0 | F |
| ATEX II 1G, ½G, 2G Ex ia IIC T6 + shipping approval[4)6)7)8)13)] | 0 | G |
| ATEX II 1G, ½G 2G Ex ia IIC + ATEX II 1D, ½D,2D IP6x[1)13)] | 0 | H |
| ATEX II ½G, 2G Ex d ia IIC T6[2)8)11)12)13)] | 0 | J |
| ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x[2)8)11)12)13)] | 0 | K |
| ATEX II 1/2G, 2G Ex d IIC T6[1)11)14)] | 0 | L |
| ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x[1)11)13)14)] | 0 | M |
| ATEX II 1D, 1/2D, 2D IP6x T[1)13)14)] | 0 | N |
| ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb[1-3)] | 0 | W |
| ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb / IEC Ex db IIC T6 ... T1 Ga/Gb, Gb[13)14)18)] | 1 | K |
| ATEX II 1/2G, II 2G Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval[2)6)8)11)12)13)] | 7 | A |
| ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval[1)6)8)11)13)] | 7 | B |
| ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)[1)11)14)] | 7 | P |
| IEC Ex ia IIC T6[10)13)] | 0 | P |
| IEC Ex ia IIC T6 + IEC IP6x T tD[1)14)15)] | 0 | Q |
| IEC Ex d ia IIC T6[2)8)11)12)13)] | 0 | R |
| IEC Ex d ia IIC T6 + IEC IP6x T tD[2)8)11)12)13)15)] | 0 | S |
| IEC Ex d IIC T6[1)11)14)] | 0 | T |
| IEC Ex d IIC T6 + IEC IP6x T tD[1)11)14)] | 0 | U |
| IEC Ex db IIC T6...T1 Ga/Gb, Gb + Ship approval[1)6)8)11)13)14)] | 7 | C |
| IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb + Ship approval[6)8)13)16)] | 7 | D |
| IEC Ex d ia IIC T6...T1 Ga/Gb, Gb + Ship approval[2)6)8)11)13)15)] | 7 | E |
| FM (NI) Class I, Div. 2, Groups A, B, C, D[3)8)13)17)] | 1 | A |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F[5)8)13)] | 1 | B |
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2)8)11)12)13)] | 1 | C |
| FM (XP) Class I, Div. 1, Groups A, B, C, D[2)11)13)14)] | 1 | D |
| FM (NI) Class I, II, III, Div. 2, Groups A, B, C, D, F, G + Ship approval[4)6)8)13)17)] | 7 | F |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[6)8)13)16)] | 7 | G |
| FM (XP-AIS) Class I, Div. 1, Groups A, B, C, D, + Ship approval[6)8)11)13)16)] | 7 | H |
| FM (XP) Class I, Div. 1, Groups A, B, C, D + Ship approval[2)6)8)13)14)] | 7 | J |
| CSA (NI) Class I, Div. 2, Groups A, B, C ,D (DIP) Class II, III, Div. 1, Groups E, F, G[1)] | 1 | E |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[5)13)] | 1 | F |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2)8)11)12)13)] | 1 | G |
| CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[8)13)14)18)] | 1 | H |
| CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval[1)6)13)] | 7 | K |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[6)13)16)] | 7 | L |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[6)8)11)32)] | 7 | M |
| CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[6)8)13)14)18)] | 7 | N |
| NEPSI Ex ia IIC T6[5)13)] | 2 | A |
| NEPSI Ex ia IIC T6 + DIP A20/21 TA T*[1)13)] | 2 | B |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No. 7ML5881- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| NEPSI Ex d ia IIC T6[2)8)11)13)] | 2 C | |
| NEPSI Ex d ia IIC T6 + DIP A20/21 TA T*[2)8)11)13)] | 2 D | |
| NEPSI Ex d IIC T6[1)11)13)14)] | 2 E | |
| NEPSI Ex d IIC T6 + DIP A20/21TA T[1)11)13)14)] | 2 F | |
| NEPSI DIP A20/21 TA T*[1)13)14)] | 2 G | |
| INMETRO Ex ia IIC T6 ... T1[5)13)] | 3 A | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb[1)11)13)] | 3 B | |
| INMETRO Ex d ia IIC T6 ... T1[2)8)11)13)] | 3 C | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb[1)8)11)13)] | 3 D | |
| INMETRO Ex d IIC T6 ... T1[1)11)13)14)] | 3 E | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb[1)11)13)14)] | 3 F | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db[1)11)13)14)] | 3 G | |
| KOSHA Ex d IIC T6 ... T1 – KE[1)11)13)14)] | 4 A | |
| Korea KC ex free area | 6 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X[13)] | 5 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[1)13)] | 5 B | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X[2)8)11)13)] | 5 C | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[2)8)11)13)] | 5 D | |
| GOST-R/EAC 1 Ex d IIC T1 ... T6 X[1)11)13)] | 5 E | |
| GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66[1)11)13)] | 5 F | |
| GOST-R/EAC Ex t IIIC T ... IP66[1)13)] | 5 G | |
| **Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.** | | |
| **Probe version/Material** | | |
| Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316[19)20)] | A | |
| Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L[19)20)] | B | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L[9)19)20)] | C | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L[9)19)20)] | D | |
| Probe exchangeable rod ø 8 mm (0.31 inch)/316L[9)19)] | E | |
| Probe exchangeable rod ø 12 mm (0.47 inch)/316L[9)19)] | F | |
| Probe coax version ø 21.3 mm (0.84 inch) with single hole/316L[9)19)20)] | G | |
| Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/316L[19)20)] | H | |
| Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L[9)19)20)] | K | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/Alloy C22 (2.4602)[9)] | L | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with centre weight/Alloy C22 (2.4602)[9)] | M | |
| Probe exchangeable rod ø 8 mm (0.31 inch)/Alloy C22 (2.4602)[9)] | N | |
| Probe exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 (2.4602)[9)] | P | |
| Probe coax version ø 21.3 mm (0.84 inch) with multiple hole/Alloy C22 (2.4602)[9)] | Q | |
| Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602)[9)] | R | |
| Probe exchangeable rod ø 8 mm (0.31 inch)/ Duplex (1.4462)[9)] | S | |
| Exchangeable rod ø 12 mm (0.47 inch)/Alloy C22 and 400 (2.4360)[9)] | T | |
| Exchangeable coated cable ø 4 mm with uncoated centering weight/PFA and 316[21)24)30)35-)36)] | U | |
| **Process fitting/Material** | | |
| Thread G 3/4" (DIN 3852-A) PN 6/316L | 0 0 | |
| Thread 3/4" NPT (ASME B1.20.1) PN 6/316L | 0 1 | |
| Thread G 3/4" (DIN 3852-A) PN 40/316L | 0 2 | |
| Thread 3/4" NPT (ASME B1.20.1) PN 40/316L | 0 3 | |
| Thread G 3/4" (DIN 3852-A) PN 100 / 316L[22)] | 0 4 | |
| Thread 3/4" NPT (ASME B1.20.1) PN 100/316L[22)] | 0 5 | |
| Thread G 1" (DIN 3852-A) PN 40/316L | 0 6 | |
| Thread 1" NPT (ASME B1.20.1) PN 40/316L | 0 7 | |
| Thread G 1" (DIN 3852-A) PN 100/316L[22)] | 0 8 | |
| Thread 1" NPT (ASME B1.20.1) PN 100/316L[22)] | 1 0 | |
| Thread G 1 1/2" (DIN 3852-A) PN 40/316L | 1 1 | |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter<br>Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No.<br>7ML5881- ● ● ● ● ● - ● ● ● ● ● ● ● | Order Code |
|---|---|---|
| Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L | 1 2 | |
| Thread G1 1/2" (DIN 3852-A) PN 100/316L[22)] | 1 3 | |
| Thread 1 1/2" NPT (ASME B1.20.1) PN 100/316L[22)] | 1 4 | |
| Thread 2 NPT PN 40, ASME B1.20.1/316L[23)24)] | 1 5 | |
| Flange DN 25 PN 40 Form C, DIN 2501/316L | 2 0 | |
| Flange DN 25 PN 40 Form F, DIN 2501/316L | 2 1 | |
| Flange DN 40 PN 40 Form C, DIN 2501/316L | 2 2 | |
| Flange DN 50 PN 40 Form C, DIN 2501/316L | 2 3 | |
| Flange DN 50 PN 40 Form V13, DIN 2513/316L | 2 4 | |
| Flange DN 80 PN 40 Form C, DIN 2501/316L | 2 5 | |
| Flange DN 80 PN 40 Form V13, DIN 2501/316L | 2 6 | |
| Flange DN 100 PN 16 Form C, DIN 2501/316L | 2 7 | |
| Flange DN 100 PN 16 Form V13, DIN 2501/316L | 2 8 | |
| Flange DN 100 PN 40 Form C, DIN 2501 /316L | 3 0 | |
| Flange DN 100 PN 40 Form V13, DIN 2513/316L | 3 1 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316L | 3 2 | |
| Flange DN 50 PN 40 EN 1092-1 Form B1/316L | 3 3 | |
| Flange DN 80 PN 40 EN 1092-1 Form B1/316L | 3 4 | |
| Flange 1" 150 lb RF, ASME B16.5/316L | 3 5 | |
| Flange 1 1/2" 150 lb RF, ASME B16.5/316L | 3 6 | |
| Flange 2" 150 lb RF, ASME B16.5/316L | 3 7 | |
| Flange 2" 300 lb RF, ASME B16.5/316L | 3 8 | |
| Flange 3" 150 lb RF, ASME B16.5/316L | 4 0 | |
| Flange 3" 300 lb RF, ASME B16.5/316L | 4 1 | |
| Flange 4" 150 lb RF, ASME B16.5/316L | 4 2 | |
| Flange 4" 300 lb RF, ASME B16.5/316L | 4 3 | |
| Flange 6" 150 lb RF, ASME B16.5/316L | 4 4 | |
| Flange 6" 300 lb RF, ASME B16.5/316L | 4 5 | |
| Thread G 3/4" PN 40, DIN3852-A/Alloy C22 (2.4602)[37)] | 4 6 | |
| Thread G 1" PN 40, DIN 3852-A/Alloy C22 (2.4602)[37)] | 4 7 | |
| Thread G 1 1/2" PN 40, DIN 3852-A/Alloy C22 (2.4602) | 4 8 | |
| Thread 1 1/2" NPT PN 40, ASME B1.20.1/Alloy C22 (2.4602) | 5 0 | |
| Flange DN 50 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating | 5 1 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 5 2 | |
| Flange DN 80 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 5 3 | |
| Flange DN 100 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 5 4 | |
| Flange DN 150 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 5 5 | |
| Flange DN 200 PN 16 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 5 6 | |
| Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 5 7 | |
| Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 5 8 | |
| Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 6 0 | |
| Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 6 1 | |
| Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 6 2 | |
| Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 6 3 | |
| Flange 6" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 6 4 | |
| Thread G 3/4" (DIN 3852-A) PN 40/Duplex 1.4462 | 6 5 | |
| Flange DN 80 PN 40 Form F, DIN 2501/Duplex (1.4462) | 6 6 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/ Duplex (1.4462) | 6 7 | |
| Flange 1" 150 lb RF, ASME16.5/Duplex (1.4462) | 6 8 | |
| Flange 1 1/2" 150 lb RF, ASME B16.5/Duplex (1.4462) | 7 0 | |
| Flange 2" 150 lb RF, ASME B16.5/Duplex (1.4462) | 7 1 | |
| Flange 2" 300 lb RF, ASME B16.5/Duplex (1.4462) | 7 2 | |
| Flange 2" 600 lb RF, ASME B16.5/Duplex (1.4462) | 7 3 | |
| Flange 3" 150 lb RF, ASME B16.5/Duplex (1.4462) | 7 4 | |
| Flange 3" 300 lb RF, ASME B16.5/Duplex (1.4462) | 7 5 | |
| Flange 4" 150 lb RF, ASME B16.5/Duplex (1.4462) | 7 6 | |
| Flange 4" 150 lb FF, ASME B16.5/Duplex (1.4462) | 7 7 | |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter<br>Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No.<br>7ML5881- ● ● ● ● ● - ● ● ● ● ● | Order Code<br>● ● ● |
|---|---|---|
| Flange 4" 300 lb RF, ASME B16.5/Duplex (1.4462) | 7 8 | |
| Flange 4" 600 lb RF, ASME B16.5/Duplex (1.4462) | 8 0 | |
| Thread 1 1/2" NPT PN 40, ASME B1.20.1/Alloy 400 (2.4360) | 8 1 | |
| Flange 2" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) | 8 2 | |
| Flange 2" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) solid | 8 3 | |
| Flange 3" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) | 8 4 | |
| Flange 3" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) | 8 5 | |
| Flange 3" 300 lb RJF, ASME B16.5/Alloy 400 (2.4360) | 8 6 | |
| Flange 4" 150 lb RF, ASME B16.5/Alloy 400 (2.4360) | 8 7 | |
| Flange 4" 300 lb RF, ASME B16.5/Alloy 400 (2.4360) | 8 8 | |
| Flange DN 25 PN 40 Form C, DIN 2501/ Alloy C22 (2.4602) solid[37)] | 9 0 | L 1 A |
| Flange DN 25 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid[37)] | 9 0 | L 1 B |
| Flange DN 80 PN 40 Form B1, EN 1092-1/ Alloy C22 (2.4602) solid | 9 0 | L 1 C |
| Flange 1" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid[37)] | 9 0 | L 1 D |
| Flange 1 1/2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid[37)] | 9 0 | L 1 E |
| Flange 1 1/2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid[37)] | 9 0 | L 1 F |
| Flange 2" 150 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 G |
| Flange 2" 300 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 H |
| Flange 2" 600 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 J |
| Flange 2" 1 500 lb RJF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 K |
| Flange 3" 150 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 L |
| Flange 3" 300 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 M |
| Flange 3" 300 lb RF, ASME B16.5/316L with<br>Alloy C22 (2.4602) coating | 9 0 | L 1 N |
| Flange 4" 150 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 P |
| Flange 4" 150 lb FF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 Q |
| Flange 4" 300 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 R |
| Flange 4" 300 lb RJF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 S |
| Flange 4" 300 lb LT, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 T |
| Flange 4" 600 lb RJF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 U |
| Flange 6" 150 lb RF, ASME B16.5/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 V |
| Flange 2 1/2" 600 lb RF, Masoneilan/<br>Alloy C22 (2.4602) solid | 9 0 | L 1 W |
| Flange 2" 600 lb RF, ASME B16.5/316/316 L[24)] | 9 0 | L 1 X |
| Flange 3" 600 lb RF, ASME B16.5/316/316L[24)25)] | 9 0 | L 1 Y |
| Flange 4" 600 lb RF, ASME B16.5/316/316L[31)] | 9 0 | L 2 A |
| Thread R1½ PN40, EN 10226-1/316L[38)] | 9 0 | L 2 B |
| Flange NPS 2" Class 1500 RF, ASME B16.5 / 316/316L[39)] | 9 0 | L 2 C |
| **Electronics** | | |
| Two-wire 4 ... 20 mA/HART | 0 | |
| Four-wire Modbus[2)8)11)] | 1 | |
| Two-wire 4 ... 20 mA/HART with<br>SIL qualification[9)10)] | 2 | |
| Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60Hz[2)8)11)34)] | 3 | |
| Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC[2)8)11)34)] | 4 | |
| PROFIBUS PA[5)8)] | 5 | |
| FOUNDATION Fieldbus[5)8)] | 6 | |
| **Seal/Second line of defense/Process temperature** | | |
| FKM (SHS FPM 70C3 GLT)/without glass seal/-40 ... +80 °C (-40 ... +176 °F) | A | |
| FKM (SHS FPM 70C3 GLT)/without glass seal/ -40 ... +150 °C (-40 ... +302 °F) | B | |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No. 7ML5881- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... +150 °C (-40 ... +302 °F)[26] | C | |
| FFKM (Kalrez 6375)/without/-20 ... 150 °C (-4 ... +302 °F) | D | |
| FFKM (Kalrez 6375)/with/-20 ... +150 °C (-4 ... +302 °F)[5] | E | |
| FFKM (Kalrez 6375)/with glass seal/-20 ... +200 °C (-4 ... +392 °F)[26] | F | |
| EPDM (A+P 75.5/KW75F)/without glass seal/ -40 ... +80 °C (-40 ... +176 °F) | G | |
| EPDM (A+P 75.5/KW75F)/without glass seal/ -40 ... +150 °C (-40 ... +302 °F)[26] | H | |
| EPDM (A+P 75.5/KW75F)/with glass seal/-40 ... +150 °C (-40 ... +302 °F)[26] | J | |
| Silicone FEP coated (A+P FEP-O-SEAL)/without glass seal/-40 ... +80 °C (-40 ... +176 °F) | K | |
| Silicone FEP coated (A+P FEP-O-SEAL)/without glass seal/-40 ... +150 °C (-40 ... +302 °F) | L | |
| Silicone FEP coated (A+P FEP-O-SEAL)/with glass seal/-40 ... +150 °C (-40 ... +302 °F)[26] | M | |
| With borosilicate glass lead through for volatile substances, e.g. ammonia/with glass seal/-60 ... +150 °C (-76 ... +302 °F)[26] | N | |
| FFKM (Kalrez 6375)/without glass seal/-20 ... +200 °C (-4 ... +392 °F) | P | |
| FKM (SHS FPM 70C3 GLT)/with glass seal/-40 ... 80 °C (-40 ... +176 °F)[26] | Q | |
| FFKM (Kalrez 6375)/without/-10 ... +150 °C | R | |
| FFKM (Kalrez 6375)/without/-10 ... +200 °C | S | |
| FFKM (Kalrez 6375)/with/-10 ... +150 °C | T | |
| FFKM (Kalrez 6375)/with/-10 ... +200 °C | U | |
| **Housing/Protection/Cable** | | |
| Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC | | |
| Plastic IP66/IP67 M20 x 1.5/blind stopper[11][15] | A | |
| Plastic IP66/IP67 1/2" NPT/blind stopper[8][11] | B | |
| Plastic 2-chamber/IP66/IP67/M20 x 1.5/blind stopper | G | |
| Plastic 2-chamber/IP66/IP67 /1/2" NPT/blind stopper | H | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Blind stopper[8][11] | C | |
| Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper[8][11] | D | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5 / Blind stopper | E | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper | F | |
| Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper[9][11] | L | |
| Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper[8][11] | M | |
| Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper[8][11] | N | |
| Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper[8][11] | P | |
| Stainless Steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Blind stopper | Q | |
| Stainless Steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/Blind stopper | R | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland stainless steel[8][11] | S | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel | T | |
| Stainless Steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel[11][28] | U | |
| Stainless Steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland stainless steel[11][28] | V | |
| Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated | W | |
| Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/Cable gland brass nickel-plated | X | |
| Stainless steel single chamber (precision casting)/IP66/ IP68 (0.2 bar) M20 x 1.5/ Cable gland brass nickel-plated | Y | |
| Stainless steel double chamber / IP66/ IP68 (0.2 bar) M20 x 1.5 / Cable gland brass nickel-plated | J | |
| Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Plug connector Harting HAN 7D (straight) | Z | Q 1 A |
| Aluminum single chamber/IP66/IP68 (0.2 bar) with M20 x 1.5/Special HARTING plug (bent) according to Tier One (ZB7555) | Z | Q 1 B |
| Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[11][27] | Z | Q 2 A |
| Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[11][27] | Z | Q 2 B |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter<br>Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No.<br>7ML5881- ● ● ● ● ● - ● ● ● ● | Order Code<br>● ● ● |
|---|---|---|
| **Lengths** | | |
| ***Rod ø 8 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 0 | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 1 | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 2 | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 3 | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 4 | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 5 | |
| ***Rod ø 8 mm/Duplex*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 1 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 1 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 1 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 1 D |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 1 E |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 1 F |
| ***Rod ø 8 mm or ø 12 mm /Alloy C22 and 400*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 1 J |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 1 K |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 1 L |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 1 M |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 1 N |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 1 P |
| ***Rod ø 12 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 2 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74)[29] | 9 | R 2 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 2 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 2 D |
| ***Cable lengths ø 2 or 4 mm/316L*** | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 2 E |
| 1 000 ... 5 000 mm (39.37 ... 196.85 inch) | 9 | R 2 F |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 2 G |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 2 H |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 2 J |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 2 K |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | 9 | R 2 L |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | 9 | R 2 M |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | 9 | R 2 N |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | 9 | R 2 P |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | 9 | R 2 Q |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | 9 | R 2 R |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | 9 | R 2 S |
| 60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch) | 9 | R 2 T |
| 65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch) | 9 | R 2 U |
| 70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch) | 9 | R 2 V |
| ***Cable Lengths ø 2 mm or ø 4 mm/Alloy C22*** | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 4 A |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | 9 | R 4 B |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 4 C |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 4 D |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 4 E |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 4 F |

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## Selection and ordering data (continued)

| SITRANS LG250 Guided radar level transmitter<br>Continuous, contact, 75 m (246 ft) range. Monitors level and interface in liquids. | Article No.<br>7ML5881- ● ● ● ● ● - ● ● ● ● | Order Code<br>● ● ● |
|---|---|---|
| 25 001 ... 30 000 mm<br>(984.29 ... 1 181.10 inch) | 9 | R 4 G |
| 30 001 ... 35 000 mm<br>(1 181.14 ... 1 377.95 inch) | 9 | R 4 H |
| 35 001 ... 40 000 mm<br>(1 377.99 ... 1 574.80 inch) | 9 | R 4 J |
| 40 001 ... 45 000 mm<br>(1 574.84 ... 1 771.65 inch) | 9 | R 4 K |
| 45 001 ... 50 000 mm<br>(1 771.69 ... 1 968.50 inch) | 9 | R 4 L |
| 50 001 ... 55 000 mm<br>(1 968.54 ... 2 165.35 inch) | 9 | R 4 M |
| 55 001 ... 60 000 mm<br>(2 165.39 ... 2 362.20 inch) | 9 | R 4 N |
| 60 001 ... 65 000 mm<br>(2 362.24 ... 2 559.06 inch) | 9 | R 4 P |
| 65 001 ... 70 000 mm<br>(2 559.09 ... 2 755.91 inch) | 9 | R 4 Q |
| 70 001 ... 75 000 mm<br>(2 755.94 ... 2 952.76 inch) | 9 | R 4 R |
| ***Coax ø 21.3 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 3 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 3 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 3 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 3 D |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 3 E |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 3 F |
| ***Coax ø 21.3 mm/Alloy C22*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 5 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 5 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 5 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 5 D |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 5 E |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 5 F |
| ***Coax ø 42.2 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 3 G |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 3 H |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 3 J |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 3 K |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 3 L |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 3 M |
| ***Coax ø 42.2 mm/Alloy C22*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[29] | 9 | R 5 G |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[29] | 9 | R 5 H |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[29] | 9 | R 5 J |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[29] | 9 | R 5 K |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[29] | 9 | R 5 L |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[29] | 9 | R 5 M |
| ***Cable lengths ø 4 mm PFA*** | | |
| 300 ... 1 000 mm (12 ... 39.37 inch) | 9 | R 6 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 9 | R 6 B |
| 2 001 ... 5 000 mm (78.77 ... 196.85 inch) | 9 | R 6 C |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 6 D |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 6 E |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 6 F |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 6 G |
| 25 001 ... 32 000 mm (984.29 ... 1 259.84 inch) | 9 | R 6 H |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs (mandatory)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Supplementary electronics** | |
| Without | **A00** |
| Additional current output 4 ... 20 mA[11)] | **A01** |
| **Dimensions centering weight (diameter/height)** | |
| Without | **B00** |
| ø 40/30 mm | **B01** |
| ø 45/30 mm (for 2 inch tubes) | **B02** |
| ø 75/30 mm (for 3 inch tubes) | **B03** |
| ø 95/30 mm (for 4 inch tubes) | **B04** |
| ø 40 mm/30 mm<br>ø 1.57/1.18 inch (for 2 inch Schedule 160) | **B05** |
| ø 45 mm/30 mm (for 2 inch tubes)<br>ø 1.77/1.18 inch (for 2 inch Schedule 40/80) | **B06** |
| ø 75 mm/30 mm (for 3 inch tubes)<br>ø 2.95/1.18 inch (for 3 inch Schedule 10/40) | **B07** |
| ø 95 mm/30 mm (for 4 inch tubes)<br>ø 3.74/1.18 inch (for 4 inch Schedule 80) | **B08** |
| **Rod mounted** | |
| Without Rod, applicable for coax or cable probe types only | **C00** |
| Mounted | **C01** |
| Not mounted | **C02** |
| **Indicating/adjustment module** | |
| Without | **E00** |
| Mounted | **E01** |
| Laterally mounted | **E02** |
| **Language of display** | |
| German | **L00** |
| English | **L01** |
| French | **L02** |
| Dutch | **L03** |
| Italian | **L04** |
| Spanish | **L05** |
| Portuguese | **L06** |
| Russian | **L07** |
| Chinese | **L08** |
| Japanese | **L09** |
| No language pre-set | **L10** |
| **Operating instructions** | |
| German | **M00** |
| English | **M01** |
| French | **M02** |
| Spanish | **M03** |
| **Further designs (optional)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description | **Y01** |
| Enter the total length of rigid part (cable version only) range from 100 ... 1 000 mm | **Y02** |
| Remote electronic cable lengths: 2 m (6.6 ft).<br>Only available with Housing options Q2A and Q2B | **Y10** |
| Remote electronic cable lengths: 5 m (16.4 ft).<br>Only available with Housing options Q2A and Q2B | **Y11** |

| Selection and Ordering data | Order code |
|---|---|
| Remote electronic cable lengths: 10 m (32.8 ft).<br>Only available with Housing options Q2A and Q2B | **Y12** |
| Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y17** |
| Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y18** |
| Material Inspection certificate 3.1 of EN 10204 | **C05** |
| 3.1-Inspection Certificate for instrument (EN 10204)[30)] | **C12** |
| Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material[30)31)]<br>Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate. | **D07** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204)[30)] | **C25** |
| 2.2-Factory certificate for material (EN 10204)[30)] | **C15** |
| Quality and test plan[30)] | **C26** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204)[30)] | **C13** |
| X-ray test + 3.1 certificate/instrument[30)] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[30)] | **C16** |
| Roughness test + 3.1 certificate/instrument[30)] | **C18** |
| Pressure test + 3.1 certificate/instrument[30)] | **C31** |
| Helium leak test + 3.1 certificate/instrument[30)] | **C32** |
| Pressure test according to NORSOK + 3.1 certificate/instrument[30)] | **C61** |
| 5 point calibration certificate (min. length 500 mm)[30)] | **C62** |
| Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate[30)] | **C63** |
| Certificate suitable for tropical regions with, all attachment parts of metal (2.1 factory certificate) | **C65** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SITRANS LG series/SITRANS RD150 sensor display module | **A5E34143449** |
| SITRANS LG, two-wire 4 ... 20 mA/HART electronic | **A5E35637821** |
| SITRANS LG, USB communicator | **A5E35192015** |
| SITRANS LG, Mounting eye M8 x 20 | **A5E36653574** |
| SITRANS LG, Mounting eye M12 x 20 | **PBD:51041448** |
| SITRANS LG, Mounting spring | **PBD:51041449** |
| Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia | **7NG4124-0AA00** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

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## Selection and ordering data (continued)

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
2) Available only with Metallic, Double chamber Housing/Protection/Cable options and certain glands.
3) Not available with Remote or Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
5) Not available with certain glands.
6) Not available with Version/Material option K, L, M, N, P, Q, R, S, T, and U.
7) Not available with Length options 3, 4, 5, R2C, and R2D.
8) Available only with Supplementary electronic option A00.
9) Not available with Seal/Second line of defense/Process temperature option N.
10) Not available with Housing/Protection/Cable option Q1B.
11) Not available with Indicating/adjustment module option E02.
12) Not available with Process fitting/Material options 00 and 01.
13) Available only with Electronic options 0 ... 4.
14) Available only with glass seal options.
15) Available only with Seal/Second line of defense/Process temperature options C, D, E, F, H, J, M, N, Q.
16) Not Available with Housing/Protection/Cable options W, X, Y, J, Q1A, and Q1B.
17) Not Available with Seal/Second line of defense/Process temperature option P.
18) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
19) Available only with Dimensions centering weight option B00.
20) Available only with Rod mounted option C00.
21) Not available with Dimensions centering weight option B00.
22) Available only with Seal/Second line of defense/Process temperature option N.
23) Not available with Version/Material options F, L, M, N, P, Q, R, S, and T.
24) Not available with Seal/Process temperature options A, G, K, N, and Q.
25) Available only with Version/Material options A ... K.
26) Not available with Remote Housing/Protection/Cable options.
27) Not available with some Seal/Process temperature options including glass.
28) Not available with Supplementary electronics options.
29) Not available with Y02.
30) Listed Certificates are not available with all configurations, please contact factory for more information.
31) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.
32) Available only with Housing/Protection/Cable options E, F, N, Q, R, T.
34) Available only with Double chamber, Plastic and Metallic Housing/Protection/Cable options and certain glands.
35) Available only with Approvals options OA (CE only) and 1D.
36) Available only with ø 4 mm PFA Length options.
37) Not available with Probe version/Material option P.
38) Available only with Probe version/Material options G and H.
39) Available only with Probe version/Material options A ... E and H.

Note: Please consult manual for further details.

| SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids. | Article No. 7ML5882- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | |
| **Approvals** | | |
| General purpose (CSA, FM, CE)[6] | 0 A | |
| Shipping approval[4)5)7)8)9)] | 0 B | |
| Overfill protection (WHG; VLAREM)[5)8)] | 0 C | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC T6[5)8)] | 0 E | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM)[5)8)] | 0 F | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval[4)5)7)8)9)10)] | 0 G | |
| ATEX II 1G,1/2G,2G Ex ia IIC + II 1D,1/2D,1/3D, 2D IP66[1)5)8)] | 0 H | |
| ATEX II 1/2G, 2G Ex d ia IIC T6[2)5)8)9)10)] | 0 J | |
| ATEX II 1/2G, 2G Ex d ia IIC + shipping approval[2)5)7)8)9)10)] | 0 L | |
| ATEX II 1/2G, II 2G Ex db ia IIC T6 ... T1 Ga/Gb, Gb + II 1D, 1/2D, 1/3D, 2D Ext IIIC T* Da, Da/Db, Da/Dc, Db[2)5)8)9)10)] | 0 M | |
| ATEX II 1/2G, 2G Ex d IIC T6[1)8)10)11)] | 0 N | |
| ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6...T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb[8)] | 0 W | |
| ATEX II 1/2G, 2G Ex d IIC + shipping approval[1)7)8)9)10)11)] | 0 Q | |
| ATEX II 1/2G,2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66[1)8)10)11)] | 0 R | |
| ATEX II 1D, 1/2D, 2D IP6x T[1)8)11)] | 0 S | |
| IEC Ex ia IIC T6[5)8)] | 0 T | |
| IEC Ex ia IIC T6...T1 Ga, Ga/Gb, Gb + Ex t IIIC T[1)8)11)] | 0 U | |
| IEC Ex d ia IIC T6[2)5)8)9)10)] | 1 A | |
| IEC Ex d ia IIC T6 + IEC IP6x T tD[2)5)8)9)10)] | 1 B | |
| IEC Ex db IIC T6 ... T1 Ga/Gb, Gb[1)8)10)11)] | 1 C | |
| IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + IEC Ex t IIIC T[8)10)11)19)] | 1 D | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D[3)5)8)9)] | 1 F | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D + Ship approval[3)5)7)8)9)10)] | 1 G | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F[5)8)9)] | 1 H | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[4)5)7)8)9)10)] | 1 J | |
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2)5)8)9)10)] | 1 K | |

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## Selection and ordering data (continued)

| SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids. | Article No. 7ML5882- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[2)5)7)8)9)10)] | 1 L | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D[8)10)19)] | 1 M | |
| CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[1)5)10)] | 1 N | |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[5)8)] | 1 P | |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2)5)8)9)10)] | 1 Q | |
| CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[8)9)10)11)19)] | 1 R | |
| NEPSI Ex ia IIC T6[5)8)] | 2 A | |
| NEPSI Ex ia IIC T6 + DIP A20/21 TA T*[1)5)8)] | 2 B | |
| NERSI Ex d ia IIC T6[2)5)8)9)10)] | 2 C | |
| NEPSI Ex d ia IIC T6 + DIP A20/21 TA T*[2)5)8)9)10)] | 2 D | |
| NEPSI Ex d IIC T6[8)10)19)] | 2 E | |
| NEPSI Ex d IIC T6 + DIP A20/21 TA T*[8)10)19)] | 2 F | |
| NEPSI DIP A20/21 TA T*[1)8)] | 2 G | |
| INMETRO Ex ia IIC T6 ... T10[5)8)] | 3 A | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb[1)5)8)10)] | 3 B | |
| INMETRO Ex d ia IIC T6 ... T1[2)5)8)9)10)] | 3 C | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb[2)5)8)9)10)] | 3 D | |
| INMETRO Ex d IIC T6 ... T1[8)10)19)] | 3 E | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb[8)10)19)] | 3 F | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db[1)5)8)10)] | 3 G | |
| KOSHA Ex d IIC T6 ... T1 – KE[8)10)19)] | 4 A | |
| Korea KC ex free area[8)] | 6 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X[8)] | 5 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[1)8)] | 5 B | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X[2)8)9)10)] | 5 C | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[2)8)9)10)] | 5 D | |
| GOST-R/EAC 1 Ex d IIC T1 ... T6 X[8)10)19)] | 5 E | |
| GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66[8)10)19)] | 5 F | |
| GOST-R/EAC Ex t IIIC T ... IP66[1)8)] | 5 G | |
| **Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type.** | | |
| **Probe version/Material** | | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316[13)14)] | A | |
| Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/316[13)14)] | B | |
| Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/PA coated[15)] | C | |
| Probe exchangeable cable ø 11 mm (0.43 inch) with gravity weight/PA coated[15)] | D | |
| Probe exchangeable rod ø 16 mm (0.63 inch)/316L[13)] | E | |
| **Process fitting/Material** | | |
| Thread G 3/4" (DIN 3852-A) PN 40/316L | 0 0 | |
| Thread 3/4" NPT (ASME B1.20.1) PN 40/316L | 0 1 | |
| Thread G 1" (DIN 3852-A) PN 40/316L | 0 2 | |
| Thread 1" NPT (ASME B1.20.1) PN 40/316L | 0 3 | |
| Thread G 1 1/2" (DIN 3852-A) PN 40/316L | 0 4 | |
| Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L | 0 5 | |
| Thread G 2" (DIN 3852-A) PN 40/316L | 0 6 | |
| Flange DN 50 PN 40 Form C, DIN 2501/316L | 1 0 | |
| Flange DN 80 PN 40 Form C, DIN 2501/316L | 1 2 | |
| Flange DN 100 PN 16 Form C, DIN 2501/316L | 1 3 | |
| Flange DN 100 PN 40 Form C, DIN 2501/316L | 1 4 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316L | 1 5 | |
| Flange DN 50 PN 40 EN 1092-1 Form B1/316L | 1 6 | |
| Flange DN 80 PN 40 EN 1092-1 Form B1/316L | 1 7 | |

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## Selection and ordering data (continued)

| SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids. | Article No. 7ML5882- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Flange DN 100 PN 16 EN 1092-1 Form B1/316L | 1 8 | |
| Flange 2" 150 lb RF, ASME B16.5/316L | 3 0 | |
| Flange 2" 300 lb RF, ASME B16.5/316L | 3 2 | |
| Flange 3" 150 lb RF, ASME B16.5/316L | 3 3 | |
| Flange 3" 300 lb RF, ASME B16.5/316L | 3 4 | |
| Flange 4" 150 lb RF, ASME B16.5/316L | 3 5 | |
| Flange 4" 300 lb RF, ASME B16.5/316L | 3 6 | |
| Flange 6" 150 lb RF, ASME B16.5/316L | 3 7 | |
| **Electronics** | | |
| Two-wire 4 ... 20 mA/HART | 0 | |
| Four-wire Modbus[2)9)10)] | 1 | |
| Two-wire 4 ... 20 mA/HART with SIL qualification[9)] | 2 | |
| Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz[2)9)10)] | 3 | |
| Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC[2)9)10)] | 4 | |
| PROFIBUS PA[9)] | 5 | |
| FOUNDATION Fieldbus[9)] | 6 | |
| **Seal/Process temperature** | | |
| FKM (SHS FPM 70C3 GLT)/-40 ... +80 °C (-40 ... +176 °F)[16)] | A | |
| FKM (SHS FPM 70C3 GLT)/-40 ... +150 °C (-40 ... +302 °F) | B | |
| FFKM (Kalrez 6375)/-20 ... +200 °C (-4 ... +392 °F) | C | |
| EPDM (A+P 70.10-02)/-40 ... +80 °C (-40 ... +176 °F)[16)] | D | |
| EPDM (A+P 70.10-02)/-40 ... +150 °C (-40 ... +392 °F) | E | |
| **Housing/Protection/Cable** | | |
| **Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC** | | |
| Plastic IP66/IP67 M20 x 1.5/blind stopper[9)10)] | A | |
| Plastic IP66/IP67 1/2" NPT/blind stopper[9)10)] | B | |
| Plastic 2-chamber/IP66/IP67/M20 x 1.5/blind stopper | C | |
| Plastic 2-chamber/IP66/IP67/ 1/2" NPT/blind stopper | D | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper[9)10)] | E | |
| Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper[9)10)] | F | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | G | |
| Aluminum double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper | H | |
| Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper[9)10)] | J | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper[9)10)] | K | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper[9)10)] | L | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper[9)10)] | M | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | N | |
| Stainless steel double chamber/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper | P | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel[9)10)] | Q | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | R | |
| Stainless steel (precision casting) 316L/ IP66/ IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel[9)10)] | S | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel[9)10)] | T | |
| Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | W | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | X | |
| Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | Y | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | U | |
| Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[10)] | Z | Q 2 A |
| Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[10)] | Z | Q 2 B |
| **Lengths** | | |
| ***Rod ø 16 mm/316L*** | | |
| 500 mm (19.69 inch) | 0 | |

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## Selection and ordering data (continued)

| SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids. | Article No. 7ML5882- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 1 | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 2 | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | 3 | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | 4 | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | 5 | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | 6 | |
| ***Cable lengths ø 4 mm/316*** | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 2 E |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | 9 | R 2 F |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 2 G |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 2 H |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 2 J |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 2 K |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | 9 | R 2 L |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | 9 | R 2 M |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | 9 | R 2 N |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | 9 | R 2 P |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | 9 | R 2 Q |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | 9 | R 2 R |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | 9 | R 2 S |
| ***Cable lengths ø 6 mm/316L*** | | |
| 500 mm (19.69 inch) | 9 | R 4 A |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 4 B |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | 9 | R 4 C |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 4 D |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 4 E |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 4 F |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 4 G |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | 9 | R 4 H |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | 9 | R 4 J |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | 9 | R 4 K |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | 9 | R 4 L |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | 9 | R 4 M |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | 9 | R 4 N |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | 9 | R 4 P |
| ***Cable lengths ø 6 mm or ø 11 mm/PA coated*** | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | 9 | R 6 A |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | 9 | R 6 B |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | 9 | R 6 C |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | 9 | R 6 D |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | 9 | R 6 E |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | 9 | R 6 F |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | 9 | R 6 G |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | 9 | R 6 H |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | 9 | R 6 J |

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## Selection and ordering data (continued)

| SITRANS LG260 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level in solids. | Article No. 7ML5882- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | 9 | R 6 K |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | 9 | R 6 L |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | 9 | R 6 M |
| 55 001 ... 65 000 mm (2 165.39 ... 2 559.06 inch) | 9 | R 6 N |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs (mandatory)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Supplementary electronics** | |
| Without | **A00** |
| Additional current output 4 ... 20 mA[10)] | **A01** |
| **Rod mounted** | |
| Without Rod, applicable for coax or cable probe types only | **C00** |
| Mounted | **C01** |
| Not mounted | **C02** |
| **Indicating/adjustment module** | |
| Without | **E00** |
| Mounted | **E01** |
| Laterally mounted | **E02** |
| **Language of display** | |
| German | **L00** |
| English | **L01** |
| French | **L02** |
| Dutch | **L03** |
| Italian | **L04** |
| Spanish | **L05** |
| Portuguese | **L06** |
| Russian | **L07** |
| Chinese | **L08** |
| Japanese | **L09** |
| No language pre-set | **L10** |
| **Operating instructions** | |
| German | **M00** |
| English | **M01** |
| French | **M02** |
| Spanish | **M03** |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs (optional)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description | **Y01** |
| Remote electronic cable lengths: 2 m (6.6 ft). Only available with Housing options Q2A and Q2B. | **Y10** |
| Remote electronic cable lengths: 5 m (16.4 ft). Only available with Housing options Q2A and Q2B. | **Y11** |
| Remote electronic cable lengths: 10 m (32.8 ft). Only available with Housing options Q2A and Q2B. | **Y12** |

| Selection and Ordering data | Order code |
|---|---|
| Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y17** |
| Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y18** |
| Material Inspection certificate 3.1 of EN 10204 | **C05** |
| 3.1-Inspection Certificate for instrument (EN 10204)[17)] | **C12** |
| Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material.[17)18)] Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate. | **D07** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204)[17)] | **C25** |
| 2.2-Factory certificate for material (EN 10204)[17)] | **C15** |
| Quality and test plan[17)] | **C26** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204)[17)] | **C13** |
| X-ray test + 3.1 certificate/instrument[17)] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[17)] | **C16** |
| Roughness test + 3.1 certificate/instrument[17)] | **C18** |
| Pressure test + 3.1 certificate/instrument[17)] | **C31** |
| Helium leak test + 3.1 certificate/instrument[17)] | **C32** |
| Pressure test according to NORSOK + 3.1 certificate/instrument[17)] | **C61** |
| 5 point calibration certificate (min. length 500 mm)[17)] | **C62** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SITRANS LG series/SITRANS RD150 sensor display module | **A5E34143449** |
| SITRANS LG, two-wire 4 ... 20 mA/HART electronic | **A5E35637821** |
| SITRANS LG, USB communicator | **A5E35192015** |
| SITRANS LG, Mounting eye M12 x 20 | **PBD:51041448** |
| SITRANS LG, Mounting spring | **PBD:51041449** |
| Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia | **7NG4124-0AA00** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | 7ML5740-.....-.. |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | 7ML5744-.....-.. |
| For applicable back up point level switch - see point level measurement section | |

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

1) Not available with Plastic and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
2) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
3) Not available with Remote and Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
4) Not available with Stainless steel (electropolished) Housing/Protection/Cable options and certain glands.
5) Not available with Seal/Process temperature option C.
6) Not available with Housing/Protection/Cable options W, X, Y, and U.
7) Not available with Probe version/Material option E.
8) Available only with certain Electronics options.
9) Available only with Supplementary electronic option A00.
10) Not available with Indicating/adjustment module option E02.
11) Not available with Seal/Process temperature options B and E.
12) Available only with Seal/Process temperature option C.
13) Not available with Seal/Process temperature options A and D.
14) Available only with Rod mounted option C00.
15) Available only with Seal/Process temperature options A and D.
16) Not available with Housing/Protection/Cable options Q2A and Q2B.
17) Listed Certificates are not available with all configurations, please contact factory for more information.
18) Available only with 316L Probes. NACE is not available with coated, plated, or hygienic connections.
19) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.

Note: Please consult manual for further details.

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● | | Order Code ● ● ● |
|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | |
| **Approvals** | | | |
| General purpose (CSA, FM, CE)[32] | 0 | A | |
| Shipping approval[1][2][3][4][5] | 0 | B | |
| Overfill protection (WHG; VLAREM)[2][3] | 0 | C | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC T6[2][32] | 0 | E | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC + Overfill (WHG; VLAREM)[2][3] | 0 | F | |
| ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval[1][2][3][4][5] | 0 | G | |
| ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x[2][7] | 0 | H | |
| ATEX II 1/2G, 2G Ex d ia IIC T6[2][5][6][8][32] | 0 | J | |
| ATEX II 1/2G, 2G Ex d ia IIC + shipping approval[1][2][3][5][6][8] | 0 | L | |
| ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x[2][5][6][8] | 0 | M | |
| ATEX II 1/2G, 2G Ex d IIC T6[6][7][32] | 0 | N | |
| ATEX II 1G, II 1/2G, II 2G Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb /IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb[2][3] | 0 | W | |
| ATEX II 1/2G, 2G Ex d IIC + ship approval[1][2][3][5][6][7] | 0 | Q | |
| ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x[2][6][7] | 0 | R | |
| ATEX II 1D, 1/2D, 2D IP6x T[2][7] | 0 | S | |
| ATEX II 1/2G, II 2G Ex db IIC T6 ... T1 Ga/Gb, Gb + Overfill protection (WHG, VLAREM)[6][7][32] | 7 | P | |
| IEC Ex ia IIC T6[2] | 0 | T | |
| IEC Ex ia IIC T6 + IEC IP6x T tD[2][7][32] | 0 | U | |
| IEC Ex d ia IIC T6[2][5][6][8][32] | 1 | A | |
| IEC Ex d ia IIC T6 + IEC IP6x T tD[2][5][6][8] | 1 | B | |
| IEC Ex d IIC T6[3][6][7] | 1 | C | |
| IEC Ex d IIC T6 + IEC IP6x T tD[2][3][6][7] | 1 | D | |
| IEC Ex db IIC T6 ... T1 Ga/Gb, Gb + Ship approval[2][3][5][6][7][9] | 7 | C | |
| IEC Ex ia IIC T6 ... T1 Ga, Ga/Gb, Gb + Ship approval[2][9][12] | 7 | D | |
| IEC Ex d ia IIC T6 ... T1 Ga/Gb, Gb + Ship approval[2][5][6][8][9] | 7 | E | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D[2][5][10][32] | 1 | F | |
| FM (NI) Class I, Div. 2, Groups A, B, C, D + ship approval[1][2][3][5][8] | 1 | G | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F[2][5][32] | 1 | H | |
| FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + ship approval[1][2][3][4][5] | 1 | J | |
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2][5][6][8][32] | 1 | K | |
| FM (XP-AIS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[1][2][3][5][6][8] | 1 | L | |
| FM (XP) Class I, Div. 1, Groups A, B, C, D[6][11][32] | 1 | M | |
| CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[3][6][7] | 1 | N | |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2][3] | 1 | P | |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2][3][5][6][8] | 1 | Q | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[3)5)6)11)19)] | 1 R | |
| CSA (NI) Class I, II, III Div. 2, Groups A, B, C, D, F, G + Ship approval[2)3)6)7)9)] | 7 K | |
| CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[2)6)9)12)] | 7 L | |
| CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval[2)3)5)6)8)9)] | 7 M | |
| NEPSI Ex ia IIC T6[2)3)] | 2 A | |
| NEPSI Ex ia IIC T6 + DIP A20/21 TA T*[2)5)7)] | 2 B | |
| NERSI Ex d ia IIC T6[2)3)5)6)8)] | 2 C | |
| NEPSI Ex d ia IIC T6 + DIP A20/21 TA T*[2)3)5)6)8)] | 2 D | |
| NEPSI Ex d IIC T6[2)3)6)11)] | 2 E | |
| NEPSI Ex d IIC T6 + DIP A20/21 TA T*[2)3)6)11)] | 2 F | |
| NEPSI DIP A20/21 TA T*[2)3)7)] | 2 G | |
| INMETRO Ex ia IIC T6 ... T1[2)32)] | 3 A | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex ia IIC T6, Ga, Ga/Gb[2)6)7)] | 3 B | |
| INMETRO Ex d ia IIC T6 ... T1[2)5)6)8)32)] | 3 C | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d ia IIC T6 Ga/Gb[2)5)68)] | 3 D | |
| INMETRO Ex d IIC T6 ... T1[2)6)11)32)] | 3 E | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db + Ex d IIC T6 Ga/Gb[2)6)11)] | 3 F | |
| INMETRO Ex t IIIC T* IP6X, Da, Da/Db, Da/Dc, Db[2)6)7)] | 3 G | |
| KOSHA Ex d IIC T6 ... T1 – KE[2)3)6)11)] | 4 A | |
| Korea KC ex free area[2)32)] | 6 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X[2)13)] | 5 A | |
| GOST-R/EAC 0 Ex ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[2)7)] | 5 B | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X[2)5)6)8)] | 5 C | |
| GOST-R/EAC 1 Ex d ia IIC T1 ... T6 X + Ex t IIIC T ... IP66[2)5)6)8)] | 5 D | |
| GOST-R/EAC 1 Ex d IIC T1 ... T6 X[2)6)11)] | 5 E | |
| GOST-R/EAC 0 Ex d IIC T1 ... T6 X + Ex t IIIC T ... IP66[2)6)11)] | 5 F | |
| GOST-R/EAC Ex t IIIC T ... IP66[2)14)] | 5 G | |
| Note: Version/Material, Process fitting/Material, and Length options are available only with options of corresponding type. | | |
| **Version/Material** | | |
| Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316[15)16)17)] | A | |
| Probe exchangeable cable ø 2 mm (0.08 inch) center weight/316L[15)17)18)] | B | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316L[15)16)17)] | C | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with center weight/316L[15)17)18)] | D | |
| Probe exchangeable rod ø 16 mm (0.63 inch)/316L[16)19)20)] | E | |
| Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L[16)17)20)] | F | |
| Probe coax version ø 42.2 mm (1.66 inch); multiple hole; reference distances/316L[16)17)20)21)26)] | G | |
| Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/Alloy C22 (2.4602)[22)30)] | H | |
| Probe exchangeable rod ø 16 mm (0.63 inch)/Alloy C22 (2.4602)[22)30)] | J | |
| Coax version ø 42.2 mm (1.66 inch) with multiple hole/Alloy C22 (2.4602)[22)30)] | K | |
| Exchangeable rod, diameter 8 mm (0.32 inch)/316L[19)23)] | L | |
| Coax ø 21.3 mm (0.838 inch) with multiple hole/316L[23)] | M | |
| **Process fitting/Material** | | |
| Thread G 1 1/2" (DIN 3852-A) PN 400/316L[20)] | 0 0 | |
| Thread 1 1/2" NPT (ASME B1.20.1) PN 400/316L[20)] | 0 1 | |
| Thread G1 1/2" PN 400, DIN 3852-A/Alloy C22 (2.4602) | 0 2 | |
| Thread 1 1/2" NPT PN 400, ASME B1.20.1/ Alloy C22 (2.4602) | 0 3 | |
| Flange DN 50 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating | 0 4 | |
| Flange DN 80 PN 40 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating | 0 5 | |
| Flange DN 100 PN 16 Form C, DIN 2501/ 316L with Alloy C22 (2.4602) coating | 0 6 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/ 316L with Alloy C22 (2.4602) coating | 0 7 | |
| Flange DN 50 PN 63 Form B1, EN 1092-1/ 316L with Alloy C22 | 0 8 | |
| Flange DN 50 PN 40 Form C, DIN 2501/316L | 1 0 | |
| Flange DN 50 PN 40 form V13, DIN 2513/316L | 1 1 | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Flange DN 65 PN 64 Form V13, DIN 2501/316L | 1 2 | |
| Flange DN 80 PN 40 Form C, DIN 2501/316L | 1 3 | |
| Flange DN 80 PN 40 Form V13, DIN 2501/316L | 1 4 | |
| Flange DN 80 PN 100 Form L, DIN 2501/316L[20)] | 1 5 | |
| Flange DN 100 PN 16 Form C, DIN 2501/316L | 1 6 | |
| Flange DN 100 PN 16 Form V13, DIN 2501/316L | 1 7 | |
| Flange DN 100 PN 40 Form C, DIN 2501/316L | 1 8 | |
| Flange DN 100 PN 40 Form V13, DIN 2513/316L | 2 0 | |
| Flange DN 150 PN 16 Form C, DIN 2501/316L | 2 1 | |
| Flange DN 50 PN 40 EN 1092-1 Form B1/316L | 2 2 | |
| Flange DN 100 PN 160 GOST 12815-80.7/316L[20)] | 2 3 | |
| Flange 2" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 2 4 | |
| Flange 2" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 2 5 | |
| Flange 2" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 2 6 | |
| Flange 3" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 2 7 | |
| Flange 3" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 2 8 | |
| Flange DN 80 PN 160 Form C, DIN 2501/316L[20)] | 6 0 | |
| Flange DN 80 PN 250 Form L, DIN 2501/316L[20)] | 6 1 | |
| Flange DN 50 PN 160, EN 1092-1 Form B1/316L[20)] | 6 2 | |
| Flange DN 50 PN 160, EN 1092-1 Form B2/316L[20)] | 6 3 | |
| Flange DN 50 PN 32, EN 1092-1 Form B1/316L[20)] | 6 4 | |
| Flange DN 65 PN 250, EN 1092-1 Form B1/316L[20)] | 6 5 | |
| Flange DN 100 PN 160, EN 1092-1 Form B2/316L[20)] | 6 6 | |
| Flange DN 80 PN 63, EN 1092-1 Form B2/316L | 6 7 | |
| Flange 4" 600 lb RF, ASME B16.5/ 316L with Alloy C22 (2.4602) coating | 6 8 | |
| Flange 2" 150 lb RF, ASME B16.5/316L | 3 0 | |
| Flange 2" 300 lb RF, ASME B16.5/316L | 3 1 | |
| Flange 2" 600 lb RF, ASME B16.5/316L | 3 2 | |
| Flange 2" 1 500 lb RF, ASME B16.5/316L | 3 3 | |
| Flange 3" 150 lb RF, ASME B16.5/316L | 3 4 | |
| Flange 3" 300 lb RF, ASME B16.5/316L | 3 5 | |
| Flange 3" 600 lb RF, ASME B16.5/316L | 3 6 | |
| Flange 3" 900 lb RF, ASME B16.5/316L | 3 7 | |
| Flange 3" 2 500 lb RF, ASME B16.5/316L | 3 8 | |
| Flange 3 1/2" 600 lb RF, ASME B16.5/316L | 4 0 | |
| Flange 4" 150 lb RF, ASME B16.5/316L | 4 1 | |
| Flange 4" 300 lb RF, ASME B16.5/316L | 4 2 | |
| Flange 4" 600 lb RF, ASME B16.5/316L | 4 3 | |
| Flange 6" 150 lb RF, ASME B16.5/316L | 4 4 | |
| Flange 6" 300 lb RF, ASME B16.5/316L | 4 5 | |
| Flange 6" 600 lb RF, ASME B16.5/316L | 4 6 | |
| Flange 2" 150 lb Fisher special return/316L | 4 7 | |
| Flange 3" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) | 4 8 | |
| Flange 2" 900 lb RF, ASME B16.5/316L | 5 0 | |
| Flange 3" 1 500 lb RF, ASME B16.5/316L | 5 1 | |
| Flange 4" 900 lb RF, ASME B16.5/316L | 5 2 | |
| Flange 4" 1 500 lb RF, ASME B16.5/316L | 5 3 | |
| Flange 4" 2 500 lb RJF, ASME B16.5/316L[20)] | 5 4 | |
| Flange 4" 1500 lb RJF, ASME B16.5/316L[20)] | 5 5 | |
| Flange 3" 600 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 5 6 | |
| Flange 4" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 5 7 | |
| Flange 4" 300 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 5 8 | |
| Flange 6" 150 lb RF, ASME B16.5/316L with Alloy C22 (2.4602) coating | 7 0 | |
| Flange DN 50 PN 40 Form C, DIN 2501/Alloy C22 (2.4602) solid | 7 1 | |
| Flange DN 100 PN 16 Form C, DIN 2501/C22 solid | 7 2 | |
| Flange DN 100 PN 40 Form N, DIN 2501/Alloy C22 (2.4602) solid | 7 3 | |
| Flange DN 50 PN 40 Form B1, EN 1092-1/Alloy C22 (2.4602) solid | 7 4 | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| Flange 2" 150 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | 7 5 | |
| Flange 2" 300 lb RF, ASME B16.5/Alloy C22 (2.4602) solid | 7 6 | |
| Flange 2" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 7 7 | |
| Flange 2" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 7 8 | |
| Flange 2" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 0 | |
| Flange 3" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 1 | |
| Flange 3" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 2 | |
| Flange 3" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 3 | |
| Flange 4" 150 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 4 | |
| Flange 4" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 8 5 | |
| Flange 3" 600 lb RJF for R31, ASME B16.5/ Alloy C22 (2.4602) solid | 8 6 | |
| Flange 2" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 A |
| Flange 3" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 B |
| Flange 3" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 C |
| Flange 4" 600 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 D |
| Flange 4" 600 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 E |
| Flange 4" 900 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 F |
| Flange 4" 900 lb RJF, ASME B16.5/ Alloy C22 (2.4602) massiv | 9 0 | L 1 G |
| Flange 4" 1 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 H |
| Flange 4" 2 500 lb RJF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 J |
| Flange 8" 300 lb RF, ASME B16.5/ Alloy C22 (2.4602) solid | 9 0 | L 1 K |
| Flange 3½" 600 lb Fisher type 249B and 259B/Alloy C22 (2.4602) solid | 9 0 | L 1 L |
| Flange 2½" 300 lb RF, ASME B16.5/316/316L | 9 0 | L 2 A |
| Flange 2½" 600 lb RF, ASME B16.5/316/316L | 9 0 | L 2 B |
| Flange DN 50 PN 40 Form D, EN 1092-1/316/316L[24)] | 9 0 | L 2 C |
| Flange 2½" 1 500 lb RF, ASME B16.5/316/316L | 9 0 | L 2 D |
| Flange 2" 600 lb RF, ASME B16.5/316L (NORSOK)[34)35)] | 9 0 | L 2 E |
| Flange 3" 1500lb RJF, ASME B16.5 / 316/316L[32)] | 9 0 | L 2 F |
| Thread G 1" (DIN 3852-A) PN 100/316L | 9 0 | L 3 C |
| Thread 1" NPT, ASME B1.20.1/PN 100/316L | 9 0 | L 3 D |
| Thread G 1½" (DIN 3852-A) PN 100/316L | 9 0 | L 3 E |
| Thread 1½" NPT, ASME B1.20.1/PN 100/316L | 9 0 | L 3 F |
| Thread 2" NPT, ASME B1.20.1/PN 100/316L | 9 0 | L 3 G |
| Thread G ¾ PN100, DIN 3852-A/316L[31)] | 9 0 | L 3 H |
| Thread ¾ NPT PN100, ASME B1.20.1/31[31)] | 9 0 | L 3 J |
| **Electronics** | | |
| Two-wire 4 ... 20 mA/HART | 0 | |
| Four-wire Modbus[5)6)8)] | 1 | |
| Two-wire 4 ... 20 mA/HART with SIL qualification[5)] | 2 | |
| Four-wire 4 ... 20 mA/HART; 90 ... 253 V AC; 50/60 Hz[5)6)8)] | 3 | |
| Four-wire 4 ... 20 mA/HART; 9.6 ... 48 V DC; 20 ... 42 V AC[5)6)8)] | 4 | |
| PROFIBUS PA[5)] | 5 | |
| FOUNDATION Fieldbus[5)] | 6 | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| **Seal/Second line of defense/Process temperature** | | |
| Ceramic-graphite/with glass seal/ -196 ... +280 °C (-321 ... +536 °F) | A | |
| Ceramic-graphite/with glass seal/ -196 ... +450 °C (-321 ... +842 °F) | B | |
| Ceramic-graphite/with glass seal/ -196 ... +400 °C (-321 ... +752 °F)[21] | C | |
| PEEK-FFKM (Kalrez 6375) /with glass seal/ -20...+250 °C (-4 ... +482 °F)[21] | D | |
| **Housing/Protection/Cable** | | |
| Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC | | |
| Plastic IP66/IP67 M20 x 1.5/blind stopper | A | |
| Plastic IP66/IP67 1/2" NPT/blind stopper | B | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | C | |
| Aluminum/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | D | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | E | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | F | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | L | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | M | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | N | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | P | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/blind stopper | Q | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper | R | |
| Aluminum/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | S | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | T | |
| Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | U | |
| Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland stainless steel | V | |
| Aluminum single chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | W | |
| Aluminum double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | X | |
| Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | Y | |
| Stainless steel double chamber/IP66/IP68 (0.2 bar) M20 x 1.5/cable gland brass nickel-plated | J | |
| Remote stainless steel single chamber housing, electropolished/IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[6] | Z | Q 2 A |
| Remote plastic single chamber housing /IP66/IP67 with cable outlet IP68 (electronics separated by cable); M20 x 1.5/blind plug[6] | Z | Q 2 B |
| **Lengths** | | |
| ***Rod ø 16 mm/316L*** | | |
| 300 mm (11.81 inch)[25] | 0 | |
| 500 mm (19.69 inch)[25] | 1 | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch)[25] | 2 | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[25] | 3 | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[25] | 4 | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[25] | 5 | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[25] | 6 | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[25] | 7 | |
| ***Rod ø 16 mm/C22*** | | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch)[25] | 9 | R 1 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[25] | 9 | R 1 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[25] | 9 | R 1 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[25] | 9 | R 1 D |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[25] | 9 | R 1 E |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[25] | 9 | R 1 F |
| ***Rod ø 8 mm/316L*** | | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter<br>Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No.<br>7ML5883- ● ● ● ● ● - ● ● ● ● | Order Code<br>● ● ● |
|---|---|---|
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | 9 | R 1 H |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 9 | R 1 J |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | 9 | R 1 K |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | 9 | R 1 L |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | 9 | R 1 M |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | 9 | R 1 N |
| ***Cable lengths ø 2 or 4 mm/316L*** | | |
| 501 ... 1 000 mm<br>(19.72 ... 39.37 inch) | 9 | R 2 E |
| 1 000 ... 5 000 mm<br>(39.37 ... 196.85 inch) | 9 | R 2 F |
| 5 001 ... 10 000 mm<br>(196.89 ... 393.70 inch) | 9 | R 2 G |
| 10 001 ... 15 000 mm<br>(393.74 ... 590.55 inch) | 9 | R 2 H |
| 15 001 ... 20 000 mm<br>(590.59 ... 787.40 inch) | 9 | R 2 J |
| 20 001 ... 25 000 mm<br>(787.44 ... 984.25 inch) | 9 | R 2 K |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | 9 | R 2 L |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | 9 | R 2 M |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | 9 | R 2 N |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | 9 | R 2 P |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | 9 | R 2 Q |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | 9 | R 2 R |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | 9 | R 2 S |
| ***Cable lengths ø 4 mm/ C22*** | | |
| 501 ... 1 000 m<br>(19.72 ... 39.37 inch) | 9 | R 4 A |
| 1 000 ... 5 000 mm<br>(39.37 ... 196.85 inch) | 9 | R 4 B |
| 5 001 ... 10 000 mm<br>(196.89 ... 393.70 inch) | 9 | R 4 C |
| 10 001 ... 15 000 mm<br>(393.74 ... 590.55 inch) | 9 | R 4 D |
| 15 001 ... 20 000 mm<br>(590.59 ... 787.40 inch) | 9 | R 4 E |
| 20 001 ... 25 000 mm<br>(787.44 ... 984.25 inch) | 9 | R 4 F |
| 25 001 ... 30 000 mm<br>(984.29 ... 1 181.10 inch) | 9 | R 4 G |
| 30 001 ... 35 000 mm<br>(1 181.14 ... 1 377.95 inch) | 9 | R 4 H |
| 35 001 ... 40 000 mm<br>(1 377.99 ... 1 574.80 inch) | 9 | R 4 J |
| 40 001 ... 45 000 mm<br>(1 574.84 ... 1 771.65 inch) | 9 | R 4 K |
| 45 001 ... 50 000 mm<br>(1 771.69 ... 1 968.50 inch) | 9 | R 4 L |
| 50 001 ... 55 000 mm<br>(1 968.54 ... 2 165.35 inch) | 9 | R 4 M |
| 55 001 ... 60 000 mm<br>(2 165.39 ... 2 362.20 inch) | 9 | R 4 N |
| ***Coax ø 42.2 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[25] | 9 | R 3 G |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[25][26] | 9 | R 3 H |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[25] | 9 | R 3 J |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[25] | 9 | R 3 K |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[25] | 9 | R 3 L |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[25] | 9 | R 3 M |
| ***Coax ø 42.2 mm/C22*** | | |

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## Selection and ordering data (continued)

| SITRANS LG270 Guided radar level transmitter Continuous, contact, 60 m (197 ft) range. Monitors level and interface in liquids in extreme environments. | Article No. 7ML5883- ● ● ● ● ● - ● ● ● ● | Order Code ● ● ● |
|---|---|---|
| 300 ... 1 000 mm (11.81 ... 39.37 inch)[25] | 9 | R 3 Q |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch)[25][26] | 9 | R 3 R |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch)[25] | 9 | R 3 S |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch)[25] | 9 | R 3 T |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch)[25] | 9 | R 3 U |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch)[25] | 9 | R 3 V |
| ***Coax ø 21.3 mm/316L*** | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | 9 | R 5 A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | 9 | R 5 B |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | 9 | R 5 C |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | 9 | R 5 D |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | 9 | R 5 E |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | 9 | R 5 F |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs (mandatory)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| **Supplementary electronics** | |
| Without | **A00** |
| Additional current output 4 ... 20 mA[6] | **A01** |
| **Dimensions centering weight (diameter/height)** | |
| Without | **B00** |
| ø 40/30 mm | **B01** |
| ø 45/30 mm (for 2 inch tubes) | **B02** |
| ø 75/30 mm (for 3 inch tubes) | **B03** |
| ø 95/30 mm (for 4 inch tubes) | **B04** |
| ø 40 mm/30 mm<br>ø 1.57 inch/1.18 inch (for 2 inch Schedule 160) | **B05** |
| ø 45 mm/30 mm (for 2 inch tubes)<br>ø 1.77 inch/1.18 inch (for 2 inch Schedule 40/80) | **B06** |
| ø 75 mm/30 mm (for 3 inch tubes)<br>ø 2.95 inch/1.18 inch (for 3 inch Schedule 10/40) | **B07** |
| ø 95 mm/30 mm (for 4 inch tubes)<br>ø 3.74 inch/1.18 inch (for 4 inch Schedule 80) | **B08** |
| **Rod mounted** | |
| Without Rod, applicable for coax or cable probe types only | **C00** |
| Mounted | **C01** |
| Not mounted | **C02** |
| **Indicating/adjustment module** | |
| Without | **E00** |
| Mounted | **E01** |
| Laterally mounted | **E02** |
| **Language of display** | |
| German | **L00** |
| English | **L01** |
| French | **L02** |
| Dutch | **L03** |
| Italian | **L04** |

| Selection and Ordering data | Order code |
|---|---|
| Spanish | **L05** |
| Portuguese | **L06** |
| Russian | **L07** |
| Chinese | **L08** |
| Japanese | **L09** |
| No language pre-set | **L10** |
| **Operating instructions** | |
| German | **M00** |
| English | **M01** |
| French | **M02** |
| Spanish | **M03** |
| **Further designs (optional)** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description | **Y01** |
| Y02 rigid part is 100 mm, only applicable for cable versions | **Y02** |
| Reference probe G length of reference distance = 260 mm/10.24 inches (note blanking 450 mm required with min. probe 1 000 mm) | **Y05** |
| Reference probe G length of reference distance = 500 mm/19.69 inches (note blanking 690 mm required with min. probe 1 250 mm) | **Y06** |
| Reference probe G length of reference distance = 750 mm/29.53 inches (note blanking 940 mm required with min. probe 1 500 mm) | **Y07** |
| Remote electronic cable lengths: 2 m (6.6 ft).<br>Only available with Housing options Q2A and Q2B | **Y10** |
| Remote electronic cable lengths: 5 m (16.4 ft).<br>Only available with Housing options Q2A and Q2B | **Y11** |
| Remote electronic cable lengths: 10 m (32.8 ft).<br>Only available with Housing options Q2A and Q2B | **Y12** |
| Customer specific adjustment (unit value, 100 % distance from seal, 0 % distance from seal) | **Y20** |
| Cleaning included certificate: oil, grease and silicone free | **W01** |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| Identification Label (measurement loop) stainless steel, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y17** |
| Identification Label (measurement loop) foil, 40 characters max, add in plain text. To add more than one line use a coma "," for line break. | **Y18** |
| Material Inspection certificate 3.1 of EN 10204 | **C05** |
| 3.1-Inspection Certificate for instrument (EN 10204)[27)] | **C12** |
| Inspection certificate 3.1 (EN 10204, NACE MR 0175) - material.[27)]<br>Note: 316L probes include NACE MR 0175 and MR 0103, non 316L probes include MR 0175 only and plated flange designs are not available with NACE certificate. | **D07** |
| 3.1-Inspection Certificate for instrument with test data (EN 10204)[27)] | **C25** |
| 2.2-Factory certificate for material (EN 10204)[27)] | **C15** |
| Quality and test plan[27)] | **C26** |
| Dye penetration test, results confirmed via a 3.1 certificate/instrument (EN10204)[27)] | **C13** |
| X-ray test + 3.1 certificate/instrument[27)] | **C14** |
| Positive material identification test + 3.1 certificate/instrument[27)] | **C16** |
| Roughness test + 3.1 certificate/instrument[27)] | **C18** |
| Pressure test + 3.1 certificate/instrument[27)] | **C31** |
| Helium leak test + 3.1 certificate/instrument[27)] | **C32** |
| Pressure test according to NORSOK + 3.1 certificate/instrument[27)33)] | **C61** |
| 5 point calibration certificate (min. length 500 mm)[27)] | **C62** |
| Pressure test (acc. to ASME B31.1), incl. 3.1 Inspection certificate[28)] | **C63** |
| Certificate: Approval for steam boiler according to EN 12952-11, EN 12953-9[29)] | **C70** |

| Selection and Ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SITRANS LG series/SITRANS RD150 sensor display module | **A5E34143449** |
| SITRANS LG, two-wire 4 ... 20 mA/HART electronic | **A5E35637821** |
| SITRANS LG, USB communicator | **A5E35192015** |
| SITRANS LG, Mounting eye M12 x 20 | **PBD:51041448** |
| SITRANS LG, Mounting spring | **PBD:51041449** |
| Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia | **7NG4124-0AA00** |
| SITRANS RD100, loop powered display -see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

Note: some configuration options are not available. For restriction information see the online PIA configuration tool.

1) Not available with Version/Material options E, F, G, J, and K.
2) Available only with certain Electronic options.
3) Not available with Seal/Process temperature option D.
4) Not available with Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
5) Available only with Supplementary electronic option A00.
6) Not available with Indicating/adjusting module E02.
7) Not available with Plastic and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
8) Available only with Double chamber, Metallic Housing/Protection/Cable options and certain glands.
9) Available only with Version/Material options A, B, C, D, and H.
10) Not available with Remote and Stainless Steel (electropolished) Housing/Protection/Cable options and certain glands.
11) Available only with Single chamber, Aluminum and Stainless steel (precision casting) Housing/Protection/Cable options.
12) Available only with Housing/Protection/Cable options N, P, V, and Q2A.
13) Not available with Housing/Protection/Cable options W, X, Y, and J.
14) Available only with Housing/Protection/Cable options C, E, L, Q.
15) Not available with Seal/Process temperature option C.
16) Available only with Dimensions centering weight option B00.
17) Available only with Rod mounted option C00.
18) Not available with Dimensions centering weight option B00.
19) Not available with Rod mounted option C00.
20) Not available with Seal/Process temperature options C and D.
21) Not available with Remote Housing/Protection/Cable options.
22) Not available with Seal/Process temperature options B and D.
23) Available only with Seal/Process temperature option D.
24) Available only with Seal/Process temperature options A, B, and C.
25) Not available with Order code Y02.
26) Accuracy is application dependent, please consult factory.
27) Listed Certificates are not available with all configurations, please contact factory for more information.
28) Available only with ASME Process fitting/Material options.
29) Available with Version/Material options G, L, M and Electronic options 2 and 6.
30) Available only with Alloy C22 Process fitting/Material options.
31) Available only with Version/Material option M.
32) Available only with some Version/Material options.
33) Available only with Process fitting options.
34) Available only with Seal/Second line of defense/Process temperature options A and B.
35) Available only with 316L probe Version/material options. Nace not available with coated, plated, or hygienic connections.

Note: Please consult manual for further details.

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## Selection and ordering data (continued)

| Selection and Ordering data<br>SITRANS LG Remote Interface<br>Provides remote display and configuration for SITRANS LG series guided radar level transmitters. | Article No.<br>7ML5840- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | |
| Note: for installation of remote display, 7ML5840, with LG two chamber housing options, contact PVC | | | | | | | | | | | | |
| **Approval** | | | | | | | | | | | | |
| For Ex-free area | | 0 | A | | | | | | | | | |
| ATEX II 1G, 2G, Ex ia IIC T6 Ga, Gb | | 0 | C | | | | | | | | | |
| ATEX II 2G, Ex d IIC T6 Gb[1] | | 0 | E | | | | | | | | | |
| IEC Ex ia IIC T6 Ga, Gb | | 0 | F | | | | | | | | | |
| IEC Ex d IIC T6 Gb[1] | | 0 | G | | | | | | | | | |
| $_{C}CSA_{US}$ (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G | | 0 | H | | | | | | | | | |
| $_{C}CSA_{US}$ (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G | | 0 | J | | | | | | | | | |
| $_{C}CSA_{US}$ (XP) Class I, Div. 1, Groups A, B, C, D[1] | | 0 | K | | | | | | | | | |
| INMETRO Ex ia IIC T6 Ga, Gb | | 0 | L | | | | | | | | | |
| INMETRO Ex d IIC T6 Gb[1] | | 0 | M | | | | | | | | | |
| Shipping Approval (DNV/GL)[6] | | 0 | N | | | | | | | | | |
| ATEX II 1G, 2G Ex ia IIC T6 Ga, Gb + Ship approval | | 0 | P | | | | | | | | | |
| ATEX II 2G Ex db IIC T6 Gb + Ship approval[1] | | 0 | Q | | | | | | | | | |
| IEC Ex ia IIC T6 Ga, Gb + Ship approval | | 0 | R | | | | | | | | | |
| IEC Ex db IIC T6 Gb + Ship approval[1] | | 0 | S | | | | | | | | | |
| $_{C}CSA_{us}$ (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + Ship approval | | 0 | T | | | | | | | | | |
| $_{C}CSA_{us}$ (XP) Class I, Div. 1, Groups A, B, C, D + Ship approval[1] | | 0 | U | | | | | | | | | |
| **Electronics** | | | | | | | | | | | | |
| Digital ($I^2C$ communication) | | | | A | | | | | | | | |
| **Housing** | | | | | | | | | | | | |
| Plastic[2][4] | | | | | 0 | | | | | | | |
| Aluminum[3][5] | | | | | 1 | | | | | | | |
| Stainless Steel (precision casting)[3][5] | | | | | 2 | | | | | | | |
| **Housing protection** | | | | | | | | | | | | |
| IP66/IP67 NEMA 4X | | | | | | 0 | | | | | | |
| IP66/IP68 NEMA 6P (0.2 bar) | | | | | | 1 | | | | | | |
| **Cable entry** | | | | | | | | | | | | |
| M20 x 1.5/ Blind plug | | | | | | | | 3 | | | | |
| ½" NPT/ Blind plug | | | | | | | | 5 | | | | |
| **Display** | | | | | | | | | | | | |
| Without | | | | | | | | | A | | | |
| Mounted | | | | | | | | | B | | | |
| **Mounting** | | | | | | | | | | | | |
| For wall mounting with Aluminum or stainless steel housing | | | | | | | | | | A | | |
| For carrier rail and wall mounting with plastic housing | | | | | | | | | | B | | |
| For carrier rail with Aluminum or stainless steel housing | | | | | | | | | | C | | |
| For tube mounting (29 ... 60 mm) including mounting material | | | | | | | | | | D | | |
| **Certificates** | | | | | | | | | | | | |
| None | | | | | | | | | | | 0 | |
| 3.1 Certificate/Instrument with test data | | | | | | | | | | | 1 | |
| Quality and Test plan | | | | | | | | | | | 2 | |

1) Available only with Housing options 1 and 2.
2) Available only with Housing option 0.
3) Available only with Housing option 1.
4) Available only with Mounting options B and D.
5) Not available with Mounting option B.
6) Shipping approval is only available with housing options 0 and 1.

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## Selection and ordering data (continued)

| SITRANS LG Replacement Probes<br>For use with SITRANS LG series guided radar level transmitters. | Article No.<br>7ML5841- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Instrument** | | | | | | | | | | | |
| LG240[4)] | | 0 | | | | | | | | | |
| LG250[6)] | | 1 | | | | | | | | | |
| LG260[7)] | | 2 | | | | | | | | | |
| LG270[9)10)] | | 3 | | | | | | | | | |
| **Probe Type[3)]** | | | | | | | | | | | |
| Exchangeable cable ø 2 mm with gravity weight/316[1)11)] | | | A | A | | | | | | | |
| Exchangeable cable ø 2 mm center weight/316[2)11)] | | | A | C | | | | | | | |
| Exchangeable cable ø 4 mm without weight/316[1)11)] | | | A | D | | | | | | | |
| Exchangeable cable ø 4 mm with gravity weight/316[1)11)] | | | A | E | | | | | | | |
| Exchangeable cable ø 4 mm with center weight/316[2)11)] | | | A | G | | | | | | | |
| Exchangeable cable ø 6 mm with gravity weight/316[1)8)11)] | | | A | H | | | | | | | |
| Exchangeable rod ø 8 mm/316L[1)] | | | A | P | | | | | | | |
| Exchangeable rod ø 8 mm/1.4435 (acc. to Basle Standard)[1)] | | | A | Q | | | | | | | |
| Exchangeable rod ø 12 mm/316L[1)] | | | A | U | | | | | | | |
| Exchangeable rod ø 16 mm/316L[1)] | | | A | W | | | | | | | |
| Exchangeable coated cable ø4 mm with uncoated centering weight / PFA and 316[11)12)] | | | B | A | | | | | | | |
| **Process fitting** | | | | | | | | | | | |
| Thread less than or equal to 1½ inch | | | | | 0 | | | | | | |
| Thread greater than or equal to 2 inch | | | | | 1 | | | | | | |
| Flange less than DN 50 or 2 inch | | | | | 2 | | | | | | |
| Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety ingold 25 x 46 mm) | | | | | 3 | | | | | | |
| **Dimension centering weight** | | | | | | | | | | | |
| Without | | | | | | 0 | | | | | |
| ø 40 mm/30 mm | | | | | | 1 | | | | | |
| ø 45 mm/30 mm (for 2 inch tubes) | | | | | | 2 | | | | | |
| ø 75 mm/30 mm (for 3 inch tubes) | | | | | | 3 | | | | | |
| ø 95 mm/30 mm (for 4 inch tubes) | | | | | | 4 | | | | | |
| ø 1.57 inch/1.18 inch (for 2 inch Schedule 160) | | | | | | 5 | | | | | |
| ø 1.77 inch/1.18 inch (for 2 inch Schedule 40/80) | | | | | | 6 | | | | | |
| ø 2.95 inch/1.18 inch (for 3 inch Schedule 10/40) | | | | | | 7 | | | | | |
| ø 3.74 inch/1.18 inch (for 4 inch Schedule 80) | | | | | | 8 | | | | | |
| **Certificates** | | | | | | | | | | | |
| Without | | | | | | | | 0 | | | |
| 2.2 Material certificate | | | | | | | | 1 | | | |
| 3.1 Material certificate | | | | | | | | 2 | | | |
| **Lengths** | | | | | | | | | | | |
| ***Rod ø 8 mm*** | | | | | | | | | | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | | | | | | | | | A | A | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | | | | | | A | B | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | | | | | | A | C | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | | | | | | A | D | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | | | | | | A | E | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | | | | | | | | | A | F | |
| ***Rod ø 12 mm*** | | | | | | | | | | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | | | | | | | | | A | G | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | | | | | | A | H | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | | | | | | A | J | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | | | | | | A | K | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | | | | | | A | L | |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | | | | | | | | | A | M | |

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## Selection and ordering data (continued)

| SITRANS LG Replacement Probes<br>For use with SITRANS LG series guided radar level transmitters. | Article No.<br>7ML5841- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| ***Rod ø 16 mm*** | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | A N |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | A P |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | A Q |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | A R |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | A S |
| 5 001 ... 6 000 mm (196.89 ... 236.22 inch) | A T |
| ***Cable Lengths ø 2 mm and 4 mm/316*** | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | A U |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | A V |
| 5 000 ... 10 000 mm (196.85 ... 393.70 inch) | A W |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | A X |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | A Y |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | B A |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | B B |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | B C |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | B D |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | B E |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | B F |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | B G |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | B H |
| 60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch) | B J |
| 65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch) | B K |
| 70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch) | B L |
| ***Cable Lengths ø 6 mm/316*** | |
| 501 ... 1 000 mm (19.72 ... 39.37 inch) | B M |
| 1 001 ... 5 000 mm (39.41 ... 196.85 inch) | B N |
| 5 000 ... 10 000 mm (196.89 ... 393.70 inch) | B P |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | B Q |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | B R |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | B S |
| 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch) | B T |
| 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch) | B U |
| 35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch) | B V |
| 40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch) | B W |
| 45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch) | B X |
| 50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch) | B Y |
| 55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch) | C A |
| 60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch) | C B |
| 65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch) | C C |
| 70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch) | C D |
| ***Cable Lengths ø 4 mm/316*** | |
| 300 ... 1 000 mm (12 ... 39.37 inch) | D A |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | D B |
| 2 001 ... 5 000 mm (78.77 ... 196.85 inch) | D C |
| 5 001 ... 10 000 mm (196.89 ... 393.70 inch) | D D |
| 10 001 ... 15 000 mm (393.74 ... 590.55 inch) | D E |
| 15 001 ... 20 000 mm (590.59 ... 787.40 inch) | D F |
| 20 001 ... 25 000 mm (787.44 ... 984.25 inch) | D G |
| 25 001 ... 32 000 mm (984.29 ... 1 259.84 inch) | D H |

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Enter the total insertion length in plain text description | **Y01** |
| Total length: Enter the total length of rigid part (range 100 ... 1 000 mm LG270 limited to 100 mm) (cable versions only) | **Y02** |

1) Available only with Dimension centering weight option 0.
2) Available only with Dimension centering weight options 1 ... 8.
3) All Probe types are only available with corresponding Probe lengths.
4) Not available with Probe type options AH, AQ, and AW.
5) Available only with Process fitting options 2 and 3.
6) Not available with Probe type options AQ and AW.
7) Available only with Probe type options AE, AH, and AW.
8) Not available with Process fitting option 2.
9) Available only with Probe type options AA, AC, AE, AG, and AW.
10) Available only with Process fitting options 0 and 3.
11) Not available with certificate options 1 and 2.
12) Available only with Dimension centering weight options 1 ... 4.

| **SITRANS LG Spacers**<br>**For use with SITRANS LG series guided radar level transmitters.** | **Article No.**<br>**7ML5842-** ● | ● | ● | ● | - | 0 | 0 | A | A | 0 |
|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Instrument** | | | | | | | | | | |
| LG240[1] | 0 | | | | | | | | | |
| LG250[2] | 1 | | | | | | | | | |
| LG260[3] | 2 | | | | | | | | | |
| LG270[3] | 3 | | | | | | | | | |
| **Version/Material** | | | | | | | | | | |
| Cable ø 4 mm/ PFA[4] | | A | A | | | | | | | |
| Rod ø 8 mm including fastening/ PEEK can be shortened[5] | | A | B | | | | | | | |
| Rod ø 10 mm/ PFA[4] | | A | C | | | | | | | |
| Rod ø 12 mm including fastening/ PEEK can be shortened[5] | | A | D | | | | | | | |
| Rod ø 16 mm, cable with gravity weight, including fastening/ PEEK can be shortened[5][7] | | A | E | | | | | | | |
| Cable ø 2 mm including fastening/ PEEK and 316L | | A | F | | | | | | | |
| Rod ø 16 mm including fastening/ 1.4568 (AISI 631) flexible[8] | | A | G | | | | | | | |
| Rod ø 8 mm including fastening/ PTFE can be shortened[5] | | A | H | | | | | | | |
| Rod ø 12 mm including fastening/ 1.4568 (AISI 631) flexible[6] | | A | G | | | | | | | |
| **Tube diameter** | | | | | | | | | | |
| 50 mm (2 inch) up to 100 mm (4 inch) | | | | 1 | | | | | | |
| 49.2 mm (1.9 inch) up to 56.3 mm (2.2 inch) | | | | 2 | | | | | | |
| 66.6 mm (2.6 inch) up to 84.9 mm (3.3 inch) | | | | 3 | | | | | | |

1) Available only with Version/Material options AA and AC.
2) Available only with Version/Material options AB, AD, AE, AH and AJ.
3) Available only with Version/Material options AE and AG.
4) Available only with Tube Diameter option 1 and LG240.
5) Available only with Tube Diameter options 2 and 3 and LG250.
6) Available only with Tube Diameter option 1 and LG250.
7) Available only with Tube diameter option 1 and LG260 or LG270.
8) Available only with Tube Diameter options 2 and 3 and LG260 or LG270.

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## Technical specifications

| SITRANS LG series | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Guided wave radar measurement |
| Measuring range | 300 ... 75 000 mm (11.81 ... 2 952.75 inch) |
| **Output** | |
| mA analog output with HART digital signal | 4 ... 20 mA/HART (SIL optional) |
| Output range | |
| • Analog | Current: minimum 3.8 mA, maximum 20.5 mA |
| • Startup current | ≤ 10 mA for 5 ms after switching on, ≤ 3.6 mA |
| Diagnostic alarm | Failure signal current output (adjustable): last valid measured value, ≥ 21 mA, ≤ 3.6 mA |
| Digital communication | HART Version 7 x and multidrop compatible |
| Modbus | Modbus RTU, Modbus ASCII |
| PROFIBUS PA | PROFIBUS PA profile 3.02 |
| FOUNDATION Fieldbus | FOUNDATION Fieldbus protocol Physical layer according to IEC 61158-2 |
| **Performance** | Process reference conditions according to DIN EN 61298-1 |
| • Measuring cycle time | < 500 ms |
| • Step response time | ≤ 3 s |
| • Temperature Effects | The measurement error from the process conditions is in the specified pressure and temperature range of below 1 % |
| Non-linearity | |
| • Coaxial | |
| • Single rod probes | |
| • Interface models | See manual for more details |
| Resolution and repeatability | Accuracy +/- 2 mm (0.08 inch) |
| Accuracy | |
| • Coaxial/rod/cable probes | +/- 2 mm (0.08 inch) |
| • Interface models | +/- 5 mm (0.197 inch)<br>Note: Typical deviation, Interface measurement. See manual for full explanation. |
| **Rated operating conditions** | |
| Ambient temperature for enclosure | -40 ... +80 °C (-40 ... +176 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| LCD readable temperature range | -40 ... +80 °C (-40 ... +176 °F) with display heated option |
| Location | Indoor/outdoor |
| Installation category | II |
| Pollution degree | 2 |
| Relative Humidity | 20 ... 85 % |
| **Medium conditions** | |
| Dielectric constant | dK ≥ 1.4 (configuration dependent)<br>Note: for measurement below 1.4 use probe end tracking. |
| Process temperature range | -196 ... +450 °C (-321 ... +842 °F) |
| Vessel pressure | -1 ... +400 bar (-100 ... +40 000 kPa) |
| **Design** | |
| Instrument weight (dependent on process fitting) - see manual for further details | Approx. 0.8 ... 8 kg (0.176 ... 17.64 lb) |
| Materials | |

| SITRANS LG series | |
|---|---|
| • Enclosure | • Plastic housing plastic PBT (Polyester)<br>• Aluminum die-cast housing, aluminum die-cast AlSi10 mg, powder-coated- basis: polyester<br>• Stainless steel housing, precision casting 316L<br>• Stainless steel housing, electropolished 316L |
| • Degree of protection | • Type 4/NEMA 4, IP65<br>• Plastic housing IP66/IP67<br>• Aluminum and stainless steel housings are IP66/68 |
| • Cable inlet | 2 x M20 x 1.5 or 2 x ½" NPT |
| Process connections | |
| • Pipe thread, cylindrical (ISO 228 T1) | G¾" A, G1" A, G1½" A according to DIN 3852-A |
| • American pipe thread, conical (ASME B1.20.1) | ¾" NPT, 1" NPT, 1½" NPT |
| • Flanged | DIN from DN 25, ASME from 1" |
| • Hygienic | Hygienic fittings |
| Process seal instrument side | FKM (SHS FPM 70C3 GLT), FFKM (Kalrez 6375), EPDM (A+P 70.10-02), silicone FEP coated (A+P FEPO-SEAL) or Borosilicate glass GPC 540 |
| Second line of defense (glass seal) (optional) | Borosilicate glass GPC 540<br>Note: The second line of defense is a second level of the process separation in the form of a gas-tight feedthrough in the lower part of the housing, preventing product from penetrating into the housing. |
| **Programming** | |
| Local | Four button, menu-driven data entry |
| Handheld communicator | Hart communicator |
| PC | SIMATIC PDM, AMS, PACTware |
| **Power** | |
| 2-wire Hart version | 9.6 ... 35 V DC |
| 4-wire versions | 9.6 ... 48 V DC, 20 ... 42 V AC, 50/60 Hz, and 90 ... 253 V AC, 50/60 Hz |
| Modbus | 8 ... 30 V DC |
| PROFIBUS PA | 9 ... 32 V DC |
| FOUNDATION Fieldbus | 9 ... 32 V DC |
| | Note: see manual for specific power based on ordered options |
| **Certificates and approvals** | |
| Hazardous approvals: | ATEX, FM, CSA, IECex<br>Note: other regional approvals are available |
| Hygienic approvals: | EHEDG, FDA |
| Overfill protection | WHG, Vlarem |
| Ship approval | ABS, CCS, GL, BV, LR |

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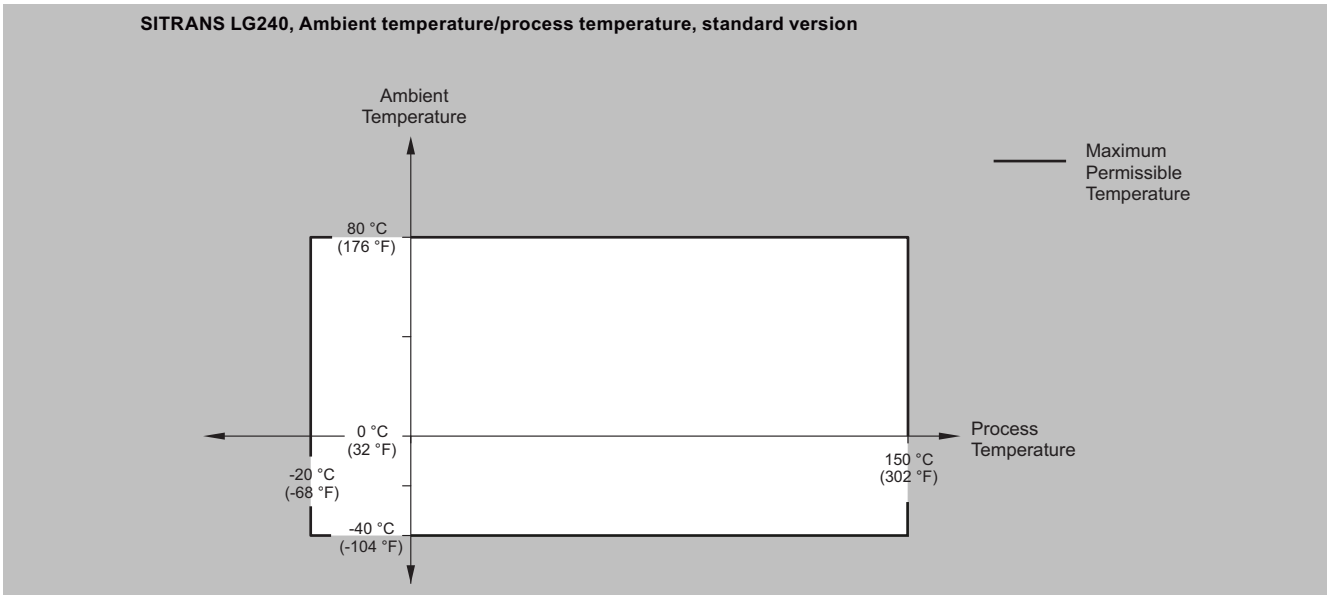
## Technical specifications (continued)

| Industries | SITRANS LG240<br>Food, Beverage and Pharmaceutical | SITRANS LG250<br>Chemical/HPI/Power/General | SITRANS LG260<br>Cement, power generation, food, processing, mineral processing, mining | SITRANS LG270<br>Chemical/HPI/Power/General |
|---|---|---|---|---|
| Applications | Hygienic and corrosive applications | Liquids, storage and process vessels with agitators, vaporous liquids, interface | Cement, fly ash, grain, coal, flour, plastics | Aggressive applications in liquids, storage and process vessels with agitators, vaporous liquids, high temperatures and pressures, low dielectric media |
| Range | 32 m | 75 m | 60 m | 60 m |
| Performance | ± 2 mm | ± 2 mm | ± 2 mm | ± 2 mm |
| Temperature | -40 ... +150 °C<br>(-40 ... +302 °F) | -40 ... +200 °C<br>(-40 ... +392 °F) | -40 ... +200 °C<br>(-40 ... +392 °F) | -196 ... +450 °C<br>(-320.8 ... +842 °F) |
| Process pressure | | | | |
| Standard version | - | -1 ... +40 bar/<br>-100 ... +4 000 kPa<br>(-14.5 ... +580 psig), depending on the process fitting | - | - |
| With borosilicate glass lead-through | - | -1 ... +100 bar/<br>-100 ... +10 000 kPa<br>(-14.5 ... +1 450 psig), depending on the process fitting | - | - |
| Communications | • 4 ... 20 mA/HART<br>• Modbus: Modbus RTU, Modbus ASCII<br>• PROFIBUS PA<br>• FOUNDATION Fieldbus<br>• SIMATIC PDM<br>• DTM/FDT for PACTware<br>• Fieldcare | • 4 ... 20 mA/HART<br>• Modbus: Modbus RTU, Modbus ASCII<br>• PROFIBUS PA<br>• FOUNDATION Fieldbus<br>• SIMATIC PDM<br>• DTM/FDT for PACTware<br>• Fieldcare | • 4 ... 20 mA/HART<br>• Modbus: Modbus RTU, Modbus ASCII<br>• PROFIBUS PA<br>• FOUNDATION Fieldbus<br>• SIMATIC PDM<br>• DTM/FDT for PACTware<br>• Fieldcare | • 4 ... 20 mA/HART<br>• Modbus: Modbus RTU, Modbus ASCII<br>• PROFIBUS PA<br>• FOUNDATION Fieldbus<br>• SIMATIC PDM<br>• DTM/FDT for PACTware<br>• Fieldcare |

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## Characteristic curves



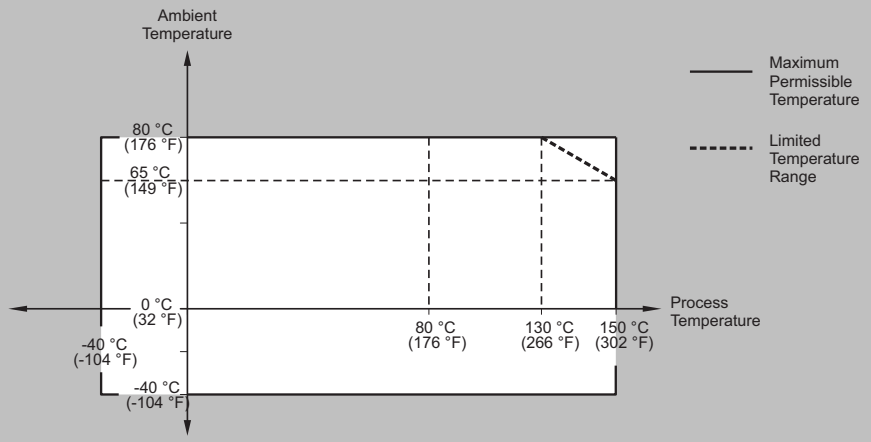

SITRANS LG240, ambient temperature/process temperature curve

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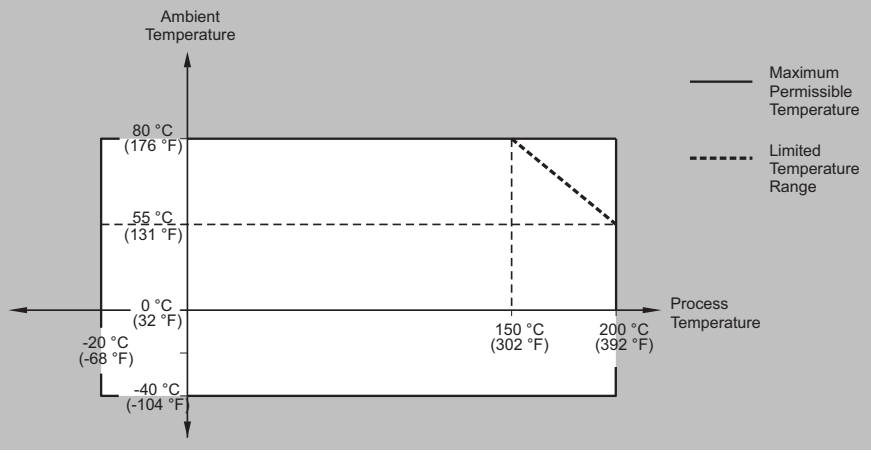


## Characteristic curves (continued)

**SITRANS LG250, Ambient temperature/process temperature, standard version**




**SITRANS LG250, Ambient temperature/process temperature, temperature adapter version**



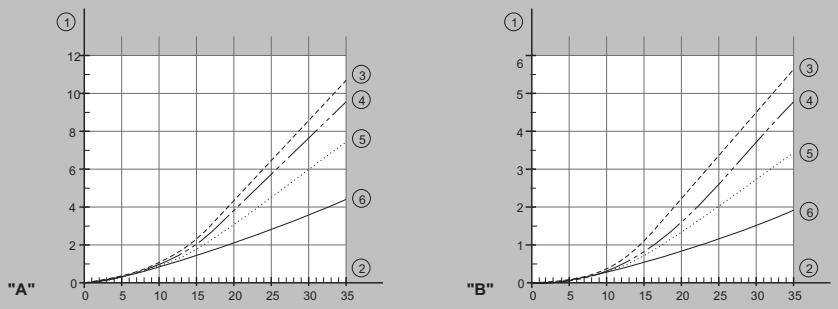

SITRANS LG250, ambient temperature/process temperature curves

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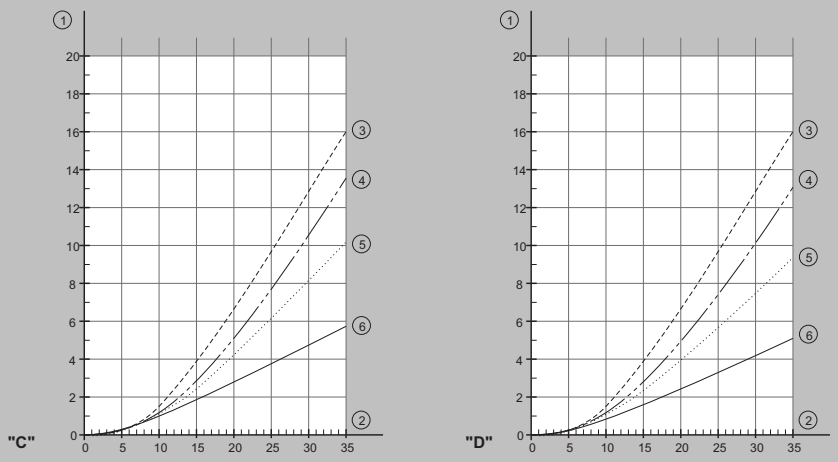
## Characteristic curves (continued)

**SITRANS LG260, Maximum tensile load with cereals and plastic granules - cable: ø 4 mm (0.157 inch)**




A. Cereals
B. Plastic granules
1. Tensile force in kN (the determined value must be multiplied with safety factor 2)
2. Cable length in m
3. Vessel diameter 12 m (39.37 ft)
4. Vessel diameter 9 m (29.53 ft)
5. Vessel diameter 6 m (19.69 ft)
6. Vessel diameter 3 m (9.843 ft)

**SITRANS LG260, Maximum tensile load with sand and cement - cable: ø 4 mm (0.157 inch)**




C. Sand
D. Cement
1. Tensile force in kN (the determined value must be multiplied with safety factor 2)
2. Cable length in m
3. Vessel diameter 12 m (39.37 ft)
4. Vessel diameter 9 m (29.53 ft)
5. Vessel diameter 6 m (19.69 ft)
6. Vessel diameter 3 m (9.843 ft)

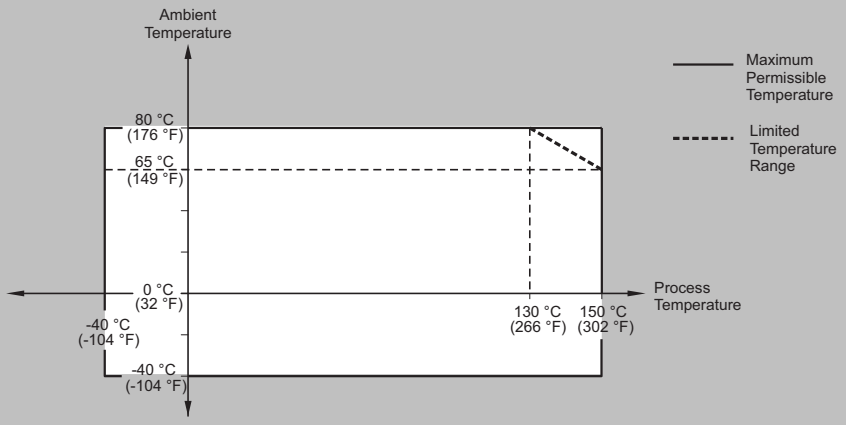
SITRANS LG260, maximum tensile load curves

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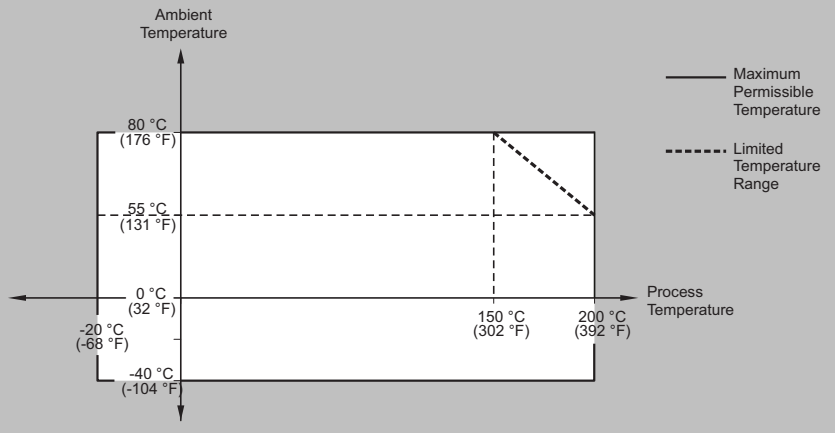


## Characteristic curves (continued)

**SITRANS LG260, Ambient temperature/process temperature, standard version**
**Cable version with ø 4 mm (0.157 inch)**
**Cable version, PA coated with ø 6 mm (0.236 inch)**




**SITRANS LG260, Ambient temperature/process temperature, temperature adapter version**
**Cable version with ø 4 mm (0.157 inch)**
**Cable version, PA coated with ø 6 mm (0.236 inch)**



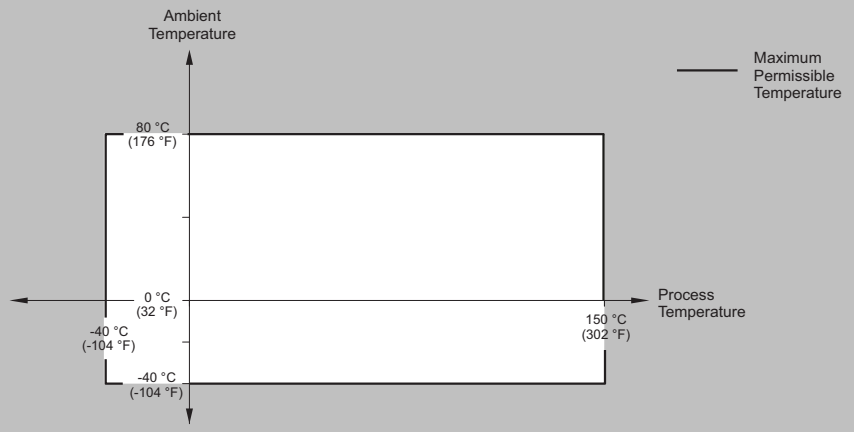

SITRANS LG260, ambient temperature/process temperature curves

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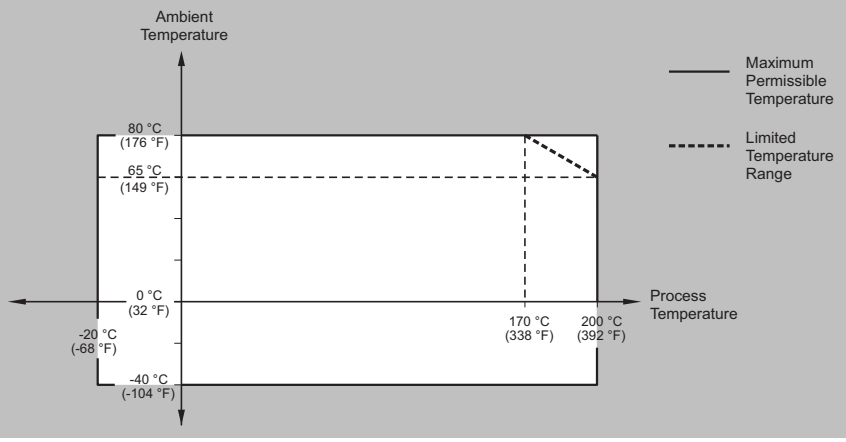


## Characteristic curves (continued)

**SITRANS LG260, Ambient temperature/process temperature, standard version**
**Cable version with ø 6 mm (0.236 inch)**
**Cable version, PA coated with ø 11 mm (0.433 inch)**




**SITRANS LG260, Ambient temperature/process temperature, temperature adapter version**
**Cable version with ø 6 mm (0.236 inch)**
**Cable version, PA coated with ø 11 mm (0.433 inch)**



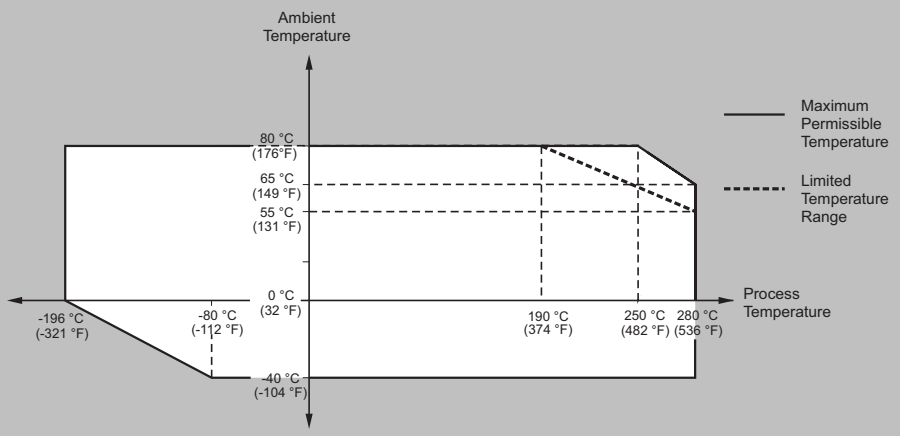

SITRANS LG260, ambient temperature/process temperature curves

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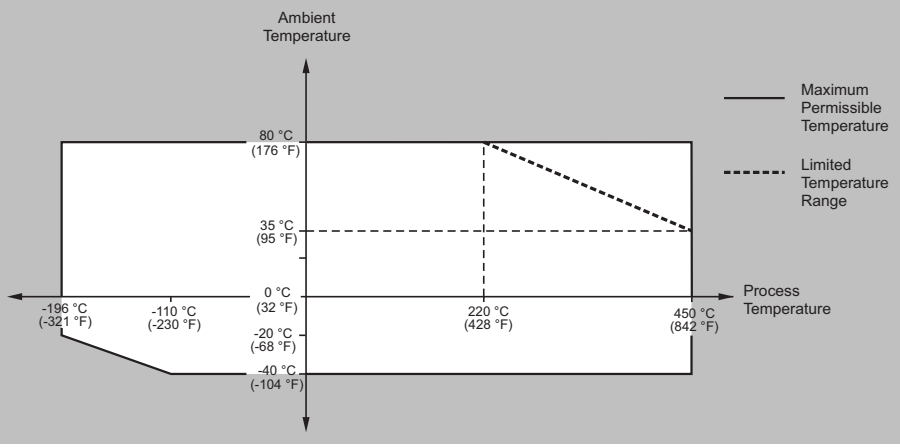


## Characteristic curves (continued)

**SITRANS LG270, Ambient temperature/process temperature ( -196 … +280 °C/-321 … +536 °F version)**




**SITRANS LG270, Ambient temperature/process temperature ( -196 … +450 °C/-321 … +842 °F version)**



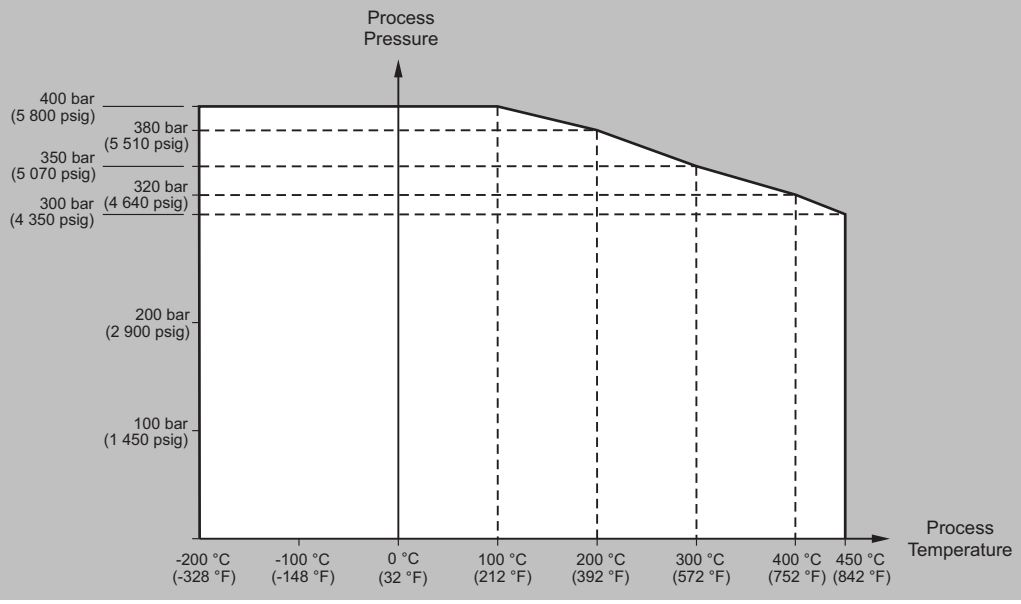

SITRANS LG270, ambient temperature/process temperature curves

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## Characteristic curves (continued)

**SITRANS LG270, Process pressure/process temperature ( -196 … +450 °C/-321 … +842 °F version)**

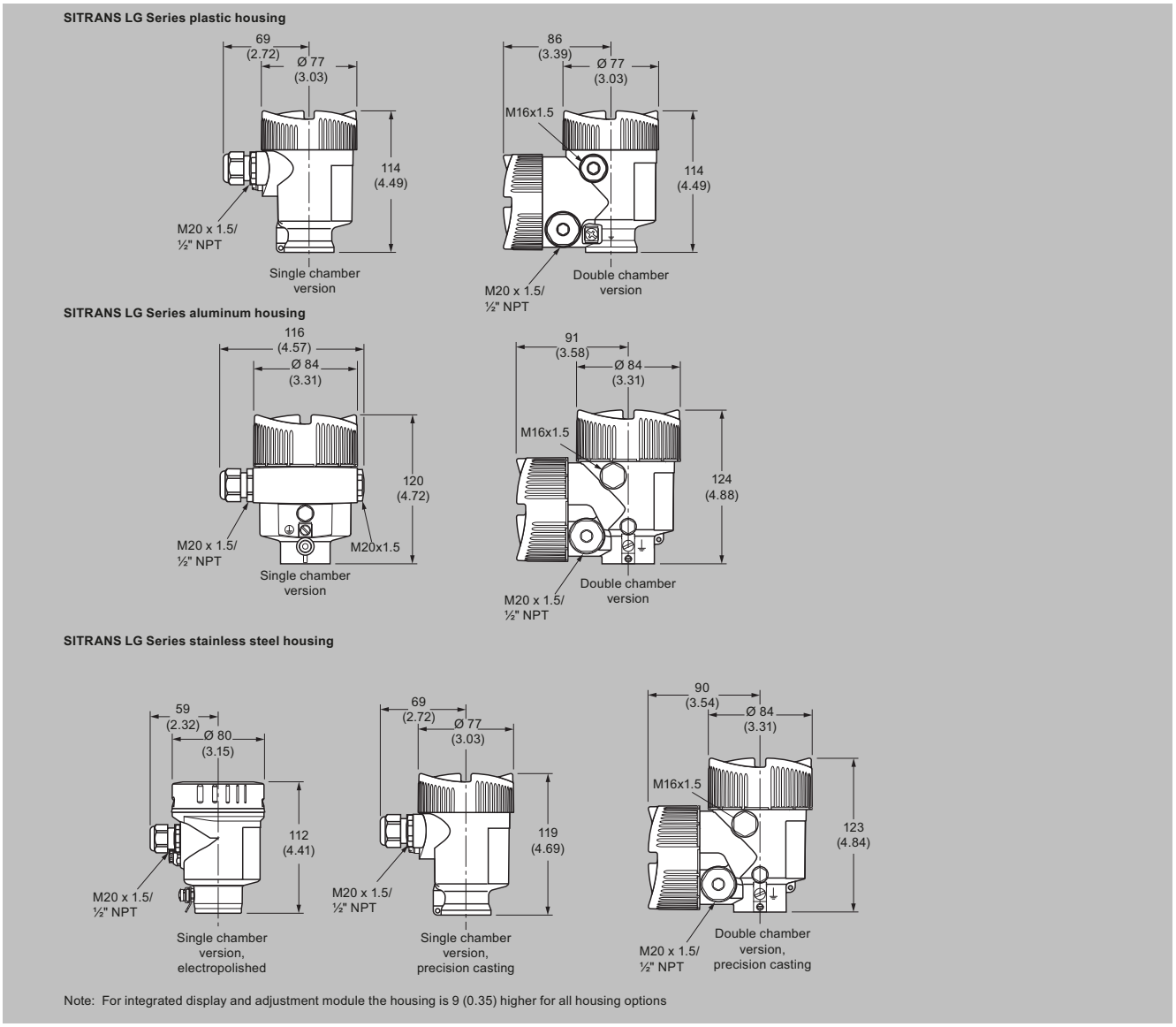



SITRANS LG270, process pressure/process temperature curve

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## Dimensional drawings

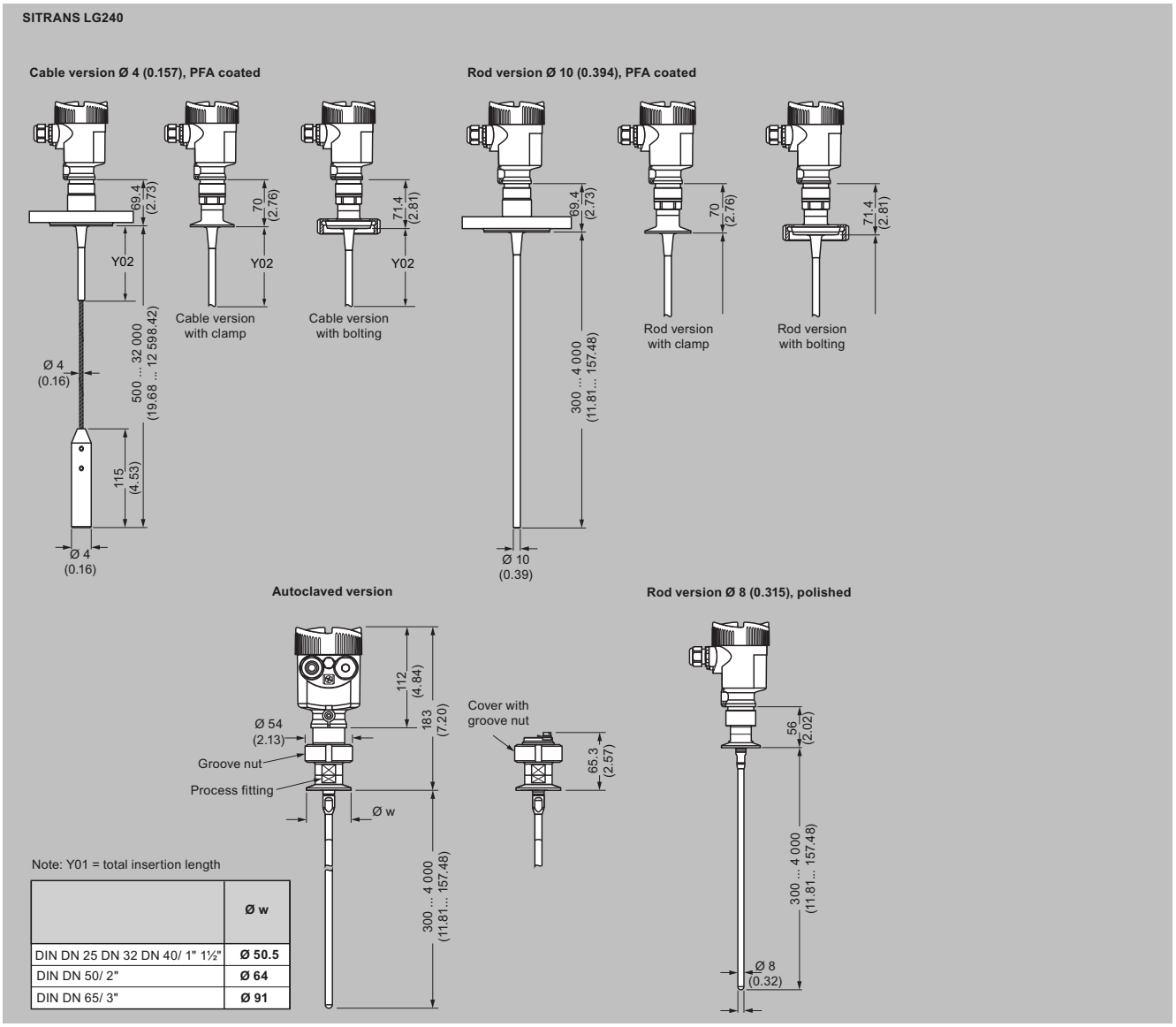



SITRANS LG series, dimensions in mm (inch)

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## Dimensional drawings (continued)



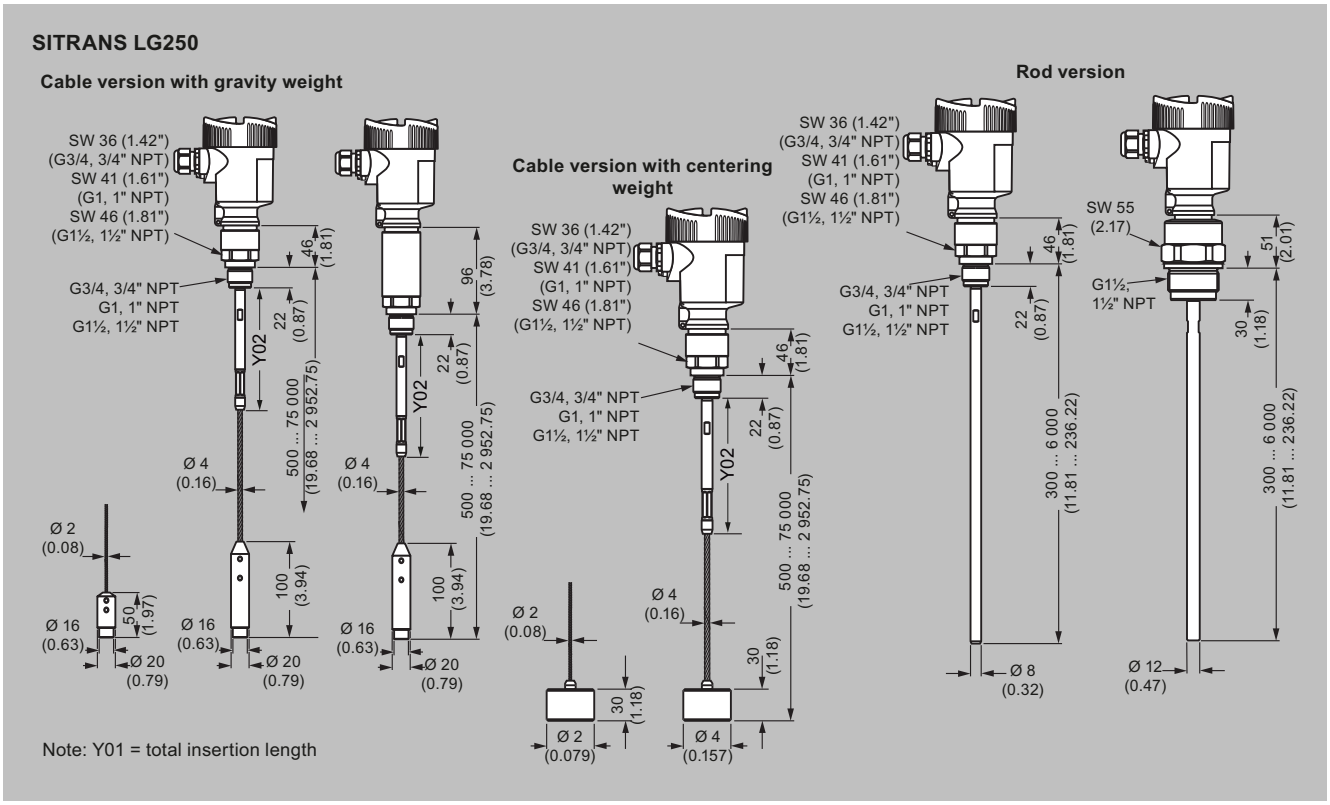

| | Ø w |
|---|---|
| DIN DN 25 DN 32 DN 40/ 1" 1½" | **Ø 50.5** |
| DIN DN 50/ 2" | **Ø 64** |
| DIN DN 65/ 3" | **Ø 91** |

SITRANS LG240, dimensions in mm (inch)

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## Dimensional drawings (continued)



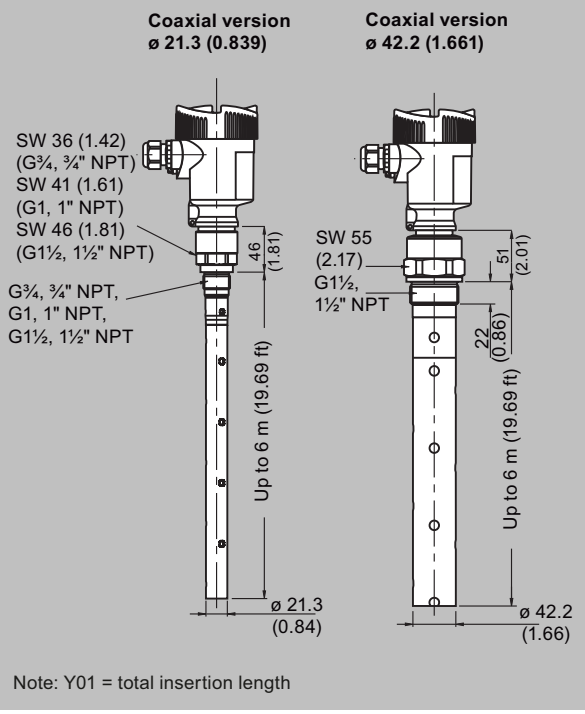

SITRANS LG250, dimensions in mm (inch)

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## Dimensional drawings (continued)

**SITRANS LG250, coax version**



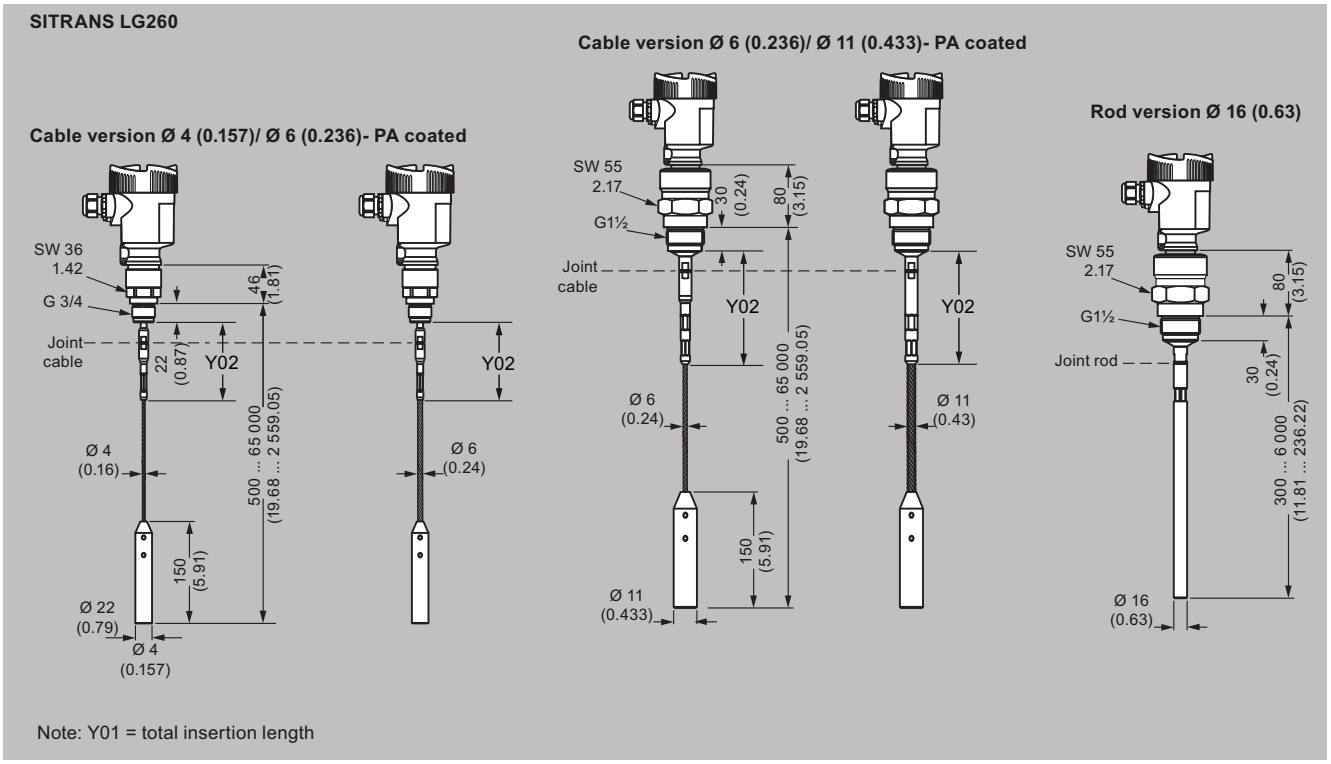

Note: Y01 = total insertion length

SITRANS LG250, dimensions in mm (inch)

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## Dimensional drawings (continued)

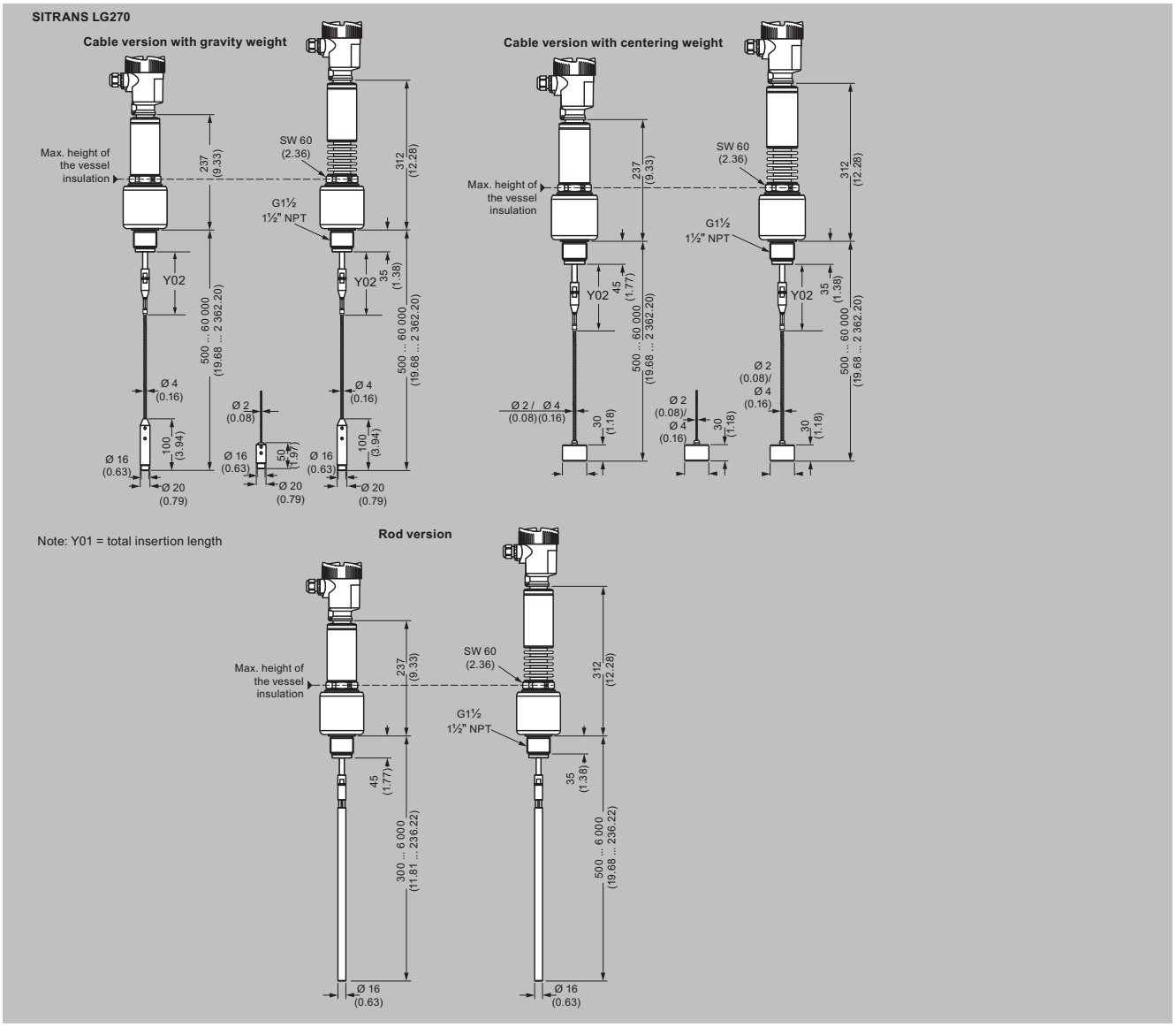



SITRANS LG260, dimensions in mm (inch)

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## Dimensional drawings (continued)

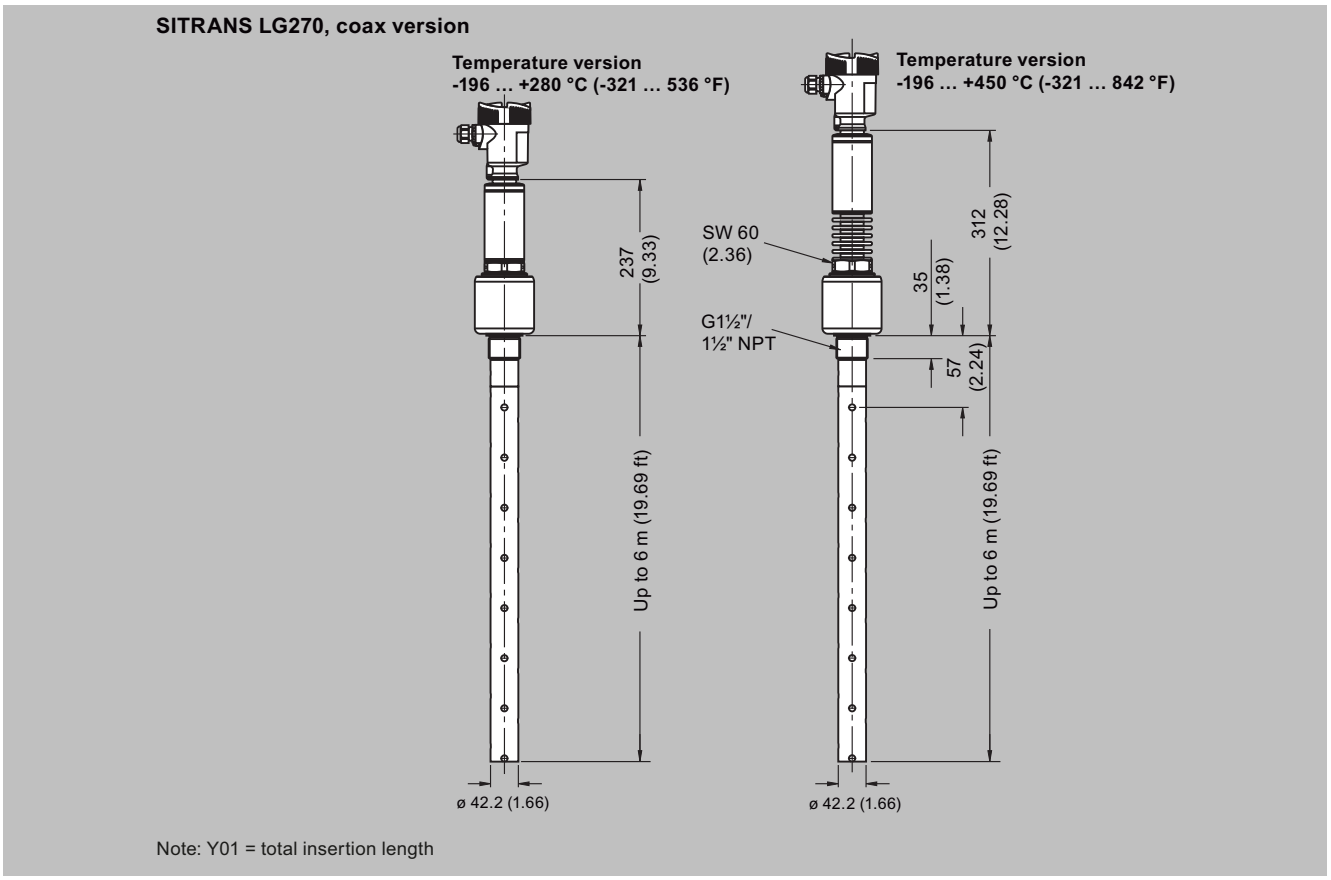



SITRANS LG270, dimensions in mm (inch)

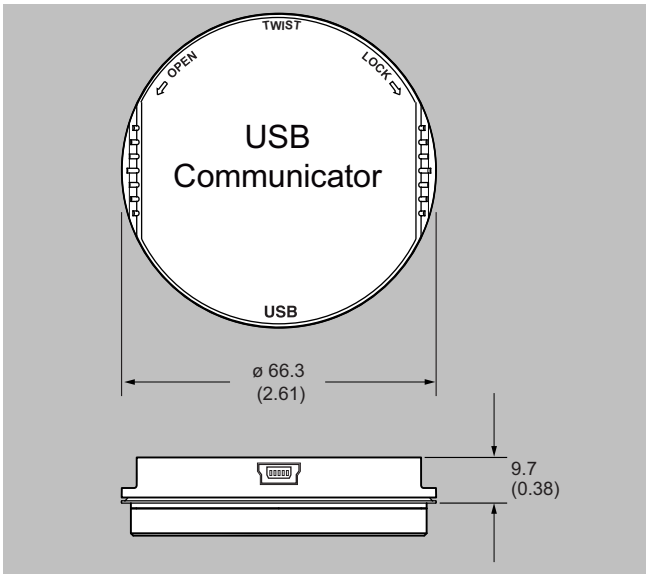
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## Dimensional drawings (continued)




SITRANS LG270, dimensions in mm (inch)

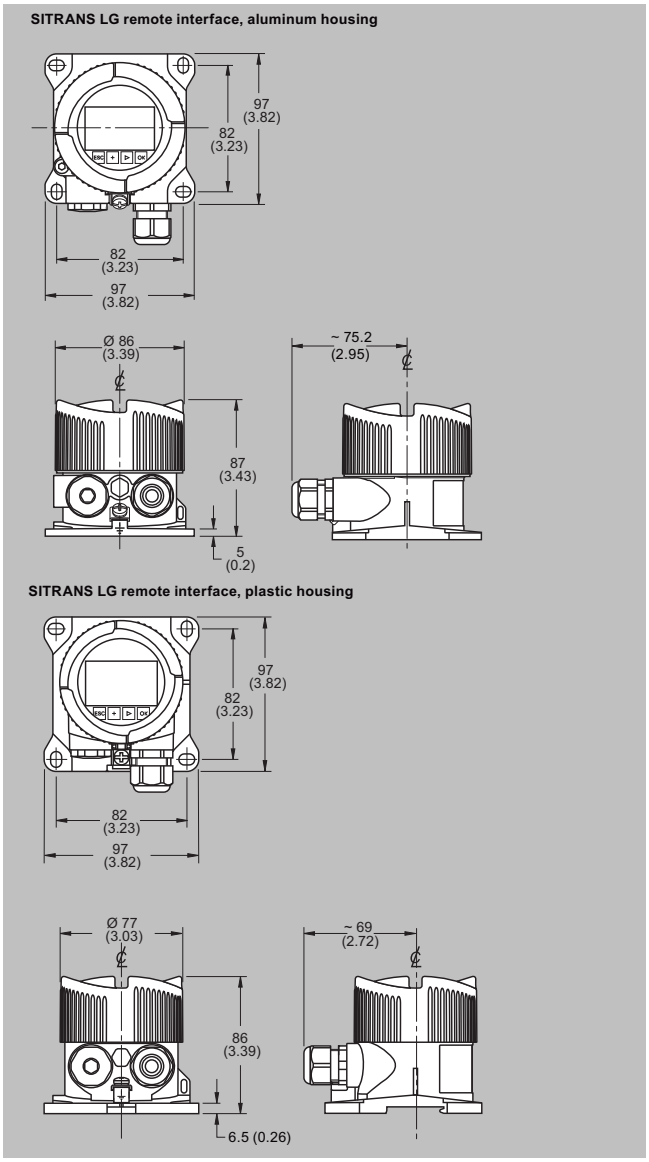



SITRANS LG USB Communicator, dimensions in mm (inch)

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## Dimensional drawings (continued)



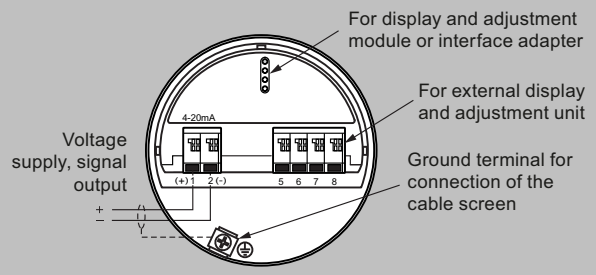

SITRANS LG remote interface, dimensions in mm (inch)

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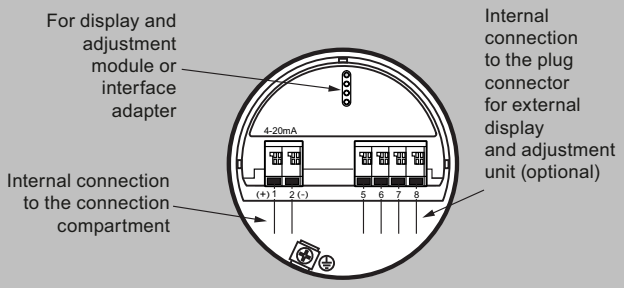


## Circuit diagrams

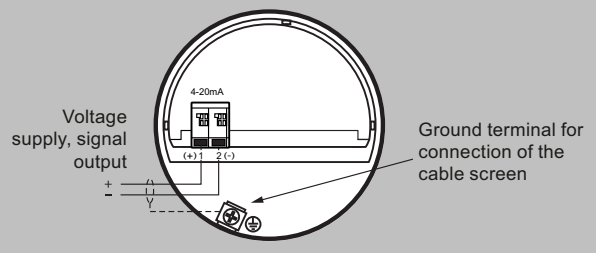
**2-wire HART electronic option, electronics and connection compartment, single chamber housing**




**2-wire HART electronic option, electronics compartment, double chamber housing**



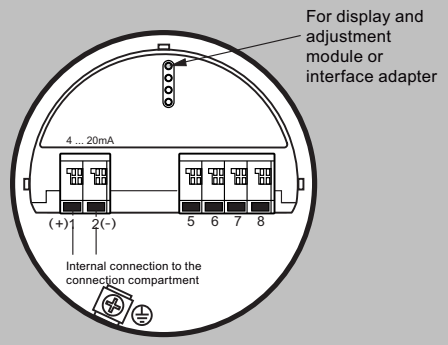

**2-wire HART electronic option, connection compartment, Ex-d-ia double chamber housing**



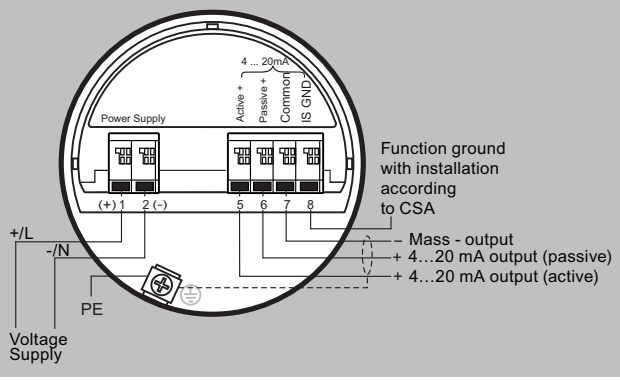

Note: All 2-wire HART connections and electronics are also available with SIL qualification.

SITRANS LG series connections

**4-wire HART electronic option, electronics compartment, double chamber housing**




**4-wire electronic option, connection compartment, double chamber housing with mains voltage**



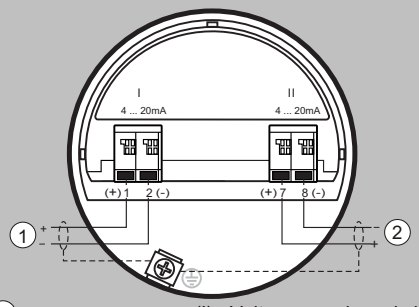

SITRANS LG series connections

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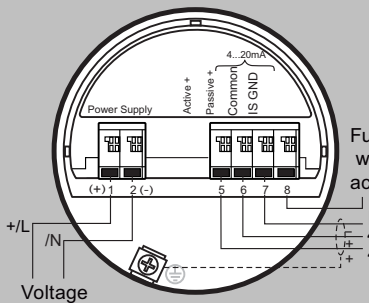
## Circuit diagrams (continued)

**Supplementary electronics**



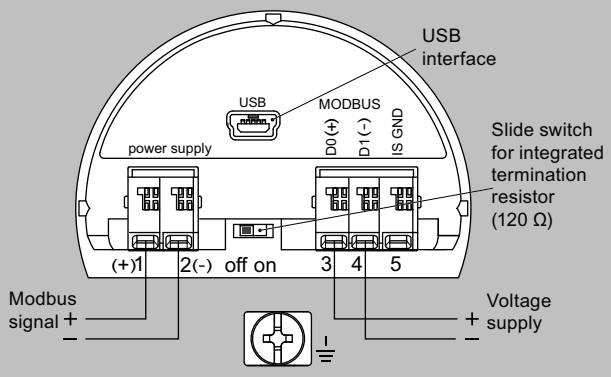

1 First current output (I) - Voltage supply and signal output (HART)
2 Second current output (II) - Voltage supply and signal output (without HART)

**Connection compartment with low voltage**

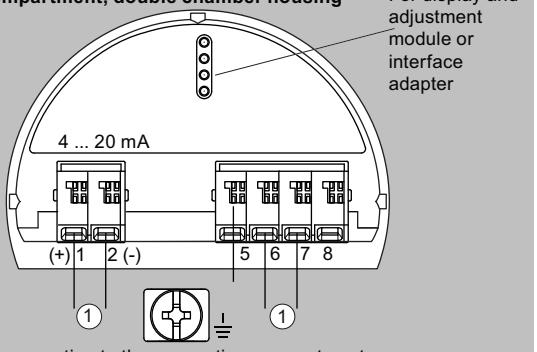



SITRANS LG series connections

**Modbus electronic option, connection compartment**




**Modbus electronic option, electronics compartment, double chamber housing**




1 Internal connection to the connection compartment

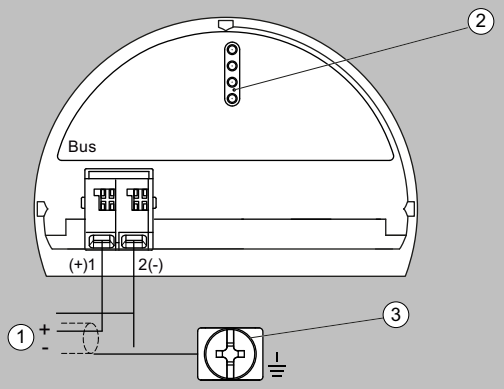
SITRANS LG series connections

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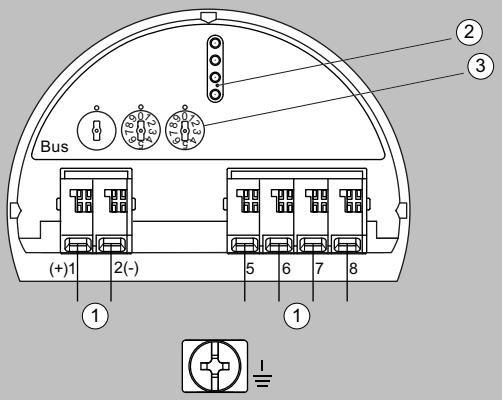
## Circuit diagrams (continued)

**PROFIBUS electronic option, connection compartment, double chamber housing**




1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Ground terminal for connection of the cable screen

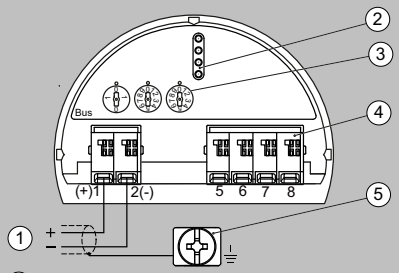
**PROFIBUS electronic option, electronics compartment, double chamber housing**




1 Internal connection to the connection compartment
2 Contact pins for the display and adjustment module or interface adapter
3 Selection switch for bus address

LG series connections

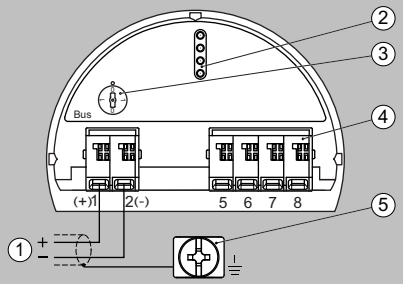
**PROFIBUS electronic option, electronics and connection compartment, single chamber housing**




1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Selection switch for bus address
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

LG series connections

**LG series, FOUNDATION Fieldbus electronic option, electronic and terminal compartment, single chamber housing**




1 Voltage supply, signal output
2 Contact pins for the display and adjustment module or interface adapter
3 Simulation switch ("1" = mode for simulation release)
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

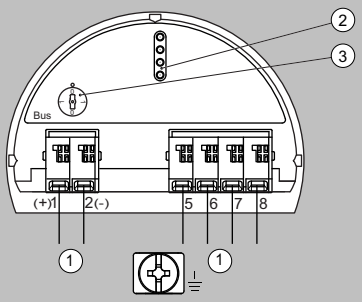
LG series connections

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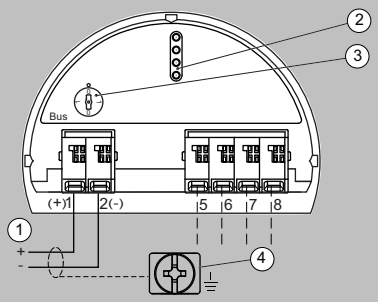
## Circuit diagrams (continued)

**LG series, FOUNDATION Fieldbus electronic option, electronic compartment, double chamber housing**




1. Internal connection to the connection compartment
2. Contact pins for the display and adjustment module or interface adapter
3. Simulation switch ("on" = simulation mode)

**LG series, FOUNDATION Fieldbus electronic option, terminal compartment, double chamber housing**




1. Voltage supply, signal output
2. For display and adjustment module or interface adapter
3. For external display and adjustment unit
4. Ground terminal for connection of the cable screen

LG series connections

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## Overview

***SITRANS LC300***

- Application
  - For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage and mining, aggregate, and cement industries
- Device description
  - Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes
  - Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation

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## Overview



SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquid, interface, and solid applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, mining, aggregate, and cement industries.

## Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media, agitated materials, and non-metallic vessels

## Application

SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

- Key Applications: conductive (dK ≥ 20) and non-conductive (dK < 20) media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

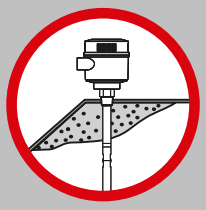
| Probe Applications | |
|---|---|
| Rod version | Conductive liquids, slurries or solids |
| Rod version with stilling well | • Conductive liquids or slurries in non-conductive tanks<br>• Non-conductive liquids in non-conductive tanks<br>• Tanks with agitation or turbulent liquids<br>• Liquids with a dielectric constant below 2<br>• Non-linear tanks, such as parabolic or spherical tanks<br>• Interface measurements |
| Cable version | Non-conductive solids or liquids |
| PFA coated cable version | Conductive or sticky liquids, slurries or solids |

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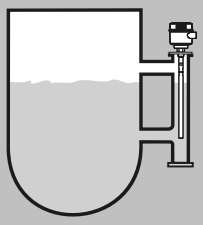


## Configuration

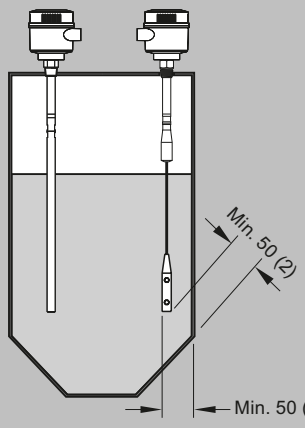
**Installation**



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass




Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS LC300 Capacitance level transmitter, rod design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 5 m (16.40 ft). | Article No. 7ML560- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Threaded, 316L stainless steel | | | | | | | | | | | |
| ¾" NPT [(Taper), ASME B1.20.1] | | 0 | A | | | | | | | | |
| 1" NPT [(Taper), ASME B1.20.1] | | 0 | B | | | | | | | | |
| 1¼" NPT [(Taper), ASME B1.20.1] | | 0 | C | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | A | | | | | | | | |
| R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | B | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | A | | | | | | | | |
| G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | B | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** [1] | | | | | | | | | | | |
| 1" ASME, 150 lb | | 5 | A | | | | | | | | |
| 1" ASME, 300 lb | | 5 | B | | | | | | | | |
| 1" ASME, 600 lb | | 5 | C | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** [1] | | | | | | | | | | | |
| DN 25, PN 16 | | 6 | A | | | | | | | | |
| DN 25, PN 40 | | 6 | B | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 | | 6 | K | | | | | | | | |
| Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app . | | | | | | | | | | | |
| **Probe Length (from flange face or including process thread)** | | | | | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | | | | A | | | | | | | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | B | | | | | | | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | C | | | | | | | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | D | | | | | | | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | E | | | | | | | |
| Bent probes also available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app. | | | | | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LC300 Capacitance level transmitter, rod design<br>Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 5 m (16.40 ft). | Article No.<br>7ML560- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)[2]] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod | | | | | | | | 0 | | | |
| **Approvals** | | | | | | | | | | | |
| General Safety CSA, FM, CE, UKCA, RCM | | | | | | | | | A | | |
| Dust Ignition Proof with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | B | | |
| Flameproof Enclosure with IS Probe CE, UKCA, RCM, ATEX, UKEX II 1/2G Ex ia/db; ATEX, UKEX II 1/2D Ex ia/tb | | | | | | | | | C | | |
| Dust Ignition Proof with IS Probe CSA/ FM Class II, III Div. 1Gr. E, F, G T4 | | | | | | | | | D | | |
| Explosion Proof Enclosure with IS Probe CSA/ FM Class I, II, III Div. 1 Gr. A, B, C, D, E, F, G T4 | | | | | | | | | E | | |
| **Enclosure** | | | | | | | | | | | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |
| Stainless steel, contact local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app. | | | | | | | | | | | |

[1] Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.
[2] Not available with FM approvals.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Insertion length, specify in plain text: Y01: ... mm | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1] | **E34** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Electronic transmitter kit (includes transmitter and driver) | **7ML1830-1KN** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

[1] Available only with Approvals options A and B.

| SITRANS LC300 Capacitance level transmitter, stilling well design<br>Continuous, contact, monitors level or interface in liquids.<br>Extension options up to 5 m (16.40 ft). | Article No.<br>7ML5671- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Process connection** | | | | | | | | | | | |
| Threaded, 316L stainless steel | | | | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** [1] | | | | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LC300 Capacitance level transmitter, stilling well design<br>Continuous, contact, monitors level or interface in liquids.<br>Extension options up to 5 m (16.40 ft). | Article No. 7ML5671- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2" ASME, 150 lb | | 5 | G | | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** [1] | | | | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 | | 6 | K | | | | | | | | |
| Sanitary, hastelloy, duplex or other custom process connections available.<br>Please contact a local sales person for details.<br>For more information, please visit http://www.automation.siemens.com/aspa_app<br>. | | | | | | | | | | | |
| **Probe Length**<br>**(from flange face or including process thread)**<br>***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 300 ... 1 000 mm (11.81 ... 39.37 inch) | | | | A | | | | | | | |
| 1 001 ... 2 000 mm (39.41 ... 78.74 inch) | | | | B | | | | | | | |
| 2 001 ... 3 000 mm (78.78 ... 118.11 inch) | | | | C | | | | | | | |
| 3 001 ... 4 000 mm (118.15 ... 157.48 inch) | | | | D | | | | | | | |
| 4 001 ... 5 000 mm (157.52 ... 196.85 inch) | | | | E | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection tem-peratures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)][2] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| 35 mm (1.38 inch) diameter stilling well,<br>with 19 mm (0.75 inch) diameter 316L<br>stainless steel, PFA lined rod with PTFE spacers | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| General Safety (CSA, FM, CE, RCM) | | | | | | | | | A | | |
| Dust Ignition Proof With IS Probe<br>CE, RCM, ATEX II 1/2 D T100 °C | | | | | | | | | B | | |
| Flame Proof Enclosure With IS Probe<br>CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1,<br>ATEX II 1/2 D T100 °C | | | | | | | | | C | | |
| Dust Ignition Proof With IS Probe<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 | | | | | | | | | D | | |
| Explosion Proof Enclosure With IS Probe<br>CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 | | | | | | | | | E | | |
| **Enclosure** | | | | | | | | | | | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |

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## Selection and ordering data (continued)

| SITRANS LC300 Capacitance level transmitter, stilling well design<br>Continuous, contact, monitors level or interface in liquids.<br>Extension options up to 5 m (16.40 ft). | Article No.<br>7ML5671- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68 | C |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68 | D |
| Stainless steel, please contact a local sales person for details.<br>For more information, please visit<br>http://www.automation.siemens.com/aspa_app. | |

1) Flange bolting patterns and facings dimensionally correspond to the -applicable ASME B16.5 or EN 1092-1 standard.
2) Not available with FM approvals.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Insertion length, specify in plain text: Y01: ... mm | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMMETRO[1] | **E34** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Electronic transmitter kit (includes transmitter and driver) | **7ML1830-1KN** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available only with Approvals options A and B.

| SITRANS LC300 Capacitance level transmitter, cable design<br>Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft). | Article No.<br>7ML5672- ● ● ● ● ● - ● ● ● 0 |
|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | |
| **Process connection** | |
| ***Threaded, 316L stainless steel*** | |
| 1½" NPT [(Taper), ASME B1.20.1] | 0 D |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | 1 D |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | 3 D |
| ***Welded flange, 316L stainless steel, raised face*** [1] | |
| 1½" ASME, 150 lb | 5 D |
| 1½" ASME, 300 lb | 5 E |
| 1½" ASME, 600 lb | 5 F |
| 2" ASME, 150 lb | 5 G |
| 2" ASME, 300 lb | 5 H |
| 2" ASME, 600 lb | 5 J |
| 3" ASME, 150 lb | 5 K |
| 3" ASME, 300 lb | 5 L |
| 3" ASME, 600 lb | 5 M |
| 4" ASME, 150 lb | 5 N |
| 4" ASME, 300 lb | 5 P |
| 4" ASME, 600 lb | 5 Q |
| ***Welded flange, 316L stainless steel, Type A flat faced*** [1] | |
| DN 40, PN 16 | 6 C |
| DN 40, PN 40 | 6 D |

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## Selection and ordering data (continued)

| SITRANS LC300 Capacitance level transmitter, cable design Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft). | Article No. 7ML5672- | ● | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DN 50, PN 16 | | 6 | E | | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | | |
| DN 100, PN 40 | | 6 | K | | | | | | | | |
| Sanitary, hastelloy, duplex or other custom process connections available. Please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app. | | | | | | | | | | | |
| **Probe Length (from flange face or including process thread)** ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | | |
| 1 000 ... 2 000 mm (39.37 ... 78.74 inch) | | | | A | | | | | | | |
| 2 001 ... 4 000 mm (78.78 ... 157.48 inch) | | | | B | | | | | | | |
| 4 001 ... 6 000 mm (157.52 ... 236.22 inch) | | | | C | | | | | | | |
| 6 001 ... 8 000 mm (236.26 ... 314.96 inch) | | | | D | | | | | | | |
| 8 001 ... 10 000 mm (315.00 ... 393.70 inch) | | | | E | | | | | | | |
| 8 001 ... 10 000 mm (315.00 ... 393.70 inch) | | | | F | | | | | | | |
| 12 001 ... 14 000 mm (472.48 ... 551.18 inch) | | | | G | | | | | | | |
| 14 001 ... 16 000 mm (551.22 ... 629.92 inch)[2] | | | | H | | | | | | | |
| 16 001 ... 18 000 mm (629.96 ... 708.66 inch)[2] | | | | J | | | | | | | |
| 18 001 ... 20 000 mm (708.70 ... 787.40 inch)[2] | | | | K | | | | | | | |
| 20 001 ... 22 000 mm (787.44 ... 866.14 inch)[2] | | | | L | | | | | | | |
| 22 001 ... 24 000 mm (866.18 ... 944.88 inch)[2] | | | | M | | | | | | | |
| 24 001 ... 25 000 mm (944.92 ... 984.25 inch)[2] | | | | N | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)][3] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| Bare 316L stainless steel cable and 316L stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield | | | | | | | | 0 | | | |
| **Approvals** | | | | | | | | | | | |
| General Safety (CSA, FM, CE, RCM) | | | | | | | | | A | | |
| Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C | | | | | | | | | B | | |
| Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C | | | | | | | | | C | | |
| Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 | | | | | | | | | D | | |
| Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4 | | | | | | | | | E | | |
| **Enclosure** | | | | | | | | | | | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |
| Stainless steel, please contact a local sales person for details. For more information, please visit http://www.automation.siemens.com/aspa_app. | | | | | | | | | | | |

1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.
2) Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.
3) Not available with FM approvals.

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Insertion length, specify in plain text: Y01: ... mm | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1)] | **E34** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Electronic transmitter kit (includes transmitter and driver) | **7ML1830-1KN** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

[1)] Available only with Approvals options A and B.

| **SITRANS LC300 Capacitance level transmitter, PFA coated cable design<br>Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft).** | **Article No.<br>7ML5673-** ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | |
| **Process connection** | | | | | | | | | | |
| ***Threaded, 316L stainless steel*** | | | | | | | | | | |
| 1½" NPT [(Taper), ASME B1.20.1] | | 0 | D | | | | | | | |
| R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] | | 1 | D | | | | | | | |
| G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] | | 3 | D | | | | | | | |
| ***Welded flange, 316L stainless steel, raised face*** [1)] | | | | | | | | | | |
| 1½" ASME, 150 lb | | 5 | D | | | | | | | |
| 1½" ASME, 300 lb | | 5 | E | | | | | | | |
| 1½" ASME, 600 lb | | 5 | F | | | | | | | |
| 2" ASME, 150 lb | | 5 | G | | | | | | | |
| 2" ASME, 300 lb | | 5 | H | | | | | | | |
| 2" ASME, 600 lb | | 5 | J | | | | | | | |
| 3" ASME, 150 lb | | 5 | K | | | | | | | |
| 3" ASME, 300 lb | | 5 | L | | | | | | | |
| 3" ASME, 600 lb | | 5 | M | | | | | | | |
| 4" ASME, 150 lb | | 5 | N | | | | | | | |
| 4" ASME, 300 lb | | 5 | P | | | | | | | |
| 4" ASME, 600 lb | | 5 | Q | | | | | | | |
| ***Welded flange, 316L stainless steel, Type A flat faced*** [1)] | | | | | | | | | | |
| DN 40, PN 16 | | 6 | C | | | | | | | |
| DN 40, PN 40 | | 6 | D | | | | | | | |
| DN 50, PN 16 | | 6 | E | | | | | | | |
| DN 50, PN 40 | | 6 | F | | | | | | | |
| DN 80, PN 16 | | 6 | G | | | | | | | |
| DN 80, PN 40 | | 6 | H | | | | | | | |
| DN 100, PN 16 | | 6 | J | | | | | | | |
| DN 100, PN 40 | | 6 | K | | | | | | | |
| Sanitary, hastelloy, duplex or other custom process connections available.<br>Please contact a local sales person for details.<br>For more information, please visit http://www.automation.siemens.com/aspa_app. | | | | | | | | | | |
| **Probe Length<br>(from flange face or including process thread)** | | | | | | | | | | |
| ***Add Order code Y01 and plain text: "Insertion length ... mm"*** | | | | | | | | | | |
| 1 000 ... 2 000 mm (39.37 ... 78.74 inch) | | | | A | | | | | | |

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## Selection and ordering data (continued)

| SITRANS LC300 Capacitance level transmitter, PFA coated cable design<br>Continuous, contact, monitors level or interface in liquids or solids. Extension options up to 25 m (82.02 ft). | Article No.<br>7ML5673- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 001 ... 4 000 mm (78.78 ... 157.48 inch) | | | | B | | | | | | | |
| 4 001 ... 6 000 mm (157.52 ... 236.22 inch) | | | | C | | | | | | | |
| 6 001 ... 8 000 mm (236.26 ... 314.96 inch) | | | | D | | | | | | | |
| 8 001 ... 10 000 mm (315.00 ... 393.70 inch) | | | | E | | | | | | | |
| 10 001 ... 12 000 mm (393.74 ... 472.44 inch) | | | | F | | | | | | | |
| 12 001 ... 14 000 mm (472.48 ... 551.18 inch) | | | | G | | | | | | | |
| 14 001 ... 16 000 mm (551.22 ... 629.92 inch)[2] | | | | H | | | | | | | |
| 16 001 ... 18 000 mm (629.96 ... 708.66 inch)[2] | | | | J | | | | | | | |
| 18 001 ... 20 000 mm (708.70 ... 787.40 inch)[2] | | | | K | | | | | | | |
| 20 001 ... 22 000 mm (787.44 ... 866.14 inch)[2] | | | | L | | | | | | | |
| 22 001 ... 24 000 mm (866.18 ... 944.88 inch)[2] | | | | M | | | | | | | |
| 24 001 ... 25 000 mm (944.92 ... 984.25 inch)[2] | | | | N | | | | | | | |
| **Thermal isolator** | | | | | | | | | | | |
| Without thermal isolator | | | | | 0 | | | | | | |
| With thermal isolator [for process connection temperatures over 85 °C (185 °F)] | | | | | 1 | | | | | | |
| **Wetted seals** | | | | | | | | | | | |
| FKM | | | | | | 0 | | | | | |
| FFKM [for process temperatures above -20 °C (-4 °F)][3] | | | | | | 1 | | | | | |
| **Probe material** | | | | | | | | | | | |
| PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield | | | | | | | | 1 | | | |
| **Approvals** | | | | | | | | | | | |
| General Safety (CSA, FM, CE, RCM) | | | | | | | | | A | | |
| Dust Ignition Proof With IS Probe<br>CE, RCM, ATEX II 1/2 D T100 °C | | | | | | | | | B | | |
| Flame Proof Enclosure With IS Probe<br>CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1,<br>ATEX II 1/2 D T100 °C | | | | | | | | | C | | |
| Dust Ignition Proof With IS Probe<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 | | | | | | | | | D | | |
| Explosion Proof Enclosure With IS Probe<br>CSA/FM Class I, Div. 1, Groups A, B, C, D<br>CSA/FM Class II, Div. 1, Groups E, F, G<br>CSA/FM Class III T4 | | | | | | | | | E | | |
| **Enclosure** | | | | | | | | | | | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65 | | | | | | | | | | A | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65 | | | | | | | | | | B | |
| Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68 | | | | | | | | | | C | |
| Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68 | | | | | | | | | | D | |
| Stainless steel, please contact a local sales person for details.<br>For more information, please visit http://www.automation.siemens.com/aspa_app<br>. | | | | | | | | | | | |
| **Mounting eye** | | | | | | | | | | | |
| Without Mounting eye | | | | | | | | | | | 0 |
| With mounting eye | | | | | | | | | | | 1 |

1) Flange bolting patterns and facings dimensionally correspond to the -applicable ASME B16.5 or EN 1092-1 standard.
2) Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.
3) Not available with FM approvals.

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## Selection and ordering data (continued)

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Insertion length, specify in plain text: Y01: ... mm | **Y01** |
| Stainless steel tag [70 x 13 mm (2.75 x 0.5 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text | **Y15** |
| Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000 | **C11** |
| Material inspection Certificate Type 3.1 per EN 10204 | **C12** |
| INMETRO[1)] | **E34** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Electronic transmitter kit (includes transmitter and driver) | **7ML1830-1KN** |
| SITRANS RD100, loop powered display - see Chapter 7 | **7ML5741-.....-.** |
| SITRANS RD150, remote digital display for 4 ... 20 mA and HART devices - see Chapter 7 | **7ML5742-.....-....** |
| SITRANS RD200, universal input display with Modbus conversion - see Chapter 7 | **7ML5740-.....-..** |
| SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7 | **7ML5744-.....-..** |
| For applicable back up point level switch - see point level measurement section | |

1) Available only with Approvals options A and B.

| LC300 Specials[1)] | |
|---|---|
| **LC300 Cable Extensions, 316L stainless steel** | |
| Kit, Stainless steel cable extension, 1 m, adjustable by customer | **A5E01163688** |
| Kit, Stainless steel cable extension, 3 m, adjustable by customer | **A5E01163689** |
| Kit, Stainless steel cable extension, 5 m, adjustable by customer | **A5E01163690** |
| Kit, Stainless steel cable extension, 10 m, adjustable by customer | **A5E01163691** |
| Kit, Stainless steel cable extension, 15 m, adjustable by customer | **A5E01163693** |
| Kit, Stainless steel cable extension, 20 m, adjustable by customer | **A5E01163695** |
| **LC300 Cable Extensions, 316 stainless steel with PFA coating** | |
| Kit, PFA cable extension, 1 m | **A5E01163709** |
| Kit, PFA cable extension, 3 m | **A5E01163710** |
| Kit, PFA cable extension, 5 m | **A5E01163711** |
| Kit, PFA cable extension, 10 m | **A5E01163712** |
| Kit, PFA cable extension, 15 m | **A5E01163713** |
| Kit, PFA cable extension, 20 m | **A5E01163714** |
| **LC300 Mounting Eye** | |
| Spare mounting eye (LC300 PFA versions only) | **A5E01163717** |
| **LC300 Weight Kit, 316L stainless steel** | |
| Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300 | **A5E01163727** |

Customers interested in a custom designed device should consult a local sales person. For more information, please visit http://www.automation.siemens.com/aspa_app.

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## Technical specifications

| SITRANS LC300 | |
|---|---|
| **Input** | |
| Measuring range | 1.66 ... 3 300 pF |
| Span | Min. 3.3 pF |
| **Output** | |
| Loop current | Continuous signal 4 ... 20 mA/20 ... 4 mA according to NAMUR 43 |
| **Accuracy (transmitter)** | |
| Temperature stability | 0.25 % of actual capacitance value |
| Non-linearity and repeatability | < 0.4 % of full scale and actual measurement value |
| Accuracy | Deviation < 0.5 % of actual measurement value |
| **Rated operating conditions**[1] | |
| Ambient conditions | |
| • Ambient temperature | -40 ... +85 °C (-40 ... +185 °F)[2][3] |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| • Installation category | I |
| • Pollution degree | 4 |
| • Ingress protection | Type 4/NEMA 4/IP65 (optional IP68) |
| Installation conditions | |
| • Location | Indoor/outdoor |
| • Process pressure | -1 ... +35 bar g (-14.6 ... +511 psi g) |
| • Process temperature | -40 ... +200 °C (-40 ... +392 °F)[4] |
| • Min. dielectric constant $\epsilon_r$ | 1.5 |
| • Min. difference in dielectric constant for interface measurement | 5 |
| **Design** | |
| Material | |
| • Enclosure | Aluminum, epoxy-coated |
| Probe diameter | |
| • Rod version | 19 mm (0.75 inch) with PFA jacket |
| • Cable version | 9 mm (0.35 inch) with PFA jacket,<br>6 mm (0.24 inch) without PFA jacket |
| Active shield length | |
| • Rod version | Threaded: 120 mm (4.72 inch)<br>Flanged: 100 mm (3.94 inch) |
| • Cable version | Threaded: 125 mm (4.92 inch)<br>Flanged: 105 mm (4.13 inch) |
| Process connection of probe | |
| • Threaded rod mounting | ¾",1",1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1]<br>R ¾",1", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] |
| • Threaded cable mounting | 1½" NPT [(Taper), ANSI/ASME B1.20.1]<br>R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]<br>G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] |
| • Flange mounting | 1 ... 4" ASME, DN 25 ... 100 |
| Enclosure cable inlet | 2 x ½" NPT or 2 x M20 x 1.5 |
| **Power supply** | 12 ... 30 V DC any polarity, 2-wire current loop circuit |
| **User Interface** | |
| Display | Local LCD, 4 digit, each 0 ... 9 and limited alpha characters |
| **Safety** | |
| Measurement current signaling | According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA) |
| **Certificates and approvals** | |
| General | CE, $CSA_{US/C}$, FM, RCM, KCC, EAC |
| Dust Ignition Proof (Intrinsically Safe probe circuit) | |
| • Canada/USA | FM/CSA:<br>Class II, Div. 1, Groups E, F, G<br>Class III T4 |
| • Europe | ATEX ½ D T100 °C |
| Flame Proof (Intrinsically Safe probe circuit) | |
| • Europe | ATEX II ½ G EEx d [ia] IIC T6 ... T1<br>ATEX II ½ D T100 °C |
| • Brazil | Ex d [ia Ga] IIC T6 ... T4 Gb Ex tb IIIC T85 °C ... T100 °C Db IP65/IP68 |
| • Russia/Kazakhstan | EAC Ex |
| Explosion Proof (Intrinsically Safe probe circuit) | |
| • Canada/USA | Class I, Div. 1, Groups A, B, C, D<br>Class II, Div. 1, Groups E, F, G<br>Class III T4 |
| Marine | ABS Type Approval, Lloyds Register |
| Overfill Protection | VLAREM II |
| Other | Pattern Approval (AQSIQ, China), CRN, PED |

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also LC300 Pressure/Temperature curves.
2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)
3) Minimum voltage of 15 V DC is required for use at -40 °C (-40 °F)
4) Not suitable for steam environments

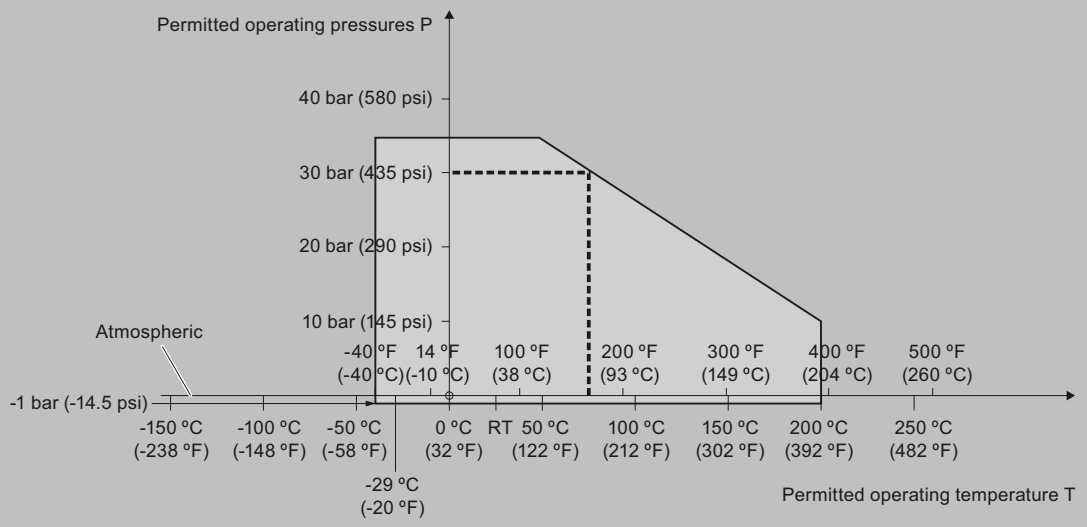
| Design: Probe | Rod version | Stilling well version | Cable version |
|---|---|---|---|
| Length | Min. 300 mm (12 inch),<br>max. 5 000 mm (197 inch) | Min. 300 mm (12 inch),<br>max. 5 000 mm (197 inch) | Min. 1 000 mm (40 inch),<br>max. 25 000 mm (984 inch) |
| Sensor wetted parts | PFA, 316L stainless steel | PFA, 316L stainless steel | 316L stainless steel or 316L stainless steel with PFA insulation |
| O-ring seal material | FKM or FFKM | FKM or FFKM | FKM or FFKM |
| Thermal isolator | Optional | Optional | Optional |
| Options | N/A | N/A | Mounting eye for PFA insulated cable version |

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## Characteristic curves

**Pressure/temperature curve**
**LC300 standard, extended rod and cable probes**
**Threaded process connections**
**(7ML5670, 7ML5671, 7ML5672 and 7ML5673)**



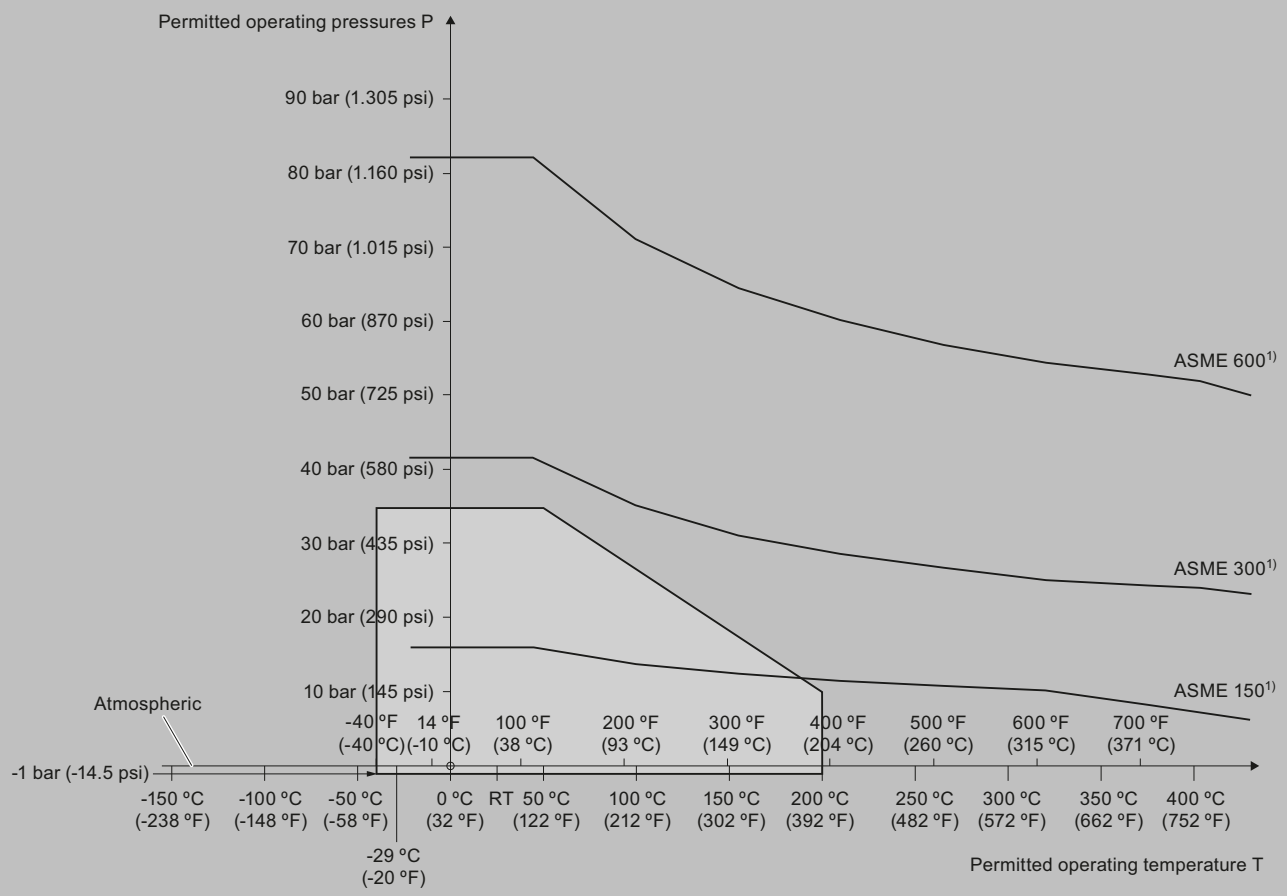

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673))

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## Characteristic curves (continued)

**Pressure/temperature curve**
**LC300 standard, extended rod and cable probes**
**ASME flanged process connections**
**(7ML5670, 7ML5671, 7ML5672 and 7ML5673)**




[1)] The curve denotes the minimum allowable flange class for the shaded area below.

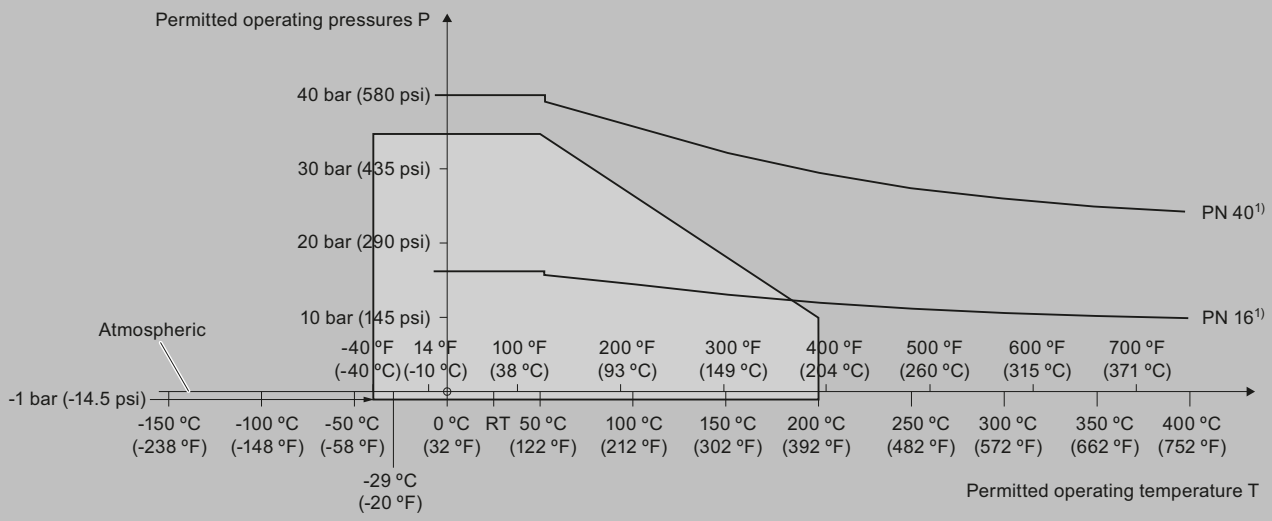
SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

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## Characteristic curves (continued)

**Pressure/temperature curve**
**LC300 standard, extended rod and cable probes**
**EN flanged process connections**
**(7ML5670, 7ML5671, 7ML5672 and 7ML5673)**



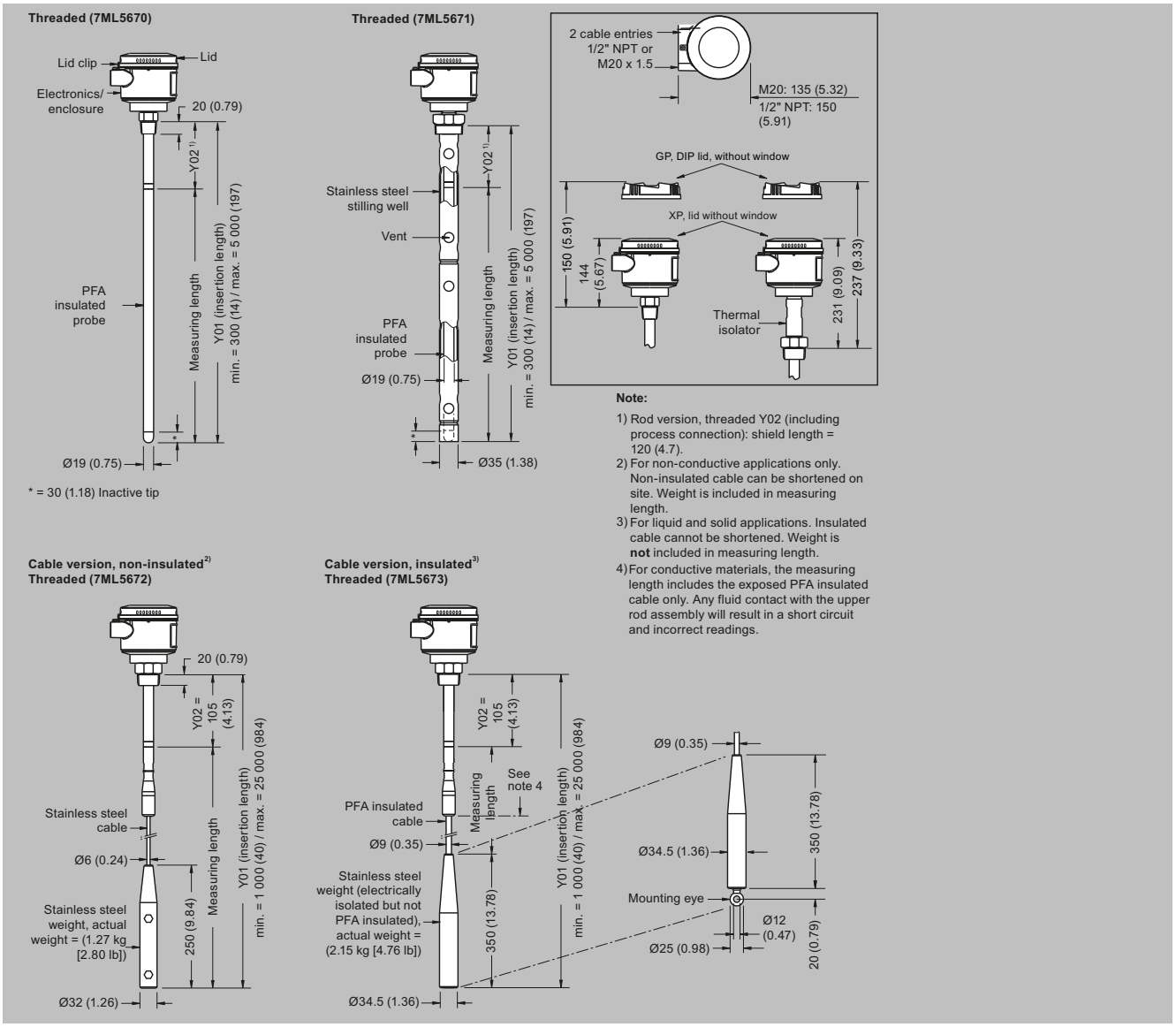

1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 process pressure/temperature derating curves (7ML5670, 7ML5671, 7ML5672, and 7ML5673)

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## Dimensional drawings

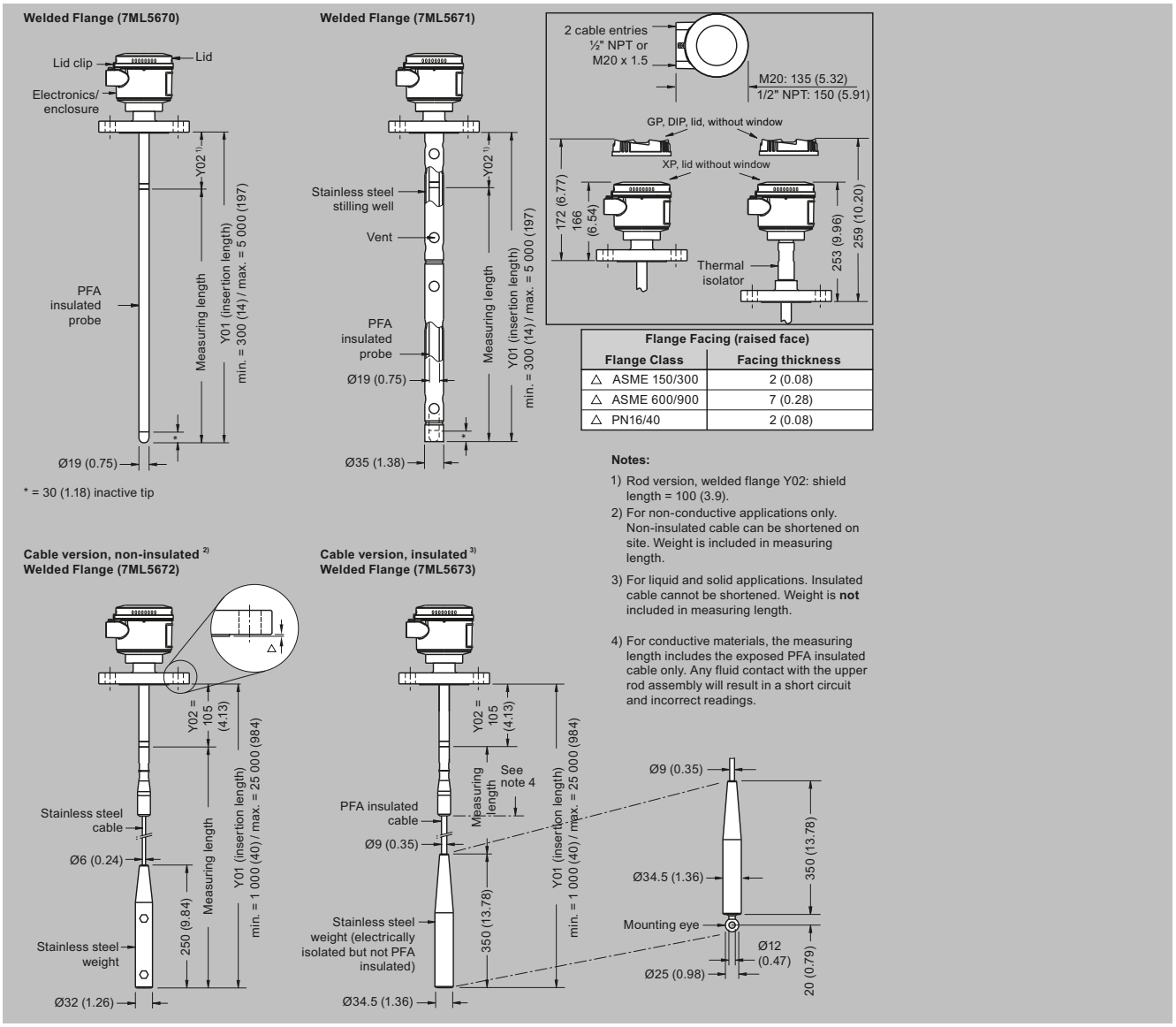



SITRANS LC300 threaded process connections, dimensions in mm (inch)

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## Dimensional drawings (continued)



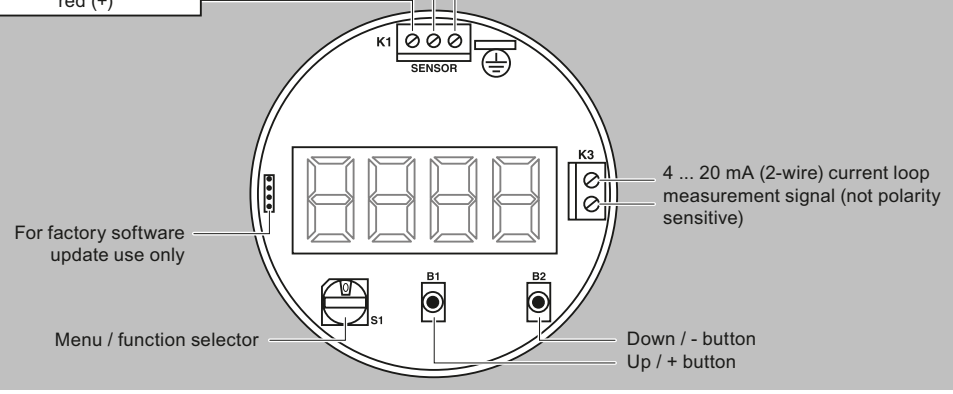

SITRANS LC300 flanged process connections, dimensions in mm (inch)

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## Circuit diagrams

| With safety barrier | Without safety barrier |
|---|---|
| white (S) | orange (S) |
| black (O) | black (O) |
| red (+) | red (+) |




SITRANS LC300 connections

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## Overview

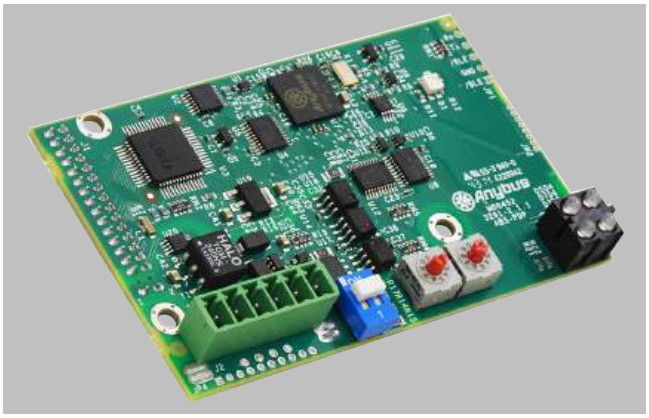
***SmartLinx modules, Dolphin Plus software***

- Description
  - Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems
  - Dolphin Plus for quick and easy configuring, monitoring, tuning and diagnostics of Siemens devices

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## Overview



SmartLinx modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

## Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scaleable application layer allows for optimized network bandwidth and memory requirements (for PROFIBUS DP-V0 and DeviceNet only)
- Modules available for PROFIBUS DP-V0, PROFIBUS DP-V1, PROFINET, DeviceNet, Modbus TCP/IP, and EtherNet/IP

## Application

With the addition of a SmartLinx module, Siemens instruments can be connected to a variety of industrial communications networks.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinx enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinx provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

***Selecting a communications module: PROFIBUS DP-V0 versus PROFIBUS DP-V1***

The PROFIBUS DP-V1 card was added to MultiRanger 200 HMI and HydroRanger 200 HMI to provide acyclic communication and SIMATIC PDM support over PROFIBUS and PROFINET. For backward compatibility, the PROFIBUS DP-V0 card can also be used with MultiRanger 200 HMI and HydroRanger 200 HMI.

MultiRanger 100/200, HydroRanger 200, BW500/L, and SF500 are compatible only with the PROFIBUS DP-V0 module.

## Selection and ordering data

| Selection and Ordering data | Article No. |
|---|---|
| SmartLinx modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens. | |
| SmartLinx PROFIBUS DP-V0 module | **7ML1830-1HR** |
| SmartLinx PROFIBUS DP-V1 module | **A5E35778741** |
| SmartLinx DeviceNet module | **7ML1830-1HT** |
| Smartlinx PROFINET IO module[1)] | **7ML1830-1PM** |
| SmartLinx Modbus TCP/IP, EtherNet/IP module | **7ML1830-1PN** |
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

1) SmartLinx PROFINET module is certified per standard V2.2.4.

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## Technical specifications

| Module type | PROFIBUS DP-V0 |
|---|---|
| Interface | RS 485 (PROFIBUS standard) |
| Transmission rate | All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps |
| Slave address | 0 ... 99 |
| Connection | Slave |
| SmartLinx module compatibility | • MultiRanger 200 HMI<br>• MultiRanger 100/200<br>• HydroRanger 200 HMI<br>• HydroRanger 200<br>• Milltronics BW500, BW500/L<br>• Milltronics SF500 |

| Module type | PROFIBUS DP-V1 |
|---|---|
| Interface | RS 485 (PROFIBUS standard) |
| Transmission rate | All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps |
| Slave address | 0 ... 99 |
| Connection | Slave |
| SmartLinx module compatibility | • MultiRanger 200 HMI<br>• HydroRanger 200 HMI |

| Module type | PROFINET IO module |
|---|---|
| Interface | RJ 45 female |
| Transmission rate | 10/100 Mbits/s |
| Address | IP address though dip switches or via DCP or DHCP |
| Connection | Slave/server |
| SmartLinx module compatibility | • MultiRanger 200 HMI<br>• HydroRanger 200 HMI<br>• Milltronics BW500, BW500/L<br>• Milltronics SF500 |

| Module type | Modbus TCP/IP, EtherNet/IP |
|---|---|
| Interface | RJ 45 female |
| Transmission rate | 10/100 Mbits/s |
| Address | IP address though dip switches or via DCP or DHCP |
| Connection | Slave/server |
| SmartLinx module compatibility | • MultiRanger 200 HMI<br>• HydroRanger 200 HMI<br>• Milltronics BW500, BW500/L<br>• Milltronics SF500 |

| Module type | DeviceNet |
|---|---|
| Interface | DeviceNet physical layer |
| Transmission rate | 125, 250, 500 |
| MAC address | 0 ... 63 |
| Connection | Slave (group 2) |
| SmartLinx module compatibility | • MultiRanger 200 HMI<br>• MultiRanger 100/200<br>• HydroRanger 200 HMI<br>• HydroRanger 200<br>• Milltronics BW500, BW500/L<br>• Milltronics SF500 |

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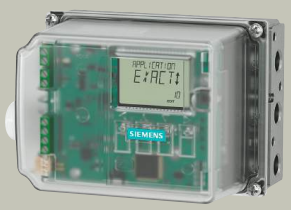



| | |
|---|---|
| 5/2 | Product overview |
| 5/3 | SIPART PS2 |
| 5/29 | SIPART PS100 |

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## Overview

| Positioners | | | |
|---|---|---|---|
| **Type** | **Area of application** | **Device description** | **Software for parameterization** |
| **SIPART PS2**  | Position control of pneumatic linear or part-turn actuators | In polycarbonate, aluminum or stainless steel enclosure<br>• Connection: 4 ... 20 mA<br>• HART, PROFIBUS PA, FOUNDATION Fieldbus<br>• No explosion protection or intrinsically safe Ex i, Ex e, Ex t<br>• Modularly extensible with limit switches, sensors, etc.<br>• Digital inputs and outputs<br>• Automatic commissioning<br>• Diagnostic functions<br>• Manual operation on the device | SIMATIC PDM |
| **SIPART PS2 (for hazardous areas)**  | Position control of pneumatic linear or part-turn actuators | Same as above, but here in flameproof aluminum or stainless steel enclosure<br>• Not Ex<br>• Flameproof Ex d<br>• Intrinsically safe Ex i, Ex e, Ex t<br>• Flameproof and intrinsically safe Ex d + Ex i | SIMATIC PDM |
| **SIPART PS100**  | Position control of pneumatic linear or part-turn actuators | In polycarbonate or aluminum enclosure<br>• Connection: 4 ... 20 mA<br>• HART<br>• Digital inputs and outputs<br>• Automatic commissioning at the push of a button<br>• Manual operation on the device | |

***Supplied product documentation on DVD and safety notes***



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with safety notes as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**. This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weight measurement portfolio. The delivery may also contain product-specific or order-specific printed materials. For more information, refer to the Annex.

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## Overview



SIPART PS2 in polycarbonate enclosure with gauge block (optional)



SIPART PS2 in aluminum enclosure



SIPART PS2 in stainless steel enclosure with gauge block (optional)

## Overview (continued)



SIPART PS2 in flameproof aluminum enclosure (Ex d) with gauge block (optional)



SIPART PS2 in flameproof stainless steel enclosure 316L with gauge block (optional)

SIPART PS2 positioners control the valve position according to set-point value specification on pneumatic valves. The valve can be verified with various intelligent online (during operation) and offline (e.g. between batch processes) diagnostic functions. Diagnostic functions can be optionally expanded by pressure sensors.

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## Benefits

SIPART PS2 positioners excel in their:

- Easy installation
- Automatic commissioning
- Simple operation and on-device configuration with local display or via SIMATIC PDM
- Very high control performance
- Minimal air consumption in stationary operation
- "Close tight" function for maximum torque on the process valve seat
- "Fast Open/Fast Close" function for defined approach of the end position with fast reaction to new setpoint specifications
- "Fail Safe" function: Secure depressurization SIL 2 in case of failure of electrical auxiliary power
- "Fail in place" function: Maintain current position on failure of electrical and/or pneumatic auxiliary power
- "Fail to Open" function: Pressurizing of the actuator in case of failure of electrical auxiliary power
- Numerous functions can be activated by simple configuring (e.g. characteristic curves and limits)
- One device variant for all applications: Linear actuators, part-turn actuators and cylinders
- Optional with internal or external contactless position feedback for external ambient conditions
- "Intelligent solenoid valve": Solenoid valve function and diagnostics in one device
- Extensive diagnostic functions:
  - Full Stroke Test
  - Multi Step Response Test
  - Valve Performance Test
  - Valve Signature, pressure sensor-aided
  - Partial Stroke Test, optionally pressure sensor-supported for performance and maintenance assessment of the valve
  - Leakage monitoring
- Can be operated with natural gas, carbon dioxide, nitrogen or noble gases

## Application

The SIPART PS2 is used in the following industry sectors:

- Valve manufacturing
- Chemical industry
- Petrochemical industry
- Oil and gas
- Paper
- Water and wastewater
- Power supply
- Pharmaceuticals
- Food and beverages

The devices are available in variants for:

- 4 to 20 mA
- HART communication
- PROFIBUS PA communication
- FOUNDATION Fieldbus communication
- Single-and double-acting valves in various enclosure designs and various materials (polycarbonate, aluminum and stainless steel)
- Applications without explosion protection requirements
- Hazardous applications in the versions:
  - Device protection with intrinsic safety (Ex i)
    for use in Zone 1, 2, 21, 22 or Class I, II, III/Division 1/Groups A-G
  - Device dust ignition protection by enclosure (Ex t)
    for use in Zone 21, 22 or Class II, III/Division 1/Groups E-G
  - Device protection with increased security (Ex e)
    for use in Zone 2 or Class I, Division 2, Groups A-D
  - Device protection with flameproof enclosure (Ex d)
    for use in Zone 1 or Class I, Division 1, Groups A-D

***Stainless steel enclosure for extreme ambient conditions***

The SIPART PS2 is available in a stainless steel enclosure for use in particularly aggressive environments (e.g. offshore operation, chlorine plants). The device functionality is not different due to the enclosure variants.

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## Design

The SIPART PS2 digital positioner comprises the following components:

- Base plate with lid with/without inspection window, depending on the variant
- Electronics with screw-type terminals:
  - 4 to 20 mA
  - 4 to 20 mA with HART
  - PROFIBUS PA according to IEC 61158-2, bus-supplied
  - FOUNDATION Fieldbus (FF) according to IEC 61158-2, bus-supplied
- Position feedback via potentiometer or non-contacting sensor (NCS)
- Pneumatic block

The pneumatic connections for supply air and actuating pressure are located on the right side of the enclosure. A gauge block, venting gauge block, booster, VDI3847 interface or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit.

***Optional expansion with modules and functions***

Optionally, SIPART PS2 can be expanded with the following modules and functions:

Analog Output Module (AOM)

Analog position feedback 4 to 20 mA.

Digital I/O Module (DIO) with 3 digital outputs and 1 digital input

- Signaling of two limits of the travel or angle. The two limits can be assigned parameters independently as maximum or minimum values.
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device/valve fault occurs.
- 2nd digital input for alarm signals or for triggering safety reactions, e.g. hold position or approach safety position.

Inductive Limit Switches (ILS)

Via the inductive switches, 2 independent limits can be set and monitored as NAMUR signal (EN 60947-5-6). The module also contains an integrated fault indicator (see "Digital I/O Module (DIO)").

Mechanic Limit Switches (MLS)

2 independent limits can be monitored via the mechanical switches. The module also contains an integrated fault indicator (see "Digital I/O Module (DIO)").

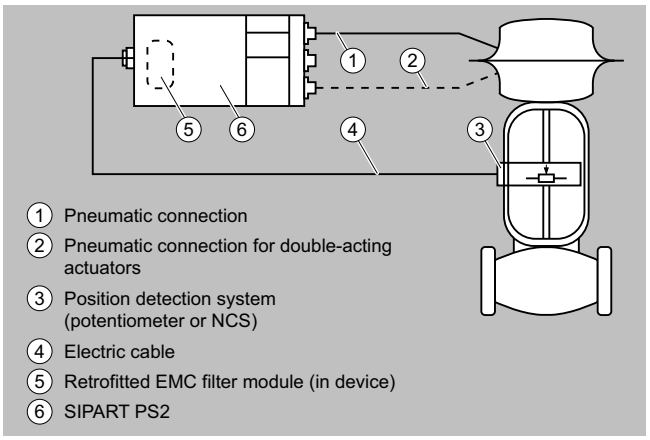
Valid for all modules described above:

- All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

***Separate mounting of positioner and position detection***

Separate mounting of the positioner and position detection can be implemented with SIPART PS2. Only measurement of the stroke or angle, for example, is carried out directly on the actuator. This means that the positioner can be installed at a distance in a protected area. Components are connected electrically via a cable and pneumatically via tubes or pipes. The system is often advantageous if the ambient conditions at the valve exceed the specified values for the positioner (e.g. strong vibrations, radiation, magnetism).

## Design (continued)




Separate installation of the position detection and positioner SIPART PS2

***Use for position detection***

The following can be used for position detection:



SIPART PS2, NCS for strokes > 14 mm

- Non-contacting sensor (NCS)
- Position Transmitter
- Linear potentiometers
- Commercial sensors

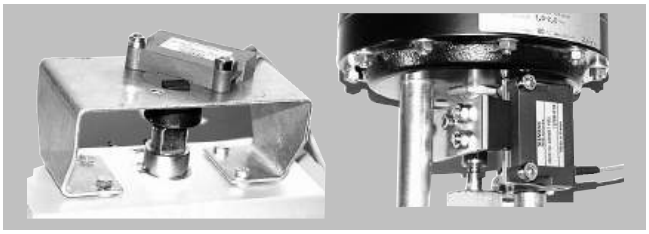
Non-contacting sensor (NCS)

For SIPART PS2

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## Design (continued)



Left: NCS for part-turn actuator (6DR4004-.N.10) mounted on mounting console 6DR4004-1D to 4D
Right: NCS for linear actuator (6DR4004-.N.20) mounted with actuator-specific/customer-specific mounting solution

Position Transmitter

With potentiometer, with NCS, with NCS and ILS or with NCS and MLS for SIPART PS2.
Mounting takes place like with SIPART PS2.




Linear potentiometers

With 3K, 5K or 10 to 20 kΩ (e.g. pneumatic cylinder).

Commercial sensors

With 4 to 20 mA or 0 to 10 V (only with non-ex applications).

## Function

***Monitoring functions***

The SIPART PS2 has comprehensive monitoring functions with which changes on the actuator and process valve can be detected and signaled depending on the set limit. This information provides important indications on the status of the valve.
Determined/monitored measuring data:

- Travel integral
- Number of changes in direction
- Alarm counter
- Self-adjusting dead zone
- Process valve end position (e.g. for detection of process valve seat wear or deposits)
- Operating hours (also according to temperature and position ranges) as well as min./max. temperature
- Operating cycles of piezoelectric valves in pneumatic block
- Process valve travel time
- Actuator leakages

***At a glance with the Diagnostics Cockpit***

With the Diagnostics Cockpit, the HART variants of the SIPART PS2 provide a straightforward way of getting started with the world of diagnostic capabilities. All relevant information on the valve, such as setpoint, actual value, control deviation, status of the diagnostic system, etc., is available at a glance. Additional facts and details are just a few mouse clicks away from the Diagnostics Cockpit.

***Status monitoring with 3-stage alarm concept***

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status alarms derived from these monitoring functions signal active faults of the valve with grading in the form of traffic light signaling. The status alarms are symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Maintenance required (green wrench)
- Urgent maintenance demanded (yellow wrench)
- Imminent danger of valve failure or general failure (red wrench)

This allows users to put early measures into action before an acute process valve or actuator fault occurs which could result in a system shutdown. Early alarms indicate, for example, the onset of a diaphragm break in the actuator or progressive sluggishness of a valve. In this way, users can guarantee plant safety and availability with suitable maintenance strategies.

This 3-stage alarm hierarchy also allows early detection and signaling of static friction of a gland, wear of a process valve plug/seat, or deposits or coatings on the fittings.

These fault indications can be output either line-conducted over the alarm outputs of the positioner (maximum 3), or via communication over the HART or fieldbus interfaces. In this case, the HART, PROFIBUS and FOUNDATION Fieldbus variants of SIPART PS2 allow for differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the valve.

The device's local display also displays the graded maintenance requirements, complete with identification of the source of the fault.

***Maintenance required of control valves***

The Full Stroke Test, Step Response Test, Multi Step Response Test and Valve Performance Test provide detailed information about the maintenance required of the valve. With the help of the HART com-

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## Function (continued)

munication system, you receive comprehensive test results and can identify the extent of the maintenance measures. In order to quantify the performance capability of valves, characteristic values such as step response times (T63, T86 or Txx), dead times, overshoot, hysteresis, measurement deviations and non-linearity are determined.

***Functional Safety according to SIL 2***

In the variants 6DR5.1.-0....-....-Z C20, the positioner is suitable for use on single-acting valves with spring return that satisfy the special requirements in terms of functional safety up to SIL 2 according to IEC 61508 or IEC 61511. The positioner depressurizes the process valve actuator on demand/in the event of a fault (safe depressurizing) and puts the process valve in the preset safety position.

***Valve Signature***

With pressure sensor-aided Valve Signature, the characteristic curve of the valve can be recorded, saved in the device (max. 10 characteristic curves) and displayed in PDM, for example. The reference characteristic curve is recorded at the beginning directly during initialization. Based on the exportable data, friction values, spring characteristics, hysteresis, breakout pressures can be determined. If the test is regularly repeated, characteristic curves can be compared with one another and changes over time can be displayed as the basis for a predictive maintenance approach.

***Partial Stroke Test***

With the pressure sensor-aided Partial Stroke Test, the function of safety (open/close) valves can be checked reliably during operation. Up to 10 characteristic curves and important parameters are saved in the device. They can be displayed in PDM, for example. Recording of the reference characteristic curve takes place during operation and in settled state. Based on the exportable data, friction values, spring characteristics, hysteresis, breakout pressures can be determined. If the test is regularly repeated, characteristic curves can be compared with one another and changes over time can be displayed as the basis for a predictive maintenance approach.

***Intelligent solenoid valve***

The SIPART PS2 can (parameterizable) take on the function of a solenoid valve for open/close valves and also offers intelligent diagnostics for valves with the pressure sensor-aided Partial Stroke Test, for example. For devices without explosion protection and only in connection with the pressure sensor-aided diagnostics, SIPART PS2 can also be operated with 24 V, i.e. without additional wiring. All other devices must be supplied with 4 to 20 mA. SIPART PS2 takes on the function as "Intelligent solenoid valve" with additional pressure sensor-aided diagnostics and handles multiple tasks in one device:

- The positioner opens and closes the valve quickly and without control.
- In a safety scenario, during power failure, the SIPART PS2 drives the valve into the safety position "Functional Safety according to SIL 2".
- A pressure sensor-aided Partial Stroke Test can be performed automatically at regular intervals. This test keeps the valve in regular movement and prevents rusting of the valve due to corrosion or incrustation.

Solenoid valves on control valves normally cannot be tested during operation. They are therefore not necessary when using SIPART PS2 as the depressurizing is carried out on demand by SIPART PS2. This means that, on control valves, both the control function and the shut-off function can be carried out by a single device.

***Configuring***

The SIPART PS2 positioner contains the following configurations:

- Input current range 4 to 20 mA

## Function (continued)

- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Split-range mode: Adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed
- Direction of action: Rising or falling output pressure with rising setpoint
- Limits of position range, start-of-scale/full-scale value
- Limits (alarms) of the process valve position: Minimum and maximum value
- Automatic tight closing stroke adjustment in accordance with the valve process characteristic curve
- Function of the digital inputs
- Function of alarm output, etc.

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## Selection and ordering data

| SIPART PS2 electropneumatic positioner | Article No. 6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
|  Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Version** | | |
| 4 ... 20 mA | 0 | |
| 4 ... 20 mA, HART | 1 ***N*** [1] | |
| 4 ... 20 mA (3-/4-wire) | 1 ***N*** [1] | |
| PROFIBUS PA | 5 | |
| FOUNDATION Fieldbus | 6 | |
| Without electronics (for 19-inch remote variant) | 9 | |
| **Actuator** | | |
| Single-acting | 1 | |
| Double-acting | 2 | |
| **Enclosure** | | |
| Polycarbonate, glass-fiber reinforced[2] | 0 | |
| Stainless steel, without inspection window, 1.4581 | 2 | |
| Aluminum, AlSi12 | 3 | |
| **Type of protection (Ex)** | | |
| Without explosion protection | N | |
| Increased safety (Ex e)[3], dust ignition protection by enclosure (Ex t)[3] | D | |
| Intrinsic safety (Ex i)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | E | |
| Intrinsic safety (Ex i), increased safety (Ex e)[3]<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | F | |
| Increased safety (Ex e)[3] | G | |
| Intrinsic safety (Ex i), increased safety (Ex e)[3], dust ignition protection by enclosure (Ex t)[3]<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | K | |
| **Connection thread electric/pneumatic** | | |
| M20×1.5 / G¼ | G | |
| ½-14 NPT / ¼-18 NPT | N | |
| M20×1.5 / ¼-18 NPT | M | |
| ½-14 NPT / G¼ | P | |
| M12 device plug (A coding) for electronics[4] / G¼<br>The M12 cable socket can be ordered separately with 6DR4004-5A. | R | |
| M12 device plug (A coding) for electronics[4] / ¼-18 NPT<br>The M12 cable socket can be ordered separately with 6DR4004-5A. | S | |
| **Limit monitor**<br>Including 2nd cable gland | | |
| None | 0 | |
| Digital I/O Module (DIO), 1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator).<br>Device plug M12 optionally orderable with -Z D55. | 1 | |
| Inductive Limit Switches (ILS), 2 inductive limit switches and 1 digital output (DQ)<br>Device plug M12 optionally orderable with -Z D56. | 2 | |
| Mechanic Limit Switches (MLS), 2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications.<br>Device plug M12 optionally orderable with -Z D57. | 3 | |
| Internal NCS module for non-contacting position detection. The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11. | 9 | L 1 A |
| **Option modules**<br>Including 2nd cable gland | | |
| None | 0 | |
| Analog Output Module (AOM), analog position feedback 4 ... 20 mA.<br>Device plug M12 optionally orderable with -Z D53. SITRANS I100 isolating power supply sold separately (7NG4124-1AA00) | 1 | |

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## Selection and ordering data (continued)

| SIPART PS2 electropneumatic positioner | Article No. 6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
| Analog Input Module (AIM) to connect external position detection systems, e. g. NCS Sensor, Position Transmitter 6DR4004-1ES/2ES/3ES/4ES or other sensors. The internal position detection is not applied but can be ordered in addition with -Z K11.<br>Device plug M12 optionally orderable with -Z D54. SITRANS I100 isolating power supply sold separately (7NG4124-1AA00) | 2 | |
| Analog Output Module (AOM) and Analog Input Module (AIM). The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11. Device plug M12 is not available. | 3 | |
| **Brief instructions** | | |
| English/German/Chinese | A | |
| French/Italian/Spanish | B | |
| **Version** | | |
| Standard / Fail-safe<br>• Depressurizing the actuator in case of failure of electrical auxiliary power | A | |
| Fail in Place<br>• Maintain position in case of failure of electrical and/or pneumatical auxiliary power | F | |
| Fail to Open<br>• Pressurizing of the actuator in case of failure of electrical auxiliary power | G | |
| **Gauge block** | | |
| None | 0 | |
| With pressure gauges made of plastic IP31 (MPa, bar) | | |
| • Block made of aluminum, single-acting, G¼ | 1 | |
| • Block made of aluminum, double-acting, G¼ | 2 | |
| With pressure gauges made of plastic IP31 (MPa / psi) | | |
| • Block made of aluminum, single-acting, ¼-18 NPT | 3 | |
| • Block made of aluminum, double-acting, ¼-18 NPT | 4 | |
| With pressure gauges made of metal IP44 (MPa, bar, psi) | | |
| • Block made of aluminum, single-acting, G¼ | 9 | R 1 A |
| • Block made of aluminum, double-acting, G¼ | 9 | R 2 A |
| • Block made of aluminum, single-acting, ¼-18 NPT | 9 | R 1 B |
| • Block made of aluminum, double-acting, ¼-18 NPT | 9 | R 2 B |
| With pressure gauges made of stainless steel IP54 (MPa, bar, psi) | | |
| • Block made of stainless steel 316, single-acting, G¼ | 9 | R 1 C |
| • Block made of stainless steel 316, double-acting, G¼ | 9 | R 2 C |
| • Block made of stainless steel 316, single-acting, ¼-18 NPT | 9 | R 1 D |
| • Block made of stainless steel 316, double-acting, ¼-18 NPT | 9 | R 2 D |
| **** Can be ordered on request*** | * | * * * |
| Pressure gauge block 316 with gauge IP65, 316L (MPa, bar, psi) | | |
| **Venting gauge block** | | |
| Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position. | | |
| • Block made of aluminum, double-acting, G¼ | 9 | R 2 E |
| • Block made of aluminum, double-acting, ¼-18 NPT | 9 | R 2 F |
| **Booster (Cv = 2)** | | |
| Aluminum with gauges made of metal IP44 (MPa, bar, psi) | | |
| • Single-acting, G½ | 9 | R 1 J |
| • Double-acting, G½ | 9 | R 2 J |
| • Single-acting, ½-14 NPT | 9 | R 1 K |
| • Double-acting, ½-14 NPT | 9 | R 2 K |

1) Explosion protection Ex i only available in connection with order option -Z P01/P02
2) Only for type of protection Ex i
3) Impact energy on inspection window max. 2 joule for aluminum enclosure 6DR5..3.
4) Device plug M12 mounted and electrically connected in versions 6DR50.., 6DR51.., 6DR55.. and 6DR56..

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## Selection and ordering data (continued)

| Options<br>Add "-Z" to article number, specify order code and plain text | Order code |
|---|---|
| **Stainless steel sound absorber**<br>Standard with stainless steel enclosures | **A40** |
| **Functional safety (SIL 2) for 6DR5.1. only (single-acting positioner)**<br>Device suitable for use according to IEC 61508 and IEC 61511 | **C20** |
| **M12 device plug (D coding)**<br>The M12 cable socket can be ordered separately with 6DR4004-5D. | |
| Connected with Analog Output Module (AOM) | **D53** |
| Connected with Analog Input Module (AIM) | **D54** |
| Connected with Digital I/O Module (DIO) | **D55** |
| Connected with Inductive Limit Switches (ILS) | **D56** |
| Connected with Mechanic Limit Switches (MLS) | **D57** |
| **Optimized control behavior for small actuators (< 200 cm³)** | **K10** |
| **Additional internal position detection by means of a potentiometer** | **K11** |
| **Pneumatic terminal strip made of stainless steel 316** | **K18** |
| **Interface according to VDI/VDE 3847**<br>For single and double-acting, with CATS (Clean Air To Spring) only for single-acting. Not for flameproof enclosure. | **K20** |
| **Operation with natural gas**<br>Device is optimized for natural gas operation and contains corrosion-protected, painted electronics and high-quality FVMQ elastomers. Exhaust air (natural gas) cannot be dissipated collectively. | **K50** |
| **Permissible ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F)**<br>For 6DR5..1., 6DR5..2., 6DR5..3.: Lid without inspection window | **M40** |
| **Pressure sensor supported monitoring / diagnostics** | |
| Monitoring of the device/custom min./max. supply pressure PZ.<br>Hold position on demand. Messages according to NAMUR NE107. | **P01** |
| Monitoring of the device/custom min./max. supply pressure PZ.<br>Hold position on demand.<br>Valve Signature, Partial Stroke Test, monitoring of leakage and actuating pressure (triggered), actuating pressure limitation for single-acting actuators. Messages according to NAMUR NE107. | **P02** |
| **Certificates** | |
| EN 10204 certificate type 2.1 | **C35** |
| DNV (Det Norske Veritas) | **S10** |

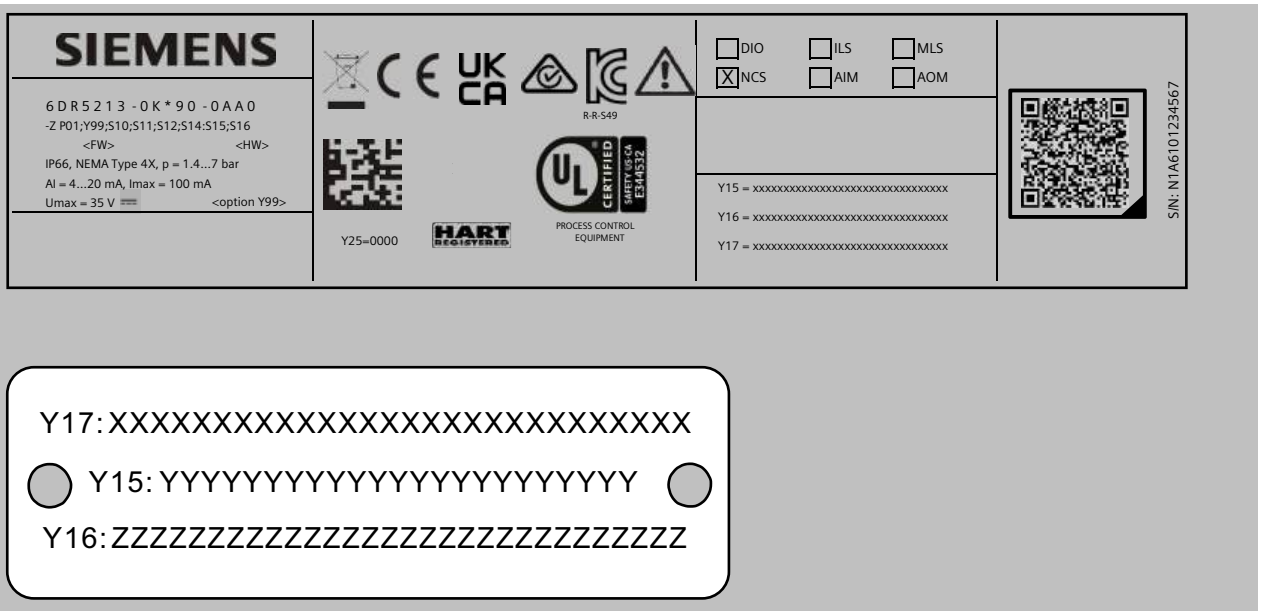
| Options<br>Add "-Z" to article number, specify order code and plain text | Order code |
|---|---|
| LR (Lloyds Register) | **S11** |
| BV (Bureau Veritas) | **S12** |
| ABS (American Bureau of Shipping) | **S14** |
| KR (Korean Register of Shipping) | **S15** |
| CCS (China Classification Society) | **S16** |
| RINA (Registro Italiano Navale) | **S17** |
| **TAG plate made of stainless steel, 3-line**<br>Text line 1: plain text from Y17<br>Text line 2: plain text from Y15<br>Text line 3: plain text from Y16 | **A20** |
| **Measuring point description**<br>Input field: Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text | **Y15** |
| **Measuring point text**<br>Input field: Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text | **Y16** |
| **Measuring point number (TAG no.)**<br>Input field: Max. 32 characters; specify in plain text | **Y17** |
| **Preset bus address**<br>Input field: Specify in plain text (for 6DR55.. and 6DR56.. only) | **Y25** |
| **Customer-specific parameter setting**<br>Input field: Specify in plain text | **Y30** |
| **Special design / Product Variant Request (PVR)**<br>Input field: Specify order number from PVR clarification in plain text | **Y99** |
| **Examples:** | |
| • Conformal coating / Tropicalization | **VP001** |
| • Gauge block with IP65 gauge | **VP002** |
| • SIPART PS2 for part-turn applications up to 180° | **VP003** |
| Creation of a "Product Variant Request" is a prerequisite | |

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## Selection and ordering data (continued)

***Nameplate on SIPART PS2, tag plate made of stainless steel***




| SIPART PS2 electropneumatic positioner, in flameproof enclosure | Article No. 6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
|   Click the article number for online configuration in the PIA Life Cycle Portal. | | |
| **Version** | | |
| 4 ... 20 mA | 0 | |
| 4 ... 20 mA, HART | 1 | |
| PROFIBUS PA | 5 | |
| FOUNDATION Fieldbus | 6 | |
| **Actuator** | | |
| Single-acting | 1 | |
| Double-acting | 2 | |
| **Enclosure** | | |
| Aluminum, flameproof, AlSi12 | 5 | |
| Stainless steel, 316L, flameproof, 1.4409 | 6 | |
| **Type of protection (Ex)** | | |
| Without explosion protection | N | |
| Flameproof enclosure (Ex d), Dust ignition protection by enclosure (Ex t) | E | |

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## Selection and ordering data (continued)

| SIPART PS2 electropneumatic positioner, in flameproof enclosure | Article No. 6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● ● | Order code ● ● ● ● |
|---|---|---|
| Intrinsic safety (Ex i), increased safety (Ex e)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | F | |
| Increased safety (Ex e) | G | |
| Intrinsic safety (Ex i), increased safety (Ex e), dust ignition protection by enclosure (Ex t)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | K | |
| Flameproof enclosure (Ex d), dust ignition protection by enclosure (Ex t), Intrinsic safety (Ex i)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00) | P | |
| **Connection thread electrical/pneumatic** | | |
| M20×1.5 / G¼ | G | |
| ½-14 NPT / ¼-18 NPT | N | |
| M20×1.5 / ¼-18 NPT | M | |
| ½-14 NPT / G¼ | P | |
| M25×1.5 / G¼ | Q | |
| **Limit monitor** | | |
| None | 0 | |
| Digital I/O Module (DIO), 1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator). | 1 | |
| Inductive Limit Switches (ILS), 2 inductive limit switches and 1 digital output (DQ). | 2 | |
| Mechanic Limit Switches (MLS), 2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications. | 3 | |
| Internal NCS module for non-contacting position detection. The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11. | 9 | L 1 A |
| **Option modules** | | |
| None | 0 | |
| Analog Output Module (AOM), 4 ... 20 mA current module<br>SITRANS I100 isolating power supply sold separately (7NG4124-1AA00) | 1 | |
| Analog Input Module (AIM) to connect external position detection systems, e. g. NCS Sensor, Position Transmitter 6DR4004-1ES/2ES/3ES/4ES or other sensors. The internal position detection is not applied but can be ordered in addition with -Z K11. | 2 | |
| Analog Output Module (AOM) and Analog Input Module (AIM). The internal position detection via a potentiometer is not applied but can be ordered in addition with -Z K11.<br>SITRANS I100 isolating power supply sold separately (7NG4124-1AA00) | 3 | |
| **Brief instructions** | | |
| English/German/Chinese | A | |
| French/Italian/Spanish | B | |
| **Version** | | |
| Standard / Fail-safe<br>• Depressurizing the actuator in case of failure of electrical auxiliary power | A | |
| Fail in Place<br>• Maintain position in case of failure of electrical and/or pneumatical auxiliary power | F | |
| Fail to Open<br>• Pressurizing of the actuator in case of failure of electrical auxiliary power | G | |
| **Gauge block** | | |
| None | 0 | |
| With pressure gauges made of plastic IP31 (MPa, bar) | | |
| • Block made of aluminum, single-acting, G¼ | 1 | |
| • Block made of aluminum, double-acting, G¼ | 2 | |
| With pressure gauges made of plastic IP31 (MPa / psi) | | |
| • Block made of aluminum, single-acting, ¼-18 NPT | 3 | |
| • Block made of aluminum, double-acting, ¼-18 NPT | 4 | |
| With pressure gauges made of metal IP44 (MPa, bar, psi) | | |
| • Block made of aluminum, single-acting, G¼ | 9 | R 1 A |
| • Block made of aluminum, double-acting, G¼ | 9 | R 2 A |
| • Block made of aluminum, single-acting, ¼-18 NPT | 9 | R 1 B |
| • Block made of aluminum, double-acting, ¼-18 NPT | 9 | R 2 B |
| With pressure gauges made of stainless steel IP54 (MPa, bar, psi) | | |
| • Block made of stainless steel 316, single-acting, G¼ | 9 | R 1 C |
| • Block made of stainless steel 316, double-acting, G¼ | 9 | R 2 C |
| • Block made of stainless steel 316, single-acting, ¼-18 NPT | 9 | R 1 D |
| • Block made of stainless steel 316, double-acting, ¼-18 NPT | 9 | R 2 D |

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## Selection and ordering data (continued)

| SIPART PS2 electropneumatic positioner, in flameproof enclosure | Article No. 6DR5 ● ● ● - 0 ● ● ● ● - 0 ● ● ● | Order code ● ● ● |
|---|---|---|
| **** Can be ordered on request*** | * | * * * |
| Pressure gauge block 316 with gauge IP65, 316L (MPa, bar, psi) | | |
| **Venting gauge block** | | |
| Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position. | | |
| • Block made of aluminum, double-acting, G¼ | 9 | R 2 E |
| • Block made of aluminum, double-acting, ¼-18 NPT | 9 | R 2 F |
| **Booster (Cv = 2)** | | |
| Aluminum with gauges made of metal IP44 (MPa, bar, psi) | | |
| • Single-acting, G½ | 9 | R 1 P |
| • Double-acting, G½ | 9 | R 2 P |
| • Single-acting, ½-14 NPT | 9 | R 1 Q |
| • Double-acting, ½-14 NPT | 9 | R 2 Q |

| Options<br>Add "-Z" to article number, specify order code and plain text | Order code |
|---|---|
| **Functional safety (SIL 2) only for 6DR5.1* (single-acting positioner)**<br>Device suitable for use according to IEC 61508 and IEC 61511. | **C20** |
| **Optimized control behavior for small actuators (< 200 cm³)** | **K10** |
| **Additional internal position detection by means of a potentiometer** | **K11** |
| **Pneumatic terminal strip made of stainless steel 316** | **K18** |
| **Operation with natural gas**<br>Device is optimized for natural gas operation and contains corrosion-protected, painted electronics and high-quality FVMQ elastomers. Exhaust air (natural gas) can be dissipated collectively with the 6DR5..5*. | **K50** |
| **Permissible ambient temperature during operation -40 ... 80 °C (-40 ... +176 °F)**<br>For 6DR5..1*, 6DR5..2*, 6DR5..3*: Lid without inspection window | **M40** |
| **Pressure sensor supported monitoring/diagnostics** | |
| Monitoring of the device/custom min./max. supply pressure PZ.<br>Hold position on demand. Messages according to NAMUR NE107. | **P01** |
| Monitoring of the device/custom min./max. supply pressure PZ.<br>Hold position on demand.<br>Valve Signature, Partial Stroke Test, monitoring of leakage and actuating pressure (triggered), actuating pressure limitation for single-acting actuators. Messages according to NAMUR NE107. | **P02** |
| **Certificates** | |
| Explosion protection (Japan) | **E29** |
| EN 10204 certificate type 2.1 | **C35** |
| DNV (Det Norske Veritas) | **S10** |
| LR (Lloyds Register) | **S11** |
| BV (Bureau Veritas) | **S12** |

| Options<br>Add "-Z" to article number, specify order code and plain text | Order code |
|---|---|
| ABS (American Bureau of Shipping) | **S14** |
| KR (Korean Register of Shipping) | **S15** |
| CCS (China Classification Society) | **S16** |
| RINA (Registro Italiano Navale) | **S17** |
| **TAG plate made of stainless steel, 3-line**<br>Text line 1: plain text from Y17<br>Text line 2: plain text from Y15<br>Text line 3: plain text from Y16 | **A20** |
| **Measuring point description**<br>Input field: Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text | **Y15** |
| **Measuring point text**<br>Input field: Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA; specify in plain text | **Y16** |
| **Measuring point number (TAG no.)**<br>Input field: Max. 32 characters; specify in plain text | **Y17** |
| **Preset bus address**<br>Input field: Specify in plain text (for 6DR55.. and 6DR56.. only) | **Y25** |
| **Customer-specific parameter setting**<br>Input field: Specify in plain text | **Y30** |
| **Special design / Product Variant Request (PVR)**<br>Input field: Specify order number from PVR clarification in plain text | **Y99** |
| **Examples:** | |
| • Conformal coating / Tropicalization | **VP001** |
| • Gauge block with IP65 gauge | **VP002** |
| • SIPART PS2 for part-turn applications up to 180° | **VP003** |
| Creation of a "Product Variant Request" is a prerequisite. | |

### *Accessories*

Sensors and modules for remote variants

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## Selection and ordering data (continued)

***NCS sensor***

| NCS sensor<br>For contact-free position detection (not for Ex d version) | Article No.<br>6DR4004- | ● | N | ● | ● | 0 |
|---|---|---|---|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Explosion protection** | | | | | | |
| Non-explosion-proof | | 8 | | | | |
| In type of protection (Ex)<br>• Intrinsic safety<br>• Non-sparking | | 6 | | | | |
| **Cable length** | | | | | | |
| 6 m (19.68 ft) | | | | N | | |
| 20 m (65.67 ft) | | | | P | | |
| 40 m (131.23 ft) | | | | R | | |
| **Actuator type** | | | | | | |
| Linear actuator for stroke ≤ 14 mm (0.55 inches)<br>Mounting is actuator-specific and is not included in the scope of delivery as a mounting kit. Mounting kit 6DR4004-8V can be used on NAMUR actuators for this purpose. | | | | | 2 | |
| Linear actuator for strokes ≥ 14 ... 130 mm (0.55 ... 5.12 inches)<br>Mounting is actuator-specific and is not included in the scope of delivery as a mounting kit. For mounting on NAMUR actuators and, depending on the stroke of the mounting kit 6DR4004-8V (2 ... 35mm) or in addition to the -8V, the long lever handle 6DR4004-8L (35 ... 120 mm) may be used. | | | | | 3 | |
| Part-turn actuator, magnet holder made of anodized aluminum<br>A NAMUR mount is not included in the scope of delivery but can be ordered separately with 6DR4004-1D/-2D/-3D/-4D. | | | | | 4 | |

***Position Transmitter***

- See technical specifications for explosion protection (ATEX / IECEx / FM / CSA / not Ex d).
- SIPART PS2 externally mounted in protected area.
- Requirement: SIPART PS2 with integrated Analog Input Module (AIM) as order option or retrofit with 6DR4004-6F/-8F.
- Variant with cable and cable socket M12 stainless steel 6DR4004-5D on request

| | Article No. |
|---|---|
| **Position Transmitter (potentiometer)**<br>In aluminum enclosure with potentiometer, without electronics, without pneumatic block, for separate mounting of position detection on actuator. | 6DR4004-1ES |
| **Position Transmitter (NCS)**<br>Aluminum enclosure with non-contacting position detection (NCS), without electronics, without pneumatic block, for separate mounting of position detection on actuator. | 6DR4004-2ES |
| **Position Transmitter (NCS, ILS)**<br>In aluminum enclosure with non-contacting position detection (NCS) and inductive limit switches (ILS), without electronics, without pneumatic block, for separate mounting of position detection on actuator. | 6DR4004-3ES |
| **Position Transmitter (NCS, MLS)**<br>In aluminum enclosure with non-contacting position detection (NCS) and mechanic limit switches (MLS), without electronics, without pneumatic block, for separate mounting of position detection on actuator. | 6DR4004-4ES |

Other accessories

| | Article No. |
|---|---|
| **Control unit for 3× SIPART PS2 4 ... 20 mA**<br>19-inch control unit with 3× electronics, 2-wire, 4 ... 20 mA, for remote installation of the electronics for the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.) | A5E00151560 |
| **Control unit for 5× SIPART PS2 PA**<br>19-inch control unit including 5× PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 1× plug panel A5E00252845 or A5E00252830 separately. | A5E00250501 |
| **Control unit for 10× SIPART PS2×PA**<br>19-inch control unit including 10× PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 2× plug panels A5E00252845 or A5E00252830 separately. | A5E00250502 |
| **Control unit for 15× SIPART PS2 PA**<br>19-inch control unit including 15× PROFIBUS PA module, for remote installation of the electronics of the SIPART PS2 6DR59* in a protected area (e.g. against radiation, dirt, temperature, etc.), order 3x plug panels A5E00252845 or A5E00252830 separately. | A5E00250503 |
| **Plug panel for control unit (50)**<br>Connection panel (rear panel) for 19-inch PROFIBUS PA control unit with Burndy 50 plug (50 pins) to connect a max. of 5 units of SIPART PS2 w/o electronics module (6DR59*). The Burndy 50 cable socket is already included in the scope of delivery.<br>Order in addition: 1× for A5E00250501, 2× for A5E00250502 and 3× for A5E00250503. | A5E00252845 |
| **Plug panel for control unit (50 + 8)**<br>Connection panel (rear panel) for 19-inch PROFIBUS PA control unit with Burndy 50 plug (50 pins) to connect a max. of 5 units of SIPART PS2 w/o electronics (6DR59*). Additional Burndy 8 plug (8 pins) to link communication between control units. The Burndy 50 cable socket is already included in the scope of delivery.<br>Order in addition: 1× for A5E00250501, 2× for A5E00250502 and 3× for A5E00250503 | A5E00252830 |

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## Selection and ordering data (continued)

| | Article No. |
|---|---|
| **Analog Input Module (AIM)**<br>For connecting external position detection systems to the SIPART PS2, for example Position Transmitter 6DR4004-1ES/2ES/3ES/4ES, NCS sensor or others. | |
| • With explosion protection | 6DR4004-6F |
| • Without explosion protection | 6DR4004-8F |
| **Digital I/O Module (DIO)**<br>1 digital input, 3 digital outputs (2 limits min. or max., 1 fault indicator) | |
| • With explosion protection | 6DR4004-6A |
| • Without explosion protection | 6DR4004-8A |
| **Inductive Limit Switches (ILS)**<br>2 inductive limit switches and 1 digital output (DQ) | |
| • With explosion protection | 6DR4004-6G |
| • Without explosion protection | 6DR4004-8G |
| **Mechanic Limit Switches (MLS)**<br>2 mechanical limit switches and 1 digital output (DQ). Not applicable for natural gas applications! | |
| • With explosion protection | 6DR4004-6K |
| • Without explosion protection | 6DR4004-8K |
| **Analog Output Module (AOM)**<br>For analog position feedback 4 ... 20 mA | |
| • With explosion protection | 6DR4004-6J |
| • Without explosion protection | 6DR4004-8J |
| **Internal NCS module**<br>For non-contacting position detection, for installation in the SIPART PS2 | |
| • Without explosion protection | 6DR4004-5L |
| • With explosion protection | 6DR4004-5LE |
| **Overvoltage protection** | |
| Overvoltage protection up to 6 kV for 2-wire, M20 × 1.5 | 6DR4004-1LP |
| Overvoltage protection up to 6 kV for 3-wire, M20 × 1.5 | 6DR4004-2LP |
| Overvoltage protection up to 6 kV for 4-wire, M20 × 1.5 | 6DR4004-3LP |
| Overvoltage protection up to 6 kV for PA/FF, M20 × 1.5 | 6DR4004-4LP |
| **Cable socket M12 stainless steel** | |
| A-coding, for cable mounting (0.25 ... 0.5 mm²). The cable socket can be connected to SIPART PS2 with M12 device plug. | 6DR4004-5A |
| D-coding, for cable mounting (0.25 ... 0.5 mm²). The cable socket can be connected to SIPART PS2 with M12 device plug. | 6DR4004-5D |
| **Gauge block** | |
| With pressure gauges made of plastic IP31 (MPa, bar) | |
| • Block made of aluminum, single-acting, G¼ | 6DR4004-1M |
| • Block made of aluminum, double-acting, G¼ | 6DR4004-2M |
| With pressure gauges made of plastic IP31 (MPa, psi) | |
| • Block made of aluminum, single-acting, ¼-18 NPT | 6DR4004-1MN |
| • Block made of aluminum, double-acting, ¼-18 NPT | 6DR4004-2MN |
| With pressure gauges made of metal IP44 (MPa, bar, psi) | |
| • Block made of aluminum, single-acting, G¼ | 6DR4004-1P |
| • Block made of aluminum, double-acting, G¼ | 6DR4004-2P |
| • Block made of aluminum, single-acting, ¼-18 NPT | 6DR4004-1PN |
| • Block made of aluminum, double-acting, ¼-18 NPT | 6DR4004-2PN |
| With pressure gauges made of stainless steel IP54 (MPa, bar, psi) | |
| • Block made of stainless steel 316, single-acting, G¼ | 6DR4004-1Q |
| • Block made of stainless steel 316, double-acting, G¼ | 6DR4004-2Q |
| • Block made of stainless steel 316, single-acting, ¼-18 NPT | 6DR4004-1QN |
| • Block made of stainless steel 316, double-acting, ¼-18 NPT | 6DR4004-2QN |
| Gauge block 316 with gauge IP65, 316L (MPa, bar, psi) | **Can be ordered on request** |
| **Venting gauge block**<br>Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position. | |
| • Block made of aluminum, double-acting, G¼ | 6DR4004-2RE |
| • Block made of aluminum, double-acting, ¼-18 NPT | 6DR4004-2RF |
| **Booster (Cv = 2)**<br>Aluminum with gauges made of metal IP44 (MPa, bar, psi) | |
| For SIPART PS2 enclosure variants 6DR5..0/2/3. (non-flameproof enclosure) | |
| • Single-acting, G½ | 6DR4004-1RJ |
| • Double-acting, G½ | 6DR4004-2RJ |
| • Single-acting, ½-14 NPT | 6DR4004-1RK |
| • Double-acting, ½-14 NPT | 6DR4004-2RK |
| For SIPART PS2 enclosure variants 6DR5..5/6. (flameproof enclosure) | |
| • Single-acting, G½ | 6DR4004-1RP |
| • Double-acting, G½ | 6DR4004-2RP |
| • Single-acting, ½-14 NPT | 6DR4004-1RQ |
| • Double-acting, ½-14 NPT | 6DR4004-2RQ |
| **Interface according to VDI/VDE 3847**<br>For single- and double-acting, with CATS (Clean Air To Spring) only for single-acting, not for flameproof enclosures | 6DR4004-5PB |
| **Mounting kit for NAMUR part-turn actuators** | |
| VDI/VDE 3845, with plastic coupling wheel, without mounting console | 6DR4004-8D |
| VDI/VDE 3845, with stainless steel coupling, without mounting console | TGX:16300-1556 |
| Console for mounting the SIPART PS2, NCS sensor or Position Transmitter on NAMUR part-turn actuators VDI/VDE 3845 | |
| • 80 × 30 × 20 mm (3.15 × 1.18 × 0.79 inches) | 6DR4004-1D |
| • 80 × 30 × 30 mm (3.15 × 1.18 × 1.18 inches) | 6DR4004-2D |
| • 130 × 30 × 30 mm (5.12 × 1.18 × 1.18 inches) | 6DR4004-3D |
| • 130 × 30 × 50 mm (5.12 × 1.18 × 1.97 inches) | 6DR4004-4D |

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## Selection and ordering data (continued)

| | Article No. |
|---|---|
| **Mounting kit for other part-turn actuators**<br>The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D. | |
| SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A | **TGX:16152-328** |
| Masoneilan Camflex II | **TGX:16152-350** |
| Fisher 1051/1052/1061, sizes 30, 40, 60 to 70 | **TGX:16152-364** |
| Fisher 1051/1052, size 33 | **TGX:16152-348** |
| **Mounting kit for NAMUR linear actuators** | |
| NAMUR-linear actuator with short lever (2 ... 35 mm (0.08 ... 1.38 inches)) | **6DR4004-8V** |
| Lever arm for strokes of 35 ... 130 mm (1.38 ... 5.12 inches) without NAMUR mounting bracket | **6DR4004-8L** |
| Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm (1.38 inches) stroke | **6DR4004-8VK** |
| Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with long lever > 35 mm (1.38 inches) stroke | **6DR4004-8VL** |
| **Mounting console, stainless steel 316L**<br>Robust design to support extended loads like SIPART PS2 in a flameproof 316L stainless steel enclosure or as a variant with the booster. The console gets mounted and therefore supported by both stands of the actuator. | **6DR4004-8R** |
| Tapered roller made of stainless steel 316 for replacing the tapered roller made of plastic in the mounting kits 6DR4004-8V, -8VK, -8VL | **6DR4004-3N** |
| Terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits | **6DR4004-3M** |

| | Article No. |
|---|---|
| **Mounting kit for other linear actuators** | |
| MASONEILAN type 87/88 | **TGX:16152-1210** |
| MASONEILAN type 37/38, all sizes | **TGX:16152-1215** |
| Fisher type 657/667, sizes 30 ... 80 | **TGX:16152-900** |
| Samson actuator type 3277<br>Yoke dimension = 101 mm (integrated connection without pipe), not for Ex d | **6DR4004-8S** |
| **Pneumatic terminal strip made of stainless steel 316**<br>As spare part or to replace the pneumatic terminal strip made of aluminum | |
| • Single-acting, G¼ | **6DR4004-1R** |
| • Double-acting, G¼ | **6DR4004-2R** |
| • Single-acting, ¼-18 NPT | **6DR4004-1RN** |
| • Double-acting, ¼-18 NPT | **6DR4004-2RN** |
| **Connection block**<br>For safety solenoid valve with extended mounting flange according to NAMUR | |
| • For mounting according to IEC 534-6 | **6DR4004-1B** |
| • For SAMSON actuator (integrated mounting) see above | **6DR4004-1C** |
| **HART modem with USB interface** | **7MF4997-1DB** |
| **SIPART PS2 / PS100 demo case** | **6DR4004-5DE** |

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## Technical specifications

| SIPART PS2 (all device designs) | |
|---|---|
| **Operating conditions** | |
| Ambient conditions | For indoor and outdoor use |
| Ambient temperature | In hazardous areas, observe the maximum permissible ambient temperature according to the temperature class. |
| • Permissible ambient temperature for operation[1)] | -30 ... +80 °C (-22 ... +176 °F)<br>Optional -40 ... +80 °C (-40 ... +176 °F) |
| • Height | ≤ 2 000 m above mean sea level.<br>At altitudes greater than > 2 000 m above mean sea level, use a suitable power supply. |
| • Relative humidity | 0 ... 100% |
| Degree of protection[2)] | IP66/Type NEMA 4X |
| Corrosion protection according to EN ISO 9227:2022 and EN ISO 12944:2017 | |
| • 6DR5..0 Polycarbonate enclosure | C5-M medium durability |
| • 6DR5..3 Aluminum enclosure and 6DR5..5 Aluminum enclosure, flameproof | C5-M medium durability |
| • 6DR5..2 Stainless steel enclosure and 6DR5..6 Stainless steel enclosure, flameproof | C5-M high durability |
| Mounting position | Any. Electrical connections and exhaust opening not facing up in wet environment (outdoor/rain). |
| Vibration resistance | |
| • Harmonic oscillations (sine) according to EN 60068-2-6/10.2008 | 3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis<br>98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axis |
| • Bumping (half-sine) according to EN 60068-2-27/02.2010 | 150 m/s² (492 ft/s²), 6 ms, 1 000 shocks/axis |
| • Noise (digitally controlled) according to EN 60068-2-64/04.2009 | 10 ... 200 Hz; 1 $(m/s^2)^2$/Hz (3.28 $(ft/s^2)^2$/Hz)<br>200 ... 500 Hz; 0.3 $(m/s^2)^2$/Hz (0.98 $(ft/s^2)^2$/Hz)<br>4 hours/axis |
| • Recommended continuous duty range of the complete valve | ≤ 30 m/s² (98.4 ft/s²) without resonance sharpness |
| Climatic class | According to IEC EN 60721-3 |
| • Storage | 1K23, -40 ... +80 °C (-40 ... +176 °F) |
| • Transport | 2K12, -40 ... +80 °C (-40 ... +176 °F) |
| **Pneumatic data** | |
| Auxiliary power (inlet air) | Compressed air, carbon dioxide ($CO_2$), nitrogen ($N_2$), noble gasses or natural gas |
| • Pressure[3)] | 1.4 ... 7 bar (20.3 ... 101.5 psi) |
| Air quality according to ISO 8573-1 | |
| • Solid particulate size and density | Class 3 |
| • Pressure dew point | Class 3 (min. 20 K (36 °F) below ambient temperature) |
| • Oil content | Class 3 |
| Unrestricted flow (DIN 1945) | |
| • Inlet air (pressurize actuator)[4)] | |
| - 2 bar; 0.1 KV (29 psi; 0.116 CV) | 4.1 Nm³/h (18.1 USgpm) |
| - 4 bar; 0.1 KV (58 psi; 0.116 CV) | 7.1 Nm³/h (31.3 USgpm) |
| - 6 bar; 0.1 KV (87 psi; 0.116 CV) | 9.8 Nm³/h (43.1 USgpm) |
| • Exhaust air (depressurize actuator for all versions except fail in place)[4)] | |
| - 2 bar; 0.2 KV (29 psi; 0.232 CV) | 8.2 Nm³/h (36.1 USgpm) |
| - 4 bar; 0.2 KV (58 psi; 0.232 CV) | 13.7 Nm³/h (60.3 USgpm) |
| - 6 bar; 0.2 KV (87 psi; 0.232 CV) | 19.2 Nm³/h (84.5 USgpm) |
| • Exhaust air (depressurize actuator for fail in place version) | |
| - 2 bar; 0.1 KV (29 psi; 0.116 CV) | 4.3 Nm³/h (19.0 USgpm) |

## Technical specifications (continued)

| SIPART PS2 (all device designs) | |
|---|---|
| - 4 bar; 0.1 KV (58 psi; 0.116 CV) | 7.3 Nm³/h (32.2 USgpm) |
| - 6 bar; 0.1 KV (87 psi; 0.116 CV) | 9.8 Nm³/h (43.1 USgpm) |
| Restrictor ratio | Adjustable |
| Typical auxiliary power consumption in the controlled state | 0.01 Nm³/h (0.044 US gpm) |
| Sound pressure | $L_{Aeq}$ < 75 dB<br>$L_{Amax}$ < 80 dB |
| Sound pressure with installed Siemens booster | $L_{Aeq}$ < 95 dB<br>$L_{Amax}$ < 98 dB |
| **Structural design** | |
| Mode of operation | |
| • Range of stroke (linear actuators) | 3 ... 130 mm (0.12 ... 5.12 inches); higher range of stroke on request |
| • Angle of rotation range (part-turn actuators) | 30 ... 100° (up to 180° on request) |
| Mounting type | |
| • On linear actuators | Using mounting kit 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 60534-6-1 (NAMUR) with ribs, bars or flat face. |
| • On part-turn actuators | Using mounting kit 6DR4004-8D or TGX:16300-1556 on actuators with mounting plane according to VDI/VDE 3845 and IEC 60534-6-2.<br>The actuator-specific mounting console 6DR4004-1D ... 4D must be ordered separately, see the selection and ordering data. |
| Weight, positioner without option modules or accessories | |
| • 6DR5..0 Glass-fiber reinforced polycarbonate enclosure | Approx. 0.9 kg (1.98 lbs) |
| • 6DR5.11 Aluminum enclosure, only single-acting | Approx. 1.3 kg (2.86 lbs) |
| • 6DR5..2 Stainless steel enclosure | Approx. 3.9 kg (8.6 lbs) |
| • 6DR5..3 Aluminum enclosure | Approx. 1.6 kg (3.53 lbs) |
| • 6DR5..5 Aluminum, flameproof | Approx. 5.2 kg (11.46 lbs) |
| • 6DR5..6 Stainless steel enclosure, flameproof | Approx. 8.4 kg (18.5 lbs) |
| Material | |
| Dimensions | See "Dimensional drawings" |
| Device designs | |
| • In polycarbonate enclosure 6DR5..0 | Single-acting and double-acting |
| • In aluminum enclosure 6DR5..1 | Single-acting |
| • In aluminum enclosures 6DR5..3 and 6DR5..5 | Single-acting and double-acting |
| • In stainless steel enclosures 6DR5..2 and 6DR5..6 | Single-acting and double-acting |
| Gauge block | |
| • Degree of protection with: | |
| - Pressure gauge made of plastic | IP31 |
| - Gauge made of metal | IP44 |
| - Pressure gauge made of stainless steel 316 | IP54 |
| • Vibration resistance | According to EN 837-1 |
| Connections, electrical | |
| • Screw terminals | 2.5 mm² AWG30-14 |
| • Cable bushing | |
| - Without explosion protection as well as with Ex i | M20x1.5 or ½-14 NPT |
| - With explosion protection Ex d | Ex d-certified M20x1.5; ½-14 NPT or M25x1.5 |
| Connections, pneumatic | Internal thread G¼ or ¼-18 NPT |

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## Technical specifications (continued)

| SIPART PS2 (all device designs) | |
|---|---|
| **Controller** | |
| Controller unit | |
| • Five point controller | Adaptive |
| • Deadband | |
| - dEbA = Auto | Adaptive |
| - dEbA = 0.1 ... 10% | Can be set as fixed value |
| Analog-to-digital converter | |
| • Scan time | 10 ms |
| • Resolution | ≤ 0.05% |
| • Transmission error | ≤ 0.2% |
| • Temperature influence effect | ≤ 0.1%/10 K (≤ 0.1%/18 °F) |
| **Certificates and approvals** | |
| DoC compliance | The applicable directives and applied standards with their revision levels can be found in the Declaration of Conformity on the internet. |
| UL conformity | The SIPART PS2 has documented compliance with the safety requirements in the USA and Canada. These are UL classified, recognized and listed. |
| Explosion protection | You can find details on explosion protection in the compact operating instructions and the explosion protection certificates. |

1) At ≤ -10 °C (≤ 14 °F), the refresh rate of the local display is limited. When using Analog Output Module (AOM), only T4 is permissible.
2) Max. impact energy 1 joule for enclosure with inspection window 6DR5..0 and 6DR5..1 or max. 2 joules for 6DR5..3.
3) The following applies to fail in place double-acting: 3 ... 7 bar (43.5 ... 101.5 psi)
4) When using Ex d versions (6DR5..5-... and 6DR5..6-...), values are reduced by approximately 20%.

| SIPART PS2 with 4 ... 20 mA / HART | Electronics without explosion protection |
|---|---|
| **Electrical specifications** | |
| Current input $I_W$ | |
| • Nominal signal range | 4 ... 20 mA |
| • Test voltage | 840 V DC, 1 s |
| • Digital input BIN1 (terminals 9/10; galvanically connected to basic device) | Suitable only for floating contact; max. contact load < 5 µA at 3 V |
| ***2-wire connection (terminals 6/8)*** | |
| 6DR50.. and 6DR53..; 4 ... 20 mA 6DR51.. and 6DR52..; HART | |
| Minimum current to maintain operation | ≥ 3.8 mA |
| Required load voltage $U_B$ (corresponds to Ω at 20 mA) | |
| • 4 ... 20 mA (6DR50..) | |
| - Typical | 6.36 V (= 318 Ω) |
| - Max. | 6.48 V (= 324 Ω) |
| • 4 ... 20 mA (6DR53..) | |
| - Typical | 7.9 V (= 395 Ω) |
| - Max. | 8.4 V (= 420 Ω) |
| • HART (6DR51..) | |
| - Typical | 6.6 V (= 330 Ω) |
| - Max. | 6.72 V (= 336 Ω) |
| • HART (6DR52..) | |
| - Typical | - |
| - Max. | - |
| • Static destruction limit | ± 40 mA |

## Technical specifications (continued)

| SIPART PS2 with 4 ... 20 mA / HART | Electronics without explosion protection |
|---|---|
| Effective internal capacitance $C_i$ | |
| • 4 ... 20 mA | - |
| • HART | - |
| Effective internal inductance $L_i$ | |
| • 4 ... 20 mA | - |
| • HART | - |
| For connecting to circuits with the following peak values | - |
| ***3-/4-wire connection (terminals 2/4 and 6/8)*** | |
| 6DR53..; 4 ... 20 mA | |
| Load voltage at 20 mA | ≤ 0.2 V (= 10 Ω) |
| Auxiliary power $U_{Aux}$ | 18 ... 35 V DC |
| Current consumption $I_H$ | ($U_{Aux}$ -7.5 V)/2.4 kΩ [mA] |
| Effective internal capacitance $C_i$ | - |
| Effective internal inductance $L_i$ | - |
| For connecting to circuits with the following peak values | - |
| Galvanic isolation | between $U_{Aux}$ and $I_W$ |
| **HART communication** | |
| HART version | 7 |
| PC parameterization software | SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery. |

| Pressure sensors 6DR51.. -Z P01/ -Z P02 | |
|---|---|
| Required load voltage $U_B$ (corresponds to Ω at 20 mA) | max. 9.4 V (= 470 Ω) |
| Static destruction limit | ± 30 V |

| SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus | Electronics without explosion protection |
|---|---|
| **Electrical specifications** | |
| ***Auxiliary power supply, bus circuit*** | Bus-powered |
| Bus voltage | 9 ... 32 V |
| For connecting to circuits with the following peak values | |
| • Bus connection with FISCO supply unit | |
| • Bus connection with barrier | |
| Effective internal capacitance $C_i$ | - |
| Effective internal inductance $L_i$ | - |
| Current consumption | 11.5 mA ± 10% |
| Additional fault current | 0 mA |
| ***Safety shutdown can be activated with "jumper" (terminals 81/82)*** | Galvanically isolated from bus circuit and digital input |
| • Input resistance | > 20 kΩ |
| • Signal state "0" (shutdown active) | 0 ... 4.5 V or unconnected |
| • Signal state "1" (shutdown not active) | 13 ... 30 V |
| For connecting to power supply with the following peak values | |
| Effective internal capacitance and inductance | - |
| Digital input DI1 for PROFIBUS (terminals 9/10); electrically connected to the bus circuit) | Jumpered or connection to switching contact. Suitable only for floating contact; max. contact load < 5 µA at 3 V |
| Galvanic isolation | |

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## Technical specifications (continued)

| SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus | Electronics without explosion protection |
|---|---|
| • For basic device without explosion protection | Galvanic isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules |
| Test voltage | 840 V DC, 1 s |
| **PROFIBUS PA communication** | |
| Communication | Layers 1 and 2 according to PROFIBUS PA, transmission technology according to IEC 61158-2; slave function; layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard with the extended PROFIBUS functions (all data acyclic, manipulated variable, feedbacks and status also cyclic) |
| C2 connections | Four connections to master class 2 are supported; automatic connection setup 60 s after break in communication |
| Device profile | PROFIBUS PA profile B, version 3.02, more than 150 objects |
| Response time to master message | Typically 10 ms |
| Device address | 126 (when delivered) |
| PC parameterization software | SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery. |
| **FOUNDATION Fieldbus communication** | |
| Communications group and class | According to technical specification of the FOUNDATION Fieldbus for H1 communication |
| Function blocks/functions | Group 3, Class 31PS (Publisher Subscriber), 1 Resource Block (RB2), 1 Analog Output Function Block (AO), 1 PID Function Block (PID), 1 Transducer Block (Standard Advanced Positioner Valve), Link Active Scheduler (LAS) function |
| Execution times of the blocks | AO: 30 ms<br>PID: 40 ms |
| Physical layer profile | 123, 511 |
| FF registration | Tested with ITK 6.x |
| Device address | 22 (when delivered) |

### *Option modules*

| Digital I/O Module (DIO) | Without explosion protection, suitable for Ex d 6DR4004-8A |
|---|---|
| 3 digital output current circuits | • Alarm output A1: Terminals 41 and 42<br>• Alarm output A2: Terminals 51 and 52<br>• Alarm output: Terminals 31 and 32 |
| • Auxiliary power $U_{Aux}$ | ≤ 35 V and the current consumption is to be limited to < 25 mA |
| • Signal state | |
| - High (not addressed) | Conductive, R = 1 kΩ[1] |
| - Low[2] (addressed) | Blocked, $I_R$ < 60 µA |
| • For connecting to circuits with the following peak values | - |
| 1 circuit | Digital input DI2: Terminals 11 and 12, terminals 21 and 22 (jumper) |
| • Electrically connected to the basic device | |
| - Signal state 0 | Floating contact, open |
| - Signal state 1 | Floating contact, closed |
| - Contact load | 3 V, 5 µA |
| • Galvanically isolated from the basic device | |
| - Signal state 0 | ≤ 4.5 V or open |
| - Signal state 1 | ≥ 13 V |
| - Natural resistance | ≥ 25 kΩ |

## Technical specifications (continued)

| Digital I/O Module (DIO) | Without explosion protection, suitable for Ex d 6DR4004-8A |
|---|---|
| • Static destruction limit | ± 35 V |
| Galvanic isolation | The three outputs, the DI2 input and the basic device are galvanically isolated from each other. |

1) When using in the flameproof encapsulated enclosure, the current consumption must be restricted to 10 mA per output.
2) The status is also Low if the basic device is faulty or without auxiliary power.

| Analog Output Module (AOM) | Without explosion protection, suitable for Ex d 6DR4004-8J |
|---|---|
| DC output for position feedback | |
| 1 current output: Terminals 61 and 62 | 2-wire connection |
| Nominal signal range | 4 ... 20 mA, short-circuit-proof |
| Total operating range | 3.6 ... 20.5 mA |
| Auxiliary power $U_{Aux}$ | +12 ... +35 V |
| External load $R_B$ [kΩ] | ≤ ($U_{Aux}$ [V] – 12 V)/I [mA] |
| Transmission error | ≤ 0.3% |
| Temperature influence effect | ≤ 0.1%/10 K (≤ 0.1%/18 °F) |
| Resolution | ≤ 0.1% |
| Residual ripple | ≤ 1% |
| For connecting to circuits with the following peak values | - |
| Galvanic isolation | Galvanically isolated from the alarm option and safely isolated from the basic device |

| Inductive Limit Switches (ILS) | Without explosion protection, suitable for Ex d 6DR4004-8G |
|---|---|
| Limit transmitter with Inductive Limit Switches (ILS) and fault indicator | |
| 2 Inductive Limit Switches (ILS) | • Digital output (limit transmitter) A1: Terminals 41 and 42<br>• Digital output (limit transmitter) A2: Terminals 51 and 52 |
| • Connection | 2-wire system acc. to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side |
| • Signal state High (not addressed) | > 2.1 mA |
| • Signal state Low (addressed) | < 1.2 mA |
| • 2 Inductive Limit Switches (ILS) | Type SJ2-SN |
| • Function | NC (normally closed) contact |
| • Connecting to circuits with the following peak values | Rated voltage 8 V current consumption:<br>≥ 3 mA (limit not addressed)<br>≤ 1 mA (limit addressed) |
| 1 alarm output | Digital output: Terminals 31 and 32 |
| • Connection | On switching amplifier according to EN 60947-5-6: (NAMUR),<br>$U_{Aux}$ = 8.2 V, $R_i$ = 1 kΩ. |
| • Signal state High (not addressed) | R = 1.1 kΩ |
| • Signal state Low (addressed) | R = 10 kΩ |
| • Auxiliary power $U_{Aux}$ | $U_{Aux}$ ≤ DC 35 V<br>I ≤ 20 mA |
| • Connecting to circuits with the following peak values | - |
| Galvanic isolation | The 3 outputs are galvanically isolated from the basic device. |

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## Technical specifications (continued)

| Mechanic Limit Switches (MLS) | With explosion protection Ex i 6DR4004-6K |
|---|---|
| Limit transmitter with mechanical switching contacts | |
| 2 limit value contacts | • Digital output A1: Terminals 41 and 42<br>• Digital output A2: Terminals 51 and 52 |
| For connecting to circuits with the following peak values: | |
| • Max. switching voltage AC/DC | $U_i$ = 30 V |
| • Max. switching current AC/DC | $I_i$ = 100 mA |
| • Max. switching capacity | $P_i$ = 750 mW |
| 1 alarm output | Digital output: Terminals 31 and 32 |
| • Connection | On switching amplifier according to EN 60947-5-6: (NAMUR), $U_{Aux}$ = 8.2 V, $R_i$ = 1 kΩ |
| • Signal state High (not addressed) | R = 991 kΩ |
| • Signal state Low (addressed) | R = 10 kΩ |
| • Auxiliary power | $U_{Aux}$ ≤ DC 35 V<br>I ≤ 20 mA |
| Galvanic isolation | The 3 outputs are galvanically isolated from the basic device |

| Analog Input Module (AIM) | Without explosion protection 6DR4004-8F |
|---|---|
| | The Analog Input Module (AIM) 6DR4004-6F and -8F is required for connecting a Non Contacting Sensor (NCS) or Position Transmitter 6DR4004-1ES through -4ES. Potentiometers of a different design with resistance values between 3 and 20 kΩ and 4 ... 20 mA and 0 ... 10 V signals can also be connected. |
| R-potentiometer | |
| • Peak values when powered by the basic unit with PA (6DR55) or with FF communication (6DR56) | $U_{max}$ = 5 V |
| • Peak values when supplied by other basic units (6DR50/1/2/3/9) | $U_{max}$ = 5 V |
| Signal 20 mA | |
| • Nominal signal range | 0 ... 20 mA |
| • Internal load $R_B$ | 200 Ω |
| • Static destruction limit | 40 mA |
| Signal 10 V | |
| • Nominal signal range | 0 ... 10 V |
| • Internal resistance $R_i$ | 25 kΩ |
| • Static destruction limit | 20 V |
| Supply and signal circuits | Electrically connected to the basic device |

| NCS sensor | Without explosion protection 6DR4004-8N* |
|---|---|
| Position range | |
| • Linear actuator 6DR4004-.N.20 | 3 ... 14 mm (0.12 ... 0.55") |
| • Linear actuator 6DR4004-.N.30 | 10 ... 130 mm (0.39 ... 5.12"); up to 200 mm (7.87") on request |
| • Part-turn actuator | 30° ... 100° |
| Linearity for NCS sensor and internal NCS module 6DR4004-5L/-5LE (after correction by means of positioner) | ± 1 % |
| Hysteresis for NCS sensor and NCS module 6DR4004-5L/-5LE | ± 0.2 % |

## Technical specifications (continued)

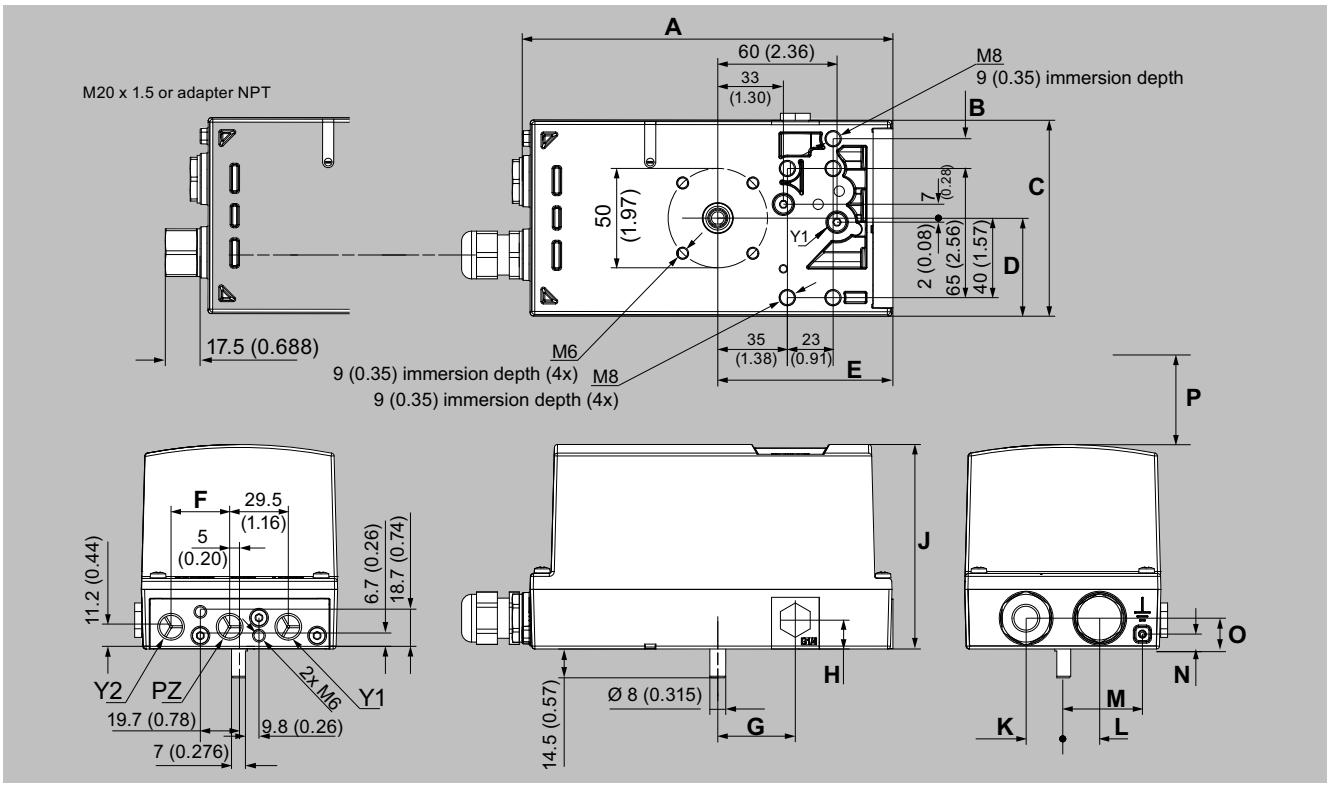
| NCS sensor | Without explosion protection 6DR4004-8N* |
|---|---|
| Temperature influence (range: Rotation angle 120° or stroke 14 mm) | ≤ 0.1%/10 K (≤ 0.1%/18 °F) for -20 ... +90 °C (-4 ... +194 °F)<br>≤ 0.2%/10 K (≤ 0.2%/18 °F) for -40 ... -20 °C (-40 ... -4 °F) |
| Climatic class | According to IEC EN 60721-3 |
| • Storage | 1K23, -40 ... +90 °C (-40 ... +194 °F) |
| • Transport | 2K12, -40 ... +90 °C (-40 ... +194 °F) |
| Continuous working temperature | -40 °C ... +90 °C (-40 °F ... +194 °F) |
| Vibration resistance | |
| • Harmonic oscillations (sine) according to IEC 60068-2-6 | 3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis<br>98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axis |
| • Bumping according to IEC 60068-2-29 | 300 m/s² (984 ft/s²), 6 ms, 4000 shocks/axis |
| Degree of protection | IP68 according to IEC/EN 60529; Type 4X according to NEMA 250 |

| Booster | |
|---|---|
| **Operating conditions** | |
| Permissible ambient temperature for operation | -30 ... +80 °C (-22 ... +176 °F) |
| Climatic class | According to IEC EN 60721-3 |
| • Storage | 1K23, -40 ... +80 °C (-40 ... +176 °F) |
| • Transport | 2K12, -40 ... +80 °C (-40 ... +176 °F) |
| Vibration resistance | |
| • Harmonic oscillations | According to ISA-S75.13 |
| • Bumping (half-sine) according to EN 60068-2-27/02.2010 | 150 m/s² (492 ft/s²), 6 ms, 1 000 shocks/axis |
| **Structural design** | |
| Booster weight | |
| • Single-acting | |
| - Optional module for standard enclosure | 2.9 kg (6.5 lb) |
| - Installed with polycarbonate enclosure | 4.0 kg (8.8 lbs) |
| - Optional module for flameproof aluminum enclosure | 3.3 kg (7.3 lbs) |
| - Installed with flameproof aluminum enclosure | 7.9 kg (17.4 lbs) |
| • Double-acting | |
| - Optional module for standard enclosure | 4.3 kg (9.4 lbs) |
| - Installed with polycarbonate enclosure | 5.3 kg (11.7 lbs) |
| - Optional module for flameproof aluminum enclosure | 4.7 kg (10.4 lbs) |
| - Installed with flameproof aluminum enclosure | 9.3 kg (20.5 lbs) |
| Connections | |
| • Pneumatic | ½-14 NPT or G½ |
| **Pneumatic data** | |
| Auxiliary power (inlet air) | Compressed air, carbon dioxide ($CO_2$), nitrogen ($N_2$), noble gasses or natural gas |
| • Pressure | 1.4 ... 7 bar (20.3 ... 101.5 psi) |
| • Inlet air | According to ISO 8573-1 |
| • Air consumption | $1.2 \times 10^{-2}$ Nm³/h (0.007SCFM) |
| Pressure gauge | Stainless steel enclosure MPa, bar, psi<br>Degree of protection IP54 |
| Flow capacity | Cv = 2.0 |

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## Dimensional drawings




SIPART PS2, non-flameproof enclosure, dimensions in mm (inch)

| Value | 6DR5..0 G¼ | ¼-18 NPT | 6DR5..1 | 6DR5..2 | 6DR5..3 G¼ | ¼-18 NPT |
|---|---|---|---|---|---|---|
| A | 184.5 (7.26) | 186.5 (7.34) | 185 (7.28) | 186.5 (7.34) | 186.5 (7.34) | 188.5 (7.42) |
| B | - | - | - | 15 (0.59) | - | - |
| C | 95 (3.74) | 95 (3.74) | 84 (3.31) | 99 (3.90) | 98.6 (3.88) | 98.6 (3.88) |
| D | 48 (1.89) | 48 (1.89) | 34.5 (1.36) | 49.5 (1.95) | 48.6 (1.91) | 48.6 (1.91) |
| E | 88.5 (3.48) | 90.5 (3.56) | 88.8 (3.50) | 88.5 (3.48) | 88.8 (3.50) | 90.8 (3.57) |
| F[1] | 29.5 (1.16) | 29.5 (1.16) | - | 29.5 (1.16) | 29.5 (1.16) | 29.5 (1.16) |
| G | 39 (1.54) | 39 (1.54) | 44 (1.73) | 39 (1.54) | 39 (1.54) | 39 (1.54) |
| H | 14.5 (0.57) | 14.5 (0.57) | 16 (0.63) | 16 (0.63) | 14.5 (0.57) | 14.5 (0.57) |
| J | 96.6 (3.80) | 96.6 (3.80) | 96.6 (3.80) | 98.5 (3.88) | 103 (4.06) | 103 (4.06) |
| K | 18.5 (0.73) | 18.5 (0.73) | 22 (0.87) | 18.5 (0.73) | 18.5 (0.73) | 18.5 (0.73) |
| L | 18.5 (0.73) | 18.5 (0.73) | 7 (0.23) | 18.5 (0.73) | 18.5 (0.73) | 18.5 (0.73) |
| M | - | - | 26.5 | 41.5 | 40 | 40 |
| N | - | - | 7.5 | 7.5 | 7.5 | 7.5 |
| O | 14.5 (0.57) | 14.5 (0.57) | 14.5 (0.57) | 14.5 (0.57) | 15.5 (0.61) | 15.5 (0.61) |
| P | > 150 (5.91)[2] | > 150 (5.91)[2] | > 150 (5.91)[2] | > 150 (5.91)[2] | > 150 (5.91)[2] | > 150 (5.91)[2] |

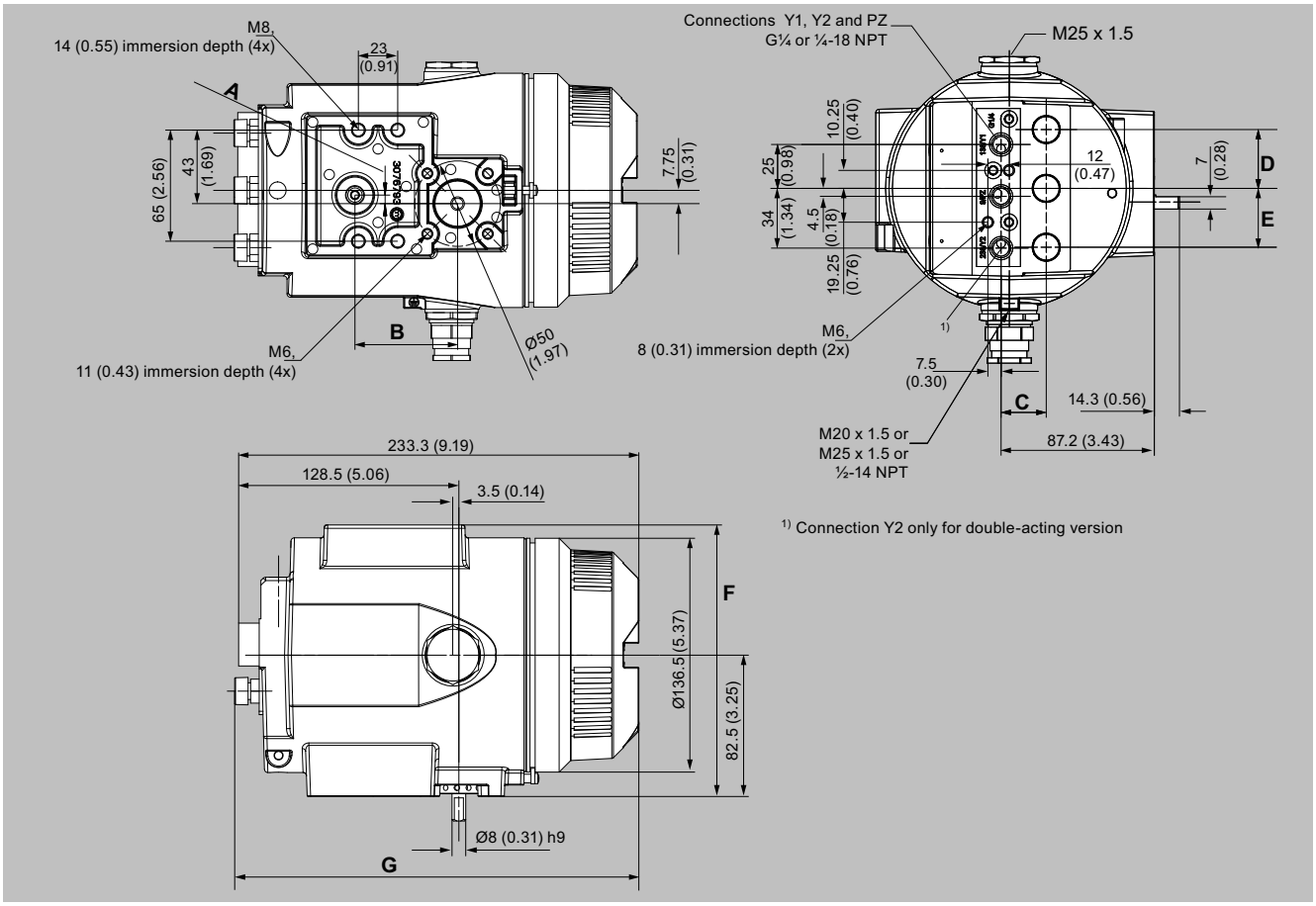
[1] Dimension applies only to double-acting actuators.
[2] Adhere to this minimum clearance P for service and maintenance above the lid.

| SIPART PS2, non-flameproof enclosure | |
|---|---|
| 6DR5..0 | Polycarbonate enclosure; dimensions with pneumatic interface G¼ or ¼-18 NPT |
| 6DR5.11 | Aluminum enclosure, only single-acting |
| 6DR5..2 | Stainless steel enclosure, without inspection window |
| 6DR5..3 | Aluminum enclosure; dimensions with pneumatic connection G¼ or ¼-18 NPT |

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## Dimensional drawings (continued)




SIPART PS2, flameproof enclosure, dimensions in mm (inch)

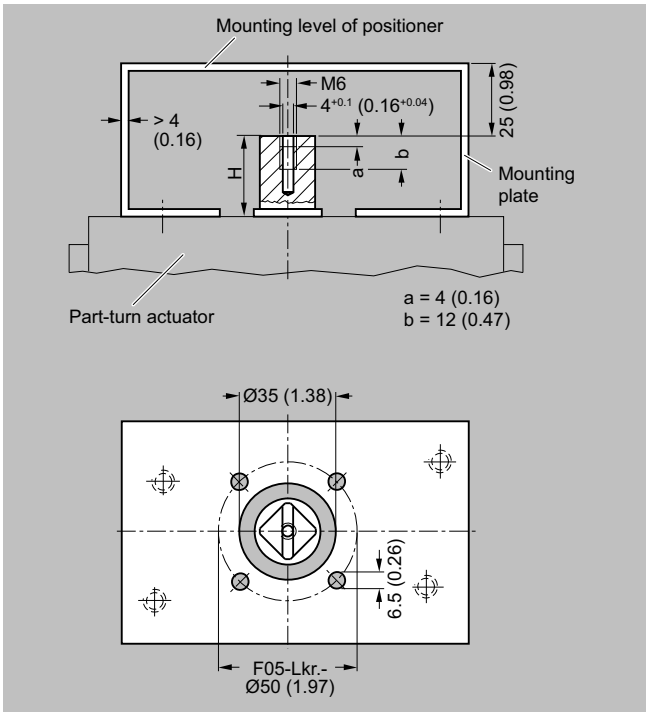
| Value | 6DR5..5 | 6DR5..6 |
|---|---|---|
| A | 5 (0.2) | - |
| B | 60 (2.36) | - |
| C | 25.7 (1.01) | 21.7 (0.85) |
| D | 33.5 (1.32) | 25 (0.99) |
| E | 33.5 (1.32) | - |
| F | 158.5 (6.24) | 160 (6.3) |
| G | 235.3 (9.26) | 227.6 (8.96) |

| SIPART PS2, flameproof enclosure | |
|---|---|
| 6DR5..5 | Aluminum enclosure, flameproof; dimensions with pneumatic interface G¼ or ¼-18 NPT |
| 6DR5..6 | Stainless steel enclosure, flameproof |

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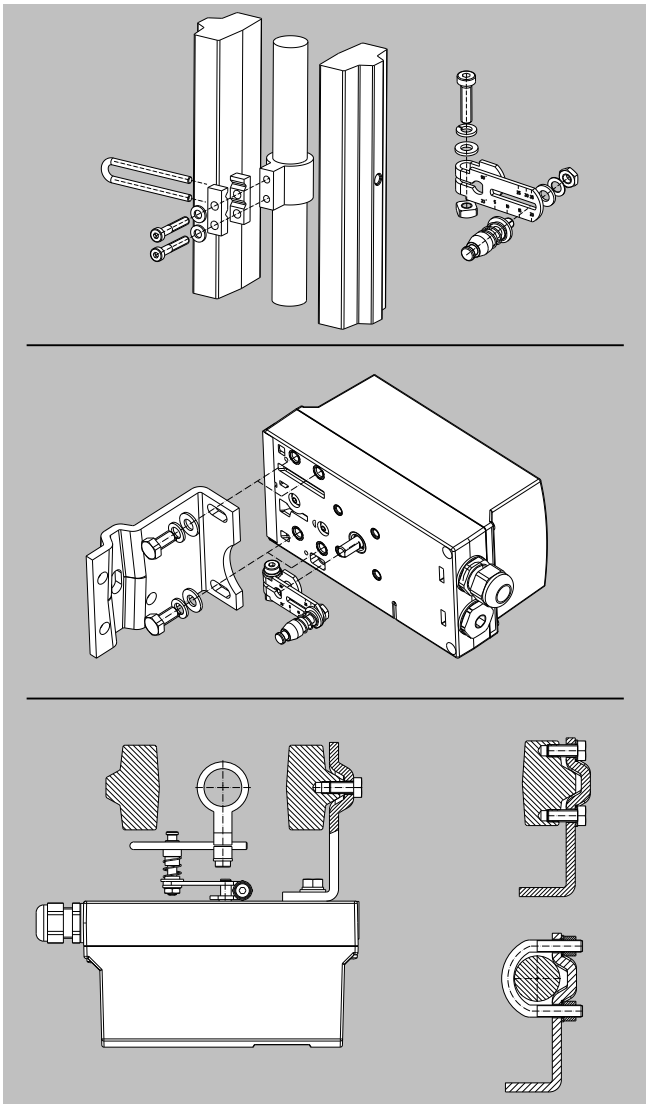
## Dimensional drawings (continued)




Mounting onto part-turn actuators; mounting console can be ordered via 6DR4004-1D/-2D/-3D/-4D, extract from VDI/VDE 3845, dimensions in mm (inch)

***Mounting kit for NAMUR linear actuators 6DR4004-8V***

- 1 mounting bracket
- 2 clamps
- 1 U-bracket
- 1 lever arm with adjustable tapered roller
- 2 U-bolts
- Various screws and lock washers

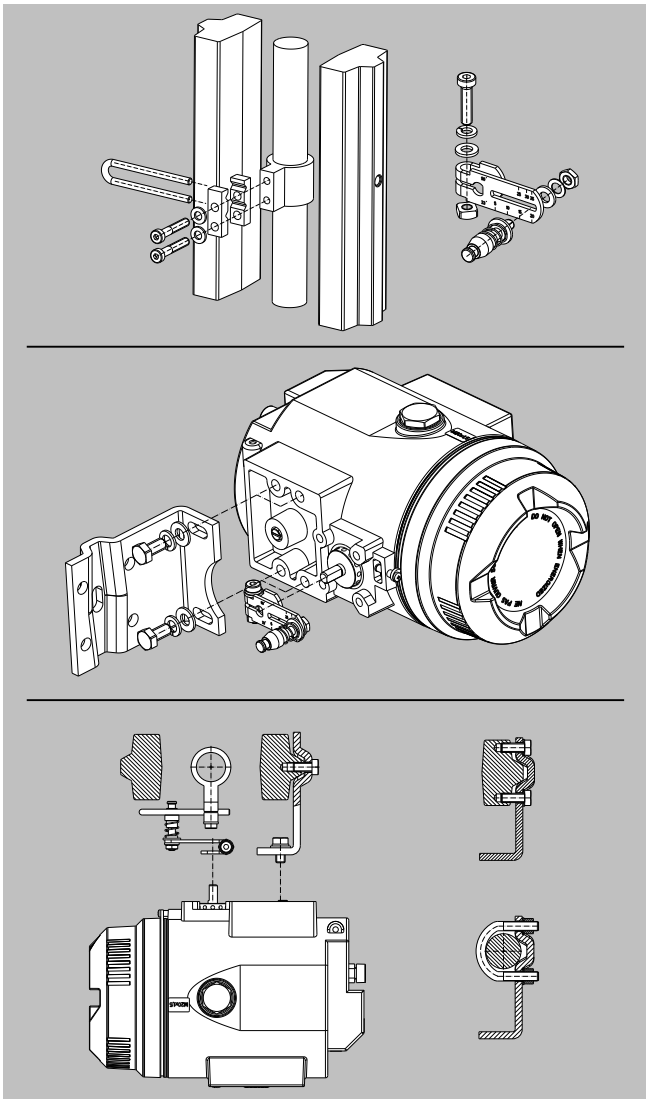


Mounting of SIPART PS2 on linear actuators

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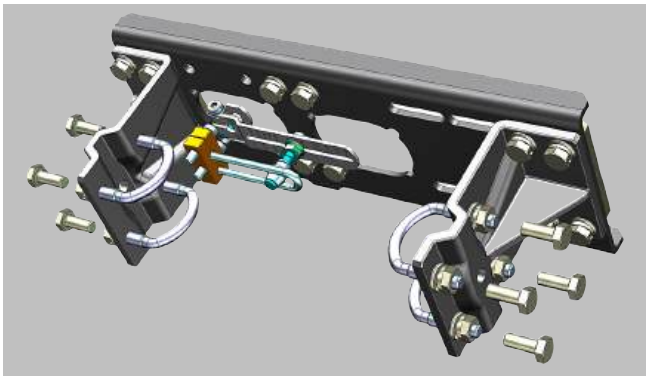
## Dimensional drawings (continued)



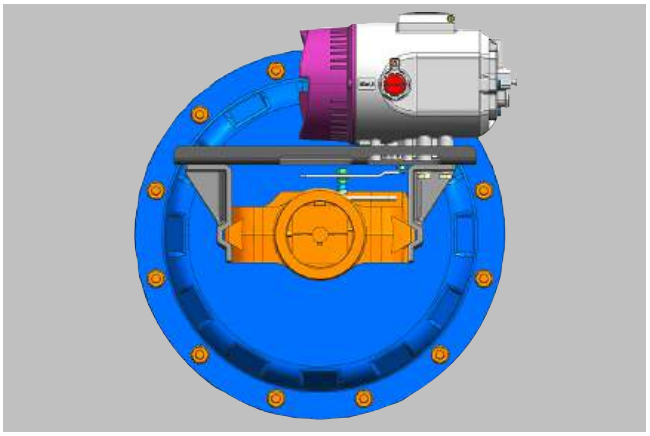
Mounting of SIPART PS2 in flameproof aluminum enclosure on linear actuators

***Mounting console made of stainless steel 316L for linear actuators 6DR4004-8R***

- Console with 2 adjustable mounting brackets
- 4 U-brackets for pillar mounting
- 1 lever arm with adjustable tapered roller
- 2 clamps with U-bracket
- Screws and lock washers



Mounting console made of stainless steel 316L 6DR4004-8R



Mounting console stainless steel 316L mounted on SIPART PS2 in flameproof stainless steel enclosure 316L

***Mounting kit for NAMUR part-turn actuators 6DR4004-8D***

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

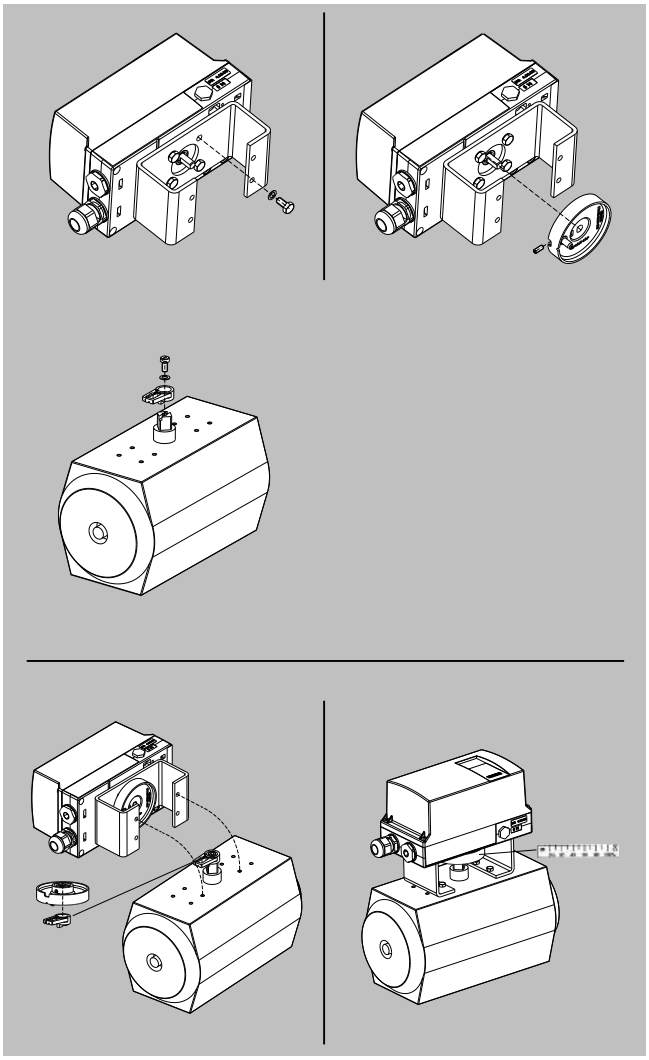
Notice

The mounting console for mounting on the part-turn actuators is not included in the scope of delivery, but can be ordered separately via 6DR4004-1D/-2D/-3D/-4D. Fixing screws are not included in the scope of delivery (see "Technical specifications")

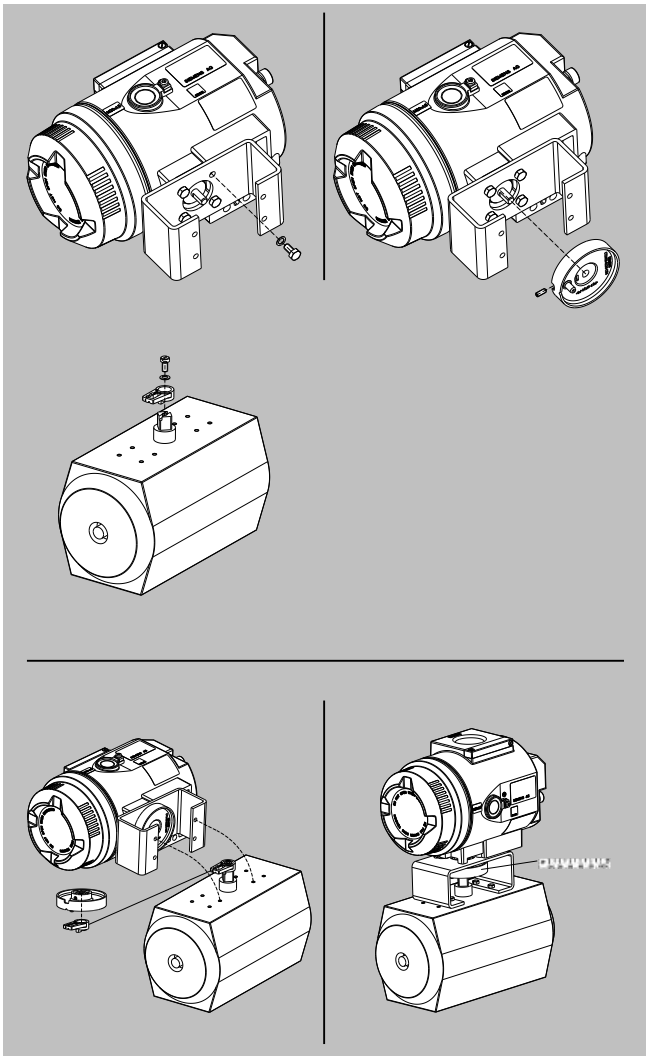
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## Dimensional drawings (continued)



Mounting of SIPART PS2 on part-turn actuators



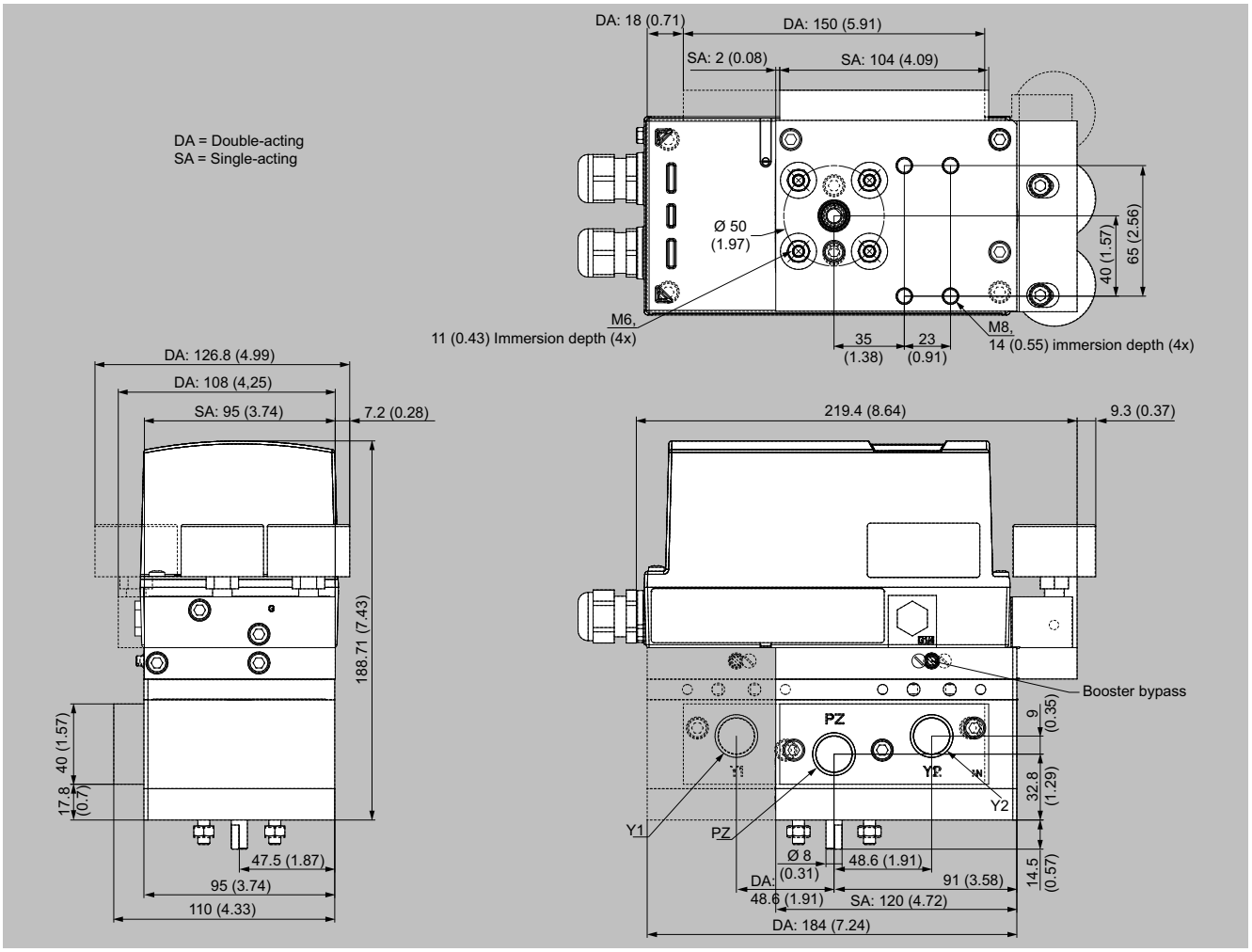
Mounting of SIPART PS2 in flameproof aluminum enclosure on part-turn actuators

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## Dimensional drawings (continued)

***Booster mounted on positioner***

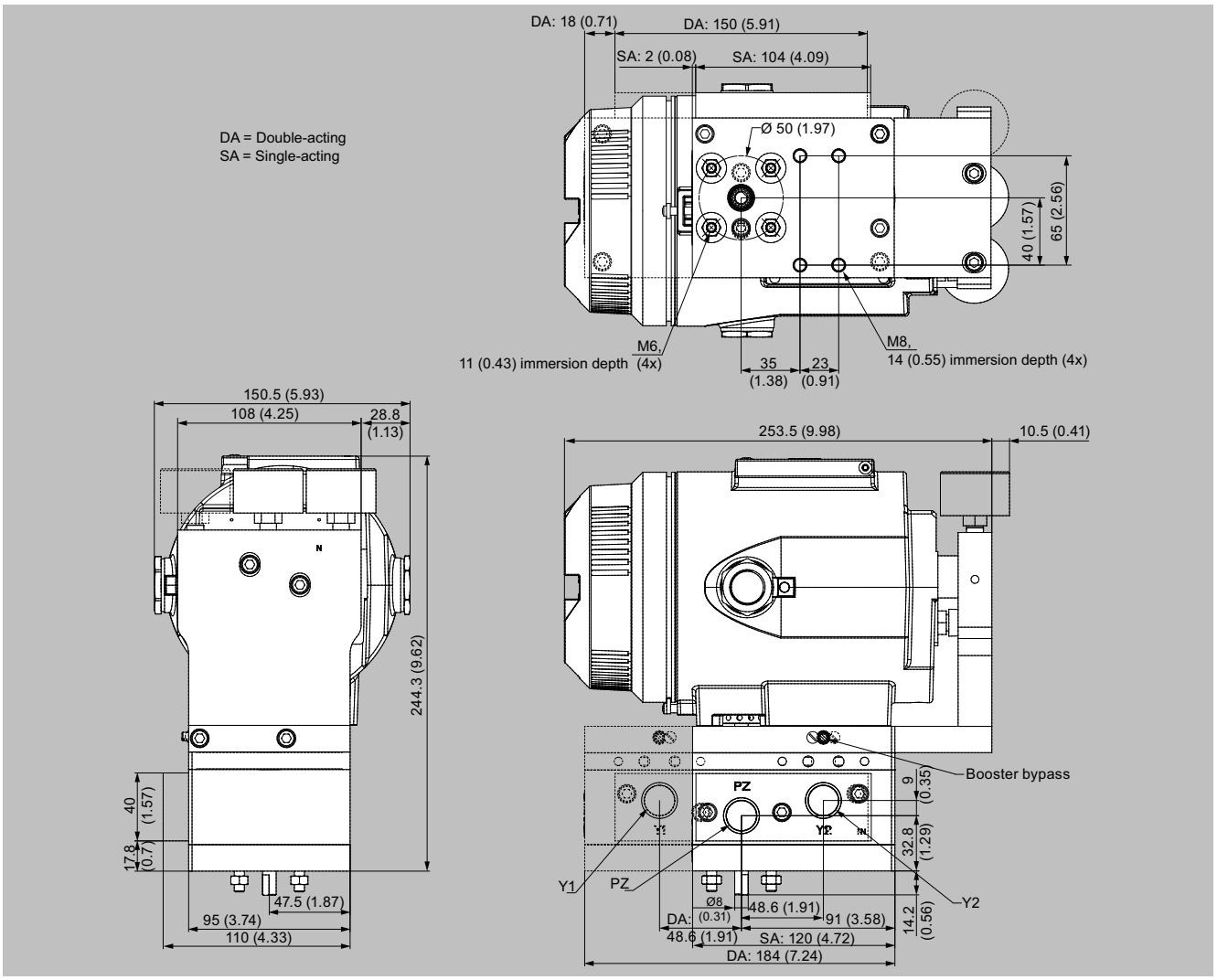



Booster mounted on positioner, dimensions in mm (inch)

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## Dimensional drawings (continued)




Booster mounted on positioner in a flameproof enclosure, dimensions in mm (inch)

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## More information

***Documentation and certificates***

All documentation and all available certificates are available free of charge in multiple languages through the QR code below:

***Special designs***

On request

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## Overview




SIPART PS100 with polycarbonate lid




SIPART PS100 in aluminum enclosure

The SIPART PS100 electropneumatic positioner is used to control the process valve or damper position of pneumatic linear or part-turn actuators. The SIPART PS100 regulates the process valve according to the setpoint.

## Benefits

The SIPART PS100 positioners offer the following advantages:

- Fast commissioning at the push of a button
- Simple operation via the local display and four buttons
- Local display symbols according to NAMUR NE 107
- Negligible air consumption in stationary operation
- Setting the application profile based on predefined selection options, e.g. close tight valve, open/close valve, small valve
- Rapid response in end positions means short travel times and a close tight valve.
- Insensitive to oscillations (vibrations) and steam hammer
- Leakage compensation ensures a constant actual value and protects the actuator
- Only one device version for linear and part-turn actuators
- Consistent parameter assignment with HART communication
- Safe use in hazardous areas

## Application

The SIPART PS100 is used in the following industry sectors:

- Valve manufacturing
- Chemical industry
- Power supply
- Paper
- Water and wastewater
- Food and beverages
- Pharmaceuticals

The SIPART PS100 can be utilized in applications with pneumatic actuators and a setpoint signal of 4 ... 20 mA.

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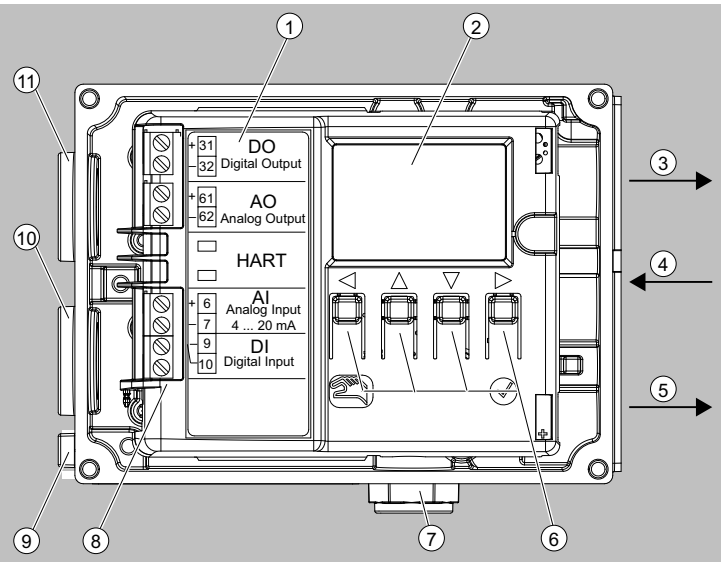
## Design

The SIPART PS100 positioner comprises the following components:

- Enclosure (base plate with lid)
- Electronics
- Wear-free, contact-free position detection
- Pneumatic block

The pneumatic block is located in the enclosure, the pneumatic connections for the inlet air and the actuating pressure on the right-hand side of the enclosure. The electrical connections are located on the left-hand side of the enclosure.
The SIPART PS100 positioner is fitted to the relevant pneumatic linear or part-turn actuator using an appropriate mounting kit. The positioner shaft is located on the underside of the base plate. The positioner shaft is connected to the spindle of the linear actuator or the actuator shaft of the part-turn actuator using the mounting kit.
The electronics are available with the following options:

- Analog output (AO) 4 to 20 mA
  The current position of the valve is converted into a 4 to 20 mA signal.
- Digital input and digital output (DI and DQ)
  - Position limit monitoring.
  - Output of an alarm in the event of a control deviation or a device fault.
  - Approach of a defined process valve position, disabling of keys, blocking of valve process valve by means of digital input.
- HART communication on parameter assignment and information on the device status




1 Wiring diagram on module cover
2 Display
3 Output: actuating pressure Y1
4 Input: supply air pressure PZ
5 Output: actuating pressure Y2 for double-acting actuators
6 Buttons
7 Exhaust air outlet with a sound absorber
8 Connecting terminals
9 Grounding, thread M4
10 Lower cable gland, thread M20x1.5
11 Upper cable gland, thread M20x1.5

SIPART PS100, enclosure with open lid

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## Function

Local operation is performed using the built-in local display and the four buttons. It enables, for example:

- Starting automatic commissioning with the press of a button
- Configuring the device
- Switching between the operation modes:
  - AUTO: The positioner controls the valve according to the analog input (AI) 4 to 20 mA
  - MANUAL: Valve movement with the middle keys

A hallmark of the SIPART PS100 is its own extremely low consumption of air. Compressed air is only required to move the valve. In the controlled state, consumption of air is negligible.

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## Selection and ordering data

| SIPART PS100 electropneumatic positioner without explosion protection | Article No. 6DR71 | ● | ● | - | 0 | ● | ● | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Enclosure material** | | | | | | | | | | | | | | |
| Polycarbonate, lid with inspection window | | 0 | | | | | | | | | | | | |
| Aluminum, lid without inspection window | | 1 | | | | | | | | | | | | |
| **Actuator type** | | | | | | | | | | | | | | |
| For single-acting actuators | | | 1 | | | | | | | | | | | |
| For double-acting actuators | | | 2 | | | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | |
| 2-wire, 4 ... 20 mA | | | | | | N | | | | | | | | |
| 2-wire, 4 ... 20 mA, HART | | | | | | A | N | | | | | | | |
| **Device option 1** | | | | | | | | | | | | | | |
| Without device option 1 | | | | | | | N | | | | | | | |
| With digital input (DI) and digital output (DQ) | | | | | | | A | | | | | | | |
| **Device option 2** | | | | | | | | | | | | | | |
| Without device option 2 | | | | | | | | 0 | | | | | | |
| With analog output (AQ) 4 ... 20 mA | | | | | | | | 1 | | | | | | |
| **Thread of the lower cable entry/cable gland** | | | | | | | | | | | | | | |
| M20 × 1.5/without cable gland | | | | | | | | | 0 | | | | | |
| M20 × 1.5/with plastic cable gland | | | | | | | | | 1 | | | | | |
| M20 × 1.5/with metal cable gland | | | | | | | | | 2 | | | | | |
| ½-14 NPT/without cable gland | | | | | | | | | 4 | | | | | |
| **Thread of the upper cable entry/cable gland** | | | | | | | | | | | | | | |
| M20 × 1.5/with blanking plug | | | | | | | | | | | 0 | | | |
| M20 × 1.5/with plastic cable gland | | | | | | | | | | | 1 | | | |
| M20 × 1.5/with metal cable gland | | | | | | | | | | | 2 | | | |
| ½-14 NPT/without cable gland | | | | | | | | | | | 4 | | | |
| **Pneumatic thread** | | | | | | | | | | | | | | |
| G¼ | | | | | | | | | | | | A | | |
| ¼-18 NPT | | | | | | | | | | | | B | | |
| **Pneumatic accessories** | | | | | | | | | | | | | | |
| Without gauge block | | | | | | | | | | | | | A | |
| Pressure gauge made of plastic, block made of aluminum | | | | | | | | | | | | | C | |
| Pressure gauge made of metal, block made of aluminum | | | | | | | | | | | | | D | |
| Gauge made of stainless steel, block made of stainless steel | | | | | | | | | | | | | E | |

| SIPART PS100 electropneumatic positioner with explosion protection | Article No. 6DR71 | ● | ● | - | ● | ● | N | ● | ● | - | ● | ● | ● | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Click the article number for online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | | | | |
| **Enclosure material** | | | | | | | | | | | | | | |
| Polycarbonate, lid with inspection window | | 0 | | | 1 | | | | | | | | | |
| Aluminum, lid without inspection window | | 1 | | | | | | | | | | | | |
| **Actuator type** | | | | | | | | | | | | | | |
| For single-acting actuators | | | 1 | | | | | | | | | | | |
| For double-acting actuators | | | 2 | | | | | | | | | | | |
| **Degree of protection** | | | | | | | | | | | | | | |
| Ex i (ATEX, IECEx,...)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00). | | | | | 1 | | | | | | | | | |
| Ex i; Ex e (ATEX, IECEx,...)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00). | | | | | 2 | | | | | | | | | |
| Ex i; Ex e; Ex t (ATEX, IECEx,...)<br>SITRANS I200 output isolation amplifier sold separately (7NG4131-1AA00). | | | | | 3 | | | | | | | | | |
| **Communication** | | | | | | | | | | | | | | |
| 2-wire, 4 ... 20 mA | | | | | | N | | | | | | | | |
| 2-wire, 4 ... 20 mA, HART | | | | | | A | | | | | | | | |
| **Device option 2** | | | | | | | | | | | | | | |
| Without device option 2 | | | | | | | | 0 | | | | | | |
| With analog output (AQ) 4 ... 20 mA<br>SITRANS I100 isolating power supply sold separately (7NG4124-1AA00). | | | | | | | | 1 | | | | | | |

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## Selection and ordering data (continued)

| SIPART PS100 electropneumatic positioner with explosion protection | Article No. 6DR71 ● ● - ● ● N ● ● - ● ● ● 0 |
|---|---|
| **Thread of the lower cable entry/cable gland** | |
| M20 × 1.5/without cable gland | 0 |
| M20 × 1.5/with plastic cable gland | 1 |
| M20 × 1.5/with metal cable gland | 2 |
| ½-14 NPT/without cable gland | 4 |
| **Thread of the upper cable entry/cable gland** | |
| M20 × 1.5/with blanking plug | 0 |
| M20 × 1.5/with plastic cable gland | 1 |
| M20 × 1.5/with metal cable gland | 2 |
| ½-14 NPT/without cable gland | 4 |
| **Pneumatic thread** | |
| G¼ | A |
| ¼-18 NPT | B |
| **Pneumatic accessories** | |
| Without gauge block | A |
| Pressure gauge made of plastic, block made of aluminum | C |
| Pressure gauge made of metal, block made of aluminum | D |
| Gauge made of stainless steel, block made of stainless steel | E |

| Options<br>Add "-Z" to article number, specify order code and plain text | Order code |
|---|---|
| **TAG plate made of stainless steel, 3-line**<br>Input fields<br>Text line 1: plain text from Y15<br>Text line 2: plain text from Y16<br>Text line 3: plain text from Y17 | **A20** |
| **Version with stainless steel sound absorbers** | **A40** |
| Explosion protection (Japan) | **E29** |
| EN 10204 certificate type 2.1 | **C35** |
| DNV (Det Norske Veritas) | **S10** |
| **Measuring point description**<br>Input field: Max. 16 characters; specify in plain text | **Y15** |
| **Measuring point text**<br>Input field: Max. 24 characters; specify in plain text | **Y16** |
| **Measuring point number (TAG no.)**<br>Input field: Max. 32 characters; specify in plain text | **Y17** |

| Accessories | Article No. |
|---|---|
| Bluetooth adapter and assembly kit PS100 | **7MP3210-0AA01** |
| **Gauge block** | |
| With pressure gauges made of plastic IP31 (MPa, bar) | |
| • Block made of aluminum, single-acting, G¼ | **6DR4004-1M** |
| • Block made of aluminum, double-acting, G¼ | **6DR4004-2M** |
| With pressure gauges made of plastic IP31 (MPa, psi) | |
| • Block made of aluminum, single-acting, ¼-18 NPT | **6DR4004-1MN** |
| • Block made of aluminum, double-acting, ¼-18 NPT | **6DR4004-2MN** |
| With gauges made of metal IP44 (MPa, bar, psi) | |
| • Block made of aluminum, single-acting, G¼ | **6DR4004-1P** |
| • Block made of aluminum, double-acting, G¼ | **6DR4004-2P** |
| • Block made of aluminum, single-acting, ¼-18 NPT | **6DR4004-1PN** |
| • Block made of aluminum, double-acting, ¼-18 NPT | **6DR4004-2PN** |

| Accessories | Article No. |
|---|---|
| With pressure gauges made of stainless steel 316 IP54 (MPa, bar, psi) | |
| • Block made of stainless steel 316, single-acting, G¼ | **6DR4004-1Q** |
| • Block made of stainless steel 316, double-acting, G¼ | **6DR4004-2Q** |
| • Block made of stainless steel 316, single-acting, ¼-18 NPT | **6DR4004-1QN** |
| • Block made of stainless steel 316, double-acting, ¼-18 NPT | **6DR4004-2QN** |
| **Venting gauge block**<br>Depressurizing of Y2 on compressed air failure with pressure gauges made of metal IP44 (MPa, bar, psi). The double-acting actuator with springs moves into the safety position. | |
| • Block made of aluminum, double-acting, G¼ | **6DR4004-2RE** |
| • Block made of aluminum, double-acting, ¼-18 NPT | **6DR4004-2RF** |
| **Booster (Cv = 2)**<br>Aluminum with gauges made of metal IP44 (MPa, bar, psi) | |
| • Single-acting, G½ | **6DR4004-1RJ** |
| • Double-acting, G½ | **6DR4004-2RJ** |
| • Single-acting, ½-14 NPT | **6DR4004-1RK** |
| • Double-acting, ½-14 NPT | **6DR4004-2RK** |
| **Mounting kit for NAMUR part-turn actuators** | |
| VDI/VDE 3845, with plastic coupling wheel, without mounting console | **6DR4004-8D** |
| VDI/VDE 3845, with stainless steel coupling, without mounting console | **TGX:16300-1556** |
| Console for mounting on NAMUR part-turn actuators VDI/VDE 3845 | |
| • 80 × 30 × 20 mm (3.15 × 1.18 × 0.79 inches) | **6DR4004-1D** |
| • 80 × 30 × 30 mm (3.15 × 1.18 × 1.18 inches) | **6DR4004-2D** |
| • 130 × 30 × 30 mm (5.12 × 1.18 × 1.18 inches) | **6DR4004-3D** |
| • 130 × 30 × 50 mm (5.12 × 1.18 × 1.97 inches) | **6DR4004-4D** |

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## Selection and ordering data (continued)

| Accessories | Article No. |
|---|---|
| **Mounting kit for other part-turn actuators**<br>The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D. | |
| SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A | **TGX:16152-328** |
| Masoneilan Camflex II | **TGX:16152-350** |
| Fisher 1051/1052/1061, to 30, 40, 60 to 70 | **TGX:16152-364** |
| Fisher 1051/1052, size 33 | **TGX:16152-348** |
| **Mounting kit for NAMUR linear actuators** | |
| NAMUR-linear actuator with short lever (2 ... 35 mm (0.08 ... 1.38 inches)) | **6DR4004-8V** |
| Lever arm for strokes of 35 ... 130 mm (1.38 ... 5.12 inches) without NAMUR mounting bracket | **6DR4004-8L** |
| Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm (1.38 inches) stroke | **6DR4004-8VK** |
| Reduced mounting kit (as for 6DR4004-8V but without fixing angle and U-bracket), with long lever > 35 mm (1.38 inches) stroke | **6DR4004-8VL** |
| Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators | **6DR4004-3N** |
| Two terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators | **6DR4004-3M** |
| **Mounting kit for other linear actuators** | |
| MASONEILAN type 87/88 | **TGX:16152-1210** |
| MASONEILAN type 37/38, all sizes | **TGX:16152-1215** |
| Fisher type 657/667, size 30 ... 80 | **TGX:16152-900** |
| **Interface according to VDI/VDE 3847** | |
| Interface according to VDI/VDE 3847 for single and double-acting, CATS-equipped (Clean Air To Spring) on single-acting, not for flameproof enclosure | **6DR4004-5PB** |

***Scope of delivery for positioner***

1 SIPART PS100 positioner as ordered

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## Technical specifications

| SIPART PS100 | |
|---|---|
| **Input** | |
| Analog input (AI), terminals 6 and 7 | |
| • Nominal signal range | 4 ... 20 mA |
| • Minimum current to maintain operation | 3.8 mA |
| • Maximum load voltage | 6.5 V (corresponds to 325 Ω at 20 mA) |
| • Static destruction limit | ± 40 mA |
| • Type of communication | HART 7 |
| Digital input (DI), terminals 9 and 10 | |
| • Galvanic isolation | Electrically connected to analog input<br>Galvanically isolated from the outputs |
| • Signal state 0, floating contact open | > 300 kΩ |
| • Signal state 1, floating contact closed | < 3 kΩ |
| • Contact load | Suitable only for floating contact; max. contact load < 20 µA, 3 V |
| **Output** | |
| Analog output (AO), terminals 61 and 62 | |
| • Connection type | 2-wire connection |
| • Nominal signal range | 4 ... 20 mA |
| • Fault current | < 3.6 mA |
| • Supply voltage $U_H$ | 12 ... 30 V |
| • External load $R_B$ [kΩ] | ≤ ($U_H$ [V] - 12 V)/$I_O$ [mA] |
| • Resolution in relation to the nominal signal range | 0.05% |
| • Transmission error in relation to the nominal signal range | ± 0.3% |
| • Effect of ambient temperature | ± 0.1%/10K |
| • Maximum residual ripple | ± 0.5% |
| • Galvanic isolation | Galvanically isolated from the other electrical inputs and outputs |
| Digital output (DQ), terminals 31 and 32 | |
| • Maximum supply voltage $U_H$ | 35 V |
| • External current consumption | To be limited to 50 mA |
| • "Conductive" state | • Permissible rated current 50 mA<br>• Maximum terminal voltage 3 V<br>• Overload-proof |
| • "Locked" state<br>"Locked" is also the state if the device is faulty or analog input (AI) is = 0 mA. | I < 60 µA |
| **Operating conditions** | |
| Ambient conditions for operation according to IEC 60068-2 | For indoor and outdoor use |
| Ambient temperature | |
| • Ambient temperature | -20 ... +80 °C (-4 ... +176 °F) |
| • Relative humidity | 0 ... 100% |
| Pollution degree according to IEC 61010-1 | 2 |
| Overvoltage category according to IEC 61010-1 | II |
| Degree of protection of enclosure | |
| • According to IEC 60529 | IP66 |
| • According to NEMA 250 | Type 4X |
| Corrosion protection according to EN ISO 9227:2022 and EN ISO 12944:2017 | |
| • 6DR710 polycarbonate enclosure | C5-M medium durability |
| • 6DR711 aluminum enclosure | C5-M medium durability |
| Vibration resistance | |
| • Harmonic oscillations (sine) according to IEC 60068-2-6 | 3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis,<br>98.1 m/s² (321.84 ft/s²),<br>27 ... 300 Hz, 3 cycles/axis |

## Technical specifications (continued)

| SIPART PS100 | |
|---|---|
| • Bumping (half-sine) according to IEC 60068-2-27 | 150 m/s² (492 ft/s²), 6 ms, 1 000 shocks/axis |
| • Noise (controlled digitally) according to IEC 60068-2-64 | 10 ... 200 Hz; 1 $(m/s^2)^2$/Hz (3.28 $(ft/s^2)^2$/Hz)<br>200 ... 500 Hz; 0.3 $(m/s^2)^2$/Hz<br>(0.98 $(ft/s^2)^2$/Hz), 4 hours/axis |
| Climatic class | According to IEC EN 60721-3 |
| • Storage | 1K23, -40 ... +80 °C (-40 ... +176 °F) |
| • Transport | 2K13, -40 ... +80 °C (-40 ... +176 °F) |
| **Pneumatic data** | |
| Pneumatic operating medium | Compressed air, carbon dioxide ($CO_2$), nitrogen ($N_2$), noble gasses |
| • Operating pressure | 1.4 ... 7 bar (20.3 ... 101.5 psi) |
| Air quality according to ISO 8573-1 | |
| • Solid particulate size and density | Class 3 |
| • Pressure dew point | Class 3 (min. 20 K (36 °F) below ambient temperature) |
| • Oil content | Class 3 |
| Flow rate | |
| • Aerate process drive | |
| - Supply pressure 4 bar (58 psi) | 7.1 $Nm^3/h$ (31.3 USgpm) |
| - Supply pressure 6 bar (87 psi) | 9.8 $Nm^3/h$ (43.1 USgpm) |
| • Depressurize process drive | |
| - Actuating pressure 4 bar (58 psi) | 13.7 $Nm^3/h$ (60.3 USgpm) |
| - Actuating pressure 6 bar (87 psi) | 19.2 $Nm^3/h$ (84.5 USgpm) |
| Leakage actuator chamber (positioner portion) | < 6 · $10^{-4}$ $Nm^3/h$ (0.0026 USgpm) |
| Typical auxiliary power consumption in the controlled state | 0.01 $Nm^3/h$ (0.044 US gpm) |
| Sound pressure | • $L_{A\,eq}$ < 75 dB<br>• $L_{A\,max}$ < 80 dB |
| **Structural design** | |
| Supported actuator types | |
| • Linear actuator, range of stroke | 10 ... 130 mm (0.39 ... 5.12") |
| • Part-turn actuator, angle-of-rotation range | 10 ... 100° |
| Weight, positioner without accessories | Approx. 1.0 kg (2.20 lbs) |
| Material | |
| • Lid | • Aluminum<br>• Polycarbonate |
| • Base plate | Aluminum |
| • Gauge block | Aluminum, anodized or stainless steel 316 |
| • Pressure gauge | • Plastic, mechanics brass<br>• Stainless steel, mechanics brass nickel-plated<br>• Stainless steel, mechanics stainless steel 316 |
| Torques | |
| • Lid fixing screws | 1.5 Nm (1.1 ft lb) |
| • Part-turn actuator fixing screws DIN 933 M6x12-A2 | 5 Nm (3.7 ft lb) |
| • Linear actuator fixing screws DIN 933 M8x16-A2 | 12 Nm (8.9 ft lb) |
| • Gland pneumatic G¼ | 15 Nm (11.1 ft lb) |
| • Gland pneumatic ¼-18 NPT | |
| - Without sealant | 12 Nm (8.9 ft lb) |
| - With sealant | 6 Nm (4.4 ft lb) |

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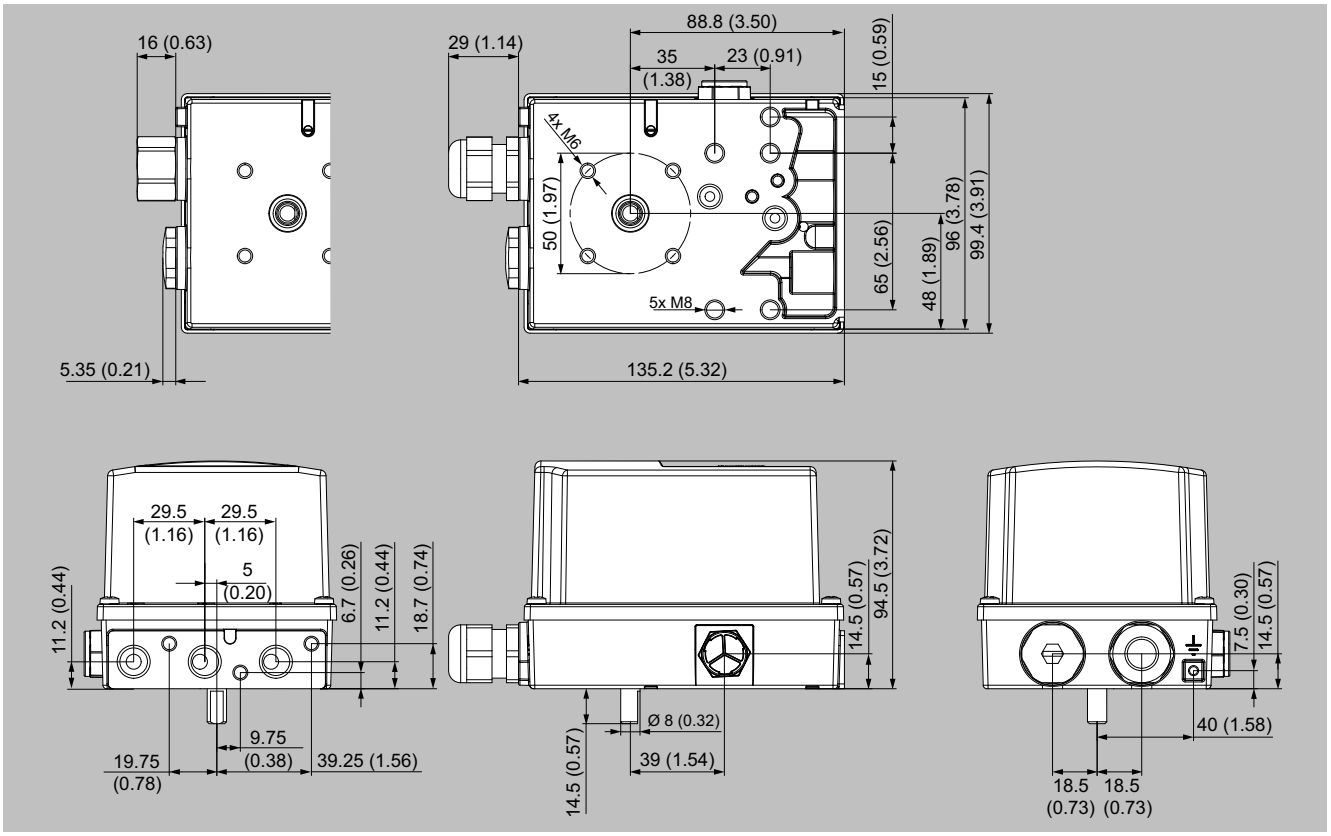
## Technical specifications (continued)

| SIPART PS100 | |
|---|---|
| • M20 cable gland, plastic | 4 Nm (3 ft lb) |
| • M20 cable gland, metal | 6 Nm (4.4 ft lb) |
| • ½-14 NPT cable gland, metal | 15 Nm (11.1 ft lb) |
| • ½-14 NPT cable gland, metal in the NPT adapter | 68 Nm (50 ft lb) |
| **IMPORTANT:** To avoid damage to the device, the NPT adapter must be held in place while the NPT gland is screwed into the NPT adapter. | |
| • Union nut made of plastic | 2.5 Nm (1.8 ft lb) |
| • Union nut made of metal | 4 Nm (3 ft lb) |
| • Gauge block fixing screws | 6 Nm (4.4 ft lb) |
| Pressure gauge | |
| • Degree of protection | |
| - Plastic pressure gauge, mechanics brass | IP31 |
| - Metal pressure gauge, mechanics brass nickel-plated | IP44 |
| - Stainless steel pressure gauge, mechanics stainless stee 316L | IP54 |
| Connections, electrical | |
| • Screw terminals | 2.5 $mm^2$ AWG30-14 |
| • Cable bushing | M20x1.5 or ½-14 NPT with NPT adapter |
| Connections, pneumatic | G¼ or ¼-18 NPT |
| **Controller** | |
| Controller unit | |
| • Five-point switch | Adaptive |
| • Deadband | |
| - Adjustable maximum value | ± 0.1 ... 3%, plus hysteresis (half of the deadband, but at least 0.2%) |
| - Minimization of the maximum value | Always active |
| Analog input (AI), terminals 6 and 7 | |
| • Sampling interval | 50 ms |
| • Resolution | 0.05% |
| Position detection | |
| • Sampling interval | 10 ms |
| • Resolution at 10 mm stroke | 0.1% |
| • Temperature influence effect | 0.1%/10 K (0.1%/18 °F) |
| **Certificates and approvals** | |
| DoC compliance | You can find the appropriate directives and standards, including the relevant versions, in the Declaration of Conformity on the internet. |
| UL conformity | The SIPART PS100 has documented compliance with the safety requirements in the USA and Canada. These are UL classified, recognized and listed. |
| Explosion protection | You can find details on explosion protection in the compact operating instructions and the explosion protection certificates. |

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## Dimensional drawings




Non-flameproof enclosure, dimensions in mm (inch)

## More information

***Documentation and certificates***

All documentation and all available certificates are available free of charge in multiple languages through the QR code below:

***Special designs***

On request

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| | |
|---|---|
| **6/2** | **Product overview** |
| **6/4** | **Acoustic and motion sensing** |
| **6/6** | **Acoustic sensors** |
| 6/6 | SITRANS DA400 Acoustic diagnostic unit |
| 6/12 | SITRANS AS100 Acoustic sensor |
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| **6/21** | **Motion sensors** |
| 6/21 | Milltronics MFA 4p Motion failure alarm controller |
| 6/29 | Milltronics MSP-7 Motion sensor |
| 6/32 | SITRANS WM300 Motion failure alarm controller |
| 6/37 | SITRANS WM100 Motion sensor |

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## Overview

| | Application | Device description |
|---|---|---|
| **Acoustic sensor for pump monitoring**<br>  | Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways. | **SITRANS DA400**<br>• 4 inputs for structure-born noise sensors<br>• 4 universal inputs<br>• 6 digital outputs<br>• With PROFIBUS DP or PROFIBUS PA<br>• Sensor degree of protection IP66/IP68 |
| **Acoustic sensors for material flow monitoring**<br>  | Acoustic sensor for solids flow detection. | **SITRANS AS100**<br>• Non-invasive<br>• Screw in, bolt on, weld, or bond in place<br>• Analog output<br>• High and low sensitivity range of operation |
|  | Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow.<br>It processes signals from the sensor, providing relay and analog outputs for interface into a process. | **SITRANS CU02**<br>• 3 digit LCD display<br>• 4 ... 20 mA output<br>• Two programmable relays<br>• Adjustable independent time delay for each relay<br>• DIN rail mounting provides easy installation |

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## Overview (continued)

| Motions sensors | Application | Device description |
|---|---|---|
|  | Highly sensitive single set point motion sensor alarm unit, used with MSP probes. | **Milltronics MFA 4p**<br>• Probe/target separation up to 100 mm (4 inch)<br>• Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm) |
|  | Highly sensitive dual setpoint motion sensor system, used with Milltronics MSP probes. | **SITRANS WM300 MFA**<br>• Up to 100 mm (4 inch) gap between target and probe.<br>• Setpoint adjustment range 2 to 5 000 Hz (120 to 300 000 ppm |
|  | Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs. | **Milltronics MSP-7**<br>• Up to 100 mm (4 inch) gap between target and probe<br>• Corrosion resistant construction |
|  | Heavy-duty zero speed alarm switch. | **SITRANS WM100**<br>• Detects the absence or presence of motion of rotating or reciprocating or conveying equipment |

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## Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.

## Mode of operation

***Acoustic Sensing***

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The SITRANS AS100 sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

***Motion sensing***

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

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## Technical specifications

***Process Protection Selection Guide***

| Criteria | SITRANS DA400 | SITRANS AS100 | Milltronics MFA 4p | SITRANS WM300 MFA | Milltronics MSP-7 | SITRANS WM100 |
|---|---|---|---|---|---|---|
| Typical industries | Mining, water/wastewater, chemicals/petrochemicals and oil & gas industry | Aggregates, grain, cement, food processing, power generation, steel processing | Aggregates, cement, mining, wastewater, grain | Mining aggregate, cement, and other primary and secondary industries. | General industrial applications | Aggregates, cement, mining |
| Typical Applications | Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels. | Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection | Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators | Tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators | Tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps | Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators |
| Operation | Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency | Acoustic sensing | Motion sensing | Motion sensing | Motion sensing | Motion sensing |
| Enclosure | Electronics housing, Makrolon IP65, sensor, stainless steel material number 1.4571 (316Ti SST) | Compact 304 or 303 stainless steel, IP68 | Type 4X/NEMA 4X/IP65 polycarbonate | Polycarbonate | Type 4X/NEMA 4X/-IP67 aluminum | Type 4X/NEMA 4X/IP67 aluminum |
| Sensor mounting | Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways | Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap | Non-contacting probes secured with supplied flange | Non-contacting probes secured with supplied flange | Non-contacting probe secured with supplied flange | Non-contacting, secured with supplied flange |
| Operating temperature | Electronics:<br>-20 ... +60 °C<br>(-4 ... +140 °F)<br>Sensor:<br>-20 ... +110 °C<br>(-4 ... +230 °F) | -20 ... +80 °C<br>(-4 ... +176 °F)[1] | -20 ... +50 °C<br>(-4 ... +122 °F)[2] | -20 ... +50 °C<br>(-4 ... +122 °F) | -40 ... +60 °C<br>(-40 ... +140 °F) | -40 ... +60 °C<br>(-40 ... +140 °F) |
| Power requirements | 19 V ... 36 V DC,<br>< 100 mA | 20 ... 30 V DC, 18 mA | 100/115/200/230 V AC ± 10 % 50/60 Hz, 15 VA | 100 ... 240 V AC, 50/60 Hz,<br>0.7 ... 0.35 A per LOGO! power module | 21 ... 28 V DC,<br>40 mA max. | 115 or 230 V AC<br>± 10 % 50/60 Hz,<br>7 VA |
| Approvals | CE, PROFIBUS DP, and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D | CE, RCM, CSA/FM Class II, Div. 1, Groups E, F, G optional, ATEX II, 2GD, 3D optional, EAC | $CSA_{US/C}$, CE, RCM | CE, CSA/$UL_{C/US}$, FM, EAC, RCM, KCC | CE, RCM | $CSA_{US/C}$, CE, RCM |

[1] Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)
[2] Probes available for -40 ... +260 °C (-40 ... +500 °F)

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# SITRANS DA400 Acoustic diagnostic unit

## Overview



The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- In the version for pump monitoring; on oscillating displacement pumps
- In the version for material flow monitoring; on pipes, conveying equipment or channels.

It comprises an electric diagnostic unit and up to four acoustic sensors.

## Benefits

***Benefits when pump monitoring***

- Increased availability of the system through:
  - Advanced maintenance planning thanks to early recognition of defective components
  - Reduced downtimes (no fault locating necessary)
  - Increased maintenance intervals
  - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- Increased productivity

***Benefits when material flow monitoring***

- Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

## Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where an oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. against the pipe or channel wall.

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## Function

***Product features***

Continuous and independent status monitoring:

- Of the flow control valves, for leaks
- Of the membranes, for material fatigue
- Of the temperature loading of the hydraulic oil
- Of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate control systems:

- Via digital outputs
- Digitally, via PROFIBUS DP

Simple to operate and parameterize:

- Locally, via digital display and keys
- PROFIBUS DP

***Mode of operation***

Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

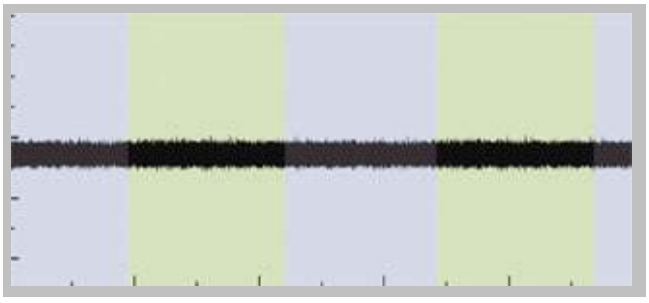
The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

These oscillations are created by:

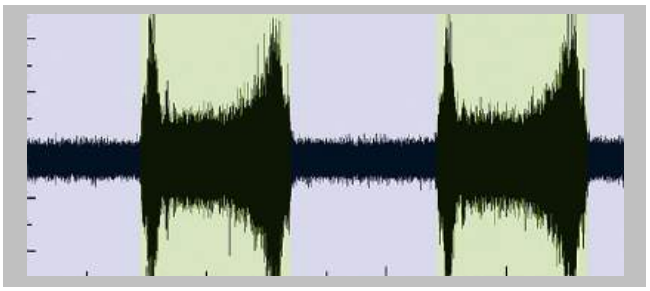
- Friction and impact of bulk solids in:
  - pipes, raceways or channels
  - chutes
  - conveyors
- Friction and impact of mechanical parts
- Bursting of bubbles
- Cavitation
- Turbulence in gas and liquid flows

The following shows an example of signal levels at an oscillating displacement pump



Signal from structure-borne sound sensor with intact valve

## Function (continued)



Signal from structure-borne sound sensor with defective valve

Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave impacts on the sensor base is not important.

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## Selection and ordering data

| SITRANS DA400 Acoustic diagnostic unit<br>Monitors material flow in pipes, leakage in valves or oscillating pumps with up to 4 independent acoustic sensors. | Article No.<br>7MJ2400- | ● | A | A | 0 | ● |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Communication** | | | | | | |
| • PROFIBUS DP | | 1 | | | | |
| **Application software** | | | | | | |
| For continuous condition monitoring of positive displacement pumps | | | | | | 1 |
| For material flow monitoring in pipes, raceways and conveyors | | | | | | 2 |

| SITRANS DA400 Acoustic diagnostic unit<br>Monitors material flow in pipes, leakage in valves or oscillating pumps with up to 4 independent acoustic sensors. | Article No.<br>7MJ2000- | 1 | A | ● | 0 | 0 |
|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | |
| **Cable<br>(incl. pin and allen screw M6)** | | | | | | |
| 20 m | | | | B | | |
| 40 m | | | | C | | |
| 100 m | | | | F | | |

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## Technical specifications

| SITRANS DA400 | |
|---|---|
| **Input** | |
| Acoustic channels | 4 |
| • Cycle time | 10 ms |
| Universal inputs | 4 |
| • Cycle time | 80 ms |
| • Low pass filter time | 1 s |
| Universal analog current input | |
| • Load | < 105 Ω |
| • Resolution | 0.1 % |
| • Accuracy | 0.5 % |
| • Fault signal | > 21 mA or < 3.6 mA (at 4 ... 20 mA) |
| • Alarm monitoring hysteresis | 0.5 % |
| • Static destruction limit | 40 mA, 4 V |
| Universal input 24 V digital signal | |
| • Input resistance | > 19 kΩ |
| • Signal level Low | < 4.5 V or open |
| • Signal level High | > 7 V |
| • Hysteresis | > 1 V |
| • Static destruction limit | ± 40 V |
| 8.2 V source for NAMUR signal (DIN EN 60947-5-6) | |
| • Open circuit voltage | 8.2 V ± 0.3 V, short-circuit proof |
| • Input resistance | < 950 Ω |
| • Static destruction limit for incorrect wiring | +20 V/-10 V |
| **Output** | |
| Digital outputs | 6 |
| • Semiconductor relay | Individually isolated, short circuit-proof |
| • Switching voltage | 24 V AC/36 V DC, any polarity |
| • Destruction limit | 35 V AC, 50 V DC |
| • Max. switching current | 100 mA |
| **Conditions of use** | |
| Installation conditions | Vertical wall mounting, cables fed in from below |
| Climatic class | Class 4K4 according to EN 60721-3-4 |
| Permissible ambient temperature | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | -20 ... +60 °C (-4 ... 140 °F) |
| Mechanical load | Class 4M3 according to EN 60721-3-4 |
| Degree of protection to EN 60529 | IP65 |
| Electromagnetic Compatibility | |
| • Emitted interference and interference immunity | To EN 61326 and NAMUR NE 21 |
| Usage limits for water | |
| • Delivery side | ≥ 10 bar a |
| • Number of strokes | Min. 4 $min^{-1}$, max. 10 ... 500 $min^{-1}$ |
| **Design** | |
| Weight (without options) | Approx. 2.5 kg |
| Dimensions (W x H x D) in mm (inch) | 172 x 320 x 80 (6.8 x 12.6 x 3.2) |
| Enclosure material | Polycarbonate |
| Electrical connection via screw terminals | • Rigid 2.5 mm (0.984 inch)<br>• Flexible 1.5 mm (0.59 inch)<br>• Flexible with connector sleeves 1.5 mm (0.59 inch) |
| Cable inlet via plastic cable joints | • 2 x Pg 13.5<br>• 5 x Pg 11 |

## Technical specifications (continued)

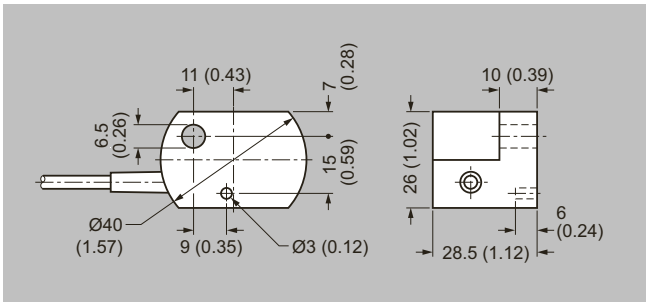
| SITRANS DA400 | |
|---|---|
| **Power supply** | |
| Rated voltage | 24 V DC |
| Operating range | 19 ... 36 V DC |
| Current consumption | < 100 mA |
| **Communication** | |
| PROFIBUS DP | RS 485, switchable terminating resistor |
| Protocol | Cyclic with Master C1 and acyclic with Master C2 |
| PC parameterization software | SIMATIC PDM (not included in the scope of delivery) |

| Sensor for SITRANS DA400 | |
|---|---|
| **Setup** | • Piezoceramic sensor with pre-amplifier<br>• Encapsulated electronics<br>• 4-wire cable with anti-kink sleeve |
| **Conditions of use** | |
| Permissible ambient temperature | -40 ... +110 °C (-40 ... +230 °F) |
| Degree of protection to EN 60529 | P66/IP68 |
| Mechanical load | Class 4M7 according to EN 60721-3-4 |
| Climatic class | Class 4K4 according to EN 60721-3-4 |
| **Design** | |
| Housing material | Stainless steel 1.4571 (316Ti SST) |
| Cable | Ends with wire protectors and cable shoe for connection to the SITRANS DA400 |
| Weight | 125 g (0.276 lb) |
| Dimensions (W x H x D) in mm (inch) | 26 x 29 x 40 (1.02 x 1.14 x 1.57) |
| **Power Supply** | Power fed from device |

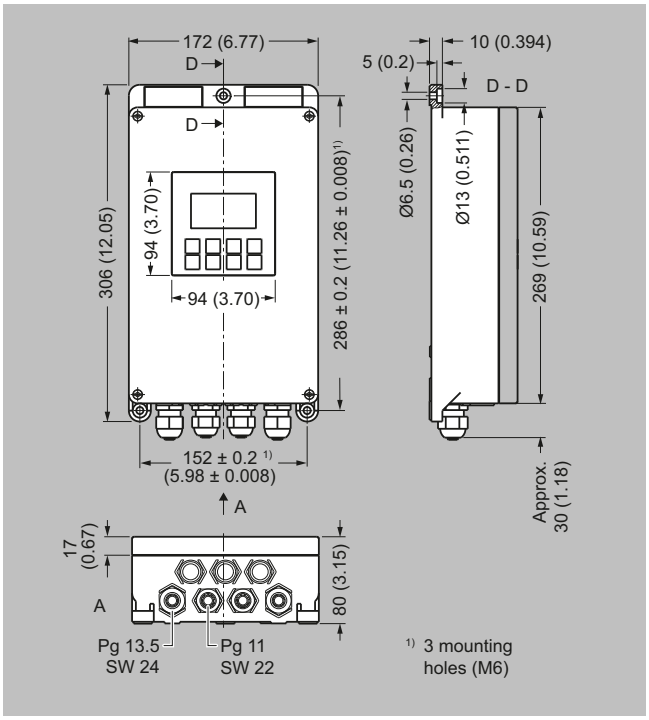
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## Dimensional drawings




Sensor for SITRANS DA400, dimensions in mm (inch)

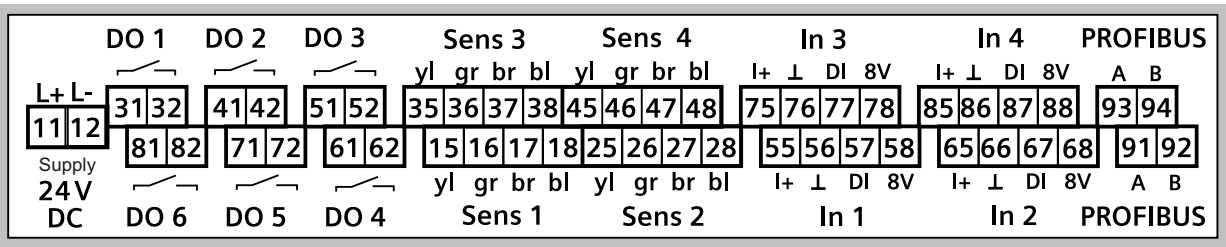



SITRANS DA400, dimensions in mm (inch)

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## Circuit diagrams




| | | | | | |
|---|---|---|---|---|---|
| L+/L- | Power supply | In | Input | ⊥ | Ground |
| DO | Digital output | yl | Yellow | DI | Digital input |
| Sens | Sensor | gr | Green | A | Signal A (green) with PROFIBUS DP |
| | | br | Brown | B | Signal B (red) with PROFIBUS DP |
| | | bl | Black | | |
| | | I+ | Analog current input + | | |

SITRANS DA400, terminal assignment

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# SITRANS AS100 Acoustic sensor

## Overview




SITRANS AS100 is an acoustic sensor used for solids flow detection.

## Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

## Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

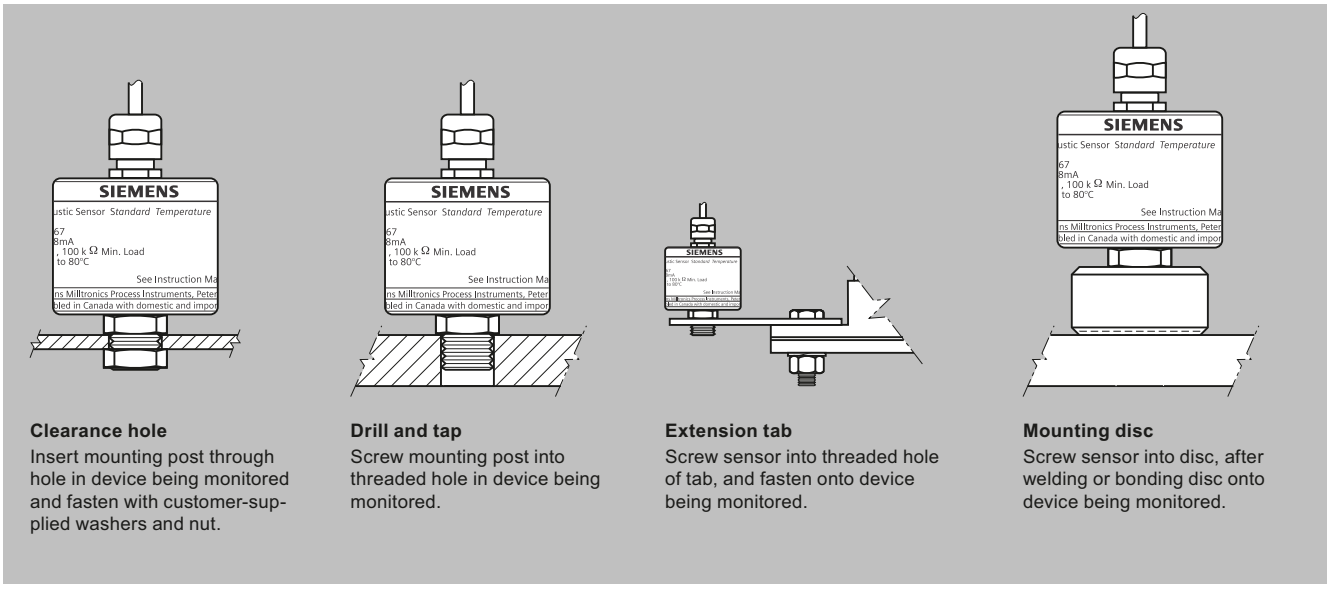
Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

## Design




**Clearance hole**
Insert mounting post through hole in device being monitored and fasten with customer-supplied washers and nut.

**Drill and tap**
Screw mounting post into threaded hole in device being monitored.

**Extension tab**
Screw sensor into threaded hole of tab, and fasten onto device being monitored.

**Mounting disc**
Screw sensor into disc, after welding or bonding disc onto device being monitored.

SITRANS AS100 mounting

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## Selection and ordering data

| SITRANS AS100 Acoustic sensor<br>Non-invasive, for detection of solids flow. | Article No.<br>7MH7560- ● | ● | ● | 0 | ● |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Sensor** | | | | | |
| Standard temperature range<br>[-20 ... +80 °C (-4 ... +176 °F)][1] | | 1 | | | |
| Extended temperature range<br>[-40 ... +125 °C (-40 ... +257 °F)][2] | | 3 | | | |
| Extended temperature range<br>[-30 ... +120 °C (-22 ... +248 °F)][3] | | 4 | | | |
| **Cable Length** | | | | | |
| 4 m (13.12 ft) | | | A | | |
| **Sensor Mounting** | | | | | |
| None | | | | A | |
| Mounting disk | | | | B | |
| Mounting tab | | | | C | |
| **Approvals** | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC | | | | | 1 |
| CSA/FM Class II, Div. 1, Group E, F, and G<br>(includes ½" NPT female fitting) | | | | | 3 |
| CSA Class II, Div. 1, Group E, F, and G<br>(includes ½" NPT female fitting) | | | | | 4 |
| FM/CSA Class II, Div. 1, Groups E, F, & G;<br>ATEX II 3D, Ex tc IIIC T100°C Dc, Ta 0= -20°C to +80°C, IP68 (includes M20 female fitting);<br>UKEX II 3D, Ex tc IIIC T100°C Dc, Ta = -20°C to +80°C, IP68 (includes M20 female fitting);<br>EAC Ex Ex tc IIIC T100°C Dc;<br>CE, UKCA, RCM | | | | | 5 |
| ATEX II 2 G Ex d IIC T4 Gb, c/w cable gland;<br>ATEX II 2 D Ex tb IIIC T100°C Db, c/w cable gland;<br>EAC Ex 1Ex db IIC T4 Gb;<br>EAC Ex Ex tb IIIC T100°C Db[4] | | | | | 6 |

[1] Available with approval options 1, 3, 5, and 6 only.
[2] Available with approval option 1 only.
[3] Available with approval option 4 only.
[4] Available with sensor option 1 only and sensor mounting option A only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Manufacturer's test certificate: According to EN 10204-2.2 | **C11** |
| Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters),<br>specify in plain text | **Y17** |

| Spare Parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Mounting tab | **7MH7723-1AA** |
| Mounting disk | **7MH7723-1AB** |
| ½" NPT adapter kit for standard temperature range sensor, not Class II approved | **7MH7723-1BW** |
| M20 adapter kit for standard temperature range sensor, not Class II or ATEX and UKEX approved | **7MH7723-1BV** |
| ½" NPT adapter kit for extended temperature range sensor, not Class II approved<br>Note: Adapter kits are not CSA Class II approved | **7MH7723-1BX** |

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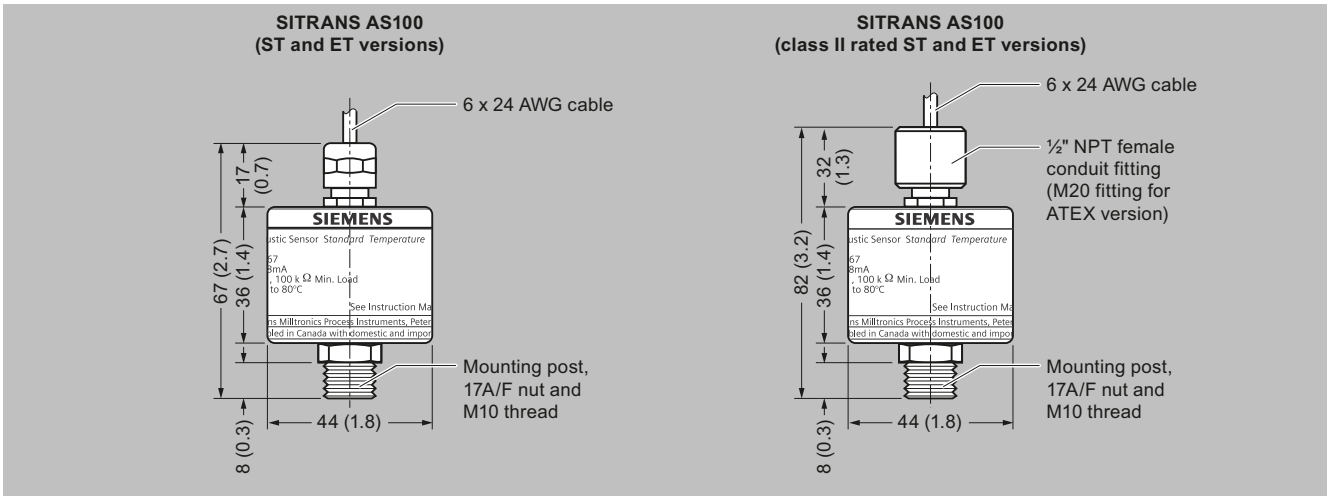
## Technical specifications

| SITRANS AS100 Acoustic sensor | |
|---|---|
| **Mode of Operation** | |
| Operating principle | Acoustic sensing of high frequency emissions caused by impact or friction |
| Typical application | • Detects burst filter bags in dust collection systems<br>• Detects material being conveyed in pneumatic conveyor lines<br>• Route confirmation in chute work |
| **Model** | |
| Standard | Standard operating temperature range |
| Extended | Extended operating temperature range |
| **Operation** | |
| Relative sensitivity | 0.5 %/°C of reading, average over the operating range |
| Outputs | Analog, 0.08 ... 10 V DC nominal, 100 kΩ minimum load impedance |
| **Rated operating conditions** | |
| Amb. temperature for enclosure | |
| • Standard | -20 ... +80 °C (-4 ... +176 °F) |
| • Extended | • -40 ... +125 °C (-40 ... +257 °F) (CE and UKCA only)<br>• -30 ... +120 °C (-22 ... +248 °F) option |
| Storage temperature | |
| • Standard | -20 ... +80 °C (-4 ... +176 °F) |
| • Extended | • -40 ... +125 °C (-40 ... +257 °F) (CE and UKCA only)<br>• -30 ... +120 °C (-22 ... +248 °F) option |
| **Design** | |
| Weight | 0.4 kg (1 lb) |
| Enclosure | Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version, aluminum 231 on 2GD version] |
| Degree of protection | IP68 (waterproof) |
| Cable | |
| • Standard | 4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 $mm^2$), shielded |
| • Extended | 4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 $mm^2$) conductor, shielded |
| **Power supply** | 20 ... 30 V DC, 18 mA (typical) |
| **Certificates and approvals** | CE, UKCA, RCM, EAC, KC,<br>CSA/FM, Class II, Div. 1,<br>Groups E, F, G (optional),<br>ATEX II 2GD (optional),<br>ATEX II 3D (optional),<br>UKEX II 3D (optional),<br>EAC Ex |

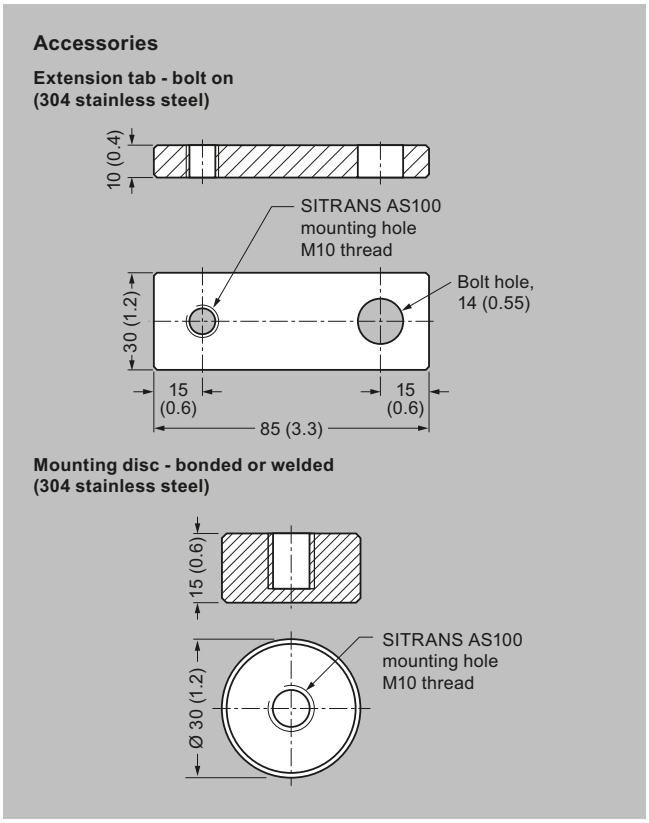
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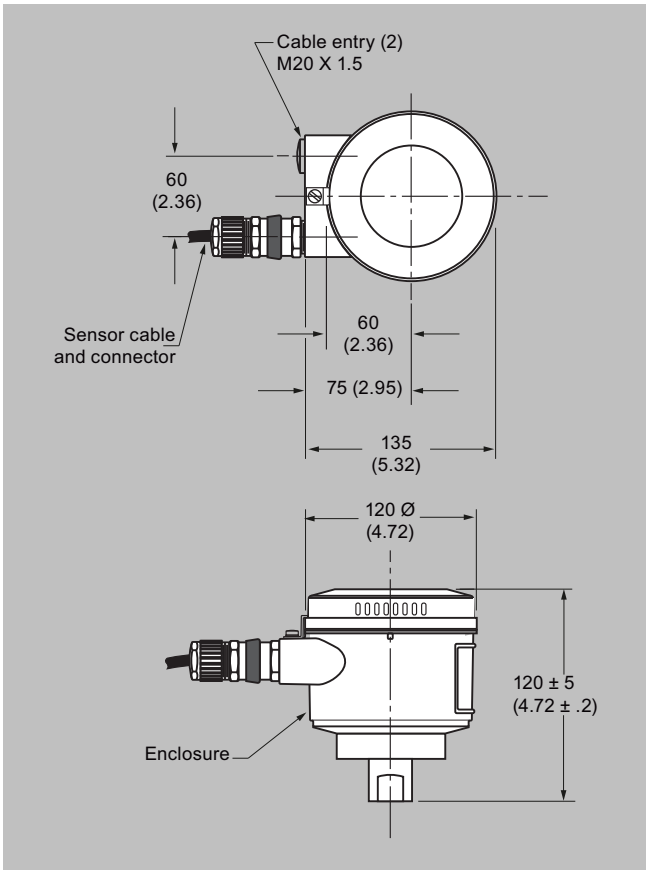
## Dimensional drawings




SITRANS AS100, dimensions in mm (inch)




SITRANS AS100 accessories, dimensions in mm (inch)



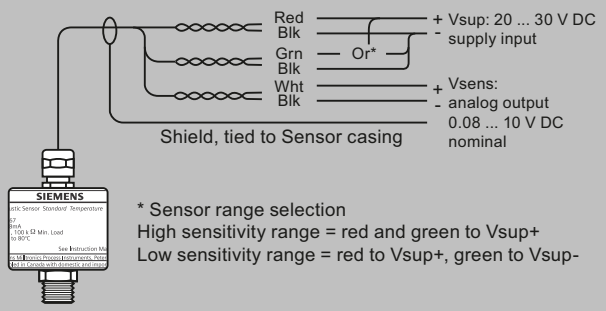

SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

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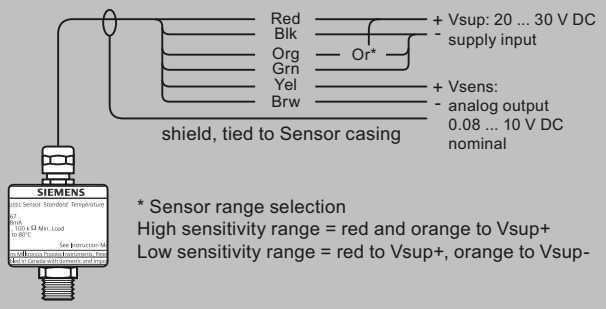
## Circuit diagrams

**Standard temperature range**




* Sensor range selection
High sensitivity range = red and green to Vsup+
Low sensitivity range = red to Vsup+, green to Vsup-

**Extended temperature range**




* Sensor range selection
High sensitivity range = red and orange to Vsup+
Low sensitivity range = red to Vsup+, orange to Vsup-

**Interconnection**
The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.
The following table provides a guideline for suitable wire gauges where distances are considerable.

Max. distance between sensor and supply
(24 V or Control Unit).

| | Wire size | | Distance | |
|---|---|---|---|---|
| AWG | mm | mm² | meters | feet |
| 24 | 7 x 0.20 | 0.25 | 500 | 1 600 |
| 22 | 7 x 0.25 | 0.35 | 800 | 2 600 |
| 20 | 10 x 0.25 | 0.5 | 1 200 | 3 900 |

SITRANS AS100 connections

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## Overview




SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

## Benefits

- 4 to 20 mA output
- Two programmable relays
- Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

## Application

SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

- Key applications: with SITRANS AS100 for bulk solids flow

## Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

The SITRANS CU02 may be mounted up to 500 m (1 500 ft) from the sensor.

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## Selection and ordering data

| SITRANS CU02 Control unit<br>Set-point alarm controller, for use with AS100 acoustic sensor. | Article No.<br>7MH7562- ● | ● | ● |
|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | |
| **Power Supply** | | | |
| 100 V AC | 1 | | |
| 115 V AC | 2 | | |
| 200 V AC | 3 | | |
| 230 V AC | 4 | | |
| **Enclosure** | | | |
| Standard DIN Rail | | A | |
| **Approvals** | | | |
| Ordinary Locations/General Purpose (Non-Ex), $_{C}CSA_{US}$, CE, UKCA, RCM, EAC, KC | | | A |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Manufacturer's test certificate: According to EN 10204-2.2 | **C11** |
| Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]:<br>Measuring-point number/identification<br>(max. 16 characters), specify in plain text | **Y18** |

| Selection and Ordering data | Order code |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at<br>http://www.siemens.com/processinstrumentation/documentation | |

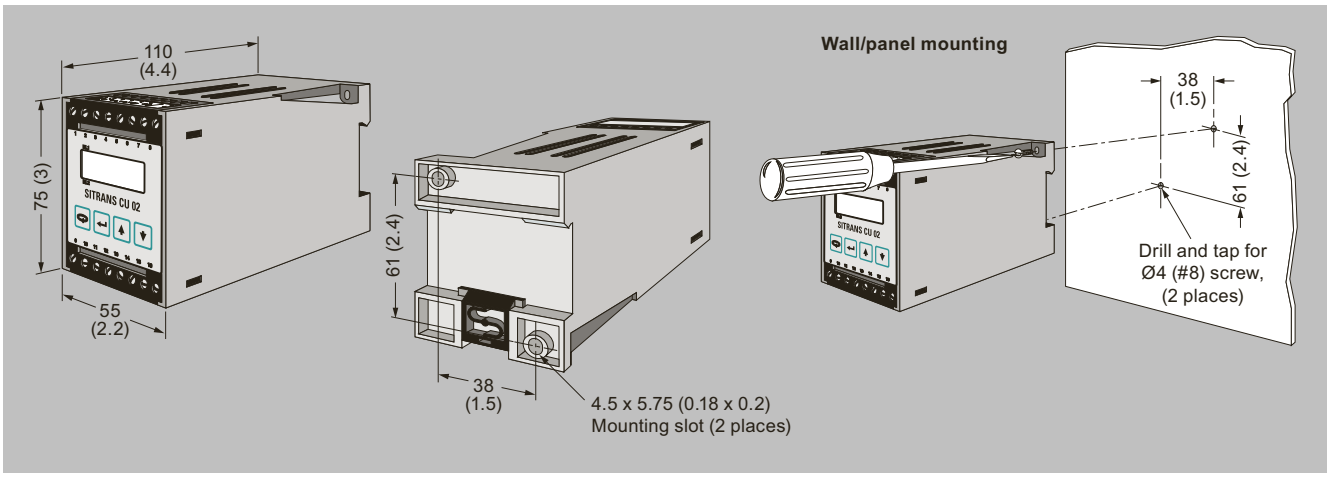
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## Technical specifications

| SITRANS CU02 Control unit | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Controller for acoustic sensing (SITRANS AS100) |
| Typical application | Connects to SITRANS AS100 to detect burst filter bag |
| **Input** | 0 ... 10 V DC, from sensor |
| **Output** | |
| Output signal | 4 ... 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 amp at 250 V AC non-inductive |
| Sensor excitation | 26 V DC |
| Max. load | 750 Ω |
| **Rated operating conditions** | |
| Installation conditions | |
| • Location | Indoor |
| Ambient conditions | |
| • Ambient temperature for enclosure | -20 ... +50 °C (-4 ... +122 °F) |
| • Storage temperature | -20 ... +50 °C (-4 ... +122 °F) |
| • Relative humidity | 80 % for temperatures up to 50 °C (122 °F) |
| • Degree of protection | IP20 |
| • Installation category | II |
| • Pollution degree | 2 |
| **Design** | |
| Weight | 550 g (18 oz) |
| Dimensions (W x H x D) | 55 x 75 x 110 mm (2.2 x 3 x 4.4 inch) |
| Material enclosure | Polycarbonate |
| Mounting | DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor |
| Cable | 2 twisted pair, 24 AWG (22 $mm^2$), shielded. Mount up to 500 m (1 500 ft) from sensor |
| **Display** | Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment graphic symbols for operation status |
| **Power supply** | |
| Supply voltage | 100, 115, 200, 230 V AC ± 15 %, 50/60 Hz, factory set |
| Power consumption | Max. 10 VA |
| **Approvals** | $_{c}CSA_{US}$, CE, UKCA, RCM, EAC, KC |

## Dimensional drawings

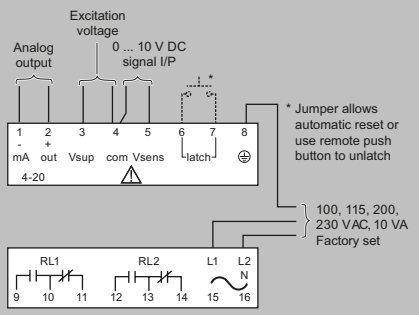



SITRANS CU02, dimensions in mm (inch)

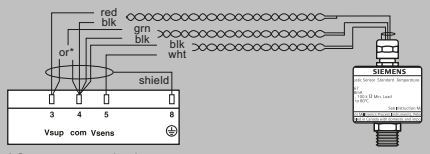
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## Circuit diagrams

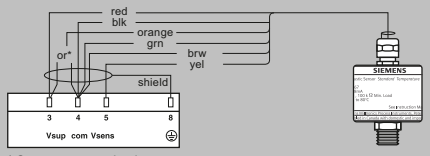



**Standard temperature version**




* Sensor range selection
High sensitivity range = green to 'Vsup'
Low sensitivity range = green to 'com'

**Extended temperature version**




* Sensor range selection
High sensitivity range = orange to 'Vsup'
Low sensitivity range = orange to 'com'

**Mounting**
Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

**Interconnection**
All field wiring must have insulation suitable for at least 250 V.
Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
The maximum allowable working voltage between adjacent relay contacts shall be 250 V. If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

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## Overview




MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP probes.

## Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

## Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. The CE and UKCA approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

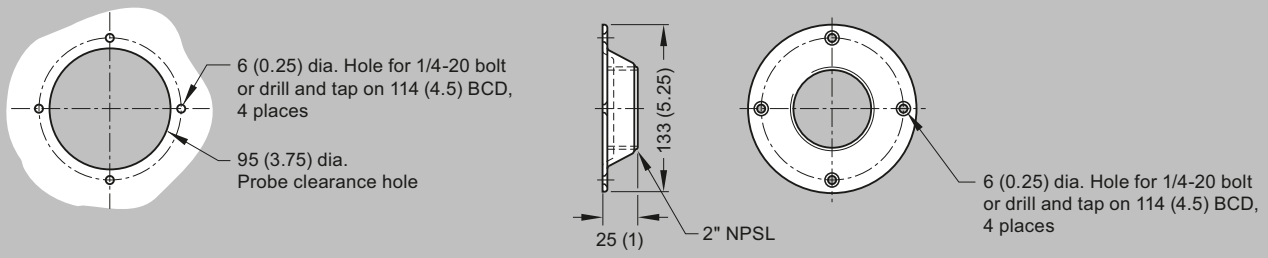
- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

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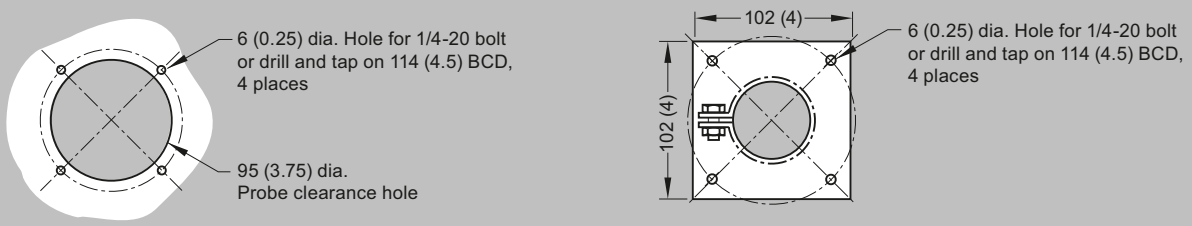
## Design

**Mounting for Milltronics MSP-12, MSP-3, XPP-5**




**Note:** Mounting flange supplied with probe.

**Mounting for Milltronics MSP-9**




Milltronics MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

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## Design (continued)



**Standard Milltronics MSP-12**
- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



**Milltronics XPP-5**
- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X,6, IP67



**High temperature Milltronics MSP-3**
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



**Stainless high temperature Milltronics MSP-9**
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)



**Milltronics RMA (Remote Mounted Amplifier)**
- Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (½" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics motion probes

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## Milltronics MFA 4p Motion failure alarm controller

### Selection and ordering data

| Milltronics MFA 4p Motion failure alarm controller<br>Set-point alarm controller, for use with MSP motion probes. | Article No.<br>7MH7144- | ● | ● | ● | ● |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Enclosure** | | | | | |
| NEMA 4X, polycarbonate enclosure | | 1 | | | |
| NEMA 4, painted mild steel enclosure | | 2 | | | |
| NEMA 4X, 304 (1.4301) stainless steel enclosure | | 3 | | | |
| **Input Voltage** | | | | | |
| 100 ... 240 V AC, ± 10 %, 50/60 Hz, 15 VA | | | A | | |
| **Speed detection version** | | | | | |
| Standard, underspeed (U/S) or overspeed (O/S), switch selectable | | | | A | |
| Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm) | | | | B | |
| **Approvals** | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC, $_{C}$CSA$_{US}$, FM | | | | | 2 |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Manufacturer's test certificate: According to EN 10204-2.2 | **C11** |
| Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]:<br>Measuring-point number/id-entification (max. 27 characters),<br>specify in plain text | **Y15** |
| Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) [483 x 584 x 203 mm (19 x 23 x 8 inch)] | **A35** |
| Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)] | **S50** |

| Spare parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Circuit Card, standard | **7MH7723-1DU** |
| Circuit Card, Slow speed | **7MH7723-1DV** |
| Lid with overlay for MFA 4p | **7MH7723-1GY** |

| Milltronics RMA Remote mounted amplifier<br>Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes. | Article No.<br>7MH7145- | 0 | ● |
|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | |
| **Enclosure** | | | |
| Aluminum enclosure, IP65, Type/NEMA 4X, ½" NPT entry | | | A |
| Painted steel, Type/NEMA 4, IP65 rating | | | C |
| 304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating | | | D |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Manufacturer's test certificate: According to EN 10204-2.20 | **C11** |
| Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]:<br>Measuring-point number/id-entification (max. 16 characters),<br>specify in plain text | **Y18** |

| Spare parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Card, RMA | **7MH7723-1DT** |

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## Selection and ordering data (continued)

| Milltronics Motion sensing probes<br>Heavy duty, 100 mm measuring range, for use with RMA, MFA 4p, WM300 MFA, or other control.<br>Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier) | Article No.<br>7MH7146- ● | ● | ● |
|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | |
| **Cable Length** | | | |
| Standard length (as described in Model options)[1] | 0 | | |
| ***Add Order code Y01 and plain text: "Total cable length ... m"*** | | | |
| Extended cable length 2 000 ... 30 000 mm (79.2 ... 1 181 inch)[2] | 1 | | |
| Extended cable length 30 001 ... 50 000 mm (1 181 ... 1 969 inch)[4] | 2 | | |
| Extended cable length 50 001 ... 100 000 mm (1 969 ... 3 937 inch)[4] | 3 | | |
| **Model [standard cable length/type]** | | | |
| MSP-3, ½" NPT cable inlet[3]<br>[1.5 m (5 ft) high temperature cable] | | B | |
| MSP-9 [1.5 m (5 ft) high temperature cable][3] | | D | |
| MSP-12, ½" NPT cable inlet, no cable | | E | |
| XPP-5 [1.5 m (5 ft) cable, (CSA Class I,<br>Groups A, B, C and D; Class II Groups E, F, and G)] | | G | |
| XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)] | | H | |
| XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)] | | J | |
| **Approvals** | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC | | | A |

1) No Y01 needed in Order code for standard length.
2) Only available with model options B, D, G, H, J.
3) MSP-3 and MSP-9 probes required the use of RMA (amplifier).
4) Available with Model options G, H, and J only.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total cable length: enter the total cable length in plain text description | **Y01** |
| Acrylic coated, stainless steel tag<br>[13 x 45 mm (0.5 x 1.75 inch)]:<br>Measuring-point number/identification<br>(max. 16 characters), specify in plain text | **Y17** |
| Cable gland kit | **A57** |
| Manufacturer's test certificate: According to EN 10204-2.2 | **C11** |

| Spare parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Locknut, for MSP-3, MSP-7, MSP-12, XPP-5 | **7MH7723-1CR** |
| Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5 | **7MH7723-1CS** |
| Mounting bracket for MSP-9 | **7MH7723-1CT** |
| Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12 | **7MH7723-1CU** |
| Lid for MSP-9 | **7MH7723-1CV** |
| Lid gasket, for MSP-3, MSP-9 | **7MH7723-1CW** |
| Lid gasket, for MSP-7, MSP-12 | **7MH7723-1CX** |
| Motion cable gland adaptor kit | **7MH7723-1JU** |

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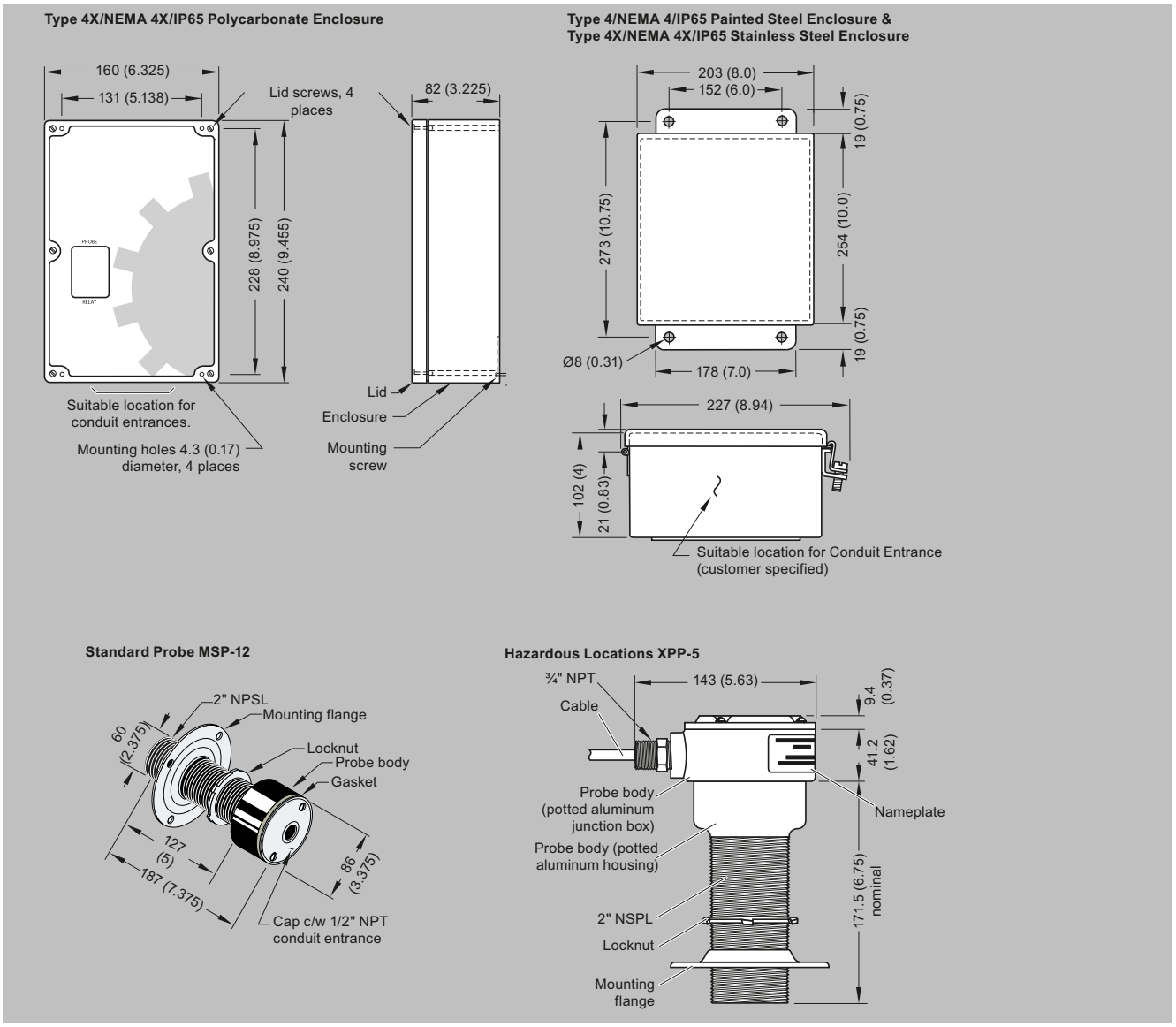
## Technical specifications

| Milltronics MFA 4p Motion failure alarm controller | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Motion monitor and alarm |
| Typical application | Monitoring loss of motion in tail pulley, screw flights, bucket elevators |
| **Features** | • Switch selectable overspeed or under-speed detection<br>• Setpoint adjustment: 0.15 ... 3 000 PPM<br>• Adjustable start-up time delay: 0 ... 60 seconds<br>• Visual indication of probe operation and relay status |
| **Output** | 2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive |
| **Performance** | |
| Repeatability | ± 1 % |
| Dead band | ± 0.25 % |
| **Dynamic Range** | 0 ... 7 200 PPM |
| **Ambient Temperature Range** | -20 ... +50 °C (-5 ... +122 °F) |
| **Storage temperature** | -20 ... +50 °C (-5 ... +122 °F) |
| **Design** | |
| Enclosure rating | Type 4X/NEMA 4X/IP65 (standard and optional stainless steel)<br>Type 4/NEMA 4/IP65 (optional mild steel) |
| Enclosure dimensions | 160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch)<br>Optional: mild steel or 304 (1.4301) stainless steel<br>203 x 254 x 102 mm (8 x 10 x 4 inch) |
| Enclosure material | Polycarbonate<br>Optional: mild steel or stainless steel |
| **Power Supply** | 100 ... 240 V AC, 50/60 Hz,<br>15 VA, ± 10 % of rated voltage |
| **Certificates and approvals** | CE, UKCA, RCM, EAC, KC, $_{C}$CSA$_{US}$, FM |

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## Dimensional drawings



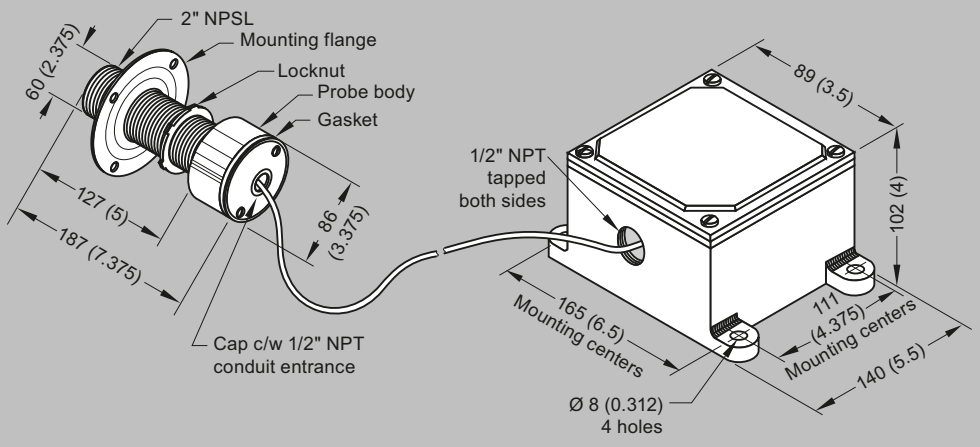

Milltronics MFA 4p and probe, dimensions in mm (inch)

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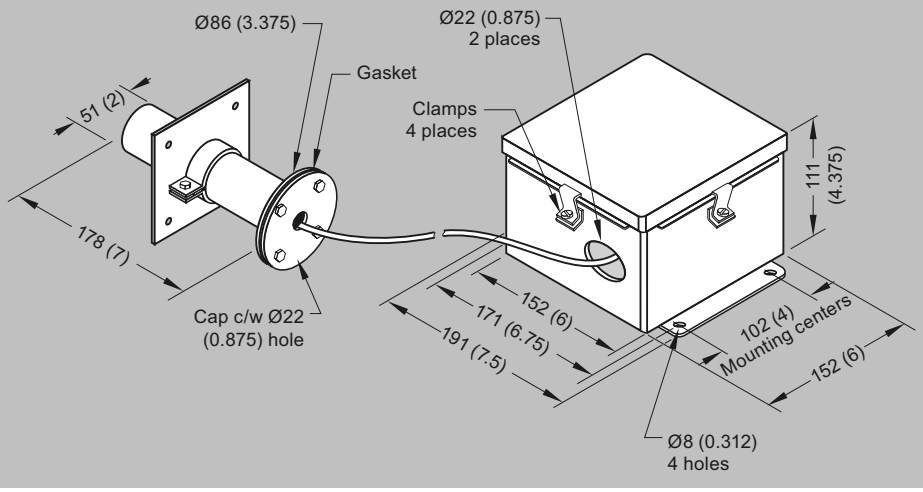


## Dimensional drawings (continued)

**High temperature probe MSP-3**




**High temperature stainless steel probe MSP-9**




Milltronics probes, dimensions in mm (inch)

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## Overview



Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

## Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

## Application

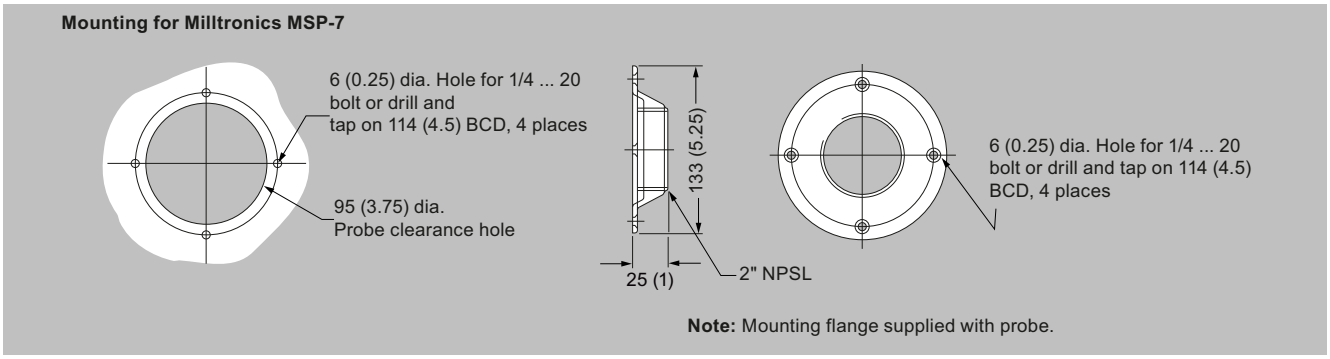
The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

## Design




Mounting for Milltronics MSP-7, dimensions in mm (inch)

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## Milltronics MSP-7 Motion sensor

### Selection and ordering data

| Milltronics Motion sensing probes<br>Heavy duty, 100 mm measuring range, for use with WM300 MFA, or other control. | Article No.<br>7MH7146- | ● | ● | ● |
|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | |
| **Cable Length** | | | | |
| Standard length (as described in Model options)[1] | | 0 | | |
| ***Add Order code Y01 and plain text: "Total cable length ... m"*** | | | | |
| Extended cable length 2 ... 30 m (6.6 ... 98.4 ft) | | 1 | | |
| **Model [standard cable length/type]** | | | | |
| MSP-7, ½" NPT cable inlet [1.5 m (5 ft) cable] | | | K | |
| **Approvals** | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, RCM, EAC, KC | | | | A |

[1] No Y01 needed in Order code for standard length.

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Total cable length: enter the total cable length in plain text description | **Y01** |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text | **Y17** |
| Cable gland kit | **A57** |
| Manufacturer's test certificate: According to EN 10204-2.2 | **C11** |

| Spare parts | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Spare Parts** | |
| Locknut, for MSP-3, MSP-7, MSP-12, XPP-5 | **7MH7723-1CR** |
| Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5 | **7MH7723-1CS** |
| Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12 | **7MH7723-1CU** |
| Lid gasket, for MSP-7, MSP-12 | **7MH7723-1CX** |
| Motion cable gland adaptor kit | **7MH7723-1JU** |

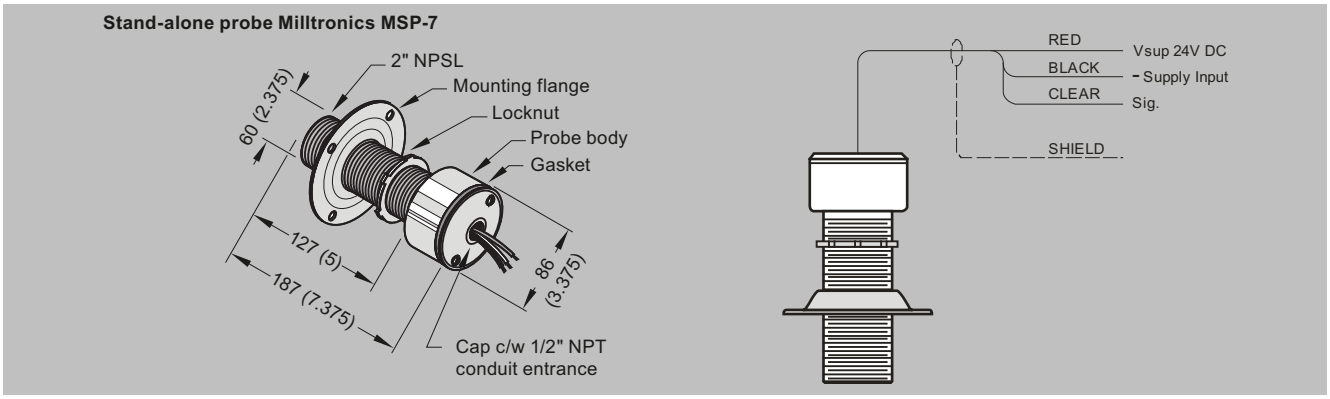
### Technical specifications

| Milltronics MSP-7 Motion sensor | |
|---|---|
| Measuring principle | Magnetic |
| Typical application | Monitoring loss of motion in tail pulley, screw flights, bucket elevators |
| **Features** | • Rugged corrosion resistant aluminum body<br>• Low voltage operation<br>• Large dynamic range<br>• Threaded body for finite adjustment |
| **Output** | NPN open collector, 2 kΩ pull up to input voltage, 330 Ω impedance, 40 mA max. |
| **Performance** | |
| Repeatability | ± 1 % |
| Dead band | ± 0.25 % |
| **Dynamic Range** | 0 ... 7 200 PPM |
| **Ambient Temperature Range** | -40 ... +60 °C (-40 ... +140 °F) |
| **Storage temperature** | -40 ... +60 °C (-40 ... +140 °F) |
| **Design** | |
| Enclosure rating | Type 4X/NEMA 4X/IP67 |
| **Power Supply** | 21 ... 28 V DC, 40 mA max. |
| **Certificates and approvals** | CE, UKCA, RCM, EAC, KC |

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## Dimensional drawings




Stand-alone probe Milltronics MSP-7, dimensions in mm (inch)

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# SITRANS WM300 Motion failure alarm controller

## Overview




SITRANS WM300 MFA motion failure alarm controller is a highly sensitive dual setpoint motion sensor system, used with Milltronics MSP probes.

## Benefits

- Up to 100 mm (4 inch) gap between target and probe.
- Over and under speed setpoint detection.
- Setpoint adjustment range 2 to 5 000 Hz (120 to 300 000 ppm).
- Adjustable start-up time delay.
- Visual indication of probe operation and relay status.
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability.

## Application

The SITRANS WM300 MFA detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The dual setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

Multiple machines can be monitored with twin, independent probe inputs as well as an additional 2 inputs for differential speed detection (DSD) within a machine monitoring solution such as a belt conveyor comparing the head to tail pulley speeds. An optional analog output module can convert the WM300 into a non-contacting tachometer (NCT) with 2 mA outputs.

A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. SITRANS WM300 MFA consistently meets the needs of mining aggregate, cement and other primary and secondary industries.

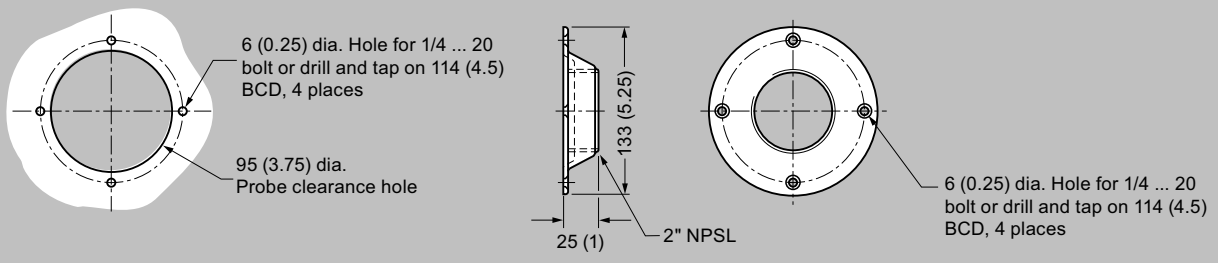
- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

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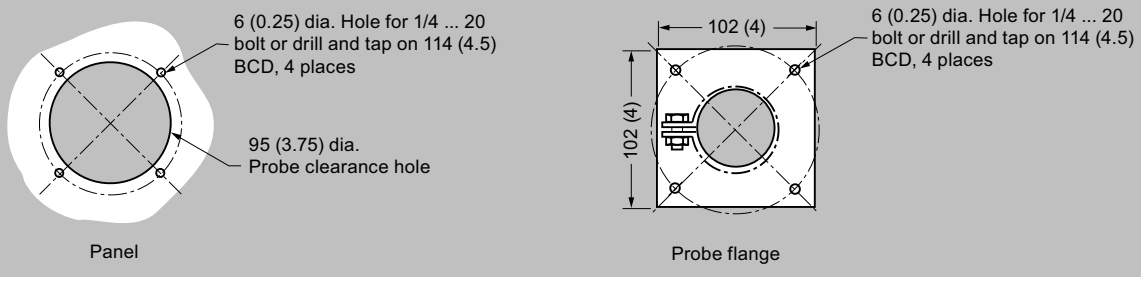
## Design

**Mounting for Milltronics MSP-3, MSP-7, MSP-12, XPP-5**




**Note:** Mounting flange supplied with probe.

**Mounting for Milltronics MSP-9**




Milltronics MSP-12, MSP-3, MSP-7, MSP-9, XPP-5 mounting, dimensions in mm (inch)



**Standard Milltronics MSP-12**
- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67



**Standard Milltronics MSP-7**
- Heavy-duty general purpose motion probe for direct connection to WM300 MFA
- Long lasting aluminum body
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- NPN, open collector output
- 24 V DC power supply



**Milltronics XPP-5**
- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X,6, IP67



**High temperature Milltronics MSP-3**
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Enclosure rating: Type/NEMA 4X, 6, IP67



**Stainless high temperature Milltronics MSP-9**
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Enclosure rating: Type/NEMA 4X, 6, IP67



**Milltronics RMA (Remote Mounted Amplifier)**
- Available for internal mounted IMA in probe, or without and converting older existing applications into 3-wire NPN signals for use with WM300 MFA
- DIN rail mount
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)

Milltronics motion probes

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## Selection and ordering data

| Selection and ordering data | Article No. |
|---|---|
| **Motion Failure Alarm MFA, DSD, NCT**<br>A highly sensitive dual setpoint motion sensor system, used with up to 2 MSP or XPP probes. Capable of hi/lo setpoint as well as differential monitoring with 2 additional probes. | **7MH7701-0AA00-0A** |
| **Remote Mounted Amplifier RMA**<br>A remote mounted amplifier for 2 Milltronics MSP-1, MSP-3, MSP-9, MSP-12 and XPP-5 motion sensing probes. | **7MH7702-0B** |
| **Analog output module NCT**<br>Additional module required for NCT applications featuring 2, 4 ... 20 mA outputs, used with WM300. | **6ED10551MM000BA2** |
| **Power conversion module**<br>Convert 100 ... 240 V AC ... 24 V DC power, for use with WM300 | **6EP33316SB000AY0** |
| **Remote display and configuration panel**<br>Larger text display panel mount HMI for use with enclosure mounted WM300 for easy user access and monitoring. | **6ED10554MH080BA0** |
| **Operating Instructions**<br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |

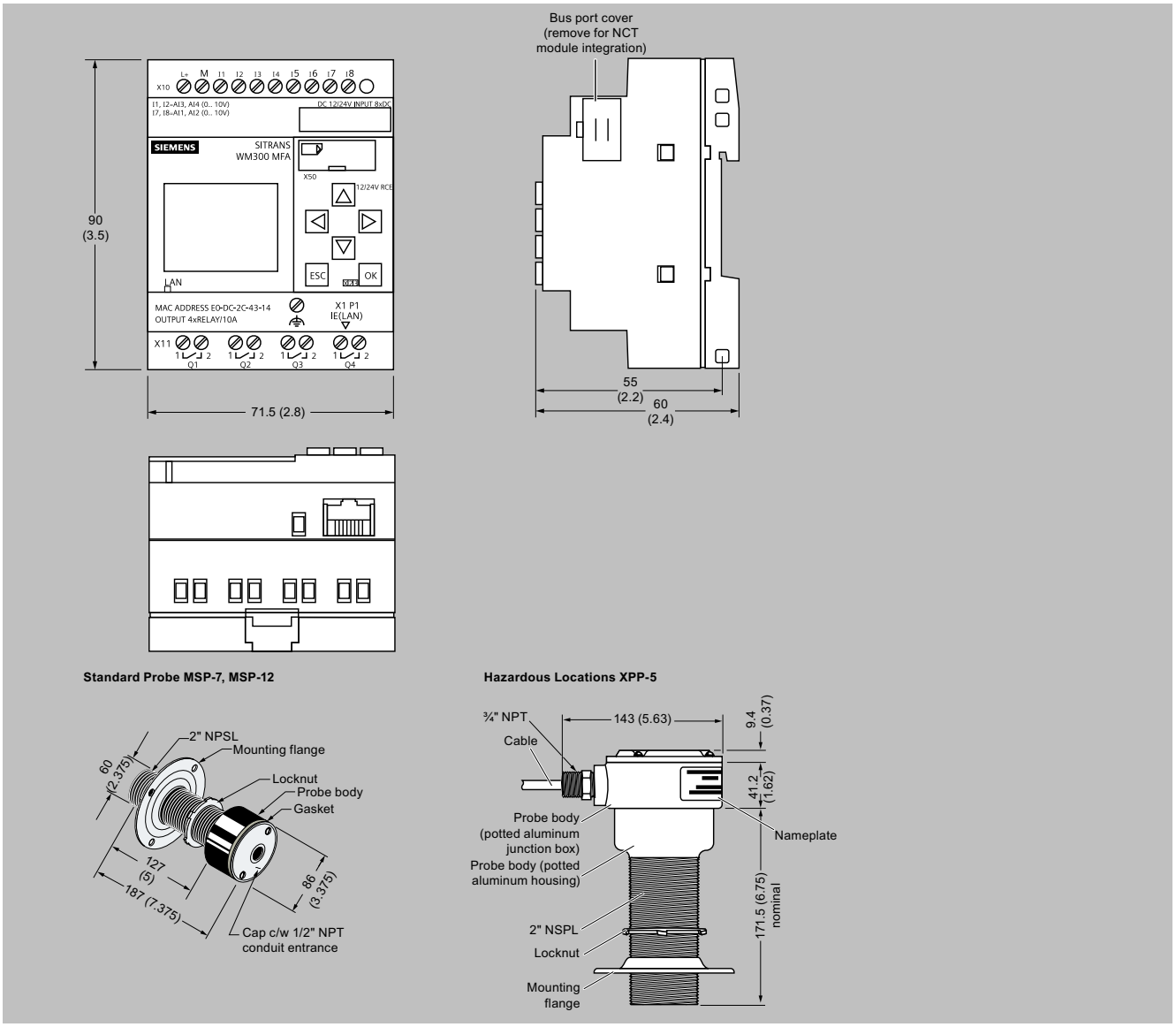
## Technical specifications

| | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Motion monitor and alarm |
| Typical application | Monitoring loss of motion in tail pulley, screw flights, bucket elevators |
| **Features** | • Switch user configurable overspeed and underspeed detection<br>• Setpoint adjustment range:<br>- Standard model: 2 ... 5 000 Hz (120 ... 300 000 ppm)<br>- Slow speed version: 2 ... 400 seconds (30 ... 0.15 ppm)<br>• Adjustable start-up time delay: 0 ... 60 seconds<br>• Visual indication of probe operation and relay status |
| **Output** | 4 relays |
| Resistive rating | • 10 A at 24 V DC<br>• 10 A at 240 V AC |
| **Performance** | |
| Repeatability | ± 1 % |
| Dead band | ± 0.25 % |
| **MSP and XPP dynamic range** | 0 ... 7 200 PPM |
| **Ambient temperature range** | -20 ... +50 °C (-5 ... +122 °F) |
| **Storage temperature** | -20 ... +50 °C (-5 ... +122 °F) |
| **Design** | |
| Enclosure dimensions | 71.5 x 90 x 60 mm (2.8 x 3.5 x 2.4 inch) |
| Enclosure material | Polycarbonate |
| **Power** | • 10.8 ... 28.8 V DC, 25 ... 165 mA<br>• Power supply: 100 ... 240 V AC, 50/60 Hz, 0.7 ... 0.35 A per LOGO! power module |
| **Certificates and approvals** | CE, UKCA, cCSA/UL$_{US}$, FM, EAC, RCM, KC |

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## Dimensional drawings



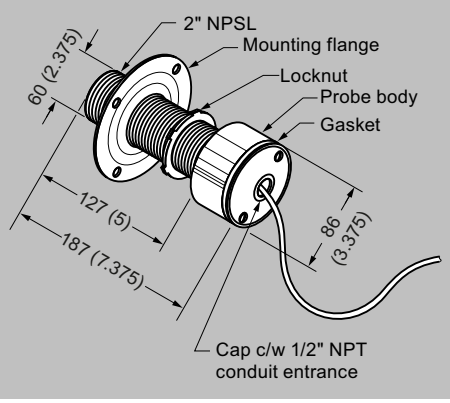

SITRANS WM300 MFA and probe, dimensions in mm (inch)

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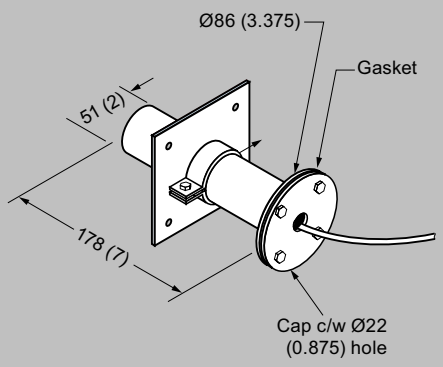


## Dimensional drawings (continued)

**High temperature probe MSP-3**




**High temperature stainless steel probe MSP-9**




Milltronics probes, dimensions in mm (inch)

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## Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

## Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

## Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

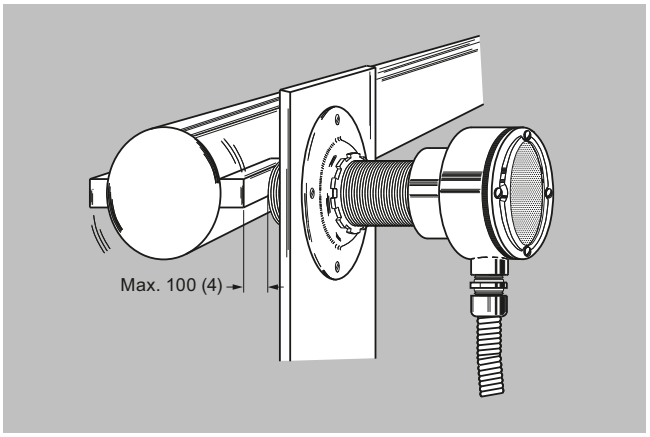
The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

## Design

***Mounting***

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.




SITRANS WM100 mounting, dimensions in mm (inch)

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## Selection and ordering data

| SITRANS WM100 Motion sensor<br>Heavy duty speed alarm switch with 100 mm measuring range. | Article No.<br>7MH71- 0<br>58 - | ● | A | 0 | 0 |
|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | |
| **Model** | | | | | |
| 115 V AC | | A | | | |
| 230 V AC | | B | | | |

| Selection and Ordering data | Order code |
|---|---|
| **Further designs** | |
| Please add "**-Z**" to Article No. and specify Order code(s). | |
| Manufacturer's Test Certificate: According to EN 10204-2.2 | **C11** |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]:<br>Measuring-point number/i-dentification (max. 16 characters), specify in plain text | **Y17** |

| Accessories | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Locknut | **7MH7723-1CR** |
| Mounting flange | **7MH7723-1CS** |
| Motion cable gland adaptor kit | **7MH7723-1JU** |

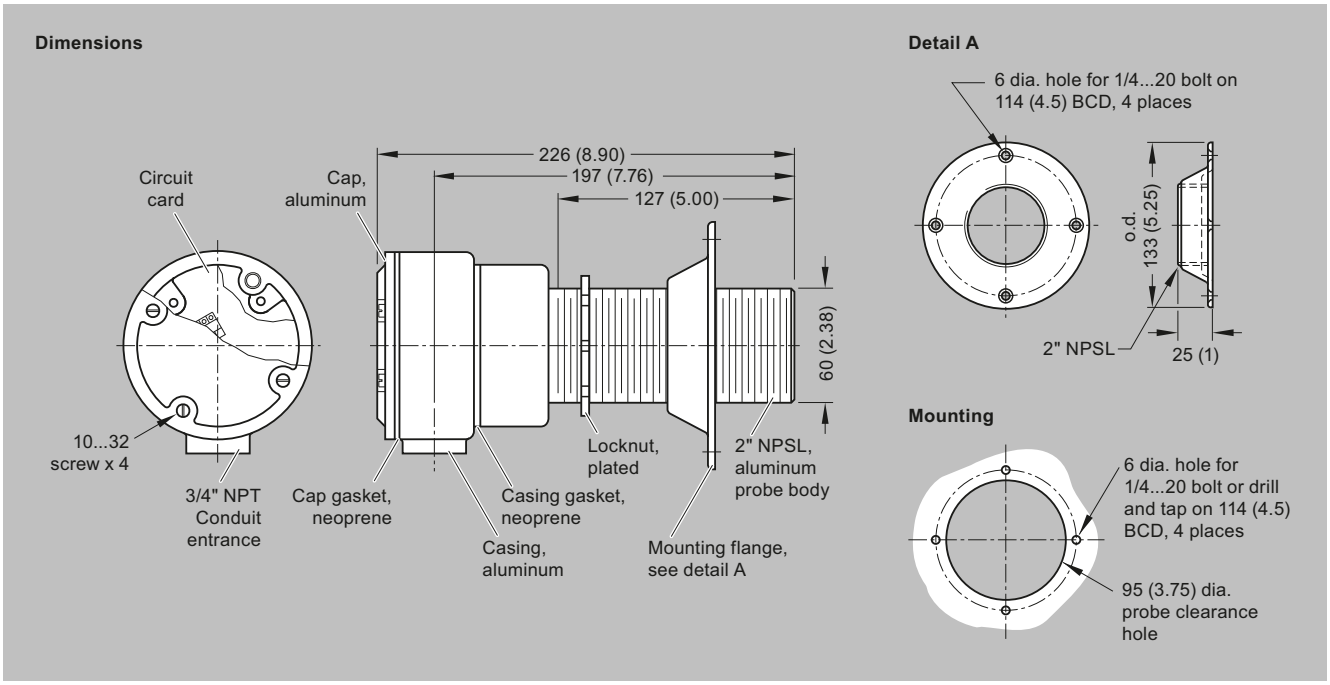
## Technical specifications

| | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Disruption of magnetic field by ferrous target |
| Typical application | Monitors absence or presence of motion in harsh conditions |
| **Output** | |
| Contact | 1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation |
| Time delay | Start up: 10 ... 14 seconds (5 ... 7 seconds with 12 ppm jumper installed) |
| Zero Speed (selected via a common jumper) | 5 seconds ± 1 (minimum speed 10 ... 15 ppm)<br>or<br>10 seconds ± 2 (minimum speed 5 ... 7.5 ppm) |
| **Rated operating conditions** | |
| Operating temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Storage temperature | -40 ... +60 °C (-40 ... +140 °F) |
| **Design** | |
| Probe body | Aluminum |
| Process mounting | 2" NPSL |
| Connection box | Aluminum, ¾" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 $mm^2$) wire size |
| Gasketing | Neoprene |
| Display | Red LED for verification of pulses |
| Enclosure rating | Type NEMA 4x, 6, IP67 |
| **Dynamic range** | Minimum 6 or 12 pulses per minute<br>Maximum 3 000 pulses per minute |
| **Shipping weight** | 2 kg (4.4 lb) |
| **Power supply** | • 115 V AC/50 ... 60 Hz, 7 VA<br>• 230 V AC/50 ... 60 Hz, 7 VA<br>• ± 10 % of rated voltage |
| **Certificates and approvals** | $_{C}CSA_{US}$, CE, UKCA RCM, EAC, KC |

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## Dimensional drawings

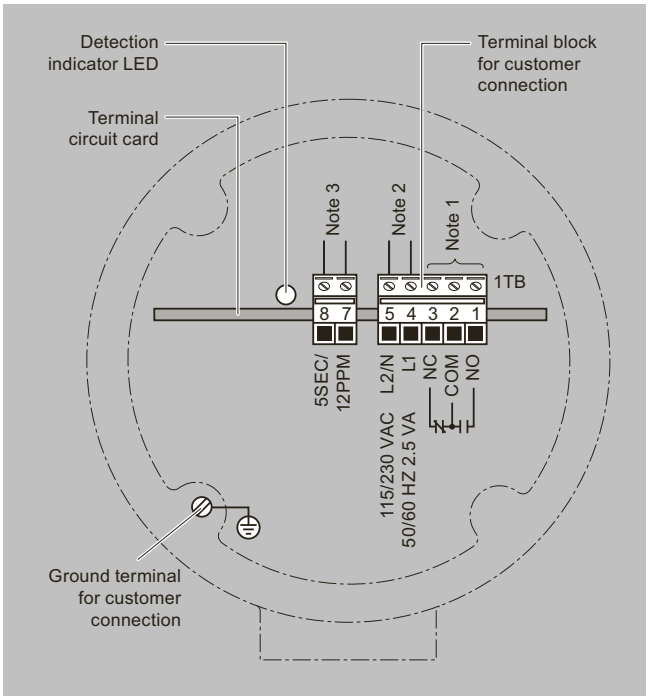



SITRANS WM100 mounting, dimensions in mm (inch)

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## Circuit diagrams




SITRANS WM100 wiring

Notes:

1. Dry contacts shown in de-energized (alarm or shelf) state.

2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.

3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

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# Supplementary components



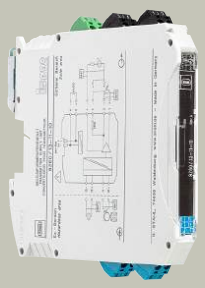
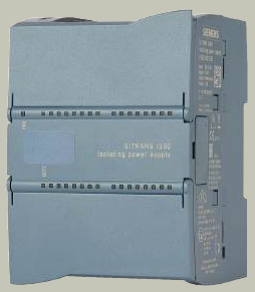

| | |
|---|---|
| **7/2** | **Product overview** |
| **7/6** | **Supply units and isolation amplifiers** |
| 7/6 | SITRANS I100 |
| 7/9 | SITRANS I200 |
| 7/12 | SITRANS I300 |
| **7/15** | **Displays** |
| 7/15 | SITRANS RD100 |
| 7/18 | SITRANS RD150 |
| 7/22 | SITRANS RD200 |
| 7/26 | SITRANS RD300 |
| **7/31** | **Remote Terminal Unit** |
| 7/31 | SIMATIC RTU3000C |
| **7/45** | **Network transitions** |
| 7/45 | IE/PB LINK |
| 7/55 | SIMATIC CFU |
| 7/57 | SIMATIC CFU PA edition |
| 7/59 | SIMATIC CFU DIQ edition |

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## Overview

**Power supply units and isolation amplifiers**

| Type | Area of application | Device description | Programming software |
|---|---|---|---|
| **SITRANS I100**  | Isolating power supply for 2-wire transmitter, 4-wire transmitter with intrinsically safe input (mA sources) and analog output module (AOM) for SIPART PS2. | Single-channel version, output 0/4 ... 20 mA, intrinsically safe Ex i, approved to SIL 2 (IEC/EN 61508), width 12.5 mm, DIN rail-mounting. | – |
| **SITRANS I200**  | Compact single-channel output isolation amplifier for HART output signals 0/4 ... 20 mA. For the intrinsically safe operation of positioners such as SIPART PS2, I/P converters or indicators. | HART output isolation amplifier for DIN rail mounting, with intrinsically safe output. Approved up to SIL 2 (IEC/EN 61508), width 12.5 mm. | – |
| **SITRANS I300**  | Isolating power supply for 4-wire devices in hazardous areas | Isolating power supply with intrinsically safe EIA-485 interface for DIN rail mounting, for 4-wire devices. | – |

**Display devices**

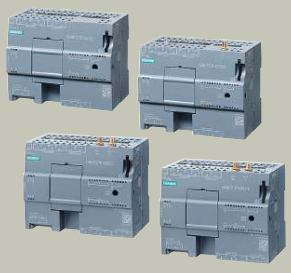
| Type | Area of application | Device description | Programming software |
|---|---|---|---|
| **SITRANS RD100**  | Remote digital display in 2-wire system, power supply via the current loop, NEMA 4X enclosure, for process measuring equipment | • Versatile 2-wire measuring instrument that displays process tags in level, flow, pressure, temperature and weighing applications<br>• FM-approved, CSA-approved and CE-approved device that can be installed in a range of environments, including hazardous areas<br>• Large, easy-to-read local display<br>• Easy to install and set up using a quick 2-step process | – |

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## Overview (continued)

| Display devices | | | |
|---|---|---|---|
| **SITRANS RD150**  | Remote digital display for 4 to 20 mA and HART devices | • Easy operation via local display with 4-button menu control<br>• Background illuminated local display<br>• HART communication<br>• Flexible mounting options<br>• Plastic, stainless steel or aluminum enclosures up to IP68<br>• Complete configuration of the connected sensors with optional USB Communicator and PC<br>• Supports multiple HART sensors with HART Multidrop | – |
| **SITRANS RD200**  | Remote digital display with universal input for control panel mounting for process measuring equipment. Supports RTD, thermocouple, current and voltage inputs. Supporting software enables remote configuration and data logging. | • Universal remote digital display for various inputs; ideal for use with most field devices<br>• Standard local display for control panel mounting with optional enclosures<br>• Two optional relays for alarm display or process control applications<br>• Special copy function of the measuring instrument reduces setup time, costs and errors<br>• RD software supports remote configuration, monitoring and logging for up to 100 displays | – |
| **SITRANS RD300**  | Universal, easy-to-operate, remote digital display for control panel mounting for process instruments. Delivers flow rate/total values in various applications (pumped flow rate, summation and control). | • Remote digital display for level, flow, pressure, weighing and other process instruments.<br>• The universal, easy-to-operate display device for flow rate/total values is ideal for flow rate, summation and control applications.<br>• Using the RD software, which is available for download free of charge, you can record and display the data on your PC.<br>• It is designed for one or two current and voltage inputs and supports mathematical functions such as averaging. | – |

| Remote Terminal Unit | | | |
|---|---|---|---|
| **Type** | **Area of application** | **Device description** | **Programming software** |
| **SIMATIC RTU3000C**  | The devices of the RTU3000C family are compact telecontrol stations (RTU: Remote Terminal Unit) for applications with their own power supply. They are particularly suited for monitoring and control of remote stations that are not connected to a power supply network. The RTUs can independently collect data from connected sensors with timestamps, pre-process the data, and transfer it to a control center. The RTU3000C is supplied with energy by a battery, rechargeable battery or solar panel or a 12 ... 24 V DC power supply unit. | • Flexible location of use<br>- Energy-optimized operation and flexible power supply concept<br>• Rugged hardware<br>- Reliable operation, even in tough environments with increased temperature range (-40 °C to +70 °C)<br>• Flexible connection to control centers<br>- Thanks to swappable telecontrol protocols<br>• Fast and flexible data communication<br>• Simple and cost-effective engineering<br>- Easy configuration with standard web browser without additional engineering tool. | – |

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## Overview (continued)

| Remote Terminal Unit | | | |
|---|---|---|---|
| | | • Remote access<br>- To HART or Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM.<br>• Fully automatic timestamp<br>• Automatic temporary storage of process values<br>• Secure data transfer<br>- Use of OpenVPN VPN technology and encrypted email connections<br>• Time of day is retained in case of power failure<br>• Saves travel and maintenance costs<br>- Thanks to web-based management | |

| Network gateways | | | |
|---|---|---|---|
| **Type** | **Area of application** | **Device description** | **Programming software** |
| **IE/PB LINK**<br>  | IE/PB LINKs are gateways for connecting the two network types, Industrial Ethernet and PROFIBUS, i.e. they enable access to all PROFIBUS nodes connected to the lower-level PROFIBUS network.<br>The variants IE/PB LINK HA and IE/PB LINK PN IO are offered as gateways from Industrial Ethernet and PROFIBUS.<br>**IE/PB LINK IO**<br>Gateway with PROFINET IO functionality, S7 routing and data record routing for standard ambient conditions<br>**IE/PB LINK HA**<br>Gateway optimized for use in the process industry through the possibility of deployment in harsh ambient conditions and the connection of PROFIBUS field devices to a redundant AS as PROFINET IO controllers | Both product variants can be used in 2 operation modes:<br>Standard mode enables, for example, loading of programs and configuration data via PG/OP communication, data record routing for configuration and diagnostics of field devices with the SIMATIC PDM tool, S7 routing e.g. for cross-network loading of SIMATIC controllers on PROFIBUS.<br>When operated as a PROFINET IO proxy, from the perspective of the PN IO controller, all PROFIBUS DP slaves connected after the IE/PB LINK are treated as PN IO devices according to the PROFINET standard. The IE/PB LINK is the proxy of the connected PROFIBUS DP slaves.<br>Both IE/PB LINK variants offer the possibility to use different transmission media by employing BusAdapters. | – |

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## Overview (continued)

| Network gateways | | | |
|---|---|---|---|
| **SIMATIC Compact Field Unit (CFU)**<br>  | Smart field distributors installed at process level and directly connected to the automation system via PROFINET.<br>Two versions are available:<br>• SIMATIC CFU PA edition<br>• SIMATIC CFU DIQ edition<br>**SIMATIC CFU PA edition**<br>• PROFIBUS PA already integrated into SIMATIC FCU<br>• Robust and really easy to use<br>• Automatic addressing of connected devices<br>• Device integration via standardized communication profiles<br>**SIMATIC CFU DIQ edition**<br>• Individual, customized solutions<br>• Flexible system expansion<br>• 16 freely configurable, digital IO channels<br>• Expansion functions can be configured if desired<br>• "Counter" and "Frequency measurement" operation modes with a limit frequency of 1 kHz can be activated as additional operation modes. | • High overheads for device integration and replacement<br>• Complicated, error-prone wiring and routing over several levels, making the hardware FAT very complex<br>• Very long copper cables and numerous terminal points in the field<br>• Multiple individual control cabinets<br>• Large numbers of different components and protocols necessitate costly spare parts inventories and training sessions<br>• High planning and documentation costs<br>• Flexible connection options via PROFINET<br>• Ready for Process Automation (PA Ready) | – |

***Supplied product documentation on DVD and safety notes***



The scope of delivery of the Siemens products for process instrumentation includes a multilingual instruction sheet with **safety notes** as well as a uniform **mini DVD – Process Instrumentation and Weighing Systems**.

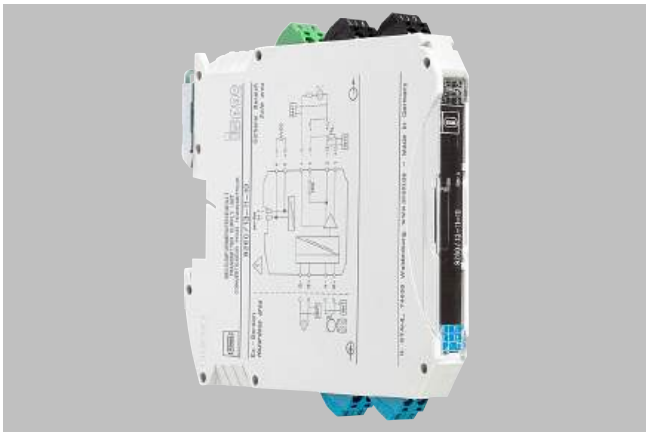
This DVD contains the most important manuals and certificates for the Siemens process instrumentation and weight measurement portfolio. The delivery may also contain product-specific or order-specific printed materials.

For more information, refer to the Appendix on page 10/3.

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## Overview



Analog input 0/4 to 20 mA

The isolating power supplies are used for the intrinsically safe operation of transmitters or for connecting to intrinsically safe mA sources and the analog output module (AOM) for SIPART PS2.

The transmitters are supplied with auxiliary power from the isolating power supplies.

HART communication signals are transmitted bidirectionally by the isolating power supplies.

## Benefits

- Active and passive output 0/4 to 20 mA
- Universally applicable for transmitters and mA sources (4-wire transmitters)
- Narrow design – 12.5 mm (0.49 inch) width – for one and two-channel version
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Installation permissible in Zones 2, 22 and Div. 2
- Can be used up to SIL 2 (IEC/EN 61508)

| | Zones | | | | | |
|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 20 | 21 | 22 |
| Ex i interfaces | X | X | X | X | X | X |
| Installation in | | | X | | | X |

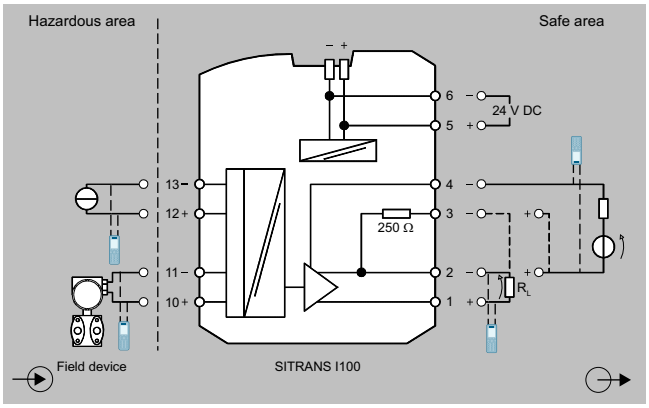
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## Design

The SITRANS I100 HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.




SITRANS I100 isolating power supply HART, function block diagram

## Selection and ordering data

| | Article No. |
|---|---|
| **SITRANS I100 isolating power supply**<br>• DIN rail mounting<br>• For 2-wire transmitters<br>• For 4-wire transmitter with intrinsically safe input (mA sources)<br>• For analog output module (AOM) for SIPART PS2<br>• Single-channel version with output 0/4 ... 20 mA, intrinsically safe Ex i<br>• 12.5 mm wide<br>• Approved up to SIL 2 (IEC/EN 61508) | **7NG4124-1AA00** |

## Technical specifications

| **SITRANS I100** | |
|---|---|
| **General** | |
| Number of channels | 1 |
| Transmitter infeed operation | Yes |
| Isolation amplifier operation | Yes |
| Input | 0/4 ... 20 mA |
| Output | 0/4 ... 20 mA with HART |
| Output adjustment time | < 0.2 ms |
| Output A | 0/4 ... 20 mA active (source) |
| Output B | 0/4 ... 20 mA active (sink) |
| **Ex i input** | |
| Input signal | 0/4 ... 20 mA with HART |
| Input functional range | 0 ... 24 mA |
| Communication signal | HART |
| Transmitter supply voltage | ≥ 16 V at 20 mA |
| Voltage drop | < 3.5 V |
| Short-circuit current | ≥ 22.5 mA |
| **Output** | |
| Output signal | 0/4 ... 20 mA with HART (active/passive) |
| Output functional range | 0 ... 24 mA |
| Communication signal | HART |
| Output characteristics | = Input signal |
| Output current at $I_E = 0$ | $I_A = 0$ mA |
| Max. load resistance $R_L$ | 1 000 Ω |
| Residual ripple | ≤ 20 $mV_{eff}$ |
| Settling time (10 ... 90%) | < 200 µs (isolating transformers: < 600 µs) |
| Galvanic isolation | |
| • Test voltage according to EN 60079-11 | |
| - Ex i-input to output | 375 V peak value |
| - Ex i-input to auxiliary power | 375 V peak value |
| • Test voltage according to EN 61010/EN 50178 | |
| - Output to auxiliary power | 300 $V_{eff}$ |
| - Output to output | 300 $V_{eff}$ |
| **Measuring accuracy** | |
| Error limits temperature influence | ≤ 0.1%/10 K |
| Deviation | ≤ 0.1% |
| Deviation typical | 0.05% |
| **Operating conditions** | |
| Degree of protection | |
| • Enclosure | IP30 |
| • Terminals | IP20 |
| Ambient temperature | -20 ... +60 °C (-4 ... +140 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| Relative humidity | ≤ 95%, (no condensation) |
| Usage in height | < 2 000 m (6 562 ft) |
| Electromagnetic compatibility | Tested acc. to the following standards and regulations:<br>• EN 61326-1 Use in the industrial environment<br>• Interference immunity in accordance with EN 61000-6-2<br>• Noise radiation according to EN 61000-6-4 |
| **Structural design** | |
| Weight | 185 g (0.41 lb) |
| Enclosure material | Polyamide |
| Grid size | 12.5 mm (0.49 inch) |
| Fire resistance (UL-94) | V0 |
| Mounting type | DIN rail NS35/15; NS35/7.5 |

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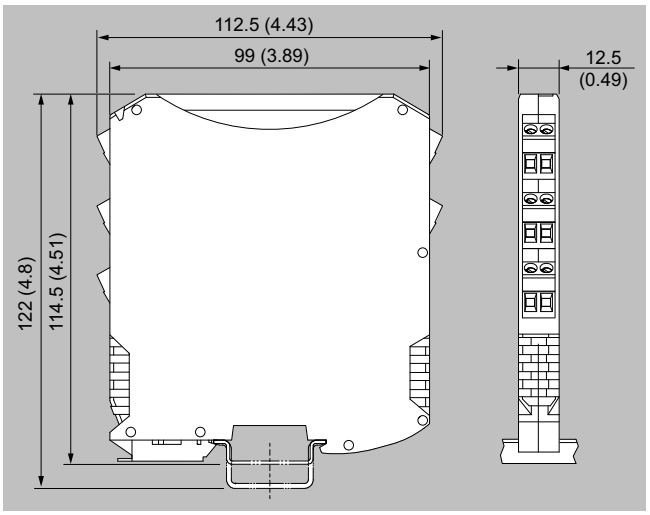


## Technical specifications (continued)

| SITRANS I100 | |
|---|---|
| Mounting position | Vertical or horizontal |
| Connection type | Screw terminals |
| • One-wire core cross-section | |
| - Rigid | 0.2 ... 2.5 mm² (0.00031 ... 0.0039 inch²) |
| - Flexible | 0.2 ... 2.5 mm² (0.00031 ... 0.0039 inch²) |
| **Auxiliary power** | |
| Nominal voltage $U_N$ | 24 V DC |
| Voltage range | 19.2 ... 30 V |
| Residual ripple within voltage range | ≤ 3.6 $V_{SS}$ |
| Rated current | 76 mA |
| Power consumption | 1.8 W |
| Max. power loss: | 1.2 W |
| Status indicator | Green "PWR" LED |
| Reverse polarity protection | Yes |
| Safety specifications | |
| • Max. voltage $U_o$ | 25.2 V |
| • Max. current $I_o$ | 93 mA |
| • Max. power $P_o$ | 587 mW |
| • Max. permissible external capacitance $C_o$ for IIC/IIB | 107 nF/820 nF |
| • Max. permissible external inductance $L_o$ for IIC/IIB | 2 mH/4 mH |
| • Internal capacitance $C_i$ and inductance $L_i$ | Negligible |
| • Max. safety-technical voltage | AC 253 V |
| • SIL | 2 |
| • Isolation amplifier, input: | |
| - Max. output voltage $U_o$ | -[1] |
| - Max. connectable voltage $U_i$ | 30 V |
| - Max. connectable current $I_i$ | 150 mA |
| - Internal capacitance Ci and inductance $L_i$ of the isolation amplifier | Negligible |
| **Certificates and approvals** | |
| ***ATEX/IECEx explosion protection*** | |
| Certificates | • BVS 17 ATEX E 087 X<br>• IECEx BVS 17.0079X |
| Gas/dust explosion protection, firedamp protection for Zones 2 and 22 | |
| • ATEX | • II 3 (1) G Ex nA [ia Ga] IIC T4 Gc<br>• II (1) D [Ex ia Da] IIIC<br>• I (M1) [Ex ia Ma] I |
| • IECEx | • Ex nA [ia Ga] IIC T4 Gc<br>• [Ex ia Da] IIIC<br>• [Ex ia Ma] I |
| Installation | In Zones 2 and 22, Div. 2 and in safe areas |
| Other approvals | • USA/Canada (UL): NEC certification (Class I, II, III) 1, 2<br>• DNV marine approval<br>• Other approvals for India and Korea |

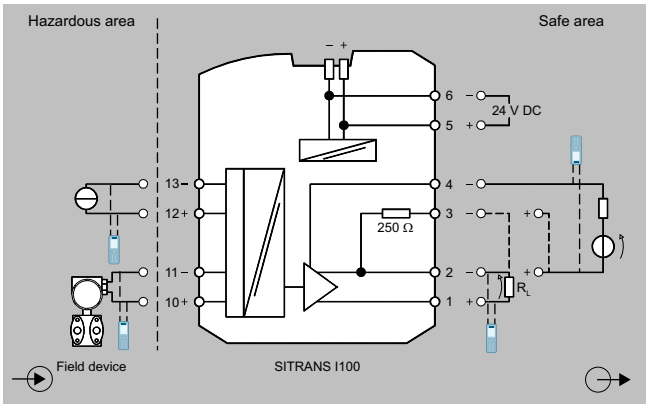
[1] $U_o$ does not have to be taken into account in 4-wire operation.

## Dimensional drawings

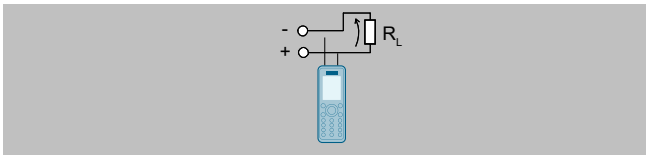



SITRANS I100 isolating power supply HART, dimensions in mm (inch)

## Circuit diagrams




SITRANS I100 isolating power supply HART, connection diagram

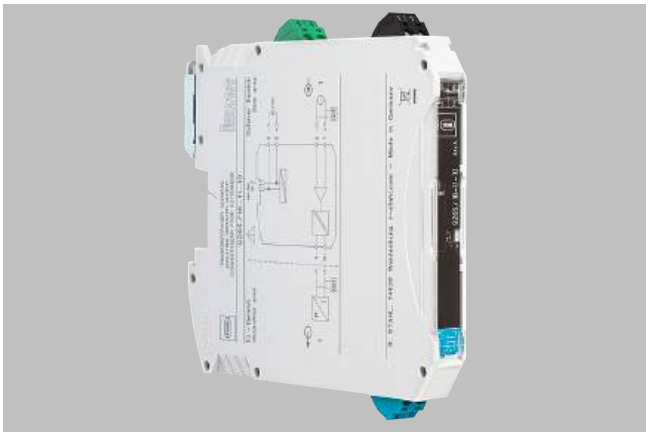



SITRANS I100 isolating power supply HART, output configuration

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## Overview



Analog output 0/4 to 20 mA for HART

The single-channel Ex i output isolation amplifiers are used for intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2) is also possible. The devices transfer a superimposed HART communication signal bidirectionally.

The SITRANS I200 is used for intrinsically safe operation of regulating valves, I/P converters or indicators.

- Superimposed HART communication signals are transmitted bidirectionally by the output isolator.
- Input, output and auxiliary power are electrically isolated from each other.

## Benefits

- Compact single-channel Ex i output isolation amplifiers
- Narrow design – 12.5 mm (0.49 inch) width – for single-channel version
- For HART output signals 0/4 to 20 mA
- Output intrinsically safe [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Wire break and short-circuit monitoring and messaging (can be switched off)
- Installation permissible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC/EN 61508)

| | Zones | | | | | |
|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 20 | 21 | 22 |
| Ex intrinsically safe interface | X | X | X | X | X | X |
| Installation in | | | X | | | X |

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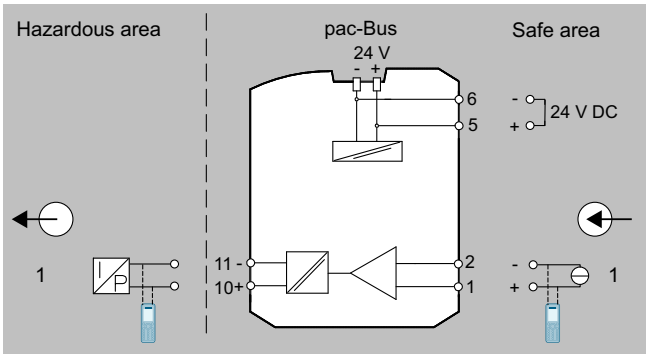


## Design

The SITRANS I200-Ex i output isolation amplifier is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be individually connected using push-in screw terminals.




SITRANS I200 output isolation amplifier, function block diagram

## Selection and ordering data

| | Article No. |
|---|---|
| **SITRANS I200 Ex i output isolation amplifier, Ex**<br>• Single channel<br>• DIN rail mounting<br>• For HART output signals 0/4 ... 20 mA<br>• Intrinsically safe operation of positioners, e.g. SIPART PS2, I/P converters or indicators<br>• 12.5 mm wide<br>• Approved up to SIL 2 (IEC/EN 61508) | **7NG4131-1AA00** |

## Technical specifications

| SITRANS I200 | |
|---|---|
| **General** | |
| Number of channels | 1 |
| LFD relay (LFD = Line fault detection) | No |
| **Electrical specifications** | |
| ***Input*** | |
| Input signal | 0/4 ... 20 mA with HART |
| Functional range | 0 ... 24 mA |
| Response threshold line fault ($L_F$) | $I_E$ > 3.6 mA |
| Response of the input to line fault ($L_F$) | $R_E$ ≥ 1 MΩ |
| ***Output*** | |
| Output signal | 0/4 ... 20 mA with HART |
| Functional range | 0.0 ... 24.0 mA |
| Communication signal | HART |
| Max. load resistance $R_L$ | 700 Ω |
| Residual ripple | ≤ 20 mV |
| Settling time (10 ... 90%) (valid for 4 ... 20 mA) | ≤ 140 µs |
| No-load voltage $U_a$ | 27.00 V |
| Average measuring error | 0.10% |
| Line fault | |
| • Setting switch | Enabled/disabled for short circuit |
| • Response threshold | $I_E$ > 3.6 mA |
| • Display | Red "ERR" LED |
| Error detection | |
| • Wire break | $R_L$ > 10 kΩ |
| • Short circuit | $R_L$ < 50 Ω |
| Error limits temperature influence | ≤ 0.1% / 10 K |
| ***Galvanic isolation*** | |
| Test voltage according to IEC EN 60079-11 | |
| • Ex i output to auxiliary power | 375 V AC peak value |
| • Ex i output to input | 375 V AC peak value |
| Test voltage according to EN 61010/EN 50178 | |
| • Input to auxiliary power | 300 $V_{eff}$ |
| ***Auxiliary power*** | |
| Nominal voltage $U_N$ | 24 V DC |
| Voltage range | 19.2 ... 30 V |
| Rated current | 45 mA |
| Power consumption | 1.1 W |
| Max. power loss: | 1.1 W |
| Status indicator | Green "PWR" LED |
| Reverse polarity protection | Yes |
| Safety specifications | |
| • Max. voltage $U_o$ | 25.2 V |
| • Max. current $I_o$ | 93 mA |
| • Max. power $P_o$ | 587 mW |
| • Max. permissible external capacitance $C_o$ for IIC/IIB | 0.107 µF/0.817 µF |
| • Max. permissible external inductance $L_o$ for IIC/IIB | 2 mH/4 mH |
| • Internal capacitance $C_i$ / internal inductance $L_i$ | Negligible |
| • Max. safety-technical voltage | 253 V |
| • SIL | 2 |
| **Operating conditions** | |
| Degree of protection | |
| • Enclosure | IP30 |

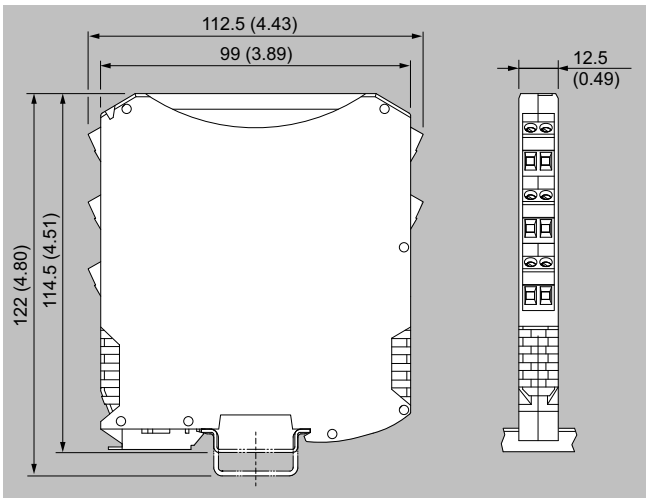
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## Technical specifications (continued)

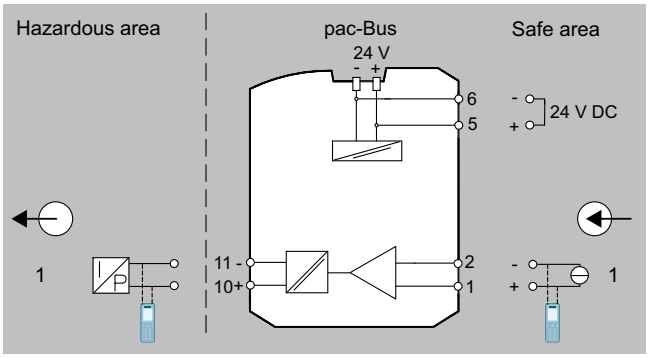
| SITRANS I200 | |
|---|---|
| • Terminals | IP20 |
| Ambient temperature | -40 °C ... +70 °C (-40 °F ... +158 °F) |
| Storage temperature | -40 °C ... +85 °C (-40 °F ... +185 °F) |
| Relative humidity | ≤ 95% |
| Usage in height | < 2 000 m (6 562 ft) |
| Electromagnetic compatibility (EMC) | • EN 61326-1 Use in the industrial environment<br>• Namur NE 21 |
| **Structural design** | |
| Weight | 0.170 kg (0.38 lb) |
| Enclosure material | Polyamide |
| Grid size | 12.5 mm (0.49 inch) |
| Width | 12.5 mm (0.49 inch) |
| Height | 114.5 mm (4.51 inches) |
| Length | 116 mm (4.57 inches) |
| Fire resistance (UL-94) | V0 |
| Mounting type | DIN rail NS35/15. NS35/7.5 |
| Mounting position | Any (vertical or horizontal) |
| Connection type | Screw terminal |
| Screw terminals | |
| Core cross-section | |
| • Rigid | 0.2 mm² ... 2.5 mm²<br>(0.00031 ... 0.0039 inch²) |
| • Flexible min. | 0.2 mm² ... 2.5 mm²<br>(0.00031 ... 0.0039 inch²) |
| Conductor cross-section AWG | 16 ... 12 |
| **Certificates and approvals** | |
| ***ATEX/IECEx explosion protection*** | |
| Operating range (zones) | 2 |
| Ex interface zone | 0, 20 |
| Gas/dust explosion protection, firedamp protection for Zones 2 and 22 | |
| Certificates | • BVS 20 ATEX E 045 X<br>• IECEx BVS 20.0035X |
| • ATEX | • Ex II 3 (1) G Ex ec [ia Ga] IIC T4 Gc<br>• Ex II (1) D [Ex ia Da] IIIC<br>• Ex I (M1) Ex [Ex ia Ma] I |
| • IECEx | • Ex ec [ia Ga] IIC T4 Gc<br>• [Ex ia Da] IIIC<br>• Ex [Ex ia Ma] I |
| Installation | In Zone 2, Div. 2 and in the safe area |
| Certificates | • ATEX (BVS), IECEx (BVS), SIL (BVS)<br>• cULus<br>• PESO<br>• KTL |
| Marine approval | DNV |

## Dimensional drawings




SITRANS I200 output isolation amplifier HART, dimensions in mm (inch)

## Circuit diagrams




SITRANS I200 output isolation amplifier HART, connection diagram

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## Overview



EIA-485 interface for Modbus RTU, PROFIBUS RS 485-IS and BACnet MS/TP communication.

- The isolating power supplies are used for the intrinsically safe operation of 4-wire devices.
- The isolating power supply supplies the 4-wire devices with power.

## Benefits

- Suitable for 4-wire devices
- Galvanic isolation between EIA-485 and EIA-485-IS, between the power supply and EIA-485-IS, and between the power supply on the input side and the intrinsically safe power supply on the output side.
- Intrinsically safe power supply and communication [Ex ia] IIC
- Installation permissible in Zone 2 and Div. 2
- Diagnostics via LEDs
- Integrated, connectable bus termination on the non-hazardous side and the hazardous side
- Transmission rates of 1 200 bps to 1.5 Mbps

## Application

Isolating power supply for 4-wire devices in hazardous areas

## Design

The EIA-485 transmitter isolating power supply consists of a compact plastic enclosure (IP20) in the SIMATIC S7-1200 design, and is equipped with plug-in screw terminals. On the front are a green LED for indicating the auxiliary power supply status and a yellow LED for signaling communication. The push-in screw terminals are jumpered on the EIA-485 transmitter isolating power supply, allowing the power supply and primary-side communication to further SITRANS I300 devices to be looped through.

## Selection and ordering data

| | Article No. |
|---|---|
| **SITRANS I300 isolating power supply** | |
| Isolating power supply with intrinsically safe EIA-485 interface, DIN rail mounting, for 4-wire devices | **A5E39832532** |

## Technical specifications

| SITRANS I300 | |
|---|---|
| **Power supply** | |
| Input | |
| • Nominal voltage $U_N$ | 24 V DC |
| • Voltage range | 19.2 ... 28.8 V |
| • Residual ripple within voltage range | ≤ 3.6 $V_{SS}$ |
| • SITRANS I300 current consumption (24 V DC) | ≤ 210 mA |
| • Power loss for a load of 1.5 W | 3.3 W at 24 V DC |
| • Reverse polarity protection | Yes |
| Output | |
| • Nominal voltage | 15.6 V |
| • Max. current | 459 mA |
| • Max. power | 1.5 W |
| Galvanic isolation | Test voltage according to EN 60079-11 |
| • EIA-485 to EIA-485-IS | 1 500 V AC |
| • Power supply to EIA-485-IS | 1 500 V AC |
| **Operating conditions** | |
| Degree of protection of enclosure | IP20 |
| Degree of protection of terminals | IP20 |
| Ambient conditions | |
| • Ambient temperature | -40 ... +60 °C (-40 ... +140 °F) |
| • Storage temperature | -40 ... +70 °C (-40 ... +158 °F) |
| • Relative humidity (no condensation) | ≤ 95% |
| Electromagnetic compatibility | Tested acc. to the following standards and regulations: EN 61326-1 Use in the industrial environment |
| **Structural design** | |
| Dimensions in mm (width x height x depth) | 70 x 100 x 75 |
| Weight | Approx. 250 g (0.55 lbs) |
| Screw terminals | |
| • One-wire connection | |
| - Rigid | 0.34 ... 2.5 mm² (AWG 22 ... 14) |
| - Flexible | 0.34 ... 2.5 mm² (AWG 22 ... 14) |
| - Flexible with end ferrules | 0.34 ... 2.5 mm² (AWG 22 ... 14) |
| Mounting type | • On DIN rail acc. to EN 50022 (NS35/15; NS35/7.5)<br>• Wall |
| Mounting position | Vertical or horizontal |

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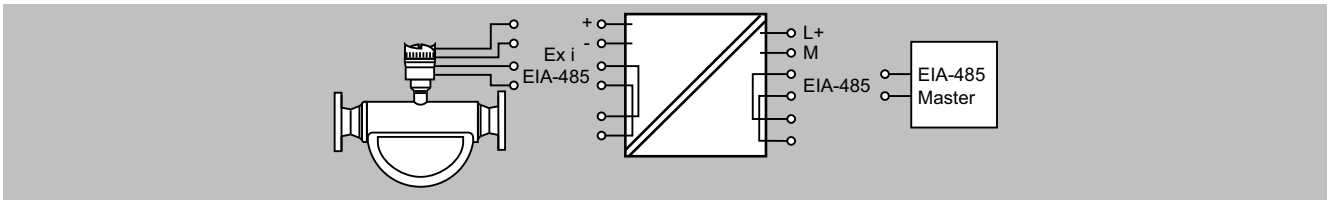
## Technical specifications (continued)

| SITRANS I300 | |
|---|---|
| **Communication** | |
| EIA-485 segment (primary side) | |
| • Supported transmission rates | • 1 200 bps<br>• 2 400 bps<br>• 4 800 bps<br>• 9 600 bps<br>• 19.2 kbps (factory setting)<br>• 38.4 kbps<br>• 45.45 kbps<br>• 57.6 kbps<br>• 76.8 kbps<br>• 93.75 kbps<br>• 115.2 kbps<br>• 187.5 kbps<br>• 460.8 kbps<br>• 500 kbps<br>• 1.5 Mbps |
| • Terminating resistor | Integrated, connectable |
| EIA-485-IS segment (secondary side) | |
| • Permissible cable lengths | |
| - 1 200 ... 187 500 bps | ≤ 1 000 m |
| - 500 kbps | ≤ 400 m |
| - 1.5 Mbps | ≤ 200 m |
| • Terminating resistor | Integrated, connectable |
| Diagnostic functions | |
| • Monitoring, 24 V power supply | Green "PWR" LED |
| • Bus monitoring | Yellow "RX/TX" LED |
| **Certificates and approvals** | |
| ATEX explosion protection | |
| • EC type-examination certificate | ATEX LVD EMC RoHs |
| • Degree of protection | CAT 3[1] G |
| Installation | In Zone 2, Div. 2 and in safe areas |
| Safety specifications (acc. to IEC 60079-11) | |
| • Max. voltage $U_0$ | 17.42 V |
| • Max. current $I_0$ | 459 mA |
| • Max. power $P_0$ | 2 000 mW |
| • Max. connectable capacitance $C_0$ for IIC/IIB | 327 nF/1 958 nF |
| • Max. connectable inductance $L_0$ for IIC/IIB | 134 µH/675 µH |
| • Internal capacitance $C_i$ | Negligible |
| • Internal inductance $L_i$ | Negligible |
| • Maximum insulation voltage $U_m$ | See certificate |
| Explosion protection acc. to EAC Ex | Available soon |
| Marine approvals | • DNV-GL (Det Norske Veritas/Germanischer Lloyd)<br>• LR (Lloyds Register)<br>• BV (Bureau Veritas)<br>• ABS (American Bureau of Shipping)<br>• RINA (Registro Italiano Navale) |

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## Circuit diagrams




SITRANS I300 isolating power supply, connection diagram

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## Overview




The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

## Benefits

- Easy setup
- Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

## Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas.
It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C
(-40 to +185 °F), adding only 1 V to the loop.

Calibration consists of a quick two-step process involving the adjustment of only two non-interacting potentiometers.

- Key Applications: remotely displays process variables in level, flow, pressure, temperature, and weighing applications, in a 4 to 20 mA loop.

## Selection and ordering data

| SITRANS RD100 Display<br>Remote digital display for process instruments. 2-wire, loop powered, NEMA 4X enclosure. | Article No.<br>7ML5741- | ● | ● | A | 0 | 0 | - | 0 |
|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | |
| **Conduit hole location (½ inch)** | | | | | | | | |
| None | | 1 | | | | | | |
| Bottom | | 2 | | | | | | |
| Rear | | 3 | | | | | | |
| Top | | 4 | | | | | | |
| **Approvals** | | | | | | | | |
| FM/CSA | | | A | | | | | |
| CE | | | B | | | | | |

| Selection and Ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| Panel mount kit | **7ML1930-1BN** |
| 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) | **7ML1930-1BP** |
| 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) | **7ML1930-1BQ** |

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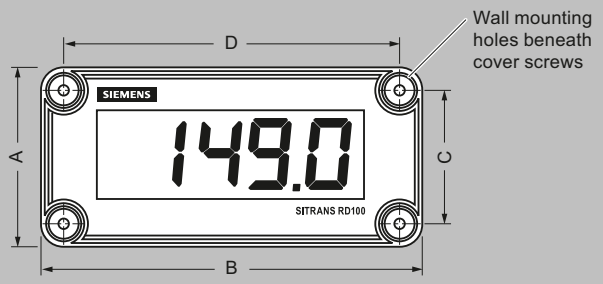


## Technical specifications

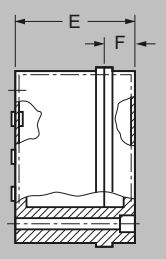
| SITRANS RD100 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Analog to digital conversion |
| Measuring range | 4 ... 20 mA |
| Measuring points | 1 instrument only |
| **Accuracy** | ± 0.1 % of span ± 1 count |
| **Rated operating conditions** | |
| Ambient conditions | |
| • Operating temperature range | -40 ... +85 °C (-40 ... +185 °F) |
| • Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| **Design** | |
| Weight | 340 g (12 oz) |
| Material (enclosure) | Impact-resistant glass filled polycarbonate body and clear polycarbonate cover |
| Degree of protection | NEMA 4X, IP67 |
| **Power supply** | |
| External loop power supply | 30 V DC max. |
| **Display** | • 1.0 inch (2.54 cm) high LCD<br>• Numeric range from -1 000 ... +1 999 |
| **Certificates and approvals** | |
| Non-hazardous | CE |
| Hazardous | |
| • Intrinsically Safe | • CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4<br>• CSA/FM Class I, Zone 0, Group IIC |
| • Non-incendive | • CSA/FM Class I, Div. 2, Groups A, B, C, D<br>• CSA/FM Class II and III, Div. 2, Groups F and G |
| **Options** | |
| Mounting | • 2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel)<br>• Panel mounting kit |

## Dimensional drawings

**RD100 - front view**




**RD100 - side view**



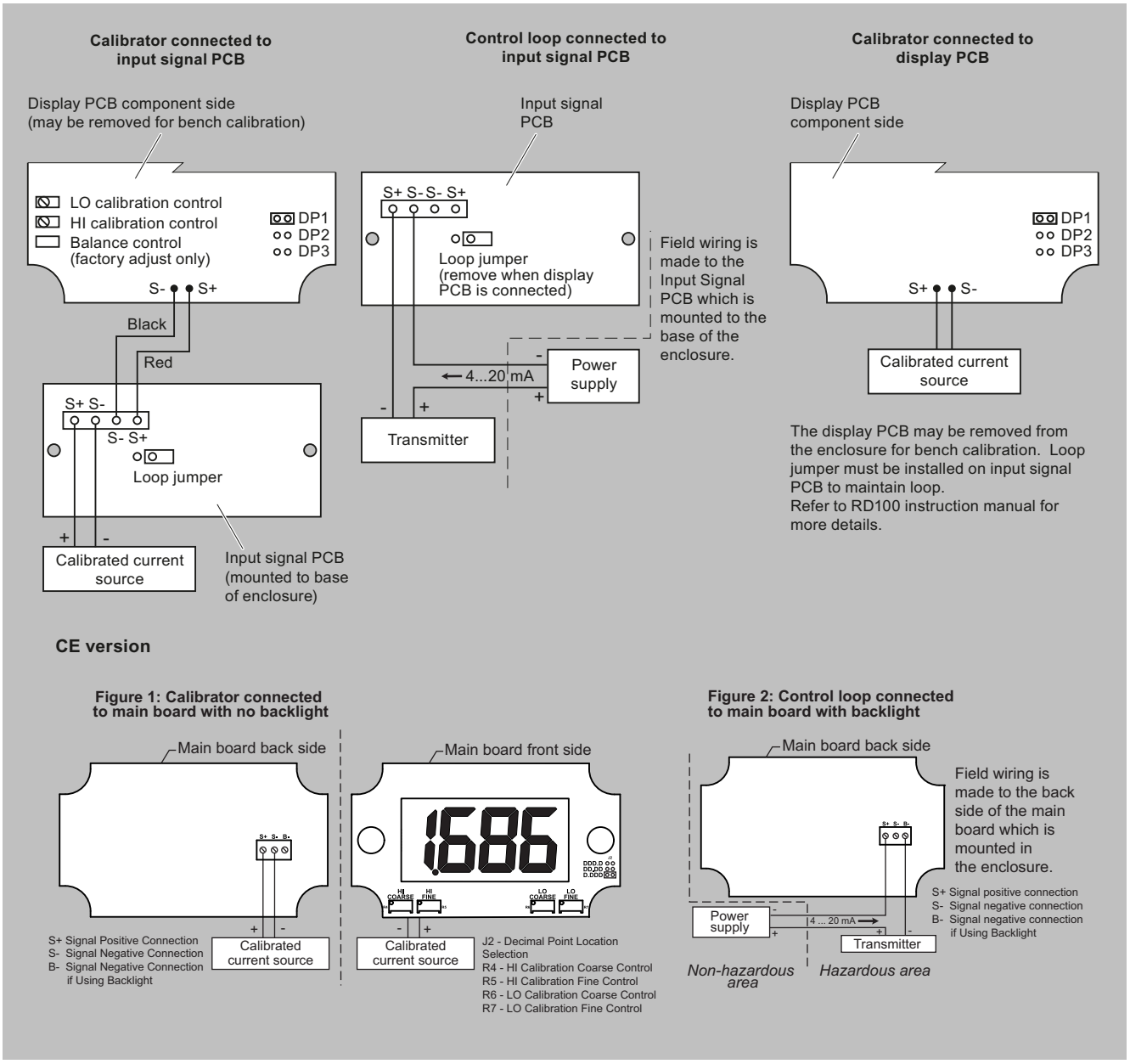

A: 80 (3.15)
B: 140 (5.51)
C: 60 (2.36)
D: 120 (4.72)
E: 65 (2.56)
F: 20 (0.79)

SITRANS RD100, dimensions in mm (inch)

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## Circuit diagrams




SITRANS RD100 connections

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## SITRANS RD150

### Overview




The SITRANS RD150 is a remote display for 4 to 20 mA and HART devices.

### Benefits

- Ease of use through 4 button menu driven display
- Backlit display
- HART communications
- Flexible mounting options
- Plastic, stainless steel or aluminum housings up to IP68
- Full configuration of connected sensors with optional USB Communicator and PC
- Support for multiple HART sensors with HART Multi-drop

### Application

The versatile SITRANS RD150 can be installed remotely from your instrument, providing 4/20 mA or multiple HART variable readings in a safe and convenient location.

Easy to use, 4 button, menu driven, display for configuration of HART instruments via standard HART commands and full configuration of connected instruments via USB and computer.

- Key Applications: remotely displays process variables in level, flow, pressure, temperature, and weighing applications, in a 4 to 20 mA HART loop.

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## Selection and ordering data

| SITRANS RD150 Display<br>Remote digital display with configuration for process instruments. HART or 4 to 20 mA loop display, metal and plastic field mount enclosures. | Article No.<br>7ML5742- | ● | ● | ● | ● | ● | - | ● | ● | ● | ● |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | | | |
| **Approvals** | | | | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA | | 0 | A | | | | | | | | |
| ATEX II 1G, Ex ia IIC T6...T1 Ga[4]<br>UKEX II 1G, Ex ia IIC T6...T1 Ga[4] | | 0 | C | | | | | | | | |
| ATEX II 2G Ex db IIC T6 Gb[9][10]<br>UKEX II 2G Ex db IIC T6 Gb[9][10] | | 0 | F | | | | | | | | |
| IECEx Ex ia IIC T6...T1 Ga, Gb[4] | | 0 | J | | | | | | | | |
| IECEx Ex db IIC T6 Gb[9][10] | | 0 | M | | | | | | | | |
| $_{C}CSA_{US}$ (IS) Class I, Div. 1, Groups A, B,C, D[12] | | 0 | N | | | | | | | | |
| $_{C}CSA_{US}$ (XP) Class I, Div. 1, Groups A, B, C, D[9][11] | | 0 | R | | | | | | | | |
| **Electronics** | | | | | | | | | | | |
| Two-wire 4 ... 20 mA/HART | | | | A | | | | | | | |
| Two-wire 4 ... 20 mA without HART | | | | B | | | | | | | |
| **Housing** | | | | | | | | | | | |
| Plastic[1][4][6] | | | | | 0 | | | | | | |
| Aluminum[2][4][7] | | | | | 1 | | | | | | |
| Stainless steel (precision casting)[2][4][7] | | | | | 2 | | | | | | |
| For panel mounting (72 x 72 mm)[3][5][8] | | | | | 3 | | | | | | |
| **Housing protection** | | | | | | | | | | | |
| IP66/IP67 NEMA 4X | | | | | | 0 | | | | | |
| IP66/IP68 NEMA 6P (0.2 bar) | | | | | | 1 | | | | | |
| IP40 NEMA 2 | | | | | | 2 | | | | | |
| IP40 Type 1 | | | | | | 3 | | | | | |
| **Cable entry** | | | | | | | | | | | |
| M20 x 1.5/Cable gland PA black (ø5 ... 9 mm), standard | | | | | | | | 0 | | | |
| M20 x 1.5/Cable gland brass nickel plated (ø6 ... 12 mm) | | | | | | | | 1 | | | |
| M20 x 1.5/Blind plug | | | | | | | | 2 | | | |
| M20 x 1.5/Threaded fitting brass nickel-plated; for shielded cable (ø9 ... 13 mm) | | | | | | | | 3 | | | |
| ½" NPT/Blind plug | | | | | | | | 4 | | | |
| ½" NPT/Cable gland PA black (ø5 ... 9 mm) | | | | | | | | 5 | | | |
| ½" NPT/Threaded fitting brass nickel plated (ø6 ... 12 mm) | | | | | | | | 6 | | | |
| ½" NPT/Threaded fitting brass nickel plated; for shielded cable (ø9 ... 13 mm) | | | | | | | | 7 | | | |
| Without | | | | | | | | 8 | | | |
| **Display** | | | | | | | | | | | |
| Without | | | | | | | | | A | | |
| Mounted | | | | | | | | | B | | |
| **Mounting** | | | | | | | | | | | |
| For wall mounting with aluminum or stainless steel housing | | | | | | | | | | A | |
| For carrier rail and wall mounting with plastic housing | | | | | | | | | | B | |
| For carrier rail with aluminum or stainless steel housing | | | | | | | | | | C | |
| For tube mounting (29 ... 60 mm) incl. mounting material | | | | | | | | | | D | |
| For panel mounting | | | | | | | | | | E | |
| **Certificates** | | | | | | | | | | | |
| None | | | | | | | | | | | 0 |
| 3.1 Certificate/Instrument with test data | | | | | | | | | | | 1 |
| Quality and Test plan | | | | | | | | | | | 2 |

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## Selection and ordering data (continued)

| Selection and ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| USB communicator | **A5E35192015** |
| SITRANS LG/SITRANS RD150 sensor display module | **A5E34143449** |

1) Available only with Housing protection option 0.
2) Available only with Housing protection option 1.
3) Available only with Housing protection option 2.
4) Available only with Cable entry options 0, 2, 4, and 5.
5) Available only without Cable entry option 8.
6) Available only with Carrier rail and Tube mount Mounting options.
7) Available only with Wall mount, Carrier rail with aluminum or stainless steel housing, and Tube mount Mounting options.
8) Available only with Panel mounting option.
9) Available only with Housing options 1 and 2.
10) Available only with Cable entry options 2, 3, 4, and 7.
11) Available only with Cable entry options 2, 3, 4, 6, and 7.
12) Not available with Cable entry option 1.

## Technical specifications

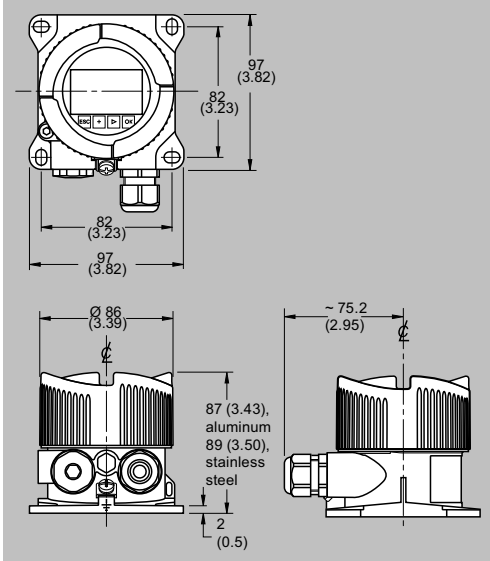
| SITRANS RD150 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Analog to digital conversion |
| Measuring range | 3.5 ... 22.5 mA |
| Measuring points | HART multi-drop support |
| **Accuracy** | ± 0.1 % of 20 mA |
| **Rated operating conditions** | |
| Without display and adjustment module | -40 ... +80 °C (-40 ... +176 °F) |
| With display and adjustment module | -20 ... +70 °C (-4 ... +158 °F) |
| Storage temperature | -40 ... +80 °C (-40 ... +176 °F) |
| **Design** | |
| Weight | |
| • Plastic housing | 0.35 kg (0.772 lb) |
| • Aluminum housing | 0.7 kg (1.543 lb) |
| • Stainless steel housing | 2.0 kg (4.409 lb) |
| Material (enclosure) | |
| • Plastic housing | Plastic PBT (Polyester) |
| • Aluminum housing | Aluminum die-casting AlSi10Mg, powder-coated (basis: Polyester) |
| • Stainless steel housing | 316L precision casting, blasted |
| Degree of protection | |
| • Plastic housing | IEC 60529 IP66/IP 67, NEMA Type 4X |
| • Housing for panel mounting (mounted) | IEC 60529 IP40, NEMA Type 1 |
| • Aluminum/stainless steel housing | IEC 60529 IP66/IP68 (0.2 bar), NEMA Type 6P |
| **Power supply** | |
| External loop power supply | 35 V DC max. |
| **Display** | |
| Number of digits | 5 |
| Digit size | 7 x 13 mm (0.28 x 0.51 inch) |
| **Certificates and approvals** | See the online PIA configuration tool for details. |
| **Options** | |
| Mounting | • Panel Mounting<br>• Carrier rail mounting<br>• Pipe mounting |

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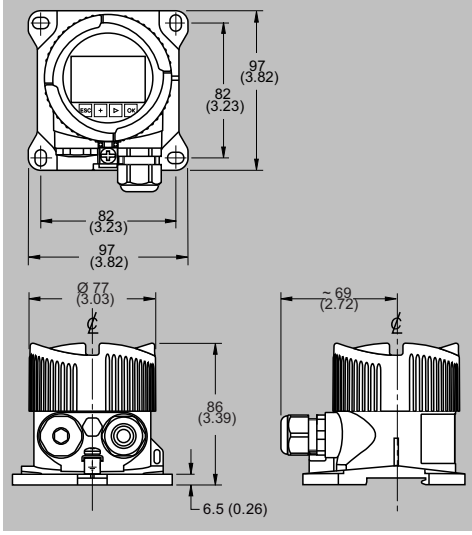


## Dimensional drawings

**SITRANS RD150, aluminum/stainless steel housing**

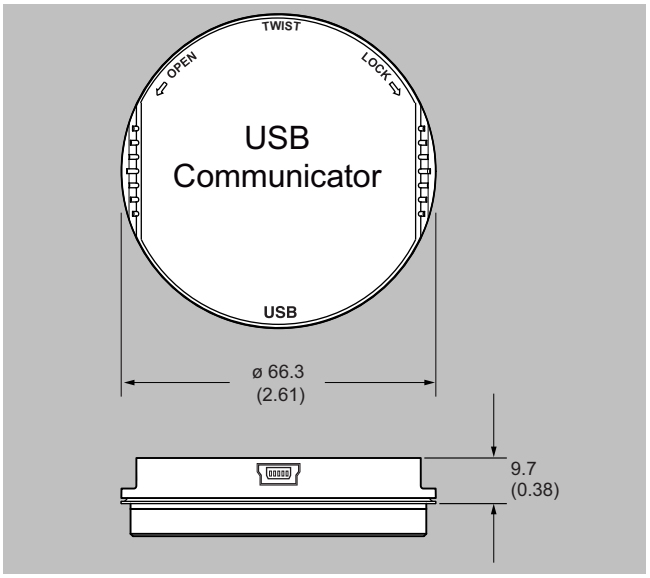



**SITRANS RD150, plastic housing**




SITRANS RD150, dimensions in mm (inch)

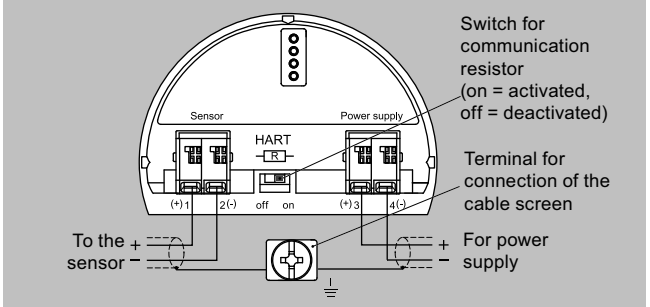
## Dimensional drawings (continued)



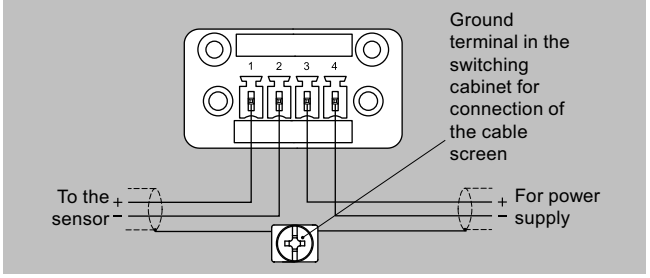

USB Communicator, dimensions in mm (inch)

## Circuit diagrams

**Standard housing with 2 wire device**




**Panel mount**




SITRANS RD150 connections

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## SITRANS RD200

### Overview




The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

### Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple, and RTD signals
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost, and errors
- RD software supports remote configuration, monitoring, and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, pump alternation control, and optional NEMA 4 and 4X field enclosures
- 2X option for 30.5 mm (1.2 inch) high, red LED display

### Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments.

Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD Software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments.

The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring, and data logging with RD Software.

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## Selection and ordering data

| SITRANS RD200 Display<br>Remote digital display for process instruments. With 4 to 20 mA, 0 to 10 V, RTD, and TC inputs and pump control. Panel mount with field mount enclosure options. | Article No.<br>7ML5740- ● | ● | ● | ● | ● | - | ● | A |
|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | |
| **Input voltage** | | | | | | | | |
| 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. | 1 | | | | | | | |
| 12 ... 36 V DC; 12 ... 24 V AC, 6 W max. | 2 | | | | | | | |
| **Transmitter supply** | | | | | | | | |
| None | | A | | | | | | |
| Single 24 V DC transmitter supply[1] | | B | | | | | | |
| Dual 24 V DC transmitter supply[1][2] | | C | | | | | | |
| **Output** | | | | | | | | |
| None | | | A | | | | | |
| 2 relays | | | B | | | | | |
| 4 ... 20 mA output | | | C | | | | | |
| **Communication** | | | | | | | | |
| Modbus RTU | | | | 0 | | | | |
| **Approvals** | | | | | | | | |
| Ordinary Locations/General Purpose (Non-Ex), CE, UKCA, UL, ¿UL | | | | | 1 | | | |
| **Display Size** | | | | | | | | |
| Standard | | | | | | | 0 | |
| 2X option for 30.5 mm (1.2 inch) high, red LED | | | | | | | 1 | |

1) Available with input voltage option 1 only.
2) Available with output option C only.

| Selection and Ordering data | Article No |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| **Accessories** | |
| SITRANS RD200 copy cable 2.1 m (7 ft) | **7ML1930-1BR** |
| SITRANS RD200 RS 232 serial adapter (copy cable included) | **7ML1930-1BS** |
| SITRANS RD200 RS 422/485 serial adapter (copy cable included) | **7ML1930-1BT** |
| RS 232 to RS 422/485 isolated converter | **7ML1930-1BU** |
| RS 232 to RS 422/485 non-isolated converter | **7ML1930-1BV** |
| USB to RS 422/485 isolated converter | **7ML1930-1BX** |
| USB to RS 422/485 non-isolated converter | **7ML1930-1BY** |
| RD200 USB serial adapter | **7ML1930-6AH** |
| USB to RS 232 converter | **7ML1930-6AK** |
| RD Software CD for 1 ... 100 displays | **7ML1930-1CC** |
| Low cost polycarbonate plastic enclosure for 1 display | **7ML1930-1CF** |
| 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML1930-1CF | **7ML1930-1BP** |
| 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML1930-1CF | **7ML1930-1BQ** |
| ***Thermoplastic enclosure*** | |
| For use with 1 display | **7ML1930-1CG** |
| For use with 2 displays | **7ML1930-1CH** |
| For use with 3 displays | **7ML1930-1CJ** |
| For use with 4 displays | **7ML1930-1CK** |
| For use with 5 displays | **7ML1930-1CL** |
| For use with 6 displays | **7ML1930-1CM** |
| ***Stainless steel enclosure (Type 304, EN 1.4301)*** | |
| For use with 1 display | **7ML1930-1CN** |
| For use with 2 displays | **7ML1930-1CP** |
| For use with 3 displays | **7ML1930-1CQ** |
| For use with 4 displays | **7ML1930-1CR** |
| For use with 5 displays | **7ML1930-1CS** |
| For use with 6 displays | **7ML1930-1CT** |
| ***Steel enclosure*** | |
| For use with 1 display | **7ML1930-1CU** |
| For use with 2 displays | **7ML1930-1CV** |
| For use with 3 displays | **7ML1930-1CW** |
| For use with 4 displays | **7ML1930-1CX** |
| For use with 5 displays | **7ML1930-1CY** |
| For use with 6 displays | **7ML1930-1DA** |

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## Technical specifications

| SITRANS RD200 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Analog to digital conversion |
| Measuring points | • 1 instrument<br>• Remote monitoring of 100 instruments with PC and RD software |
| **Input** | |
| Measuring range | |
| • Current | • 4 ... 20 mA, 0 ... 20 mA |
| • Voltage | • 0 V DC ... 10 V DC, 1 ... 5 V, 0 ... 5 V |
| • Thermocouple temperature | • Type J: -50 ... +750 °C (-58 ... +1 382 °F)<br>• Type K: -50 ... +1 260 °C (-58 ... +2 300 °F)<br>• Type E: -50 ... +870 °C (-58 ... +1 578 °F)<br>• Type T: -180 ... +371 °C (-292 ... +700 °F)<br>• Type T, 0.1° resolution: -180.0 ... +371 °C (-199.9 ... +700 °F) |
| • RTD temperature | • 100 Ω RTD: -200 ... +750 °C (-328 ... +1 382 °F) |
| **Output signal** | |
| Output | • 4 ... 20 mA (optional)<br>• Modbus RTU |
| Relays | 2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional) |
| Communications | • RS 232 with PDC or Modbus RTU<br>• RS 422/485 with PDC or Modbus RTU |
| **Accuracy** | |
| 4 ... 20 mA optional output | ± 0.1 % FS ± 0.004 mA |
| Process input | ± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS |
| Thermocouple temperature input | • Type J: ± 1 °C (± 2 °F)<br>• Type K: ± 1 °C (± 2 °F)<br>• Type E: ± 1 °C (± 2 °F)<br>• Type T: ± 1 °C (± 2 °F)<br>• Type T, 0.1° resolution: ± 1 °C (± 1.8 °F) |
| RTD temperature input | • 100 Ω RTD: ± 1 °C (± 1 °F) |
| **Rated operating conditions** | |
| Ambient conditions | |
| • Storage temperature range | -40 ... +85 °C (-40 ... +185 °F) |
| • Operating temperature range | -40 ... +65 °C (-40 ... +149 °F) |
| **Design** | |
| Weight | 269 g (9.5 oz) (including options) |
| Material (enclosure) | • 1/8 DIN, high impact plastic, UL94V-0, color: gray<br>• Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures |
| Degree of protection | Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided |
| **Electrical connection** | |
| mA output signal | 2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable |
| Electrical connection and relay connection | Copper conductor according to local requirements, rated 3 A at 250 V AC |
| **Power supply** | |
| Input voltage option 1 | 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. |
| Input voltage option 2 | 12 ... 36 V DC; 12 ... 24 V AC, 6 W max. |
| Transmitter power supply | One or two isolated transmitter power supplies (optional) |
| • Single power supply | One 24 V DC ± 10 % at 200 mA max. |
| • Dual power supplies | Two 24 V DC ± 10 % at 200 mA and 40 mA max. |

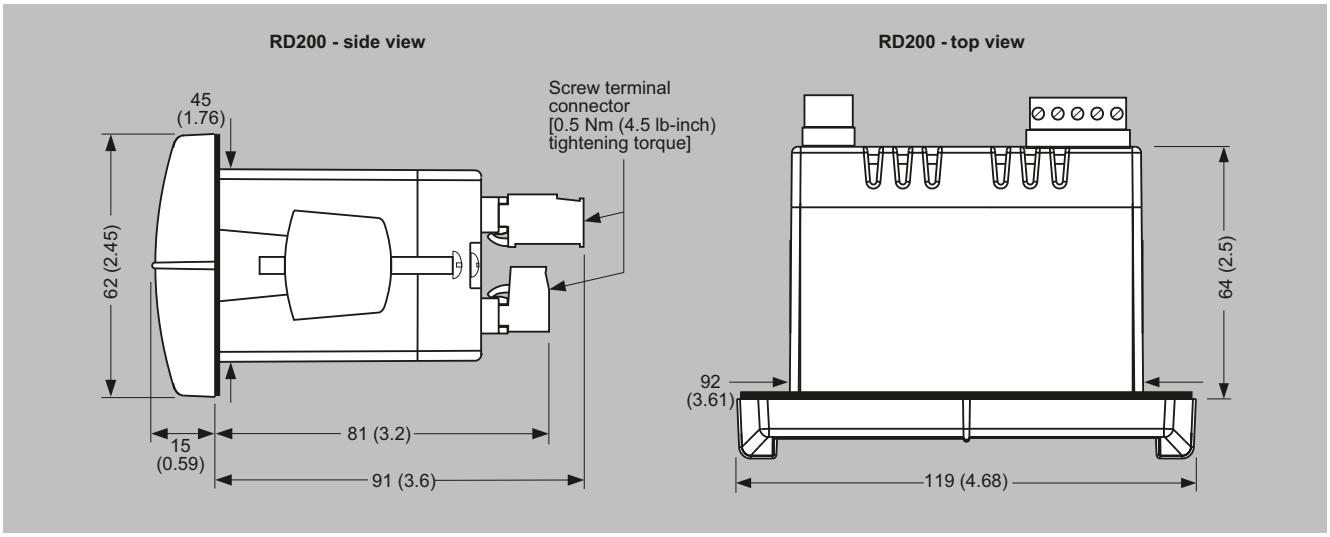
## Technical specifications (continued)

| SITRANS RD200 | |
|---|---|
| External loop power supply | 35 V DC max. |
| Output loop resistance | • 24 V DC, 10 ... 700 Ω max.<br>• 35 V DC (external), 100 ... 1 200 Ω max. |
| **Displays and controls** | |
| Display | • 14 mm (0.56 inch) high LED<br>• 2X option for 30.5 mm (1.2 inch) high, red LED<br>• Numeric range from -1 999 ... +9 999<br>• Four digits, automatic lead zero blanking<br>• Eight intensity levels |
| Memory | • Non-volatile<br>• Stores settings for minimum of 10 years if power is lost |
| Programming | • Primary: front panel<br>• Secondary: meter copy or PC with SITRANS RD software |
| **Certificates and approvals** | CE, UKCA, UL, cUL |
| **Options** | |
| Enclosures | Plastic, steel, and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures |
| Mounting | • 2 inch (5.08 cm) pipe mounting kit (zinc plated seal)<br>• 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) |

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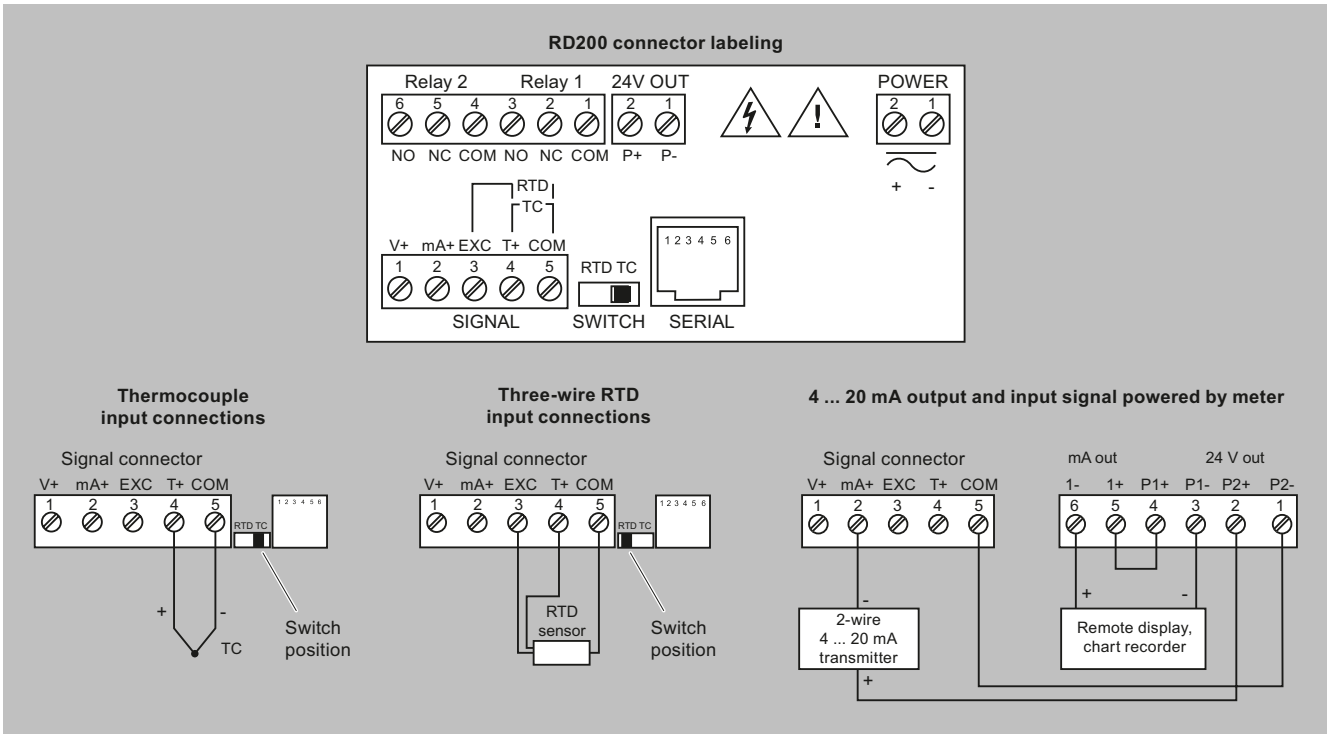


## Dimensional drawings




SITRANS RD200, dimensions in mm (inch)

## Circuit diagrams



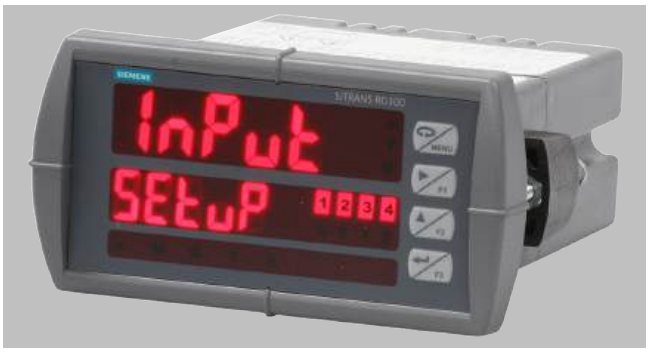

SITRANS RD200 connections

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## SITRANS RD300

### Overview




The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

### Benefits

- Easy setup and programming via front panel buttons or using free RD software available via USB drive
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-Point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line, 6-digit display
- Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

### Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free RD software available via USB drive.

The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

- Key Applications: tank farms, pump alternation control, local or remote display of level, flow, pressure and weighing instrument values, PC monitoring and data logging with RD Software.

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## Selection and ordering data

| SITRANS RD300 Display<br>Remote digital panel mount process display with current or voltage inputs.<br>Two input, multi-line display, totalizer and pump control. | Article No.<br>7ML5744- | ● | ● | ● | ● | ● | - | 0 | A |
|---|---|---|---|---|---|---|---|---|---|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | | | | | | | | |
| **Input voltage** | | | | | | | | | |
| 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. | | 1 | | | | | | | |
| 12 ... 36 V DC; 12 ... 24 V AC, 6 W max. | | 2 | | | | | | | |
| **Output** | | | | | | | | | |
| None | | | A | | | | | | |
| 2 Relays | | | B | | | | | | |
| 4 Relays | | | C | | | | | | |
| 4 ... 20 mA output | | | D | | | | | | |
| 2 Relays and 4 ... 20 mA output | | | E | | | | | | |
| 4 Relays and 4 ... 20 mA output | | | F | | | | | | |
| **Type** | | | | | | | | | |
| Single input process and flow rate/totalizer Mtr | | | | A | | | | | |
| Dual input process Mtr | | | | B | | | | | |
| **Display** | | | | | | | | | |
| Standard | | | | | 0 | | | | |
| SunBright | | | | | 1 | | | | |
| **Approvals** | | | | | | | | | |
| UL, cUL, and CE | | | | | | 0 | | | |

| Selection and Ordering data | Article No. |
|---|---|
| **Operating Instructions** | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/ processinstrumentation/documentation | |
| **Accessories** | |
| DIN-Rail Mounting Kit | **7ML1930-6AB** |
| 4 Relays Expansion Module | **7ML1930-6AC** |
| 4 Digital I/O Module | **7ML1930-6AD** |
| Dual output 4 ... 20 mA expansion module for dual input meter | **7ML1930-6AP** |
| Meter Copy Cable | **7ML1930-6AE** |
| RD300 RS 232 Serial Adapter | **7ML1930-6AF** |
| RD300 RS 422/485 Serial Adapter | **7ML1930-6AG** |
| RD300 USB Serial Adapter | **7ML1930-6AJ** |

| Selection and Ordering data | Article No. |
|---|---|
| USB to RS 232 Converter | **7ML1930-6AK** |
| RS 232 to RS 422/485 isolated converter | **7ML1930-1BU** |
| RS 232 to RS 422/485 non-isolated converter | **7ML1930-1BV** |
| USB to RS 422/485 isolated converter | **7ML1930-1BX** |
| USB to RS 422/485 non-isolated converter | **7ML1930-1BY** |
| Snubber | **7ML1930-6AL** |
| ***Plastic enclosure*** | |
| For 1 meter | **7ML1930-6AM** |
| For 2 meters | **7ML1930-6AN** |
| For 4 meters | **7ML1930-1CK** |
| For 5 meters | **7ML1930-1CL** |
| For 6 meters | **7ML1930-1CM** |

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## Technical specifications

| SITRANS RD300 | |
|---|---|
| **Mode of operation** | |
| Measuring principle | Analog to digital conversion |
| Measuring points | 1 or 2 instruments |
| ***Input*** | |
| Measuring range | |
| • Current | 4 ... 20 mA, 0 ... 20 mA |
| • Voltage | 0 V DC ... +10 V DC, 1 ... 5 V, 0 ... 5 V |
| **Output signal** | |
| Output | • 4 ... 20 mA (optional)<br>• Modbus RTU |
| Relays | 2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional) |
| Communications | • RS 232 with Modbus RTU<br>• RS 422/485 with Modbus RTU<br>• USB configuration and monitoring port |
| **Accuracy** | |
| 4 ... 20 mA optional output | ± 0.1 % FS<br>± 0.004 mA |
| Process input | ± 0.05 % of span ± 1 count, square root: 10 ... 100 % FS |
| **Rated operating conditions** | |
| Ambient conditions | |
| • Storage temperature range | -40 ... +85 °C (-40 ... +185 °F) |
| • Operating temperature range | -40 ... +65 °C (-40 ... +149 °F) |
| **Design** | |
| Weight | 269 g (9.5 oz) (including options) |
| Material (enclosure) | • 1/8 DIN, high impact plastic, UL94V-0, color: gray<br>• Optional plastic, steel and stainless steel (Type 304, EN 1.4301)NEMA 4 enclosures |
| Degree of protection | Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided |
| **Electrical connection** | |
| mA output signal | 2-core copper conductor, twisted, shielded, 0.82 ... 3.30 mm² (18 ... 12 AWG), Belden 8 760 or equivalent is acceptable |
| Electrical connection and relay connection | Copper conductor according to local requirements, rated 3 A at 250 V AC |
| **Power supply** | |
| Input voltage option | 85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max. or jumper selectable 12/24 V DC ± 10 %, 15 W max. |
| Transmitter power supply | Terminals P+ & P-: 24 V DC ± 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 ... 265 V AC models rated at 200 mA max, 12/24 V DC powered models rated at 100 mA max., at 50 mA max. for 5 or 10 V DC supply. |
| External loop power supply | 35 V DC max. |
| Output loop resistance | • 24 V DC, 10 ... 700 Ω max.<br>• 35 V DC (external), 100 ... 1 200 Ω max. |
| **Displays and controls** | |
| Main display | 0.6 inch (15 mm) high, red LEDs |
| Second display | 0.46 inch (12 mm) high, red LEDs, 6-digits: each (-99 999 ... 999 999) |
| Memory | • Non-volatile<br>• Stores settings for minimum of 10 years if power is lost |
| Programming | • Primary: front panel<br>• Secondary: Meter Copy or PC with SITRANS RD Software |

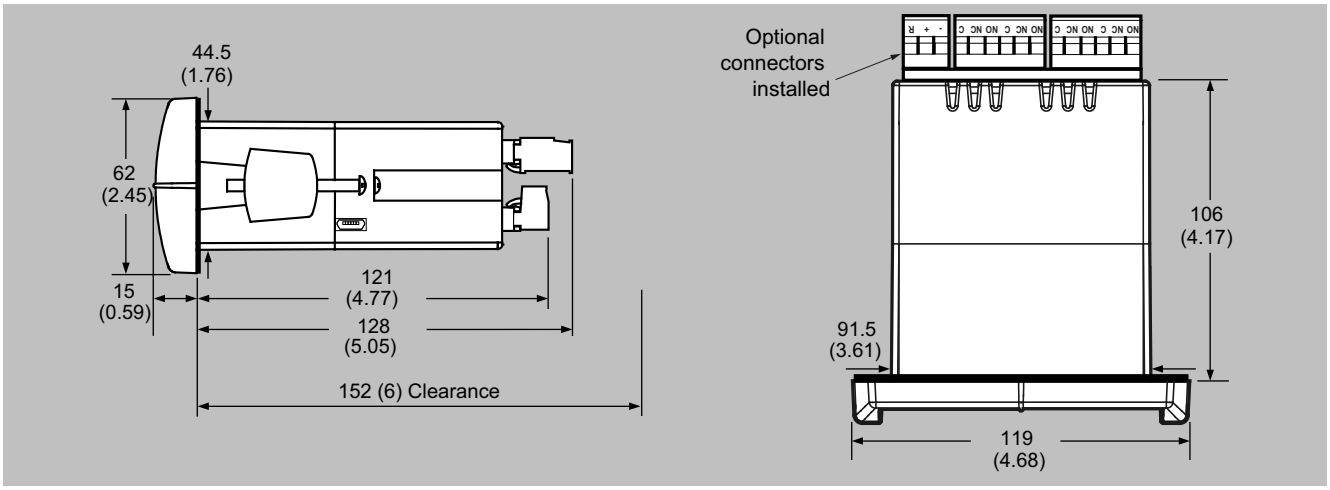
## Technical specifications (continued)

| SITRANS RD300 | |
|---|---|
| **Certificates and approvals** | CE, UL, cUL |
| **Options** | |
| Enclosures | Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures |

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## Dimensional drawings

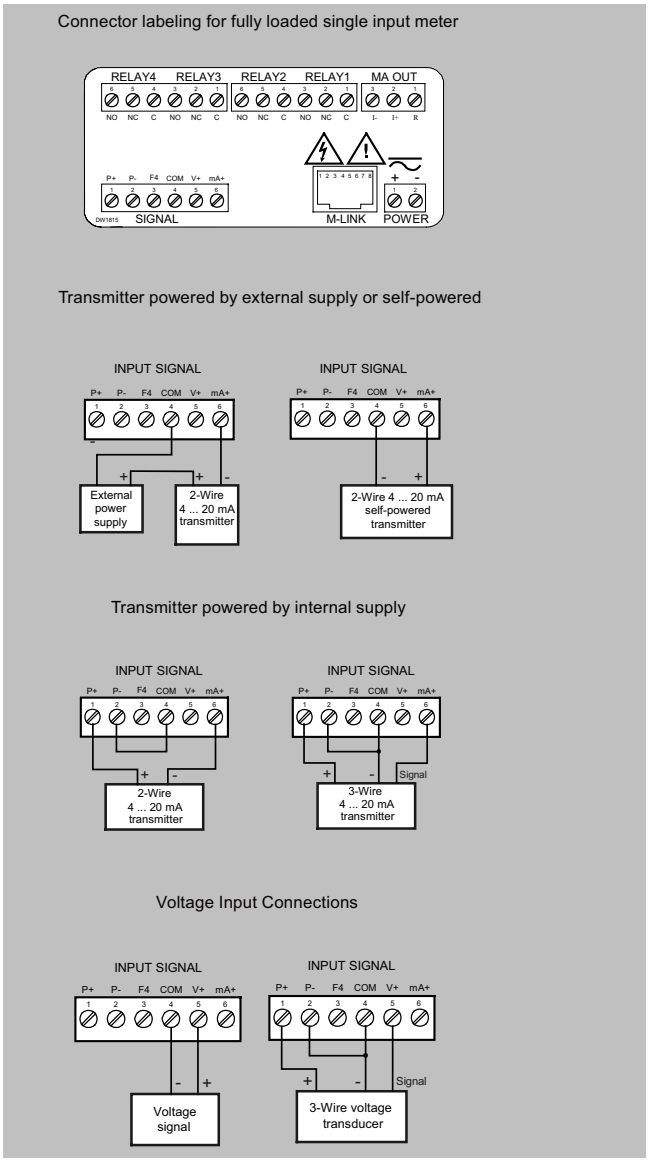



SITRANS RD300, dimensions in mm (inch)

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## Circuit diagrams

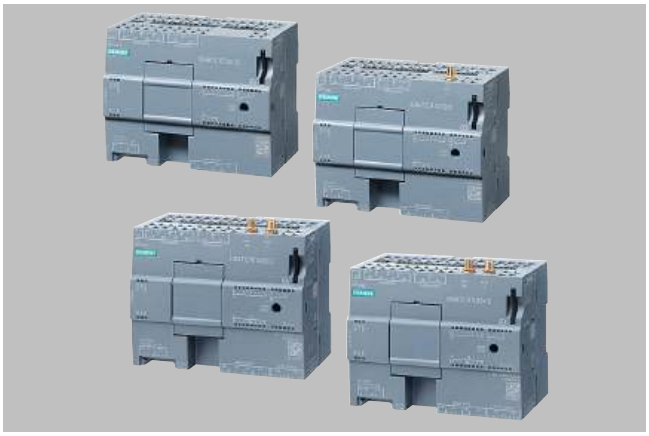



SITRANS RD300 connections

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## Overview



The devices of the RTU3000C family are compact RTUs (Remote Terminal Units) for applications with their own power supply. They are particularly suited for monitoring and control of external stations that are not connected to an energy supply network. The RTUs can independently collect data from connected sensors with time stamps, preprocess the data, and transfer it to a control center. The RTU3000C is supplied with power by a battery, an accumulator or a solar panel or by a 12 ... 24 V DC power supply unit.

The devices of the RTU3000C series are characterized by the following properties:

- Worldwide data exchange between a remote measuring point and a control center via public or private networks (WAN), e.g. mobile networks, internet
- Communication with a control center (telecontrol center) with the help of the DNP3, IEC 60870-5-104 or SINAUT ST7 telecontrol protocols
- Connection to a control center with TeleControl Server Basic
- Connection to a cloud system via MQTT
- Acquisition of process signals, alarms, count pulses, measured values or output of switching commands by means of integrated inputs as well as digital inputs and outputs
- Preprocessing of the acquired signals by a variety of function/program blocks
- FTP client functionality for transmitting data to an FTP server
- Time synchronization
  - On the basis of NTP (**N**etwork **T**ime **P**rotocol)
  - By means of the partner in the control center
  - Via the mobile radio network (RTU3030C, RTU3031C and RTU3041C)
  - Via GPS (RTU3031C and RTU3041C)
- Automatic alarm transmission per email or text message
- Use as data logger by saving the process values to SD card
- Data buffering in the substations in the event of connection failures
- LED signaling for fast diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard DIN rail

## Overview (continued)

- Use in harsh environment thanks to extended temperature range from -40 to +70 °C and IP68 protection thanks to optional protective enclosure
- Fast commissioning thanks to easy configuration using the integrated web server

***Additional RTU3030C and RTU3031C features:***

- Integrated UMTS modem for global wireless data exchange between a remote measuring point and a control center based on the mobile wireless standard UMTS (**U**niversal **M**obile **T**elecommunications System) with data transfer rates of up to 21 Mbps in the downlink (HSDPA) and 5.76 Mbps in the uplink (HSUPA)
- UMTS operation with fixed or dynamic IP addresses, depending on telecommunication contract
- Time synchronization over the mobile network
- Wake-up of station from hibernation mode by means of text message or call

***Additional RTU3031C features as compared to RTU3030C:***

- Support for 4 additional digital outputs designed as solid-state relays
- GPS antenna connection option for localization and time synchronization
- Function block for comparison of the setpoint/actual position

For RTU3041C:

- Integrated modem for global wireless data exchange between a remote measuring point and a control center on the basis of the LTE-M and NB-IoT mobile wireless standards.
- With the sole exception of the mobile radio interface, the further functional scope corresponds with that of the RTU3031C.

Note that not all network operators for LTE-M and NB-IoT support the text messaging (SMS) function.

Additional functions with firmware V5.0

- Connection to cloud systems via MQTT, for example to MindSphere, MS Azure, AWS (Amazon) or IBM Cloud
- Support for MQTT publish/subscribe mechanisms for sending topics from the RTU3000C to the cloud (publish) and receiving topics from the cloud (subscribe).
- To facilitate commissioning, RTU3000C supports DCP (Discovery and Configuration Protocol).
- To accelerate firmware updates, the firmware can be upgraded directly via the SD card without using the WBM as of installed V5.0.

Additional functions with firmware V4.0

- Only for RTU3041C: Power saving function eDRX (Extended Discontinuous Reception) for LTE-M and NB-IoT mobile networks, in order to reduce power consumption.
- Function block "Formula": The function block calculates the result of the specified mathematical or Boolean expression, depending on as many as four input variables.

Additional functions with firmware V3.1

- Connection of sensors via Modbus RTU (as of firmware V3.0) or HART Multidrop (as of V3.1) via the optional Extension Board HART/RS485
- Remote access to HART devices on the Extension Board HART/RS485 via SIMATIC PDM

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## Overview (continued)

- Remote access to Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM
- Connection of the RTU3000C to a redundant DNP3 Master
- Local logging of Security and Audit events
- Central logging of Security and Audit events using syslog
- Increase the quantity structure of the function blocks and flags
- More efficient encryption mechanisms with TLS connections for HTTPS, Mail, FTP, DynDNS and VPN product versions

Product versions

Different product versions are offered for the various applications:

- **SIMATIC RTU3010C**

  Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC for connection to external industry routers; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics via web interface

- **SIMATIC RTU3030C**

  Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated UMTS modem; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 4 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

- **SIMATIC RTU3031C**

  Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated UMTS modem; GPS functionality; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 8 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

- **SIMATIC RTU3041C**

  Compact RTU for variable power supply using batteries, rechargeable batteries, solar or 10.8 V DC to 28.8 V DC with integrated modem for LTE-M/NB-IoT; GPS functionality; connection via TeleControl Basic, DNP3, IEC60870-5-104 or SINAUT ST7 as well as MQTT protocols, on-board I/O (8 DI, 8 DQ, 4 AI), configuration and diagnostics via web interface; note country approvals.

In conjunction with the "TeleControl Server Basic" control center software, the RTU3000C forms a telecontrol system with additional properties:

- Connection of up to 5000 remote terminal units to the control center via OPC UA
- Central status monitoring of the substations
- No special provider services required for fixed IP addresses
- Wireless teleservice access to the substations
- Wake-up of substations by calling or text message

Together with MQTT, the application possibilities are expanded to include cloud applications. In addition to monitoring process data and visualization of process states of the RTUs in a telecontrol system, all the advantages of cloud systems are made available in this way:

- Improvement of process quality and detection of malfunctions through (big) data analysis of all relevant parameters, predictive maintenance

## Overview (continued)

- Automatic process optimization by combining with data from other data sources, e.g. weather data for a preventive adaptation of the process to avoid critical conditions

## Benefits

get Designed for Industry

- **Flexible location of use**

  A flexible power supply concept allows for use of the RTU3000C at different measuring points in a widely distributed network, independent of an existing power supply network.

- **Rugged hardware**

  The rugged hardware enables reliable operation even in harsh environments with an increased temperature range (-40 °C to +70 °C).

- **Flexible connection to control centers or cloud systems**

  Thanks to reloadable telecontrol protocols, various applications and connection options to different control centers or cloud systems are supported in one device.

- **Fast and flexible data communication**

  Time- and event-driven communication ensures that the operating personnel is informed immediately and reliably about process alarms, statuses and values.

- **Simple and cost-efficient engineering**

  The integrated web server enables easy configuration using the standard web browser without additional engineering tools.

- **Remote access** to HART or Modbus devices on the Extension Board HART/RS485 via SIMATIC PDM.

- **Fully automatic time stamp**

  To enable subsequent and correct archiving of process data in the control system, all data frames are time-stamped at their place of origin.

- **Automatic buffering of process values**

  Data is buffered in the substations to prevent it getting lost in case of connection failures.

- **Secure data transmission**

  Use of OpenVPN technology and encrypted email connections ensures secure data transmission.

  The RTUs also support secure HTTPS access to the web server both over the local Ethernet interface and remotely, e.g. via mobile wireless. In addition, the FTP file transfer can also be carried out with encryption.

- **Time not lost in case of a power outage**

  A buffered real-time clock ensures that the correct time is available even after a power outage.

- **Savings on travel and maintenance costs**

  Thanks to web-based management, configuration, diagnostics, control and monitoring can easily be performed remotely.

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## Application

The telecontrol stations of the RTU3000C family can be used as a substation (Remote Terminal Unit) in telecontrol applications. Typical application examples include the acquisition of measured values in plants that are spread over large geographical areas (e.g. level monitoring of water tanks in the water/wastewater industry). In addition to these applications, MQTT enables additional uses in the cloud environment.

- Data exchange and centralized data monitoring for automation systems spread over large geographical areas, including integrated GPS positioning functionality for RTU30x1C
- Connection of difficult-to-access external stations without network infrastructure
- Connection of measuring points at locations without power supply infrastructure

These applications can be found in the most diverse industries:

- Water/wastewater treatment plants
  - Detection of leaks or water loss
  - Monitoring of pumping stations, water towers/reservoirs
  - Acquisition and monitoring of level / pressure / flow / temperature
  - Flood protection
- Inventory management – monitoring of levels in tanks and silos
- Agriculture – monitoring of irrigation systems or greenhouses
- Wind power – wind measurement for designing wind turbines
- Control and localization of mobile stations, such as monitoring of navigation buoys

## Design

The SIMATIC RTU3000C is a compact module in SIMATIC S7-1200 format:

- Rugged, compact plastic enclosure for the temperature range -40 °C to +70 °C
- Easily accessible connection and diagnostics elements
- Easy mounting on a standard DIN rail
- Four plug-in screw-type terminals for eight digital inputs (pushbutton/switch/relay contacts) of which the first two inputs can be configured as counter inputs.
- Four plug-in screw-type terminals for four analog inputs: Current / voltage (0/4 ... 20 mA, 0 ... 10 V, 0 ... 5 V) or temperature measurement (Pt1000)
- Two plug-in screw-type terminals for four digital outputs designed as relay contacts
- RTU30x1C: two additional plug-in screw terminals for four additional digital outputs, designed as solid-state relays
- The close-loop (12 V or 24 V can be selected) and switchable controller outputs X10/X11 can be used for the supply of sensors and actuators
- 5-pin, plug-in terminal strip for connection of an 12 ... 24 V DC external supply voltage; connection protected against polarity reversal
- Connection socket for battery module (up to six battery modules can be connected)
- RJ45 socket for connection to Industrial Ethernet at 10/100 Mbps
- Pushbutton for the functions wake-up, shutdown, warm restart or reset to factory settings
- Slot for an SD card (Siemens SMC, SD or SDHC)
- Installed temperature sensor for monitoring of temperature inside enclosure

RTU3030C and RTU30x1C additions:

- SMA antenna port for mobile network antenna
- Slot for a mini SIM card

RTU30x1C additions:

- Antenna port for GPS antenna
- Support for 4 additional digital outputs designed as solid-state relays

The remote terminal units of the RTU3000C family can be used in stand-alone operation. The power supply can take place in independent operation by means of battery / accumulator /solar panel. The optional batteries are connected directly on the left side of the device without additional wiring. The power can also be supplied by a 5-pin terminal strip on the bottom of the module, even in combination with battery modules. The SD card tray is located on the front of the module. Removable screw-type terminals make for quick module replacement because the connected sensors must not be wired again.

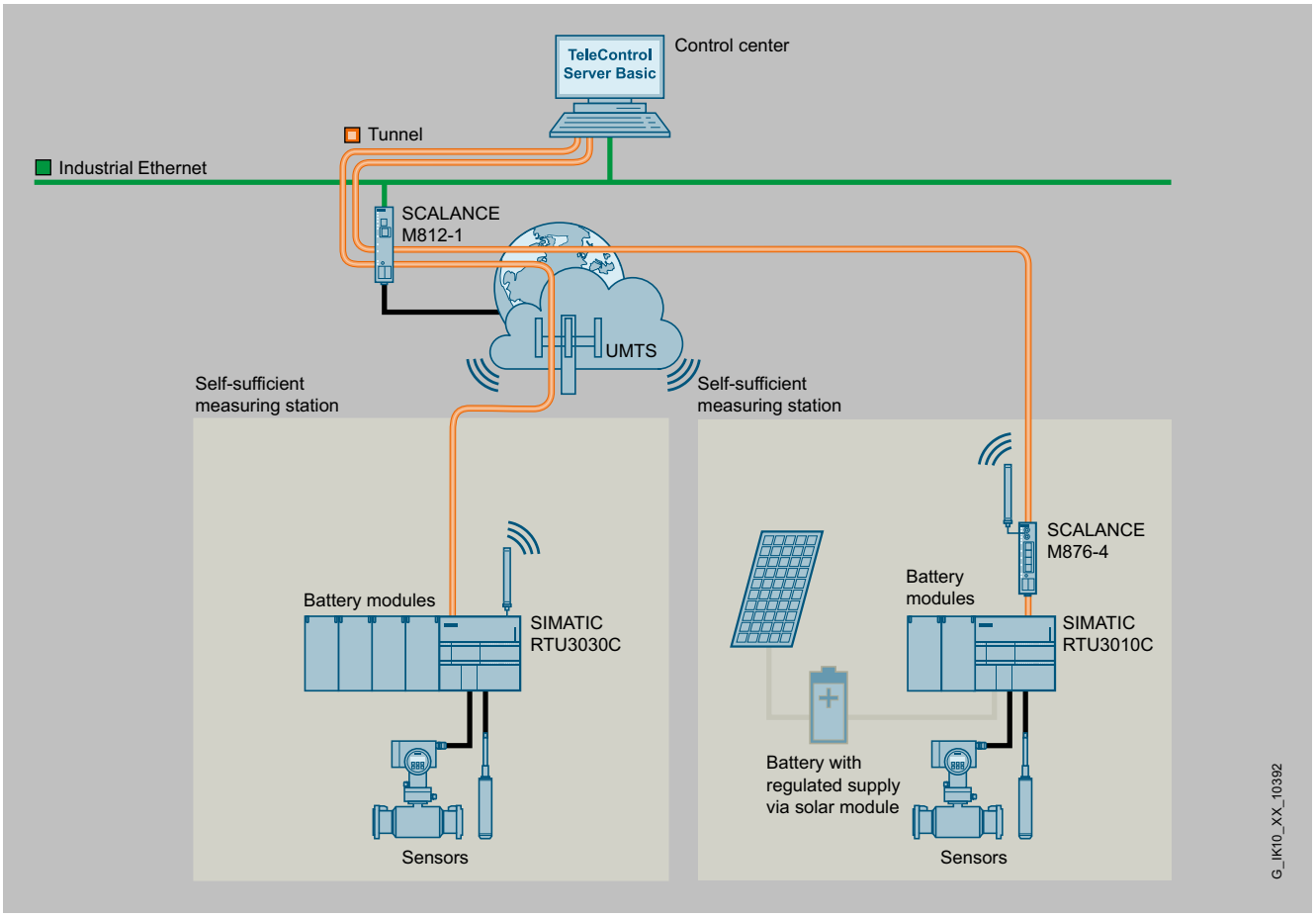
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## Function

The devices of the RTU3000C family are compact telecontrol stations. They enable connection of remote measuring points to TeleControl Server Basic or another control center as well as a cloud system and monitoring of these measuring points. To ensure autonomous operation, the devices can also switch between four different operating modes:

- **Hibernation mode**
  All inputs and communication functions are turned off so that power consumption is minimal. Outputs can retain their last value.
- **Update mode**
  Used to query the inputs and outputs. The query cycle can be configured individually.
- **Communication mode**
  Mobile wireless connection or connection via LAN interface and external router and communication to the central office are active.
- **Service mode**
  Maintenance work can take place without loss of data.




Connection of the SIMATIC RTU3030C to TeleControl Server Basic

***Energy-independent mode***

The RTU3000C stations can be operated in energy saving mode. Depending on the communication requirements and the connected type of power supply (e.g. battery, solar accumulator), independent operation can thus be guaranteed for many years to come. Power consumption can be determined by the RTU (from hardware level V2) for the diagnostics and prognosis of the battery life. The determined value can be logged and transferred to the control center.

***Data backup***

Data losses are prevented by the data buffering mechanisms integrated in the product. In the event of a connection failure, time-stamped frames are buffered in the device. When the connection returns, the buffered values are automatically transferred to the control center in the right order.

***Data logging***

The RTU3000C stations support the backup of process data on SD card. The retentively saved data can be sent cyclically by email and/or FTP or, if necessary, be downloaded directly using web-based management (WBM).

***Data point configuration***

For data point configuration, the RTUs supports a series of data point types: Digital input, digital output, analog input, counter input. The data points can be configured with little effort using the web pages of the RTU3000C stations. A cyclic and/or event-control-

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## Function (continued)

ler transfer of measured values, setpoints or alarms can thus be implemented in just a few steps.

***Data preprocessing***

Ready-to-use function and program blocks enable data preprocessing directly in the RTU. The process data can be linked by means of process blocks for basic control jobs.

Up to 44 different types are supported in the following groups:

- Blocks for logical functions (e.g. AND, OR)
- Blocks for time functions (e.g. ON and OFF delay, astronomical clock)
- Blocks for analog value functions (e.g. threshold value monitoring)
- Counter blocks: Featuring the retentivity option, which saves the current count value during restarting and reconfiguration so that it is not lost.
- Analog and digital bit memories for buffering calculation results
- Blocks for messages (text messages, email)
- Block for FTP file transfer
- Relay blocks (latching relay, pulse relay)
- Blocks for silo volume calculation
- Block for rectangular weir overflow calculation
- "Formula" function block for evaluation of mathematical and Boolean expressions of up to four input variables.

***Time synchronization***

The RTUs support time synchronization and therefore ensure that historical data is given the correct time stamp. The following synchronization mechanisms are available: via NTP, the remote control center, mobile radio and GPS, depending on type of RTU.

***Alarms sent by email or text message***

Alarm emails or, in the case of RTU3030C and RTU3031C, alarm text messages can be configured for timely communication of station statuses to service and maintenance personnel. If previously defined events (such as threshold violation) should occur, application-specific information is sent automatically by email or SMS (directly or via the connected router).
Note that not all network operators for LTE-M and NB-IoT (RTU3041C) support the text messaging (SMS) function.

***GPS position (RTU30x1C)***

The function block checks whether a predefined setpoint position has been reached.

The actual position can also be transferred to the control center as a tag.

***Telecontrol communication using standard protocols***

For communication with the control center, the RTUs support the DNP3, IEC 60870-5-104 and SINAUT ST7 telecontrol protocols. The RTUs act as a DNP3 station, as an IEC slave or, in the case of SINAUT ST7, as a station connected to an ST7 node station, e.g. TIM 1531 IRC. The RTUs can also be connected to the TeleControl Server Basic (TCSB). TCSB enables a connection to any control center software, e.g. WinCC V7 or via any OPC UA-capable client. With MQTT, all the advantages of cloud systems can be used.

***Remote maintenance***

The RTU3000C stations provide remote maintenance access via WBM for access from the control center. The RTU3030C or RTU3031C can be woken from hibernation mode via text message or a call. When using the "TeleControl Basic" communication protocol, the wake-up text message can be generated in the CMT of TCSB.

***Security mechanisms***

Access to the RTU3000C stations requires an authorization. Up to 20 authorized email addresses or phone numbers can be defined in the WBM for e-mail and SMS messages. Data is sent through an OpenVPN tunnel or a secure tunnel of the TeleControl Server Basic. Email messages can be encrypted (support of STARTTLS). FTP uploads can be performed encrypted via SSL with FTPS.

***Diagnostics***

The RTU3000C provides comprehensive diagnostic options for a quick and informative analysis of the station status. Basic diagnostic information, such as the status of the power supply, the communication connection and the inputs and outputs are signaled directly to the RTU by LEDs. The current status of the LEDs can also be retrieved through WBM.

Using the web server, comprehensive information can be retrieved, such as facts about the connection history, buffer status, and the transferred measured values.

Furthermore, up to four new, freely definable tag tables are available in which an independent overview of all required tags can be composed to provide a display of all significant process values at a glance. The categorized user administration (Admin and User) ensures that only authorized persons are given access.

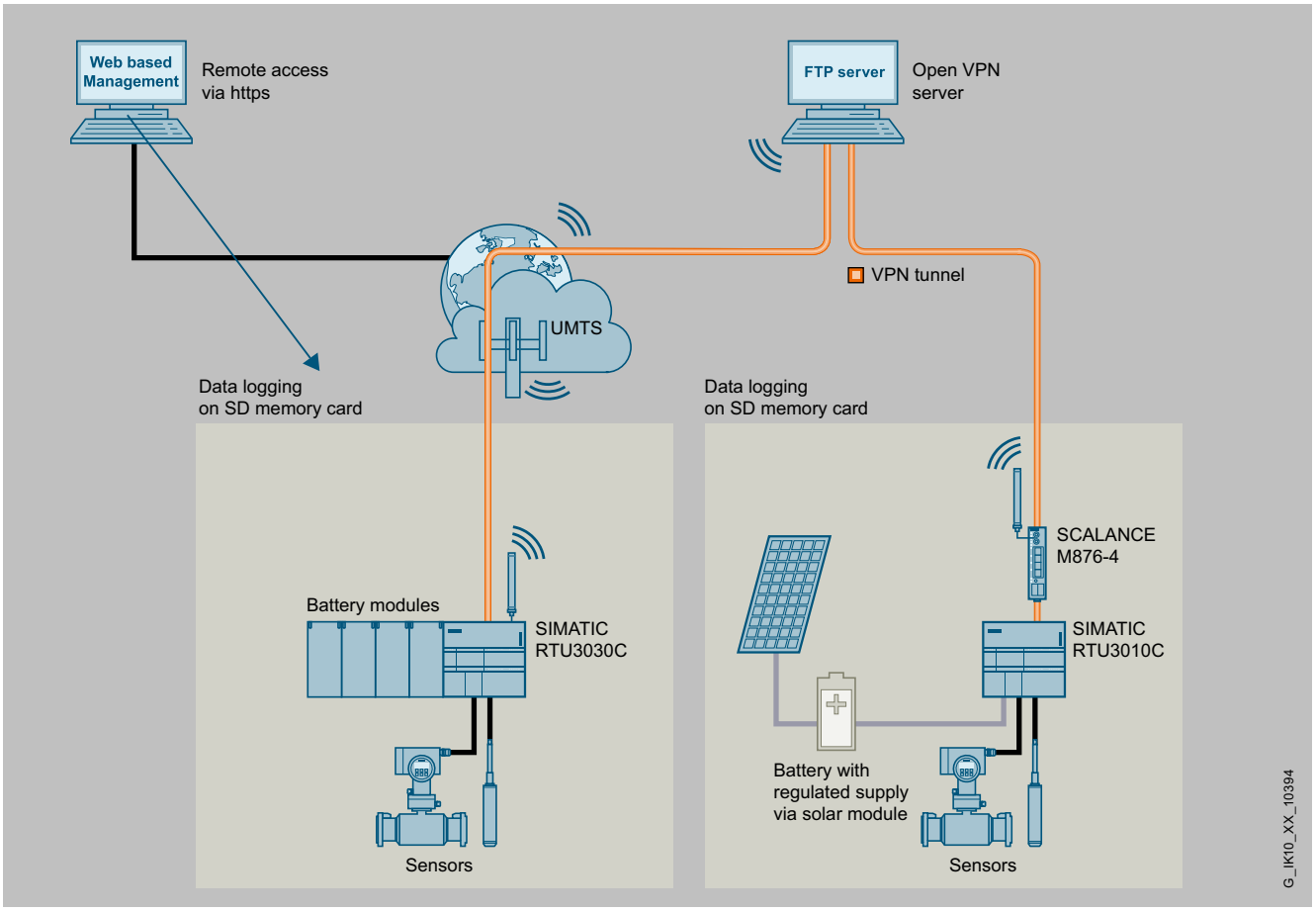
***Configuration over web server***

The integrated web server is accessed locally for diagnostics from a PC or remotely via the mobile wireless interface or Ethernet interface with upstream industrial router. Configuration, firmware update or configuration changes can therefore be performed remotely without additional software thereby saving time and money.

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## Integration




Example of configuration for data logging with RTU3000C

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## Selection and ordering data

| | Article No. |
|---|---|
| **SIMATIC RTU3010C** [1] | **6NH3112-0BA00-0XX0** |
| Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; connection of external modems; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT; on-board I/Os: 8 DI, 4 DQ, 4 AI; FTP client; configuration/diagnostics via web server; time synchronization; email; SD card slot. | |
| **SIMATIC RTU3030C** [1] | **6NH3112-3BA00-0XX0** |
| Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated UMTS modem; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 4 DQ, 4 AI; FTP client; Ethernet port; configuration / diagnostics via web server, time synchronization, text message, email, SD card slot, note country approvals. | |
| **SIMATIC RTU3031C** [1] | **6NH3112-3BB00-0XX0** |
| Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated UMTS modem; GPS; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 8 DQ, 4 AI; FTP client; Ethernet port, configuration / diagnostics via web server, time synchronization, text message, email, SD card slot, note country approvals. | |
| **SIMATIC RTU3041C** [1] | **6NH3112-4BB00-0XX0** |
| Compact low-power RTU; battery or solar-powered; connection of external power supply 10.8 V DC to 28.8 V DC; integrated modem for LTE-M/NB-IoT; GPS; connection to TeleControl Server Basic, DNP3, IEC 60870-5-104 or SINAUT ST7 as well as MQTT, on-board I/Os: 8 DI, 8 DQ, 4 AI; FTP client; Ethernet port, configuration / diagnostics via web server, time synchronization, text message, email, SD card slot, note country approvals. | |
| **HART/RS485 extension board** | **6NH3112-3BA00-6XX1** |
| Extension card for low-power RTU3000C family; connection of 8 Modbus RTU slaves or of 8 HART devices in multidrop mode. | |

[1] Please note country approvals under www.siemens.com/mobilenetwork-approvals

## Accessories

| | Article No. |
|---|---|
| **Battery case for SIMATIC RTU3000C** | **6NH3112-3BA00-1XX2** |
| Battery case for mounting of two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery! Please observe information on the battery type in the Equipment Manual! | |
| **Battery expansion case for SIMATIC RTU3000C** | **6NH3112-3BA00- 1XX6** |
| Battery expansion case for accommodating two D cell batteries; suitable for SIMATIC RTU3000C; batteries must be procured externally and are not included in the scope of delivery. Please observe information on the battery type in the Equipment Manual! | |
| **Enclosure in IP68 degree of protection** | |
| For SIMATIC RTU3000C; Note: Cable glands and sealing plugs must be ordered separately in the necessary quantity | |
| • **Aluminum enclosure**; Temperature range -40 to +80 °C | **6NH3112-3BA00-1XX3** |
| • **Stainless steel enclosure** Temperature range -60 to +135 °C | **6NH3112-3BA00-1XX1** |
| **M16 cable gland** | **6NH3112-3BA00-1XX4** |
| For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass | |
| **Blanking plugs M16** | **6NH3112-3BA00-1XX5** |
| For IP68 enclosure, temperature range -40 to +100 °C, nickel-plated brass | |
| **SIMATIC Memory Card** | |
| 4 MB | **6ES7954-8LC03-0AA0** |
| 12 MB | **6ES7954-8LE03-0AA0** |
| 24 MB | **6ES7954-8LF03-0AA0** |
| 256 MB | **6ES7954-8LL03-0AA0** |
| **ANT896-4MA 2G/3G/4G antenna** | **6GK5896-4MA00-0AA3** |
| Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; can be rotated radially with additional joint; with SMA plug for direct mounting on the device; antenna gain 2dBi; IP54 | |
| **ANT896-4ME 2G/3G/4G antenna** | **6GK5896-4ME00-0AA0** |
| Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional characteristic; with N-female connector for remote installation indoors and outdoors; antenna gain 3dBi; IP66 | |
| **ANT794-4MR antenna** | **6NH9860-1AA00** |
| Omnidirectional antenna for GSM (2G), UMTS (3G) and LTE (4G) networks; omnidirectional; weatherproof for indoor and outdoor use; 5 m connecting cable with fixed connection to antenna; SMA plug; including mounting bracket, screws, wall plugs | |

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## Accessories (continued)

| | Article No. |
|---|---|
| **ANT895-6ML GPS antenna**<br>ANT895-6ML GPS antenna with integrated signal amplifier, including 0.3 m connecting cable and N-female connector; 3 dBi IP67 (-40 ... +85 °C) mounting with magnet or screw mounting; note country approvals; compact instructions on paper in English/German; scope of delivery: 1x ANT 895-6ML | 6GK5895-6ML00-0AA0 |
| **SIMATIC NET antenna connection cable N/SMA male/male**<br>Flexible antenna connecting cable for connection of antenna and SCALANCE M | |
| • 0.3 m | 6XV1875-5LE30 |
| • 1 m | 6XV1875-5LH10 |
| • 2 m | 6XV1875-5LH20 |
| • 5 m | 6XV1875-5LH50 |
| **SIMATIC NET antenna N-Connect male/male flexible connection cable**<br>Flexible cable for connecting an RCoax cable or antenna to a SCALANCE W-700 access point with N-Connect connections; pre-assembled with two N-Connect male connections | |
| • 1 m | 6XV1875-5AH10 |
| • 2 m | 6XV1875-5AH20 |
| • 5 m | 6XV1875-5AH50 |
| • 10 m | 6XV1875-5AN10 |
| **SIMATIC NET N-Connect/ N-Connect female/female panel feedthrough**<br>Cabinet bushing for wall thicknesses up to 4.5 mm, two N-Connect female connectors | 6GK5798-2PP00-2AA6 |
| **LP798-1N lightning protector**<br>Lightning protector with N/N female/female connector, IP67 (-40 to +85 °C), frequency range: 0 ... 6 GHz | 6GK5798-2LP00-2AA6 |
| **SITOP PSU100C 1-phase, 12 V DC/2 A**<br>Stabilized power supply<br>Input: 100 ... 230 V AC<br>Output: 12 V DC/2 A | 6EP1321-5BA00 |
| **SITOP PSU100C 1-phase, 12 V DC/6.5 A**<br>Stabilized power supply<br>Input: 100 ... 230 V AC<br>Output: 12 V DC/6.5 A | 6EP1322-5BA10 |
| **SITOP PSU100C 1-phase, 24 V DC/1.3 A**<br>Stabilized power supply<br>Input: 120 ... 230 V AC<br>Output: 24 V DC/1.3 A | 6EP1331-5BA10 |
| **SITOP PSU100C 1-phase, 24 V DC/2.5 A**<br>Stabilized power supply<br>Input: 100 ... 230 V AC<br>Output: 24 V DC/2.5 A | 6EP1332-5BA00 |
| **SITOP PSU100C 1-phase, 24 V DC/3.7 A**<br>Stabilized power supply<br>Input:<br>100 ... 230 V AC (110 ... 300 V AC)<br>Output: 24 V DC/3.7 A<br>Limited output power NEC class 2 | 6EP1332-5BA20 |

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## Technical specifications

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| operating mode | Standby mode (Sleep mode), Actualization mode, Communication mode | Standby mode (Sleep mode), Actualization mode, Communication mode |
| **transfer rate** | | |
| transfer rate | | |
| • for Industrial Ethernet | 10 ... 100 Mbit/s | 10 ... 100 Mbit/s |
| • for GPRS transmission | | |
| • with downlink maximum | | 85.6 kbit/s |
| • with uplink maximum | | 107 kbit/s |
| • for LTE-M transmission | | |
| • with downlink maximum | | 300 kbit/s |
| • with uplink maximum | | 375 kbit/s |
| • for NB-IoT transmission | | |
| • with downlink maximum | | 21 kbit/s |
| • with uplink maximum | | 62.5 kbit/s |
| **interfaces** | | |
| number of interfaces according to Industrial Ethernet | 1 | 1 |
| number of electrical connections | | |
| • at the 1st interface according to Industrial Ethernet | 1 | 1 |
| • for external antenna(s) | | 2 |
| • for power supply | 1 | 1 |
| number of slots | | |
| • for SIM cards | | 1 |
| • for memory cards | 1 | 1 |
| type of electrical connection | | |
| • at the 1st interface according to Industrial Ethernet | RJ45 port | RJ45 port |
| type of electrical connection | | |
| • for external antenna(s) | | SMA socket (50 ohms) |
| • for power supply | 5-pole plugable terminal block | 5-pole plugable terminal block |
| type of antenna | | |
| • at connection 1 connectable | | mobile wireless antenna |
| • at connection 2 connectable | | Active GPS antenna |
| slot version | | |
| • for SIM card | | Mini SIM card, with adapter Micro SIM card also |
| • of the memory card | SD 1.0, SD 1.1, SDHC, Siemens SMC | SD 1.0, SD 1.1, SDHC, Siemens SMC |
| storage capacity of the memory card maximum | 32 Gibyte | 32 Gibyte |
| design of the removable storage | | |
| • C-PLUG | No | No |
| **signal inputs/outputs** | | |
| number of electrical connections for digital input signals | 8 | 8 |
| type of electrical connection for digital input signals | pluggable screw terminal block | pluggable screw terminal block |
| digital input version | Suitable for open-drain transistor or switch, 2-wire-technique | Suitable for open-drain transistor or switch, 2-wire-technique |
| number of electrical connections as counter inputs for digital input signals | 2 | 2 |
| pulse duration at counter input minimum | 0.1 ms | 0.1 ms |
| pulse frequency at counter input maximum | 5 000 Hz | 5 000 Hz |
| number of electrical connections for digital output signals | 4 | 8 |
| type of electrical connection for digital output signals | pluggable screw terminal block | pluggable screw terminal block |

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## Technical specifications (continued)

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| digital output version | bistable relay, 2-wire-technique | 4DO bistable relay, 2-wire technology 4DO solid-state relay |
| output current at digital output | 300 mA; Limiting continuous current | 300 mA; Limiting continuous current, with solid-state relays 60 mA |
| number of analog inputs integrated | 4 | 4 |
| connector type at the analog input | pluggable screw terminal block | pluggable screw terminal block |
| type of analog input | 2-/3-/4-wire-technique | 2-/3-/4-wire-technique |
| product function parameterizable analog inputs | Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C | Yes; Current 0/4..20mA, Voltage 0..5/10V, Temperature (Pt1000) -80..+140°C |
| A/D resolution at the analog input | 12 bit | 12 bit |
| **wireless technology** | | |
| type of mobile wireless service is supported | | |
| • SMS | No | Yes |
| • GPRS | | Yes |
| • | over external, IP-based router | GPRS (Multislot Class 10) |
| • LTE-M | | Yes |
| • NB-IoT | | Yes |
| type of wireless network is supported | | |
| • GSM | | Yes |
| operating frequency for GSM transmission | | operating frequency for GSM transmission 850 MHz, operating frequency for GSM transmission 900 MHz, operating frequency for GSM transmission 1800 MHz, operating frequency for GSM transmission 1900 MHz |
| operating frequency for LTE-M transmission | | operating frequency for LTE-M transmission band 1 (2100 MHz), operating frequency for LTE-M transmission band 2 (1900 MHz), operating frequency for LTE-M transmission band 3 (1800 MHz), operating frequency for LTE-M transmission band 4 (1700 MHz), operating frequency for LTE-M transmission band 5 (850 MHz), operating frequency for LTE-M transmission band 8 (900 MHz), operating frequency for LTE-M transmission band 12 (700 MHz), operating frequency for LTE-M transmission band 13 (700 MHz), operating frequency for LTE-M transmission band 18 (850 MHz), operating frequency for LTE-M transmission band 19 (850 MHz), operating frequency for LTE-M transmission band 20 (800 MHz), operating frequency for LTE-M transmission band 26 (850 MHz), operating frequency for LTE-M transmission band 28 (700 MHz) |
| operating frequency for NB-IoT transmission | | operating frequency for NB-IoT transmission band 1 (2100 MHz), operating frequency for NB-IoT transmission band 2 (1900 MHz), operating frequency for NB-IoT transmission band 3 (1800 MHz), operating frequency for NB-IoT transmission band 5 (850 MHz), operating frequency for NB-IoT transmission band 8 (900 MHz), operating frequency for NB-IoT transmission band 12 (700 MHz), operating frequency for NB-IoT transmission band 13 (700 MHz), operating frequency for NB-IoT transmission band 18 (850 MHz), operating frequency for NB-IoT transmission band 19 (850 MHz), operating frequency for NB-IoT transmission band 20 (800 MHz), operating frequency for NB-IoT transmission band 26 (800 MHz), operating frequency for NB-IoT transmission band 28 (700 MHz) |
| **supply voltage, current consumption, power loss** | | |
| type of voltage of the supply voltage | DC | DC |
| supply voltage external at DC | 12 ... 24 V | 12 ... 24 V |

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## Technical specifications (continued)

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| supply voltage external at DC rated value | 10.8 ... 28.8 V | 10.8 ... 28.8 V |
| type of output voltage for the supply of external devices | DC 12 V or 24 V | DC 12 V or 24 V |
| supply voltage for GPS antenna maximum | | 3.8 V; Nominal 3.8 V (3.575 V @5 mA, 3.35 V @ 10 mA, 3.125 V @ 15 mA) |
| consumed current note | without connected consumers | without connected consumers |
| consumed current | | |
| • from external supply voltage at 24 V DC | | |
| • in standby mode typical | 14 mA | 14 mA |
| • in update mode typical | 35 mA | 35 mA |
| • in communication mode typical | 55 mA | 83 mA |
| • with battery operation at 7.2 V DC | | |
| • in standby mode typical | 0.28 mA | 0.28 mA |
| • in update mode typical | 71 mA | 71 mA |
| • in communication mode typical | 125 mA | 208 mA |
| output current for GPS antenna maximum | | 15 mA |
| power loss [W] | without connected consumers | without connected consumers |
| power loss [W] with external supply voltage at 24 V DC | | |
| • in standby mode typical | 0.34 W | 0.34 W |
| • in update mode typical | 0.85 W | 0.85 W |
| • in communication mode typical | 1.25 W | 2 W |
| power loss [W] with battery operation at 7.2 V DC | | |
| • in standby mode typical | 0.002 W | 0.002 W |
| • in update mode typical | 0.51 W | 0.51 W |
| • in communication mode typical | 0.9 W | 1.5 W |
| **ambient conditions** | | |
| ambient temperature | | |
| • for vertical installation during operation | -40 ... +60 °C | -40 ... +60 °C |
| • for horizontally arranged busbars during operation | -40 ... +70 °C | -40 ... +70 °C |
| • during storage | -40 ... +70 °C | -40 ... +70 °C |
| • during transport | -40 ... +70 °C | -40 ... +70 °C |
| relative humidity | | |
| • at 30 °C without condensation during operation maximum | 95 % | 95 % |
| protection class IP | IP20; IP68 with protective housing (see accessories) | IP20; IP68 with protective housing (see accessories) |
| **design, dimensions and weights** | | |
| module format | Compact module | Compact module |
| width | 130 mm | 130 mm |
| height | 100 mm | 100 mm |
| depth | 75 mm | 75 mm |
| net weight | 0.34 kg | 0.37 kg |
| fastening method | | |
| • 35 mm top hat DIN rail mounting | Yes | Yes |
| • wall mounting | Yes | Yes |
| **product features, product functions, product components general** | | |
| product function | | |
| • DynDNS client | | Yes |
| • no-ip.com client | | Yes |
| **product functions cloud connectivity** | | |
| protocol is supported | | |
| • Message Queuing Telemetry Transport (MQTT) | Yes | Yes |

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**Technical specifications** (continued)

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| • HTTP | Yes | Yes |
| product function for cloud connectivity | | |
| • trigger management | Yes | Yes |
| • time stamping | Yes | Yes |
| product feature for cloud connectivity buffered message frame memory | Yes | Yes |
| **performance data** | | |
| number of users email addresses definable maximum | 20 | |
| number of users/telephone numbers/email addresses definable maximum | | 20 |
| number of user groups definable maximum | 10 | 10 |
| number of program block types | 44 | 46 |
| number of configurable program blocks | 48 | 48 |
| number of digital bit memories maximum | 48 | 48 |
| number of analog bit memories maximum | 24 | 24 |
| **performance data IT functions** | | |
| number of possible connections | | |
| • as client by means of FTP maximum | 1 | 1 |
| number of entries in the FTP buffer maximum | 12 | 12 |
| number of possible connections | | |
| • as server by means of HTTP maximum | 2 | 2 |
| • as server by means of HTTPS maximum | 2; http and https can be combined (max. number of 2 connections cannot be exceeded). | 2; http and https can be combined (max. number of 2 connections cannot be exceeded). Max. one connection via https is possible on the mobile wireless interface. |
| • as email client maximum | 1 | 1 |
| number of free texts for emails and SMS maximum | 20 | 20 |
| number of characters per free text for emails or SMS maximum | 160 | 160 |
| number of entries in the email buffer maximum | 12 | 12 |
| **performance data telecontrol** | | |
| suitability for use | | |
| • node station | No | No |
| • substation | Yes | Yes |
| • TIM control center | No | No |
| control center connection | IEC 60870-5-104, DNP3-capable control stations, SINAUT ST7cc/sc, TeleControl Server Basic | |
| • by means of a permanent connection | supported | supported |
| • by means of demand-oriented connection | supported | supported |
| protocol is supported | | |
| • DNP3 | Yes | Yes |
| • IEC 60870-5 | Yes | Yes |
| • SINAUT ST1 protocol | | No |
| • SINAUT ST7 protocol | Yes | Yes |
| product function data buffering if connection is aborted | Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900 | Yes; number of telegrams for: IEC 60870: approx. 5,000, DNP3: approx. 10,900, SINAUT ST7: approx. 7,700, TeleControl Server Basic: approx. 10.900 |
| data volume as user data per station in telecontrol mode maximum | 256 Kibyte | 256 Kibyte |
| product feature buffered message frame memory | Yes | Yes |
| **performance data teleservice** | | |
| diagnostics function online diagnostics with SIMATIC STEP 7 product function | No | No |

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## Technical specifications (continued)

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| • program download with SIMATIC STEP 7 | No | No |
| • remote firmware update | Yes | Yes |
| • remote configuration | Yes | Yes |
| **product functions management, configuration, engineering** | | |
| configuration software | | |
| • required | No, configuration by using the integrated webserver | No, configuration by using the integrated webserver |
| product function gateway for SIMATIC PDM | | |
| • with Modbus TCP | Yes | Yes |
| • with HART-IP protocol | Yes | Yes |
| **product functions diagnostics** | | |
| product function web-based diagnostics | Yes | Yes |
| **product functions security** | | |
| operating mode Virtual Private Network (VPN) | Yes; OpenVPN client | Yes; OpenVPN client |
| product function with VPN connection | OpenVPN | OpenVPN |
| type of encryption algorithms with VPN connection | AES-128, AES-256 | AES-128, AES-256 |
| type of authentication procedure with VPN connection | certificate based | certificate based |
| type of authentication with Virtual Private Network PSK | No | No |
| type of hashing algorithms with VPN connection | SHA-256 | SHA-256 |
| number of possible connections with VPN connection | 2; one simultaneous productive connection only | 2; one simultaneous productive connection only |
| product function | | |
| • password protection for Web applications | Yes | Yes |
| • password protection for teleservice access | Yes | Yes |
| • password protection for VPN | Yes | Yes |
| • encrypted data transmission | Yes | Yes |
| • switch-off of non-required services | Yes | Yes |
| • SysLog | Yes | Yes |
| **product functions time** | | |
| protocol is supported | | |
| • NTP | Yes | Yes |
| product component hardware real time clock | Yes | Yes |
| product feature hardware real time clock w. battery backup | Yes | Yes |
| accuracy of the hardware real time clock per day maximum | 1.8 s | 1.8 s |
| time synchronization | | |
| • from NTP-server | Yes | Yes |
| • from GPS-signal | | Yes |
| • from control center | Yes | Yes |
| • from mobile network provider | | Yes |
| • PC | Yes | Yes |
| • manual setting | Yes | Yes |
| **product functions position detection** | | |
| product function | | |
| • position detection with GPS | | Yes |
| • pass on position data | | Yes |
| **standards, specifications, approvals hazardous environments** | | |
| certificate of suitability CCC for hazardous zone according to GB standard | Yes; GB3836.1, GB3836.8 | Yes; GB3836.1, GB3836.8 |
| certificate of suitability CCC for hazardous zone according to GB standard as marking | Ex nA IIC T4 Gc | Ex nA IIC T4 Gc |

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## Technical specifications (continued)

| Article number<br>product type designation | 6NH3112-0BA00-0XX0<br>RTU3010C | 6NH3112-4BB00-0XX0<br>RTU3041C |
|---|---|---|
| **further information internet links** | | |
| internet link | | |
| • to website: Industrial communication | http://www.siemens.com/simatic-net | http://www.siemens.com/simatic-net |
| • to website: Image database | http://automation.siemens.com/bilddb | http://automation.siemens.com/bilddb |
| • to website: CAx-Download-Manager | http://www.siemens.com/cax | http://www.siemens.com/cax |
| • to website: Industry Online Support | https://support.industry.siemens.com | https://support.industry.siemens.com |

## More information

***Technical requirements/compatibility***

Corresponding suitable industrial routers (e.g. SCALANCE M) for the connection to the control center via the Ethernet interface of the RTU3000C can be found under Remote Networks - IP-based modems and routers.

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## Overview



IE/PB Link HA and IE/PB Link PN IO

IE/PB LINKs are gateways for connecting the two network types, Industrial Ethernet and PROFIBUS, i.e. they enable access to all PROFIBUS stations connected to the lower-level PROFIBUS network.

***Product variants***

Two variants are offered as gateways for Industrial Ethernet and PROFIBUS:

- **IE/PB LINK PN IO**

  Gateway with PROFINET IO functionality, S7 routing and data record routing for standard ambient conditions

- **IE/PB LINK HA**

  Gateway optimized for use in the process industry due to the possibility of deployment in harsh ambient conditions and the connection of PROFIBUS field devices to a redundant AS as PROFINET IO controller

Both product variants can be used in two operating modes:

Standard mode enables, for example, loading of programs and configuration data via PG/OP communication, data record routing for configuration and diagnostics of field devices with the SIMATIC PDM tool, S7 routing e.g. for cross-network loading of SIMATIC PLCs on PROFIBUS.

When operated as a PROFINET IO proxy, from the perspective of the PN IO controller, all PROFIBUS DP slaves connected after the IE/PB LINK are treated as PN IO devices according to the PROFINET standard, i.e. the IE/PB LINK is the proxy of the connected PROFIBUS DP slaves.

Both IE/PB LINK versions offer the possibility to use different transmission media by employing BusAdapters.

## Benefits

get Designed for Industry

- Protection of investment due to simple connection of PROFIBUS DP slaves to PROFINET IO controller. This enables a step-by-step transition to modern PROFINET networks
- Independence from individual vendors through support of the PROFINET standard for distributed field devices
- Flexible use due to different connection system and hardware; copper (RJ45, FC) and fiber-optic cables (SCRJ for POF/PCF, LC for glass fiber-optic)
- Also enables use in plants with PROFIsafe applications
- Worldwide access to data of the PROFIBUS stations via Industrial Ethernet and Internet for vertical integration
- Access to process data from all enterprise levels
- Loading of STEP 7 programs from a central location
- Easy engineering and extensive diagnostics options due to optimum TIA integration

***IE/PB LINK HA also offers:***

- High availability through redundancy mechanisms in PROFINET IO through use as S2 device
- Interruption-free plant operation in the redundant system, even when configuration changes are required during operation, through support for Configuration in Run (H-CiR)
- Easy migration of large PROFIBUS networks to PROFINET by supporting up to 125 PROFIBUS DP slaves
- Reliable operation even in harsh ambient conditions

## Application

As an autonomous component, both IE/PB LINK versions provide a seamless transition between Industrial Ethernet and PROFIBUS.

Using the IE/PB LINK as a proxy, you can continue to use existing PROFIBUS nodes (even with PROFIsafe functionality V2.0 or higher) and integrate them into a PROFINET application.

IE/PB LINK HA additionally offers connection to a redundant PROFINET IO automation system and the functionality Configuration in Run (H-CIR).

Both IE/PB LINK versions also offers cross-network PG/OP communication by means of S7 routing. Cross-network access to data of S7 stations for visualization with S7 OPC server and S7 routing; via the IE/PB LINK, access is possible from the Industrial Ethernet (for example for HMI applications with OPC client interface) to data of the S7 stations on the PROFIBUS using the S7 OPC server.

In addition, data record routing (PROFIBUS DP) is supported. This means it is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to configure and perform diagnostics for a PROFIBUS field device via the IE/PB LINK. IE/PB LINK HA also designed for use in harsh ambient conditions.

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## Design

Both IE/PB LINK versions provide all the advantages of the SIMATIC ET 200SP design:

- Compact design;
  the front of the rugged plastic enclosure features:
  - Two RJ45 ports for connecting to Industrial Ethernet; the connection is made via the IE FC RJ45 plug 90 with 90° cable outlet or via a standard patch cable
  - A 9-pin sub-D socket for connection to PROFIBUS
  - A 4-pin terminal strip for connecting the external redundant supply voltage of 24 V DC (two infeeds)
  - Diagnostics LEDs
- Optional connection possibility for Industrial Ethernet via BusAdapter (BA) of the SIMATIC ET 200SP system at the front
- Easy installation on standard mounting rails
- Can be operated without a fan
- Fast device replacement in the event of a fault by using the optional C-PLUG removable data storage medium (not included in scope of supply)

## Function

***Compact gateway between PROFINET and PROFIBUS***

- Connection to Industrial Ethernet via integrated 2-port real-time switch with 100 Mbps full duplex connection with autosensing for automatic switchover
- In case of replacement part: Connection to Industrial Ethernet also with 10 Mbps half duplex
- Connection to PROFIBUS with 9.6 Kbps to 12 Mbps
- Support for MRP (Media Redundancy Protocol) using integrated Real Time Switch
- SIMATIC ET 200SP design: Use of the BusAdapter (BA) of the SIMATIC ET 200SP system for freely selecting the connection system and physical characteristics on the PROFINET side

IE/PB LINK HA also offers

- Use in ambient temperatures from -40 °C to +70 °C
- Conformal coating
- Support for enhanced interference immunity according to NAMUR recommendation NE21

***Operation as PROFINET IO proxy***

- Connection of PROFIBUS DP slaves to PROFINET IO controller with real-time property, according to PROFINET standard. From the viewpoint of the controller, all DP slaves are treated like devices with PROFINET interface, i.e. the IE/PB LINK PN IO is their proxy

IE/PB LINK HA also offers

- Connection of PROFIBUS DP slaves to a redundant SIMATIC S7 controller (S7-400H) as PROFINET S2 device including support for Configuration in Run (H-CiR)
- Connection of up to 125 PROFIBUS DP slaves on the single controller and up to 64 PROFIBUS DP slaves in operation as S2 device on the redundant controller

***Additional functionality for vertical integration (standard operation or operation as PROFINET IO proxy)***

- S7 routing
  - Permits cross-network PG communication, in other words, all S7 stations on Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device.
  - Access can take place to visualization data of S7 stations on the PROFIBUS from HMI stations on Industrial Ethernet.
- Data record routing (PROFIBUS DP)
  - Using this option, the IE/PB LINK PN IO can be used as a router for data records that are forwarded to field devices (DP slaves). SIMATIC PDM (Process Device Manager) is a tool that creates data records of this type for parameterization and diagnostics of field devices.
  - The configuration of the IE/PB LINK PN IO for standard mode is possible via SINEC PNI (Primary Setup Tool Network Initialization) as well as STEP 7 / TIA Portal

The supplementary functions for vertical integration can also be used in an existing PROFIBUS application without PROFINET IO for connection to a higher-level Industrial Ethernet.

In this case, the IE/PB Link PN IO is used as an additional DP master Class 2 on a PROFIBUS segment for coupling to Industrial Ethernet and offers the above functions.

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## Function (continued)

***Media redundancy (MRP):***

- IE/PB LINK supports the media redundancy protocol MRP as an MRP client within a PROFINET network with a ring topology

***Diagnostics***

Extensive diagnostic options are available via STEP 7 or SNMP, including:

- Diagnostics of the assigned PROFIBUS field devices;
  using the IE/PB LINK as a proxy, the connected DP slaves can be diagnosed in the same manner as PROFINET IO devices (even in the user program of the PROFINET IO controller)
- General diagnostics and statistics functions
- Connection diagnostics
- Diagnostic buffer
- Integration into network management systems through the support of SNMP V1 MIB-II

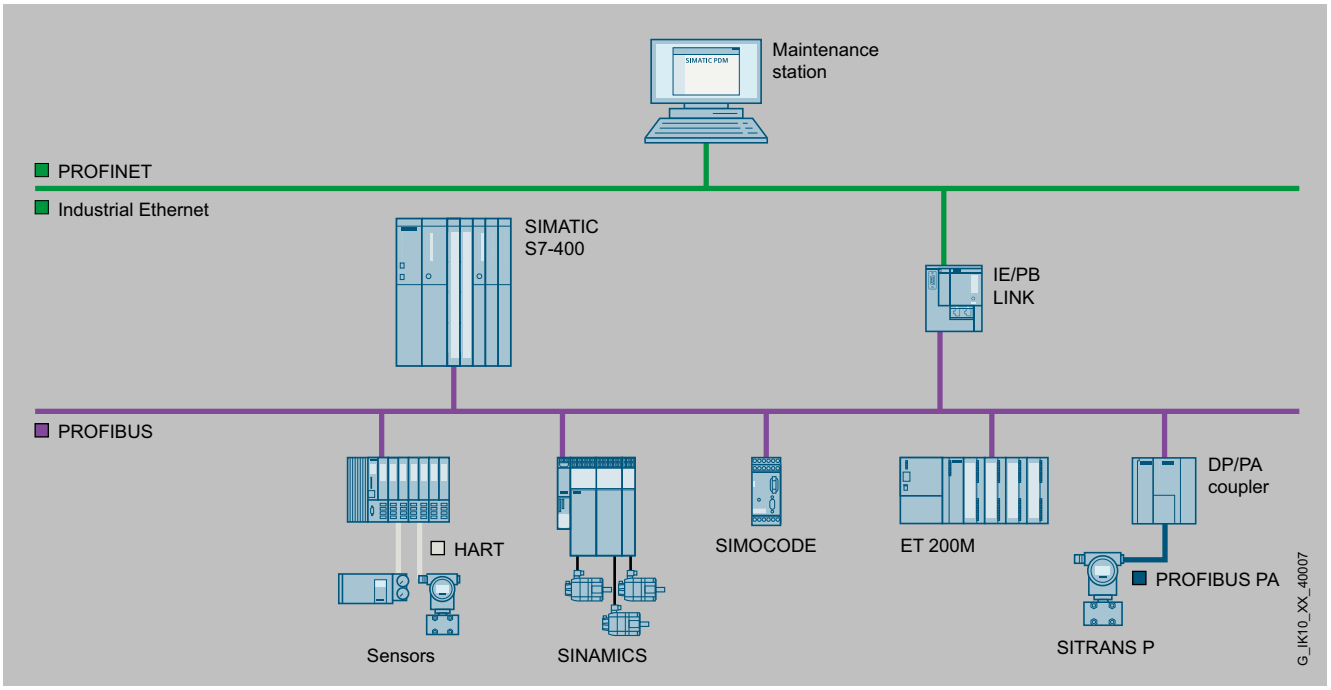
***Configuration***

- With STEP 7 V5.x or STEP 7 Professional in the TIA Portal, all the necessary parameters for IE/PB Link, e.g. the addresses and all necessary routing information, are generated automatically
- The configuration data for PROFINET IO created with STEP 7 is saved on the IO controller. Attention must however be paid to the memory capacity.
- IE/PB LINK can be swapped in the event of failure without a programming device because the relevant configuration data is saved on the PN IO controller or on the C-PLUG.
- If the IE/PB LINK PN IO is only to be used as a gateway and not as a PROFINET IO device, the IE/PB LINK behaves like a simple network component. Accordingly, the IP and PROFIBUS parameters and the network settings can also be assigned with a STEP 7 Professional (TIA Portal) without a license
- The IP and PROFIBUS parameters as well as the network settings can also be assigned using SINEC PNI
- The initialization data for the Industrial Ethernet interface is backed up on the C-PLUG (configuration plug) removable data storage medium
- Use in networks that support an exchange of devices without programming devices on the basis of the Link Layer Discovery Protocol (LLDP)

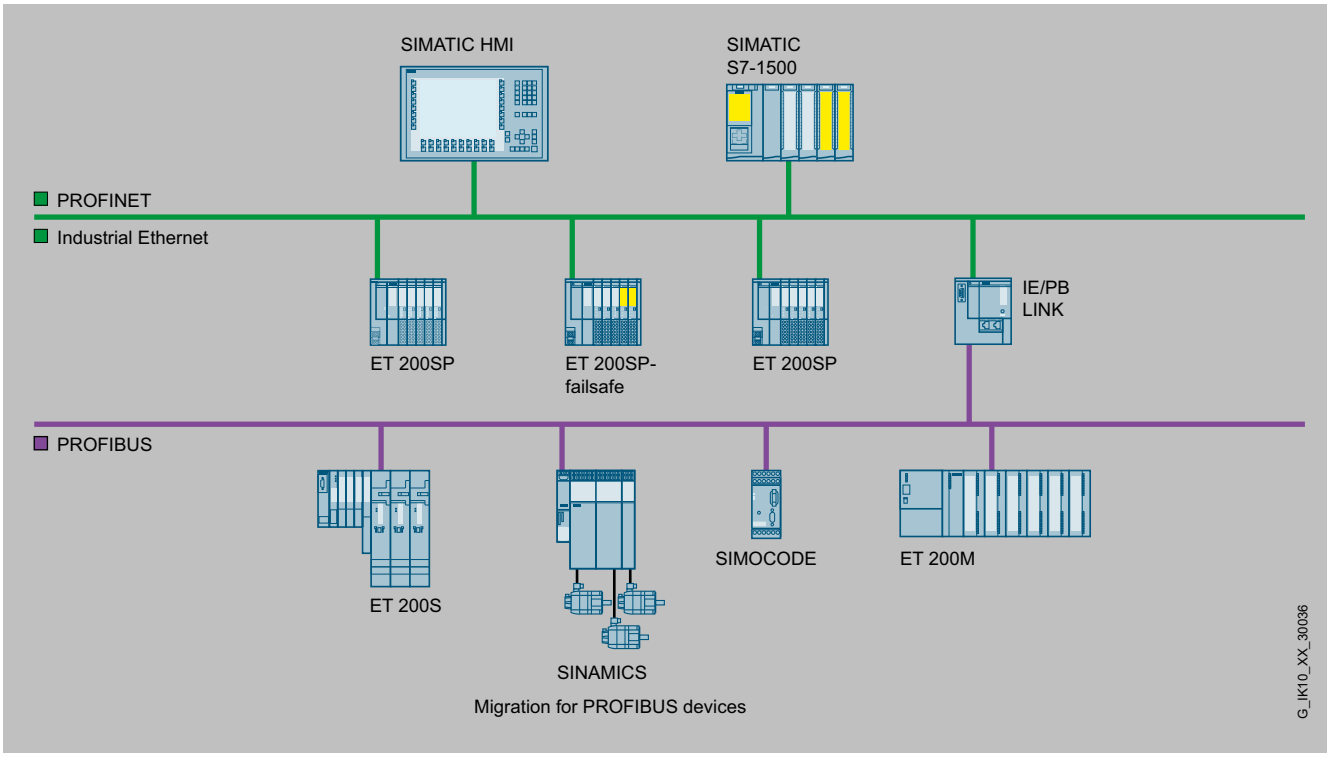
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## Integration




IE/PB LINK: Gateway in standard mode

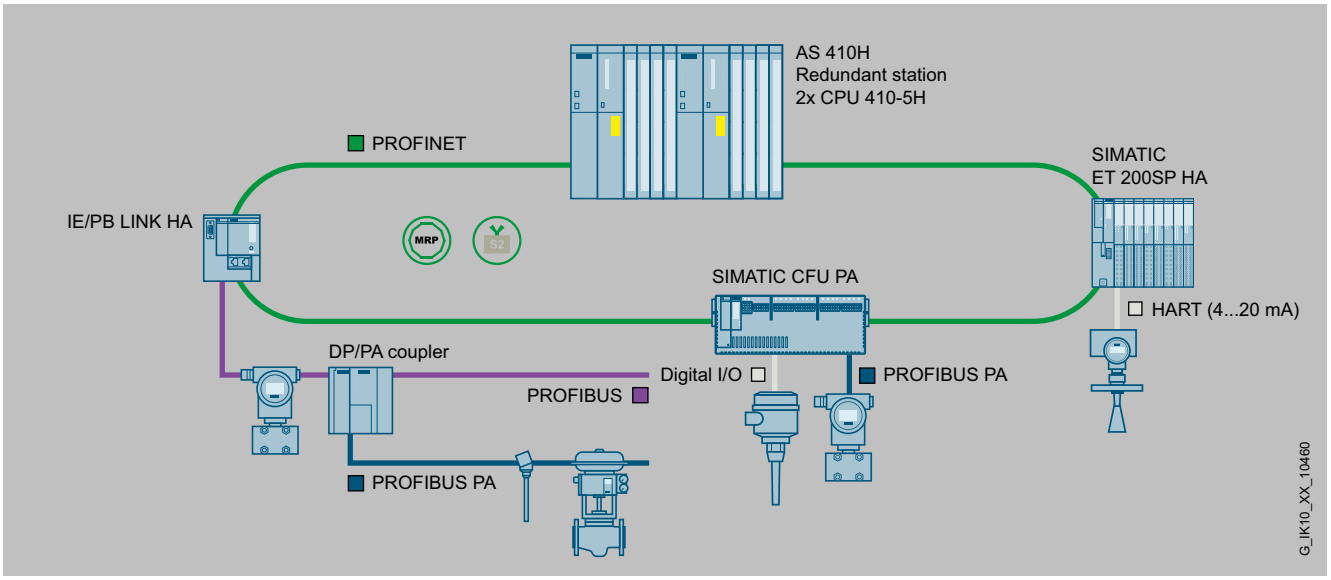



IE/PB LINK: PROFINET IO proxy

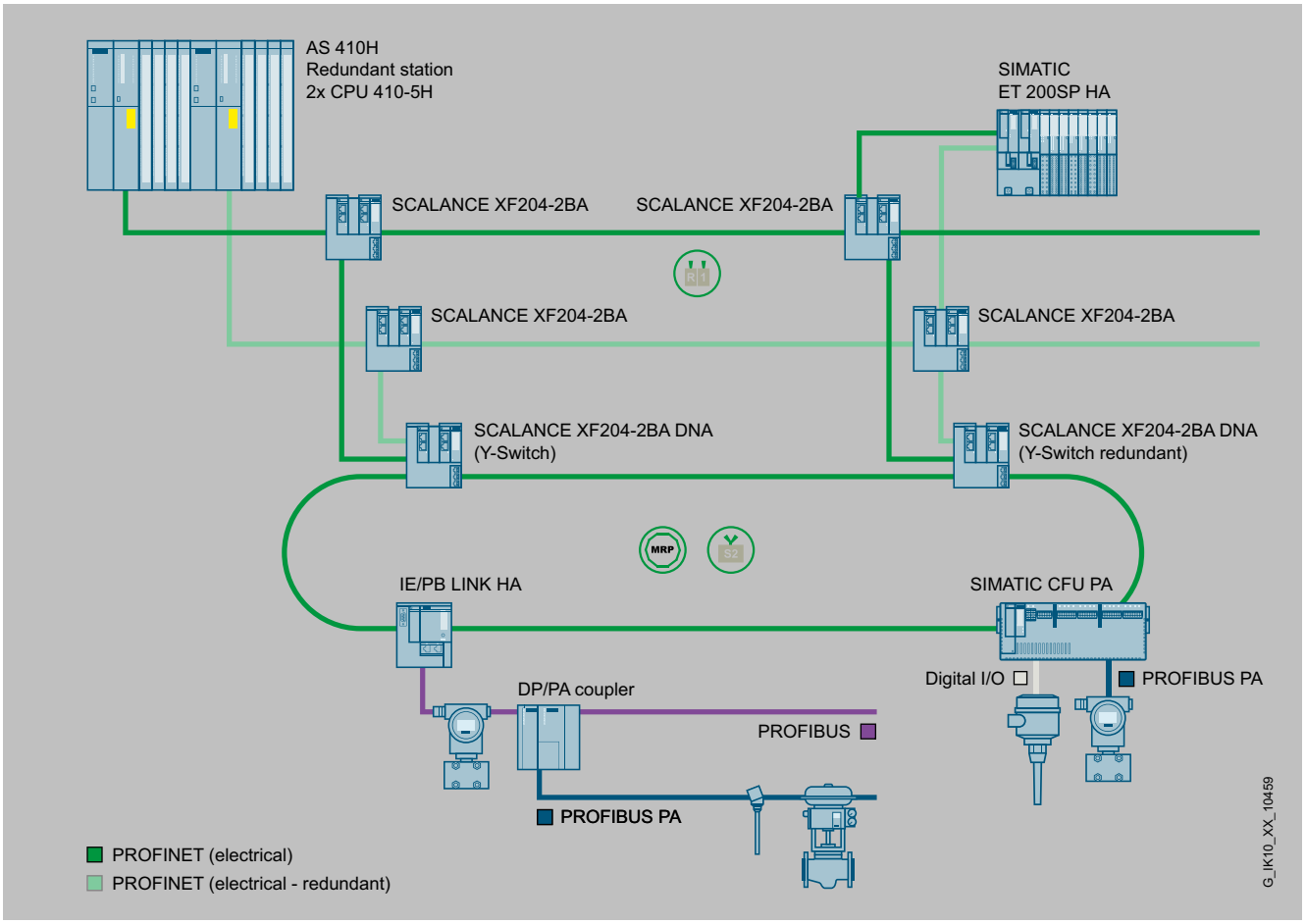
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## Integration (continued)




IE/PB LINK HA: System redundancy as S2 device in the MRP ring




IE/PB LINK HA: PROFINET system redundancy on R1 system

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## Selection and ordering data

| | Article No. |
|---|---|
| **IE/PB Link PN IO**<br>Gateway between Industrial Ethernet and PROFIBUS, PROFINET IO proxy with real-time communication, time synchronization via SIMATIC protocol, NTP, SNMP V1, LLDP, S7 routing, data record routing, connection of up to 64 S7/DPV0/DPV1 slaves, support for DP/PA LINK and DP/FF LINK, 10/100 Mbps Fast Ethernet, MRP, 9.6 kbps up to 12 Mbps PROFIBUS, firmware download via configuration tool, redundant power supply, firmware version V4.0 Gateway | **6GK1411-5AB10** |
| **IE/PB LINK HA**<br>Gateway between Industrial Ethernet and PROFIBUS, PROFINET IO proxy with real-time communication, system redundancy S2, H-CiR, time synchronization via SIMATIC protocol, NTP, SNMP V1, LLDP, S7 routing, data record routing, connection of up to 125 S7/DPV0/DPV1 slaves, support for DP/PA LINK and DP/FF LINK, 10/100 Mbps Fast Ethernet, MRP, 9.6 kbps up to 12 Mbps PROFIBUS, firmware download via configuration tool, redundant power supply, conformal coating, extended temperature range -40 °C to 70 °C | **6GK1411-5BB00** |
| **Accessories** | |
| **C-PLUG**<br>Removable data storage medium for easy device replacement if a fault occurs. For storing configuration and application data. Can be used in the following SIMATIC NET products with C-PLUG slot:<br>SCALANCE XC-200, XP-200, XM-400, XR-500, M-800, W-700, SC-600 and S615 | **6GK1900-0AB10** |
| **BusAdapter**<br>BusAdapters offer a free selection of connection system and hardware for the PROFINET interface. Alternatively, they can be used for the Industrial Ethernet interface on the device. The following BusAdapter versions are supported by the IE/PB LINK PN IO:<br>***Variants with copper connection (RJ45, FastConnect (FC))*** | |
| • BA 2xRJ45 with 2 RJ45 connections | **6ES7193-6AR00-0AA0** |
| • BA 2xFC with 2 FastConnect connections | **6ES7193-6AF00-0AA0** |
| • BA 2xRJ45 HA with 2 RJ45 sockets | **6DL1193-6AR00-0AA0** |
| • BA 2xFC HA with 2x FastConnect connection | **6DL1193-6AF00-0AA0** |
| • SIPLUS BusAdapter BA 2xRJ45 with 2 RJ45 connections | **6AG1193-6AR00-7AA0** |
| • SIPLUS BusAdapter BA 2xFC with 2 FastConnect connections | **6AG1193-6AF00-7AA0** |

## Selection and ordering data (continued)

| | Article No. |
|---|---|
| • BA 2xRJ45 VD HA BusAdapter VD (variable distance), for Ethernet communication via 2-, 4- or 8-wire copper cables, 2xRJ45 sockets | **6GK5991-2VA00-8AA2** |
| ***Variants with fiber-optic connection (FOC)*** | |
| • BA 2xLC with LC glass fiber-optic connection | **6ES7193-6AG00-0AA0** |
| • BA 2xSCRJ with 2 x SCRJ FO connection | **6ES7193-6AP00-0AA0** |
| • BA 2xLC HA with 2 x LC glass fiber-optic connections | **6DL1193-6AG00-0AA0** |
| • SIPLUS BusAdapter BA 2xLC with LC glass fiber-optic connection | **6AG1193-6AG00-2AA0** |
| • SIPLUS BusAdapter BA2SCRJ with 2 x SCRJ FO connection | **6AG1193-6AP00-2AA0** |
| ***Media converter versions*** | |
| • BA LC/RJ45 Media converter glass fiber-optic cable/CU for 1 x LC FO connection and 1 x RJ45 connection | **6ES7193-6AG20-0AA0** |
| • BA LC/FC Media converter glass fiber-optic cable/CU 1 x LC FO connection and 1 x RJ45 connection | **6ES7193-6AG40-0AA0** |
| • BA SCRJ/RJ45 Media converter fiber-optic cable/CU 1 x SCRJ FO connection and 1 x RJ45 connection | **6ES7193-6AP20-0AA0** |
| • BA SCRJ/FC Media converter fiber-optic cable/CU 1 x SCRJ FO connection and 1 x FastConnect connection | **6ES7193-6AP40-0AA0** |
| • BA LC/RJ45 HA Media converter glass fiber-optic cable/CU, 1 x LC FO connection and 1 x RJ45 connection | **6DL1193-6AG20-0AA0** |
| • BA LC/FC HA Media converter glass fiber-optic cable/CU, 1 x LC FO connection and 1 x FastConnect connection | **6DL1193-6AG40-0AA0** |

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## Accessories

***C-PLUG***

***BusAdapters***

BusAdapters offer a free selection of connection system and hardware for the PROFINET interface. **Alternatively,** they can be used for the Industrial Ethernet interface on the device.

The following BusAdapter versions are supported by the IE/PB LINK PN IO:

***Versions PN copper interfaces (RJ45 or FastConnect (FC))***

- **BA 2xRJ45** with 2 RJ45 connections
- **BA 2xFC** with 2 FastConnect connections
- **BA 2xRJ45 HA** with 2 RJ45 sockets
- **BA 2xFC HA** with 2x FastConnect connection
- **BA 2xRJ45 VD HA** with 2 RJ45 connections for variable distance
- **SIPLUS BusAdapter BA 2xRJ45** with 2 RJ45 connections
- **SIPLUS BusAdapter BA 2xFC** with 2 FastConnect connections

***Versions with PN fiber-optic connections (FO)***

- **BA 2xLC** with two glass fiber-optic connections (Lucent Connector) with increased potential difference
- **BA 2xSCRJ** with 2 SCRJ FO connections with increased potential difference
- **BA 2xLC HA** with LC glass fiber-optic connection
- **SIPLUS BusAdapter BA 2xLC** with LC glass fiber-optic connection
- **SIPLUS BusAdapter BA2SCRJ** with 2 x SCRJ FO connection

***Media converter versions:***

- **BA SCRJ / RJ45**, with one glass fiber-optic and one RJ45 connection (media converter)
- **BA LC / FC** with one glass fiber-optic and one FastConnect connection (media converter)
- **BA SCRJ / RJ45**, with one SCRJ FO and one RJ45 connection (media converter)
- **BA SCRJ / FC**, with one SCRJ FO and one FastConnect connection (media converter)
- **BA LC/RJ45 HA** with one LC FO connection and one RJ45 connection
- **BA LC/FC HA** with one LC FO connection and one FastConnect connection

The version for connecting IP67 modules of the SIMATIC ET 200AL (BA-SEND, BA 1xFC) is not supported.

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## Technical specifications

| Article number<br>product type designation | 6GK1411-5AB10<br>IE/PB LINK PN IO | 6GK1411-5BB00<br>IE/PB LINK HA |
|---|---|---|
| suitability for operation | Gateway between Industrial Ethernet and PROFIBUS | Gateway between Industrial Ethernet and PROFIBUS |
| **transfer rate** | | |
| transfer rate | | |
| • at the 1st interface | 10 ... 100 Mbit/s | 10 ... 100 Mbit/s |
| • at the 2nd interface | 9.6 kbit/s ... 12 Mbit/s | 9.6 kbit/s ... 12 Mbit/s |
| **interfaces** | | |
| number of electrical connections | | |
| • at the 1st interface according to Industrial Ethernet | 2 | 2 |
| • at the 2nd interface according to PROFIBUS | 1 | 1 |
| • for power supply | 2 | 2 |
| type of electrical connection | | |
| • at the 1st interface according to Industrial Ethernet | RJ45 port onboard or bus adapter | RJ45 port onboard or bus adapter |
| type of electrical connection | | |
| • at the 2nd interface according to PROFIBUS | 9-pin Sub-D socket (RS 485) | 9-pin Sub-D socket (RS 485) |
| • for power supply | 4-pole terminal block | 4-pole terminal block |
| design of the removable storage | | |
| • C-PLUG | Yes | Yes |
| **supply voltage, current consumption, power loss** | | |
| type of voltage of the supply voltage | DC | DC |
| supply voltage external at DC rated value | 24 V | 24 V |
| relative positive tolerance at DC at 24 V | 20 % | 20 % |
| relative negative tolerance at DC at 24 V | 15 % | 15 % |
| consumed current | | |
| • from external supply voltage at DC at 24 V typical | 0.2 A | 0.2 A |
| • from external supply voltage at DC at 24 V maximum | 0.3 A | 0.3 A |
| power loss [W] | 4.8 W; Typical | 4.8 W; Typical |
| **ambient conditions** | | |
| ambient temperature | | |
| • for vertical installation during operation | 0 ... 40 °C | -40 ... +50 °C |
| • for horizontally arranged busbars during operation | 0 ... 60 °C | -40 ... +70 °C |
| • during storage | -40 ... +70 °C | -40 ... +70 °C |
| • during transport | -40 ... +70 °C | -40 ... +70 °C |
| relative humidity | | |
| • at 25 °C without condensation during operation maximum | 95 % | 95 % |
| protection class IP | IP20 | IP20 |
| **design, dimensions and weights** | | |
| module format | ET 200SP design | ET 200SP design |
| width | 100 mm | 100 mm |
| height | 117 mm | 117 mm |
| depth | 74 mm | 74 mm |
| net weight | 0.6 kg | 0.6 kg |
| product feature conformal coating | | Yes |
| fastening method | | |
| • 35 mm top hat DIN rail mounting | Yes | Yes |
| **performance data PROFIBUS DP** | | |
| service as DP master | | |
| • DPV0 | Yes | Yes |
| • DPV1 | Yes | Yes |
| number of DP slaves | | |
| • at the 2nd interface as DP master maximum | 64 | 125 |

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## Technical specifications (continued)

| Article number<br>product type designation | 6GK1411-5AB10<br>IE/PB LINK PN IO | 6GK1411-5BB00<br>IE/PB LINK HA |
|---|---|---|
| data volume | | |
| • of the address range of the inputs as DP master total | 2 048 byte | 4 096 byte |
| • of the address range of the outputs as DP master total | 2 048 byte | 4 096 byte |
| • of the address range of the inputs per DP slave | 244 byte | 244 byte |
| • of the address range of the outputs per DP slave | 244 byte | 244 byte |
| **performance data S7 communication** | | |
| number of possible connections for S7 communication | | |
| • maximum | 32 | 32 |
| **performance data multi-protocol mode** | | |
| number of active connections with multi-protocol mode | 48 | 48 |
| **performance data PROFINET communication as PN IO device** | | |
| product function PROFINET IO device | Yes | Yes |
| **product functions management, configuration, engineering** | | |
| product function MIB support | Yes | Yes |
| protocol is supported | | |
| • SNMP v1 | Yes | Yes |
| • DCP | Yes | Yes |
| • LLDP | Yes | Yes |
| configuration software | | |
| • required | STEP 7 as of V5.5 SP4 HF11 and HSP, STEP 7 Professional as of V15, PCS7 V9.0, PCS neo as of V3.0, PNI as of V1.0 | STEP 7 as of V5.6 SP2 HF3 and HSP, STEP 7 Professional probably as of V17, PCS7 as of V9.0 SP3, PNI as of V1.0. |
| identification & maintenance function | | |
| • I&M0 - device-specific information | Yes | Yes |
| • I&M1 - higher level designation/location designation | Yes | Yes |
| • I&M2 - installation date | Yes | Yes |
| • I&M3 - comment | Yes | Yes |
| product function is supported identification link | Yes | Yes |
| **product functions routing** | | |
| service as PROFIBUS data set routing | Yes | Yes |
| number of possible connections with data set routing maximum | 32 | 32 |
| **product functions redundancy** | | |
| product function | | |
| • ring redundancy | Yes | Yes |
| product function of the PROFINET IO device is supported | | |
| • PROFINET system redundancy | No | Yes; as S2-Device at CPU 410-5 H and S7 400H |
| protocol is supported Media Redundancy Protocol (MRP) | Yes | Yes |
| **product functions time** | | |
| product function pass on time synchronization | Yes | Yes |
| protocol is supported | | |
| • NTP | Yes | Yes |
| • SIMATIC time synchronization (SIMATIC Time) | Yes | Yes |
| **standards, specifications, approvals hazardous environments** | | |
| certificate of suitability CCC for hazardous zone according to GB standard | Yes; GB3836.1, GB3836.8 | Yes; GB3836.1, GB3836.8 |
| certificate of suitability CCC for hazardous zone according to GB standard as marking | Ex nA IIC T4 Gc | Ex nA IIC T4 Gc |
| **accessories** | | |
| accessories | Optional: C-PLUG, BusAdapter of the ET 200SP system | Optional: C-PLUG, BusAdapter of the ET 200SP system |

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## Technical specifications (continued)

| Article number<br>product type designation | 6GK1411-5AB10<br>IE/PB LINK PN IO | 6GK1411-5BB00<br>IE/PB LINK HA |
|---|---|---|
| **further information internet links** | | |
| internet link | | |
| • to web page: selection aid TIA Selection Tool | http://www.siemens.com/tia-selection-tool | http://www.siemens.com/tia-selection-tool |
| • to website: Industrial communication | http://www.siemens.com/simatic-net | http://www.siemens.com/simatic-net |
| • to website: Image database | http://automation.siemens.com/bilddb | http://automation.siemens.com/bilddb |
| • to website: CAx-Download-Manager | http://www.siemens.com/cax | http://www.siemens.com/cax |
| • to website: Industry Online Support | https://support.industry.siemens.com | https://support.industry.siemens.com |

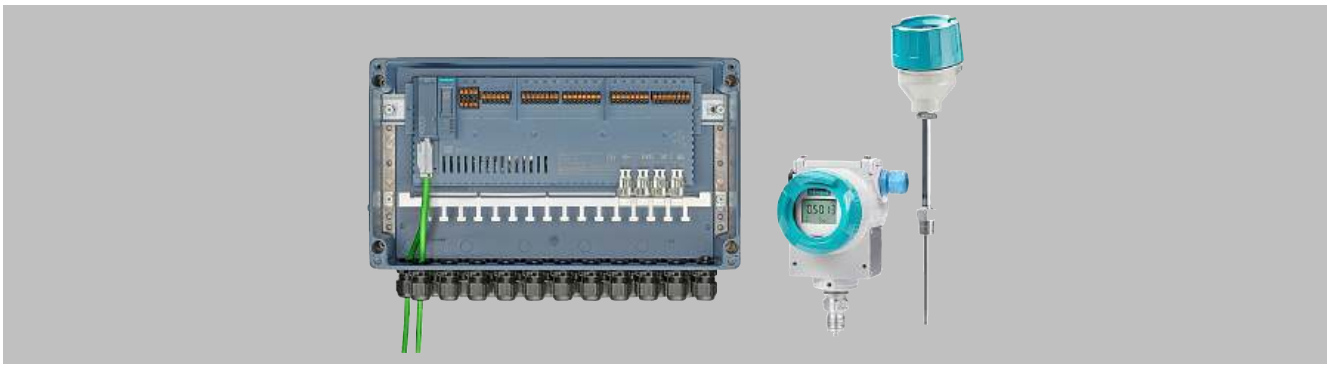
## More information

http://www.siemens.com/profinet

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## Overview



***Smart Field Distributor – SIMATIC Compact Field Unit***

With the new SIMATIC Compact Field Unit (CFU), we are re-interpreting the conventional approach to field device connection. The smart field distributor is installed at the process level and is connected via PROFINET, the world's leading Industrial Ethernet standard, directly to the automation system to form the foundation for digitalization in the field.

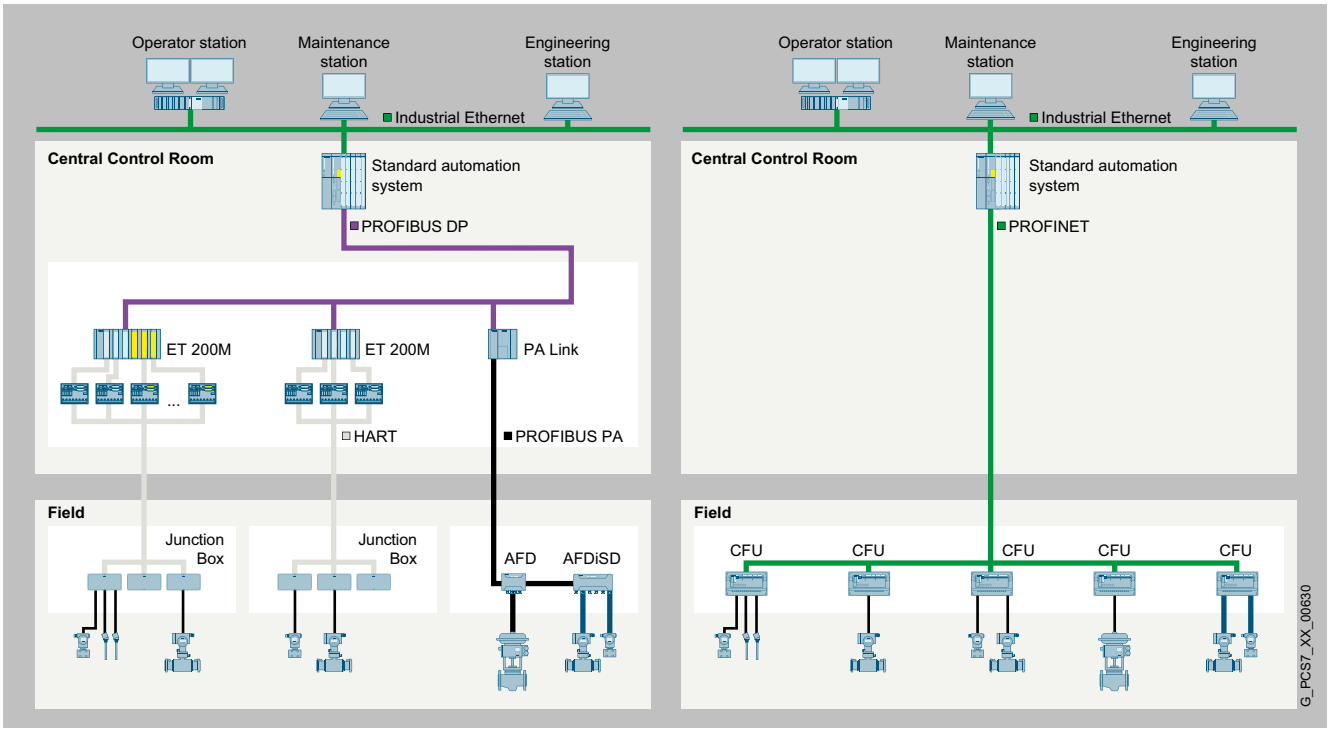
You benefit from greater flexibility and very simple handling coupled with maximum availability. This allows you to efficiently transfer your familiar system concept to the digital world.

***Today's challenges for field device connection:***

- High overhead for device integration and replacement
- Complicated, error-prone wiring and routing over multiple levels, making the hardware FAT very complex
- Extremely long copper cables and numerous terminal points in the field
- Multiple individual control cabinets
- Large numbers of different components and protocols necessitate costly spare parts inventories and training sessions
- High planning and documentation costs

***SIMATIC CFU – The answer to these challenges***

Mode of operation




Field device connection with previous technology (left) and with SIMATIC CFU (right)

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## Overview (continued)

The SIMATIC Compact Field Unit (CFU) is a real game-changer in field device connection and offers you entirely new prospects regarding simplicity, flexibility and standardization. The smart field distributor is installed at the process level and is connected via PROFINET directly to the automation system to form the foundation for digitalization in the field. Utilization of digital fieldbus communication considerably simplifies device interfacing compared to conventional 4 ... 20 mA engineering.

Greater flexibility thanks to consistent decentralization

Distributed installation of the SIMATIC CFU means that classic control cabinets are no longer required and you can make considerable savings in cabling and the number of terminal points, as well as reducing planning and documentation overheads. The high granularity (16 I/O per SIMATIC CFU) enables flexible assignment to the higher-level controllers.

## Function



The SIMATIC CFU was specifically designed to meet the requirements of the process industry in the Industry 4.0 environment (application example: SIMATIC CFU in a standard cast aluminum housing).

***System integration via Industrial Ethernet standard***

- Flexible connection options via PROFINET
- Ready for Process Automation (PA Ready):
  - Redundant PROFINET connection (S2) for maximum availability
  - Media redundancy (MRP)
  - Configuration in RUN (CiR)
- BusAdapter (electrical, optical or combination)

***Ready for distributed use***

- Installation up to hazardous zone 2/22 (with conformal housing)
- Extended temperature range from -40 to +70 °C
- Conformal coating use up to 4000 meters altitude
- Implementation of increased interference immunity according to NAMUR NE 21
- Optional: Aluminum enclosure for direct field deployment in zone 2/22

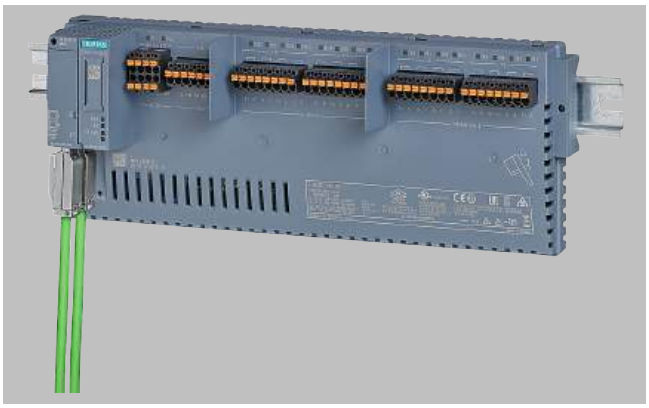
## More information

You can find more information on the CFU and its variants, as well as an overview of all ordering data here:
https://support.industry.siemens.com/cs/ww/en/view/109749357

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## Overview



SIMATIC CFU here with BusAdapter, PROFINET bus cable and push-in terminals

***SIMATIC CFU PA edition***

Plug-and-produce simplicity

Digitalization requires a digital infrastructure facilitating integrated digital communication right down to the sensors and actuators. You can use the established and proven PROFIBUS PA standard to achieve this. It is integrated into the PA edition of the SIMATIC CFU, thus combining ruggedness and easy handling with all the advantages of the PROFINET standard based on Industrial Ethernet. Connected devices are automatically addressed. The device is integrated via standardized communication profiles.

This innovative new implementation of the PROFIBUS PA concept makes it possible to combine the simplicity of a point-to-point wiring system with the scalability of digital PROFIBUS PA fieldbus communication. As with digital field devices, it is not necessary to know prior to connection whether the discrete field device is a sensor or actuator – This can be easily configured afterwards via software.

Combination of digital fieldbus and discrete I/Os

- 8 × digital fieldbus (PROFIBUS PA)
- 8 × digital inputs/outputs, freely configurable (1 x counter functionality / frequency measurement)

Easy to use

- Automatic addressing of PROFIBUS PA field devices
- System-supported detection and integration of PROFIBUS PA field devices into the process control system
  - Utilization of standardized PA profiles
  - Commissioning, device replacement and maintenance wizards
- Implementation of diagnostic messages according to NAMUR NE 107
- Installation on a 35 mm DIN rail

## Overview (continued)

Aluminum field housing



SIMATIC CFU aluminum field housing, open



SIMATIC CFU aluminum field housing, closed

The die-cast aluminum housing is suitable for use in zone 2/22 hazardous areas. The following are included in the housing scope of delivery:

- 22 × M20 plastic cable glands (incl. blanking plugs)
- 35 mm DIN rail
- Rail for strain relief and shield support

The enclosure has a display window for LED diagnostics.

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## Selection and ordering data

| | |
|---|---|
| **SIMATIC CFU PA bundle with push-in terminals**<br>Comprising:<br>• SIMATIC CFU PA, Article No. 6ES7655-5PX11-0XX0<br>• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0<br>pre-assembled and tested | **6ES7655-5PX11-1XX0** |
| **SIMATIC CFU PA bundle with aluminum enclosure**<br>Comprising:<br>• SIMATIC CFU PA, Article No. 6ES7655-5PX11-0XX0<br>• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0<br>• Aluminum enclosure with cable glands, shield busbar, shield connection clamps<br>pre-assembled and tested | **6ES7655-5PX11-1AX0** |

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## Overview



***SIMATIC CFU DIQ edition***

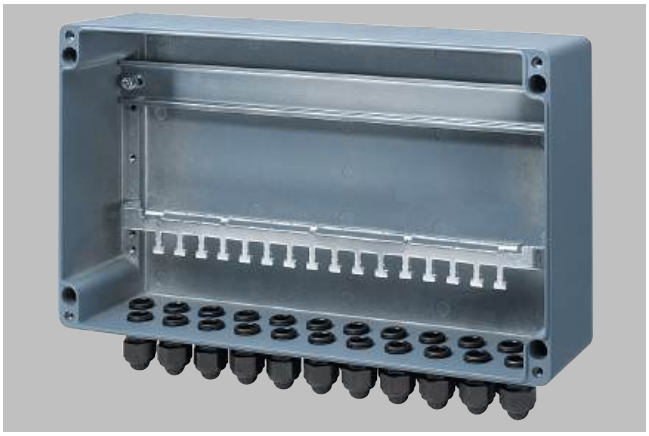
Individual, customer-specific solutions and flexible system/plant extensions are requirements that are becoming increasingly important in the process industry due to digitalization. SIMATIC CFU DIQ edition with 16 freely configurable digital IO channels offers a solution for the growing demands of distributed I/O.

SIMATIC CFU also has expansion functions for optional configuration. Two additional operating modes can be activated for selected digital inputs. "Counter" operating mode and "Frequency measurement" operating mode with a cut-off frequency of 1 kHz.

Actuator shutdown can be set for the digital outputs. The actuator shutdown of the SIMATIC CFU uses a monitoring channel (DI channel) to quickly set all digital outputs to a low digital level.

- 16 × digital inputs/outputs, freely configurable (2 x counter functionality / frequency measurement)

Aluminum field housing



SIMATIC CFU aluminum field housing, open

## Overview (continued)



SIMATIC CFU aluminum field housing, closed

The die-cast aluminum housing is suitable for use in zone 2/22 hazardous areas. The following are included in the housing scope of delivery:

- 22 × M20 plastic cable glands (incl. blanking plugs)
- 35 mm DIN rail
- Rail for strain relief and shield support

The enclosure has a display window for LED diagnostics.

## Selection and ordering data

| | |
|---|---|
| **SIMATIC CFU DIQ with aluminum housing**<br>Comprising:<br>• SIMATIC CFU DIQ, Article No. 6ES7655-5PX31-0XX0<br>• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX00-1XX0<br>• Aluminum housing with cable glands, shield busbar, shield connection clamp<br>pre-assembled and tested | **6ES7655-5PX31-1AX0** |
| **SIMATIC CFU DIQ**<br>Comprising:<br>• SIMATIC CFU DIQ, Article No. 6ES7655-5PX31-0XX0<br>• SIMATIC CFU push-in terminals, Article No. 6ES7655-5PX31-1XX0<br>pre-assembled and tested | **6ES7655-5PX31-1XX0** |

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| | |
|---|---|
| **8/2** | **Digitalization** |
| 8/2 | Digital solutions & apps |
| 8/2 | SITRANS SCM IQ, SITRANS CC220, SITRANS MS200 |
| 8/6 | SITRANS store IQ |
| 8/10 | SITRANS mobile IQ |
| 8/11 | SITRANS serve IQ |
| 8/16 | Connectivity |
| 8/16 | SITRANS AW050 |
| **8/18** | **Communication** |
| 8/18 | Field device instrumentation |
| 8/18 | SIMATIC PDM |
| 8/30 | SITRANS DTM |
| 8/31 | SITRANS Library |
| 8/32 | Communication protocols |
| 8/32 | FOUNDATION Fieldbus |
| 8/33 | HART communication protocol |
| 8/34 | PROFIBUS |

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## Overview




SITRANS SCM IQ is a Siemens Insights Hub-based cloud application, used in conjunction with SITRANS MS200 and SITRANS CC220, for smart condition monitoring and predictive maintenance.

SITRANS CC220 is an industrial IIOT gateway that collects measurement and status data from up to eight SITRANS MS200 multisensors. It then forwards the data, via the plant network or a secondary data channel, to the SITRANS SCM IQ cloud application.

SITRANS MS200 is a battery-powered, wireless multisensor that provides process condition data that is not normally available for typical process control functions. MS200 can monitor conditions such as vibration states and temperature.

## Benefits

- Detects changes to the normal operating conditions of industrial machinery such as pumps, motors, gears, etc., in industrial settings
- Detects the on/off state of each connected device
- Labels detected anomalies and sends notifications
- Allows for more efficient maintenance planning through early warnings
- Improves control, protection, and availability of machinery
- Can help to reduce plant downtime
- Built-in configuration tools and device management
- Easy commissioning, minimal training required, and long maintenance cycles

## Application

SITRANS MS200 multisensors are suitable for use with a wide range of rotating equipment, within all industries that require rugged IIoT sensors. The sensors are suitable for measurement within any industrial environment and at extreme temperatures. They can be used indoors and outdoors.

SITRANS MS200 sensors and corresponding SITRANS SCM IQ application, can be used in process industries such as food and beverage, power generation, utilities, and chemical. Typical applications include filling stations, agitating vessels, and many types of pumps, gears, compressors, fans or bearings.

## Design

SITRANS MS200 is contained within a rugged, IP69 enclosure for use with rotating equipment. SITRANS CC220 is an IP20 device and is typically mounted inside a cabinet.

SITRANS SCM IQ is designed for use on the Siemens cloud-based IoT ecosystem, Insights Hub. SITRANS SCM IQ can be combined with an array of Siemens cloud-based applications for complete plant supervision and control.

## Function

**SITRANS MS200, Battery powered clamp-on sensor**

- Monitors temperature and vibration of rotating equipment

**SITRANS CC220, IIOT gateway**

- Cyclically polls data from MS200 multisensors
- Securely uploads data to SITRANS SCM IQ
- Can handle up to eight SITRANS MS200 sensors

**SITRANS SCM IQ, Insights Hub application for smart condition monitoring**

- Manages connected SITRANS CC220 gateways and SITRANS MS200 multisensors
- Intuitive training of machine learning models to automatically detect anomalies
- Supports labelling anomalies and sends notifications via email or push notification (when used with SIMATIC Notifier)

## Selection and ordering data

| Selection and ordering data | Article No. |
|---|---|
| **SITRANS MS200**<br>A battery-powered, wireless multisensor that provides process condition data that is collected in addition to the core process control data. | **7MP2210-2AB21-2-AB1** |
| **SITRANS CC220**<br>A cloud connector that collects measurement and status data from up to eight SITRANS MS200 multisensors, then forwards it to the SITRANS SCM IQ cloud application | **7MP2200-2CB05-2-AA1** |
| **SITRANS SCM IQ**<br>SITRANS SCM IQ is a Siemens Insights hub-based application, used in conjunction with SITRANS MS200 and SITRANS CC220, for smart condition monitoring and predictive maintenance | **SITRANS SCM IQ is distributed by the Siemens Digital Exchange. Please visit:** https://www.dex.siemens.com |
| **Operating Instructions**<br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation. | |
| **Spare Parts** | |
| SITRANS MS200 replacement battery with plug, 3.6 V/2.6 Ah | **7MP2210-2AB21-2-AB8** |

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## Technical specifications

| SITRANS MS200 | |
|---|---|
| **Scope of measurement** | Vibration and temperature |
| **Data transmission** | |
| Polling | Cyclic, via SITRANS CC220 |
| **Vibration sensor** | 3-axis accelerometer |
| Frequency range | 15 ... 3.3 kHz |
| Resolution | 0.122 mg (nominal at ± 4 g measurement range, 0.488 mg at ± 16 g) |
| Sampling rate | 6.6 kHz |
| **Temperature sensor** | |
| Temperature range | -30 ... +80 °C (-22 ... +176 °F) |
| Accuracy | ± 4 °C |
| Repeatability | 0.1 °C |
| **Voltage supply** | |
| Voltage | 3.6 V |
| Capacity | 2.6 Ah |
| Lithium content | 0.65 g (0.023 oz) |
| Weight of battery | 18 g (0.63 oz) |
| Battery life at 25 °C (77 °F) | 2 ... 5 years |
| Replacement | Replacement batteries are offered by Siemens. Please see spare parts for more details. |
| **Communication** | |
| Bluetooth | Bluetooth BLE 5.0 |
| Data transmission cycle | 1 per 100 seconds |
| **Environment** | |
| Storage temperature | -40 ... +85 °C (-40 ... +185 °F) |
| Ambient temperature | -30 ... +80 °C (-22 ... +176 °F) |
| Altitude | • Operation: -1 000 ... 2 000 m (3 280 ... 6 561.68 ft)<br>• Pressure: 795 ... 1 080 hPa |
| Rating | IP69 2 m/24 h, according to IEC 60529 |

| SITRANS CC220 | |
|---|---|
| **Functions** | |
| Connecting | Connects SITRANS MS200 multisensor with SITRANS SCM IQ cloud application |
| Polling | Cyclic polling of SITRANS MS200 |
| Cloud connect | Forwards data to SITRANS SCM IQ cloud. Connection through plant network or Internet Access Point (e.g. SCALANCE M876-4). |
| **Voltage supply** | |
| Voltage | 24 V nominal |
| Fuse | No |
| Fan | Passive cooling |
| **Communication** | |
| To sensor | Bluetooth BLE 5.0 |
| To cloud | MQTT |
| **Environment** | |
| Storage temperature | -20 ... +70 °C (-4 ... +158 °F) |
| Ambient temperature | 0 ... +50 °C (-32 ... +122 °F) |
| Altitude | • Operation: -1 000 ... 2 000 m (3 280 ... 6 561.68 ft)<br>• Pressure: 795 ... 1 080 hPa |
| Rating | IP20, according to IEC 60529 |

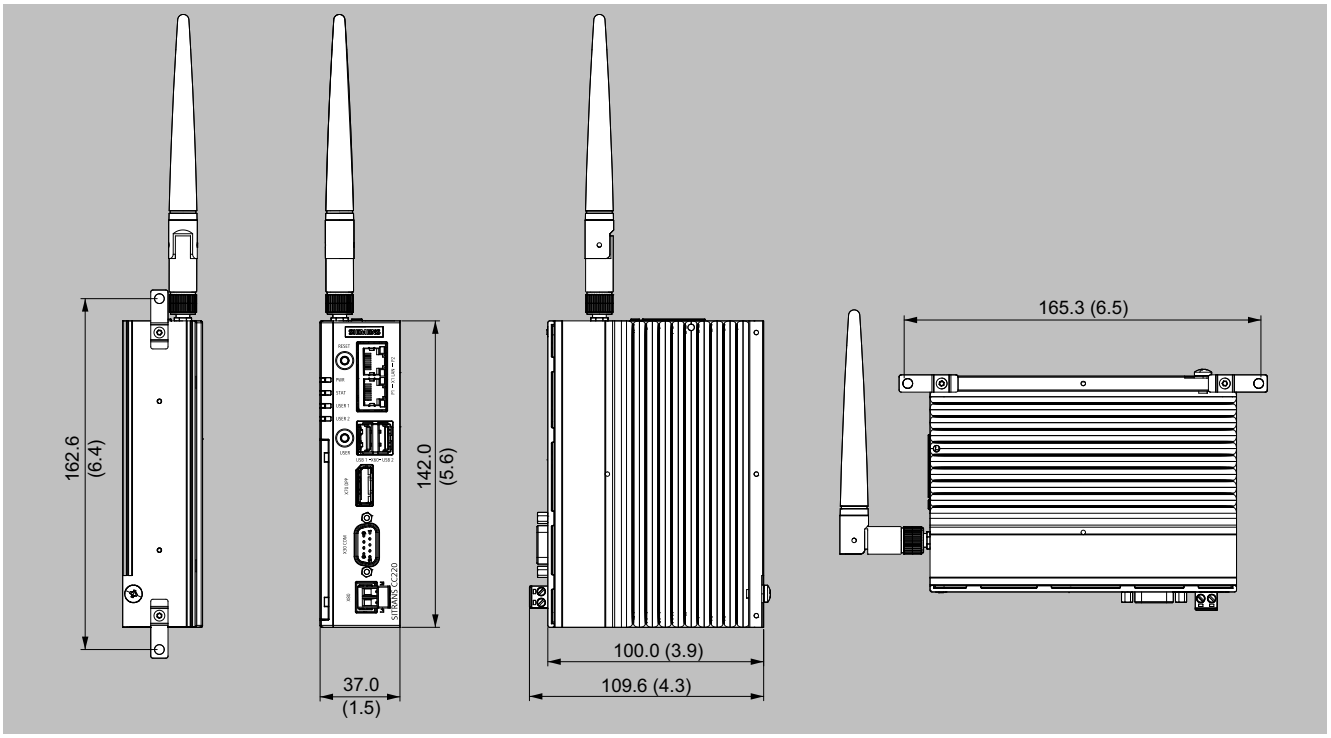
## Technical specifications (continued)

| SITRANS SCM IQ | |
|---|---|
| **Device connectivity** | Manages connection of SITRANS MS200 and SITRANS CC220 through a convenient user interface |
| **Sensor data modeling** | Activation and management of machine learning models |
| **Anomaly management** | Documentation and management of detected anomalies |
| **Notifications** | Provides notification of detected anomalies via email or push notification (when used with SIMATIC Notifier). |

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## Dimensional drawings

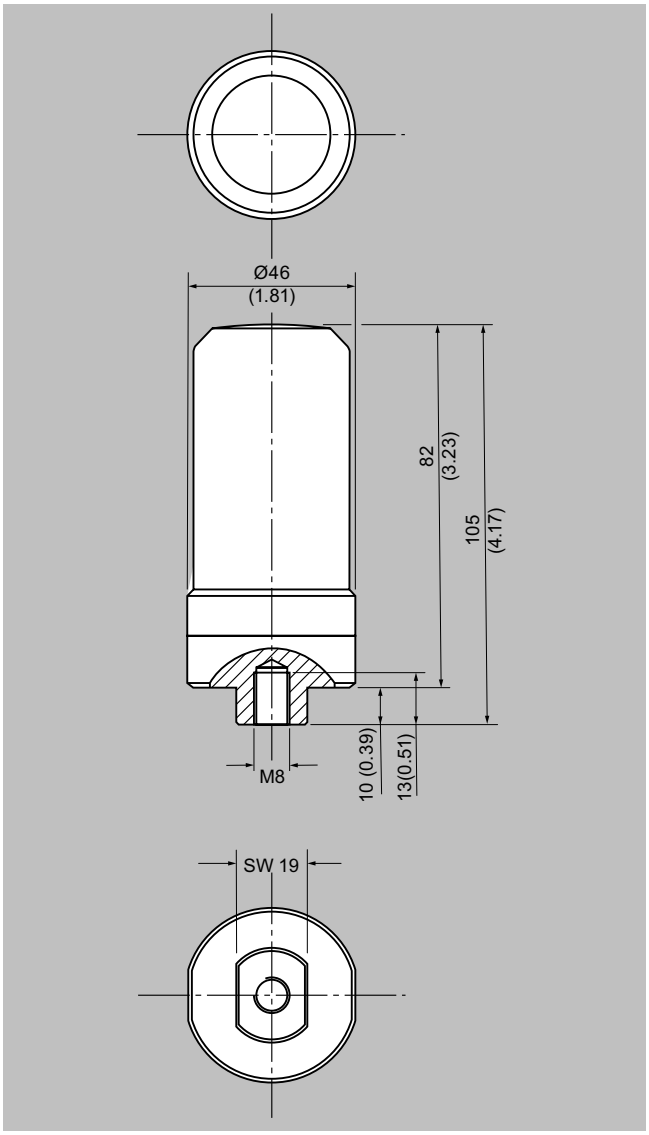



SITRANS CC220, dimensions in mm (inch)

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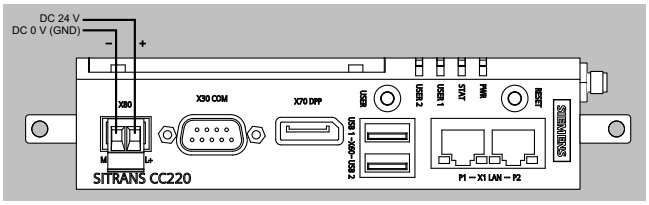


## Dimensional drawings (continued)




SITRANS MS200, dimensions in mm (inch)

## Circuit diagrams




SITRANS CC220, connections

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## Overview

SITRANS store IQ is a Siemens cloud based application used to monitor and manage inventories in process and discrete industries.

## Benefits

- Manage entire inventory network from a central location.
- Reduce overhead required to monitor and plan stock levels.
- Avoid unnecessary downtime and cost associated with unexpected shortages.
- Increase transparency of measurement reliability.

## Application

Inventory management is a necessary task in virtually every value chain. Inventories are required whenever material is processed, produced, or assembled. SITRANS store IQ is an inventory management app based on Siemens cloud resources, that records measurements and data from various types of instrumentation, including a level device at a process tank or scales mounted in storage shelves. SITRANS store IQ also monitors auxiliary measurements, helping to better characterize inventories, for example, with temperature readings or binaries.

SITRANS store IQ records readings and visualizes them in a customizable way, offering structuring with hierarchies, map views, and graph views. The acquired data can be used to create proactive alarms via email or SMS, exactly as required for your application. The SITRANS store IQ app can be used on a desktop computer or mobile device.

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## Design

- A reliable and accurate record of inventory data from anywhere.
- A flexible structure for configuring an inventory network of any size.
- Provides a visualization of an inventory mix, with material breakdown.
- KPI thresholds to easily assess inventory levels.
- Custom alarms for proactive notifications.
- Based on cloud and cloud connectivity solutions.
- Open to virtually every measurement technology.
- Ability to monitor any process values, including humidity, temperature, digital inputs.

***The following standard SITRANS store IQ base package and extensions are available:***

SITRANS store IQ can be ordered via the Siemens PLM store: https://www.dex.siemens.com/ccrz__ProductList?cartID=&operation=quickSearch&searchText=-Sitrans%20store%20iq&portalUser=&store=&cclcl=en_US&selected=industrial-iot

| Pricing Model | |
|---|---|
| **Application subscription** | **SITRANS Store IQ Package Base** |
| | See order[1] |
| Billing cycle | Full amount in advance |
| SITRANS Store IQ application | ✓ |
| Base environment[2] | ✓ |
| Asset attributes | 100[3] |
| Time series data ingest rate | 0.05 KB/s[4] |
| Time series data storage | 1 GB |
| Notification emails | 1 000 email notifications |
| Users | 100 |
| | According to your specific configuration, the required number of the above mentioned cloud resources might differ. |
| **Extension (for cloud resources)** | **SITRANS Store IQ Package Asset Attributes Extension** |
| | See order[1] |
| Billing cycle | Full amount in advance |
| Asset attributes | 100 additional asset attributes |
| Time series data ingest rate | 0.03 KB/s additional time series data ingest rate |
| Time series data storage | 1 GB additional time series data storage |
| **Extension (for cloud resources)** | **SITRANS Store IQ Package Data Ingest Extension** |
| | See order[1] |
| Billing cycle | Full amount in advance |
| Time series data ingest rate | 0.10 KB/s additional time series data ingest rate |
| **Extension (for cloud resources)** | **SITRANS Store IQ Package Data Storage Extension** |
| | See order[1] |
| Billing cycle | Full amount in advance |
| Time series data storage | 5 GB additional time series data storage |
| **Extension (for cloud resources)** | **SITRANS Store IQ Package Notification Extension** |
| | See order[1] |
| Billing cycle | Full amount in advance |
| Notification emails | 1 000 additional email notifications |
| SMS notifications | 25 additional SMS notifications |
| **Extensions (for Third-Party Resources)** | |
| | Call notifications may be offered in/for certain countries. Offered call notifications are provided as Third-Party technology. Please see Third-Party terms section. Call notifications may be blocked, delayed or prevented from being delivered by reasons outside of our control and there is no warranty that the call notifications will be uninterrupted, secure or error free or that calls will reach their intended destination during any stated time-frame. For the avoidance of doubt, Siemens may discontinue this service without prior notice at any time. |

1) Subscription-based pricing is set forth in the order.
2) You can decide if a base environment shall be created and provisioned to you as part of your SITRANS Store IQ Package Base subscription or if the SITRANS Store IQ Package Base (without a base environment) shall be added to an existing account (base environment or capability package account). A package can only be added to an existing account if the account and package are hosted in the same data center location. If you decide to add various packages to one existing account, please note the following: The cloud resources included in the various packages will be combined under one account; it is your responsibility to allocate the cloud resources to the various packages according to your needs. The combination of cloud resources under one account may lead to technical limitations in their accessibility.
3) Depending on the configuration of e.g., the transmitter and/or gateway, single or multiple asset attributes are being used by the SITRANS Store IQ application.
4) Equals an update of up to 30 asset attributes approximately every five minutes.

| Customer Requirement in Relation to Cloud Resources | | | |
|---|---|---|---|
| **Requirement from Customer** | **Effect on Required Number of Asset Attributes** | **Effect on Required Time Series Data Ingest Rate** | **Effect on Required Time Series Data Storage** |
| Increase number of measurements | Increase | Higher rate required | Increase |
| Consideration of complex tank geometries | Increase[1] | Higher rate required | Increase |
| Increase frequency of data capture | None | Higher rate required | Increase |
| Increase storage (extend duration of stored data) | None | None | Increase |

1) Using the features of SITRANS Store IQ application for e.g., for tank monitoring, each measurement might consume over 32 asset attributes.

Note:

The standard subscription term for SITRANS Store IQ Package Base is 12 or 36 months. The subscription term shall automatically renew if stated in the order. Siemens reserves the right to discontinue the SITRANS store IQ app with a 12 months notice and replace the

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## Design (continued)

SITRANS store IQ app with a different app that is similar but not identical in functionality.

The subscription term for extensions will be co-termed with the subscription term of the application and therefore can be shorter than the standard subscription term.

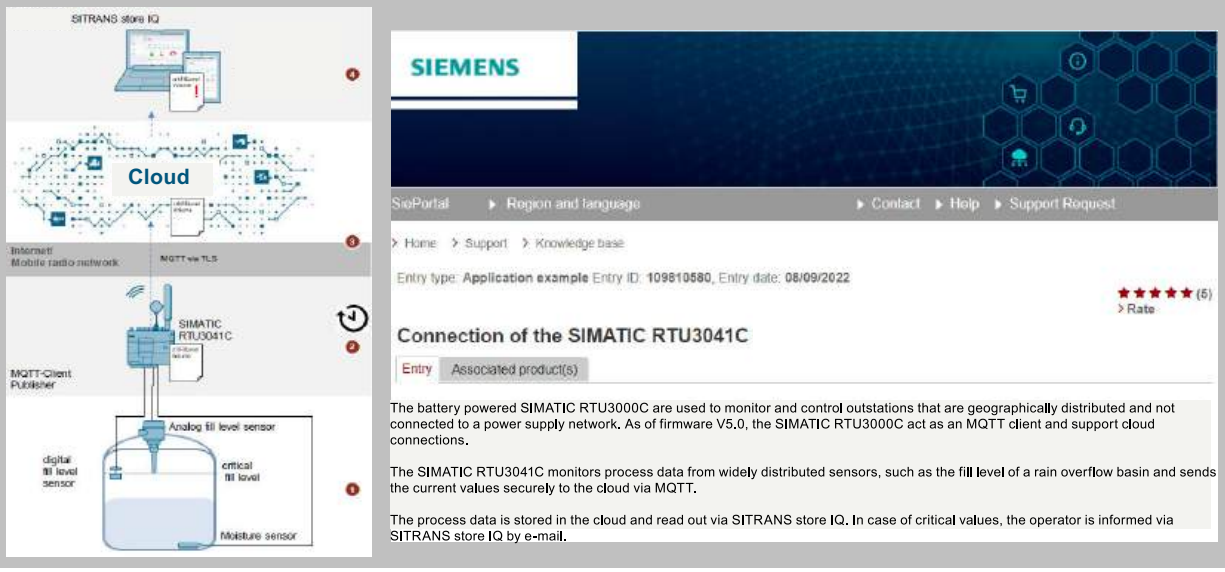
If an application subscription is terminated, the associated extensions will also be terminated at the same time.
For all terms and conditions please see the SITRANS Store IQ Package product sheet.

The subscription fee for SITRANS Store IQ Package Base and for any of the extensions described herein are fully charged in advance for the entire subscription term unless otherwise expressly provided in an order.

For all terms and conditions, please see the SITRANS Store IQ packages in the Siemens PLM store at
https://www.dex.siemens.com/ccrz__ProductList?cartID=&operation=quickSearch&searchText=Sitrans%20store%20iq&portalUser=&store=&cclcl=en_US&selected=industrial-iot

## Integration

**How to connect field devices to SITRANS store IQ using SIMATIC RTU**

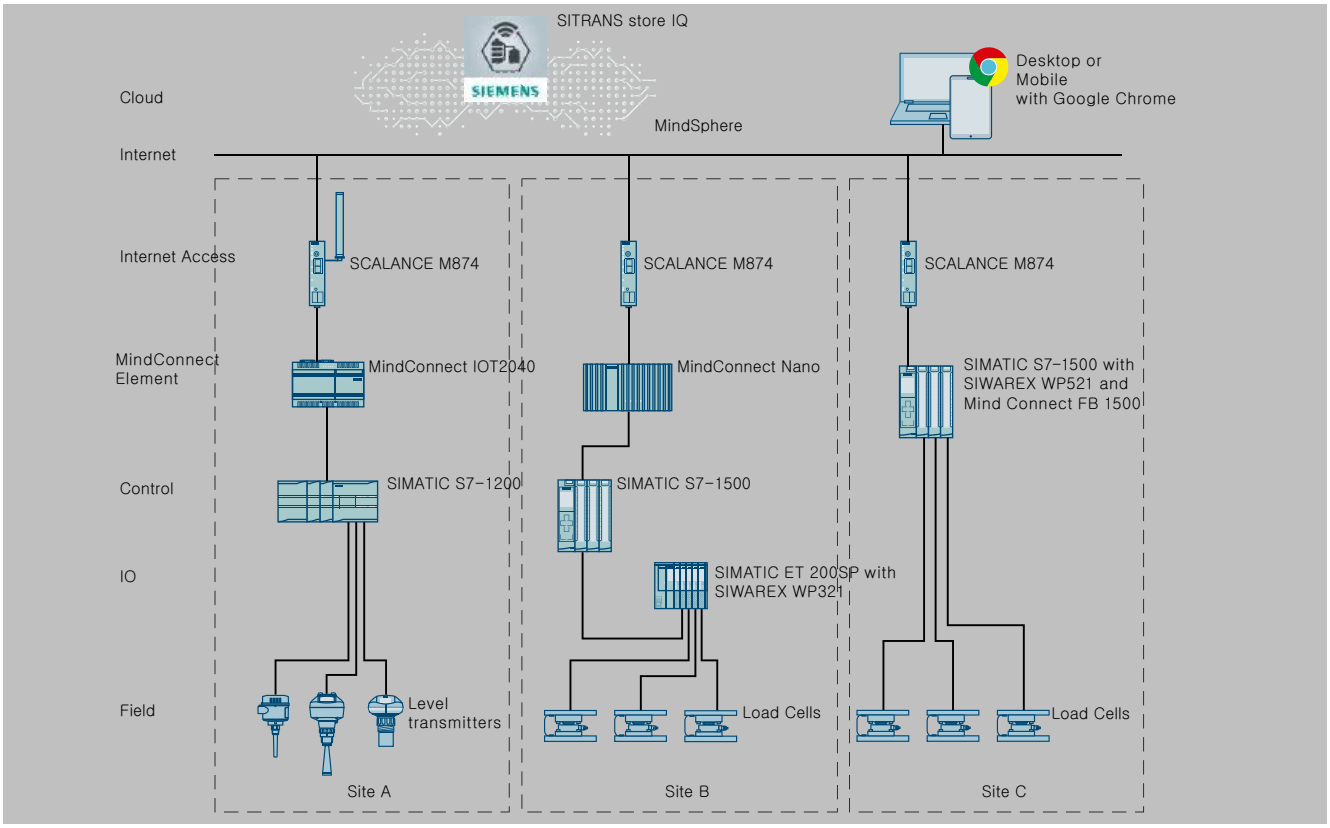



How to connect field devices to SITRANS store IQ using SIMATIC RTU, for more details please visit:
https://support.industry.siemens.com/cs/de/en/view/109810580

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## Integration (continued)




SITRANS store IQ is based on MindSphere and supports various possibilities to onboard instrumentation devices and acquire data. The figure shows several integration examples.

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## Overview



SITRANS mobile IQ is an app that gives you easy access to SITRANS field devices via your smartphone or tablet.

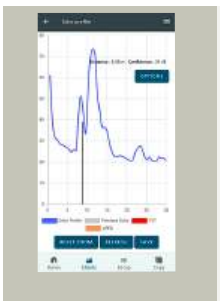
## Benefits

- Commissioning and parameterization of field devices.
- Displays device status and measurement values.
- Helps with identifying errors and troubleshooting in case of failures.
- Direct link to manuals, certificates, FAQs, and much more.

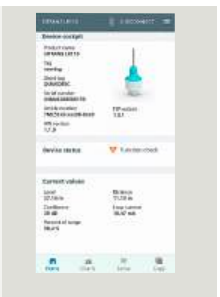
## Application

Commissioning and parameterization of field devices:

- **Device list**
  All supported devices in the environment are displayed.
- **Device Cockpit**
  Overview of the connected device, device status, and current measured values.
- **Setup**
  Commissioning and parameterization of the device, including graphical support.
- **Charts**
  History of selected measurement and diagnostic values.







## Mode of operation

***Mobile devices / operating systems***

SITRANS mobile IQ is compatible with supported Android and iOS mobile devices.

SITRANS mobile IQ uses a Bluetooth interface to communicate with the field devices. Your mobile device must have a Bluetooth interface, version 4.2 or better.

Currently supported field devices are listed on SIOS (http://www.siemens.com/osSITRANSmobileIQ) and in the App Store and Google Play. Additional field devices are in preparation and require a new installation of the App on your mobile device. Only the listed field devices are compatible with SITRANS mobile IQ.

**Data connection:** internet connection is required to access additional information such as manuals of supported field devices.

## Integration

***Further information***

Product note in Industry Online Support – Product Support

https://support.industry.siemens.com/cs/document/109775578/sitrans-mobile-iq?dti=0&lc=en-WW

***Download App***

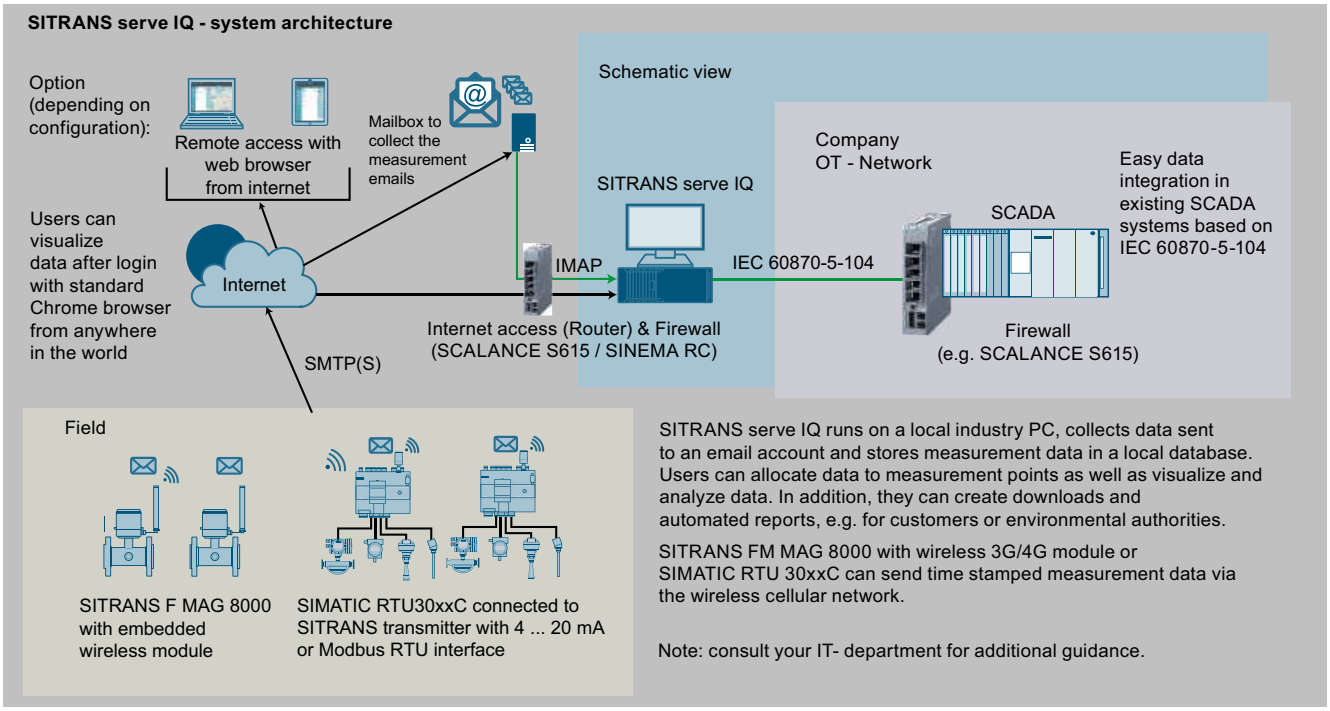
https://apps.apple.com/us/app/sitrans-mobile-iq/id1496146361

https://play.google.com/store/apps/details?id=com.siemens.sitransmobileiq&hl=en_US

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## Overview




SITRANS serve IQ is an on-premise application that acquires measurement data sent by email (CSV file attachments) from remote sensors. The data is stored locally on an Industry PC and visualized in charts and tables. If configured, authorized users can access this on-premise application via the Internet.

Optionally, users can create and send customized reports on measurement data and log events in a log-book to, for example, document services. An interface for forwarding data to a SCADA system using the telemetry protocol IEC 60870-5-104 is also available.

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## Benefits

Widely distributed measuring points are used in a range of applications and industries. These include:

- Flow measurement in water supply networks.
- Level measurement in tanks and silos.
- Height measurement in bodies of water.

Today, remote devices send measurement data and alarms in csv-format via email (e.g. SITRANS MAG 8000 3G/4G or SIMATIC RTU 30xxC).

SITRANS serve IQ supports you by:

- Reading and parsing the email attachment containing the measurement data from the email address provided by you.
- Visualizing historical and current process values in charts or tables and displaying alarms.
- As customers or environmental authorities ask for measurement data, users can create customized reports on totalizer values and send them automatically by email. This optional license also enables the logbook functionality that allows users to comment on measurement data or to document service activities.
- Forwarding process values to SCADA via the optional telemetry protocol IEC 60870-5-104.
- If enabled, users can access the application from the Internet using the Google Chrome web-browser. Access is limited to the organization holding the license. Additional measures to ensure IT-security are required (e.g. firewall).

## Application

SITRANS serve IQ software must be installed on a local IPC, on-premise and must have access to an email account used for receiving data from remote devices.

When data from supported devices is sent to the predefined email account, SITRANS serve IQ performs the following activities:

- Reads and parses the email attachment containing the valid measurement data from the user provided email address.
- Reads the time stamped measurement data and store it locally on your PC.
- Visualizes the data in trends, display alarms, and downloads the data in tables to authorized users.

Optional features include:

- Customized reports on totalizer values and the ability to send them automatically by email.
- Logbook functionality allowing users to comment on measurement data or to document service activities.
- On further request, ability to forward measurement data to a SCADA system via IEC 60870-5-104 telemetry protocol that is widely used in the water and power industries.

SITRANS serve IQ can be used with the following products:

- SITRANS F MAG8000 with integrated wireless communication module.
- All transmitters in the SITRANS product family with 4 to 20 mA or Modbus RTU interface that can be connected to a SIMATIC RTU30xxC.

SITRANS serve IQ continuously monitors received measurement values against configurable upper and lower limits. Values exceeding the limits will be reported as warnings or alarms, depending on the user setting.

For details and limitation, consult the Product page available at www.siemens.com/SIOS/sitransserveiq.

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## Design

SITRANS serve IQ software is supplied with a Media Package on a USB stick or online software download with an installation program.

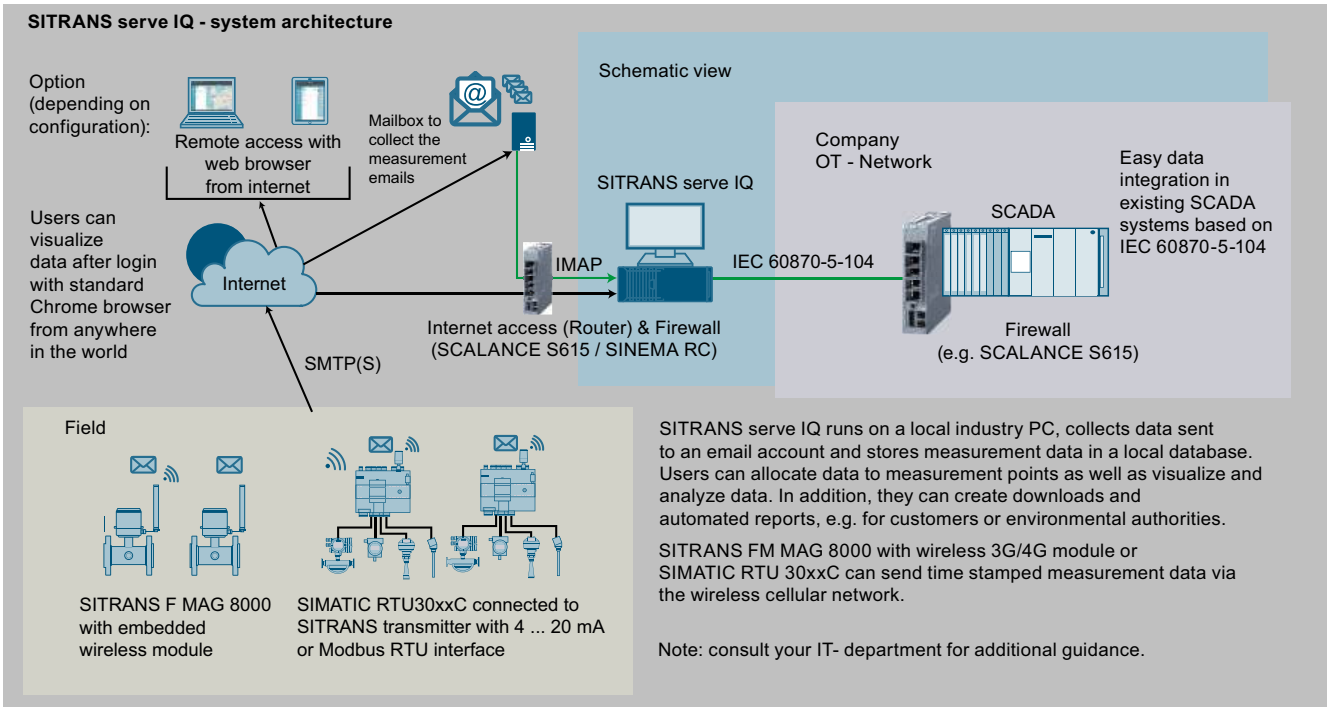
SITRANS serve IQ consists of a software package and several license upgrade options.

| Software packages | SITRANS serve IQ perpetual[1] |
|---|---|
| Number of sending units supported | 10 units, with a maximum of 40 variables each |
| License type | Perpetual license |

| License upgrade options: | |
|---|---|
| Additional devices | SITRANS serve IQ license upgrade for 1, 10, 100, or 500 additional devices according to the customer's requirements, to a maximum of 1 300 devices in total. |
| Logbook and automated reports | • Comment on measurement data or document service activities<br>• Create reports on totalizer values and send automatically by email. |
| IEC 60870-5-104 telemetry protocol | • Data interface to SCADA server (single or redundant) with the standardized IEC 60870.5.104 telemetry protocol.<br>• Enables easy integration in SIMATIC PCS 7 Telecontrol. |

[1] SITRANS serve IQ software is protected against unauthorized copying by the Automation License Manager (ALM) tool.

Note: a trial version for 90 days for two (2) devices is available. Following these 90 days, the installed software must be updated to the professional version by means of SITRANS serve IQ perpetual.




SITRANS serve IQ, communication paths: processing, archiving, displaying and transmitting measured values

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## Selection and ordering data

| SITRANS Serve IQ V1.3 Software Package Complete, 10 devices with logbook and automated reports functionality and support of IEC 60870-5-104 protocol Perpetual license[1)2)] | Article No. |
|---|---|
| • Software and license on USB stick | 6BG0000-0AA10-2CS1 |
| • Software and license via Online software download | 6BG0000-0AA10-0CS1 |

| SITRANS Serve IQ V1.3 Software Package Base, 10 devices Perpetual license for 10 devices[1)2)] | Article No. |
|---|---|
| • Software and license on USB stick | 6BG0000-0AA10-2CS0 |
| • Software and license via Online software download | 6BG0000-0AA10-0CS0 |

| SITRANS Serve IQ, License upgrade for logbook and automated reports functionality License activates access to the logbook and report functionalities.[1)2)] | Article No. |
|---|---|
| • Software and license on USB stick | 6BG0000-0AA10-3CY5 |
| • Software and license via Online software download | 6BG0000-0AA10-1CY5 |

| SITRANS Serve IQ V1.3 Software Package Demo On-premise application for Windows to acquire measurement data from remote sensors as well as store, and visualize data in trends and tables via web browser. 90-day trial license for 2 devices[1)2)] | Article No. |
|---|---|
| • License and software on USB stick | 6BG0000-0AA10-2CR0 |
| • License and software via Online software download | 6BG0000-0AA100-0CR0 |

| SITRANS Serve IQ, license upgrade, add IEC 60870-5-104 SITRANS Serve IQ license upgrade to add IEC 60870-5-104 telemetry protocol for data integration to SCADA.[1)] | Article No. |
|---|---|
| • License on USB stick | 6BG0000-0AA10-3CY1 |
| • License via Online software download | 6BG0000-0AA10-1CY1 |

## Selection and ordering data (continued)

| SITRANS Serve IQ, license upgrade, add 1 unit SITRANS Serve IQ license upgrade to add 1 additional device.[1)2)] | Article No |
|---|---|
| • License on USB stick | 6BG0000-0AA10-3CA0 |
| • License via Online software download | 6BG0000-0AA10-1CA0 |

| SITRANS Serve IQ, license upgrade, add 10 units SITRANS Serve IQ license upgrade to add 10 additional devices.[1)2)] | Article No |
|---|---|
| License on USB stick | 6BG0000-0AA10-3CB0 |
| License via Online software download | 6BG0000-0AA10-1CB0 |

| SITRANS Serve IQ, license upgrade, add 100 units SITRANS Serve IQ license upgrade to add 100 additional devices.[1)2)] | Article No |
|---|---|
| • License on USB stick | 6BG0000-0AA10-3CC0 |
| • License via Online software download | 6BG0000-0AA10-1CC0 |

| SITRANS Serve IQ, license upgrade, add 500 units SITRANS Serve IQ license upgrade to add 500 additional devices.[1)2)] | Article No |
|---|---|
| • License on USB stick | 6BG0000-0AA10-3CD0 |
| • License via Online software download | 6BG0000-0AA10-1CD0 |

1) SITRANS serve IQ product sheet and specific terms and software licensing conditions shall apply.
2) The number of devices refers to, for example, the number of SITRANS FM MAG8000 flowmeters with a wireless communication module or the number of SIMATIC RTU30xxC devices. Per device, a maximum of 40 values (e.g. process values, indication of battery power, alarms) is possible.

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## Technical specifications

| SITRANS serve IQ | |
|---|---|
| **Technical specifications for the on-premise installation** | |
| Operating system | Windows 10 Pro, 64-bit, version 2019 LTSC |
| Docker Desktop, Version 4.16.2 | Software and Docker ID to be supplied by customer.<br>Software download available at https://docs.docker.com/desktop/release-notes/.<br>Docker ID available at https://docs.docker.com/docker-id/.<br>Subscription fees may apply. |
| RAM | Minimum: 8 GB, recommended: 16 GB |
| Hard disk | At least 250 GB, SSD recommended |
| Security | Firewall, additional security measures supplied by customer |
| Internet access | Routers that allow the forwarding of IP ports and address transformations. |
| Notes | • We recommend installing SITRANS serve IQ on a standalone SIMATIC IPC 427E Microbox PC<br>• To minimize the risk of software conflicts, we recommend installing only Microsoft Office (Windows® 10 Pro 64-bit, Enterprise), Docker Desktop, and SITRANS serve IQ on the IPC. Installation on any other PC and with other software may have a negative impact on performance and proper functioning of SITRANS serve IQ. |
| **Other technical requirements** | • Fixed IP address for the PC hosting SITRANS serve IQ<br>• Internet access for the PC hosting SITRANS serve IQ, to read emails, and to access OpenStreetMap.<br>• A dedicated email mailbox supporting IMAP and SMTP protocol to which the measurement data will be sent in a specific protocol. |
| **Limitation of service - ability period** | The maximum serviceability period of SITRANS serve IQ is limited to two years. For further information on service, please visit: https://support.industry.siemens.com/cs/sc/5508/process-information?lc=en-DE |
| ***For more details, please visit the product page at*** www.siemens.com/SIOS/sitransserveiq. | |

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## Overview



SITRANS AW050 is a Bluetooth adapter for compatible SITRANS field devices. In combination with the SITRANS mobile IQ, SITRANS AW050 allows you to easily parametrize and maintain compatible SITRANS field devices via a smartphone or tablet.

## Benefits

- Connects to the existing service or display port of the field device
- Enables remote access to field devices for:
  - Commissioning and parameterization
  - Displaying device status and measurement values
  - Identifying errors and troubleshooting in case of failures
  - Displaying graphs and trend views of measurements and diagnosis information
  - Direct links to manuals, certificates, FAQs, and much more

## Application

SITRANS AW050 supports commissioning, parameterization, and maintenance of compatible field devices. AW050 will establish a secure connection to your field device. In combination with SITRANS mobile IQ, several functions are supported:

- **Device list**
  All supported devices in the environment are displayed.
- **Device cockpit**
  Overview of the connected device, device status, and current measured values.
- **Setup**
  Commissioning and parameterization of the device, including graphical support.
- **Charts**
  History of selected measurement and diagnostic values.

## Design

SITRANS AW050 provides a Bluetooth interface for communication with SITRANS mobile IQ.

## Integration

SITRANS AW050 is mounted in the existing cable gland and connected to the service or display port of the device.




SITRANS AW050, mounted on SITRANS Probe LU240




SITRANS AW050, mounted on SIPART PS100

## Selection and ordering data

| Selection and ordering data | Article No. |
|---|---|
| **SITRANS AW050**<br>Bluetooth adapter, used in combination with SITRANS mobile IQ for easy parametrization and maintenance of compatible SITRANS field devices. | |
| • SITRANS AW050 including mounting kit for SIPART PS100 | **7MP3210-0AA01** |
| • SITRANS AW050 including mounting kit for SITRANS Probe LU240 | **A5E50514198** |
| **SITRANS mobile IQ**<br>Application to monitor and parameterize compatible field devices via Bluetooth. | **Download via Google Play Store or Apple App Store** |
| **Operating instructions**<br>All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |

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## Selection and ordering data (continued)

| | |
|---|---|
| https://apps.apple.com/us/app/sitrans-mobile-iq/id1496146361 | https://play.google.com/store/apps/details?id=com.siemens.sitransmobileiq&hl=en_US |

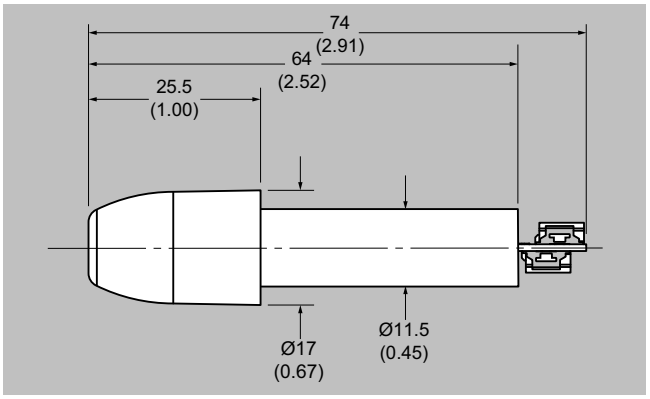
## Technical specifications

| SITRANS AW050 | |
|---|---|
| **Software requirements** | SITRANS mobile IQ<br>• Available for iOS 12.0 or higher and Android 7.0 or higher |
| **Operating conditions and structural design** | |
| Ambient conditions | For use indoors and outdoors |
| Ambient temperature | For ambient temperature ranges, please refer to the operating instructions for the connected SITRANS field device |
| • Permissible ambient temperature for operation (SITRANS AW050 only) | -40 ... +80 °C (-40 ... +176 °F) |
| • Relative humidity | 0 ... 100 % |
| Degree of pollution | 2 |
| Overvoltage category | II |
| Input voltage range | 2.2 ... 3.4 V DC |
| Maximum current consumption | 2.5 mA |
| Weight | 13 g (0.46 oz) |
| Degree of protection | • Type 4X, Type 6 according to UL 50E<br>• IP66, IP68 in accordance with IEC 60529 |
| EMC | EN 61326 |
| Material | Polycarbonate |
| Communication, interface | Bluetooth BLE 4.2 |
| Range | Class 2, approx. 10 m (32.8 ft) |
| **Certificates and approvals** | Radio approvals<br>• Europe: CE<br>• UK: UKCA<br>• USA: Contains FCC ID RYYEYSHJN<br>• Canada: Contains IC: 4389B-EYSHJN<br>• China: CMIIT ID: 2020DJ15120 |

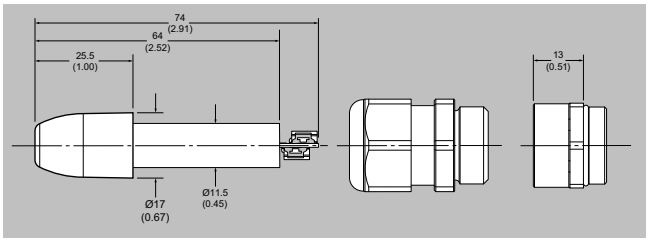
Notes:

- SITRANS mobile IQ is available for Android and iOS. For more information see: https://support.industry.siemens.com/cs/ww/en/view/109775578.
- The instruction manual for the SITRANS AW050, including mounting description is included in the operating instructions of the compatible SITRANS field device.
- Compatible with:
  - SIPART PS100 with FW 1.03.00 or higher.
  - SITRANS Probe LU240 with measurement range 6 m (19.69 ft) and 12 m (39.37 ft).

## Dimensional drawings




SITRANS AW050, dimensions in mm (inch)

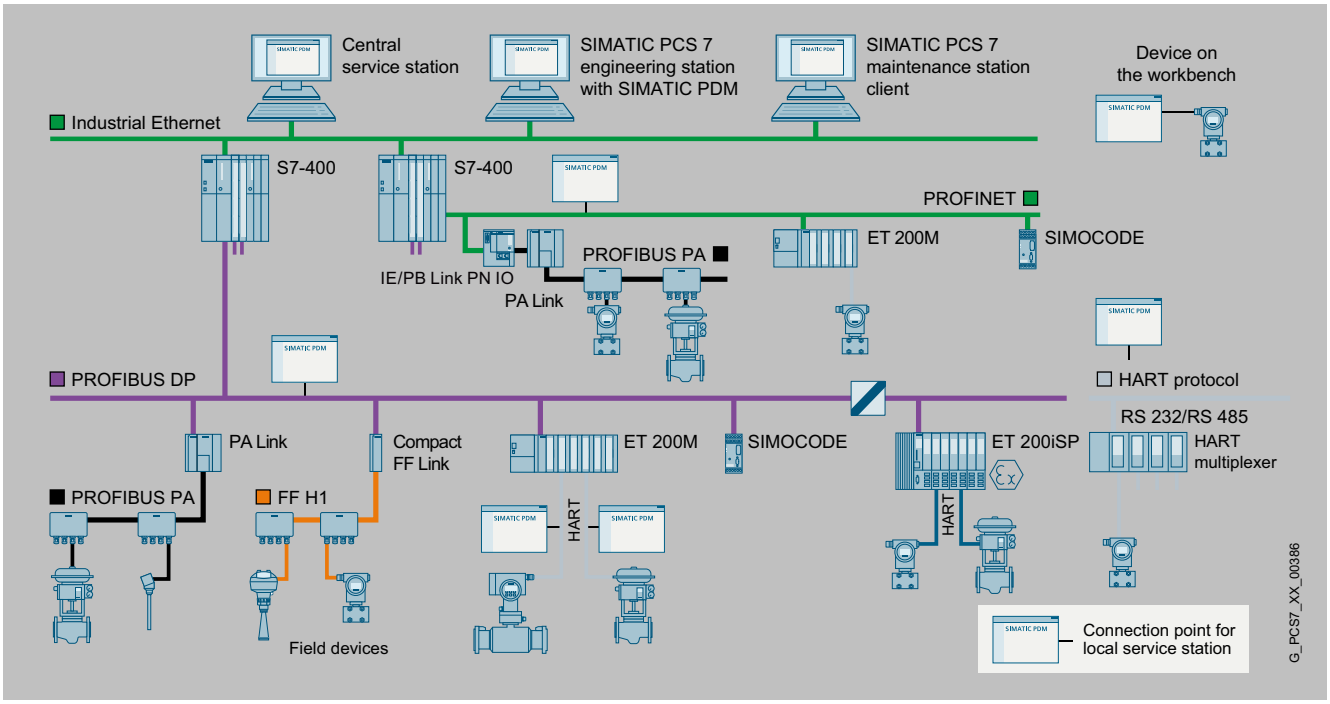



SITRANS AW050 with cable gland and SIPART PS100 mounting kit, dimensions in mm (inch)

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## Overview




Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

With *one* software product, SIMATIC PDM enables users to work with over 4 000 devices and device variants from Siemens and over 200 other manufacturers worldwide on a *single* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open process device manager on the global market. Devices not previously supported can be integrated in SIMATIC PDM by importing their device description packages (either EDD or FDI). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- Uniform representation and operation of devices
- Uniform representation of diagnostics information
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs
- Quantity options for
  - Transfer of parameters between devices
  - Transfer of parameter sets to the devices
  - Export and import functions
  - Diagnostics update

SIMATIC PDM can be used extremely flexibly and tailored to a specific task for field device service:

- Single-point station for point-to-point connection to field devices
- Local service and parameter assignment station with connection to fieldbus segments
- Central service and parameter assignment station with connection to plant bus
- Central HART service and parameter assignment station for HART multiplexers and WirelessHART field devices
- Integrated into the stand-alone SIMATIC PDM Maintenance Station
- Integrated into the SIMATIC PCS 7 process control system

Maintenance personnel can assign field device parameters at mobile and stationary workstations with SIMATIC PDM. Practically every workstation integrated in the production plant can be used for configuration. Service personnel are thus able to work directly at the location of the field device, while data is stored centrally in the engineering station or maintenance station. This leads to a significant shortening of maintenance and travel times. Additional device-independent system functions support higher-level maintenance stations for creating progress lists for work and servicing.

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**Overview** (continued)

When a maintenance station is configured in the SIMATIC PCS 7 process control system, SIMATIC PDM is integrated into it and transmits parameter data, diagnostic information and processing information. You can switch directly to the SIMATIC PDM views from the diagnostics faceplates in the maintenance station to perform diagnostics and work on the device in more detail.

A SIMATIC PDM user administration system based on SIMATIC Logon is used to assign various roles with defined function privileges to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices integrated with device description packages, SIMATIC PDM provides a range of information for display and further processing on the maintenance station, for example:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (for example local configuration changes), device test completed
- Information on changes (audit trail report)
- Parameter information

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## Design

| Components | Product packages | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | SIMATIC PDM Stand alone | | | | SIMATIC PDM system-integrated | | | |
| | Minimum configuration | Basic configuration | Service and parameter assignment station | | in the configuration environment | | | |
| | | | local | central | SIMATIC S7 | SIMATIC PCS 7 | | |
| | **PDM Single Point** | **PDM Basic** | **PDM Service** | **PDM Stand alone Server** | **PDM S7** | **PDM PCS 7** | **PDM PCS 7 Server** | **PDM PCS 7 FF** |
| SIMATIC PDM TAGs[1] in scope of supply | 1 | 4 | 4 + 50 | 4 + 100 | 4 + 100 | 4 + 100 | 4 + 100 | 4 + 100 |
| **SIMATIC PDM expansion options** | | | | | | | | |
| Count Relevant Licenses (accumulative) - 10 TAGs - 100 TAGs - 1 000 TAGs | *cannot be expanded* | o | o | o | o | o | o | o |
| SIMATIC PDM Basic | | ● | ● | ● | ● | ● | ● | ● |
| SIMATIC PDM Extended | | o | o | ● | ● | ● | ● | ● |
| SIMATIC PDM integration in STEP 7/PCS 7 | | o | o | o | ● | ● | ● | ● |
| SIMATIC PDM Routing[2] | | ● | ● | ● | o | ● | ● | ● |
| SIMATIC PDM Server | | o | o | ● | o | o | ● | o |
| SIMATIC PDM 1 Client[3] | | o | o | ● (2 ×) | o | o | o | o |
| SIMATIC PDM Communication FOUNDATION Fieldbus | | – | – | – | o | o | o | ● |
| SIMATIC PDM HART Server | | o | o | o | o | – | – | – |

SIMATIC PDM product structure
● Product component is part of the product package
o Optional product component for the product package; order additive
– Product component is not relevant for the product package or not available
1) For TAG definition, see "Design" section under "SIMATIC PDM TAGs"
2) In combination with SIMATIC PDM Integration in STEP 7/PCS 7
3) In combination with SIMATIC PDM Server

***Customer-oriented product structure***

The customer-oriented product structure of SIMATIC PDM provides optimal support for the named main use cases and enables you to adapt the scope of functions and performance to your individual requirements. The product range is organized as follows:

SIMATIC PDM Stand alone product packages

- SIMATIC PDM Single Point, a minimum configuration for single device handling
- SIMATIC PDM Basic for local service and parameter assignment stations as well as basic configuration for individual product package with optional product components
- SIMATIC PDM Service for local service and parameter assignment stations
- SIMATIC PDM Stand alone Server for central service and parameter assignment stations, e.g. for various plant units

SIMATIC PDM system-integrated product packages

- SIMATIC PDM S7 for local SIMATIC S7 engineering and service stations
- Various configurations for central SIMATIC PCS 7 engineering and service stations:
  - SIMATIC PDM PCS 7
  - SIMATIC PDM PCS 7 Server (enables device parameter assignment and diagnostics on clients of the PCS 7 engineering station and PCS 7 Maintenance Station)
  - SIMATIC PDM PCS 7-FF (supports the FOUNDATION Fieldbus H1)

In some circumstances, the product packages can be expanded with optional product components (for details, see the Design section).

| Product range | SIMATIC PDM V9.1 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Single Point** | **Basic** | **Service** | **Stand alone Server** | **S7** | **PCS 7** | **PCS 7 Server** | **PCS 7-FF** |
| **TAGs contained** | **1** | **4** | **4 + 50** | **4 + 100** | **4 + 100** | **4 + 100** | **4 + 100** | **4 + 100** |
| Project: Create offline | ● | ● | ● | ● | ● | ● | ● | ● |
| Project: Usable TAG extensions | – | ● | ● | ● | ● | ● | ● | ● |
| Project: Process device network view | ● | ● | ● | ● | ● | ● | ● | ● |
| Project: Process device plant view | ● | ● | ● | ● | ● | ● | ● | ● |
| Project: Export/import devices | – | – | ● | ● | – | – | – | – |
| Project: Export/import parameters | – | o | ● | ● | ● | ● | ● | ● |
| Project: HW Config | – | o | o | o | ● | ● | ● | ● |
| Project: Utilization of SIMATIC PDM options | – | ● | ● | ● | ● | ● | ● | ● |
| Project: Integration in STEP 7/PCS 7 | – | o | o | o | ● | ● | ● | ● |
| Group operations | – | o | o | ● | o | ● | ● | ● |
| Setting device IDs | – | o | o | ● | o | ● | ● | ● |

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## Design (continued)

| Product range | SIMATIC PDM V9.1 Single Point | Basic | Service | Stand alone Server | S7 | PCS 7 | PCS 7 Server | PCS 7-FF |
|---|---|---|---|---|---|---|---|---|
| Communication: HART modem | ● | ● | ● | ● | ● | – | – | – |
| Communication: HART interface | ● | ● | ● | ● | ● | – | – | – |
| Communication: PROFIBUS DP/PA | ● | ● | ● | ● | ● | ● | ● | ● |
| Communication: HART over PROFIBUS DP | ● | ● | ● | ● | ● | ● | ● | ● |
| Communication: FF H1 | – | – | – | – | o | o | o | ● |
| Communication: Modbus | ● | ● | ● | ● | ● | ● | ● | ● |
| Communication: Ethernet | ● | ● | ● | ● | ● | ● | ● | ● |
| Communication: PROFINET | ● | ● | ● | ● | ● | ● | ● | ● |
| Communication: HART over PROFINET | ● | ● | ● | ● | ● | ● | ● | ● |
| Devices: Export/import parameters | – | o | o | ● | ● | ● | ● | ● |
| Devices: Comparison of parameter values | – | o | o | ● | ● | ● | ● | ● |
| Devices: Saving parameters | ● | ● | ● | ● | ● | ● | ● | ● |
| Devices: Change log (Audit Trail) | – | o | o | ● | ● | ● | ● | ● |
| Devices: Calibration report | – | o | o | ● | ● | ● | ● | ● |
| Devices: Print function | ● | o | o | ● | ● | ● | ● | ● |
| Devices: Document manager | – | o | o | ● | ● | ● | ● | ● |
| Lifelist: Basic functionality | ● | ● | ● | ● | ● | ● | ● | ● |
| Lifelist: Expanded functionality (scan range, diagnostics, export, addressing) | – | o | o | ● | ● | ● | ● | ● |
| Communication: Data record routing | – | o | o | o | o | ● | ● | ● |
| Communication: HART multiplexer | – | o | o | o | o | – | – | – |
| Communication: WirelessHART | – | o | o | o | o | – | – | – |
| Function: HART SHC mode (increased communication speed) | ● | ● | ● | ● | ● | ● | ● | ● |
| Function: Device parameterization on PCS 7 maintenance station clients | – | o | o | o | o | o | ● | o |
| Function: Device parameter assignment on SIMATIC PDM clients | – | o | o | ● (2 ×) | o | o | o | o |

SIMATIC PDM overview of functions and features
● Product component is part of the product package
o Optional product component for the product package; order additive
– Product component is not relevant for the product package or not available

***SIMATIC PDM Stand alone product packages***

SIMATIC PDM Single Point V9.1

This minimum configuration with handheld functionality is intended for handling exactly *one* field device via point-to-point coupling. It cannot be expanded with functions or with SIMATIC PDM TAG or SIMATIC PDM 1 Client licenses. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

The functionality is matched accordingly. The device functions are supported as defined in the device description, for example:

- Managing the device library and unlimited device selection
- Parameter assignment and diagnostics according to the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist
- Printing the parameter list

SIMATIC PDM Basic V9.1

SIMATIC PDM Basic is for local service and parameter assignment stations on any computers (IPC/notebook) with local connection to bus segments or direct connection to the device.

Supported communication types:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic is equipped with all basic functions required for operation and parameter assignment of devices. That is, compared to SIMATIC PDM Single Point, it has the following additional functions:

- EDD-based diagnostics in the lifelist

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**Design** (continued)

- Memory function (only exporting and importing of parameter data)
- Report function
- Communication with HART field devices via remote I/Os

As a basic block for an individual configuration, SIMATIC PDM Basic can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs. SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

The SIMATIC PDM Extended option allows the activation of additional SIMATIC PDM system functions (for details, see SIMATIC PDM Extended V9.1 under "Optional product components").

SIMATIC PDM Service V9.1

With this product package for extended service, local service and parameter assignment stations can be realized on any type of computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 50 SIMATIC PDM TAGs

Like SIMATIC PDM Basic, SIMATIC PDM Service can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option. It is permitted to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged for according to the objects configured in the process device plant view as follows:

- 10 SIMATIC PDM TAGs per S7 DSGW (data record gateway) with one PROFIBUS subnet
- 20 SIMATIC PDM TAGs per S7 DSGW with more than one PROFIBUS subnet
- 10 TAGs per IE/PB Link
- 1 TAG per field device (except in the case of special specifications)

SIMATIC PDM stand-alone server V9.1

With the SIMATIC PDM Stand alone Server product package, you can establish central service and parameter assignment stations that operate according to the client/server principle. Portals opened on licensed SIMATIC PDM clients (SIMATIC PDM sessions) enable handling of production plant field devices via the SIMATIC PDM server on the plant bus assigned via registration. The product package can be used multiple times within a plant, e.g. for various plant units. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM Server
- 2 × SIMATIC PDM 1 Client
- 100 SIMATIC PDM TAGs

SIMATIC PDM Stand alone Server can be expanded with all functional SIMATIC PDM options (PDM Routing only in combination with PDM Integration in STEP 7/PCS 7 required) as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses besides the SIMATIC PDM clients. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components". For user management of the SIMATIC PDM clients, the SIMATIC Logon product is also required. It is possible to upgrade to another product version.

Note: For use of gateways and for PROFINET or Ethernet communication with field devices, SIMATIC PDM TAG licenses are charged according to the objects configured in the process device plant view (for details, see corresponding note under SIMATIC PDM Service V9.1).

***SIMATIC PDM system-integrated product packages***

SIMATIC PDM S7 V9.1

The SIMATIC PDM S7 product package designed for use in a SIMATIC S7 configuration environment is intended for setup of a local SIMATIC S7 engineering and service station. It requires the installation of STEP 7 V5.5+SP4. It includes:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1 000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 V9.1

The SIMATIC PDM PCS 7 product package suitable for use in a SIMATIC PCS 7 configuration environment is intended for use in a central SIMATIC PCS 7 engineering and service station. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM Server as well as with cumulative SIMATIC PDM TAGs (sets of 10, 100 or 1000) (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

SIMATIC PDM PCS 7 Server V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7 Server product package expanded with the SIMATIC PDM Server option can also be used for a central SIMATIC PCS 7 engineering and service station. Field devices integrated using an Electronic Device Description (EDD) can then be assigned parameters on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. The following are components of SIMATIC PDM PCS 7 Server:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing

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**Design** (continued)

- SIMATIC PDM Server
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 Server can be expanded with the functional option SIMATIC PDM Communication FOUNDATION Fieldbus as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs and SIMATIC PDM 1-Client licenses (see "Optional product components"). The portals opened on these clients (SIMATIC PDM sessions) must also be licensed with the SIMATIC PDM 1-client licenses besides the SIMATIC PDM clients. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM PCS 7-FF V9.1

Instead of SIMATIC PDM PCS 7, the SIMATIC PDM PCS 7-FF product package expanded with the SIMATIC PDM Communication FOUNDATION Fieldbus option can also be used for a central SIMATIC PCS 7 engineering and service station. This additionally supports parameter assignment of field devices on FOUNDATION Fieldbus H1. Components of SIMATIC PDM PCS 7-FF are:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7-FF V9.1 can be expanded with the functional option SIMATIC PDM Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs (see "Optional product components"). SIMATIC PDM 1 Client licenses (sets of 1) can also be added in combination with the SIMATIC PDM Server option.

***Optional product components***

SIMATIC PDM Extended V9.1 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- Extended information in the Lifelist
- Export and import functions
- Print functions
- Document manager
- Comparison function
- Group operations
- Setting device IDs

This functionality is already integrated in the following product packages: SIMATIC PDM Stand alone Server, SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server and SIMATIC PDM PCS 7-FF.

SIMATIC PDM Integration option in STEP 7/PCS 7 V9.1

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM System-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM Routing V9.1 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing can be used in combination with SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF. SIMATIC PDM Routing can be additionally installed as an option on a local SIMATIC S7 engineering and service station with SIMATIC PDM S7.

SIMATIC PDM Server V9.1 option

The server functionality can be activated in a local or central service station with this option. It enables parameter assignment of selected field devices on any client of the SIMATIC PCS 7 Maintenance Station as well as on local SIMATIC PDM clients. This functionality is already integrated in the SIMATIC PDM Stand alone Server and SIMATIC PDM PCS 7 Server. The SIMATIC PDM clients as well as the portals opened on these clients (SIMATIC PDM sessions) must be licensed with SIMATIC PDM 1 client licenses. For details about this, refer to "SIMATIC PDM 1 Client" under "Optional product components".

SIMATIC PDM Communication FOUNDATION Fieldbus V9.1 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

SIMATIC PDM HART Server V9.1 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, WirelessHART field devices can also be parameterized with SIMATIC PDM.

***SIMATIC PDM TAGs (version-independent)***

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM TAG corresponds to a SIMATIC PDM object that represents the individual field devices or field components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. SIMATIC PDM TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

***SIMATIC PDM 1 Client (version-independent)***

SIMATIC PDM 1 Client is a cumulative single-client license for SIMATIC PDM configurations with SIMATIC PDM Server, for example SIMATIC PDM Stand alone Server or SIMATIC PDM PCS 7 Server. The license is used to activate registered SIMATIC PDM clients and SIMATIC PDM sessions (opened portals) on these clients.

Each "SIMATIC PDM 1 Client" license activates one SIMATIC PDM client with one SIMATIC PDM session. A SIMATIC PDM session is defined as one opened portal together with the parameter views of the field devices opened from the portal. Each additional simultaneously opened SIMATIC PDM session on this client requires its own "SIMATIC PDM 1 Client" license. For larger projects, up to 30 registered SIMATIC PDM Clients are possible.

The "SIMATIC PDM 1 Client" license must be transferred to the computer with the SIMATIC PDM Server. The SIMATIC PDM Standalone Server product package comes with 2 "SIMATIC PDM 1 Client" licenses.

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**Design** (continued)

***SIMATIC PDM Software Media Package V9.1***

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, a SIMATIC PDM Software Media Package is supplied together with each ordering item when supplied via "Goods delivery" (not with optional product components). Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

- Stand alone mode
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

***Information on ordering and delivery***

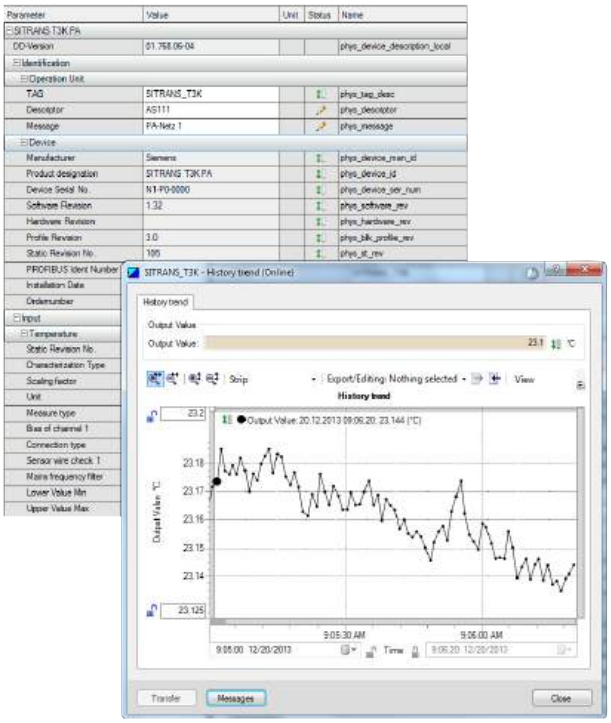
Installation software for the SIMATIC PDM is provided in the form of a software media package. Software media packages and product-specific software licenses are separate packages, which are not merged into a single delivery unit for a goods delivery.

The number of delivered software media packages can be determined by the number of ordered items. You can find more information under "Goods delivery" in the "Software Media and Logistics" section, "PCS 7 Software Packages" subsection in the ST PCS 7 catalog.

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## Function




SIMATIC PDM, parameter view and trend window

***SIMATIC PDM core functions***

- Creation of project-specific device libraries
- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

## Integration

***Device integration***

SIMATIC PDM supports all devices defined by the Electronic Device Description (EDD) and devices described by Field Device Integration Technology (FDI Technology V1.2). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time, it is the guideline of the established organizations for

- PROFIBUS and PROFINET (PI – PROFIBUS & PROFINET International)
- HART (FCG: Field Communication Group)
- Foundation Fieldbus (FCG: Field Communication Group)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or through the libraries of the FCG. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD or FDI device description packages in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. By simply importing the manufacturer's device-specific device description packages, you can update existing devices and integrate further devices in SIMATIC PDM.

***Technical support***

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

Contacts in the Region

The Technical Support responsible for your Region can be found on the Internet at:

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## Selection and ordering data

| | |
|---|---|
| **SIMATIC PDM Stand alone product packages** | |
| ***Minimum configuration*** | |
| **SIMATIC PDM Single Point V9.1**<br>including 1 TAG; product package for operation and configuration of one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET<br>Additional functions or SIMATIC PDM TAGs are not possible<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3HA68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3HA68-0YH5** |
| ***Basic configuration for individual product package as well as local service and parameter assignment stations*** | |
| **SIMATIC PDM Basic V9.1**<br>including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3AB68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3AB68-0YH5** |

## Selection and ordering data (continued)

| | |
|---|---|
| ***Configuration for local service and parameter assignment station*** | |
| **SIMATIC PDM Service V9.1**<br>Product package for service and measuring circuit tests on a local service station, with<br>• SIMATIC PDM Basic incl. 4 TAGs<br>• 50 TAGs<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3JD68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3JD68-0YH5** |
| ***Configuration for central service and parameter assignment station*** | |
| **SIMATIC PDM stand-alone server V9.1**<br>Product package for service and device management in plant units, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM Server<br>- 2 × SIMATIC PDM 1 Client<br>- 100 TAGs<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3TX68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3TX68-0YH5** |
| **SIMATIC PDM system-integrated product packages** | |

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## Selection and ordering data (continued)

| | |
|---|---|
| ***Configuration for local SIMATIC S7 engineering and service station*** | |
| **SIMATIC PDM S7 V9.1**<br>Product package for use in a SIMATIC S7 configuration environment, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM Integration in STEP 7/PCS 7<br>- 100 TAGs<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3KD68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3KD68-0YH5** |
| ***Configuration for central SIMATIC PCS 7 engineering and service stations*** | |
| **SIMATIC PDM PCS 7 V9.1**<br>Product package for use in a SIMATIC PCS 7 configuration environment<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)<br>Floating license for 1 user, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM Integration in STEP 7/PCS 7<br>- SIMATIC PDM Routing<br>- 100 TAGs<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3LD68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3LD68-0YH5** |

## Selection and ordering data (continued)

| | |
|---|---|
| **SIMATIC PDM PCS 7-FF V9.1**<br>Product package for use in a SIMATIC PCS 7 configuration environment, including FOUNDATION Fieldbus H1 communication<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)<br>Floating license for 1 user, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM Integration in STEP 7/PCS 7<br>- SIMATIC PDM Routing<br>- SIMATIC PDM Communication FOUNDATION Fieldbus<br>- 100 TAGs<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3MD68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3MD68-0YH5** |
| **SIMATIC PDM PCS 7 Server V9.1**<br>Product package for use in a SIMATIC PCS 7 configuration environment, including server functionality<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)<br>Single license for 1 installation, with<br>- SIMATIC PDM Basic incl. 4 TAGs<br>- SIMATIC PDM Extended<br>- SIMATIC PDM Integration in STEP 7/PCS 7<br>- SIMATIC PDM Routing<br>- SIMATIC PDM Server<br>- 100 TAGs<br>Without SIMATIC PCS 7 Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License, bundle with 1 × SIMATIC PDM Software Media Package per order item | **6ES7658-3TD68-0YA5** |
| • Online delivery<br>License key download and online Certificate of License combined with SIMATIC PDM Software Media Package (SIMATIC PDM and device library software download)<br>: Email address required! | **6ES7658-3TD68-0YH5** |

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## Selection and ordering data (continued)

| Optional product components for SIMATIC PDM | |
|---|---|
| **SIMATIC PDM Extended V9.1**<br>For enabling additional system functions<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | 6ES7658-3NX68-2YB5 |
| • Online delivery<br>(without SIMATIC PCS 7/SIMATIC PDM Software Media Package)<br>License key download and online Certificate of License<br>: Email address required! | 6ES7658-3NX68-2YH5 |
| **SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V9.1**<br>For integration in a SIMATIC S7/SIMATIC PCS 7 configuration environment<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | 6ES7658-3BX68-2YB5 |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | 6ES7658-3BX68-2YH5 |
| **SIMATIC PDM Routing V9.1**<br>For plant-wide navigation to field devices<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | 6ES7658-3CX68-2YB5 |
| • Online delivery<br>License key download, online Certificate of License<br>: Email address required! | 6ES7658-3CX68-2YH5 |

## Selection and ordering data (continued)

| | |
|---|---|
| **SIMATIC PDM Server V9.1**<br>For activating the server functionality<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), single license for 1 installation<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive, Certificate of License | 6ES7658-3TX68-2YB5 |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | 6ES7658-3TX68-2YH5 |
| **SIMATIC PDM Communication FOUNDATION Fieldbus V9.1**<br>For communication with field devices on FOUNDATION Fieldbus H1<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | 6ES7658-3QX68-2YB5 |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | 6ES7658-3QX68-2YH5 |
| **SIMATIC PDM HART Server V9.1**<br>For using HART multiplexers as well as for configuration of WirelessHART field devices<br>6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information), floating license for 1 user<br>Without SIMATIC PCS 7/SIMATIC PDM Software Media Package | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | 6ES7658-3EX68-2YB5 |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | 6ES7658-3EX68-2YH5 |

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## Selection and ordering data (continued)

| | |
|---|---|
| **SIMATIC PDM 1 Client**<br>Cumulative client license for SIMATIC PDM configurations with SIMATIC PDM Server, software class A, single license for 1 installation | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | **6ES7658-3UA00-2YB5** |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | **6ES7658-3UA00-2YH5** |
| **SIMATIC PDM TAGs**<br>TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user | |
| • Goods delivery<br>License key on USB flash drive and Certificate of License | |
| - 10 TAGs | **6ES7658-3XC00-2YB5** |
| - 100 TAGs | **6ES7658-3XD00-2YB5** |
| - 1 000 TAGs | **6ES7658-3XE00-2YB5** |
| • Online delivery<br>License key download and online Certificate of License<br>: Email address required! | |
| - 10 TAGs | **6ES7658-3XC00-2YH5** |
| - 100 TAGs | **6ES7658-3XD00-2YH5** |
| - 1 000 TAGs | **6ES7658-3XE00-2YH5** |
| SIMATIC PDM Software Media Package | |
| **SIMATIC PDM Software Media Package V9.1**<br>Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows 7 Ultimate 64-bit, Windows 10 Enterprise 2015 LTSB 64-bit, Windows Server 2012 R2 Standard 64-bit or Microsoft Windows Server 2016 Standard 64-bit (see SIMATIC PDM V9.1 Readme for latest information)<br>Without SIMATIC PCS 7 Software Media Package<br>Note:<br>Can only be used in conjunction with a valid license or in demo mode! | |
| • Goods delivery<br>SIMATIC PDM and device library software on DVD | **6ES7658-3GX68-0YT8** |
| • Online delivery<br>SIMATIC PDM and device library software download<br>: Email address required! | **6ES7658-3GX68-0YG8** |

## Technical specifications

| SIMATIC PDM V9.1 | |
|---|---|
| Hardware | • PG/PC/notebook with processor corresponding to operating system requirements |
| Operating system (alternatives) | • Windows 7 Professional/Ultimate/Enterprise SP1 32-bit/64-bit<br>• Windows 10 Enterprise 2015 LTSB 64-bit<br>• Windows Server 2012 R2 SP1 Standard Edition, 64-bit<br>• Microsoft Windows Server 2016 Standard 64-bit |
| Integration in STEP 7/PCS 7 | • SIMATIC PCS 7 V8.0+SP2/V8.1/V8.2 (without Communication FOUNDATION Fieldbus)<br>• SIMATIC PCS 7 V9.0<br>• STEP 7 V5.5+SP4/V5.6 |
| SIMATIC PDM Client | • Microsoft Internet Explorer 10 or 11<br>• Google Chrome |

## More information

***Update/Upgrade***

Existing installations based on SIMATIC PDM V6.x or V8.x/V9.0 (including SP in each case) can be upgraded straight to V9.1 with upgrade packages.

Projects with SIMATIC PDM V7.0 can only be upgraded to version 9.1 by first upgrading to version 8.0. Two upgrade packages are offered for SIMATIC PDM V8.x/V9.0:

- SIMATIC PDM Upgrade Package Basic[1)] (with/without SIMATIC PDM HART Server option in each case) for configurations based on:
  - SIMATIC PDM Basic
  - SIMATIC PDM Service
  - SIMATIC PDM S7
  - SIMATIC PDM PCS 7
- SIMATIC PDM Upgrade Package Complete[1)] for configurations based on:
  - SIMATIC PDM PCS 7 Server
  - SIMATIC PDM PCS 7-FF

[1)] Optional product components for SIMATIC PDM such as PDM Extended, PDM Integration in STEP 7/PCS 7, PDM Routing, PDM Server and PDM Communication FOUNDATION Fieldbus are each included in a product package listed in the SIMATIC PDM Upgrade Package Basic or SIMATIC PDM Upgrade Package Complete and are implicitly authorized to be updated via the corresponding license. The SIMATIC PDM Upgrade Package Complete is required for use of the product components PDM Server or PDM Communication FOUNDATION Fieldbus.

For more information, see the section "Update/upgrade packages", "Updates/upgrades asynchronous to the PCS 7 version" - "Upgrades SIMATIC PDM".

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## Overview




SITRANS DTM provides an easy way for Field Device Tool (FDT)/ Device Type Manager (DTM) users to parameterize Siemens Instruments using international standards.

## Benefits

- Same look and feel for all Siemens field instruments
- Support for Quick start wizards and other dialog boxes
- Quick overview using table and tree views
- Online and offline configuration
- Conformity to IEC profiles for HART and PROFIBUS

## Application

Electronic Device Description (EDD) is a proven way to describe the behavior and functionality of field instruments and other automation components.

For many years, EDD-based tools such as SIMATIC PDM from Siemens or handheld communicator have been used successfully in the process industry. Some years ago, an additional technology called FDT / DTM with the same approach was introduced to the market. To support the FDT DTM Technology for Siemens devices, the software SITRANS DTM has been developed which combines both technologies, EDD and FDT.

SITRANS DTM uses EDDs as the device description and provides the DTM interface to allow the integration of our field instruments into FDT-frame applications.

The following field instruments are currently available in SITRANS DTM:

- SITRANS TH300 HART
- SITRANS TH400 PA
- SITRANS P300 HART
- SITRANS P DSIII HART
- SITRANS P F M MAGFLO MAG6000 DP/PA
- SITRANS F C MASSFLO MASS6000 PA/PA
- SITRANS PROBE LU HART 6 m, 12 m
- SITRANS LR200 HART, PA
- SITRANS LR250 HART, PA
- SITRANS LR260 HART, PA
- SITRANS LR560 HART, PA
- SIPART PS2 HART, PA

Additionally, the SIPART PS2 FF has a DTM.

## Technical specifications

| SITRANS DTM | |
|---|---|
| Current Version | 3.1 |
| Compatible with PACTware versions | 3.6, 4.0, 4.1 |
| Compatible with Windows | XP, 7 |
| Certified by FDT group | Yes |

Free DTM software can be downloaded here:

- SITRANS DTM V3.1: https://support.industry.siemens.com/cs/document/53754140/software%3A-sitrans-dtm-v3-1?dti=0&lc=de-WW
- SITRANS DTM V4.1: https://support.industry.siemens.com/cs/document/109484287/sitrans-dtm-v4-1?dti=0&lc=de-WW

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## Overview



The SITRANS Library for SIMATIC PCS 7 extends the standard functionality of the SIMATIC PCS 7 process control system concentrated in the SIMATIC PCS 7 Advanced Process Library (APL) with technological blocks and faceplates for device-specific functions of the SITRANS field devices.

## Benefits

The SITRANS Library allows you to easily operate all device functions, such as dosing, totalizer, min/max pointer, path diagnostic, alarm diagnostics, zero point adjustment (ZPA), etc. In addition, process related diagnostic information is also provided.

The SITRANS Library is based on the modern design of the Advanced Process Library (APL). Together with the APL, the SITRANS Library enables you to create harmonic overall solutions with a consistent look & feel and optimum use of the functions of the SITRANS field devices in many industries.

It helps accelerate the engineering process, reduces the time-to-market, and simplifies process control.

Note:

SITRANS Library V13 will support PCS 7 9.1 SP1 or higher.

## Application

The SITRANS Library is best used in combination with SIMATIC PCS 7 and SITRANS field devices.

A current list of SITRANS field devices and the supported SIMATIC PCS 7 versions is available at
http://new.siemens.com/sitranslibrarypcs7devices

The SITRANS Library can be used for all core sectors of the process industry. These are:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- Glass and solar
- Oil & gas
- Food and beverage industry
- Minerals and mining

## Design

The product structure is geared toward the operational environment in the SIMATIC PCS 7 process control system. Consequently, SITRANS Library is offered in the form of an engineering component:

- SITRANS Library users can use the library with their supported PCS 7 version. No additional licenses are required for Engineering or OS runtime.

The SITRANS Library product component enables you to perform configuration work on a SIMATIC PCS 7 engineering station.

The SITRANS Library product component allows you to run blocks from a library on an automation system.

When using function blocks from SITRANS Library in SIMATIC PC 7 automation systems, please note that SIMATIC PCS 7 AS Runtime POs are also booked.

## Function

***SITRANS Library for SIMATIC PCS 7***

Sublibrary for the functional expansion of the SIMATIC PCS 7 Advanced Process Library with:

- Function blocks and faceplates for SITRANS field devices with S7-400 and S7 -410 systems.

The function blocks are configured in CFC.

Operator control and monitoring from a panel is configured with the panel interface blocks for the SITRANS F M MAG 6000 DP. Taking operating rights and hierarchical operating concepts (multi-control room operation) into consideration, the technological function can then be operated from both an operator station and a Touch Panel.

For detailed information on which field devices, which systems and system versions are supported as well as on the free download, see:

http://new.siemens.com/sitranslibrarypcs7devices

## Selection and ordering data

| Selection and ordering data | Article No. |
|---|---|
| **SITRANS Library**<br>Block library for SIMATIC PCS 7 as of V13.0 with function blocks and faceplates as well as electronic documentation.<br>The following operating systems are supported by SIMATIC PCS 7 V9.1 SP1:<br>• Windows 10 Enterprise LTSC 2019<br>• Windows Server 2019 Standard Edition<br>• Windows Server 2019 Datacenter Edition<br>Engineering license for one customer plant<br>Type of delivery: free download | **7MP2990-0AA00** |

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## Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the process engineering industry. It is only with fieldbuses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnostics options and remote parameterization.

Like PROFIBUS PA, the FF bus (FOUNDATION Fieldbus) is an open field bus with a large installed base for a wide range of application. Standardization according to IEC 61158 / EN 50170 provides you with future protection for your investment.

## Benefits

- A uniform modular system from the sensor to the connection to the control level enables new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators, etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint energy supply and data transfer
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices, also cross-vendor
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnostics options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

## Application

The transfer technology of the FOUNDATION Fieldbus is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

FOUNDATION Fieldbus can just as readily be used in standard environments as in hazardous areas. For use in hazardous areas, FOUNDATION Fieldbus and all connected devices have to be designed with type of explosion protection Ex [i].

## Function

FOUNDATION Fieldbus enables the direct connection of actuators and sensors.

FOUNDATION Fieldbus is based on a transfer optimized for intrinsically safe application. The transfer technology is internationally standardized in IEC 61158.

For FOUNDATION Fieldbus the data and energy supply for the field devices can be directed through a 2-wire cable.

FOUNDATION Fieldbus enables device-to-device communication ("control in the field").

## Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using Foundation Fieldbus:

Measuring instruments for pressure

SITRANS P300

SITRANS P DS III

SITRANS P410

Measuring instruments for temperature

SITRANS TH400

Electropneumatic positioners

SIPART PS2

Flow meters

SITRANS F M MAG 6000

SITRANS F M MAG 6000 I / I Ex

SITRANS F C MASS 6000

Level meters

SITRANS LR250

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## Overview

HART is a widely used communication standard for field devices. HART devices are specified by the FieldComm Group.

The HART standard expands the analog 4 to 20 mA signal to modulated, industry-tested, digital signal transmission.

## Benefits

- Tried-and-tested analog measured value transmission
- Simultaneous digital communication with bidirectional data transfer
- Possibility to transfer multiple measured variables from a field device (e.g. diagnostics, maintenance and process information)
- Connection to higher-level systems such as PROFIBUS DP.
- Easy installation and commissioning

Benefits in connection with SIMATIC PDM

- Manufacturer-neutral operation of all HART devices through standardized parameter sets
- HART field devices described by HART DLL are integrated in SIMATIC PDM via the Fieldcomm catalog. HART-DD (Device Description) in SIMATIC PDM standardized, manufacturer-neutral and very widely used. Additional field devices are integrated in SIMATIC PDM via EDD (Electronic Device Description)
- Simple operation and commissioning of field devices, even in usage locations that are difficult to access
- Advanced diagnostics, evaluating and logging functions

## Application

Devices can be connected in different ways:

- Through the distributed I/O
  - SIMATIC ET 200M, ET 200SP
  - SIMATIC ET 200iSP with the HART modules

  or with analog modules 4 to 20 mA and HART Handheld Communicator,
- via a HART modem with which a point-to-point connection between the PC or Engineering System and the HART device can be established
- via HART multiplexers which are contained in the HART server of the HCF.

## Integration

Siemens field devices listed in this catalog for process automation that can be controlled with HART:

Measuring instruments for pressure
SITRANS P300
SITRANS P310
SITRANS P320
SITRANS P DS III
SITRANS P410
SITRANS P420
SITRANS P500

Measuring instruments for temperature
SITRANS TF
SITRANS TH300
SITRANS TH320
SITRANS TH420
SITRANS TR300
SITRANS TR320
SITRANS TR420
SITRANS TW

Flow meters
SITRANS F M MAG 5000
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M TRANSMAG 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS F C FCT030
SITRANS F S FST030
SITRANS FUS060
SITRANS FX300
SITRANS FX330

Level meters
SITRANS Probe LR
SITRANS Probe LU
SITRANS LUT400
SITRANS Probe LU240
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560
SITRANS LG 240 / LG 250 / LG 260 / LG270

Electropneumatic positioners
SIPART PS2

Power supply units and isolation amplifiers
SITRANS I

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## Overview

Today, distributed automation solutions based on open fieldbuses are standard in many areas of the manufacturing industry and in process engineering. It is only with fieldbuses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnostics options and remote parameterization.

Today, PROFIBUS is the most successful open fieldbus with a large installed base for a wide range of applications. Standardization according to IEC 61158 / EN 50170 provides you with future protection for your investment.

## Benefits

- Fully modular system, from the sensor through to the control level, permits new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators, etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint power supply and data transfer
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also with multi-vendor support)
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnostics options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured value in the field device already, hence no rescaling necessary in SIMATIC PCS 7

## Application

PROFIBUS is suitable for fast communication with distributed I/O (PROFIBUS DP) in production automation as well as for communication tasks in process automation (PROFIBUS PA). It is the first fieldbus system that meets the demands of both areas with identical communication services.

The transfer technology of PROFIBUS PA is tailored to the requirements of the process industry. The standardized communications services guarantee interoperability between multi-vendor field devices and remote configuration of the field devices during operation.

With SIMATIC PDM (Process Device Manager), a universal tool that is not manufacturer-specific and is used for configuring, parameterizing, commissioning and diagnosing intelligent process devices on PROFIBUS, a variety of process devices of different manufacturers can be configured using a uniform graphic user interface.

PROFIBUS PA can be used both in standard environments and in hazardous areas. For use in hazardous areas, PROFIBUS PA and all connected devices have to be designed with type of protection Ex [i].

The uniform protocol of PROFIBUS DP and PROFIBUS PA enables the linking of both networks and thus the combination of timing performance and intrinsically safe transmission technology.

## Function

PROFIBUS PA expands PROFIBUS DP with process-level components for direct connection of actuators and sensors. With PROFIBUS PA, the RS 485 transmission method is replaced by a different transmission method optimized for intrinsically safe applications. Both methods are standardized internationally in IEC 61158.

PROFIBUS PA uses the same communication protocol as PROFIBUS DP; communication services and frames are identical.

With PROFIBUS PA, the information and energy supply for supplying the field devices can be conducted via a 2-wire cable.

## Integration

Siemens field devices for process automation listed in this catalog that can be controlled with PROFIBUS:

***PROFIBUS PA***

Measuring instruments for pressure
SITRANS P300
SITRANS P DS III
SITRANS P410

Measuring instruments for temperature
SITRANS TH400

Flow meters
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M TRANSMAG 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS FUS060

Level meters
Pointek CLS 200
Pointek CLS 300
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560

Electropneumatic positioners
SIPART PS2

Acoustic sensors for pump monitoring
SITRANS DA400

***PROFIBUS DP***

Measuring instruments for temperature
SITRANS TO500

Flow meters
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I
SITRANS F C MASS 6000 19" / IP67
SIFLOW FC070 (via ET 200M)

Level meters
HydroRanger 200
MultiRanger 100/200
SITRANS LU 01, LU 02, LU 10

Acoustic sensors for pump monitoring
SITRANS DA400

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| | |
|---|---|
| **9/1** | **Introduction** |
| **9/3** | **Lifecycle Services** |
| 9/3 | Remote Services for Process Instrumentation |
| 9/4 | Calibration Services |
| 9/5 | Lifecycle Management Suite |
| 9/6 | Inventory Baseline Services |
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| 9/9 | Managed System Services |
| 9/11 | Preventive System Analysis |
| 9/12 | Asset Optimization Services |
| 9/13 | Lifecycle Services Contract |

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## Overview

***Ensure business success with Digital Enterprise Services***

Increasing demands make it ever more important that industrial plants operate at highest productivity and efficiency levels. Digital Enterprise Services provides industry businesses with the vital competitive edge.

Whether it's production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries. All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant.

Right from the earliest stages of planning, engineering, and building all the way to operation and modernization, these services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise. Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

## More information

Fore more information please visit us via:
www.siemens.com/digital-enterprise-services

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## Overview

Optimal system-specific remote support and proactive remote services with globally available know-how from the product manufacturer based on state-of-the-art IT infrastructure.

***Your need:***

- Ensure engineering, commissioning and maintenance without significant in-house effort
- Complete transparency through central administration of all system accesses
- Sustainable remote solution concepts

***Our service offer:***

- Communication between customer system and Siemens IT via a common remote service platform
- Providing remote IT infrastructure, including support and maintenance
- Based on this, we offer our Remote Service

## Benefits

- Secure remote connection to SIMATIC TechSupport IT infrastructure
- Ensuring fast and worldwide availability of experts
- Innovative service concept thanks to industry-standard service and collaboration software
- Compatible with proven security concepts and TÜV/CERT certification of the Siemens cRSP (common Remote Service Platform) infrastructure

## Application

- SIMATIC PCS 7, PCS neo, Step 7, TIA Portal and devices of proccess automation

## More information

More information is available online at:
www.siemens.com/siremote

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# Calibration Services

## Overview

Ensuring operational readiness throughout the lifecycle by regularly certifying the accuracy of measurement equipment both offsite and onsite.

***Support:***

If you have questions about this service, please contact us.

***Your need:***

- Reliable calibration, measurement and testing of process instrumentation
- High quality engineering performance and related expertise
- Ensuring long-term and reliable performance of equipment and machinery

***Our service offer:***

- Offsite calibration: Wide range of calibrations for dimension, electronics and process instruments remotely
- Onsite calibration: Maintenance of measuring devices on site to avoid longer down times
- Traceable calibration for measuring equipment of all manufacturers by Siemens Industrial Laboratory (SIRENT) with accreditation by national accreditation body of the Federal Republic of Germany (DAkkS)

## Benefits

- Complying with norms, guidelines and legal specifications while calibrating for quality assurance according to ISO 9000
- Verfication of billing measurements (cold water, flow of heat/cold segments)
- Early fault detection and determination of the operational reliability of measuring equipment

## Application

- Process instrumentation field devices.

## Options

| | Pressure | Temperature | Flow | Dynamic Weighing |
|---|---|---|---|---|
| Off-site Calibration according to ISO 9001 | ✓ | ✓ | ✓ | |
| Off-site Calibration according to ISO 17025 | ✓ | ✓ | ✓ | |
| Off-site Domestic Custody Transfer Verification | | | ✓ | |
| Off-site Calibration according to ISO 9001* | ✓ | ✓ | | ✓ |

*On-site services will be performed by local Siemens Customer Service. Please contact Siemens office in your region for further information.

## More information

More information is available here.

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## Overview

Lifecycle Management Suite is a COMOS MRO-based Computerized Maintenance Management System (CMMS). The pre-configured cloud-based system provides Standard Operation Procedures (SOP) in the form of checkpoints for lifecycle services assigned to SIMATIC PCS 7 system components and field devices of process instrumentation

***Support:***

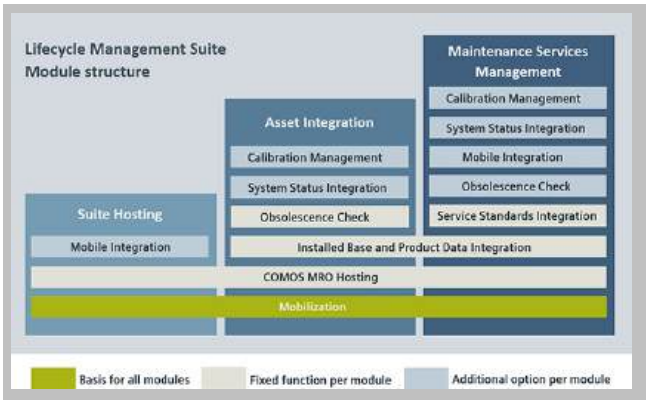
If you have questions about this service, please contact us.

***Your need:***

- Efficient maintenance of the plant and ensuring availability and serviceability of the control technology
- Feedback of service activities and continuous analysis of maintenance histories
- Availability of monitoring information also on mobile devices

***Our service offer:***

- COMOS MRO-based and pre-configured CMMS system with standard operation procedures
- Comprehensive range of calibration and verification functions for field devices
- Generation of maintenance, obsolescence and IT security reports




Lifcycle Management Suite

## Benefits

- Full transparency thanks to effective import and analysis functions
- Fast system deployment through online setup
- Optimized maintenance and comprehensive asset lifecycle information

## Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658

## Options

| | |
|---|---|
| COMOS MRO-SW via cloud access for one year | 9LA1110-5CA00-0AA0 |
| COMOS MRO-SW and asset management functions via cloud access for 1 year | 9LA1110-5CA00-0BA0 |
| COMOS MRO-SW and maintenance management functionalities via cloud access for 1 year | 9LA1110-5CA00-0CA0 |
| Integration for PCS 7 >= V8.x | 9LA1110-5CA00-1AA0 |
| iBase Integration PCS 7 (Interface SAS DC) | 9LA1110-5CA00-1AB0 |
| Service standards- Integration PCS 7 | 9LA1110-5CA00-1AC0 |
| 10x Obsolescence Checks | 9LA1110-5CA00-1AD0 |
| System Status Integration (Analyzer Results) | 9LA1110-5CA00-1AE0 |
| Integration of COMOS Mobile Operations (1 Authorized Named User) for "Territory" | 9LA1110-5CA00-1MA0 |

***Options and Extensions:***

| | |
|---|---|
| Additional 1 floating license COMOS MRO for 3 Authorized Named Users for "Territory" Extension | 9LA1110-5CA00-1BA0 |
| Additional 1 Authorized Named User for an existing floating license for "Territory" | 9LA1110-5CA00-1BB0 |
| Mobilization "Suite Hosting" | 9LA1110-5CA00-1CA0 |
| Mobilization "Asset Integration" (remote) | 9LA1110-5CA00-1CB0 |
| Mobilization "Maintenance Services Management" (remote) | 9LA1110-5CA00-1CC0 |
| Additional Technical Support 10 h/Subscription Cycle | 9LA1110-5CA00-1CD0 |

## More information

More information is available online here.

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## Overview

Inventory Baseline Services show which products are used where in the system and represent the lifecycle status of the automation system. The system information is comprehensively recorded and the plant situation is transparently displayed.

***Support:***

If you have questions about this service, please contact us: services.automation@siemens.com

***Your need:***

- Knowledge of the current inventory for planning and preparation of further service measures
- Standardized and complete recording of all installed automation components
- Simultaneously lowest possible time and cost expenditure

**Our service offer**:

- Cost-efficient, data-based inventory of the automation system
- Transparent overview of the currently installed system inventory and the spare parts stock
- Supply of the result through standardized reports
- Professional evaluation by Siemens experts

## Benefits

- Decision support for planning future maintenance and modernization measures
- Data basis for further lifecycle services, e.g., SIMATIC System Audit, Lifecycle Information Services or Asset Optimization Services
- Preparation for updates or upgrades

## Application

SIMATIC PCS 7, SIMATIC PCS neo, Step 7, WinCC, 6ES7658

## Selection and ordering data

| | |
|---|---|
| **Complete execution of the service for automation systems** | **9LA1110-8AJ00-1AA0** |
| **Only the evaluation of the delivered data for automation systems** | **9LA1110-8AJ00-2AA0** |
| **Evaluation of additional 20 PCs or VMs** | **9LA1110-8AJ00-4AA0** |
| ***Complete service execution for the process instruments*** | **9LA1110-8AJ00-1AB0** |
| ***Only the evaluation of the delivered data for process instruments*** | **9LA1110-8AJ00-2AB0** |

## Options

***Automation systems***

| | |
|---|---|
| Complete execution of the data collection of the installed base on site by Siemens and data evaluation (available only for Germany) | 9LA1110-8AJ00-1AA0 |
| Evaluation of the installed base, collected with the SAS DC tool (SIMATIC Assessment Suite Data Collector) | 9LA1110-8AJ00-2AA0 |
| Extension of the data collection and analysis with additional 20 PCs or VMs | 9LA1110-8AJ00-4AA0 |

***Process instrumentation (field devices)***

| | |
|---|---|
| Complete execution of the data collection of the installed base on site by Siemens and analysis of process instruments (available only for Germany) | 9LA1110-8AJ00-1AB0 |
| This service can only be ordered upon request, please contact us via e-mail: services.automation@siemens.com | |
| Evaluation of the installed base, collected with the SAS DC tool (SIMATIC Assessment Suite Data Collector) | 9LA1110-8AJ00-2AB0 |
| This service can only be ordered upon request, please contact us via e-mail: services.automation@siemens.com | |

## More information

More information is available at our product page.

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## Overview

Continuous supply with information regarding product cycle of deployed automatization components, product-related statistical failure rate as well as plant-specific information about upgrades/updates.

***Your need:***

- Protection of your plant investment
- Ensuring plant and machine avilability and serviceability
- Prevention of unplanned downtime or cost-intensive supply bottle-necks

***Our service offer:***

- Basic Information: focal point on fuctional obsolescence
- Extended Analysis: Analysis from the produced related statistical failure rate (MTBF)
- Comprehensive Operation: addition of plant specific information about upgrades/updates and recommended action

## Benefits

- Regular proactive service information for reducing obsolescene risks to a minimum
- Information about new functions in successor products provide pointers regarding optimization potential
- Utilization of new technological functions

## Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658

## Selection and ordering data

| Description | Article No. | Comments |
|---|---|---|
| • **Basic Information** < 50 article numbers | | |
| | **9LA1110-8AG10-1AA0** | - Once |
| | **9LA1110-8AG10-1AB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-1AC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-1AD0** | - Cyclically 4 × per year |
| • **Basic Information** 50-150 article numbers | | |
| | **9LA1110-8AG10-1BA0** | - Once |
| | **9LA1110-8AG10-1BB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-1BC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-1BD0** | - Cyclically 4 × per year |
| • **Basic Information** 150-300 article numbers | | |
| | **9LA1110-8AG10-1CA0** | - Once |
| | **9LA1110-8AG10-1CB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-1CC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-1CD0** | - Cyclically 4 × per year |
| • **Extended Analysis** < 50 article numbers | | |
| | **9LA1110-8AG10-2AA0** | - Once |
| | **9LA1110-8AG10-2AB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-2AC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-2AD0** | - Cyclically 4 × per year |
| • **Extended Analysis** 50-150 article numbers | | |
| | **9LA1110-8AG10-2BA0** | - Once |
| | **9LA1110-8AG10-2BB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-2BC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-2BD0** | - Cyclically 4 × per year |
| • **Extended Analysis** 150-300 article numbers | | |
| | **9LA1110-8AG10-2CA0** | - Once |
| | **9LA1110-8AG10-2CB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-2CC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-2CD0** | - Cyclically 4 × per year |
| • **Comprehensive Operation** < 50 article numbers | | |
| | **9LA1110-8AG10-3AA0** | - Once |
| | **9LA1110-8AG10-3AB0** | - Cyclically 1 × per year |

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## Selection and ordering data (continued)

| Description | Article No. | Comments |
|---|---|---|
| | **9LA1110-8AG10-3AC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-3AD0** | - Cyclically 4 × per year |
| • **Comprehensive Operation** 50-150 article numbers | | |
| | **9LA1110-8AG10-3BA0** | - Once |
| | **9LA1110-8AG10-3BB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-3BC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-3BD0** | - Cyclically 4 × per year |
| • **Comprehensive Operation** 150-300 article numbers | | |
| | **9LA1110-8AG10-3CA0** | - Once |
| | **9LA1110-8AG10-3CB0** | - Cyclically 1 × per year |
| | **9LA1110-8AG10-3CC0** | - Cyclically 2 × per year |
| | **9LA1110-8AG10-3CD0** | - Cyclically 4 × per year |

## Options

The module “Basic Analysis“ provides a general lifecycle status. The key point here is analyzing functional obsolescence.

The service module “Extended Analysis“ includes the module “Basic“ and in addition the analysis of the product-related statistical failure rate (MTBF - Mean Time Between Failures).

The service module “Comprehensive Analysis“ contains the module “Extended Analysis“ and also plant-specific information about upgrades/updates and relevant services.

Identify the right analysis for you in the first tab “Ordering data” on top of the right side.

| Sales item | | Comments |
|---|---|---|
| Basic Analysis < 50 article numbers | 9LA1110-8AG10-1AA0<br>9LA1110-8AG10-1AB0<br>9LA1110-8AG10-1AC0<br>9LA1110-8AG10-1AD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Basic Analysis 50-150 article numbers | 9LA1110-8AG10-1BA0<br>9LA1110-8AG10-1BB0<br>9LA1110-8AG10-1BC0<br>9LA1110-8AG10-1BD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Basic Analysis 150-300 article numbers | 9LA1110-8AG10-1CA0<br>9LA1110-8AG10-1CB0<br>9LA1110-8AG10-1CC0<br>9LA1110-8AG10-1CD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Extended Analysis < 50 article numbers | 9LA1110-8AG10-2AA0<br>9LA1110-8AG10-2AB0<br>9LA1110-8AG10-2AC0<br>9LA1110-8AG10-2AD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Extended Analysis 50-150 article numbers | 9LA1110-8AG10-2BA0<br>9LA1110-8AG10-2BB0<br>9LA1110-8AG10-2BC0<br>9LA1110-8AG10-2BD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Extended Analysis 150-300 article numbers | 9LA1110-8AG10-2CA0<br>9LA1110-8AG10-2CB0<br>9LA1110-8AG10-2CC0<br>9LA1110-8AG10-2CD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Comprehensive Analysis < 50 article numbers | 9LA1110-8AG10-3AA0<br>9LA1110-8AG10-3AB0<br>9LA1110-8AG10-3AC0<br>9LA1110-8AG10-3AD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Comprehensive Analysis 50-150 article numbers | 9LA1110-8AG10-3BA0<br>9LA1110-8AG10-3BB0<br>9LA1110-8AG10-3BC0<br>9LA1110-8AG10-3BD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |
| Comprehensive Analysis 150-300 article numbers | 9LA1110-8AG10-3CA0<br>9LA1110-8AG10-3CB0<br>9LA1110-8AG10-3CC0<br>9LA1110-8AG10-3CD0 | Once<br>Cycle 1x per year<br>Cylce 2x per year<br>Cycle 4x per year |

## More information

For more information please visit:
www.siemens.com/lis

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## Overview

One year exclusive and individual technical product support contract for automation, process instrumentation (field devices) and DCS systems to minimize the risk of a production downtime.

***Support:***

Should you have any question about the ordering process, please contact us at services.automation@siemens.com

***Your needs:***

- Outsourcing of service activities and concentration on core business
- Competent, high-performance support for engineering tasks and maintenance
- Avoidance of on-site service calls by using future-oriented IT-based services

***Our service offer:***

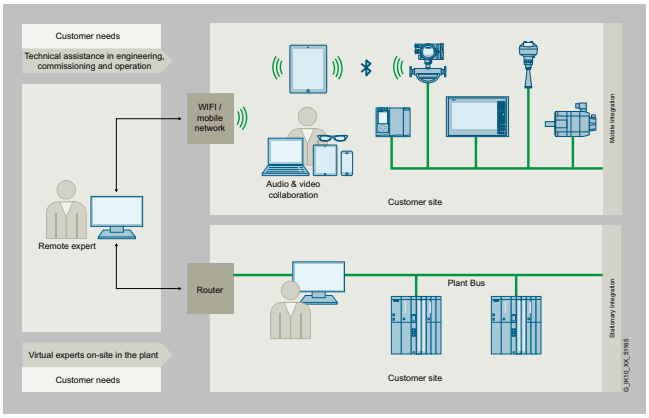
This service includes comprehensive system inventory, central coordination of all service activities by an exclusive Siemens support manager and regular status reporting.

Siemens support manager:

- Gets familiar with the plant and maintenance processes to integrate them into the system
- Coordinates and manages all your support requests with the highest priority
- Sends you quarterly status reports – from the initial system acceptance to the final report, over the entire period of the contract.

## Benefits

- Exclusive channel for fast callback and central request coordination
- Avoid on-site service
- Exclusive access to the Extranet with contract-relevant contents




Remote Collaboration Services

## Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, machine tools, drive systems, 6ES7658, 6DL89, 6ES74, 6ES76

## Selection and ordering data

| | |
|---|---|
| MSS for automation systems | **9LA1110-1BA01-0AA0-Z Y01** |
| MSS for process instrumentation (field devices) | **9LA1110-1BD01-0AA0-Z** |
| MSS for DCS systems | **9LA1110-1BH01-0AA0-Z Y01** |
| MSS Remote Desktop Sharing | **9LA1110-1BR01-0AA0-Z Y01** |
| MSS extension of 25 hrs – for DCS systems and/or field devices | **9LA1110-1BL00** |

| | |
|---|---|
| MSS for PCS neo Premium | **9LA1110-1BN01-0AA0-ZY01** |
| MSS for PCS neo – Ready for Virtualization – clarification of a possibility of virtualization of the system | **9LA1110-1BN01-0VA0-ZY01** |
| 25 hrs extension oft he support for PCS neoo | **9LA1110-1BL00-0AA0-ZY01** |

| | |
|---|---|
| MSS for Machine Tools Systems | |
| Small Package | **9MC1110-0MS00-0AA0** |
| Medium Package | **9MC1110-0MS00-0AA1** |
| Large Package | **9MC1110-0MS00-0AA2** |
| 25 hrs support extension for machine tools systems | **9MC1110-0MS00-0AA3** |

| | |
|---|---|
| MSS for Drive Systems 30 hrs technical support for one year | **9MC3110-0MS00-0AA0** |
| MSS for Drive Systems – 25 hrs support extension | **9MC3110-0MS00-0AA1** |

## Options

Contents of all MSS options:

- 1 year service contract
- 30 hrs technical support
- Service Manager as central contact person
- Access to further information in SiePortal
- Quarterly reporting on processed service requests

| | |
|---|---|
| MSS for automation systems | 9LA1110-1BA01-0AA0-Z Y01 |
| MSS for process instrumentation (field devices) | 9LA1110-1BD01-0AA0-Z Y01 |
| MSS for DCS systems | 9LA1110-1BH01-0AA0-Z Y01 |
| MSS Remote Desktop Sharing | 9LA1110-1BR01-0AA0-Z Y01 |
| MSS 25 hrs support extension – for DCS systems and/or field devices | 9LA1110-1BL00 |

| | |
|---|---|
| MSS for PCS neo Premium | 9LA1110-1BN01-0AA0-ZY01 |
| MSS for PCS neo – Ready for Virtualization – clarification of a possibility of virtualization | 9LA1110-1BN01-0VA0-ZY01 |
| 25 hrs support extension for PCS neo | 9LA1110-1BL00-0AA0-ZY01 |

| | |
|---|---|
| MSS for machine tools systems | |
| Small Package | 9MC1110-0MS00-0AA0 |
| Medium Package | 9MC1110-0MS00-0AA1 |
| Large Package | 9MC1110-0MS00-0AA2 |
| 25 hrs support extension for machine tools systems | 9MC1110-0MS00-0AA3 |

| | |
|---|---|
| MSS for Drive Systems 30 hrs technical support for one year | 9MC3110-0MS00-0AA0 |
| MSS for Drive Systems – 25 hrs support extension | 9MC3110-0MS00-0AA1 |

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## More information

For any further technical information, please visit the Product Support at https://support.industry.siemens.com/cs/ww/en/view/109806719
Visit our website at siemens.com/mss

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## Overview

Identification of potential risks for SIMATIC PCS 7 systems

***Your need:***

- Preventive system analysis to minimize risks
- Reduction of maintenace costs
- Avoidance of system downtime

***Our service offer:***

- Detailed system analyses provided by Siemens experts
- Specific "Tailor-made" measures to increase the maintenance efficiency
- Detailed reports on system condition and recommendation

## Benefits

- Fast data acquisition
- Intensive data analysis
- Transparent reporting

## Application

SIMATIC PCS 7, Step 7, TIA Portal and WinCC, 6ES7658, 6DL89

## Selection and ordering data

| Description | *Article No.* |
|---|---|
| • Preventive System Analysis one-time | **9LA1110-1CD00** |
| • Preventive System Analysis 5 | **9LA1110-1CA00** |
| • Preventive System Analysis 20 | **9LA1110-1CB00** |
| • Preventive System Analysis 50 | **9LA1110-1CC00** |
| • Preventive System Analysis 75 | **9LA1110-1CE00** |
| • Preventive System Analysis 100 | **9LA1110-1CF00** |

## Options

| | | |
|---|---|---|
| Preventive System Analysis one-time | System scope: max. 10 systems* System Status Report generated one time | 9LA1110-1CD00 |
| Preventive System Analysis 5 | System scope: max. 5 systems | 9LA1110-1CA00 |
| Preventive System Analysis 20 | System scope: max. 20 systems | 9LA1110-1CB00 |
| Preventive System Analysis 50 | System scope: max. 50 systems | 9LA1110-1CC00 |
| Preventive System Analysis 75 | System scope: max. 75 systems | 9LA1110-1CE00 |
| Preventive System Analysis 100 | System scope: max. 100 systems | 9LA1110-1CF00 |

## More information

Further information is available online at:
www.siemens.com/psa

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## Overview

Optimize overall spare parts supply for your maintenance activities with a systematic four phases approach to reach high plant availability.

***Support:***

Should you have any question about the ordering process, please contact us at services.automation@siemens.com

***Your need:***

- Secure reliable supply of spare parts
- Minimize risks related to functional obsolescence
- Reduce maintenance costs by optimizing the stock
- Optimize inventory, technically and economically (reduced capital lockup)
- Maximize transparency in inventory management
- Maintain the balance between a high plant availability and productivity of your installations and a minimal budget dedicated to the stock of spare parts replacement

***Our service offer:***

- Analysis of the spare parts situation on site: availability, product life cycle, spare parts delivery times.
- Concept: Analysis of actual demand and development of a spare parts concept
- Implementation: Establishment of required storage structures, storage locations and spare parts
- Operation: Continuous spare parts supply, depending on agreed scope cyclical inventory analysis

## Benefits

- Avoid the lack of spare parts
- Minimize inventory and the budget allocated to it
- Transparency about actual spare parts requirements
- Ensuring spare parts availability over the entire life cycle, thus providing the basis for improved serviceability
- Technical and economic warehouse optimization (lower capital commitment)

## Application

SIMATIC PCS 7, PCS neo, Step 7, TIA Portal, field devices of process instrumentation, 6ES7658, 6ES74, 6ES76

## Options

| ***Modules*** | |
|---|---|
| Analysis | 9LA1110-8AE10-1AA0 |
| Concept | 9LA1110-8AE10-2AA0 |
| Implementation | 9LA1110-8AE10-3AA0 |
| Operation Spare Parts Supply | 9LA1110-8AE10-4AA0 |
| Operation Spare Parts Management | 9LA1110-8AE10-4BA0 |

| ***Options*** | |
|---|---|
| Product Extension | 9LA1110-8AE10-8AA0 |
| Time Extension | 9LA1110-8AE10-8BA0 |

## More information

More information is available online at:
www.siemens.com/aos

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## Overview

Modular service program for a lifecycle service contract ensuring sustainable serviceability and increasing plant availability.

***Your need:***

- Long-term assurance of investment protection
- Consistent functionality on renewed and maintained system platform
- Plannability of necessary service measures and costs

***Our service offer:***

- System modernizations
- On-call service and on-site and remote repairs
- Inspection, maintenance, spare parts & repairs
- Contract management, support and consulting
- Obsolescence management

## Benefits

- Transparency of costs for services and modernization
- Increased system availability due to assured start-up times for service, spare parts supply and preventive maintenance measures
- Preservation of the serviceability of the system

## Application

SIMATIC PCS 7, PCS neo and WinCC SCADA systems

## More information

More information is available here.

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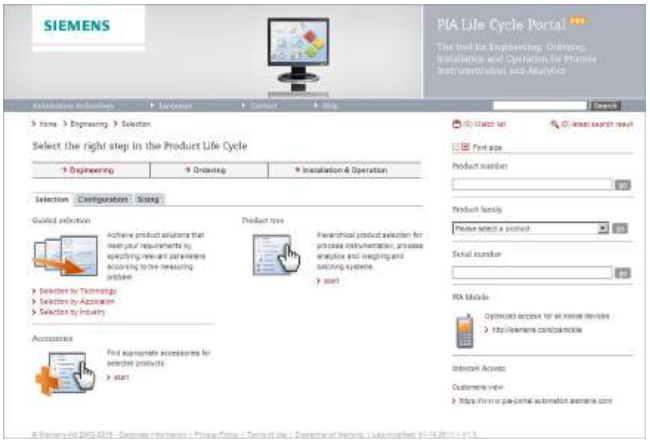

| | |
|---|---|
| **10/2**<br>10/2 | **PIA Life Cycle Portal**<br>Engineering, Ordering, Installation and Operation Tool |
| **10/3**<br>10/3 | **Delivery Time**<br>Quick Ship Program, Stock Items delivery |
| **10/4** | **Partners** |
| **10/5**<br>10/6<br>10/8 | **Industry Services**<br>Industry Services – Portfolio overview<br>Online Support |
| **10/9** | **SITRAIN – Digital Industry Academy** |
| **10/11**<br>10/11 | **Product documentation**<br>Supplied product documentation, QR Code, SIOS |
| **10/12**<br>10/12 | **Partners at Siemens**<br>Siemens Partner Program |
| **10/13** | **Pressure Equipment Directive (2014/68/EU)** |
| **10/16** | **Functional safety** |
| **10/17** | **Software licenses** |

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# Appendix
PIA Life Cycle Portal

## Engineering, Ordering, Installation and Operation Tool

### Overview




The PIA Life Cycle Portal provides the appropriate functionality in all stages of the Product Life Cycle for products of Process Instrumentation, Process Analytics and Weighing Technology.

The application guides you through Engineering & Selection, supports you at the Order and provides tools and information for Installation and Operation.

- **Phase 1:** Selection & Planning
- **Phase 2:** Ordering
- **Phase 3:** Installation & Operation
- **Additional features:** e. g. PIA Mobile

***Phase 1: Selection & Planning***



Selection

Achieve product solutions that meet your requirements by specifying relevant parameters according to the measuring point by using the *guided selection* or select the product directly in the *product and accessories tree*.



Configuration

Configure a selected product step by step and use the integrated configuration knowl-edge to avoid errors.
Product configurations which cannot be ordered are blocked.



Sizing & calculation

*Sizing & calculation* tools for Gas Analyzers, Weighing and Batching Systems and Flow measurement instruments.

***Phase 2: Ordering***



Bulk upload

Verify several part numbers in one step by uploading a simple text file.



Watchlist & projects

Collect products in a *watch list* and save it as a *project* for later use.



Interface to the Industry Mall

Order the selected products with the ordering system for Siemens' automation and drive solutions.

***Phase 3: Installation & Operation***



Spare parts

Find appropriate *spare parts* for selected products or corresponding product families.



After sales support

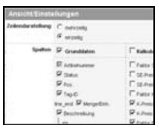
Go to the *Service and Support Portal* to access manuals, certificates and further information concerning service & support.




Device information and history

Serial number specific product information for installed devices

***Additional features***



Personalize

Register in order to customize the application to your personal needs.



PIA Mobile

Use the product *selection, configuration and device information and history* with the version optimized for mobile devices.
www.siemens.com/piamobile



Product details

Find all relevant product information at a single glance: commercial and technical data, certificates, images and documents etc.

### More information

PIA Life Cycle Portal
Ostliche Rheinbrückenstraße 50
76187 Karlsruhe, Germany
Tel.: +49 (721) 595 2114
E-Mail: support.pia-portal@siemens.com
www.siemens.com/pia-portal

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## Overview

***Delivery times***

Standard delivery times for our products are shown in the Selection and Ordering data.

***Quick Ship and Stock Items delivery***

If you need a product quickly, it is possible to choose between defined Stock Items delivery (▶ identifier) and the Quick Ship Program (⬟ identifier) when ordering. Delivery times are then displayed at the end of the configuration overview

Note

In order to obtain special delivery times, only products with the same identifier may be combined (all Stock Item symbols or all Quick Ship Program symbols).

It is not possible to combine Stock Item/Quick Ship Program options.

All other information without identifiers is available with the cur-rent delivery times, which can be found in the "Basic Data" tab of the PIA Life Cycle Portal.

***To get region-specific warehouse information: Registration and login in the PIA Life Cycle Portal required***

To get the quick ship and warehouse information specific to your region you need to register:

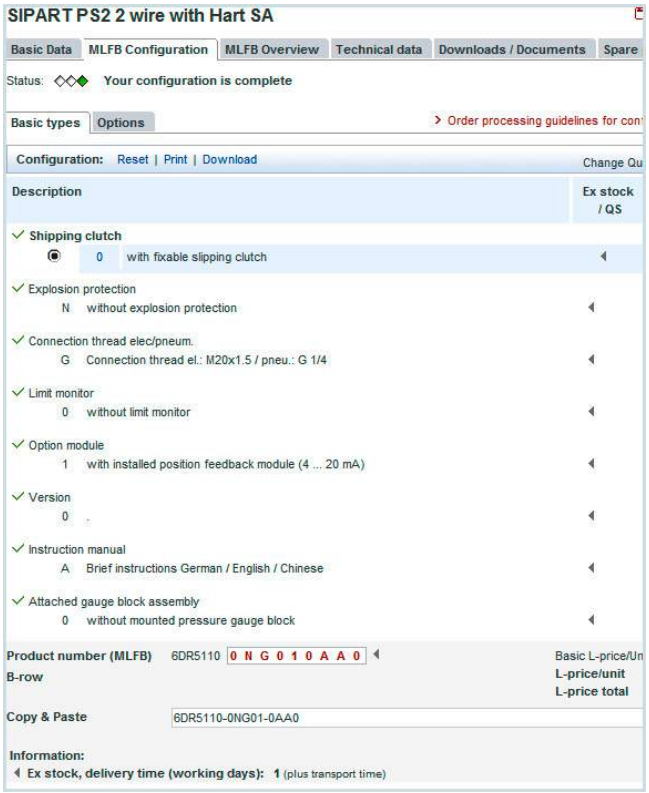
- Select the desired language.
- Use "Sign up" to register.
- After registering, log in via "Login".

***Contact***

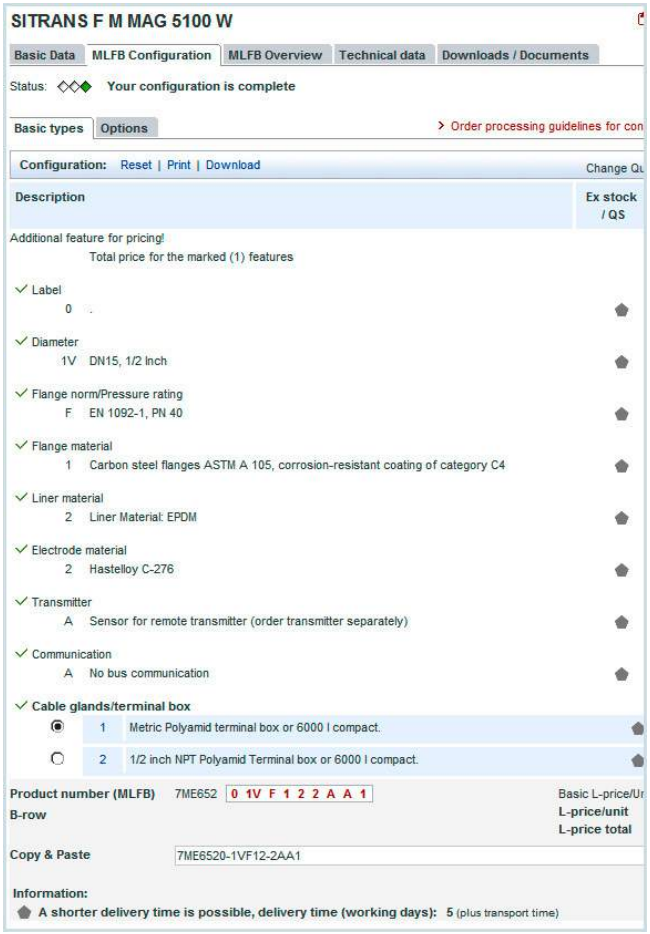
If you have questions about delivery time or the Quick Ship pro-gram, please contact your Siemens sales representative.

Learn more about the Process Instrumentation Advantage + Program
www.usa.siemens.com/aplus

***Example for Stock Items delivery in the PIA Life Cycle Portal***



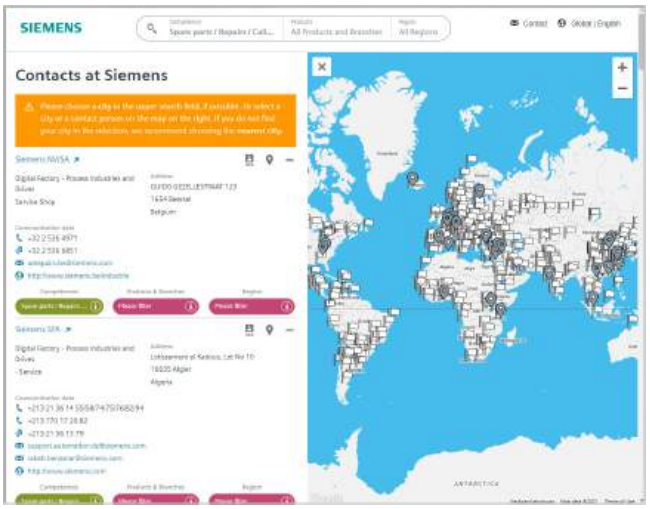

***Example for Quick Ship Program delivery in the PIA Life Cycle Portal***



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***Partners at Siemens***




At your service locally, around the globe for consulting, sales, training, service, support, spare parts on the entire portfolio of Siemens.

Your partner can be found in our Personal Contacts Database at:
www.siemens.com/automation-contact

You start by selecting

- the required competence,
- products and branches,
- a country and a city

or by a

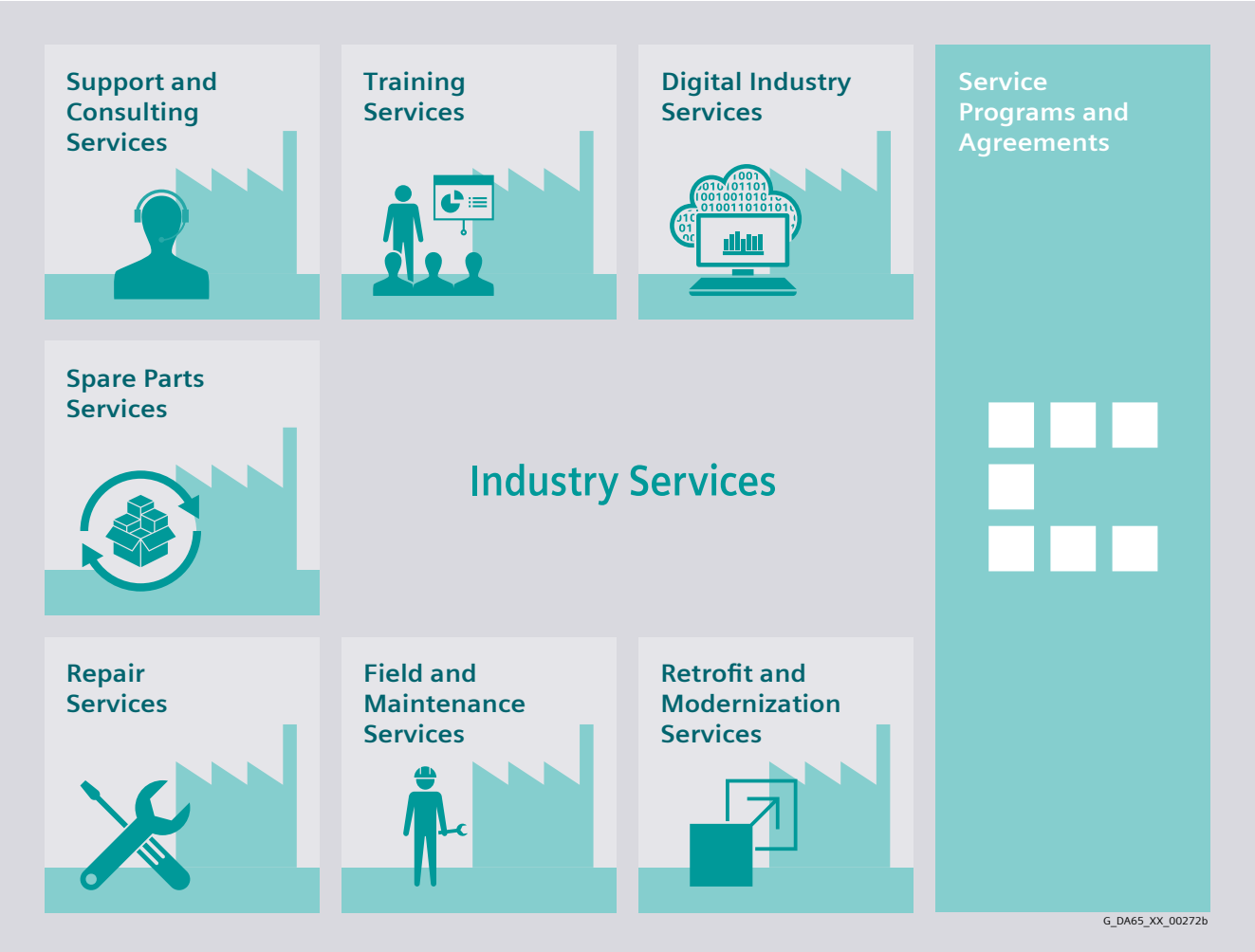
- location search or free text search.

Your USA Sales channel partner for Process Instrumentation can be found by entering your ZIP code at
www.usa.siemens.com/pi-partner

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## Overview




***Keep your business running and shaping your digital future – with Industry Services***

Optimizing the productivity of your equipment and operations can be a challenge, especially with constantly changing market conditions. Working with our service experts makes it easier. We understand your industry's unique processes and provide the services needed so that you can better achieve your busi-ness goals.

You can count on us to maximize your uptime and minimize your downtime, increasing your operations' productivity and reliability. When your operations have to be changed quickly to meet a new demand or business opportunity, our services give you the flexibility to adapt. Of course, we take care that your production is protected against cyber threats. We assist in keeping your operations as energy and resource efficient as possible and reducing your total cost of ownership. As a trendsetter, we ensure that you can capitalize on the opportunities of digitalization and by applying data analytics to enhance decision making: You can be sure that your plant reaches its full potential and retains this over the longer lifespan.

You can rely on our highly dedicated team of engineers, technicians and specialists to deliver the services you need – safely, professionally and in compliance with all regulations. We are there for you, where you need us, when you need us.

www.usa.siemens.com/services

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## Industry Services – Portfolio overview

### Overview

**Digital Industry Services**



Digital Industry Services make your industrial processes transparent to gain improvements in productivity, asset availability, and energy efficiency.

Production data is generated, filtered and translated with intelligent analytics to enhance decision-making.

This is done whilst taking data security into consideration and with continuous protection against cyber-attack threats.

www.siemens.com/us/en/products/services/industry/digital-industry-services.html

**Support and Consulting Services**



**Industry Online Support** site for comprehensive information, application examples, FAQs and support requests.

**Technical and Engineering Support** for advice and answers for all inquiries about functionality, handling, and fault clearance. The Service Card as prepaid support for value added services such as Priority Call Back or Extended Support offers the clear advantage of quick and easy purchasing.

**Information & Consulting Services**, e.g. SIMATIC System Audit; clarity about the state and service capability of your auto-mation system or Lifecycle Information Services; transparency on the lifecycle of the products in your plants.

www.usa.siemens.com/pisupport

**Training Services**



From the basics and advanced to specialist skills, SITRAIN courses provide expertise right from the manufacturer – and encompass the entire spectrum of Siemens products and systems for the industry.

Worldwide, SITRAIN courses are available wherever you need a training course in more than 170 locations in over 60 countries.

www.usa.siemens.com/sitrain

We also offer training webinars and videos at:

www.usa.siemens.com/pitraining

**Spare Parts Services**



Spare Parts Services are available worldwide for smooth and fast supply of spare parts – and thus optimal plant availability. Genuine spare parts are available for up to ten years. Logistic experts take care of procurement, transport, custom clearance, storage and order management. Reliable logistics processes ensure that components reach their destination as needed.

Since not all spare parts can be kept in stock at all times, Siemens offers a preventive measure for spare parts provisioning on the customer's premises with optimized **Spare Parts Packages** for individual products, custom-assembled drive components and entire integrated drive trains – including risk consulting.

**Asset Optimization Services** help you design a strategy for parts supply where your investment and carrying costs are reduced and the risk of obsolescence is avoided.

www.siemens.com/us/en/products/services/industry/preventive-maintenance/spare-parts-services.html

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**Overview** (continued)

### Repair Services



Repair Services are offered on-site and in regional repair centers for fast restoration of faulty devices' functionality.

Also available are extended repair services, which include additional diagnostic and repair measures, as well as emergency services.

www.siemens.com/us/en/products/services/industry/corrective-services.html

### Retrofit and Modernization Services



Provide a cost-effective solution for the expansion of entire plants, optimization of systems or upgrading existing products to the latest technology and software, e.g. migration services for automation systems.

Service experts support projects from planning through commissioning and, if desired over the entire extended lifespan, e.g. Retrofit for Integrated Drive Systems for an extended lifetime of your machines and plants.

www.siemens.com/us/en/products/services/industry/preventive-maintenance/retrofit-and-modernization-services.html

### Field and Maintenance Services



Siemens specialists are available globally to provide expert field and maintenance services, including commissioning, functional testing, preventive maintenance and fault clearance.
All services can be included in customized service agreements with defined reaction times or fixed maintenance intervals.

www.siemens.com/us/en/products/services/industry/corrective-services/field-and-maintenance-services.html

### Service Programs and Agreements



A technical Service Program or Agreement enables you to easily bundle a wide range of services into a single annual or multi-year agreement.

You pick the services you need to match your unique requirements or fill gaps in your organization's maintenance capabilities.

Programs and agreements can be customized as KPI-based and/or performance-based contracts.

www.siemens.com/us/en/products/services/industry/preventive-maintenance/service-programs-and-agreements.html

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## Online Support

### Overview




Siemens Industry and Online Support with some 1.7 million visitors per month is one of the most popular web services provided by Siemens. It is the central access point for comprehensive technical know-how about products, systems and services for automation and drives applications as well as for process industries.

In connection with the challenges and opportunities related to digitalization you can look forward to continued support with innovative offerings.

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## Introduction




SITRAIN - Digital Industry Academy stands for a modern learning culture that focuses on the needs of learners and the demands of innovative companies.

SITRAIN offers a comprehensive range of knowledge on Siemens industrial products and, under the vision "Future of Learning", pursues a holistic approach that combines different forms and methods of learning. Different learning formats allow for more effective, flexible and continuous learning depending on the type of learning.

***Education and training directly from the manufacturer***



**Industrial Automation Systems SIMATIC**
Training available for:
SIMATIC S7-1500. TIA Portal,
SIMATIC S7-300/400,
SIMATIC S7-1200



**Drive Technology**
Training available for:
SINAMICS S120 and
SINAMICS G120 low-voltage converters,
SINAMICS G130 / G150 / G180 / S150



**SINUMERIK CNC automation system**
Training available for:
SINUMERIK 840D,
SINUMERIK 840D sl and
SINUMERIK ONE



**Process Control Systems**
Training available for:
SIMATIC PCS 7,
SIMATIC PCS neo



**Digital Enterprise**
Training available for:
Openness, SIMIT, OPC UA, Industrial Edge, Virtual commissioning



**Industrial Communications**
Training available for:
PROFINET, SCALANCE, R UGGEDOM, Industrial Ethernet, Fieldbus communication, Industrial Security, Remote communication



**Identification and Locating**
Training available for:
RFID, RTLS-Systems



**Operator Control and Monitoring Systems**
Training available for:
SIMATIC WinCC Unified in TIA Portal, SIMATIC WinCC in TIA Portal, SIMATIC WinCC V7x



**Motion Control System SIMOTION**
Training available for:
SIMOTION (Programming, Commissioning, Diagnostics, Service)



**Smart Infrastructure**
Training available for:
SIRIUS, SENTRON, SIVACON, ALPHA, SIMOCODE,
Circuit breakers



**Process Analytics & Instrumentation**
Training is available for process analytics and instrumentation, explosion protection, process gas chromatographs



**Additional training offer**
SIMOVE with Automated Guided Vehicles (AGV), SIPLUS CMS, Guidelines and standards for control cabinets

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## Introduction

***Different learning formats and methods for maximum learning success***

Face-to-face training in the training center or in the virtual classroom, with fixed dates and course times, learning in a group with a learning guide? Or digital training, on your own responsibility and location-independent, on demand, 24/7?

With the learning formats "Learning Journey", "Learning Membership" and "Learning Event", SITRAIN offers a wide range of different learning options in connection with didactically effec-tive methods and modular possibilities.



***Learning Journey***

The combination for sustainable learning success

- The optimal mix of self-study units and guided live modules
- Includes a Learning Membership to work through the self-study modules and access on-demand content
- The SITRAIN learning consultant is available for questions and one-on-one consultations
- Ideal integration into the daily work routine and adaptation to one's own learning pace.



***Learning Membership***

Securing knowledge through continuous learning on your own responsibility

- With access to the comprehensive and constantly growing range of self-study units on SITRAIN access, the digital learning platform
- Search and find specific learning content or simply have a look around – anytime and anywhere
- A modern learning culture through continuous learning on your own responsibility and transparency about your learning success in the team or company.



***Learning Event***

Acquire theoretical and practical knowledge in a compact and guided format

- You achieve a defined learning goal in the shortest possible time
- The learning consultant guides you through the practical exercises and is also exclusively available to you during the theoretical sessions for the entire duration
- Focused learning, outside of the daily work routine, in a protected learning environment – virtually, in the training center, or at your company.



**Live**

Learn together with others, simultaneously and guided by a learning consultant. Online, in the SITRAIN training center or at your company.



**Self-reliant**

Expand your knowledge self-determined with industry learning and work on your learning units at your own pace and according to your own schedule.



**On demand**

Get the knowledge you need, exactly when you need it. Be it to answer a current question or to work on a special topic.



**Individuell**

Talk directly with the learning consultant, clarify detailed questions and get personal coaching for transferring the learned topics to your own application.



***Training cases catalog***

www.siemens.com/sitrain-catalog-training-cases

**Find your local offer here**

***SITRAIN – Digital Industry Academy worldwide***

You will find the regional knowledge offer in the country selection. One click will take you to the corresponding website.

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## Supplied product documentation on DVD and safety instructions




Siemens products for process instrumentation will be delivered with a multi-language **Safety note** and a **Mini DVD "Process Instrumentation and Weighing Systems".**

On the DVD, customers can find many important operating instructions and certificates of our Siemens portfolio for process instrumentation and weighing systems. As well, product or order-specific print material may be part of the delivery.

## QR Code – Easy access to product information



For easy identification, our devices are fitted with an ID Link (according to IEC 61406) which can be read with the Siemens Industry Support App or any other QR code reader.

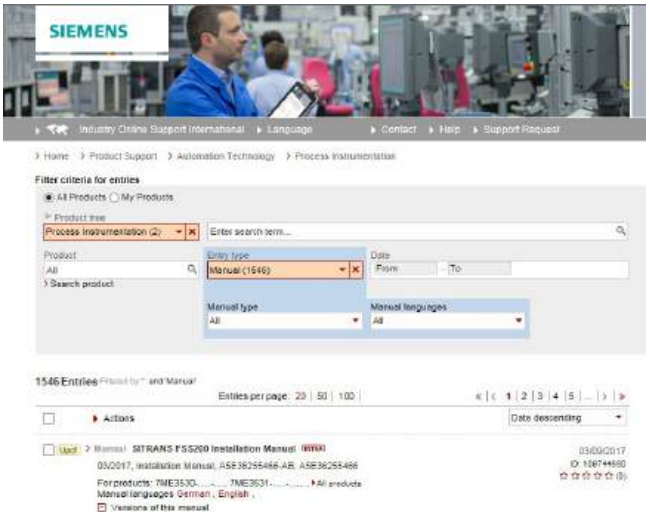
This not only enables simple access to article and serial numbers, it also provides you with a direct link to the product documentation, certificates, FAQs and videos.

You can find the Siemens Industry Support App or other QR code reader in your App Store for iOs, Android or Windows mo-bile.

More information can be found here:

www.siemens.com/global/en/products/automation/topic-areas/digital-data-chain.html

## Siemens Industry Online Support Portal (SIOS)




For the complete portfolio, customers can download product documentation for free using the following QR code to our Siemens Industry Online Support Portal (SIOS):

By entering the product names as **Search term** and selecting the field **Entry type,** you can find all operating instructions, current catalogs and brochures, certificates, product software (EDDs, calculation tools), product notes and other useful information.

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## Siemens Partner Program

### Overview

***Siemens Solution and Approved Partner – Partners for your success***




Highest competence in automation and drive technology

Siemens works closely together with selected partner companies around the world in order to ensure that customer requirements for all aspects of automation and drives are fulfilled as best as possible – wherever you are, and whatever the time.

We place great value on our customers acting in accordance with the same ideals which characterize Siemens as a whole: Competence, professionalism and quality. That is why continuous development through qualification and certification measures in line with global standards is a central aspect of our Partner Program. This means that with our partners, you benefit from the same high quality standards all over the world.
The partner emblem is the symbol for tried and tested quality.

The partner network for industry

The Siemens Partner Program offers you expertise and experience close at hand.

Within our global network, we distinguish between Solution Partners and Approved Partners. We currently work with more than 1,500 Solution Partners around the world. Our network of over 150 Approved Partners continues to grow. In more than 80 countries worldwide.

Siemens Solution Partner – Automation Drives



At present we are working with more than 1,500 Solution Partners worldwide. They are characterized by extensive application, system and sector knowledge, as well as proven project experience, and are able to implement future-proof tailored solutions of the highest quality, based on our product and system portfolio.

Siemens Approved Partner – Value Added Reseller



With their detailed technical knowledge, Siemens Approved Partners – Value Added Resellers offer a combination of products and services that range from specialist technologies and customized modifications to the provision of high-quality system and product packages. They also provide qualified technical support and assistance.

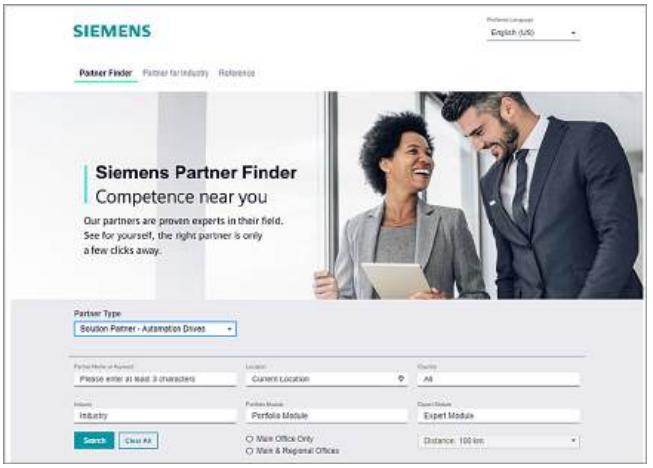
Siemens Approved Partner – Industry Services



Siemens Approved Partner – Industry Services put their unique expertise entirely at the service of enhancing your productivity and can be instrumental in ensuring the availability of your plants.

***Partner Finder***

The ideal partner for your task is just a mouse click away!




In the Siemens global Solution Partner Program, customers are certain to find the optimum partner for their specific requirements – with no great effort. The Partner Finder is basically a comprehensive database that showcases the profiles of all our partners.

Easy selection:
Set filters in the search screen form according to the criteria that are relevant to you. You can also directly enter the name of an existing partner.

Skills at a glance:
Gain a quick insight into the specific competencies of any particular partner with the reference reports.

Direct contact option:
Use our electronic query form:

www.siemens.com/partnerfinder

Additional information of the Siemens Parners for industry is available online at:

www.siemens.com/partnerprogram

Locate USA Process Instrumentation channel partners at:

www.usa.siemens.com/pi-partner

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## General

The pressure equipment directive **2014/68/EU** applies to the alignment of the statutory orders of the European member states for pressure equipment. Such equipment in the sense of the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than **0.5 bar** above atmospheric.

## Classification according to hazard potential

The classification of the devices according to the pressure equipment directive takes place according to the hazard potential (medium/pressure/volume/nominal width) in the categories I to IV or article 4 paragraph 3.
The following criteria are decisive for assessing the hazard potential; they are also listed in diagrams 1 to 4 and 6 to 9:

| | |
|---|---|
| • Fluid group | Group 1 or 2 |
| • Aggregate state | Liquid, gaseous |
| • Type of pressurized equipment | |
| - Vessel | Product of pressure and volume (PS * V [barL]) |
| - Pipeline | Nominal diameter, pressure or product of pressure and nominal diameter (PS * DN) |

The fired or otherwise heated pressure equipment is listed separately in diagram 5.

**Note:**
Liquids according to Article 4 are those liquids whose steam pressure is **not** more than **0.5 bar** above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The **maximum permissible temperature** for the used liquids is the maximum process temperature which can occur, as defined by the user. This must be within the limits defined for the equipment.

## Classification of the media (liquid/gas) into fluid groups*

"Fluids" are gases, liquids and vapors in pure phase as well as their mixtures; fluids can include a suspension of solid matter; fluids are classified into the following fluid groups according to article 13 of the pressure equipment directive 2014/68/EU.

***Paragraph a***

Group 1

Group 1 consisting of substances and mixtures, as defined in points 7 and 8 of article 2 of Regulation (EC) No. 1272/2008, that are classified as hazardous in accordance with the following physical or health hazard classes laid down in parts 2 and 3 of annex I to that Regulation:

i) unstable explosive substances/mixtures or explosive substances/ mixtures of divisions 1.1, 1.2, 1.3, 1.4 and 1.5
ii) flammable gases, categories 1 and 2
iii) oxidizing gases, category 1
iv) liquids, category 1 and 2
v) flammable liquids, category 3 where the maximum permissible temperature is above the flash point
vi) flammable solids, category 1 and 2
vii) self-reactive substances and mixtures, type A to F
viii) pyrophoric liquids, category 1
ix) pyrophoric solids, category 1
x) substances and mixtures which in contact with water emit flammable gases, category 1, 2 and 3
xi) oxidizing liquids, category 1, 2 and 3
xii) oxidizing solids, category 1, 2 and 3
xiii) organic peroxides, types A to F
xiv) acute oral toxicity, category 1 and 2
xv) acute dermal toxicity, category 1 and 2
xvi) acute inhalation toxicity, category 1, 2 and 3
xvii) specific target organ toxicity - single exposure, category 1

Group 1 comprises also substances and mixtures in pressure equipment with a maximum allowable temperature TS which ex-ceeds the flash point of the fluid.

***Paragraph b***

Group 2

All fluids that are not included in Group 1.

* from: "-DIRECTIVE 2014/68/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (recast)"

## Conformity assessment

Pressure equipment of category I to IV must meet the safety requirements set out in annex II and carry a CE marking.
They must meet a conformity assessment procedure set out in annex III of the Directive.
Pressure equipment to article 4 paragraph 3 shall be designed and manufactured in accordance with the sound engineering practice of a Member State and must not have a CE marking (CE markings from other Directives are not affected).
Siemens has (as long as the device is not subject to article 4 paragraph 3) conducted a conformity assessment for its products, given a CE marking and provided a declaration of conformity.
Monitoring of the design, dimensioning, testing and production takes place according to module H (full quality assurance).

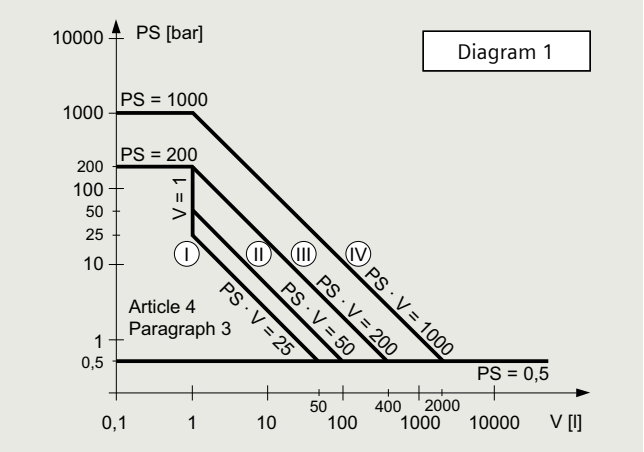
**Notes:**

- Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).
- The pressure equipment directive according to Article 1 Paragraph 2 does not apply to equipment such as e.g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

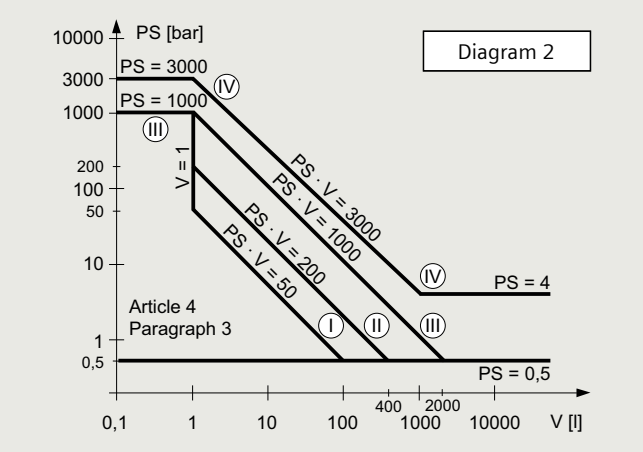
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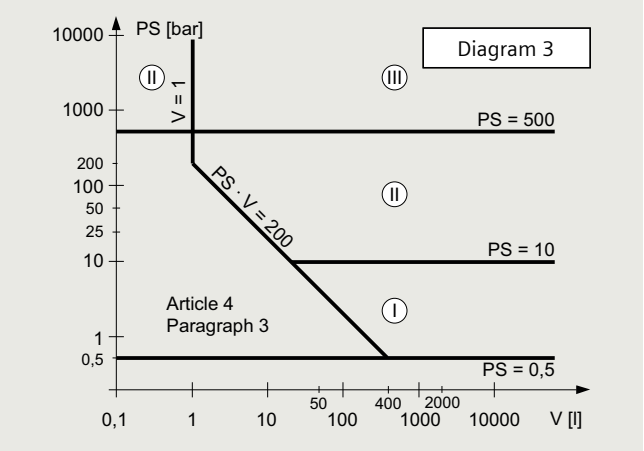
## Diagrams



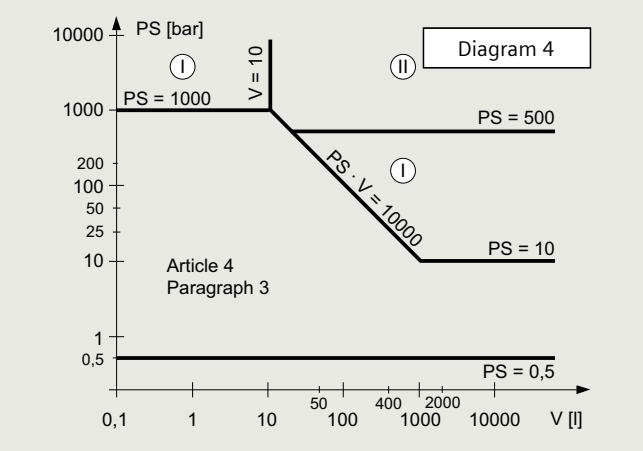

- Gases of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



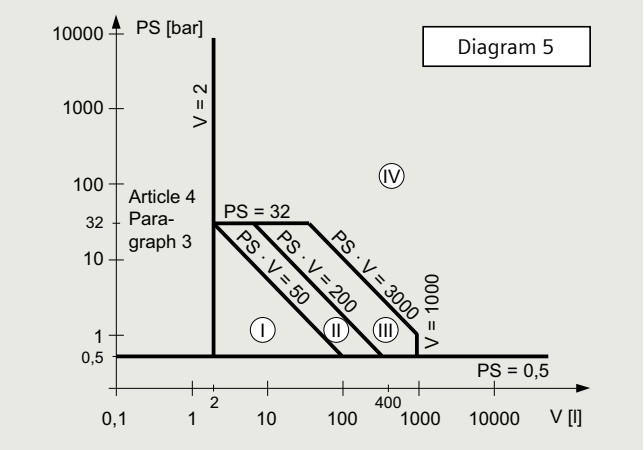

- Gases of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number i second dash
- Exception: fire extinguishers and bottles for breathing apparatus: at least Category III.




- Liquids of fluid group 1
- Vessels in accordance with article 4 paragraph 1 letter a number ii first dash



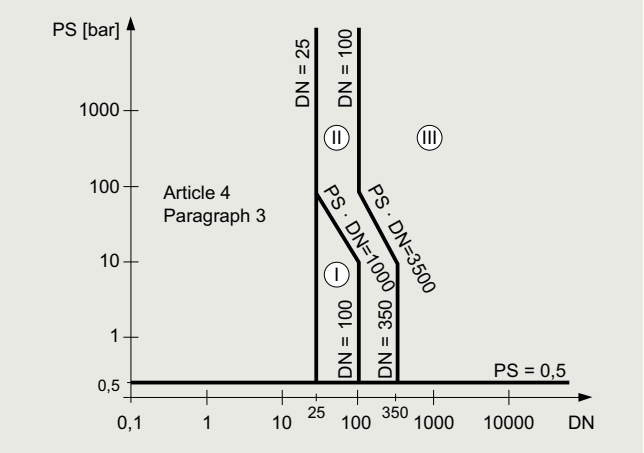

- Liquids of fluid group 2
- Vessels in accordance with article 4 paragraph 1 letter a number ii second dash
- Exception: modules for producing warm water



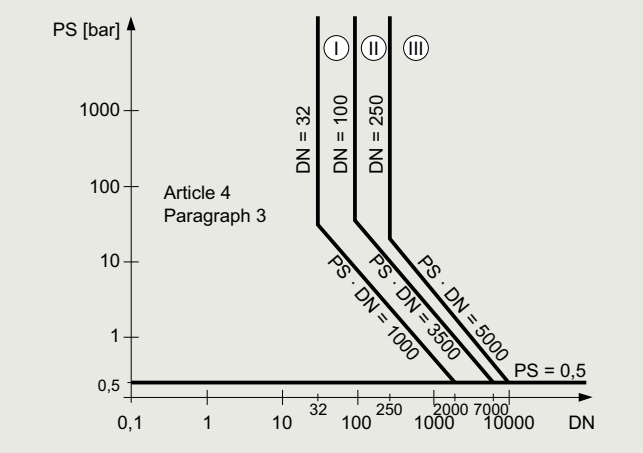

- Fuelled pressure equipment or equipment heated in another manner above 110 °C and liable to overheating.
- Pressure equipment in accordance with article 4 paragraph 1 letter b
- Exception: pressure cooker, test procedure at least according to Category III.

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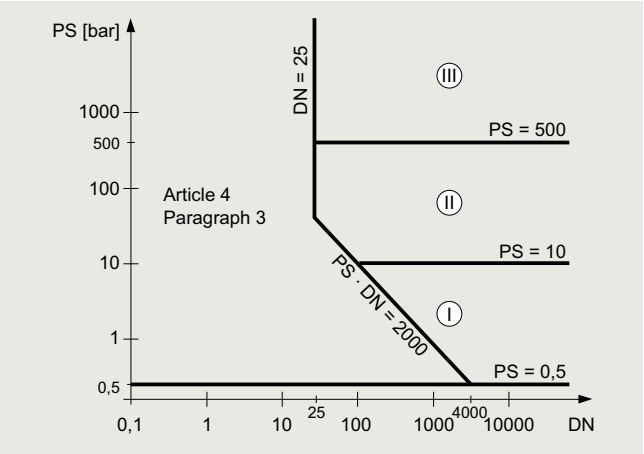




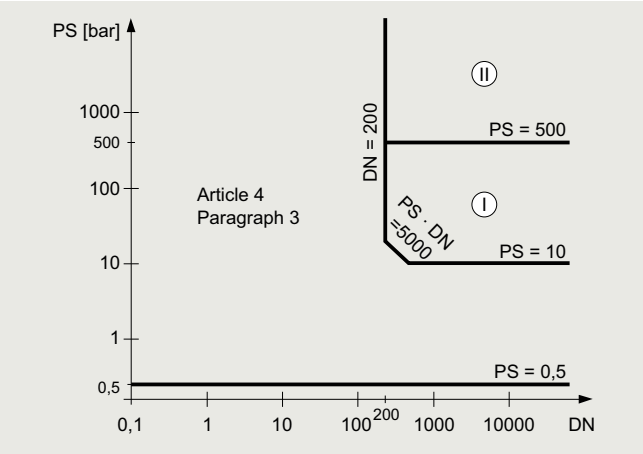

- Gases of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number i first dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.




- Gases of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number i second dash
- Exception: liquids at temperatures > 350 °C belonging to Category II must be included in Category III.




- Liquids of fluid group 1
- Piping in accordance with article 4 paragraph 1 letter c number ii first dash




- Liquids of fluid group 2
- Piping in accordance with article 4 paragraph 1 letter c number ii second dash

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## Overview



***Functional safety***

Functional safety is a strong tradition at Siemens. Werner von Siemens realized as early as 1880 that safety in automated processes is not only a human obligation, it also makes economic sense. In the process industry, hazards for humans, plants and the environment must be minimized without affecting the production process. With Safety Integrated for Process Automation from Siemens, you benefit from a comprehensive product and service offering for safe, fault-tolerant applications.

***What is the Safety Integrity Level (SIL)?***

The Safety Integrity Level is a term from the field of functional safety. It helps you assess electrical/electronic/programmable electronic systems in terms of the reliability of their safety functions. The goal is to minimize the risk of malfunction of the system and thereby increase the protection of the employed personnel, the environment and property.

The international standard IEC 61508 describes the type of risk assessment as well as measures for designing appropriate safety functions ranging from sensors, logic processing and ex-tending to actuators. The requirements for the process industry are further specified in IEC 61511-1.

Since the standards IEC 61508 and IEC 61511 for functional safety have been in effect, the demand for process instrumentation equipment conforming to SIL classification has continually increased. For this reason, the product portfolio is constantly expanded to include devices that meet the SIL standard.

You will find the current list of SIL devices from Siemens for process instrumentation available today at:

https://cache.industry.siemens.com/dl/files/162/109774162/att_1007813/v1/AP_PI_SIL_Products.pdf

***Additional information***

Brochure: "Functional Safety in Process Instrumentation with SIL Rating"

https://cache.industry.siemens.com/dl/files/169/109766169/att_980479/v1/SIL-Broschuere_EN.pdf

Website: "Functional Safety"

www.siemens.com/global/en/products/automation/topicareas/safety-integrated/process-automation.html

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## Overview

***Software types***

Software requiring a license is categorized into types.

The following software types have been defined:

- Engineering software
- Runtime software

***Engineering software***

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

***Runtime software***

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameteriza-tion/ configuration tools supplied as integral components of the scope of supply can be found in the readme file supplied with the relevant product(s).

***License types***

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

***Floating license***

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

***Single license***

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

***Rental license***

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

***Rental floating license***

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

***Trial license***

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

***Demo license***

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

***Demo floating license***

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

***Certificate of License (CoL)***

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

***Downgrading***

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

***Delivery versions***

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

***PowerPack***

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

***Upgrade***

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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## Overview

***ServicePack***

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed accord-ing to the number of existing original licenses.

***License key***

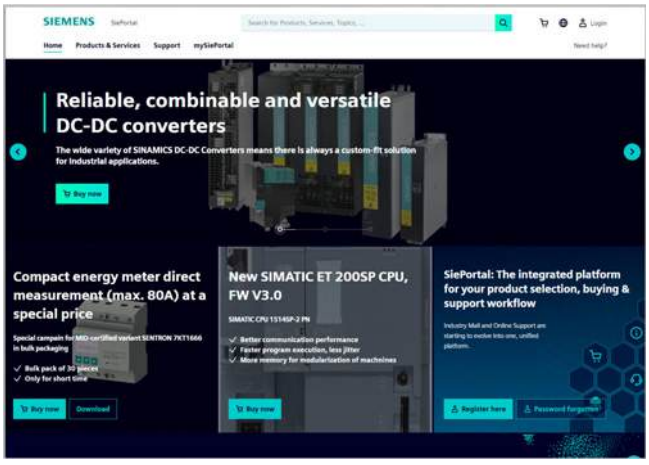
Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.
The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).
The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

***Software Update Service (SUS)***

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from https://mall.industry.siemens.com/legal/ww/en/terms_of_trade_en.pdf




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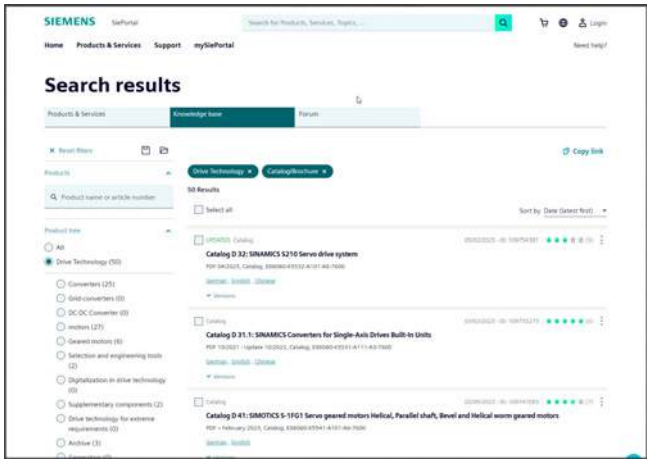
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