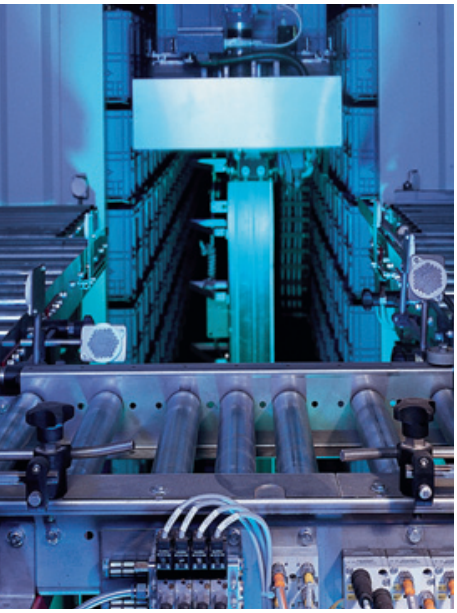
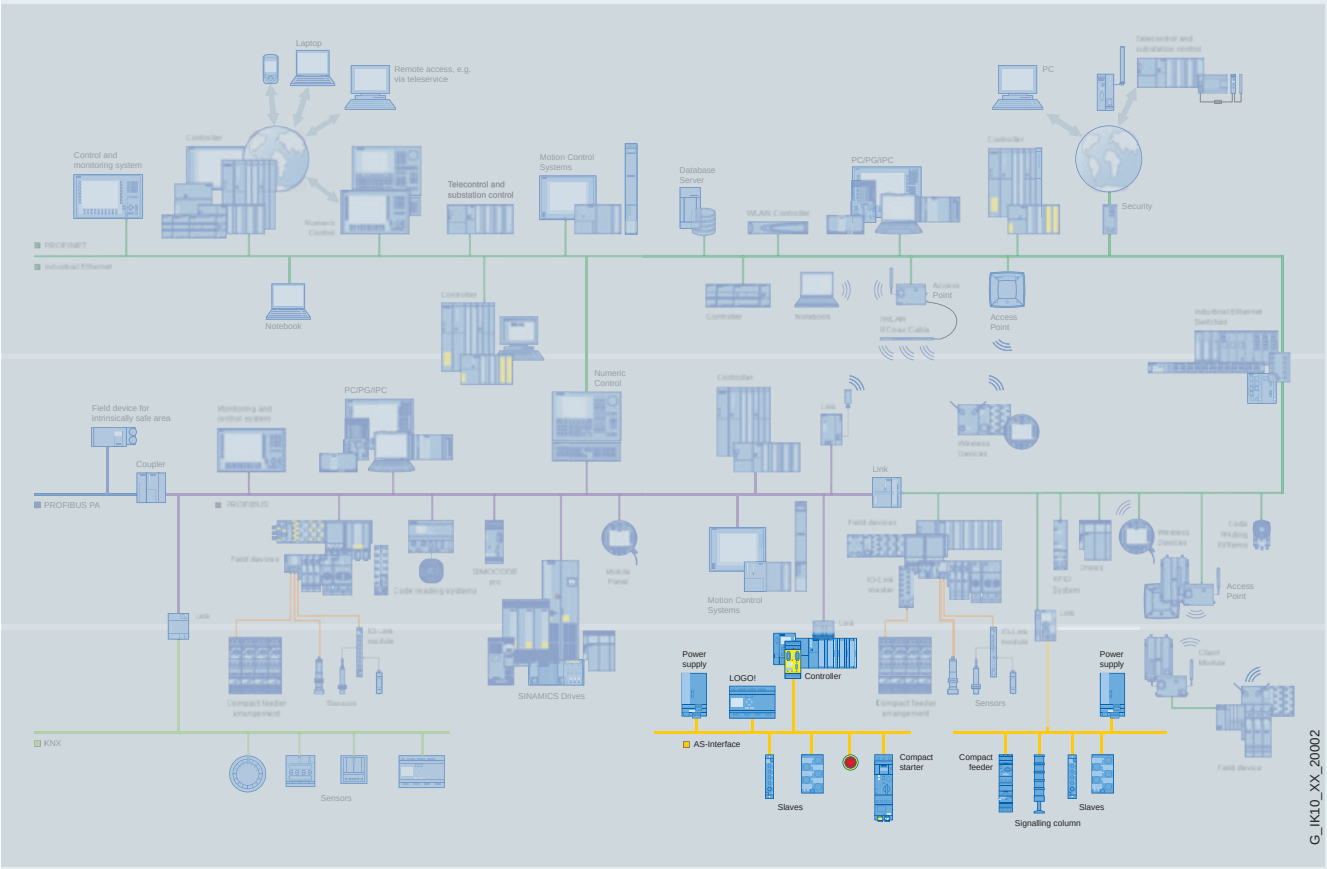
AS-Interface



Overview

AS-Interface is an open, international standard according to EN 50295 and IEC 62026-2 for process and field communication. Leading manufacturers of actuators and sensors all over the world support the AS-Interface. Interested companies are provided with the electrical and mechanical specifications by the AS-Interface Association.

AS-Interface is a single master system. For automation systems from Siemens, there are communications processors (CPs) and routers (links) which control the process or field communication as masters, and actuators and sensors which are activated as AS-Interface slaves.



Benefits

get Designed for Industry

A key feature of AS-Interface technology is the use of a shared two-conductor cable for data transmission and the distribution of auxiliary power to the sensors/actuators. An AS-Interface power supply unit that meets the requirements of the AS-Interface transmission method is used for the distribution of auxiliary power. The AS-Interface cable used for the wiring is mechanically coded and hence protected against polarity reversal and can be easily contacted by the insulation piercing method.

Elaborately wired control cables in the control cabinet and marshalling racks can be replaced by AS-Interface.

With this concept, you become extremely flexible and achieve high savings.

Application

Operating modes

Generally, master interfaces have the following operating modes:

I/O data exchange

In this operating mode, the inputs and outputs of the binary AS-Interface slaves are read and written.

Analog value transmission

AS-Interface masters according to the AS-Interface Specification V2.1 or V3.0 support integrated analog value processing. This means that data exchange with analog AS-Interface slaves (according to Analog Profile 7.3 or 7.4) is just as easy as with digital slaves.

Command interface

In addition to I/O data exchange with binary and analog AS-Interface slaves, the AS-Interface masters provide a number of other functions through the command interface.

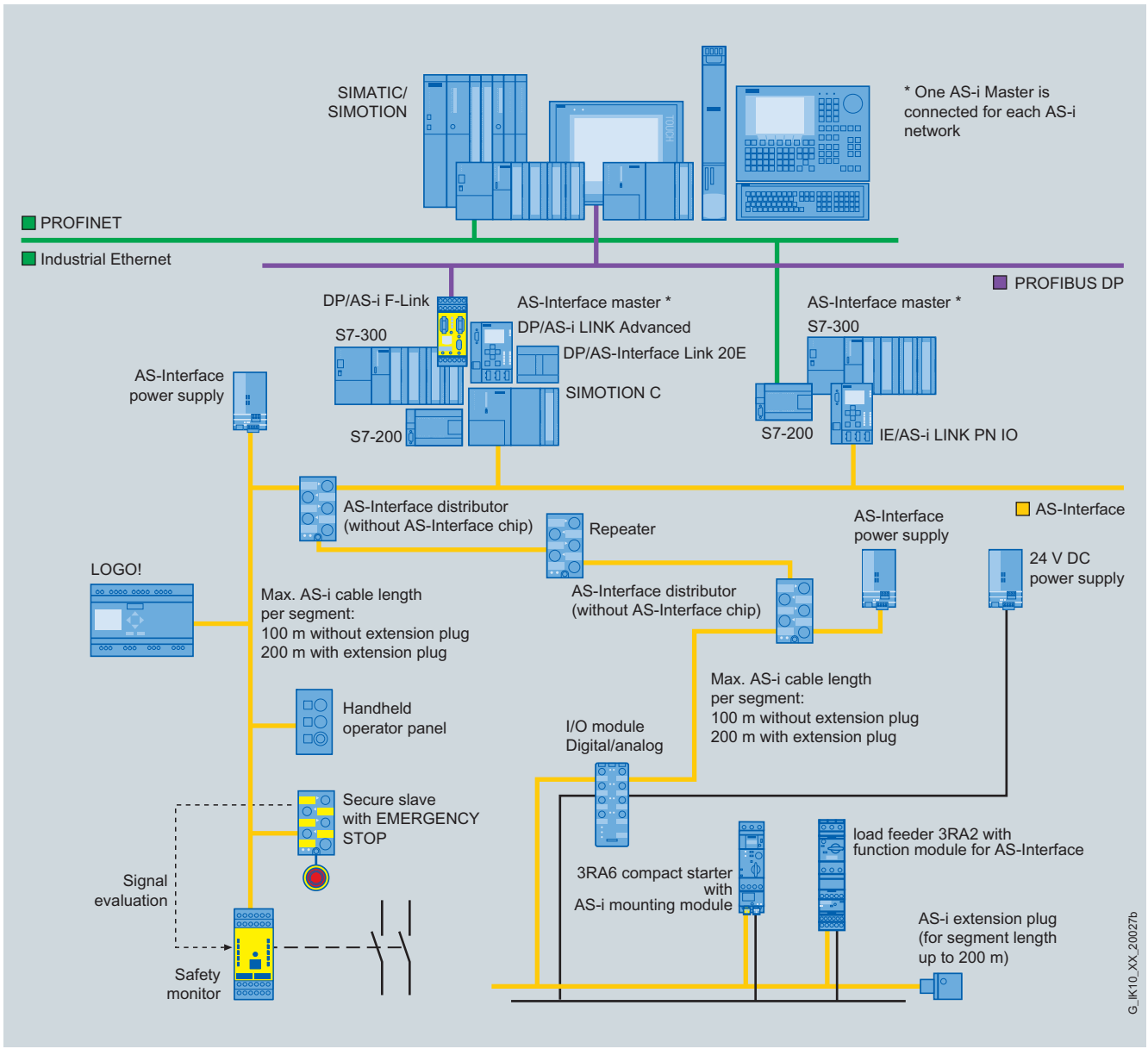
Hence it is possible, for example, for slave addresses to be issued, parameter values transferred or diagnostics information read out from user programs.

Overview

Process or field communication

The AS-Interface is used when individual actuators/sensors are spatially distributed through the machine (e.g. in a bottle filling plant, production line, among other things).
The AS-Interface replaces complex cable harnesses and connects binary and analog actuators and sensors, such as proximity switches, valves or indicator lights, to a control, for example, SIMATIC or a PC.

In practice this means: Installation is straightforward, because data and energy are conveyed together over one cable.
No special know-how for installation and commissioning is required. And thanks to the simple laying of the cable, its clear-cut structure and special version, there is not only far less risk of errors, but also less effort during maintenance and servicing.



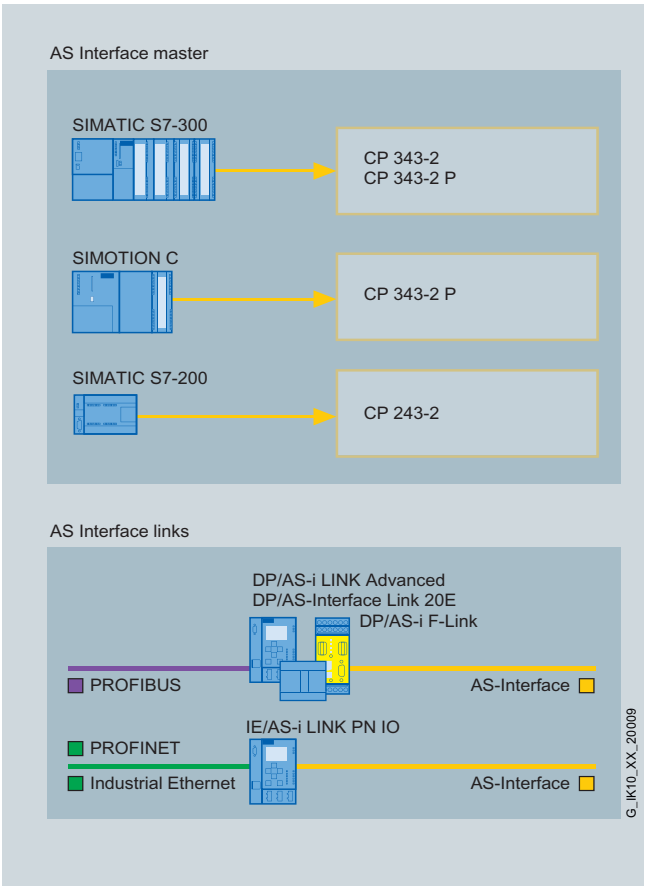
Example of a system configuration

Overview

System components

Numerous system components are offered for implementing the communication. The key elements of a system installation are:

- Master interface modules for central control units such as SIMATIC S5 and SIMATIC S7, ET 200M distributed peripherals or routers from PROFIBUS/PROFINET to AS-Interface
- AS-Interface shaped cables
- Network components such as repeaters and extension plugs
- Power supplies for the slaves
- Modules for connection of standard sensors/actuators
- Actuators and sensors with integrated AS-i slave
- Safety modules for transmitting safety-oriented data through AS-Interface
- Addressing units for setting the slave addresses during commissioning



AS-Interface masters and AS-Interface links (network transitions)

Features

Standard	EN 50295 / IEC 61158
Topology	Line, star or tree structure (same as electrical wiring)
Transmission medium	Unshielded two-conductor cable (2 x 1.5 mm^2) for data and auxiliary power
Connection methods	Contacting of the AS-Interface cable by insulation piercing method
Maximum cable length	100 m without a repeater 200 m with extension plug 300 m with two repeaters connected in series 600 m with extension plugs and two repeaters connected in parallel Larger cable lengths are possible when additional repeaters are connected in parallel
Maximum cycle time	5 ms with full expansion using standard addresses, 10 ms with full expansion using A/B addresses, profile-specific for Spec. 3.0 slaves
Number of stations per AS-Interface line	31 slaves according to AS-Interface Spec. V2.0; 62 slaves (A/B technology) according to AS-Interface Spec. V2.1 and V3.0, integrated analog value transmission
Number of binary sensors and actuators	Max. 124 DI/124 DO according to Spec. V2.0; max. 248 DI/186 DO according to Spec. V2.1; max. 496 DI/496 DO according to Spec. V3.0
Access control	Cyclic polling master slave method, cyclic data transfer by host (PLC, PC)
Error safeguard	Identification and repetition of faulty message frames

More information

For the modules referred to above, please also note the conditions of application and the additional information.

AS-Interface system manual

More information about AS-Interface is available in the AS-Interface System Manual.

The German-language AS-Interface System Manual can be downloaded for free from the Internet at:
support.automation.siemens.com/WW/view/de/26250840

The English-language AS-Interface System Manual can be downloaded for free from the Internet at:
support.automation.siemens.com/WW/view/en/26250840

Internet

You can find more information on the Internet at:
support.automation.siemens.com/WW/view/en/10805888/130000

Overview

The AS-Interface F adapter is used to connect an EMERGENCY-STOP control device according to ISO 13850 from the 3SB3 series to the AS-Interface bus system. The F adapter is suitable for control devices with mounting on front plates.

The F adapter has a safe AS-Interface 2E slave and is snapped from behind onto the EMERGENCY-STOP device (actuator). In the 2E/1A expanded version, an output is also available for actuating an indicator light with LED.

Connection to the AS-Interface bus cable is made with screw terminal, spring-type terminals or an insulation piercing method depending on the version. Addressing is performed using the AS-Interface connection or the integrated addressing socket.

Safety category 4 (SIL3) is achieved with the adapter.

Selection and ordering data

	Version	Connection	Order No.
	AS-Interface F adapters for 3SB3 EMERGENCY-STOP actuator For mounting on front plate		
 3SF5 402-1AA03	• 2I	Screw terminals	**3SF5 402-1AA03**
	• 2I/1O, with output for LED control		**3SF5 402-1AB03**
 3SF5 402-1AA04	• 2I	Spring-type terminals	**3SF5 402-1AA04**
	• 2I/1O, with output for LED control		**3SF5 402-1AB04**
 3SF5 402-1AA05	• 2I	Insulation piercing method	**3SF5 402-1AA05** NEW
	• 2I/1O, with output for LED control		**3SF5 402-1AB05** NEW

ASIsafe laser scanner

Overview

The laser scanner is an optical distance sensor for flexible monitoring of hazardous areas in horizontal applications, for access control in vertical applications, and for motion monitoring.

The provide perfect all-round protection up to Category 3 according to EN 954-1, SIL 2 according to IEC 61508, and PL d according to ISO 13849-1.

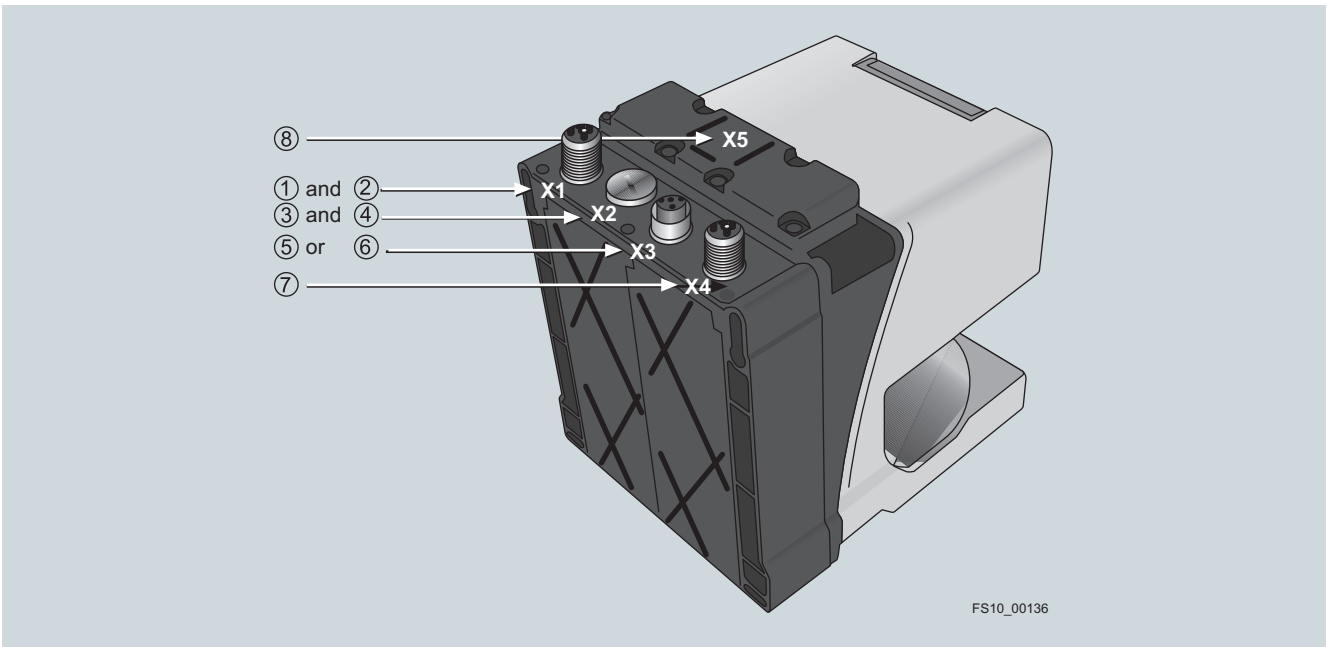
SIMATIC FS600 laser scanners work in an operating field of 190° and over a distance of up to 6.25 m. In this range the laser scanner reliably senses every object and every person.

And it works so simply: The distance sensor emits light pulses at regular intervals. If they hit an obstruction, the sensor receives the reflected light and evaluates it. If this is evaluated as the predefined area to be protected, a Stop function is triggered.

With up to 8 programmable protective fields that can be selected during operation, our laser scanners can be optimally adapted to any application – on machines, production robots, conveyor systems, or vehicles.

Different variants support optimal integration in the automation system: Whether conventionally in the safety circuit, over PROFIBUS with PROFIsafe or over AS-Interface with ASIsafe.

Integration



Terminal	Description	Item	Connectable accessories	Order No.
X1	M12 connector for AS-Interface connection (bus connection and 24 V DC power supply)	1	Laser scanner connecting cable to M12 AS-Interface adapter	3RG78 38-1EA (1 m) 3RG78 38-1EB (2 m)
		2	M12 AS-Interface adapter	3RG78 38-1DG
X2	Connection for AS-Interface addressing and diagnostics unit	3	AS-Interface addressing and diagnostics unit	3RK1 904-2AB01
		4	Connecting cable with M12 socket and M12 plug (3-core)	3RX8 000-0GF32-1AB5 (1.5 m)
X3	M12 socket for connecting the changeover for the protective fields	5	M12 jumper plug (suitable for protection field 1)	3RG78 38-1DF
		6	M12 connector with terminal housing, 5-pin	3RX8 000-0CD55
X4	M12 connector for connecting a restart button (optional)	7	M12 cable socket with terminal housing, 5-pin	3RX8 000-0CB55
X5	Optical PC interface	8	PC connecting cable for laser scanner with optical interface, 9-pin	3RG78 38-1DC

Technical specifications

Type	ASIsafe laser scanner
Protective field	
Protective field	2.15 m, 4 m, 6.25 m
Degree of remission	min. 1.8 %
Resolutions	Resolutions: 30, 40, 50, 70, 150 mm
Response time	
• 2-fold evaluation (2 scans)	85 ms (laser scanner only, without AS-Interface system times)
• Adjustable up to 16 scans	645 ms (laser scanner only, without AS-Interface system times)
Number	4 / 8 (selectable via switched inputs)
Safety category acc. to IEC 61506	SIL 2
Output	Safe AS-Interface interface
Start-up	Start-up test and start-up disable can be set separately
Warm restart	160 ms to 10 s (settable or manually)
Protective field additional distance	
• with dust suppression deactivated	83 mm
• with dust suppression activated	
- For protective fields < 3.5 mm	83 mm
- For protective fields > 3.5 mm	100 mm
• Additional distance for retro-reflectors or strongly reflective surfaces (such as certain metals or ceramics in the scan plane)	
- Over 1.2 m behind the protective field line	0 mm
- In the protective field or up to 1.2 m behind the protective field line	110 mm
Warning zone	
Detection zone	0 ... 15 m
Degree of remission	min. 20%
Object size	150 × 150 mm
Response time	
• 2-fold evaluation (2 scans)	85 ms (laser scanner only, without AS-Interface system times)
• Adjustable up to 16 scans	645 ms (laser scanner only, without AS-Interface system times)
Number of warning zones	4 / 8 (selectable via switched inputs)
Output	AS-Interface

Type	ASIsafe laser scanner
Contour measurement	
Detection zone	0 ... 50 m
Degree of remission	min. 20%
Output	RS232 serial interface via infrared interface
Radial resolution	5 mm
Lateral resolution	0.36 °
Supply voltage	
• via AS-Interface network	29.5 ... 31.6 V (according to AS-Interface specification)
• via external supply	24 V DC (+/-20 %)
• Note	The power supply unit of the external power supply as well as the AS-Interface power supply unit used to supply the AS-Interface components must provide safe isolation from the supply according to IEC 60742 and bridge short-term power failures of up to 20 ms (e.g. the AS-Interface power supply unit 3RX9 307-0AA00)
Overcurrent protection	Fuse 1.25 A, slow acting
Current consumption from the supply circuit, typically	400 mA
Current consumption from the AS-Interface circuit, typically	50 mA
Inputs	
Restart/Reset	Connection of a command device for operating mode "With restart inhibit" and/or device reset, dynamically monitored, 24 V DC opto-decoupled
Field pair switchover	Selection of 4 field pairs over 4 control lines with internal monitoring (1 field pair = 1 protective zone and 1 warning zone), 24 V DC opto-decoupled
Signal definition	
• High (logic 1)	16 ... 30 V
• Low (logic 0)	< 3 V
Control cable	
• Length	max. 50 m (0.5 mm^2 conductor cross-section, shielded)
AS-Interface address programming	Connection of a generally available AS-Interface address programming device
RS232 interfaces by means of infrared interface	For device parameterization and field function
Optical system	
Range of angle	190 °
Angle resolution	0.36 °
Lateral tolerance	
• Without mounting system (with reference to rear of enclosure)	± 0.18 °
• With mounting system (with reference to the mounting surface)	± 0.22 °
Scan rate	25 scans/s or 40 ms/scan
Laser protection class	
• According to standard	EN 60825-1, Class 1 (safe for eyes)
Wave length	905 nm
Beam divergence	2 mrad
Time basis	100 s

ASIsafe laser scanner

Technical specifications (continued)

Type	ASIsafe laser scanner
Environment and material	
Degree of protection	IP65
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-20 ... +60 °C
Housing insulation class	Type of protection 2
Humidity	according to DIN 40040, Table 10, identification letter E (fairly dry)
Dimensions (W × H × D) in mm	141 × 167 × 168
Weight	2.25 kg
Emitter	Infrared laser diode (λ = 905 nm)
Housing	Cast aluminum, plastic, steel connection plate

Type	ASIsafe laser scanner
Vibratory load over three axes according to IEC 60068, Part 2-6	10 ... 150 Hz, max. 5 *g*
Continuous shock over three axes according to IEC 60068, Part 2-29	10 *g*, 16 ms
Rotating mirror drive	Brushless DC motor
Rotating mirror bearings	Maintenance-free ball bearings
AS-Interface	
ID code	B
I/O code	0 (four data bits as outputs)
Slave address	Programmed by user in the range from 1 to 31 (delivery status = 0)
Cycle time according to AS-Interface specification	5 ms
Profile	Safe slave

"Safety of machinery" for ASIsafe laser scanners

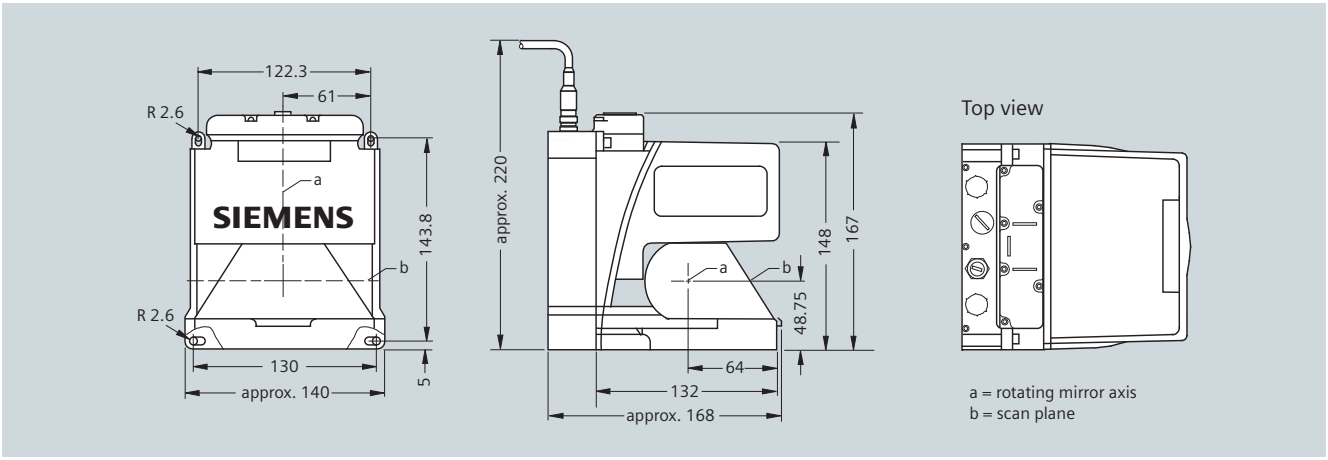
	IEC/EN 61496	IEC/EN 61508	PL 13849-1	Category ISO 3849-1	Cat. 954-1	PFHD	TM p.a.
Laser scanner	Type 3	SIL 2	d	3	3	1.5 10^{-7}	20

Ordering data

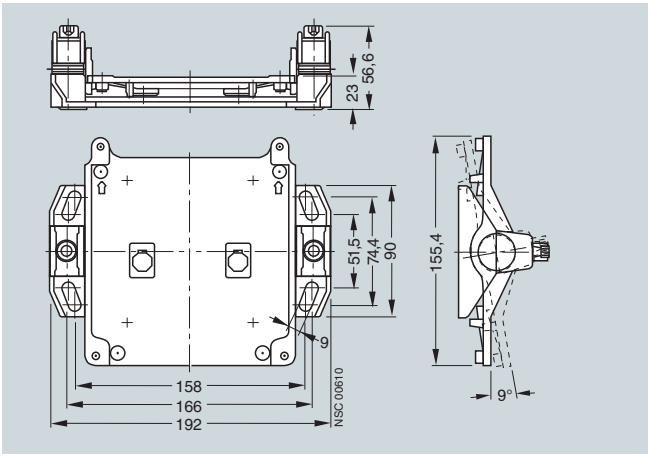
	Order No.
ASIsafe laser scanner for protection in a horizontal plane, including LS4soft software	
SIMATIC FS620I • Maximum size of protective field: 4 m • 4 protective field/warning field pairs • Resolutions: 70, 150 mm	**3SF78 34-6DD00**
ASIsafe laser scanner for protection in a horizontal and vertical plane, including LS4soft software	
SIMATIC FS660I • Maximum size of protective field: 4 m • 8 protective field/warning field pairs • Resolutions: 30, 40, 50, 70, 150 mm	**3SF78 34-6DE00**
SIMATIC FS660 LR • Maximum size of protective field: 6.25 m • 8 protective field/warning field pairs • Resolutions: 30, 40, 50, 70, 150 mm	**3SF78 34-6LE00** NEW
ASIsafe laser scanner for protection in a horizontal and vertical plane and motion monitoring, including LS4soft software	
SIMATIC FS670 • Maximum size of protective field: 4 m • 8 protective field/warning field pairs • Resolutions: 30, 40, 50, 70, 150 mm	**3SF78 34-6DM00** NEW
SIMATIC FS670 LR • Maximum size of protective field: 6.25 m • 8 protective field/warning field pairs • Resolutions: 30, 40, 50, 70, 150 mm	**3SF78 34-6LM00** NEW

	Order No.
Accessories	
Assembly system Swivel-mounted, for easy alignment	**3RG7 838-1AA**
Adapter plate for PLS mounting support	**3RG7 838-1AB**
Cleaning set Includes cleaning fluid (1000 ml), cloths (100 units)	**3RG7 838-7RS**
Connectors and cables	
PC connection cable for AS-Interface and PROFIBUS laser scanner Includes plug (9-pin) and optical interface	**3RG7 838-1DC**
M12 jumper plug (suitable for protection field 1)	**3RG7 838-1DF**
M12 adapter For AS-Interface and power supply	**3RG7 838-1DG**
M12 laser scanner – M12 adapter connection cable	**3RG7 838-1EA**
• 5-pin, 1 m	
• 5-pin, 2 m	**3RG7 838-1EB**

Dimensions

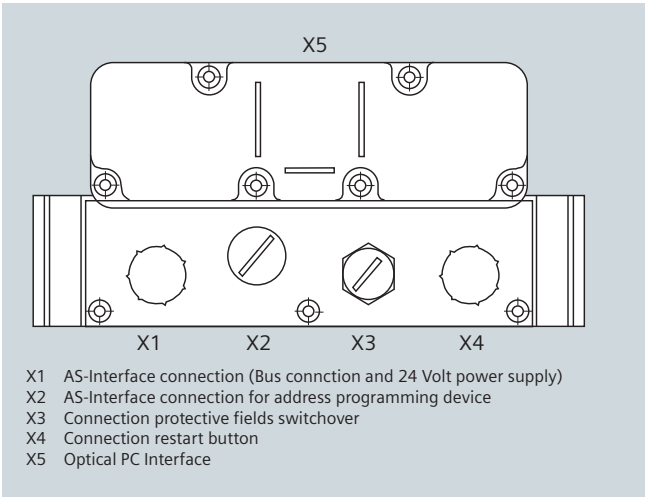


ASIsafe laser scanner



Assembly system 3RG7 838-1AA

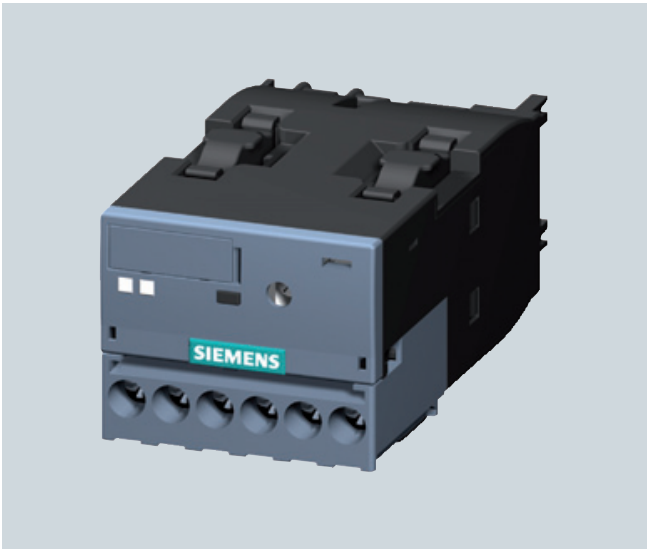
Schematics



X1 AS-Interface connection (Bus connction and 24 Volt power supply)
X2 AS-Interface connection for address programming device
X3 Connection protective fields switchover
X4 Connection restart button
X5 Optical PC Interface

SIRIUS function modules for AS-Interface

Overview



3RA27 12 function module for AS-Interface

A motor feeder which is configured with 3RT2 contactors can be connected with the help of 3RA27 function modules to a higher-level control system. The SIRIUS function modules for connection to the control system are available in an AS-i version and in an IO-Link version.

The function modules for connecting to the control system are available for direct-on-line, reversing and wye-delta starters. They are plugged directly into the front interface of the 3RT2 contactors and therefore require one contactor with communication interface per feeder (see Catalog news "LV 1 N SIRIUS Innovations · 11/2009, Chapter 3).

The function modules perform the following tasks:

- Communication, e.g. contactor operation and feedback, ready signal
- Electrical interlocking, e.g. for the reversing and wye-delta starter
- Timing relay function, e.g. wye-delta reversing time

Communication information and control supply voltage are passed on through module connectors so that the complete control current wiring on the starter is no longer needed.

The function modules are equipped with removable terminals with screw or spring-type connections. They also have an input for local disconnection, which can be connected, for example, to a limit switch.

The 3RA27 function modules for AS-Interface connection are implemented in A/B technology, making it easy to connect up to 62 feeders (regardless of whether they are direct-on-line, reversing or wye-delta starters) to an AS-i master. This results in a significant reduction of wiring compared to the conventional parallel wiring method. The electrical connection is made using standard cables.

The process image corresponds to that of the compact feeder (see Chapter 6 of the Catalog news "LV 1 N SIRIUS Innovations · 11/2009), and to that of all motor starters. Easy, duplicatable programming of the control system is thus possible.

Benefits

The SIRIUS function modules for connecting to the control system offer many different advantages. The most important are:

- Reduction of control current wiring through plug-in technology, feeder groups and integrated monitoring of circuit breaker and contactor
- Reduced space requirement in the control cabinet through fewer digital inputs and outputs in the control system
- Easy configuring through operation of feeders instead of individual contactors
- Enhanced operational reliability and quick wiring thanks to spring-type connections
- Can be flexibly combined with many automation solutions using the open, standardized IO-Link wiring system
- Small number of variants by using identical modules for size S00 and S0 contactors

This means that the SIRIUS feeder is fully integrated in the automation landscape and can use all the advantages of TIA (e.g. integration in the TIA Maintenance Station).

Application

The SIRIUS function modules for connecting to the control system can be used wherever standard induction motors up to 38 A (approx. 18.5 kW/400 V) with 3RT2 contactors are started. The AS-Interface connection is recommended wherever load feeders are used in distributed applications.

Approvals according to IEC, UL and CSA standards have been issued for the function modules.

Selection and ordering data

For selection and ordering data, see the Catalog news "LV 1 N SIRIUS Innovations · 11/2009", Chapter 3 (Accessories for 3RT2 contactors) and Chapter 6 (Accessories for 3RA2 Load Feeders).

Accessories

For the function modules, there is a selection of different module connectors that can be used if contactor assemblies for wye-delta starting are to be configured for multiple sizes or non-side-by-side arrangements.

More information

More information can be found in the Catalog news "LV 1 N SIRIUS Innovations · 11/2009" or in the Industry Mall.

For example:

- Details of power contactors for switching motors and contactor assemblies can be found in in the aforementioned Catalog news, Chapter 3 or in the Industry Mall under "Automation" --> "Industrial Communication" --> "AS-Interface" --> "Slaves" --> "Contactors and Contactor Assemblies"
- Details of function modules for AS-Interface can be found in the aforementioned Catalog news, Chapter 3 or in the Industry Mall under "Automation" --> "Industrial Communication" --> "AS-Interface" --> "Slaves" --> "Contactor and Contactor Assemblies" --> "SIRIUS Function Modules for AS-Interface"
- Details of motor starters for operation in the control cabinet can be found in the aforementioned Catalog news, Chapter 6 or in the Industry Mall under "Automation" --> "Industrial Communication" --> "AS-Interface" --> "Slaves" --> "Motor Starters for Operation in the Control Cabinet"

Overview

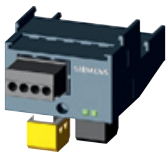
The following add-on modules are available for communication of the 3RA6 compact feeder with the control system using AS-Interface:

- AS-i add-on module
- AS-i add-on module with two local inputs
- AS-i add-on module with two free external inputs
- AS-i add-on module with one free external input and one free external output
- AS-i add-on module with two free external outputs

The AS-i add-on modules can be combined only in connection with compact feeders with a rated control supply voltage of 24 V AC/DC.

- Addressing unit for addressing the AS-i add-on module

Selection and ordering data

	Type	Order No.
	AS-i add-on modules	
 3RA69 70-3A	**AS-i add-on module** For communication of the compact feeder with the control system using AS-Interface	**3RA69 70-3A**
	AS-i add-on module with two local inputs For safe disconnection through local safety relays, e.g. cable-operated switches	**3RA69 70-3B**
	AS-i add-on module with two free external inputs Replaces the digital standard inputs "Motor On" and "Group warning"	**3RA69 70-3C**
	AS-i add-on module with one free external input and one free external output Replaces the digital standard input "Group warning"	**3RA69 70-3D**
	AS-i add-on module with two free external outputs Only for direct-on-line starters Replaces the digital standard output "Motor left"	**3RA69 70-3E**
 3RA69 70-3F	**AS-i add-on module for on-site controller** Either control of the compact feeder using AS-Interface or using on-site switches	**3RA69 70-3F**
 3RK19 04-2AB01	**Addressing units for AS-i add-on modules** • For active AS-Interface modules, intelligent sensors and actuators • According to AS-Interface Version 2.1 • Including expanded addressing mode • Scope of supply - 1 addressing unit - 1 operating manual (German, English, French, Spanish, Italian) - 1 addressing cable (1.5 m, with jack plug)	**3RK19 04-2AB01**

6

SIRIUS M200D motor starters
General data

Overview

The intelligent and highly SIRIUS M200D motor starters for the decentral installation, start, monitor and protect motors and loads up to 5.5 kW.

M200D motor starters are available in four versions:

M200D AS-i Basic	M200D AS-i Standard	M200D PROFIBUS	M200D PROFINET
Motor control with AS-i Communication		PROFIBUS	PROFINET
Mechanical or electronic switching ✔	✔	✔	✔
Electronic switching with soft starter functionality --	✔	✔	✔

Basic functionality

All M200D motor starter versions have the following functions:

- Available as direct-on-line and reversing starters in a rugged design
- Electromechanical or solid-state switching version
- Little variance – only 2 device versions up to 5.5 kW thanks to wide range setting
- All versions have the same enclosure dimensions
- Degree of protection IP65
- Quick and failsafe wiring of system and motor cables using ISO 23570 plug-in connector technology (Q4/2 and Q8/0)
- Robust and widely used M12 connection method for digital inputs and outputs
- Integrated feeder connector monitoring
- Full motor protection through overload protection and a temperature sensor (PTC, TC)
- Short-circuit and overload protection integrated
- Integrated repair switch lockable with 3 locks (multi-level service)
- Uniform wiring to the G110D/G120D frequency converters and to the ET 200pro distributed peripherals system
- Extensive diagnostics concept using LEDs
- Optional integrated manual on-site controller with key-operated switch (ordering option)
- Optionally available brake actuation with voltages from 180 V DC (no rectifier needed in motor) or 230/400 V AC (order versions)

Benefits

M200D motor starters provide the following advantages for customers:

- High plant availability through plug-in capability of the main circuit, communication and IOs – relevant for installing and replacing devices
- Cabinet-free construction and near-motor installation thanks to the high degree of protection IP65
- The motor starters record the actual current flow for the parameterizable electronic motor overload protection. Reliable messages concerning the overranging or underranging of setpoint values for comprehensive motor protection. All motor protection functions can be defined by simple parameterization
- Low stock levels and low order costs through a wide setting range for the current or a wide setting range for the electronic motor protection of 1:10 (only 2 device versions up to 5.5 kW)
- The integrated wide range for the current enables a single device to cover numerous standard motors of different sizes
- Comprehensive offering of accessories, including ready-assembled cables
- The M200D motor starters can be installed with a few manual steps. The integrated plug-in technology enables far lower wiring outlay: preassembled cables can be plugged directly onto the motor starter module
- Easy and user-friendly installation because all versions have the same enclosure dimensions
- Fast and user-friendly commissioning using an optional manual on-site controller
- Increase of process speed through integrated functions such as "Quick-Stop" and "Disable Quick-Stop", e.g. at points and crossings
- Optional manual on-site controller with momentary-contact and latching operation for easier start-up and easier service

Application

The high degree of protection IP65 makes the M200D motor starters suitable, in particular for use on extensive conveying systems such as those found in mail sorting centers, airports, automotive factories and the packing industry.

For simple operating mechanism tasks, particularly in conveyor applications, the new SINAMICS G110D frequency converter series with a performance range from 0.75 kW to 7.5 kW and degree of protection IP65 is the ideal partner for the M200D motor starters. The SINAMICS G110D frequency converters permit continuous speed control of three-phase asynchronous motors and meet the requirements of conveyor applications with frequency control (for more information, see Catalog D 11.1).

Overview

The M200D motor starter versions SIRIUS M200D, AS-i Basic and SIRIUS M200D AS-i standard (for basic functionality see M200D motor starters, General data.) exist for motor control via AS-Interface.

SIRIUS M200D AS-i Basic

Functionality

- Easy and fast on-site start-up through parameterization of local setting elements (DIP switches) and rotary coding switches for adjusting the rated operational current. The rotary coding switch has an OFF position for deactivating the overload protection with the help of the thermal motor model when using a temperature sensor.

Communication

- AS-i communication with A/B addressing according to Spec V2.1
- The AS-i bus is connected cost-effectively using an M12 connection on the device. Of the 4 digital inputs, 2 are contained in the process image and can therefore be used in the PLC program. The other 2 inputs are locally effective and permanently assigned with functions.
- The LEDs can provide comprehensive diagnostics of the device on the spot. In addition to diagnostics using the PAE process image, the device can create up to 15 different diagnostic signals per slave. The message with the highest priority can be read out through the AS-i communication. This is yet another new development which distinguishes the M200D AS-i Basic motor starter from the rest of the market and adds innovative technology, maximum availability and transparency to the system.

SIRIUS M200D AS-i Standard

The intelligent, highly flexible M200D AS-i Standard motor starters in A/B technology are designed to start and protect motors and loads up to 5.5 kW. They are available in direct-on-line or reversing starter variants, in a mechanical version and also an electronic version (the latter with soft start function).

The M200D AS-i Standard motor starter is the most functional member of the SIRIUS motor starter family in the high degree of protection IP65 for AS-i Communication. It is designed to be compatible with other SIRIUS M200D motor starter products and the frequency converter and the ET 200pro peripheral system.

Functionality

- AS-i communication with A/B addressing according to Spec 3.0
- Electronic version also with soft start function
- AS-i slave profile 7.A.E / 7.A.5 with process image 6E/4A
- Full TIA integration: All digital inputs and outputs exist in the cyclic process image and are visible through AS-i, providing maximum flexibility and best adaptability to the application
- Additionally expanded diagnostics using data record through AS-i bus
- Complete plant monitoring using statistics data record and current value monitoring by means of data records
- Parameterization through AS-i bus with the help of data records or an expanded process image from the user program
- Control of the motor starter using a command data record from the user program
- Flexible assignment of the digital inputs and outputs with all available assignable input actions
- Parameterization using Motor Starter ES at the local interface (ordering option for start-up software)
- Diagnostics with the help of Motor Starter ES (ordering option for start-up software)

Mounting and installation

The M200D motor starters can be installed with a few manual steps. The integrated plug-in technology enables far lower wiring outlay. Connecting cables can be plugged directly onto the motor starter module. Swapping of the connecting wires and malfunctions within the plant are prevented by preassembled cables. The AS-i bus is connected cost-effectively using an M12 connection on the device.
All versions have identical enclosure dimensions for easier system design and conversion.

Parameterization and configuration

The particularly robust M200D AS-i Standard motor starter is characterized by numerous functions which can be flexibly parameterized. It enables highly flexible parameterization through the AS-i bus using data records from the user program as well as user-friendly local parameterization using the Motor Starter ES start-up software through the local point-to-point interface.

Functions can be flexibly assigned to the digital inputs and outputs, adapting them to all possible conveyor applications. All motor protection functions, limit values and reactions can be defined by parameterization. The AS-i Standard is unique. In its 6E/4A process image, the motor starter sends all 4 digital inputs and the digital output via the process image to the PLC in cyclic mode. System configuration and system documentation are facilitated not least by a number of CAX data.

Operation

The new motor starter generation is characterized by high functionality, maximum flexibility and the highest level of automation.

All digital inputs and outputs exist in the cyclic process image. All limit values for monitoring functions and their reactions are parameterizable and therefore adaptable to the application. The motor starters record the actual current flow. Evaluating the current of the parameterizable solid-state overload protection increases the availability of the drives, as do reliable messages concerning the overranging or underranging of setpoint values.

Diagnostics and maintenance

The M200D sets new standards for diagnostics. In addition to diagnostics using the PAE process image and diagnostics by "parameter echo" (up to 15 different diagnostic signals per slave can be read out via AS-i Communication), the possibility of reading out diagnostic data records is unique on the market.

The AS-i Standard is recommended, in particular, for expansive and highly automated plant parts, because the possibility of monitoring devices and systems with data records (statistical data, measured values and device diagnostics) provides an in-depth view of the plant from the control room, guaranteeing the monitoring process and increasing plant availability.

The integrated maintenance timer can be used to implement preventative maintenance and avoid plant downtimes through look-ahead servicing.

Local on-site control of a drive is possible using the ordering option with integrated manual operation. This is yet another new development which distinguishes the M200D AS-i Standard motor starter from the rest of the market and adds innovative technology, maximum availability and transparency to the plant.

Overview (continued)

	 SIRIUS M200D AS-i Basic	 SIRIUS M200D AS-i Standard
Device functions (software features)		
Slave on the bus		
Fieldbus	✔ AS-i	
Slave type	✔ A/B acc. to Spec 2.1	✔ A/B acc. to Spec 3.0
Profile	✔ 7.A.E	✔ 7.A.E & 7.A.5
Number of assigned AS-i addresses on the bus	✔ 1	✔ 2
Number of stations per AS-i master	✔ Maximum 62 devices	✔ Maximum 31 devices
AS-i master profile	✔ M3 and higher	✔ M4 and higher
Parameterization		
DIP switches	✔	--
Potentiometer for rated operational current	✔	--
ES Motor Starter	--	✔
Data records through AS-i	--	✔
Diagnostics		
Diagnostics through parameter channel	✔	
Acyclic through data records	--	✔
Expanded process image PAE 4 bytes	--	✔
Process image		
Process image	✔ 4E/3A	✔ 6E/4A
Data channels		
Local optical interface (manual on-site)	✔	
AS-i bus	✔	
Motor Starter ES through local interface	--	✔
Motor Starter ES through bus	--	
Data records[1] (acyclic)		
Parameterization	--	✔
Diagnostics	--	✔
Measured values	--	✔
Statistics	--	✔
Commands	--	✔
Inputs		
Qty	✔ 4	
• Of these in the process image	✔ 2 through AS-i	✔ 4 through AS-i
Input action	✔ Permanently assigned functions, see manual	✔ Parameterizable: Flexible
Quick-Stop	✔ Permanent function: latching, edge-triggered	✔ Parameterizable function: latching (edge-triggered), non-latching (level-triggered)
Outputs		
Qty	✔ 1	
Output action	✔ Permanent function: assigned with group fault	✔ Parameterizable: Function, see manual
Brake output		
180 V DC / 230/400 V AC / none	✔	
Motor protection		
Overload protection	✔ Electronic, wide range 1:10	
Short-circuit protection	✔	
Full motor protection	✔	
Temperature sensor	✔ Parameterizable using DIP switches: PTC or Thermoclick or deactivated	✔ Parameterizable using ES Motor Starter, data record: PTC or Thermoclick or deactivated

✔ Function is available; -- Function is not available.

1) The data records are a reduced selection compared with PROFIBUS/PROFINET

Overview (continued)

	 SIRIUS M200D AS-i Basic	 SIRIUS M200D AS-i Standard
Device functions (software features)		
Device functions		
Repair switch	✔	
Current limit monitoring bottom	--	✔ Parameterizable
Current limit monitoring top	--	✔ Parameterizable
Zero current detection	✔ Permanent function: disconnection, less than 18.75 % of the rated operational current I_e	✔ Parameterizable
Blocking current	✔ Permanent function: Starting up of the motor: tripping limit at 800 % of the rated operational current I_e for 10 s Active operation: threshold for tripping "blocking current" at 400 % of the rated operational current I_e	✔ Parameterizable
Unbalance	✔ Permanent function: at 30 % of the rated operational current I_e (only mechanical MS)	✔ Parameterizable
Load type	✔ Permanent function: three-phase	✔ Parameterizable: single- and three-phase
Shutdown class	✔ Parameterizable using DIP switches: Class 10 / deactivated	Parameterizable using ES Motor Starter, data record: Class 5, 10, 15, 20
Protection against voltage failure	✔	✔ Parameterizable: Activated/deactivated
Soft starter control function		
Soft start function	--	✔
Bypass function	--	✔ Only electronic version

✔ Function is available; -- Function is not available.

Application

The M200D AS-i standard is particularly suitable for highly automated applications in conveyor systems, which require that devices and plants be monitored to prevent or limit plant down-time. The option of planning the functions of the motor starter or its interfaces also makes fine-adjustment to the function of the motor starter in the application possible and hence, provides for extreme flexibility.

M200D Motor Starters for AS-Interface

More information

Type		M200D Motor Starters			
		AS-i Basic electromechanical switching	AS-i Basic electronic switching	AS-i Standard electromechanical switching	AS-i Standard electronic switching
Technology designation[1]		DSte / RSte	sDSte / sRSte	DSte / RSte	sDSSte / sRSSte
Mechanics and environment					
Mounting dimensions (W x H x D)	mm	294 x 215 x 159			
Permissible ambient temperature					
• During operation	°C	-25 ... +55			
• During storage	°C	-40 ... +70			
Weight	g	2880 / 3130	3220 / 3420	2880 / 3130	3220 / 3420
Permissible mounting position		Vertical, horizontal, lying			
Vibration resistance acc. to IEC 60068 Part 2-6		2 *g*			
Shock resistance					
• Acc. to IEC 60068 Part 2-27		12 *g*/11 ms half-sine			
• Without influencing the contact position		9,8 *g*/5 ms or 5.9 *g*/10 ms			
Degree of protection acc. to IEC 529		IP65			
Installation height					
• Up to 1000 m		No derating			
• Up to 2000 m		1 % per 100 m			
Cooling		Convection			
Protection class IEC 536 (VDE 0106-1)		1			
Electrical specifications					
Control circuit					
Operational voltage U_{As-i}	V DC	26.5 ... 31.6			
Control supply voltage U_{aux}	V DC	20.4 ... 28.8			
Power consumption from AS-i (incl. 200 mA sensor supply)	mA	<300			
Power consumption from U_{aux} (without digital output)					
• Max.	mA	155	15 (direct-on-line)/ 175 (reversing)	155	15 (direct-on-line)/ 175 (reversing)
• Typ.	mA	75	10 (direct-on-line)/ 75 (reversing)	75	10 (direct-on-line)/ 75 (reversing)
Main circuit					
Maximum power of induction motors at 400 V AC	kW	5.5	4	5.5	5.5
Rated operational voltage U_e					
• Approval acc. to EN 60947-1	V AC	400 (50/60 Hz)			
• Approval acc. to UL and CSA	V AC	600 (50/60 Hz)			480 (50/60 Hz)
• Rated operational current range	A	0.15 ... 2 / 1.5 ...12	--	0.15 ... 2 / 1.5 ...12	--
• Rated operational current range for soft start	A	--			0.15 ... 2 / 1.5 ...12
• Rated operational current range for direct start	A	--	0.15 - 2 /1.5 - 9	--	0.15 - 2 /1.5 - 9
Rated operational current for starter I_e at 400 V AC					
• 400 V - AC-1 / 2 / 3	A	12	--	12	--
• 500 V - AC-1 / 2 / 3	A	9	--	9	--
• 400 V - AC-4	A	4	--	4	--
• 400 V AC53a	A	--	9	--	12 for soft starting 9 for direct-in-line starting

[1] DS ... Direct-on-line starter
RS ... Reversing starters
te ..... Full motor protection (thermal + electronic)
s ..... Electronic switching with semiconductor

[2] Only systems with grounded neutral point permitted

More information (continued)

Type		M200D Motor Starters			
		AS-i Basic electromechanical switching	AS-i Basic electronic switching	AS-i Standard electromechanical switching	AS-i Standard electronic switching
Technology designation[1]		DSte / RSte	sDSte / sRSte	DSte / RSte	sDSSte / sRSSte
Mechanical endurance of contactor		30 million operating cycles	--	30 million operating cycles	--
Trip class		Class 10		CLASS 5, 10, 15, 20	
Type of coordination acc. to IEC 60947-4-1		1 (2 for device variant 2A)	1	1 (2 for device variant 2A)	1
Reliable switching frequency		See manual			
Rated ultimate short-circuit breaking capacity I_q					
• At 400 V AC	kA	50			
• At 500 V AC	kA	50[2]	20[2]	50	20[2]
Short-circuit protection					
• At I_{emax} = 2 A		Integrated, 2 x13 I_e = 26 A			
• At I_{emax} = 9 /12 A		Integrated, 2 x13 I_e = 208 A			
Brake version (option)					
Designation		400 V/230 V AC	180 V DC	400 V/230 V AC	180 V DC
Operational voltage	V	400 / 230 AC	DC 180	400 / 230 AC	DC 180
Uninterrupted current	A	< 0.5	< 0.8	< 0.5	< 0.8
Short-circuit protection		Yes, 1 A melting fuse			

1) DS ... Direct-on-line starter
RS ... Reversing starters
te ..... Full motor protection (thermal + electronic)
s ..... Electronic switching with semiconductor

2) Only systems with grounded neutral point permitted

Slaves – Motor starters for operation in the field, high degree of protection

M200D motor starters for AS-Interface
M200D Basic / M200D Standard motor starters

Selection and ordering data

M200D AS-i Basic
without manual on-site operation

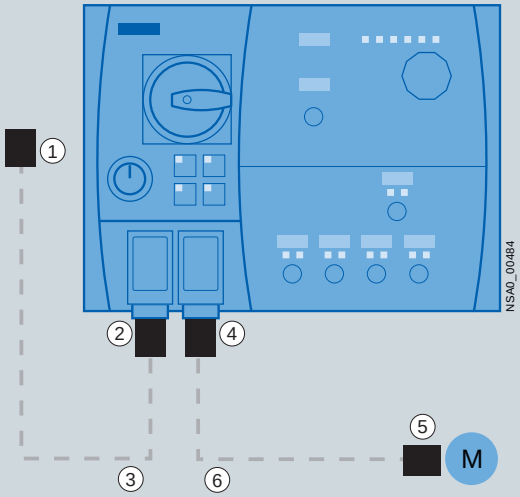
M200D AS-i Basic
with manual on-site operation

M200D AS-i Standard

Version	Order No.					
Electromechanical starters (with integrated protection)	3RK1 315-6	■	S41-	■	AA	■
Setting range for rated operational current / A						
• 0,15 ... 2		K				
• 1.5 ... 12		L				
Direct-on-line starters/reversing starters						
• Direct-on-line starters			0			
• Reversing starter			1			
• Direct-on-line starters with manual local operation			2			
• Reversing starters with manual local operation			3			
Brake control						
• Without brake control					0	
• Brake control (400 V AC)					3	
• Brake control (180 V DC)					5	
Electronic starters (with thyristors)	3RK1 315-6	■	S71-	■	AA	■
Setting range for rated operational current / A						
• 0.15 ... 2		K				
• 1.5 ... 12		N				
Direct-on-line starters/reversing starters						
• Direct-on-line starters			0			
• Reversing starter			1			
• Direct-on-line starters with manual local operation			2			
• Reversing starters with manual local operation			3			
Brake control						
• Without brake control					0	
• Brake control (230/400 V AC)					3	
• Brake control (180 V DC)					5	

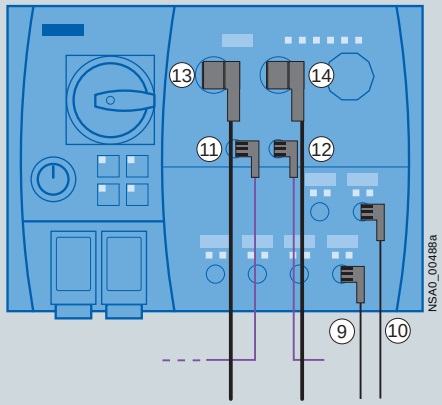
Version	Order No.					
Electromechanical starters (with integrated protection)	3RK1 325-6	■	S41-	■	AA	■
Setting range for rated operational current / A						
• 0,15 ... 2		K				
• 1,5 ... 12		L				
Direct-on-line starters/reversing starters						
• Direct-on-line starters			0			
• Reversing starter			1			
• Direct-on-line starters with manual local operation			2			
• Reversing starters with manual local operation			3			
Brake control						
• Without brake control					0	
• Brake control (400 V AC)					3	
• Brake control (180 V DC)					5	
Electronic starters (with thyristors)	3RK1 325-6	■	S71-	■	AA	■
Setting range for rated operational current / A						
• 0,15 ... 2		K				
• 1,5 ... 12		N				
Direct-on-line starters/reversing starters						
• Direct-on-line starters			0			
• Reversing starter			1			
• Direct-on-line starters with manual local operation			2			
• Reversing starters with manual local operation			3			
Brake control						
• Without brake control					0	
• Brake control (230/400 V AC)					3	
• Brake control (180 V DC)					5	

Overview



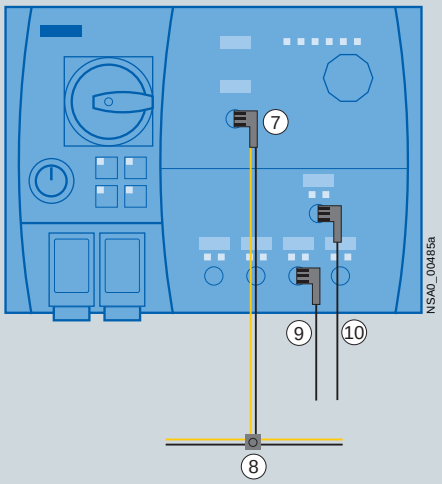
1 Power feeder plug
2 Power connection plug
3 Incoming energy supply cable
4 Motor connection plug
5 Motor plug
6 Motor cable

Power and motor connection on the M200D motor starter (in this example: M200D for AS-i)



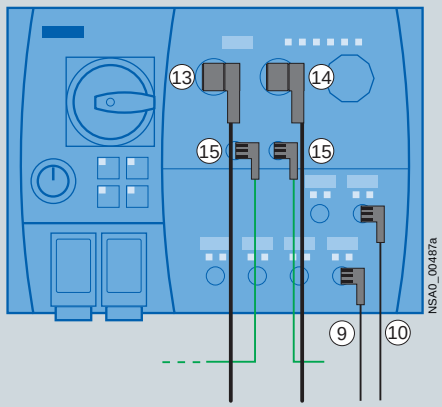
9 Connection for digital input (IO communication, 5-pole)
10 Connection for digital output (IO communication, 4- or 5-pole)
11 PROFIBUS connection (input)
12 PROFIBUS connection (loop)
13 Connection for 24 V supply (infeed)
14 Connection for 24 V supply (loop)

Communication connection using PROFIBUS and digital inputs and outputs



7 Connection for motor control with AS-i communication
8 AS-Interface M12 feeder
9 Connection for digital input (IO communication, 5-pole)
10 Connection for digital output (IO communication, 4 or 5-pole)

Communication connection using AS-Interface and digital inputs and outputs



9 Connection for digital input (IO communication, 5-pole)
10 Connection for digital output (IO communication, 4- or 5-pole)
13 Connection for 24 V supply (infeed)
14 Connection for 24 V supply (loop)
15 Connection with PROFINET (input on the left, loop on the right)

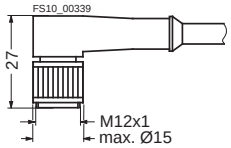
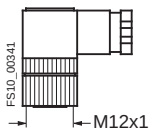
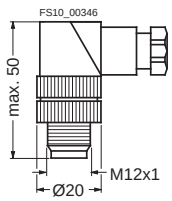
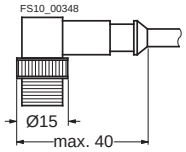
Communication connection using PROFINET and digital inputs and outputs

Selection and ordering data

The accessories listed below represent a basic selection.

	Version	Order No.
Mountable accessories		
	M200D protective brackets	**3RK1 911-3BA00**
Incoming energy supply		
	① **Power feeder plugs** Connector set for energy supply, e.g. for connecting to T terminal connectors, comprising a coupling enclosure, straight outgoing feeder (with bracket), pin insert for HAN Q4/2, incl. gland	
	• 5 male contacts 2.5 mm^2	**3RK1 911-2BS60**
	• 5 male contacts 4 mm^2	**3RK1 911-2BS20**
	• 5 male contacts 6 mm^2	**3RK1 911-2BS40**
	② **Power connection plugs** Connector set for energy supply for connection to M200D motor starters, comprising a cable-end connector hood, angular outgoing unit, female insert for HAN Q4/2, incl. gland	
	• 5 female contacts 2.5 mm^2 2 female contacts 0.5 mm^2	**3RK1 911-2BE50**
	• 5 female contacts 4 mm^2 2 female contacts 0.5 mm^2	**3RK1 911-2BE10**
	• 5 female contacts 6 mm^2 2 female contacts 0.5 mm^2	**3RK1 911-2BE30**
	② + ③ **Power connection cable** Assembled at one end with "N" and jumper pin 11 and 12 for plug monitoring, with HAN Q4/2, angular; open at one end; 5 x 4 mm^2	
	• Length 1.5 m	**3RK1 911-0DC13**
	• Length 5.0 m	**3RK1 911-0DC33**
Motor cables		
	④ **Motor connection plugs** Connector set for motor cable for connection to M200D motor starters, comprising a cable-end connector hood, angular outgoing feeder, pin insert for HAN Q8/0, incl. gland	
	• 8 male contacts 1.5 mm^2	**3RK1 902-0CE00**
	• 6 male contacts 2.5 mm^2	**3RK1 902-0CC00**
	⑤ **Motor plugs** Connector set for motor cable for connection to motors, comprising a cable-end connector hood, straight outgoing feeder, female insert for HAN 10e, incl. star jumper, incl. gland	
	• 7 female contacts 1.5 mm^2	**3RK1 911-2BM21**
	• 7 female contacts 2.5 mm^2	**3RK1 911-2BM22**
	④ + ⑥ **Motor cables, assembled at one end** Open at one end, HAN Q8/0, angular, length 5 m	
	• Motor cables for motor with brake, for M200D, 4 x 1.5 mm^2	**3RK1 911-0EB31**
	• Motor cables for motor with brake control 400 V AC or 180 V DC, 6 x 1.5 mm^2	**3RK1 911-0ED31**
	• Motor cables for motor with brake control 230 V AC or thermistor, 8 x 1.5 mm^2	**3RK1 911-0EE31**

Selection and ordering data (continued)

	Version	Order No.
	Motor control with AS-i communication [1]	
 3RX8 000-0CC42-1AF0	⑦ **Control cables, assembled at one end** Open at one end, angular M12 cable boxes for screw fixing, degree of protection IP67, 4-pole, 4 x 0.34 mm^2	
	• Cable length 5 m	**3RX8 000-0CC42-1AF0**
 3RX8 000-0CC45	⑦ **Coupling boxes with terminal compartment, can be pre-assembled** Angular M12 cable boxes for screw fixing, degree of protection IP67, 4-pole, 4 x 0.34 mm^2	**3RX8 000-0CC45**
 3RK1 901-1NR21	⑧ **AS-Interface M12 feeder** For flat cable	
	• AS-i / U_{aux}, flat cable to M12 socket	**3RK1 901-1NR20**
	• AS-i / U_{aux}, flat cable to M12 cable box, cable length 1 m	**3RK1 901-1NR21**
	• AS-i / U_{aux}, flat cable to M12 cable box, cable length 2 m	**3RK1 901-1NR22**
 3RK1 901-1MN00	**Cable terminating pieces** For sealing of open cable ends (shaped AS-Interface cable) in IP67	**3RK1 901-1MN00**
	Motor control with IO communication [1]	
 3RX8 000-0CE55	⑩ **Angular M12 coupler plugs** Degree of protection IP 67, 5-pole, for extension cable (metal screw cap) with terminal compartment, cable let-through max. 6 mm	**3RX8 000-0CE55**
 3RX8 000-0CC42-1AF0	⑩ **Control cables, assembled at one end** Angular M12 cable plugs, degree of protection IP67, 4 x 0.34 mm^2 (metal screw cap)	
	• Length 5 m	**3RX8 000-0CE42-1AF0**
	• Length 10 m	**3RX8 000-0CE42-1AL0**
	⑨, ⑩ **Control cables, assembled at one end** Angular M12 cable plugs, 5-pole	
	• PUR cables 1.5 m	**3RX8 000-1CE52-1AB5**
	• PUR cables 5 m	**3RX8 000-1CE52-1AF0**
	• PUR cables 10 m	**3RX8 000-1CE52-1AL0**

[1] For more plug-in connections, see Catalogs FS 10 and IK PI 2009.

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Selection and ordering data (continued)

Version	Order No.
Motor control with PROFIBUS	
Plugs M12 for screw fixing, angled, B coded, no terminating resistor	
• ⑪ 5 female contacts	**3RK1 902-1DA00**
• ⑫ 5 male contacts	**3RK1 902-1BA00**
Control cables, assembled at one end M12 for screw fixing, angled, B coded, no terminating resistor	
• ⑪ 5 female contacts, 3 m	**3RK1 902-1GB30**
• ⑪ 5 female contacts, 5 m	**3RK1 902-1GB50**
• ⑪ 5 female contacts, 10 m	**3RK1 902-1GC10**
⑪ ⑫ **Control cables, assembled at both ends** M12 for screw fixing, angled, 5-pole, B coded, no terminating resistor	
• 3.0 m	**3RK1 902-1NB30**
• 5.0 m	**3RK1 902-1NB50**
• 10.0 m	**3RK1 902-1NC10**
Motor control with PROFINET	
⑮ **Plugs** M12 for screw fixing, angled, D coded,	
• 4 male contacts	**3RK1 902-2DA00**
⑮⑩ **Control cables, assembled at one end** M12 for screw fixing, angled, D coded,	
• 4 male contacts, 3.0 m	**3RK1 902-2HB30**
• 4 male contacts, 5.0 m	**3RK1 902-2HB50**
• 4 male contacts, 10.0 m	**3RK1 902-2HC10**
⑮ **Control cables, assembled at both ends** M12 for screw fixing, angled at both ends, 4-pole, D coded, male contacts at both ends	
• 3.0 m	**3RK1 902-2NB30**
• 5.0 m	**3RK1 902-2NB50**
• 10.0 m	**3RK1 902-2NC10**
Connection for 24 V supply to M200D PROFIBUS / PROFINET	
Plugs On M200D, 7/8″ for screw fixing, angled, 1.5 mm^2	
• ⑬ 5 female contacts	**3RK1 902-3DA00**
• ⑭ 5 male contacts	**3RK1 902-3BA00**
⑬ **Supply lines, assembled at one end** 7/8″ for screw fixing, angled, 1.5 mm^2	
• 5 female contacts, 3.0 m	**3RK1 902-3GB30**
• 5 female contacts, 5.0 m	**3RK1 902-3GB50**
• 5 female contacts, 10.0 m	**3RK1 902-3GC10**
⑬ ⑭ **Supply lines, assembled at both ends** 7/8″ for screw fixing, angled at both ends, 5-pole, 1.5 mm^2	
• 3.0 m	**3RK1 902-3NB30**
• 5.0 m	**3RK1 902-3NB50**
• 10.0 m	**3RK1 902-3NC10**
Further accessories	
PROFIBUS trailing cables max. acceleration 4 m/s^2, at least 3000000 bending cycles, bending radius at least 60 mm, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	**6XV1 830-3EH10**
PROFIBUS FC Food bus cables With PE outer sheath for operation in the food and beverage industry, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	**6XV1 830-0GH10**
PROFIBUS FC Robust bus cables With PUR outer sheath for operation in environments exposed to chemicals and mechanical loads, 2-core, shielded, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	**6XV1 830-0JH10**
Power cables 5-core, 5 x 1.5 mm^2, trailing, sold by the meter, minimum order quantity 20 m, maximum order quantity 1000 m	**6XV1 830-8AH10**

Selection and ordering data (continued)

	Version	Order No.
Further accessories		
	PROFINET IE FC TP Standard Cable GP 2 x 2 sold by the meter	**6XV1 840-2AH10**
	PROFINET IE FC TP Trailing Cable 2 x 2 sold by the meter	**6XV1 840-3AH10**
	PROFINET IE FC TP Trailing Cable GP 2 x 2 sold by the meter	**6XV1 870-2D**
	PROFINET IE FC TP Torsion Cable 2 x 2 sold by the meter	**6XV1 870-2F**
	PROFINET IE FC TP Marine Cable, 4-core sold by the meter	**6XV1 840-4AH10**
 3RK1 922-3BA00	**Hand-held devices** for ET 200pro motor starter, (also for M200D, ET 200S High Feature and ECOFAST), for local operation. A serial interface cable must be ordered separately.	**3RK1 922-3BA00**
 3RK19 04-2AB01	**Addressing units for AS-i add-on modules** • For AS-Interface modules and sensors and actuators with integrated AS-Interface • Including extended addressing mode for A/B slaves • For setting the AS-i address of standard slaves and A/B slaves (also for slaves according to AS-Interface Version 3.0) • Battery operation with 4 batteries type AA (IEC LR6, NEDA 15) • Scope of supply - 1 addressing unit - 1 operating manual (German, English, French, Spanish, Italian) - 1 addressing cable (1.5 m, with addressing plug)	**3RK19 04-2AB01**
 3RX8 000-0GF32-1AB5	**Addressing cable, with M12 plug to M12 socket** • For addressing slaves with M12 connection, e.g. K20 or K60R modules or light curtains • When using the current version of the 3RK1 904-2AB01 addressing unit • Length 1.5 m	**3RX8 000-0GF32-1AB5**
	Dismantling tools for HAN Q4/2	**3RK1 902-0AB00**
	Crimping tools for pins/sockets 4 mm^2 and 6 mm^2	**3RK1 902-0CW00**
	Crimping tools for male contacts and sockets up to 4.0 mm^2 (HAN Q8/0)	**3RK1 902-0CT00**
	Dismantling tools for male contacts and sockets (HAN Q8/0)	**3RK1 902-0AJ00**
	USB interface cables, 2.5 m	**6SL3555-0PA00-2AA0**
	7/8″ Sealing caps	**6ES7194-3JA00-0AA0**
 3RK1 901-1KA00	**M12 sealing caps** For sealing unused input and output sockets – not for M12-AS-i connections (one set contains 10 sealing caps)	**3RK1 901-1KA00**
	RS 232 interface cables	**3RK1 922-2BP00**

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under "Distributed Field Installation System" technology

SIRIUS MCU motor starters
General data

Overview

3RK43 53-3.R58-0BA0 | 3RK43 40-3.R51-.BA0 | 3RK43 20-3.R51-.BA0 | 3RK43 20-3.Q54-.BA. | 3RK43 20-5.Q64-.BA.

Portfolio of the SIRIUS 3RK43 MCU motor starter family

The SIRIUS MCU motor starter family (MCU = Motor Control Unit) rounds off the bottom end of the SIRIUS motor starter range.

A system solution for the control of AC loads outside the control cabinet for operation in the field represents the application area for this motor starter series in a high degree of protection.

The MCU product range extends from I/O-controlled motor starters – addressing a central sub-distribution board via I/O stations – in a plastic enclosure for simple applications to motor starters with AS-i communication in a rugged metal enclosure for demanding tasks.

The MCU motor starters are completely pre-wired inside, have a high degree of protection and are designed for switching and protecting any AC loads. They are mostly used on standard induction motors in direct or reversing duty up to 5.5 kW at 400/500 V AC (electromechanical switching) and 400/460 V AC (electronic switching).

The motor and short-circuit protection integrated in the MCUs consists either of an electromechanical controlgear assembly or solid-state overload protection and a motor starter protector unit for short-circuit protection.

MCUs with metal enclosure are designed for the switching of induction motors. Integrated control of the electrically operated motor brake with a braking voltage of 230 V AC or 400 V AC is a standard feature. The braking voltage is routed to the motor over the motor cable.

SIRIUS MCU motor starters have the following main features:

- Direct-on-line or reversing starters
- Up to 5.5 kW
- Plastic or metal enclosure
- Electromechanical or electronic switching
- With brake control 230 V AC or 400 V AC
- Integrated lockable repair switch
- Short-circuit protection with SIRIUS 3RV motor starter protector
- Overload protection with thermal release (bimetal) or solid-state overload relay with wide range setting
- Power and load connection by means of an M screw
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- Robust and widely used M12 connection method for the AS-i bus connection and the digital inputs and outputs (on the MCU with metal enclosure)
- The LEDs (for AS-i bus connection) can provide comprehensive diagnostics of the device on the spot.

Overview (continued)

Locally controlled MCU motor starters in a plastic enclosure

These motor starters are designed for the autonomous operation of any AC loads – preferably induction motors.

Only the infeed needs to be connected (no bus connection or any other connection to a controller).

The motor is protected against short-circuits (50 kA) and overloads (thermal overload release) by the integrated motor starter protector. Similarly, there are no additional measures needed for these functions (e.g. back-up fuses).

These motor starters have a key-operated switch "MAN-0-AUTO" for selecting Manual, 0 or Automatic mode and preventing unauthorized changes of operating mode.

In automatic mode, the motor can be controlled automatically by connected sensors (level, temperature or pressure switches). The reversing starter is designed in addition with connections for 2 sensors so a reversal of direction is possible in accordance with these sensors. On the reversing starter, the controls with interlock are pre-wired.

In manual mode, a selector button is used by the operator for switching on, switching off and changing the direction of rotation.

I/O-controlled MCU motor starters in a plastic enclosure

These motor starters offer an economical solution for controlling induction motors distributed in the field.

The internal controls (contactors) are operated by external control with 24 V DC.

On the reversing starter, the controls with interlock are pre-wired.

The status of the circuit breaker can be queried through its floating changeover contact. The status can adopt the following positions: activated – the contact is closed – and deactivated or tripped – the contact is open (I/O control).

MCU motor starters with AS-i bus connection in a plastic enclosure

This motor starter version offers an economical solution for controlling and monitoring conveyor belts, pumps, fans or compressors.

On this MCU, the control commands and the status queries are sent over the AS-i bus. The yellow cable (bus) and the black AS-i cable for 24 V DC AUX are connected through a M12 plug.

The transparent enclosure top permits monitoring of the status LEDs. These MCUs come completely pre-wired inside.

MCU motor starters with AS-i bus connection in a metal enclosure for electromechanical or electronic switching

These MCUs with their rugged metal enclosure in degree of protection IP54 are ideal, in particular, for controlling and monitoring induction motors in harsh ambient conditions such as those often found in conveyor systems.

A special feature of this version is the manual local operation of the motor starter.

The key-operated switch "MAN-0-AUTO" for selecting Manual, 0 or Automatic mode prevents unauthorized changes of operating mode. In automatic mode, the MCU is controlled through the AS-i bus.

In manual mode, a selector button is used for switching on, switching off and changing the direction of rotation.

The status/diagnostics LEDs fitted to the cover indicate the current operating state of the motor starter.

Unlike the electromechanical starter, the solid-state motor starter has wear-free solid-state switching devices which guarantee a high switching frequency.

Another highlight of the electronic switching version is the solid-state overload relay for motor protection, which has a wide setting range for the motor current.

Overview (continued)

					
	3RK43 53-3.R58-0BA0	3RK43 40-3.R51-.BA0	3RK43 20-3.R51-.BA0	3RK43 20-3.Q54-.BA.	3RK43 20-5.Q64-.BA.
Type	**SIRIUS MCU Motor Starters**				
	Locally controlled	I/O-controlled	For AS-Interface	For AS-Interface	For AS-Interface
	Plastic enclosures	Plastic enclosures	Plastic enclosures	Metal enclosures	Metal enclosures
	Electromechanical switching	Electromechanical switching	Electromechanical switching	Electromechanical switching	Electronic switching
Device functions (software features)					
Slave on the bus					
Fieldbus	--		✔ AS-i		
Bus connection	--		✔ M12		
Slave type	--		✔ AS-i Spec 2.0	✔ A/B acc. to Spec 2.1	
Profile	--		✔ 3.0.F	✔ 7.A.0	
Number of assigned AS-i addresses on the bus	--		✔ 1		
Number of stations	--		✔ Maximum 31 devices	✔ Maximum 62 devices	
Diagnostics					
LEDs	--		✔		
Process image					
Process image	--		✔ 2I/2O	✔ 4E/3A	
Data channels					
Manual local operation	✔	--		✔	
Inputs					
Qty	✔ 1 on the direct-on-line starter 2 on the reversing starter	--	✔ 1	✔ 2	
• Of these in the process image	--		✔ DI1	✔ DI2 / DI3	
Connection	✔ Screw terminal, int.	--	✔ Screw terminal, int.	✔ M12 - A coded	
Input signal	✔ NO contact	--	✔ Switching contact or 2-wire Bero	✔ Switching contact or 2/3-wire Bero	
Input level	✔ AC 230 V	--	✔ AS-i +		
Outputs					
Qty	--		✔ 1 on the direct-on-line starter 0 on the reversing starter	✔ 1	
• Of these in the process image	--		✔ DO1	✔ DO2	
Connection	--		✔ Screw terminal, int.	✔ M12 - A coded	
Output level	--		✔ Relay cont., floating	✔ AUX-PWR+ (24 V DC)	
Motor protection					
Overload protection	✔ Thermal overload release				✔ Electronic overload releases Wide range
Short-circuit protection	✔				
Auto reset	--				✔
Temperature sensor	--			✔ TC (Thermoclick)	
Device functions					
Response when repair switch is tripped	Floating contact		✔ Signal through AS-i		
Plug monitoring	--			Possible (with plug option)	

✔ Function is available; -- Function is not available.

Benefits

- High degree of protection, namely IP55 on MCU motor starters in a plastic enclosure and IP54 on motor starters in a metal enclosure, enables distributed configurations in the field and saves space in the control cabinet
- Comprehensive motor protection thanks to integrated overload and short-circuit protection with SIRIUS 3RV motor starter protectors or integrated solid-state overload relays (solid-state starters)
- Wide range version (motor current) through solid-state overload relay
- Controlled stopping through braking control for motor brake
- Cable connection by means of economical M screw (optionally with plug-in connection)
- Simple mounting for AS-i and external auxiliary voltage (DC 24 V) over an M12 connection
- Status/diagnostics displays with built-in LEDs
- Manual operation: An integrated key-operated switch "MAN-0-AUTO" and a selector button for switching on, switching off and changing the direction of rotation for control purposes during commissioning or maintenance
- Easy and user-friendly control and monitoring through AS-Interface bus communication
- Robust and widely used M12 connection method for digital inputs and outputs to connect I/O stations and the AS-i bus connection increase flexibility and prevent errors in the system configuration.

Application

Main areas of use

Controlled by I/Os and AS-i bus:

- Airports
- Automotive industry
- Intralogistics

Locally controlled

- Industrial, commercial and agricultural applications (for autonomously controlled motors such as pumps, fans, etc.)

SIRIUS MCU motor starters
General data

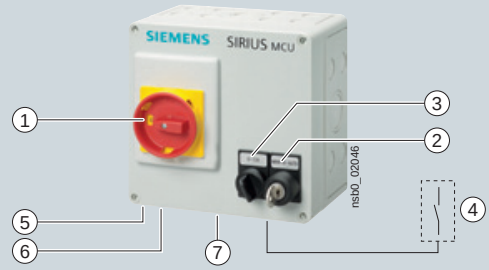
More information

Type		SIRIUS MCU Motor Starters				
		Locally controlled Plastic enclosures Electro-mechanical switching	I/O-controlled Plastic enclosures Electro-mechanical switching	For AS-Interface Plastic enclosures Electro-mechanical switching	For AS-Interface Metal enclosures Electro-mechanical switching	For AS-Interface Metal enclosures Electronic switching
Mechanics and environment						
Mounting dimensions (W x H x D)	mm	182 x 220 x 145			245 x 215 x 205	
Permissible ambient temperature • During operation	°C	-25 ... +35			-25 ... +50 max. +65 with reduction	
Weight	g	1300	1200	1500 / 1800	5800	6400
Permissible mounting position	°	On the wall 360, inclination ±30			On the wall 360, inclination ±20	
Degree of protection acc. to IEC 529		IP54	IP55		IP54	
Cooling		Convection				
Electrical specifications						
Control circuit						
Operational voltage U_{As-i}	V DC	--		26,5 ... 31,6		
Control supply voltage U_{aux}	V DC	--		20,4 ... 26,4	20,4 ... 28,8	
Control supply voltage	V	AC 230, from inside	DC 20.4 ... 26.4	--		
Power consumption from AS-i (incl. 200 mA sensor supply)	mA	--		≤ 250	≤ 270	
Main circuit						
Rating for induction motor at 400 V, 50 Hz, AC-3		See "Selection and Ordering Data"				
Incoming energy supply		M screw				
Motor feeder		M screw				
Rated operational current for starter I_e at 400 V AC		See "Selection and Ordering Data"				
Trip class		Class 10				
Type of coordination acc. to IEC 60947-4-1		1				
Short-circuit breaking capacity I_{cu} at 400 V AC	kA	50				
Brake version						
Operational voltage	V AC	--			400 or 230	
Uninterrupted current		--			Max. 5 % of I_e	
Short-circuit protection		--			Integrated	

Overview

MCU, locally controlled, plastic enclosure

- For manual and automatic mode
- Direct-on-line or reversing starters up to 12 A at 400 V AC (50/60 Hz)
- Main control switch (red/yellow)
- Lockable with padlocks (max. 3 units)
- Integrated overload and short-circuit protection with SIRIUS 3RV motor starter protectors Class 10 with short-circuit breaking capacity I_{cu} = 50 kA at 400 V AC
- Overload protection with thermal release (bimetal)
- Plastic enclosures
- Degree of protection IP54
- Cable connections by means of M screws
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- Key-operated switch for manual/automatic mode (MAN-0-AUTO)
- In manual mode, the user can operate the motor with the knob-operated control switch using the ON function (0-ON) on the direct-on-line starter or the Forwards/Reverse function (Rev-0-For) on the reversing starter.
- Automatic mode: Through connection of one sensor on the direct-on-line starter or 2 sensors on the reversing starter for e.g. temperature, pressure, level etc., the motor can be controlled in automatic mode by the connected sensors.
- 4 x M20 glands enclosed

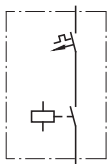
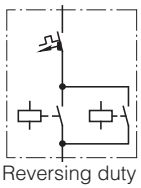


1 Main switch
2 Key-operated switch manual/automatic mode
3 Knob-operated switch manual mode
4 External sensor
5 Main energy supply by means of M screws (max. 6 mm^2)
6 Power loop-through connection possible (daisy chain)
7 Load outgoing feeder by means of M screws

(Feeder positions only examples - feeders can be laid in all directions)

MCU, locally controlled, plastic enclosure, for manual and automatic mode

Selection and ordering data

	Rated current I_e	Suitable for three-phase induction motors[1] with P	Setting range Thermal overload release	**Order No.**
	A	kW	A	
Direct-on-line starters				
 Direct-on-line starting	**1**	0.25	**0.7 ... 1**	**3RK43 53-3CR58-0BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 53-3DR58-0BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 53-3ER58-0BA0**
	2	0.75	**1.4 ... 2**	**3RK43 53-3FR58-0BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 53-3HR58-0BA0**
	4	1.50	**2.8 ... 4**	**3RK43 53-3JR58-0BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 53-3LR58-0BA0**
	8	3.00	**5.5 ... 8**	**3RK43 53-3MR58-0BA0**
	10	4.00	**7 ... 10**	**3RK43 53-3NR58-0BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 53-3PR58-0BA0**
Reversing starter				
 Reversing duty	**1**	0.25	**0.7 ... 1**	**3RK43 53-3CR58-1BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 53-3DR58-1BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 53-3ER58-1BA0**
	2	0.75	**1.4 ... 2**	**3RK43 53-3FR58-1BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 53-3HR58-1BA0**
	4	1.50	**2.8 ... 4**	**3RK43 53-3JR58-1BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 53-3LR58-1BA0**
	8	3.00	**5.5 ... 8**	**3RK43 53-3MR58-1BA0**
	10	4.00	**7 ... 10**	**3RK43 53-3NR58-1BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 53-3PR58-1BA0**

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC.
The actual starting and rated data of the motor to be protected must be considered when selecting the units.

MCU motor starters, I/O-controlled plastic enclosures, electromechanical switching

Overview

MCU, I/O-controlled, plastic enclosure

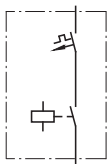
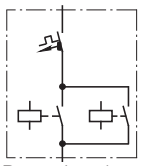
- Direct-on-line or reversing starters up to 12 A at 400 V AC (50/60 Hz)
- Repair switches (black/gray) lockable with padlocks (max. 3 units)
- Integrated overload and short-circuit protection with SIRIUS 3RV motor starter protectors Class 10 with short-circuit breaking capacity I_{cu} = 50 kA at 400 V AC
- Overload protection with thermal release (bimetal)
- Plastic enclosures
- Degree of protection IP55
- Cable connections by means of M screws
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- Control circuit: I/O-wiring; control inputs 24 V DC
- 4 x M20 glands enclosed

1 Main control switch / repair switch
2 Control inputs (24 V DC)
3 Load outgoing feeder through M screw
4 Main incoming power supply through M screw (max. 6 mm²)
5 Main power loop possible (daisy chain)

(position of outgoing units as example – outgoing units are possible on all sides)

MCU, I/O-controlled, plastic enclosure

Selection and ordering data

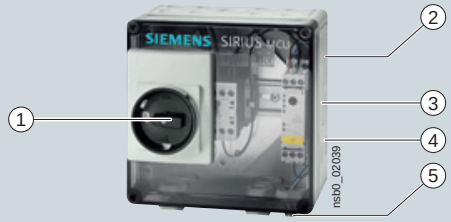
	Rated current I_e	Suitable for three-phase induction motors[1] with P	Setting range Thermal overload release	Order No.
	A	kW	A	
Direct-on-line starters				
 Direct-on-line starting	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 40-3AR51-0BA0**
	0.8	0.18	**0.55 ... 0.8**	**3RK43 40-3BR51-0BA0**
	1	0.25	**0.7 ... 1**	**3RK43 40-3CR51-0BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 40-3DR51-0BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 40-3ER51-0BA0**
	2	0.75	**1.4 ... 2**	**3RK43 40-3FR51-0BA0**
	2.5	0.75	**1.8 ... 2.5**	**3RK43 40-3GR51-0BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 40-3HR51-0BA0**
	4	1.50	**2.8 ... 4**	**3RK43 40-3JR51-0BA0**
	5	1.50	**3.5 ... 5**	**3RK43 40-3KR51-0BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 40-3LR51-0BA0**
	8	3.00	**5.5 ... 8**	**3RK43 40-3MR51-0BA0**
	10	4.00	**7 ... 10**	**3RK43 40-3NR51-0BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 40-3PR51-0BA0**
Reversing starter				
 Reversing duty	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 40-3AR51-1BA0**
	0.8	0.18	**0.55 ... 0.8**	**3RK43 40-3BR51-1BA0**
	1	0.25	**0.7 ... 1**	**3RK43 40-3CR51-1BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 40-3DR51-1BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 40-3ER51-1BA0**
	2	0.75	**1.4 ... 2**	**3RK43 40-3FR51-1BA0**
	2.5	0.75	**1.8 ... 2.5**	**3RK43 40-3GR51-1BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 40-3HR51-1BA0**
	4	1.50	**2.8 ... 4**	**3RK43 40-3JR51-1BA0**
	5	1.50	**3.5 ... 5**	**3RK43 40-3KR51-1BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 40-3LR51-1BA0**
	8	3.00	**5.5 ... 8**	**3RK43 40-3MR51-1BA0**
	10	4.00	**7 ... 10**	**3RK43 40-3NR51-1BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 40-3PR51-1BA0**

[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC.
The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Overview

MCU for AS-i, plastic enclosure

- Direct-on-line or reversing starters up to 12 A at 400 V AC (50/60 Hz)
- Repair switches (black/gray) lockable with padlocks (max. 3 units)
- Integrated overload and short-circuit protection with SIRIUS 3RV motor starter protectors Class 10 with short-circuit breaking capacity I_{cu} = 50 kA at 400 V AC
- Overload protection with thermal release (bimetal)
- Transparent plastic enclosure with LED status displays for monitoring the AS-i status
- Degree of protection IP55
- Cable connections by means of M screws
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- AS-Interface through M12 plug-in terminal
- 4 x M20 glands enclosed
- Communication: AS-Interface 2I/2O (standard slaves)

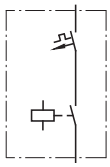
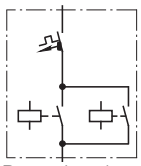


1 Main control switch / repair switch
2 Load outgoing feeder through M screw
3 Main incoming power supply through M screw (max. 6 mm²)
4 Main power loop possible (daisy chain)
5 AS-i communication / U_{aux} (24 V DC) through M12 plug

(position of outgoing units as example – outgoing units are possible on all sides)

MCU for AS-i, plastic enclosure

Selection and ordering data

	Rated current I_e	Suitable for three-phase induction motors[1] with P	Setting range Thermal overload release	Order No.
	A	kW	A	
Direct-on-line starters				
 Direct-on-line starting	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 20-3AR51-0BA0**
	0.8	0.18	**0.55 ... 0.8**	**3RK43 20-3BR51-0BA0**
	1	0.25	**0.7 ... 1**	**3RK43 20-3CR51-0BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 20-3DR51-0BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 20-3ER51-0BA0**
	2	0.75	**1.4 ... 2**	**3RK43 20-3FR51-0BA0**
	2.5	0.75	**1.8 ... 2.5**	**3RK43 20-3GR51-0BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 20-3HR51-0BA0**
	4	1.50	**2.8 ... 4**	**3RK43 20-3JR51-0BA0**
	5	1.50	**3.5 ... 5**	**3RK43 20-3KR51-0BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 20-3LR51-0BA0**
	8	3.00	**5.5 ... 8**	**3RK43 20-3MR51-0BA0**
	10	4.00	**7 ... 10**	**3RK43 20-3NR51-0BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 20-3PR51-0BA0**
Reversing starter				
 Reversing duty	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 20-3AR51-1BA0**
	0.8	0.18	**0.55 ... 0.8**	**3RK43 20-3BR51-1BA0**
	1	0.25	**0.7 ... 1**	**3RK43 20-3CR51-1BA0**
	1.25	0.37	**0.9 ... 1.25**	**3RK43 20-3DR51-1BA0**
	1.6	0.55	**1.1 ... 1.6**	**3RK43 20-3ER51-1BA0**
	2	0.75	**1.4 ... 2**	**3RK43 20-3FR51-1BA0**
	2.5	0.75	**1.8 ... 2.5**	**3RK43 20-3GR51-1BA0**
	3.2	1.10	**2.2 ... 3.2**	**3RK43 20-3HR51-1BA0**
	4	1.50	**2.8 ... 4**	**3RK43 20-3JR51-1BA0**
	5	1.50	**3.5 ... 5**	**3RK43 20-3KR51-1BA0**
	6.3	2.20	**4.5 ... 6.3**	**3RK43 20-3LR51-1BA0**
	8	3.00	**5.5 ... 8**	**3RK43 20-3MR51-1BA0**
	10	4.00	**7 ... 10**	**3RK43 20-3NR51-1BA0**
	12.5	5.50	**9 ... 12.5**	**3RK43 20-3PR51-1BA0**

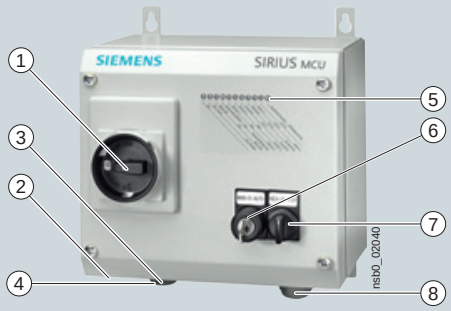
[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC.
The actual starting and rated data of the motor to be protected must be considered when selecting the units.

MCU motor starters for AS-Interface metal enclosures, electromechanical switching

Overview

MCU for AS-i, metal enclosure, electromechanical

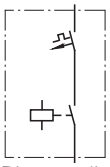
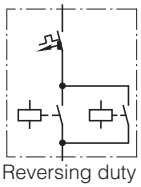
- Direct-on-line or reversing starters up to 12 A
- Repair switches (black/gray) lockable with padlocks (max. 3 units)
- Short-circuit protection with SIRIUS 3RV motor starter protectors Class 10 with short-circuit breaking capacity I_{CU} = 50 kA at 400 V AC
- Overload protection with thermal release (bimetal)
- Manual operation and key-operated switch for operating mode selection
- LED status display of the operating states
- Metal enclosures
- Degree of protection IP54
- Switched brake control 400 V or 230 V
- Cable connections by means of M screws
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- 2 x M25 glands
- 1 x M12 plug for AS-i/auxiliary voltage (24 V DC)
- 2 × M12 socket for connection of 2 sensors
- 1 × M12 socket for connection of one actuator
- Communication: AS-Interface 4I/3O (slaves in A/B technology can be addressed)



1 Main control switch / repair switch
2 Main incoming power supply (400 V AC) through M screw
3 AS-i communication / U_{aux} (24 V DC) through M12 plug
4 2 sensor inputs (M12 socket), 1 actuator output (M12 socket)
5 LED status displays of the operating states
6 Key-operated switch: Manual-0-Auto
7 Manual operation: ON/OFF or Left-0-Right (selector button)
8 Load outgoing feeder through M screw

MCU for AS-i, metal enclosure, electromechanical switching

Selection and ordering data

	Rated current I_e	Suitable for three-phase induction motors[1] with P	Setting range Thermal overload release	Order No.
	A	kW	A	
 Direct-on-line starting	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 20-3AQ54-0BA** ■
	0.8	0.18	**0.55 ... 0.8**	**3RK43 20-3BQ54-0BA** ■
	1	0.25	**0.7 ... 1**	**3RK43 20-3CQ54-0BA** ■
	1.25	0.37	**0.9 ... 1.25**	**3RK43 20-3DQ54-0BA** ■
	1.6	0.55	**1.1 ... 1.6**	**3RK43 20-3EQ54-0BA** ■
	2	0.75	**1.4 ... 2**	**3RK43 20-3FQ54-0BA** ■
	2.5	0.75	**1.8 ... 2.5**	**3RK43 20-3GQ54-0BA** ■
	3.2	1.10	**2.2 ... 3.2**	**3RK43 20-3HQ54-0BA** ■
	4	1.50	**2.8 ... 4**	**3RK43 20-3JQ54-0BA** ■
	5	1.50	**3.5 ... 5**	**3RK43 20-3KQ54-0BA** ■
	6.3	2.20	**4.5 ... 6.3**	**3RK43 20-3LQ54-0BA** ■
	8	3.00	**5.5 ... 8**	**3RK43 20-3MQ54-0BA** ■
	10	4.00	**7 ... 10**	**3RK43 20-3NQ54-0BA** ■
	12.5	5.50	**9 ... 12.5**	**3RK43 20-3PQ54-0BA** ■
	Brake control / V			
	• 230			**2**
	• 400			**3**
 Reversing duty	**0.63**	0.18	**0.45 ... 0.63**	**3RK43 20-3AQ54-1BA** ■
	0.8	0.18	**0.55 ... 0.8**	**3RK43 20-3BQ54-1BA** ■
	1	0.25	**07 ... 1**	**3RK43 20-3CQ54-1BA** ■
	1.25	0.37	**0.9 ... 1.25**	**3RK43 20-3DQ54-1BA** ■
	1.6	0.55	**1.1 ... 1.6**	**3RK43 20-3EQ54-1BA** ■
	2	0.75	**1.4 ... 2**	**3RK43 20-3FQ54-1BA** ■
	2.5	0.75	**1.8 ... 2.5**	**3RK43 20-3GQ54-1BA** ■
	3.2	1.10	**2.2 ... 3.2**	**3RK43 20-3HQ54-1BA** ■
	4	1.50	**2.8 ... 4**	**3RK43 20-3JQ54-1BA** ■
	5	1.50	**3.5 ... 5**	**3RK43 20-3KQ54-1BA** ■
	6.3	2.20	**4.5 ... 6.3**	**3RK43 20-3LQ54-1BA** ■
	8	3.00	**5.5 ... 8**	**3RK43 20-3MQ54-1BA** ■
	10	4.00	**7 ... 10**	**3RK43 20-3NQ54-1BA** ■
	12.5	5.50	**9 ... 12,5**	**3RK43 20-3PQ54-1BA** ■
	Brake control / V			
	• 230			**2**
	• 400			**3**

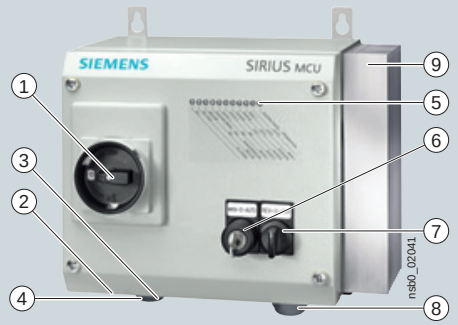
[1] Guide value for 4-pole standard motors at 50 Hz 400 V AC.
The actual starting and rated data of the motor to be protected must be considered when selecting the units.

MCU motor starters for AS-Interface metal enclosures, electronic switching

Overview

MCU for AS-i, metal enclosure, electronic

- Direct-on-line or reversing starters up to 12 A
- Switching frequency up to 3600/h
- Repair switches (black/gray) lockable with padlocks (max. 3 units)
- Short-circuit protection with SIRIUS 3RV motor starter protector
- Overload protection with solid-state overload relay
- Manual operation and key-operated switch for operating mode selection
- LED status display of the operating states
- Metal enclosures
- Degree of protection IP54
- Switched brake control 400 V or 230 V
- Cable connections by means of M screws
- Main power loop possible (daisy chain; max. 2 x 6 mm^2)
- 2 x M25 glands
- 1 x M12 plug for AS-i/auxiliary voltage (24 V DC)
- 2 × M12 plugs for connection of 2 sensors
- 1 × M12 socket for connection of one actuator
- Communication: AS-Interface 4I/3O (slaves in A/B technology can be addressed)

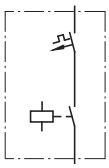
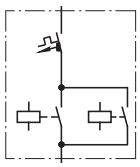


1 Main control switch / repair switch
2 Main incoming power supply (400 V AC) through M screw
3 AS-i communication / U_{aux} (24 V DC) through M12 plug
4 2 sensor inputs (M12 socket), 1 actuator output (M12 socket)
5 LED status displays of the operating states
6 Key-operated switch: Manual-0-Auto
7 Manual operation: ON/OFF or Left-0-Right (selector button)
8 Load outgoing feeder through M screw
9 Heat sink

MCU for AS-i, metal enclosure, electronic switching

6

Selection and ordering data

	Rating for induction motor Rated value[1]	Set current value of the inverse-time delayed overload release I_e	Brake control	Order No.
	kW	A	V	
 Direct-on-line starting	**0.12 … 0.37**	**0.32 … 1.25**	230	**3RK43 20-5DQ64-0BA2**
	0.55 … 1.5	**1 … 4**	230	**3RK43 20-5JQ64-0BA2**
	1.1 … 5.5	**3 … 12**	230	**3RK43 20-5PQ64-0BA2**
	0.12 … 0.37	**0.32 … 1.25**	400	**3RK43 20-5DQ64-0BA3**
	0.55 … 1.5	**1 … 4**	400	**3RK43 20-5JQ64-0BA3**
	1.1 … 5.5	**3 … 12**	400	**3RK43 20-5PQ64-0BA3**
 Reversing duty	**0.12 … 0.37**	**0.32 … 1.25**	230	**3RK43 20-5DQ64-1BA2**
	0.55 … 1.5	**1 … 4**	230	**3RK43 20-5JQ64-1BA2**
	1.1 … 5.5	**3 … 12**	230	**3RK43 20-5PQ64-1BA2**
	0.12 … 0.37	**0.32 … 1.25**	400	**3RK43 20-5DQ64-1BA3**
	0.55 … 1.5	**1 … 4**	400	**3RK43 20-5JQ64-1BA3**
	1.1 … 5.5	**3 … 12**	400	**3RK43 20-5PQ64-1BA3**

[1] Guide value for 4-pole standard motors at AC 50 Hz 400 V.
The actual starting and rated data of the motor to be protected must be considered when selecting the units.

Overview

The MCU motor starters are equipped with standardized interfaces for data and energy (option).

See also Catalog LV 1 for the field and energy bus methods for decentral installation in a high degree of protection.

Connection technology products coordinated with the SIRIUS MCU motor starters can be found at our "Siemens Solution Partners" www.siemens.com/automation/partnerfinder under "Distributed Field Installation System" technology.

SINAMICS G110D distributed inverters

Overview

The new SINAMICS G110D distributed frequency inverter series is the solution for basic drive tasks especially in the field of conveyor systems. The inverter allows the speed of three-phase asynchronous motors to be continually controlled and fulfills the requirements of conveyor-related applications with open-loop frequency control. It can be optimally integrated into the system thanks to its compact and low-profile design in an IP65 degree of protection. This drive can be optimally integrated into the Siemens TIA world of automation via AS-Interface.

With its wide power range from 0.75 kW to 7.5 kW (1.0 hp to 10 hp), it is suitable for a wide range of distributed drive solutions.

Example: SINAMICS G110D frame size FSA

Reasons for using distributed drive systems

- Modular drive solutions – therefore standardized mechatronic elements that can be individually tested
- A control cabinet is not required, resulting in a smaller space requirement and lower cooling requirements
- Long cables between the inverter and motor can be avoided (which means lower power losses, reduced noise emission and lower costs for shielded cables and additional filters)
- Distributed configurations offer considerable benefits for conveyor systems with their extensive coverage (e.g. in the automotive and logistics sectors

Siemens family of distributed drives

Siemens offers an innovative portfolio of frequency inverters to optimally implement distributed drive solutions. The strengths of the individual members of the drive family permit simple adaptation to the widest range of application demands:

- Identical connection systems
- Identical mounting dimensions for SINAMICS G110D and SINAMICS G120D
- Standard commissioning and configuration tool

Products from the family of distributed drives:

- SINAMICS G110D frequency inverters
- SINAMICS G120D frequency inverters
- SIMATIC ET 200S FC drive converters
- SIMATIC ET 200pro FC drive converters
- SIRIUS M200D motor starters

Device design

SINAMICS G110D is a compact inverter in IP65 degree of protection where the Control Unit (CU) and Power Module (PM) function units are combined in one device.

The closed-loop control electronics controls and monitors the power electronics in several different control types that can be selected. The digital inputs and analog inputs on the device mean that sensors can be simply and directly connected at the drive. The input signals can either be directly linked within the closed-loop control or they can be transferred to the central control via AS-Interface for further processing within the context of the overall system.

The power electronics supplies the motor in the power range 0.75 kW to 7.5 kW (1.0 hp to 10 hp). It is controlled (open-loop) from the microprocessor-based control. State-of-the-art IGBT technology with pulse-width-modulation is used for highly reliable and flexible motor operation. It also features an extensive range of functions offering a high degree of protection for the inverter and motor. The unusually low profile mechanical design is optimized so that the device can be directly used in the plant or system. The compact inverter has the same drilling dimensions for all of the power ratings (standard “footprint”); further, the dimensions are identical to those of the SINAMICS G120D frequency inverter. This significantly simplifies the mechanical design and retrofitting of the system.

The latest technical documentation (catalogs, dimensional drawings, certificates, manuals and operating instructions), are available on the Internet under:

http://www.siemens.com/sinamics-g110d/documentation

and offline on the DVD CA 01 in the SD Configurator. In addition,the SD Configurator can be used on the Internet without requiring any installation. The SD Configurator can be found in the Siemens Mall under the following address:

http://www.siemens.com/dt-configurator

STARTER commissioning tool

The STARTER commissioning tool (from STARTER Version 4.1.3 and higher) supports the commissioning and maintenance of SINAMICS G110D inverters. The operator guidance combined with comprehensive, user-friendly functions for the relevant drive solution allow you to commission the device quickly and easily.

Benefits

- Wide power range from 0.75 kW to 7.5 kW (1.0 hp to 10 hp)
- Fast commissioning and maintenance as well as extended diagnostic functions and communications capability with AS interface according to specification 3.0
  - Reduced number of interfaces
  - Plantwide engineering
  - Easy to handle
- Mechanical design, installation and retrofit of systems are significantly simplified as a result of the compact and space-saving design with an extremely low profile and with the same drilling dimensions for all power ratings; further, the dimensions are identical with those of the SINAMICS G120D inverter.
- Simple commissioning and maintenance using the same, standardized connectors for the bus, power and I/O connections (ISO 23570) for the complete power range of SINAMICS G110D and SINAMICS G120D inverters.
- The same connectors are used as for the SIRIUS M200D motor starter
- Simple, standard implementation of completely distributed plant and system concepts by using products in a scalable fashion:
  - SIRIUS M200D (motor starter)
  - SINAMICS G110D (inverter for basic, conveyor-related applications)
  - SINAMICS G120D (inverter for sophisticated, conveyor-related applications)
- High degree of operator friendliness by using the Intelligent Operator Panel (IOP) to parameterize, diagnose, control (open-loop) and copy drive parameters in the IOP
- Easy to replace using a plug-in design and the use of a memory card provides the highest degree of service friendliness
- Simple connection, configuration, data management as well as control of the inverter in complex plants and systems as a result of the consequential integration in TIA (Totally Integrated Automation)
- Using the optional maintenance switch, the inverter can be simply disconnected from the line supply when service is required, without any additional components or without additional wiring costs when configuring the system
- Using the optional manual local control, commissioning is fast and can be limited to specific areas, the application can be manually pre-tested on site and the system can be cleared or emptied without requiring complex options.
- By being able to connect up to five sensors directly at the unit, practically all of the drive-relevant information can be directly managed; local pre-processing of the signals relieves the fieldbus to achieve fast and reproducible response times
- Integrated class A EMC filter (acc. to EN 55011)
- Integrated brake control, brake voltages that are supported, 400 V AC/180 V DC and 230 V AC/205 V DC
- Integrated motor protection using a thermal motor model and evaluation of PTC, Thermo-Click or KTY 84 temperature sensors
- Simple device replacement and fast copying of parameters to the memory card using the optional memory card holder and the optional MMC memory card
- Engineering and commissioning using standard engineering tools such as SIZER (from Version 3.2 and higher), STARTER (from Version 4.1.3 and higher) and Drive ES ensures fast configuration and simple commissioning – STARTER is integrated into STEP 7 with Drive ES Basic, with all of the benefits of central data management and unified communication
- Software parameters for simple adaptation to 50 Hz or 60 Hz motors (IEC or NEMA motors)
- Increased degree of ruggedness and longer service life as the electronic modules are coated
- Globally certified acc. to CE, UL, c-tick

Application

SINAMICS G110D is ideally suited for basic conveyor system applications in the industrial environment for which a distributed drive with communications capability is required. This is especially true for distribution logistics and for airports.

Further, SINAMICS G110D is suitable for many additional low-performance applications in many sectors, e.g. in the automobile sector, in the food and beverage industry (without tenside) and in the packaging industry.

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Selection and ordering data

Rated power [1]		Rated output current [2]	Input current	Frame size	SINAMICS G110D with integrated Class A line filter	SINAMICS G110D with integrated Class A line filter and integrated maintenance switch
kW	hp	A	A		Order No.	Order No.
380 … 500 V 3 AC [3]						
0.75	1	2.3	2.0	FSA	6SL3511-0PE17-5AM0 NEW	6SL3511-1PE17-5AM0 NEW
1.5	1.5 [4]	4.3	3.8	FSA	6SL3511-0PE21-5AM0 NEW	6SL3511-1PE21-5AM0 NEW
3	4	7.7	7.0	FSA	6SL3511-0PE23-0AM0 NEW	6SL3511-1PE23-0AM0 NEW
4	5	10.2	9.1	FSB	6SL3511-0PE24-0AM0 NEW	6SL3511-1PE24-0AM0 NEW
5.5	7.5	13.2	12.2	FSC	6SL3511-0PE25-5AM0 NEW	6SL3511-1PE25-5AM0 NEW
7.5	10	19.0	17.9	FSC	6SL3511-0PE27-5AM0 NEW	6SL3511-1PE27-5AM0 NEW

1) Rated power based on the rated output current I_{rated}.
The rated output current I_{rated} is based on the duty cycle for high overload (HO).

2) The rated output current I_{rated} is based on the duty cycle for high overload (HO).
These current values are valid for 400 V and are stamped on the rating plate.

3) With the exception of UL operation, 500 V +10 % is possible.

4) It is not possible to make any assignment to a particular standard.

More information

More information regarding technical specifications, accessories and ordering data can be found in Catalog D 11.1 "SINAMICS G110D distributed inverters – 0.75 kW to 7.5 kW" and online in the Siemens Industry Mall.

Slaves – 3SF5 pushbutton units and indicator lights

AS-Interface enclosures with standard fittings

Overview

Enclosures with standard fittings are available with:

- 1 to 3 command points
- Operational voltage through AS-Interface (approx. 30 V)
- Vertical mounting type
- Plastic enclosures are equipped with plastic actuators and indicators, metal enclosures are equipped with metal actuators and indicators.

The actuators/indicators are fixed with an enclosure nut. If required it can be disassembled with a 27 mm socket wrench or with a 3SX17 07 ring nut wrench.

The enclosures without EMERGENCY-STOP each have one user module with 4I/3O; the enclosures with EMERGENCY-STOP have a safe AS-Interface slave integrated in the enclosure.

EMERGENCY-STOP enclosures are fitted with two NC contact blocks, which are wired to the safe slave. The contact blocks and lampholders (with spring-type terminals) of the control device, and the AS-Interface slaves, are mounted in the base of the enclosure and are cable-connected.

The plastic versions of the enclosures have a connection for the AS-Interface flat cable (the cable is routed past the enclosure on the outside); in the case of the metal versions the AS-Interface cable is routed into the enclosure.

The EMERGENCY-STOP enclosures can also be supplied with an M12 connector in place of the gland.

Selection and ordering data

	Version			Order No.
	AS-Interface enclosures, plastic, with standard fittings			
 3SF5 811-0AA08	*Equipment (A, B, C = identification letters of the command positions)*	*Enclosure top*	*Number of command points*	
	With M12 top connector			
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow	1	**3SF5 811-0AA10** NEW
	With terminal for insulation piercing method at top			
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow	1	**3SF5 811-0AA08**
 3SF5 812-0DA00	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow, with protective collar	1	**3SF5 811-0AB08**
	B = Pushbutton green, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	2	**3SF5 812-0DA00**
	B = Pushbutton white, 1 NO, label "I" A = Pushbutton black, 1 NO, label "O"	Gray	2	**3SF5 812-0DB00**
	C = Indicator light clear, label without inscription B = Pushbutton green, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	3	**3SF5 813-0DA00**
	C = Indicator light clear, label without inscription B = Pushbutton white, 1 NO, label "I" A = Pushbutton black, 1 NO, label "O"	Gray	3	**3SF5 813-0DC00**
	C = Pushbutton black, 1 NO, label "II" B = Pushbutton black, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	3	**3SF5 813-0DB00**
	AS-Interface enclosures, metal, with standard fittings			
 3SF5 811-2AB08	*Equipment (A, B, C = identification letters of the command positions)*	*Enclosure top*	*Number of command points*	
	With M12 top connector			
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow	1	**3SF5 811-2AA10**
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow, with protective collar	1	**3SF5 811-2AB10**
 3SF5 812-2DA00	**With cable gland at top**			
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow	1	**3SF5 811-2AA08**
	A = EMERGENCY-STOP mushroom pushbuttons, 1 NC, 1 NC	Yellow, with protective collar	1	**3SF5 811-2AB08**
	B = Pushbutton green, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	2	**3SF5 812-2DA00**
	B = Pushbutton white, 1 NO, label "I" A = Pushbutton black, 1 NO, label "O"	Gray	2	**3SF5 812-2DB00**
 3SF5 813-2DA00	C = Indicator light clear, label without inscription B = Pushbutton green, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	3	**3SF5 813-2DA00**
	C = Indicator light clear, label without inscription B = Pushbutton white, 1 NO, label "I" A = Pushbutton black, 1 NO, label "O"	Gray	3	**3SF5 813-2DC00**
	C = Pushbutton black, 1 NO, label "II" B = Pushbutton black, 1 NO, label "I" A = Pushbutton red, 1 NO, label "O"	Gray	3	**3SF5 813-2DB00**