# PROFINET/Industrial Ethernet
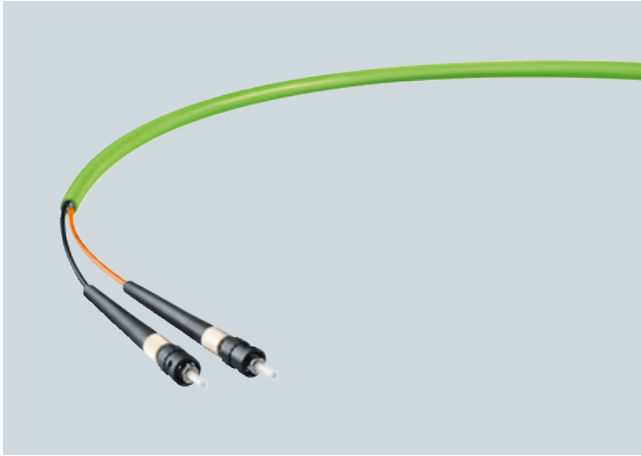
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# PROFINET/Industrial Ethernet
## Cabling system

### Overview of FC-FOCs

### Overview



- Simple on-site assembly of glass FOC in the field
- Optical signal transmission
- No radiation emission from the cable
- Unaffected by external noise fields
- No grounding problems
- Electrical isolation
- Low weight
- Simple laying of cables

### Application

The fiber-optic cable (FOC) is used for the transmission of signals in very extensive plants and where there are significant potential differences within a plant. The light beam is guided by total reflection at the transition from core to cladding which has a lower refractive index than the core.

The FC FO system enables the fast on-site assembly of glass fiber-optic cables with the right lengths to suit the respective application.

### Design

Fiber-optic cables with glass core (62.5/200/230) are offered for the FastConnect fiber-optic cable system:

- FC glass fiber-optic cable;
  duplex cable for indoor and outdoor fiber-optic networks

The fiber structure corresponds to that of the PCF. This allows simple assembly on site.

| Sheath material | Application |
|---|---|
| PVC | Standard use in indoor and outdoor areas of industrial applications |
| PUR | Highly mobile applications (tow chains) for high mechanical or chemical stress in harsh industrial environments |
| PE | Routing of cables in moist areas indoors and outdoors, and for direct burying in earth |
| FRNC | Standard applications with high fire protection requirements |

### Approvals

UL listing (safety standard) for network lines is especially necessary for the American and Canadian markets. The requirements for the appropriate approvals depend on where the cable is routed within the building. This applies to all cables which have to be routed from a machine to a remote control cabinet and are positioned on cable racks secured in the building. These cables are identified by the suffix "GP" (general purpose) in the product name and have the corresponding UL approvals.

*Assembly with FastConnect for glass fiber-optic cables*

### FC glass fiber-optic cable

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## Overview
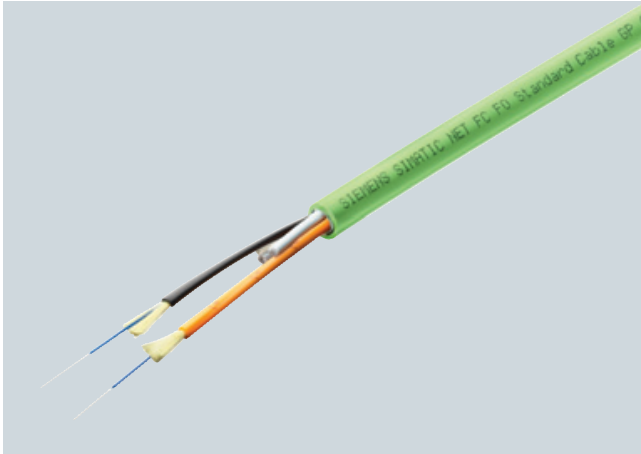


- FastConnect standard fiber-optic cable for use in optical Industrial Ethernet and PROFIBUS networks
- For all users who want to install and assemble the glass fiber-optic cables themselves over longer distances on site for office or industrial applications.
- Simple FastConnect SC/BFOC connector assembly on site
- Rugged construction for industrial applications both indoors and outdoors
- High interference immunity, as they are not sensitive to electromagnetic interference
- Extensive range of approvals (UL approvals)

## Benefits


Designed for Industry

- Avoidance of excessive cable lengths in the control cabinet, as the fiber-optic cables can be assembled to the right length on site
- Easy installation of cables in buildings, as cables can be pulled in without connectors attached
- Devices with different connection method (SC or BFOC) can easily be connected to one another using self-assembled adapter cables
- Electrical isolation of Industrial Ethernet/PROFINET/ PROFIBUS devices
- Unaffected by electromagnetic interference
- Tap-proof:
  no radiation from cable

## Application

SIMATIC NET FastConnect glass fiber-optic cables are used to construct optical indoor and outdoor Industrial Ethernet/ PROFINET and PROFIBUS networks. Devices with integral optical interface (SC or BFOC connection technology) are, for example, optical link modules (OLM) and SCALANCE X switches.

FastConnect glass fiber-optic cables are to be assembled on site using FastConnect SC or FastConnect BFOC connectors. A corresponding assembly kit (FC FO Termination Kit) is available for this purpose. The termination kit permits the stripping and the "cleaving" of the fiber in the assembled connector, as is familiar from PCF fiber-optic cables.

## Design
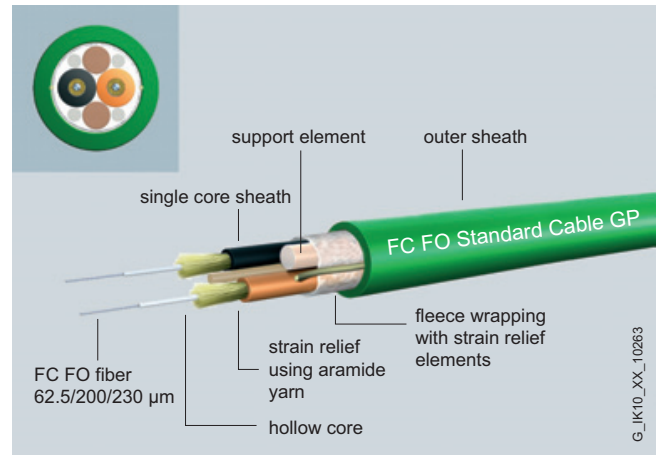


*FC FO standard cable GP (General Purpose);*
rugged round cable with green outer sheath, Kevlar strain relief elements, and 62.5/200/230 FC FO fibers for indoor/outdoor applications

*FC FO trailing cable;*
rugged round cable with green outer sheath, Kevlar strain relief elements and 62.5/200/230 FC FO fibers for use in tow chains and moving applications

Maximum cable length between two devices:
- 3000 m for 100 Mbit/s Ethernet or for PROFIBUS
- 350 m for 1000 Mbit/s Ethernet (1000Base-SX)
- 550 m for 1000 Mbit/s Ethernet (1000Base-LX)

The maximum cable lengths can be assembled from partial lengths using FastConnect couplings (SC or BFOC; maximum 2 couplings, approx. 2.5 dB attenuation per coupling). It is also possible to combine existing installed, conventional 62.5/125 µm multi-mode glass fiber-optic cable sections with the new FastConnect fiber-optic cables.

# PROFINET/Industrial Ethernet
## Cabling system

### FC glass fiber-optic cable

**Technical specifications**

| Order No.<br>Product type designation | 6XV1 847-2A<br>FC FO Standard Cable GP | 6XV1 847-2C<br>FC FO Trailing Cable |
|---|---|---|
| Product description | Glass fiber-optic cable for field assembly, cut-to-length, non-assembled | Flexible glass fiber-optic cable for field assembly, cut-to-length, non-assembled |
| Suitability for use | Cable for fixed routing in cable ducts and conduits, UL approval | Cable for high mechanical loading for use in trailing cables indoors and outdoors |
| Type of assembled fiber-optic cable | Can be preassembled with four BFOC or SC connectors | Can be preassembled with four BFOC or SC connectors |
| Cable designation | AT-V(ZN)YY 2GK 62.5/200/230 | AT-V(ZN)Y(ZN)11Y 2GK 62.5/200/230 |
| **Optical data** | | |
| Attenuation factor per length | | |
| • At 850 nm, maximum | 3.2 dB/km | 3.2 dB/km |
| • At 1300 nm, maximum | 0.9 dB/km | 0.9 dB/km |
| • At 1550 nm, maximum | – | – |
| Bandwidth length product | | |
| • At 850 nm | 200 kHz·m | 200 kHz·m |
| • At 1300 nm | 500 kHz·m | 500 kHz·m |
| **Mechanical data** | | |
| Number of fibers per FO core | 1 | 1 |
| Number of FO cores per FO cable | 2 | 2 |
| Design of optical fibers | Multi-mode gradient fiber 62.5/200/230 µm | Multi-mode gradient fiber 62.5/200/230 µm |
| Design of optical cores | Fixed core | Fixed core |
| Design of optical cable | Splittable cable | Splittable cable |
| Outer diameter | | |
| • of optical fibers | 62.5 µm | 62.5 µm |
| • of the optical fiber sheath | 230 µm | 230 µm |
| • of sheath of optical cores | 2.2 mm | 2.2 mm |
| • of cable | 7.2 mm | 8.8 mm |
| Symmetrical deviation | | |
| • of outer diameter of sheath of optical cores | 0.1 mm | 0.1 mm |
| • of outer diameter of cable | 0.5 mm | 0.5 mm |
| Material | | |
| • of the optical fiber core | Fused silica | Fused silica |
| • of the optical fiber sheath | ETFE | ETFE |
| • of sheath of optical cores | PVC | PVC |
| • of sheath of optical cable | PVC | PUR |
| • of cable grip | Aramid fibers | Aramide thread (double-ply) |
| Color | | |
| • of sheath of optical cores | Orange/black | Orange/black |
| • of cable sheath | Green | Green |
| Bending radius | | |
| • Minimum permissible with single bending | 70 mm | 130 mm |
| • Minimum permissible with multiple bending | 105 mm | 175 mm |
| • With continuous bending | – | – |
| Number of bending cycles | | |
| Tensile load, max. | 100 N | 800 N |
| Short-term lateral force per length | 500 N/cm | 500 N/cm |
| Permanent lateral force per length | 300 N/cm | 300 N/cm |
| Weight per length | 49 kg/km | 65 kg/km |

## Technical specifications (continued)

| Order No.<br>**Product type designation** | **6XV1 847-2A**<br>**FC FO Standard Cable GP** | **6XV1 847-2C**<br>**FC FO Trailing Cable** |
|---|---|---|
| **Permissible ambient conditions** | | |
| Ambient temperature | | |
| • During operating phase | -40 … +85 °C | -25 … +75 °C |
| • During storage | -40 … +85 °C | -30 … +75 °C |
| • During transport | -40 … +85 °C | -30 … +75 °C |
| • During installation | -5 … +50 °C | -5 … +50 °C |
| Fire behavior | Flame-retardant in accordance with IEC 60332-1-2 and IEC 60332-3-22 (Cat. A) | Flame-retardant in accordance with IEC 60332-1-2 |
| Chemical resistance | | |
| • to mineral oil | conditionally resistant | resistant |
| • to grease | conditionally resistant | resistant |
| • to water | not resistant | not resistant |
| Radiological resistance to UV radiation | resistant | not resistant |
| **Product properties, functions, components, general** | | |
| Product property | | |
| • halogen-free | No | No |
| • Silicone-free | Yes | Yes |
| Product component: Rodent protection | No | No |
| Cable length with glass FOC | | |
| • With 100BaseFX for Industrial Ethernet, maximum | 3 000 m | 3 000 m |
| • With 1000BaseSX for Industrial Ethernet, maximum | 350 m | 350 m |
| • With 1000BaseFX for Industrial Ethernet, maximum | 550 m | 550 m |
| • With PROFIBUS, maximum | 3 000 m | 3 000 m |
| **Standards, specifications, approvals** | | |
| Certificate of suitability | UL approval:<br>OFN (NEC Article 770, UL 1651) /<br>CSA approval:<br>OFN 90 Cel, FT1, FT4<br>(CSA Standard C22.2 No232-M1988) | – |
| Proof of suitability: RoHS conformity | Yes | Yes |

# PROFINET/Industrial Ethernet
## Cabling system

### FC glass fiber-optic cable

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| Ordering data | Order No. |
|---|---|
| **FC FO standard cable GP** 62.5/200/230 <br><br> FC FO standard cable for fixed installation indoors with PVC sheath; <br> sold by the meter | **6XV1 847-2A** |
| **FC FO trailing cable** <br><br> FC FO trailing cable for use in tow chains and moving applications; <br> sold by the meter | **6XV1 847-2C** |
| **FC FO termination kit** <br><br> Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope | **6GK1 900-1GL00-0AA0** |
| **FC SC plug** <br><br> Screw connector for on-site assembly on FC fiber-optic cable; <br> (1 pack = 10 duplex plugs + cleaning cloths) | **6GK1 900-1LB00-0AC0** |
| **FC BFOC plug** <br><br> Screw connector for on-site assembly on FC fiber-optic cable; <br> (1 pack = 20 units + cleaning cloths) | **6GK1 900-1GB00-0AC0** |
| **FC SC coupler** <br><br> FC SC duplex coupling; <br> (1 pack = 5 units) | **6GK1 900-1LP00-0AB0** |
| **FC BFOC coupler** <br><br> FC BFOC coupling; <br> (1 pack = 10 units) | **6GK1 900-1GP00-0AB0** |
| **SIMATIC NET Manual Collection** <br><br> Electronic manuals for communication systems, communication protocols, and communication products; on DVD; <br> German/English | **6GK1 975-1AA00-3AA0** |

### More information

You can order components supplementary to the SIMATIC NET cabling range from your local contact.

Technical advice on this subject is available from:

J. Hertlein
I IA SC IC PM 1
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91

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## Overview



- Compact, rugged assembly case for FastConnect glass fiber-optic cables
- Simple fitting of SC and BFOC connectors to FastConnect glass fiber-optic cables
- The quality of the assembly can be checked using the enclosed microscope

## Benefits

get **Designed for Industry**

- Simple installation of the unassembled cable
- Flexible connector assembly possible on site (SC/BFOC connectors)
- Prevention of faults by simply checking the assembled connectors on site using a microscope
- Simple repair of FC glass fiber-optic cables in the field

## Application

SIMATIC NET FC glass fiber-optic cables are used to construct optical indoor and outdoor Industrial Ethernet/PROFINET and PROFIBUS networks. They are easy to assemble on-site using the termination kit with SC or BFOC connectors. The maximum cable length between two Industrial Ethernet/PROFINET or PROFIBUS devices is 3000 m in the case of 100 Mbit/s Ethernet or PROFIBUS.

## Design
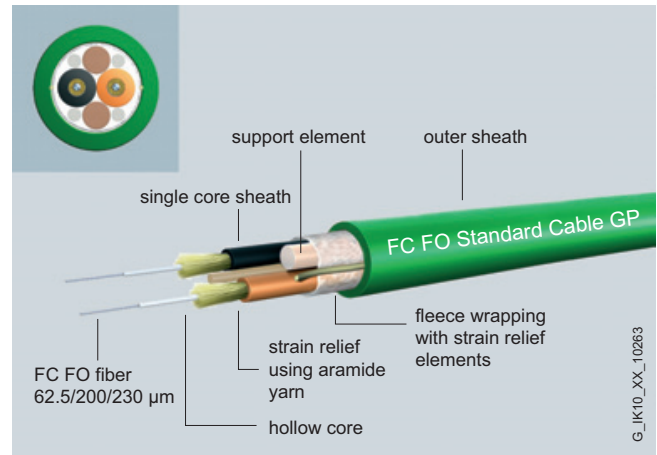


Cable construction FC glass optical fiber

The kit is available in an assembly case for on-site installation of FC SC and FC BFOC connectors on FC glass fiber-optic cables.

It consists of a stripping tool, buffer stripping tool, Kevlar scissors, fiber breaking tool and microscope.

| Ordering data | Order No. |
|---|---|
| **FC FO termination kit** <br> Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope | **6GK1 900-1GL00-0AA0** |
| *Accessories* | |
| **FC SC plug** <br> Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 duplex plugs + cleaning cloths) | **6GK1 900-1LB00-0AC0** |
| **FC BFOC plug** <br> Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 items + cleaning cloths) | **6GK1 900-1GB00-0AC0** |
| **FC SC coupler** <br> FC SC duplex coupling; (1 pack = 5 items) | **6GK1 900-1LP00-0AB0** |
| **FC BFOC coupler** <br> FC BFOC coupling; (1 pack = 10 items) | **6GK1 900-1GP00-0AB0** |

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# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### Overview

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**Overview**

Industrial Ethernet Switching components comprise:
- Compact Switch Modules (CSM)
- SCALANCE X Industrial Ethernet Switches
- Communications processors (CP) with integrated switch

#### Compact Switch Modules (CSM)

Unmanaged Switches for direct use in the SIMATIC, expansion of interfaces and for integration of machines into existing plant networks.

- **CSM 1277 unmanaged**
  for connecting a SIMATIC S7-1200 to Industrial Ethernett

- **CSM 377 unmanaged**
  for connecting a SIMATIC S7-300 or a ET 200M to Industrial Ehternet

#### SCALANCE X-000/XB-000 unmanaged

Unmanaged switches with electrical and/or optical ports for the installation of small networks with 10/100/1000 Mbit/s for machines and process cell islands

#### SCALANCE X-100 unmanaged

Switches with electrical and/or optical ports, redundant power supply and signaling contact for use in machine-level applications.(also available as media converter with two ports for communication between different media).

#### SCALANCE X-200 managed

For universal use, from machine-level applications to networked subsystems. Configuration and remote diagnosis are integrated into the STEP 7 engineering tool. This increases the plant availability. Devices with a high degree of protection permit cabinetless installation.

Corresponding switches (SCALANCE X-200IRT) are also available for use in subsystem networks with hard real-time requirements and maximum availability.

#### SCALANCE X-F200 managed

The SCALANCE XF-200 Industrial Ethernet Switches have the same functions as the SCALANCE X-200 Switches. Their flat design in ET 200S format (degree of protection IP20) makes them perfectly suited for space-saving installation in small control cabinets.

#### SCALANCE X-300 managed

For the networking of subsystems and plant areas as well as for the connection to the enterprise network. The SCALANCE X-300 managed product line combines the firmware-functionality of the SCALANCE X-400 product line with the compact design of the SCALANCE X-200 product line. This means the SCALANCE X-300 switches have extended management functions and an extended firmware functionality compared to the SCALANCE X-200 switches.

In addition, electrical and optical gigabit ethernet ports are available.

#### SCALANCE XR-300 managed

The SCALANCE XR-300 Industrial Ethernet Switches have the same functions as the SCALANCE X-300 Switches. They are rack switches and as thus perfectly suited for installation in 19" control cabinets. They are fully modular and can be adapted to meet the specific job requirement with two-port media modules (electrical and optical).

For use in power systems and under challenging environmental conditions, you can use EEC versions (Enhanced Environmental Conditions) as compact and rack modules.

#### SCALANCE X-400 managed (Layer 3)

For use in high-performance plant networks.

Thanks to the modular design, the switches can be adapted to the respective task . Due to the support of IT standards (e.g. VLAN, IGMP, RSTP), the seamless integration of automation networks into existing office networks is possible.

Routing functions on Layer 3 permit communication between different IP subnetworks.

#### Communication processors for SIMATIC with integrated switch

Managed switches for expansion of SIMATIC with Industrial Ethernet/PROFINET interfaces and for integration of the controls into existing line and ring structures.

The integrated Layer 3 functionality with Advanced CPs makes it possible to use the device as router between IP subnetworks.

#### Communication processors for PC with integrated switch

Managed switches for expansion of Industrial PCs with Industrial Ethernet/PROFINET interfaces and for integration of the PCs into existing line structures.

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## Overview (continued)



| Network components (SCALANCE X) | | | CSM (Compact Switch Module) | Integrated switch function (communications processors) |
|---|---|---|---|---|

Control Level
- X-400 managed (PROFINET) — X-400
- X-300 managed (PROFINET) — X-300, X-300EEC, XR-300/XR-300EEC

Field Level
- X-200 managed (PROFINET) — XF-200, X-200, X-200PRO
- X-200IRT managed (PROFINET) — X-200IRT, XF204IRT, X-200IRT PRO
- X-100 unmanaged (PROFINET) — X-100, X-100 Media converter
- X-000 unmanaged (PROFINET) — X005, XB-000/XB-000G

CSM: CSM 1277, CSM 377

Integrated switch function: CP 1623, CP 343-1 Advanced, CP 443-1 Advanced, CP 343-1 / CP 343-1 Lean / CP 343-1 BACnet, CP 443-1, CP 1616, CP 1604

1) additionally supports PROFINET diagnostics

Overview of SCALANCE X Industrial Ethernet switches and components with switch functionality

| Network component | CSM | Integral switch function |
|---|---|---|



**Network component**
- Basis for integrated networking in industrial automation - from the field to the management level
- Network components optimized for various applications:
  - Small and large-scale networks
  - Management functions for network structuring
  - Configuring of redundant networks
  - Use with PROFINET and Industrial Ethernet
- Robust housing for harsh environments
- Graded diagnostics concept

**CSM**
- Configuration of small networks
- Easy expansion of the number of ports for:
  - Connection of local HMI systems
  - Connection to higher-level networks
  - Service/maintenance
- Space-saving design of SIMATIC
- Unmanaged Switch with local diagnostics

**Integral switch function**
- Communications processor for interfacing with PROFINET/Industrial Ethernet including integral switch for:
  - For interfacing with distributed I/O.
  - Connection to higher-level networks
  - IP routing
  - Service/maintenance
- SIMATIC or PC module design
- Functions for network diagnostics

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# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Overview**

■ **Overview** (continued)

| | Type of device | Hardware | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Connection to S7 backplane bus | Format module S7 | PC module | Flat type of construction | Box type of construction | 19" type of construction | Rugged, compact housing | Modular design | Gigabit Ethernet | PoE (Power over Ethernet) | LED diagnosis | SIMATIC environment | Redundant power supply (2 x 24 V DC) | External supply for integrated switch | Signal contact | Local display (SET pushbutton) | C-PLUG slot |
| SCALANCE X-400 | X414-3E | | | | | | | | • | • | | • | • | • | | • | • | • |
| | X408-2 | | | | | | | | • | • | | • | • | • | | • | • | • |
| SCALANCE X-300 | X310 | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X310FE | | | | | | | • | | | | • | • | • | | • | • | • |
| | X306-1LD FE | | | | | | | • | | | | • | • | • | | • | • | • |
| | X320-1FE | | | | | | | • | | | | • | • | • | | • | • | • |
| | X320-3LD FE | | | | | | | • | | | | • | • | • | | • | • | • |
| | X307-3 | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X307-3LD | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X308-2 | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X308-2LD | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X308-2LH | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X308-2LH+ | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X308-2M | | | | | | | • | • | • | | • | • | • | | • | • | • |
| | X302-7EEC | | | | | | | • | | • | | • | • | • | | • | • | • |
| | X307-2EEC | | | | | | | • | | • | | • | • | • | | • | • | • |
| | XR324-12M | | | | | | • | | • | • | | • | • | • | | • | • | • |
| | XR324-4M EEC | | | | | | • | | • | • | | • | • | • | | • | • | • |
| SCALANCE X-200 | X204IRT | | | | | | | • | | | | • | • | • | | • | • | • |
| | XF204IRT | | | | • | | | | | | | • | • | • | | • | • | • |
| | XF204 | | | | • | | | | | | | • | • | • | | • | • | • |
| | XF208 | | | | • | | | | | | | • | • | • | | • | • | • |
| | XF204-2 | | | | • | | | | | | | • | • | • | | • | • | • |
| | XF206-1 | | | | • | | | | | | | • | • | • | | • | • | • |
| | X202-2IRT | | | | | | | • | | | | • | • | • | | • | • | • |
| | X202-2P IRT | | | | | | | • | | | | • | • | • | | • | • | • |
| | X201-3P IRT | | | | | | | • | | | | • | • | • | | • | • | • |
| | X200-4P IRT | | | | | | | • | | | | • | • | • | | • | • | • |
| | X204IRT PRO | | | | | | | • | | | | • | • | • | | • | • | • |
| | X202-2P IRT PRO | | | | | | | • | | | | • | • | • | | • | • | • |
| | X224 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X216 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X212-2 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X212-2LD | | | | | | | • | | | | • | • | • | | • | • | • |
| | X208 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X208PRO | | | | | | | • | | | | • | • | • | | • | • | • |
| | X206-1 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X206-1LD | | | | | | | • | | | | • | • | • | | • | • | • |
| | X204-2 | | | | | | | • | | | | • | • | • | | • | • | • |
| | X204-2LD | | | | | | | • | | | | • | • | • | | • | • | • |

• applies

Overview of the functions of the SCALANCE X Industrial Ethernet switches – Hardware

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## ◼ Overview (continued)

| | Type of device | Connection to S7 backplane bus | Format module S7 | PC module | Flat type of construction | Box type of construction | 19" type of construction | Rugged, compact housing | Modular design | Gigabit Ethernet | PoE (Power over Ethernet) | LED diagnosis | SIMATIC environment | Redundant power supply (2 x 24 V DC) | External supply for integrated switch | Signal contact | Local display (SET pushbutton) | C-PLUG slot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SCALANCE X-100** | X124 | | | | | | | • | | | | • | • | • | | • | • | |
| | X116 | | | | | | | • | | | | • | • | • | | • | • | |
| | X112-2 | | | | | | | • | | | | • | • | • | | • | • | |
| | X108 | | | | | | | • | | | | • | • | • | | • | • | |
| | X108PoE | | | | | | | • | | | • | • | • | • | | • | • | |
| | X106-1 | | | | | | | • | | | | • | • | • | | • | • | |
| | X104-2 | | | | | | | • | | | | • | • | • | | • | • | |
| **SCALANCE X-000** | X005 | | | | | | | • | | | | • | • | | | | | |
| | XB005 | | | | | • | | | | | | • | | | | | | |
| | XB008 | | | | | • | | | | | | • | | | | | | |
| | XB004-1 | | | | | • | | | | | | • | | | | | | |
| | XB004-1LD | | | | | • | | | | | | • | | | | | | |
| | XB005G | | | | | • | | | | • | | • | | | | | | |
| | XB008G | | | | | • | | | | • | | • | | | | | | |
| | XB004-1G | | | | | • | | | | • | | • | | | | | | |
| | XB004-1LDG | | | | | • | | | | • | | • | | | | | | |
| **Modules/CPs for SIMATIC S7** | CSM 1277 | | • | | | | | | | | | • | • | | | | | |
| | CSM 377 | | • | | | | | | | | | • | • | | | | | |
| | CP 343-1 Lean | • | • | | | | | | | | | • | • | | | | | |
| | CP 343-1 | • | • | | | | | | | | | • | • | | | | | |
| | CP 343-1 Advanced | • | • | | | | | | | • | | • | • | | | | | • |
| | CP 343-1 BACnet | • | • | | | | | | | | | • | • | | | | | |
| | CP 443-1 | • | • | | | | | | | | | • | • | | | | | |
| | CP 443-1 Advanced | • | • | | | | | | | • | | • | • | | | | | • |
| **CPs for PG/PC** | CP 1623 (PCIe) | | | • | | | | | | • | | • | • | | | • | | |
| | CP 1604 (PCI-104) | | | • | | | | | | | | • | • | | | • | | |
| | CP 1616 (PCI) | | | • | | | | | | | | • | • | | | • | | |

G_IK10_XX_10241

• applies

Overview of the functions of the SCALANCE X Industrial Ethernet switches and components with switch functionality – Hardware

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Overview**

**Overview** (continued)

| Series | Type of device | PROFINET diagnosis | Topology support (LLDP) | Command Line Interface / Telnet | Web based Management | Configuration with STEP 7 | SNMP | Ring redundancy incl. RM-functionality | Standby redundancy | IRT capability | VLAN (Virtual Local Area Network) | GVRP (Generic VLAN Registaration Protocol) | STP/ RSTP (Spanning Tree Protocol/ Rapid Spanning Tree Protocol) | Passive Listening | IGMP Snooping/Querier (Internet Group Management Protocol) | GMRP (Generic Multicast Protocol) | Broadcast/ Multicast/ Unicast Limiter | Broadcast blocking | DHCP Option 82 (Dynamic Host Configuration Protocol) | IP Access List | Access Control List (MAC) | IEEE 802.1x (Radius) | Link Aggregation | Static Routing | RIPv2 (Dynamic Routing) | OSPFv2 (Dynamic Routing) | VRRP, Router Redundancy (Virtual Router Redundancy Protocol) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCALANCE X-400 | X414-3E | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • |
| | X408-2 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| SCALANCE X-300 | X310 | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X310FE | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X307-3 | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X307-3LD | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X308-2 | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X306-1LD FE | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X320-1FE | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X320-3LD FE | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X308-2LD | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X308-2LH | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X308-2LH+ | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X308-2M | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X302-7EEC | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | X307-2EEC | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | XR324-12M | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| | XR324-4M EEC | • | • | • | • | • | • | • | • | | • | • | • | • | • | • | • | • | • | | • | • | • | | | | |
| SCALANCE X-200 | X204IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | XF204IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | XF204 | • | • | | • | • | • | • | | | | | | • | | | | | | | | | | | | | |
| | XF208 | • | • | | • | • | • | • | | | | | | • | | | | | | | | | | | | | |
| | XF204-2 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | XF206-1 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X202-2IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X202-2P IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X201-3P IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X200-4P IRT | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X204IRT PRO | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X202-2P IRT PRO | • | • | | • | • | • | • | • | • | | | | • | | | | | | | | | | | | | |
| | X224 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X216 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X212-2 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X212-2LD | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X208 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X208PRO | | | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X206-1 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X206-1LD | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X204-2 | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |
| | X204-2LD | • | • | | • | • | • | | | | | | | • | | | | | | | | | | | | | |

• applies

Overview of the functions of the SCALANCE X Industrial Ethernet switches – Software

G_IK10_XX_10242

## Overview (continued)

| Type of device | | PROFINET diagnosis | Topology support (LLDP) | Command Line Interface / Telnet | Web based Management | Configuration with STEP 7 | SNMP | Ring redundancy incl. RM-functionality | Standby redundancy | IRT capability | VLAN (Virtual Local Area Network) | GVRP (Generic VLAN Registration Protocol) | STP/ RSTP (Spanning Tree Protocol/ Rapid Spanning Tree Protocol) | Passive Listening | IGMP Snooping/Querier (Internet Group Management Protocol) | GMRP (Generic Multicast Protocol) | Broadcast/ Multicast/ Unicast Limiter | Broadcast blocking | DHCP Option 82 (Dynamic Host Configuration Protocol) | IP Access List | Access Control List (MAC) | IEEE 802.1x (Radius) | Link Aggregation | Static Routing | RIPv2 (Dynamic Routing) | OSPFv2 (Dynamic Routing) | VRRP, Router Redundancy (Virtual Router Redundancy Protocol) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCALANCE X-100 | X124 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X116 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X112-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X108 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X108PoE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X106-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | X104-2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SCALANCE X-000 | X005 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB005 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB008 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB004-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB004-1LD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB005G | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB008G | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB004-1G | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | XB004-1LDG | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Modules/ CPs for SIMATIC S7 | CSM 1277 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CSM 377 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CP 343-1 Lean | • | • | | •1) | • | • | | | | | | | | | | | | | • | | | | | | | |
| | CP 343-1 | • | • | | •1) | • | • | | | | | | | | | | | | | • | | | | | | | |
| | CP 343-1 Advanced | • | • | | •1) | • | • | | | • | | | | | | | | | | • | | | | | | • | |
| | CP 343-1 BACnet | | • | | • | • | | | | | | | | | | | | | | | | | | | | | |
| | CP 443-1 | • | • | | •1) | • | • | | | • | | | | | | | | | | • | | | | | | | |
| | CP 443-1 Advanced | • | • | | •1) | • | • | | | • | | | | | | | | | | • | | | | | | • | |
| CPs for PG/PC | CP 1623 (PCIe) | | | | • | • | | | | | | | | | | | | | | | | | | | | | |
| | CP 1604 (PCI-104) | • | • | | •1) | • | • | | | • | | | | | | | | | | | | | | | | | |
| | CP 1616 (PCI) | • | • | | •1) | • | • | | | • | | | | | | | | | | | | | | | | | |

• applies

1) Port diagnosis possible by means of integrated web server

Overview of the functions of the SCALANCE X Industrial Ethernet switches and components with switch functionality – Software

G_IK10_XX_10243

**Overview**

■ **Overview** (continued)

| Type of module | Type and quantity of ports | | | | | Max. distance |
|---|---|---|---|---|---|---|
| | Gigabit Ethernet | | | Fast Ethernet | | |
| | 10 / 100 / 1000 Mbit/s | 1000 Mbit/s | | 100 Mbit/s | | |
| | Electrical | Optical | | Optical | | |
| | Twisted Pair | Multimode | Singlemode | Multimode | Singlemode | |
| Media modules | | | | | | |
| MM992-2CUC | 2x RJ45[1] | | | | | 100 m |
| MM992-2CU | 2x RJ45 | | | | | 100 m |
| MM991-2 | | | | 2x BFOC | | 3 km |
| MM991-2LD | | | | | 2x BFOC | 26 km |
| MM991-2 | | | | 2x SC | | 3 km |
| MM991-2LD | | | | | 2x SC | 26 km |
| MM991-2LH+ | | | | | 2x SC | 70 km |
| MM992-2 | | 2x SC | | | | 750 m |
| MM992-2LD | | | 2x SC | | | 10 km |
| MM992-2LH | | | 2x SC | | | 40 km |
| MM992-2LH+ | | | 2x SC | | | 70 km |
| MM992-2ELH | | | 2x SC | | | 120 km |
| MM992-2SFP | | 2x LC[2] | 2x LC[2] | 2x LC[2] | 2x LC[2] | |
| SFP modules[3] | | | | | | |
| SFP991-1 | | | | 1x LC | | 3 km |
| SFP991-1LD | | | | | 1x LC | 26 km |
| SFP991-1LH+ | | | | | 1x LC | 70 km |
| SFP992-1 | | 1x LC | | | | 750 m |
| SFP992-1LD | | | 1x LC | | | 10 km |
| SFP992-1LH | | | 1x LC | | | 40 km |
| SFP992-1LH+ | | | 1x LC | | | 70 km |
| SFP992-1ELH | | | 1x LC | | | 120 km |

[1] with retaining collars
[2] The MM392-2SFP SFP slot module can accommodate up to two 1-port SFP modules
[3] Can only be plugged into an MM392-2SFP slot module

G_IK10_XX_10277

Media modules for SCALANCE X-300

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the Switch Selection Tool is available as a free download at:

http://support.automation.siemens.com/WW/view/en/39134641

2

**2**

## Overview



- Unmanaged switch for connecting a SIMATIC S7-1200 to an Industrial Ethernet network with a line, tree or star topology
- Multiplication of Ethernet interfaces on a SIMATIC S7-1200 for additional connection of up to three programming devices, operator controls, and further Ethernet nodes
- Simple, space-saving mounting on the SIMATIC S7-1200 mounting rail
- Low-cost solution for implementing small, local Ethernet networks
- Connection without any problems using RJ45 standard connectors
- Simple and fast status display via LEDs on the device
- Integral autocrossover function permits use of uncrossed connecting cables

## Benefits



- Reduction in assembly costs and mounting space compared to use of external network components
- Fast commissioning, as no configuration is necessary
- Flexible expansion of the network by simply inserting the CSM

## Application

The CSM 1277 is an Industrial Ethernet switch of compact design for use in the SIMATIC S7-1200. The CSM 1277 can be used to multiply the Ethernet interface of the SIMATIC S7-1200 in order to allow simultaneous communication with operator panels, programming devices, other controllers, or the office world.

The CSM 1277 and the SIMATIC S7-1200 controller can be used to implement simple automation networks at low cost.

## Design

The CSM 1277 compact switch module offers all advantages of the SIMATIC S7-1200 design:

- Compact design;
  the rugged plastic enclosure contains:
  - 4 x RJ45 sockets for connecting to Industrial Ethernet
  - 3-pole plug-in terminal strip for connection of the external 24 V DC supply on the top
  - LEDs for diagnostics and for status display of the Industrial Ethernet ports
- Simple mounting on the mounting rail of the S7-1200
- Fanless and therefore low-maintenance design
- The module can be replaced without using a programming device

## Function

- Multiplication of Ethernet interfaces of the SIMATIC S7-1200
- Design of a small, local Industrial Ethernet network with three further nodes
- Automatic detection of data transfer rate by means of auto-sensing and autocrossover functions
- LEDs for diagnostics and for status display

**Network topology and network configuration**

Various network topologies can be implemented using the CSM 1277 compact switch module:

- Connection of SIMATIC S7-1200 in linear topology:
  at least one RJ45 connection of the SIMATIC S7-1200 remains vacant, e.g. for connecting a programming device (PG)
- Connection of SIMATIC S7-1200 to a higher-level network in a tree/star topology:
  at least two RJ45 connections of the SIMATIC S7-1200 remain vacant, e.g. for connecting a programming device/operator panel (PG/OP)
- Design of a small, local network with a SIMATIC S7-1200 and three further Ethernet nodes

**Configuration**

The CSM 1277 compact switch module is an unmanaged switch and need not be configured.

**Diagnostics**

The following information is displayed on LEDs on the device:
- Power
- Port status
- Data traffic

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Compact Switch Modules
CSM 1277 unmanaged**

**2**

### Technical specifications

| Order No. | 6GK7 277-1AA00-0AA0 |
|---|---|
| **Product type designation** | **CSM 1277** |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/ optical connections for network components or terminal equipment | 4 |
| Number of electrical connections | |
| • For network components or terminal equipment | 4 |
| • For power supply | 1 |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For power supply | 3-pin terminal block |
| **Supply voltage, current consumption, power loss** | |
| Type of power supply | DC |
| Supply voltage, external | 24 V |
| • Minimum | 19.2 V |
| • Maximum | 28.8 V |
| Current consumption, maximum | 0.07 A |
| Product component: fusing of power supply input | Yes |
| Type of fusing of power supply input | 0.5 A / 60 V |
| Effective power loss at 24 V with DC | 1.6 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | 0 … 60 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |

| Order No. | 6GK7 277-1AA00-0AA0 |
|---|---|
| **Product type designation** | **CSM 1277** |
| **Design, dimensions and weights** | |
| Type of construction | SIMATIC S7-1200 device design |
| Width | 45 mm |
| Height | 100 mm |
| Depth | 75 mm |
| Net weight | 0.15 kg |
| Type of mounting | |
| • 35 mm DIN rail mounting | Yes |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| **Product properties, functions, components, general** | |
| Product function: switch-managed | No |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC from FM | FM3611: Class 1, Division 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta |
| • For Ex zone | EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T.., KEMA 08 ATEX 0003 X |
| • For CSA and UL safety | UL 508, CSA C22.2 No. 142 |
| • For emitted interference | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

**2**

### Ordering data

| | Order No. | | Order No. |
|---|---|---|---|
| **CSM 1277 compact switch module** | **6GK7 277-1AA00-0AA0** | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1 840-2AH10** |
| Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM | | 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m | |
| *Accessories* | | **IE FC stripping tool** | **6GK1 901-1GA00** |
| **IE TP Cord RJ45/RJ45** | | Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables | |
| TP cable 4 x 2 with 2 RJ45 connectors | | **IE FC Outlet RJ45** | **6GK1 901-1FC00 0AA0** |
| • 0.5 m | **6XV1 870-3QE50** | For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more | |
| • 1 m | **6XV1 870-3QH10** | | |
| • 2 m | **6XV1 870-3QH20** | **SIMATIC NET Manual Collection** | **6GK1 975-1AA00-3AA0** |
| • 6 m | **6XV1 870-3QH60** | Electronic manuals on communications systems, protocols, products; on DVD; German/English | |
| • 10 m | **6XV1 870-3QN10** | | |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XB-000 unmanaged**

### ■ Overview



- The unmanaged Industrial Ethernet switches of the SCALANCE XB-000 line are optimized for installing Industrial Ethernet networks in a line and star topology
- Versions are available for Fast Ethernet (10/100 Mbit/s, XB-000) and Gigabit Ethernet (10/100/1000 Mbit/s, XB-000G)
- Electrical or optical station or network connection
- Enclosure for space-saving installation in control cabinets or boxes on a standard rail
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- Front connection for data cable
- Connection on bottom for power supply

### ■ Benefits


get Designed for Industry

- Implementation of simple and very economical machine networking
- Space-saving installation thanks to small, compact design
- Can be used in industrial environments
- Quick commissioning without configuration
- Easy on-site diagnostics via LEDs

### ■ Application

- The unmanaged Industrial Ethernet switches of the SCALANCE XB-000 line allow cost-effective solutions for setting up small star or line topologies with switching functionality in machines or plant units.
- The enclosure is designed for space-saving installation in a control cabinet on a standard rail.

**Product versions**

*SCALANCE XB005 and SCALANCE XB008*

- For the construction of electrical Industrial Ethernet star and line topologies
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- 5 or 8 x 10/100 Mbit/s electrical RJ45 ports

*SCALANCE XB004-1/XB004-1G and SCALANCE XB004-1LD/XB004-1LDG*

- For the construction of electrical and optical Industrial Ethernet star and line topologies
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- 4 x 10/100 Mbit/s RJ45 electrical ports and 1 x 100 Mbit/s optical SC port (multi-mode/single-mode, glass)
- Low-cost connection of remote stations which are up to 26 km away

*SCALANCE XB005G and SCALANCE XB008G*

- For the construction of electrical Industrial Ethernet star and line topologies
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- 5 or 8 x 10/100/1000 Mbit/s electrical RJ45 ports

*SCALANCE XB004-1G and SCALANCE XB004-1LDG*

- For the construction of electrical and optical Industrial Ethernet star and line topologies
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- 4 x 10/100/1000 Mbit/s RJ45 electrical ports and 1 x 1000 Mbit/s optical SC port (multi-mode/single-mode, glass)
- Low-cost connection of remote stations which are up to 10 km away

**2**

## ■ Design

The SCALANCE XB-000 Industrial Ethernet switches are optimized for installation on a standard rail. Wall mounting is possible.

The SCALANCE XB-000 switches have:

- A 3-pole terminal block for connecting the power supply (1 x 24 V DC) and functional ground.
- An LED for indicating the status information (power)
- LEDs for indicating the status information (link status and data exchange) per port

The following port types are available:

- 10/100 BaseTX electrical RJ45 ports or 10/100/1000 BaseTX electrical RJ45 ports: RJ45 ports, automatic data transmission rate detection (10, 100 or 1000 Mbit/s), with Autosensing and Autocrossing function for connecting IE TP cables up to 100 m.
- 100 BaseFX, SC port optical SC port for direct connection to the Industrial Ethernet FO cables. Multimode fiber-optic cable up to 3 km
- 100 BaseFX, SC port optical SC port for direct connection to Industrial Ethernet FO cables. Single mode fiber-optic cable up to 26 km
- 1000 BaseSX, optical SC port SC sockets for direct connection to Industrial Ethernet FO cables. Multimode fiber-optic cable up to 750 m
- 1000 BaseLX, optical SC port SC sockets for direct connection to Industrial Ethernet FO cables. Single mode fiber-optic cable up to 10 km

All of the connections are made from the front.

## ■ Function

- Construction of electrical Industrial Ethernet line or star topologies
- Automatic data transmission rate detection (10/100/1000 Mbit/s), with autosensing and autocrossover function
- Easy network configuration and network expansion; no limitation on network expansion with cascading of the switches

**Network topology and network configuration**

The SCALANCE XB-000 switches are typically installed with the stations to be connected in a control cabinet or control box.

When configuring the network, it is necessary to observe the following boundary conditions:

- Length of the TP cable between two SCALANCE XB-000 switches:
  - max. 100 m
  - max. 10 m via patch cables with TP Cord
  - max. 100 m via Industrial Ethernet FC Outlet RJ45, IE FC Standard Cable and TP Cord
- Length of the fiber-optic cables:
  - max. 3 km with Industrial Ethernet FO cables Multimode
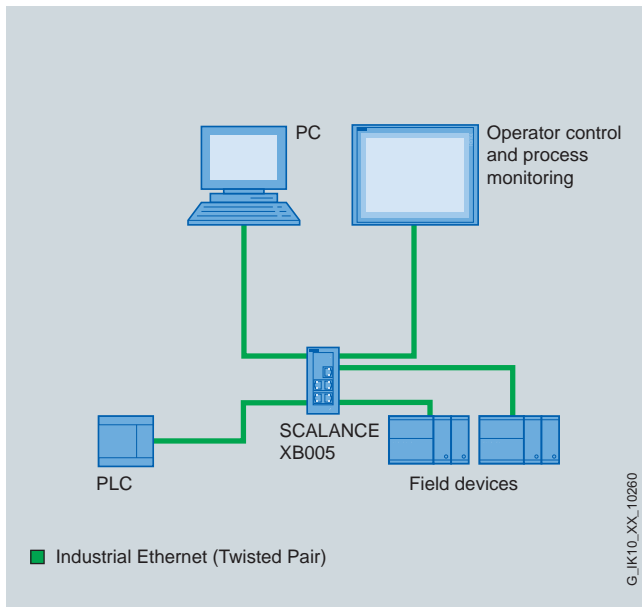  - max. 26 km with Industrial Ethernet FO cables Single mode
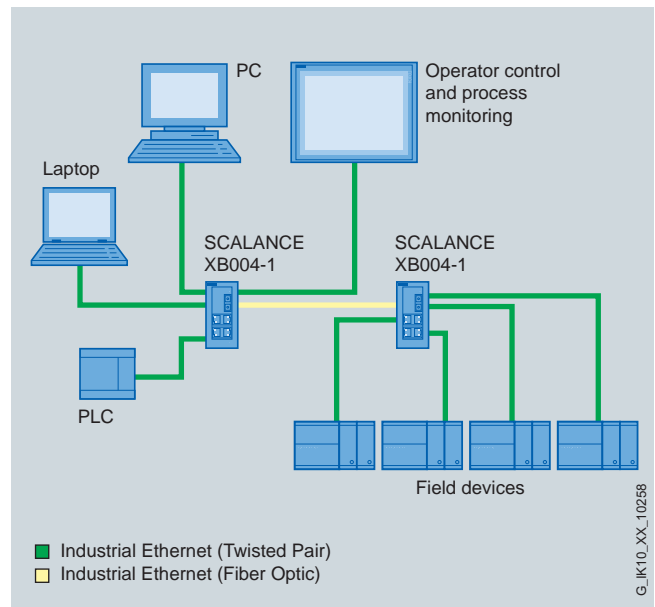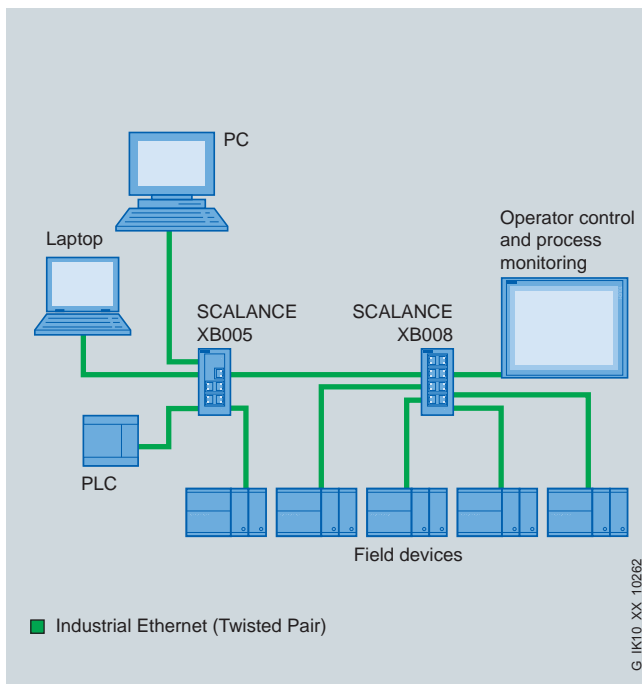
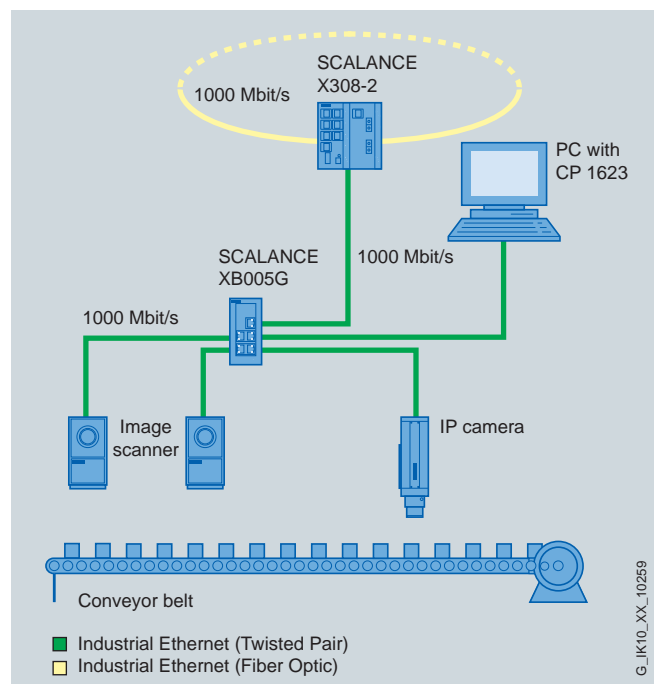**SCALANCE XB-000 unmanaged**

## Function



Electrical star topology with SCALANCE XB005
or SCALANCE XB005G



Mixed star topology with SCALANCE XB004-1
or SCALANCE XB004-1G



Electrical line topology with SCALANCE XB005 and XB008,
or SCALANCE XB005G and XB008G



Electrical star topology with SCALANCE XB005G and
connection to a Gigabit Ethernet ring

### Diagnostics

The following information is displayed by LEDs on site:

• Power
• Port status
• Data traffic

**2**

## Technical specifications

| Order No. | 6GK5 004-1BD00-1AB2 | 6GK5 004-1BF00-1AB2 | 6GK5 005-0BA00-1AB2 | 6GK5 008-0BA00-1AB2 |
|---|---|---|---|---|
| Product type designation | SCALANCE XB004-1 | SCALANCE XB004-1LD | SCALANCE XB005 | SCALANCE XB008 |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/ optical connections for network components or terminal equipment | 5 | 5 | 5 | 8 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 4 | 4 | 5 | 8 |
| • For power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For power supply | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 1 | 1 | – | – |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | SC port (multi-mode up to 3 km) | SC port (single-mode up to 26 km) | – | – |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 19.2 V | 19.2 V | 19.2 V | 19.2 V |
| • Maximum | 28.8 V | 28.8 V | 28.8 V | 28.8 V |
| Current consumption, maximum | 0.11 A | 0.1 A | 0.07 A | 0.12 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V |
| Effective power loss at 24 V with DC | 2.64 W | 2.4 W | 1.68 W | 2.88 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -10 … +60 °C | -10 … +60 °C | -10 … +60 °C | -10 … +60 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Box | Box | Box | Box |
| Width | 45 mm | 45 mm | 45 mm | 45 mm |
| Height | 100 mm | 100 mm | 100 mm | 100 mm |
| Depth | 87 mm | 87 mm | 87 mm | 87 mm |
| Net weight | 0.165 kg | 0.165 kg | 0.165 kg | 0.18 kg |
| Type of mounting | | | | |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XB-000 unmanaged**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 004-1BD00-1AB2 | 6GK5 004-1BF00-1AB2 | 6GK5 005-0BA00-1AB2 | 6GK5 008-0BA00-1AB2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XB004-1** | **SCALANCE XB004-1LD** | **SCALANCE XB005** | **SCALANCE XB008** |
| **Product properties, functions, components, general** | | | | |
| Product function: switch-managed | No | No | No | No |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

| Order No. | 6GK5 004-1GL00-1AB2 | 6GK5 004-1GM00-1AB2 | 6GK5 005-0GA00-1AB2 | 6GK5 008-0GA00-1AB2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XB004-1G** | **SCALANCE XB004-1LDG** | **SCALANCE XB005G** | **SCALANCE XB008G** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 5 | 5 | 5 | 8 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 4 | 4 | 5 | 8 |
| • For power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For power supply | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 1000 Mbit/s | 1 | 1 | – | – |
| Design of optical connection for fiber-optic cables | | | | |
| • At 1000 Mbit/s | SC port (multi-mode up to 0.75 km) | SC port (single-mode up to 10 km) | – | – |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 19.2 V | 19.2 V | 19.2 V | 19.2 V |
| • Maximum | 28.8 V | 28.8 V | 28.8 V | 28.8 V |
| Current consumption, maximum | 0.52 A | 0.52 A | 0.44 A | 0.52 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V |
| Effective power loss at 24 V with DC | 12.5 W | 12.5 W | 10.5 W | 12.5 W |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 004-1GL00-1AB2 | 6GK5 004-1GM00-1AB2 | 6GK5 005-0GA00-1AB2 | 6GK5 008-0GA00-1AB2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XB004-1G** | **SCALANCE XB004-1LDG** | **SCALANCE XB005G** | **SCALANCE XB008G** |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -10 … +60 °C | -10 … +60 °C | -10 … +60 °C | -10 … +60 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Box | Box | Box | Box |
| Width | 45 mm | 45 mm | 45 mm | 45 mm |
| Height | 100 mm | 100 mm | 100 mm | 100 mm |
| Depth | 87 mm | 87 mm | 87 mm | 87 mm |
| Net weight | 0.21 kg | 0.21 kg | 0.22 kg | 0.26 kg |
| Type of mounting | | | | |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| **Product properties, functions, components, general** | | | | |
| Product function: switch-managed | No | No | No | No |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class B) | EN 61000-6-4 (Class B) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XB-000 unmanaged**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|

### SCALANCE XB-000 Industrial Ethernet switches

*Accessories*

| | | | |
|---|---|---|---|
| Unmanaged Industrial Ethernet switches for 10/100/1000 Mbit/s, degree of protection IP20, incl. operating instructions, Industrial Ethernet network manual on CD-ROM | | **IE TP Cord RJ45/RJ45** TP cable 4 x 2 with 2 RJ45 connectors | |
| • **SCALANCE XB005** 5 x 10/100 Mbit/s RJ45 ports electrical | 6GK5 005-0BA00-1AB2 | • 0.5 m | 6XV1 870-3QE50 |
| | | • 1 m | 6XV1 870-3QH10 |
| • **SCALANCE XB008** 8 x 10/100 Mbit/s RJ45 ports electrical | 6GK5 008-0BA00-1AB2 | • 2 m | 6XV1 870-3QH20 |
| | | • 6 m | 6XV1 870-3QH60 |
| • **SCALANCE XB004-1** 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (multi-mode, glass), up to 3 km | 6GK5 004-1BD00-1AB2 | • 10 m | 6XV1 870-3QN10 |
| | | **FO Standard Cable GP 50/125** Glass fiber-optic cable, pre-assembled with 4 SC connectors | |
| • **SCALANCE XB004-1LD** 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (single-mode, glass), up to 26 km | 6GK5 004-1BF00-1AB2 | • 80 m | 6XV1 873-6AN80 |
| | | • 100 m | 6XV1 873-6AT10 |
| | | • 150 m | 6XV1 873-6AT15 |
| • **SCALANCE XB005G** 5 x 10/100/1000 Mbit/s electrical RJ45 ports | 6GK5 005-0GA00-1AB2 | • 200 m | 6XV1 873-6AT20 |
| | | • 300 m | 6XV1 873-6AT30 |
| • **SCALANCE XB008G** 8 x 10/100/1000 Mbit/s electrical RJ45 ports | 6GK5 008-0GA00-1AB2 | | |
| • **SCALANCE XB004-1G** 4 x 10/100/1000 Mbit/s electrical RJ45 ports 1 x 1000 Mbit/s optical SC port (multi-mode, glass), up to 3 km | 6GK5 004-1GL00-1AB2 | | |
| • **SCALANCE XB004-1LDG** 4 x 10/100/1000 Mbit/s electrical RJ45 ports 1 x 1000 Mbit/s optical SC port (single-mode, glass), up to 10 km | 6GK5 004-1GM00-1AB2 | | |

### SCALANCE X-100 unmanaged

■ **Overview**



- The unmanaged Industrial Ethernet switches of the SCALANCE X-100 product line are optimized for installing Industrial Ethernet networks with 10/100 Mbit/s in a line and star topology
- Depending on the port type of the devices, the connection to a station or network is electrical or optical with Power-over-Ethernet (PoE) functionality according to IEEE 802.3af ⓝⓔⓦ
- Rugged metal housing for space-saving cabinet mounting on standard rails, S7-300 DIN rail or for wall mounting
- Rugged, industry-standard station connections with PROFINET-compatible RJ45 connectors that offer additional strain relief and bending strain relief thanks to latching on the housing
- Redundant power supply
- Diagnostics on the device by means of LEDs (power, link status, data communication)
- Error signaling contact with easy adjustment using the SET button

■ **Benefits**



- Ideal solution for configuring Industrial Ethernet line and star topologies
- Reduction of network installation costs by transmitting data and energy (Power-over-Ethernet) via the conventional 4-core Industrial Ethernet cable (only SCALANCE X108PoE) ⓝⓔⓦ
- Additional power supply units can be omitted thanks to generating the Power-over-Ethernet voltage (48 V DC) directly at the switch (only SCALANCE X108PoE)
- Space-saving installation in the cabinet thanks to the compact design in S7-300 format
- Secure data communication by means of industry standard device connection with PROFINET-compliant connector IE FC RJ45 Plug 180 and latching of the connector to the housing to provide additional strain relief

- Installation is possible without a patch field by means of IE FC RJ45 Plug 180 and IE FC Standard Cable
- Simple and fast diagnostics via LED on device and signaling contact
- Low-maintenance operation thanks to fanless construction
- Use of uncrossed connection cables possible by means of integrated autocrossover function
- Easy network configuration without runtime calculation

■ **Application**

The switches of the SCALANCE X-100 product line support the inexpensive construction of Industrial Ethernet line or star topologies with switching functions. They are designed for operation in the control cabinet.

Product versions

*SCALANCE X104-2 / SCALANCE X106-1 / SCALANCE X112-2*

- Construction of optical Industrial Ethernet line or star topologies:
  - SCALANCE X104-2;
    line or star topologies with 4 electrical ports and 2 optical ports
  - SCALANCE X106-1;
    star topologies with 6 electrical ports and 1 optical port
  - SCALANCE X112-2;
    line or star topologies with 12 electrical ports and 2 optical ports
- Diagnostics on the device using LEDs (power, link status, data traffic) and signaling contact (alarm screen form can be set using a button on the device)
- The four (SCALANCE X104-2), six (SCALANCE X106-1) or twelve (SCALANCE X112-2) RJ45 sockets are designed to be industry-compatible with additional holding collars for connection of the IE FC RJ45 Plug 180

*SCALANCE X108 / SCALANCE X108PoE / SCALANCE X116 / SCALANCE X124*

- Construction of electrical Industrial Ethernet star and line topologies
  - SCALANCE X108
    with eight electrical ports
  - SCALANCE X108PoE ⓝⓔⓦ
    with eight electrical ports, two of which have Power-over-Ethernet functionality
  - SCALANCE X116
    with 16 electrical ports
  - SCALANCE X124
    with 24 electrical ports
- Diagnostics on the device using LEDs (power, link status, data traffic) and signaling contact (alarm screen form can be set using a button on the device)
- The RJ45 sockets are designed to be industry-compatible with additional holding collars for connection of the IE FC RJ45 Plug 180

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-100 unmanaged**

**2**

### ■ Design

The SCALANCE Industrial Ethernet switches with a rugged metal housing are optimized for mounting on a standard rail and an S7-300 rail. Direct wall mounting in various positions is also possible. Due to the dimensions of the housing that conform to those of SIMATIC S7-300, the devices are optimized for integration in an automation solution with S7-300 components.

The SCALANCE X-100 switches have:

- A 4-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC).
- A row of LEDs to indicate the status information (power, link status, data communication, signaling contact)
- A 2-pole terminal block for connecting the isolated signaling contact
- A SET button for on-site configuration of the signaling contact

The following port types are available:

- *10/100BaseTX, RJ45 connection;*
  RJ45 socket, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover functions for connecting IE FC cables using IE FC RJ45 Plug 180 up to 100 m.
- *10/100BaseTX, RJ45 connection and Power-over-Ethernet functionality;*
  RJ45 socket, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover functions for connecting IE FC cables using IE FC RJ45 Plug 180 up to 100 m and integrated Power-over-Ethernet functionality according to IEEE 802.3af.
- *100BaseFX, BFOC connection technique*
  BFOC sockets for direct connection to Industrial Ethernet glass fiber-optic cables up to 3000 m for configuring line and star topologies.
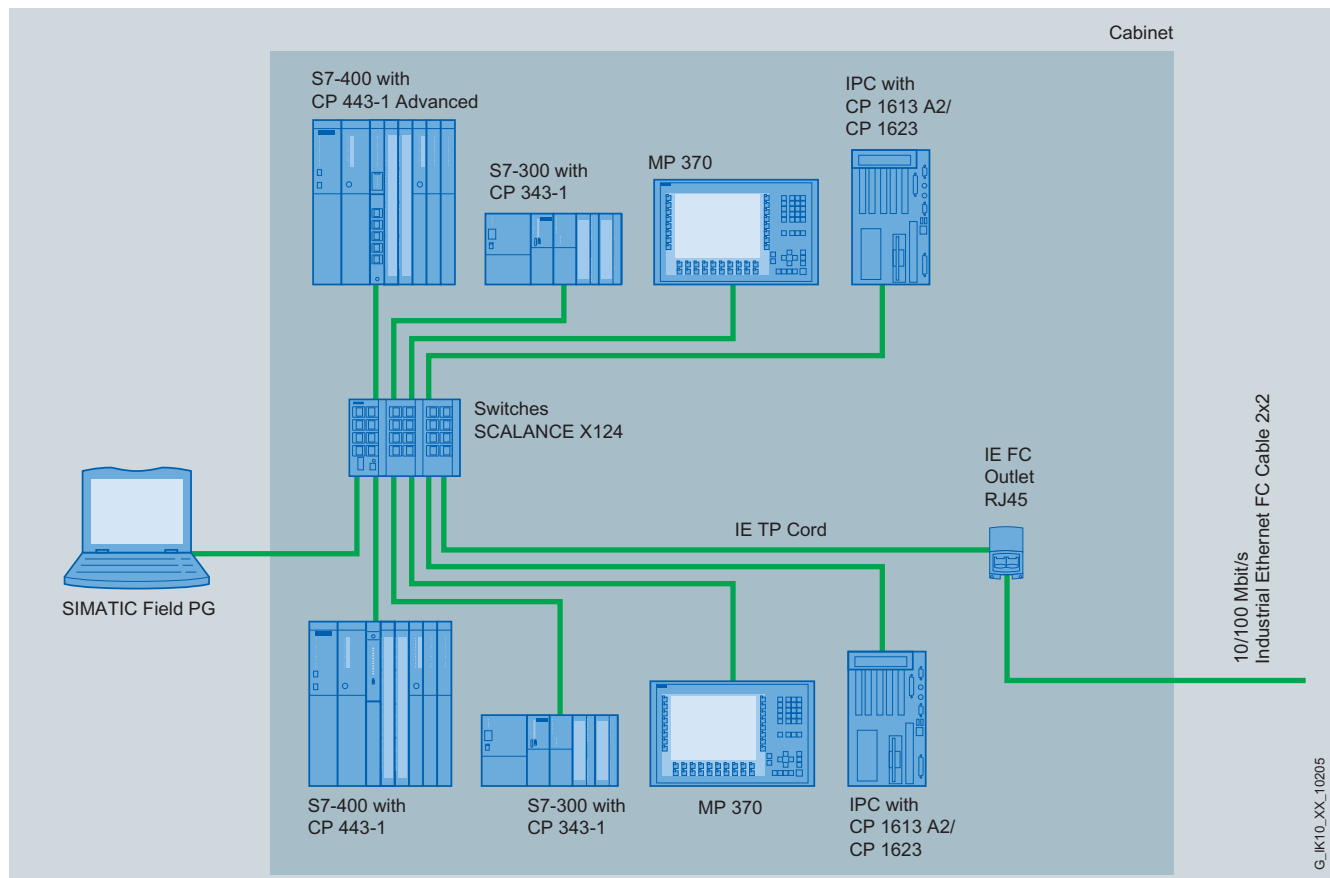
### ■ Function

- Construction of electrical and optical Industrial Ethernet line or star topologies
- Use of uncrossed connecting leads is possible due to integrated auto-crossover function of the ports
- Power supply of Power-over-Ethernet-capable terminal equipment via the data line for SCALANCE X108PoE 🔴
- Isolation of the load due to integrated switch functions
- Easy network configuration and network expansion; no limitation of the expansion of the network when switches of the SCALANCE X-100 product line are cascaded

**Network topology and network configuration**

The SCALANCE X-100 switches are typically installed with the stations to be connected in a control cabinet. They can be mixed electrically and optically in star and line topologies.

When configuring the network, it is necessary to observe the following boundary conditions:

- Length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with Industrial Ethernet FastConnect products
- Length of the TP cable between SCALANCE X switch and Power-over-Ethernet terminal equipment:
  - Max. 100 m with Industrial Ethernet FastConnect products
- Length of the fiber-optic cables:
  - Max. 3000 m with Industrial Ethernet glass fiber-optic cables



Star-shaped network topology with SCALANCE X124

**2**

## ■ **Function** (continued)



Electrical and optical line topology with SCALANCE X112-2, X104-2 and X106-1 as well as connection and supply of terminal devices with Power-over-Ethernet (PoE) by using SCALANCE X108PoE



Optical line topology with SCALANCE X104-2

**SCALANCE X-100 unmanaged**

**■ Function** (continued)

**2**



Optical star topology with SCALANCE X106-1

### Diagnostics

The following information is displayed by LEDs on site:

- Power
- Port status
- Data traffic

The Industrial Ethernet switches of the SCALANCE X-100 line can also be monitored over the floating signaling contact.

**2**

## Technical specifications

| Order No. | 6GK5 104-2BB00-2AA3 | 6GK5 106-1BB00-2AA3 | 6GK5 108-0BA00-2AA3 | 6GK5 108-0PA00-2AA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X104-2** | **SCALANCE X106-1** | **SCALANCE X108** | **SCALANCE X108PoE** NEW |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 6 | 7 | 8 | 8 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 4 | 6 | 8 | 6 |
| • With Power-over-Ethernet for network components or terminal equipment | – | – | – | 2 |
| • For signal contact | 1 | 1 | 1 | 1 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • With Power-over-Ethernet for network components or terminal equipment | – | – | – | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 2 | 1 | – | – |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | BFOC port (multi-mode up to 3 km) | BFOC port (multi-mode up to 3 km) | – | – |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.175 A | 0.15 A | 0.14 A | 1.7 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V |
| Effective power loss at 24 V with DC | 3.8 W | 3.6 W | 3.36 W | 10 W |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-100 unmanaged**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 104-2BB00-2AA3 | 6GK5 106-1BB00-2AA3 | 6GK5 108-0BA00-2AA3 | 6GK5 108-0PA00-2AA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X104-2** | **SCALANCE X106-1** | **SCALANCE X108** | **SCALANCE X108PoE** NEW |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -10 … +60 °C | -10 … +60 °C | -20 … +70 °C | -20 … +60 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 60 mm | 60 mm | 60 mm | 60 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 124 mm | 124 mm | 124 mm | 124 mm |
| Net weight | 780 g | 780 g | 780 g | 900 g |
| Type of mounting | | | | |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | Yes | Yes | Yes | Yes |
| **Product properties, functions, components, general** | | | | |
| Product function: switch-managed | No | No | No | No |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location) | UL 1604 and UL 2279-15 (hazardous location) | UL 1604 and UL 2279-15 (hazardous location) | UL 1604 and UL 2279-15 (hazardous location) |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |
| Marine classification association | | | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes | Yes | Yes | No |
| • Bureau Veritas (BV) | Yes | Yes | Yes | No |
| • Det Norske Veritas (DNV) | Yes | Yes | Yes | No |
| • Germanischer Lloyd (GL) | Yes | Yes | Yes | No |
| • Lloyds Register of Shipping (LRS) | Yes | Yes | Yes | No |
| • Nippon Kaiji Kyokai (NK) | Yes | Yes | Yes | No |
| • Polski Rejestr Statkow (PRS) | Yes | Yes | Yes | No |

■ **Technical specifications** (continued)

| Order No. | 6GK5 112-2BB00-2AA3 | 6GK5 116-0BA00-2AA3 | 6GK5 124-0BA00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X112-2** | **SCALANCE X116** | **SCALANCE X124** |
| **Data transmission rate** | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 14 | 16 | 24 |
| Number of electrical connections | | | |
| • For network components or terminal equipment | 12 | 16 | 24 |
| • For signal contact | 1 | 1 | 1 |
| • For power supply | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 |
| Design of electrical connection | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | |
| • At 100 Mbit/s | 2 | – | – |
| Design of optical connection for fiber-optic cables | | | |
| • At 100 Mbit/s | BFOC port (multi-mode up to 3 km) | – | – |
| **Inputs/outputs** | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | |
| Type of power supply | DC | DC | DC |
| Supply voltage, external | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.45 A | 0.3 A | 0.45 A |
| Product component: fusing of power supply input | Yes | Yes | Yes |
| Type of fusing of power supply input | 0.6 A / 60 V | 0.6 A / 60 V | 0.6 A / 60 V |
| Effective power loss at 24 V with DC | 5.16 W | 4.4 W | 4.8 W |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | -10 … +70 °C | -20 … +70 °C | -20 … +70 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 30 | IP 30 | IP 30 |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-100 unmanaged**

**2**

## ■ Technical specifications (continued)

| Order No. | 6GK5 112-2BB00-2AA3 | 6GK5 116-0BA00-2AA3 | 6GK5 124-0BA00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X112-2** | **SCALANCE X116** | **SCALANCE X124** |
| **Design, dimensions and weights** | | | |
| Type of construction | Compact | Compact | Compact |
| Width | 120 mm | 120 mm | 180 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 124 mm | 124 mm | 124 mm |
| Net weight | 1.1 kg | 1.1 kg | 1.5 kg |
| Type of mounting | | | |
| • 35 mm DIN rail mounting | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes |
| • S7-300 rail mounting | Yes | Yes | Yes |
| **Product properties, functions, components, general** | | | |
| Product function: switch-managed | No | No | No |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta | FM3611: Class 1, Divison 2, Group A, B, C, D / T.., CL.1, Zone 2, GP. IIC, T.. Ta |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA IIT.., KEMA 08 ATEX, 0003 X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA IIT.., KEMA 08 ATEX, 0003 X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA IIT.., KEMA 08 ATEX, 0003 X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location) | UL 1604 and UL 2279-15 (hazardous location) | UL 1604 and UL 2279-15 (hazardous location) |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |
| Marine classification association | | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes | Yes | Yes |
| • Bureau Veritas (BV) | Yes | Yes | Yes |
| • Det Norske Veritas (DNV) | No | No | No |
| • Germanischer Lloyd (GL) | No | No | No |
| • Lloyds Register of Shipping (LRS) | Yes | Yes | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes | Yes | Yes |
| • Polski Rejestr Statkow (PRS) | No | No | No |

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **SCALANCE X-100**<br>**Industrial Ethernet switches** | | *Accessories* | |
| Industrial Ethernet switches for 10/100 Mbit/s, incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | | **IE FC TP standard cable GP 2 x 2 (Type A)** | **6XV1 840-2AH10** |
| | | 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| • **SCALANCE X104-2**<br>4 x 10/100 Mbit/s RJ45 ports, electrical<br>2 x BFOC ports, optical (multi-mode, glass) up to 3 km | **6GK5 104-2BB00-2AA3** | | |
| • **SCALANCE X106-1**<br>6 x 10/100 Mbit/s RJ45 ports, electrical<br>1 x BFOC port, optical (multi-mode, glass) up to 3 km | **6GK5106-1BB00-2AA3** | **IE FC RJ45 Plug 180** | |
| | | RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • **SCALANCE X112-2**<br>12 x 10/100 Mbit/s RJ45 ports, electrical<br>2 x BFOC ports, optical (multi-mode, glass) up to 3 km | **6GK5 112-2BB00-2AA3** | | |
| • **SCALANCE X108**<br>8 x 10/100 Mbit/s RJ45 ports, electrical | **6GK5 108-0BA00-2AA3** | • 1 pack = 1 item | **6GK1 901-1BB10-2AA0** |
| • **SCALANCE X108PoE** *NEW*<br>6 x 10/100 Mbit/s RJ45 ports, electrical<br>2 x 10/100 Mbit/s RJ45 PoE ports, electrical | **6GK5 108-0PA00-2AA3** | • 1 pack = 10 items<br>• 1 pack = 50 items | **6GK1 901-1BB10-2AB0**<br>**6GK1 901-1BB10-2AE0** |
| • **SCALANCE X116**<br>16 x 10/100 Mbit/s RJ45 ports, electrical | **6GK5 116-0BA00-2AA3** | | |
| • **SCALANCE X124**<br>24 x 10/100 Mbit/s RJ45 ports, electrical | **6GK5 124-0BA00-2AA3** | | |

### SCALANCE XF-200 managed

**Overview**
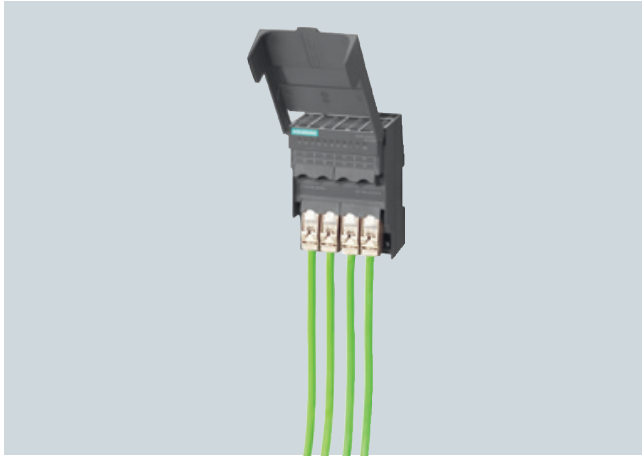


- The managed Industrial Ethernet switches of the SCALANCE XF-200 line are optimized for setting up Industrial Ethernet networks with 10/100 Mbit/s in a line, star or ring topology

- Integrated redundancy manager for constructing Fast Ethernet ring topologies with fast media redundancy

- Electrical or optical connection to stations or network in accordance with the port type of the devices

- Enclosure in ET 200S format (slim design) for use in small control boxes

- Rugged, industry-standard node connections with PROFINET-compliant RJ45 connectors that latch onto the enclosure to offer additional strain and bending relief

- The devices feature PROFINET diagnostics, SNMP access, integral web server and automatic e-mail sending function for remote diagnosis and signaling over the network.

**Benefits**

get — Designed for Industry

- Saves space in the control cabinet and uses smaller control boxes due to slim design in the format of the ET 200S distributed I/O

- Simple connection and disconnection of the RJ45 plug by means of easily accessible RJ45 sockets angled downward on the device

- High availability of the network thanks to:
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cables (redundancy manager integrated)
  - Easy device replacement by means of plug-in C-PLUG swap medium

- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 ports

- Protection of investment due to integration into existing network management systems by means of standardized SNMP access

- Time savings during engineering, commissioning and in the operating phase of a plant by using the configuration and diagnostics integrated in STEP 7

**2**

## ■ Application

The SCALANCE XF-200 Industrial Ethernet switches permit cost-effective configuration of Industrial Ethernet line, star or ring topologies with switching functionality for networks in which high availability or remote diagnostics options are required.
The devices with degree of protection IP20 are designed for operation in the control cabinet.

### Product versions

• Switches with electrical and optical ports
  for glass multi-mode FOC up to 3 km:
  - *SCALANCE XF204-2*;
    4 x 10/100 Mbit/s RJ45 port, electrical
    2 x 100 Mbit/s BFOC port, optical
  - *SCALANCE XF206-1*;
    6 x 10/100 Mbit/s RJ45 port, electrical
    1 x 100 Mbit/s BFOC port, optical

• Switches with electrical ports:
  - *SCALANCE XF204*;
    4 x 10/100 Mbit/s RJ45 port, electrical
  - *SCALANCE XF208*;
    8 x 10/100 Mbit/s RJ45 port, electrical

Characteristics:

• Diagnostics on the device by means of LEDs
  (power, link status, data traffic)

• Remote diagnostics by means of signaling contact,
  PROFINET, SNMP, and Web browser

• The RJ45 sockets are designed to be industry-compatible
  with additional sleeves, for connection of the
  IE FC RJ45 Plug 180
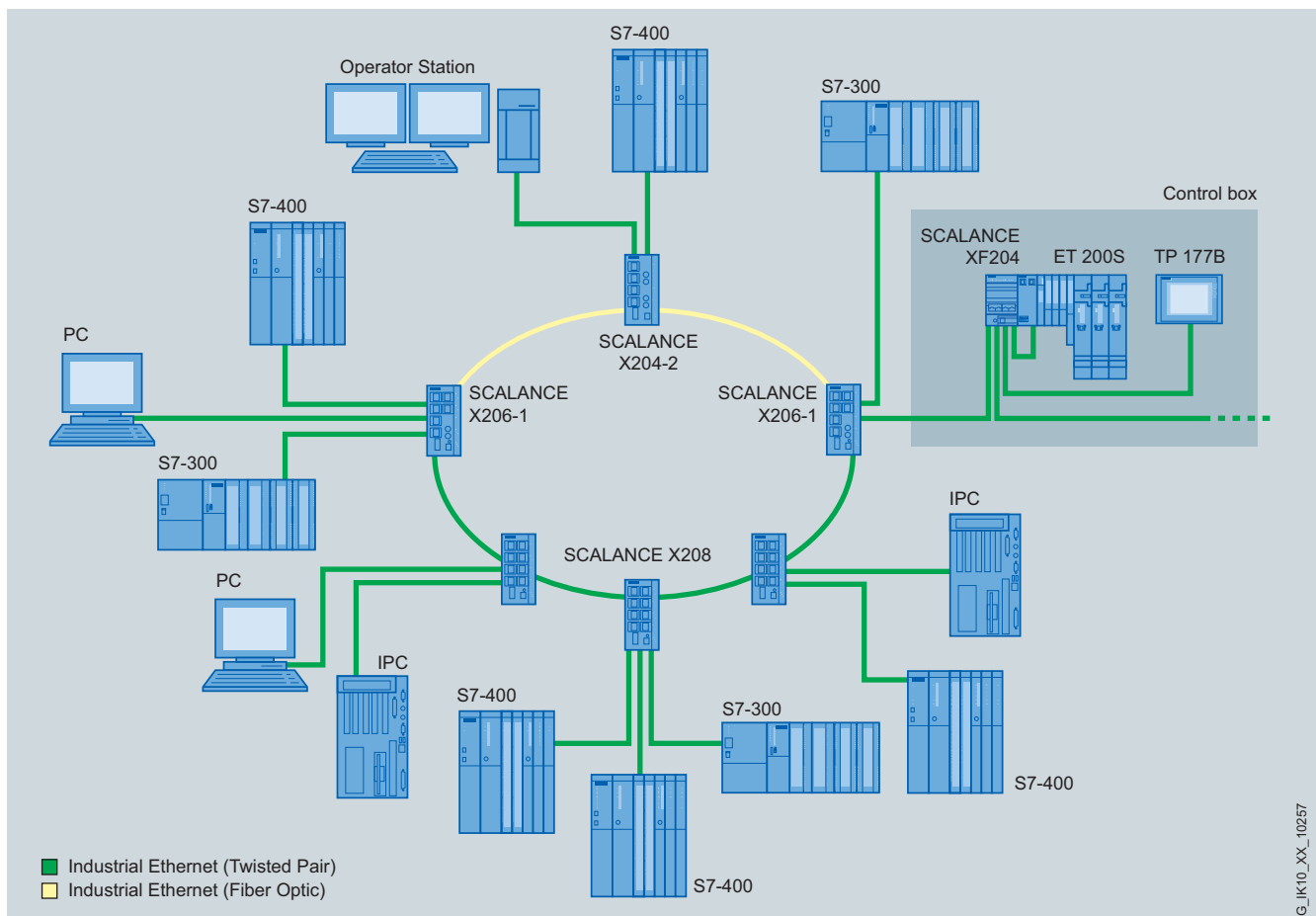


Ring topology with SCALANCE X-200 and networking in the control box with the slim SCALANCE XF204

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**2**

### SCALANCE XF-200 managed

#### Design

The SCALANCE XF-200 managed Industrial Ethernet switches are designed for installation on a standard DIN rail. With their enclosure in ET 200S format (slim design), the devices are optimally suited for integration in automation solutions in small control boxes together with the ET200S.

The switches with degree of protection IP20 feature:

- A 4-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC)
- A row of LEDs to indicate the status information (power, link status, data traffic, power supply, signaling contact)
- A 2-pole terminal block for connecting the isolated signaling contact
- A SET button for on-site configuration of the signaling contact

The SCALANCE XF-200 switches are available with the following port types:

- *10/100BaseTX, RJ45 connection;*
  RJ45 socket, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover functions for connecting IE FC cables using the IE FC RJ45 Plug 180.
- *100BaseFX, BFOC connection technique;*
  BFOC sockets for direct connection to Industrial Ethernet glass fiber-optic cables up to 3 km (multi-mode fiber-optic cable) for configuring line, ring, and star topologies.

#### Function

- Setup of electrical and optical Industrial Ethernet line, star and ring topologies
- Fast redundancy in the ring with High Speed Redundancy (HSR); up to 0.3 seconds for reconfiguration of the ring with 50 switches in the ring
- Fast redundancy in the ring with PROFINET-compliant Media Redundancy Protocol (MRP); max. 0.2 seconds required for reconfiguration of the ring with 50 switches in the ring
- The functioning of the ring is continuously monitored by the integrated redundancy manager. It recognizes failure of a transmission path in the ring or failure of a SCALANCE XF-200 and activates the substitute path within 0.3 or 0.2 seconds
- Use in ring topologies (100 Mbit/s) together with SCALANCE X-400, SCALANCE X-300, SCALANCE X-200, SCALANCE X-200IRT
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- Load disconnection through integral switch functionality
- Easy diagnostics using signaling contact, SNMP and Web browser
- Easy copper cable diagnostics with Web browser for localizing cable breaks
- Integration into the diagnostics of a PROFINET I/O controller with expanded diagnostics functions for a consistent diagnostics concept, including network infrastructure
- Diagnosis of data traffic by means of a parameterizable mirror port with a standard commercial network analyzer
- Fast device replacement in the event of a fault by using the optional C-PLUG swap medium (not included in scope of supply)

#### Network topology and network configuration

The SCALANCE XF-200 Industrial Ethernet switches with IP20 degree of protection are usually installed in a control cabinet together with the stations to be connected. Electrical and optical versions can be installed together in star, line and ring topologies.

When configuring the network, it is necessary to observe the following boundary conditions:

- Length of the TP cable between two SCALANCE XF switches:
  - max. 100 m with IE FC cable and IE FC RJ45 Plug 180
  - max. 10 m using patches with TP cord
- Length of the optical cables
  - max. 3000 m with Industrial Ethernet glass fiber-optic cables (multi-mode)
- IP address:
  The IP address is assigned using the DHCP (Dynamic Host Configuration Protocol) mechanism. If there is no corresponding server in the network, the IP address can be assigned using the supplied software tool PST (Primary Setup Tool) or STEP 7. The SCALANCE XF-200 switches are configured with STEP 7.

#### Commissioning and diagnostics

PROFINET diagnostic interrupts from SCALANCE XF-200 switches can be displayed with the appropriate SIMATIC Engineering Tools and processed in the controller with expanded diagnostics function. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

The SCALANCE XF-200 Industrial Ethernet switches can also be integrated into a network management system through the standardized protocol SNMP (Simple Network Management Protocol). In the event of a fault in the device, error messages (SNMP traps) can be sent to a network system or as e-mail to a specified network administrator.

The integral Web server enables configuration and diagnostics settings to be made using a standard browser (e.g. port configuration). Statistical information can also be read out over the Web server (e.g. port capacity utilization).

The following information is displayed by LEDs on site:

- Power
- Port status
- Data traffic
- Signaling contact
- Redundancy manager function

The Industrial Ethernet switches of the SCALANCE XF-200 line can also be monitored using the floating signaling contact.

**2**

## ■ Technical specifications

| Order No. | 6GK5 204-0BA00-2AF2 | 6GK5 204-2BC00-2AF2 | 6GK5 206-1BC00-2AF2 | 6GK5 208-0BA00-2AF2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XF204** | **SCALANCE XF204-2** | **SCALANCE XF206-1** | **SCALANCE XF208** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 4 | 6 | 7 | 8 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 4 | 4 | 6 | 8 |
| • For signal contact | 1 | 1 | 1 | 1 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Maximum number of optical connections for fiber-optic cables at 100 Mbit/s | – | 2 | 1 | – |
| Design of optical connection for fiber-optic cables at 100 Mbit/s | – | BFOC port (multi-mode up to 3 km) | BFOC port (multi-mode up to 3 km) | – |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | – | -19 ... -14 dB | -19 ... -14 dB | – |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.16 A | 0.22 A | 0.17 A | 0.16 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | 1.1 A / 33 V | 1.1 A / 33 V | 1.1 A / 33 V | 1.1 A / 33 V |
| Effective power loss at 24 V with DC | 2.64 W | 5.28 W | 4.08 W | 3.12 W |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XF-200 managed**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 204-0BA00-2AF2 | 6GK5 204-2BC00-2AF2 | 6GK5 206-1BC00-2AF2 | 6GK5 208-0BA00-2AF2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XF204** | **SCALANCE XF204-2** | **SCALANCE XF206-1** | **SCALANCE XF208** |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +60 °C | -40 … +60 °C | -40 … +60 °C | -40 … +60 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Flat | Flat | Flat | Flat |
| Width | 75 mm | 75 mm | 75 mm | 75 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 73 mm | 73 mm | 73 mm | 73 mm |
| Net weight | 250 g | 250 g | 250 g | 250 g |
| Type of mounting | | | | |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | No | No | No | No |
| • S7-300 rail mounting | No | No | No | No |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • With IRT | | | | |
|   - PROFINET IO-Switch | No | No | No | No |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • Telnet | No | No | No | No |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | No | No | No | No |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |

**2**

## Technical specifications (continued)

| Order No. | 6GK5 204-0BA00-2AF2 | 6GK5 204-2BC00-2AF2 | 6GK5 206-1BC00-2AF2 | 6GK5 208-0BA00-2AF2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XF204** | **SCALANCE XF204-2** | **SCALANCE XF206-1** | **SCALANCE XF208** |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function DHCP client | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | No | No | No | No |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |
| **Product functions Security** | | | | |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |
| Marine classification association | | | | |
| • Bureau Veritas (BV) | Yes | No | No | No |

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **SCALANCE XF-200 Industrial Ethernet switches**<br><br>Industrial Ethernet switches with integrated SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM | | **FC FO Standard Cable GP 62.5/200/230**<br><br>FC FO Standard Cable for fixed installation indoors with PVC sheath; sold by the meter | 6XV1 847-2A |
| • **SCALANCE XF204-2**<br>4 x 10/100 Mbit/s RJ45 ports, electrical; 2 x 100 Mbit/s BFOC ports, optical (multi-mode, glass), up to 3 km | 6GK5 204-2BC00-2AF2 | **FC FO Trailing Cable**<br><br>FC FO Trailing Cable for use in tow chains and moving applications; sold by the meter | 6XV1 847-2C |
| • **SCALANCE XF206-1**<br>6 x 10/100 Mbit/s RJ45 ports, electrical; 1 x 100 Mbit/s BFOC optical port (multi-mode, glass), up to 3 km | 6GK5 206-1BC00-2AF2 | **FC FO Termination Kit**<br><br>Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope | 6GK1 900-1GL00-0AA0 |
| • **SCALANCE XF204**<br>4 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 204-0BA00-2AF2 | **FC BFOC Plug**<br><br>Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths) | 6GK1 900-1GB00-0AC0 |
| • **SCALANCE XF208**<br>8 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 208-0BA00-2AF2 | **IE TP Cord RJ45/RJ45 TP Cable 4 x 2 with two RJ45 connectors** | |
| *Accessories* | | • 0.5 m | 6XV1 870-3QE50 |
| **IE FC RJ45 Plug 180**<br><br>RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | • 1 m | 6XV1 870-3QH10 |
| | | • 2 m | 6XV1 870-3QH20 |
| | | • 6 m | 6XV1 870-3QH60 |
| | | • 10 m | 6XV1 870-3QN10 |
| | | **C-PLUG**<br><br>Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot | 6GK1 900-0AB00 |
| • 1 pack = 1 unit | 6GK1 901-1BB10-2AA0 | | |
| • 1 pack = 10 units | 6GK1 901-1BB10-2AB0 | **SIMATIC NET Manual Collection**<br><br>Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English | 6GK1 975-1AA00-3AA0 |
| • 1 pack = 50 units | 6GK1 901-1BB10-2AE0 | | |

**2**

## Overview
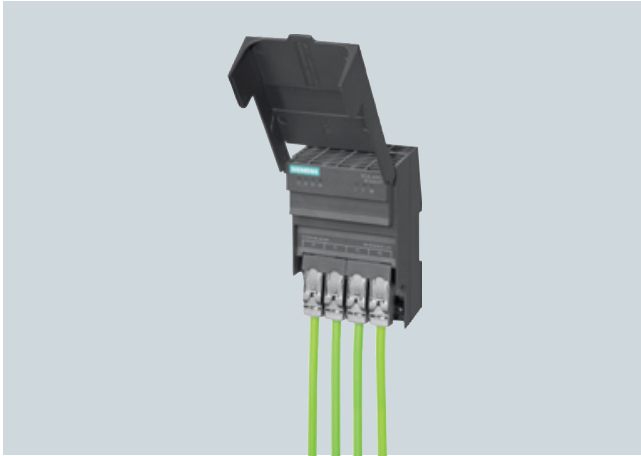


- The SCALANCE XF204IRT Industrial Ethernet switch is suitable for the construction of deterministic and isochronous real-time Industrial Ethernet 10/100 Mbit/s networks in line, star, and ring topologies
- Connection of up to four terminal units possible
- Enclosure in ET 200S format (slim design, 75 mm width) for space-saving use in small control boxes
- Integrated redundancy manager for constructing Fast Ethernet ring topologies with fast media redundancy
- The device features PROFINET diagnostics, SNMP access, integral web server and automatic e-mail sending function for remote diagnosis and signaling over the network.

## Benefits


**get** **Designed for Industry**

- Optimized startup behavior (link setup, data forwarding) of PROFINET network components and IO Devices through fast start-up functionality
- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 ports
- Simple connection and disconnection of the RJ45 plug by means of easily accessible RJ45 sockets angled downward on the device
- High network availability through setup of redundant ring structures and standby coupling of rings
- Protection of investment due to integration into existing network management systems by means of standardized SNMP access
- Time savings during engineering, commissioning and in the operating phase of a plant by using the configuration and diagnostics integrated in STEP 7

## Application

The SCALANCE XF204IRT Industrial Ethernet switch permits the construction of isochronous real-time (IRT) Industrial Ethernet line and star topologies. Thanks to innovative switching technology, the special requirements of automation with regard to line topology, isochronous mode for motion control applications, and unlimited IT openness are satisfied within a single technology based on the PROFINET standard.

### Product versions

SCALANCE XF204IRT

- For setting up electrical Industrial Ethernet line, star or ring topologies with four electrical ports (ET 200S design)

Characteristics:

- Diagnostics on the device by means of LEDs (power, link status, data traffic)
- Remote diagnostics is possible through signaling contact (signal mask can be set locally using buttons), PROFINET, SNMP, and web browser
- Automatic e-mail sending function
- The RJ45 sockets are designed to be industry-compatible with additional sleeves, for connection of the IE FC RJ45 Plug 180

### Real-Time Ethernet

- Interfacing of the PROFINET IO Devices to the PROFINET IO Controller through high-performance, optimized data transmission
- Isochronous real-time communication based on the transmission procedure of the IEEE 802 standard by combining the switching mechanisms "Cut Through" and "Store and Forward"
- Coexistence of isochronous mode for motion control applications and IT openness:
  Reaction-free transmission of real-time and non-real-time communication on the same line

### Additionally through isochronous real-time (IRT) Ethernet

- Isochronous real-time communication based on the transmission procedure of the IEEE 802 standard by combining the switching mechanisms "Cut Through" and "Store and Forward"
- For drive controls, PROFINET with isochronous real-time is the best performing system worldwide with regard to its isochronronous and deterministic response.
  With a cycle time of 1 ms, for example, axes can be controlled in isochronous mode whereby 50% of the bandwidth is available solely for IT communication.

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**2**

## SCALANCE XF-200IRT managed

### ■ Design

The SCALANCE XF-204IRT managed Industrial Ethernet switch is designed for mounting on a standard mounting rail. With its enclosure in ET 200S format (slim design), the device is optimally suited for integration in automation solutions in small control boxes together with the ET 200S.

The switch with degree of protection IP30 features:

- 2 x 2-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC)
- A row of LEDs to indicate the status information (power, link status, data traffic, power supply, signaling contact)
- A 2-pole terminal block for connecting the isolated signaling contact
- A SET button for on-site configuration of the signaling contact

The SCALANCE XF204IRT switch is available with the following port types:

- *10/100BaseTX, RJ45 connection;*
  RJ45 socket, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover functions for connecting IE FC cables using the IE FC RJ45 Plug 180.

### ■ Function

- Configuration of electrical Industrial Ethernet line, star and ring topologies
- Integral redundancy manager for setting up ring topologies
- Integral standby function for redundant coupling of two rings
- Extremely short cycle times with highly accurate clock-pulse rates thanks to integrated real-time functions
- System-wide clock accuracy (deviation less than 1 ms)
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- Easy diagnostics using signaling contact, SNMP and Web browser
- Integration into the diagnostics of a PROFINET IO Controller by means of real-time communication (RT) according to the PROFINET standard
- Fast device replacement in the event of a fault by using the optional C-PLUG swap medium (not included in scope of supply)

### Network topology and network configuration

The SCALANCE XF204IRT Industrial Ethernet switch with degree of protection IP30 is installed in a control cabinet together with the stations to be connected. It can be combined electrically in star, line and ring topologies.

When configuring the network, it is necessary to observe the following boundary conditions:

- Length of the TP cable between two SCALANCE XF switches:
  - Max. 100 m with IE FC cable and IE FC RJ45 Plug 180
- IP Address:
  The IP address is assigned using the DHCP (Dynamic Host Configuration Protocol) mechanism. If there is no corresponding server in the network, the IP address can be assigned using the supplied software tool PST (Primary Setup Tool) or STEP 7. The device and real-time configuration of the SCALANCE XF204IRT switch is performed via STEP 7.
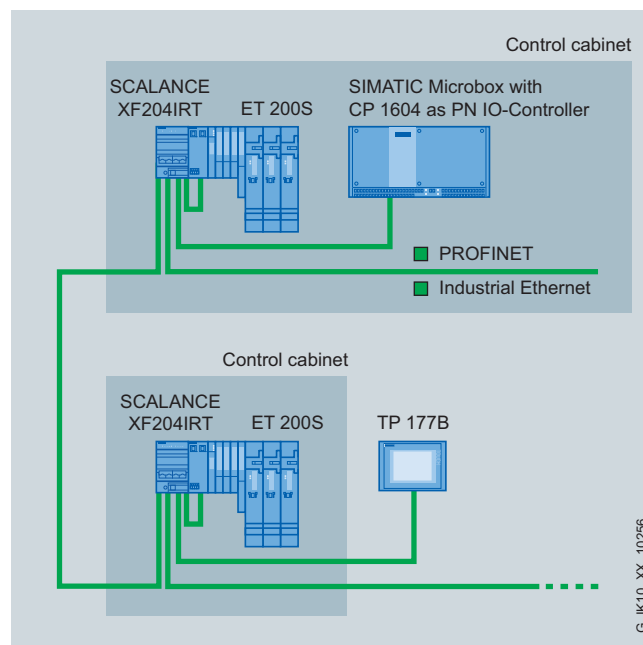


SCALANCE XF204IRT with ET 200S and SIMATIC Microbox in compact control cabinets or boxes

### Commissioning and diagnosis

PROFINET diagnostic interrupts from SCALANCE XF204IRT can be displayed with the appropriate SIMATIC Engineering Tools and processed in the controller with expanded diagnostics function. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

The SCALANCE XF204IRT Industrial Ethernet switch can also be integrated into a network management system through the standardized Simple Network Management Protocol (SNMP). In the event of a fault in the device, error messages (SNMP traps) can be sent to a network system or as e-mail to a specified network administrator.

The integral Web server enables configuration and diagnostics settings to be made using a standard browser (e.g. port configuration). Statistical information can also be read out over the Web server (e.g. port capacity utilization).

The following information is displayed by LEDs on site:

- Power
- Port status
- Data traffic
- Signaling contact
- Redundancy manager function

## Technical specifications

| Order No. | 6GK5 204-0BA00-2BF2 |
|---|---|
| **Product type designation** | **SCALANCE XF204IRT** |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/ optical connections for network components or terminal equipment | 4 |
| Number of electrical connections | |
| • For network components or terminal equipment | 4 |
| • For signal contact | 1 |
| • For power supply | 1 |
| • For redundant power supply | 1 |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 4-pin terminal block |
| Design of the swap medium C-Plug | Yes |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of power supply | DC |
| Supply voltage, external | 24 V |
| • Minimum | 18 V |
| • Maximum | 32 V |
| Current consumption, maximum | 0.2 A |
| Product component: fusing of power supply input | Yes |
| Type of fusing of power supply input | 0.6 A / 60 V |
| Effective power loss at 24 V with DC | 4.8 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +60 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |

| Order No. | 6GK5 204-0BA00-2BF2 |
|---|---|
| **Product type designation** | **SCALANCE XF204IRT** |
| **Design, dimensions and weights** | |
| Type of construction | Flat |
| Width | 75 mm |
| Height | 125 mm |
| Depth | 73 mm |
| Net weight | 0.25 kg |
| Type of mounting | |
| • 35 mm DIN rail mounting | Yes |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | |
| Product function | |
| • CLI | Yes |
| • Web-based management | Yes |
| • MIB support | Yes |
| • Traps via e-mail | Yes |
| • Configuration with STEP 7 | Yes |
| • SMTP server | Yes |
| • Port mirroring | No |
| • With IRT - PROFINET IO-Switch | Yes |
| • PROFINET IO-Diagnostics | Yes |
| Protocol is supported | |
| • Telnet | No |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • FTP | Yes |
| • BOOTP | No |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| • DCP | Yes |
| • LLDP | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XF-200IRT managed**

**2**

## ■ Technical specifications

| Order No. | 6GK5 204-0BA00-2BF2 |
|---|---|
| **Product type designation** | **SCALANCE XF204IRT** |
| **Product functions Diagnostics** | |
| Product function | |
| • Port diagnostics | Yes |
| • Packet size statistics | Yes |
| • Packet type statistics | Yes |
| • Error statistics | Yes |
| **Product functions DHCP** | |
| Product function DHCP client | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Standby redundancy | Yes |
| • Redundancy procedure HSR | Yes |
| • Redundancy procedure MRP | Yes |
| • Passive listening | Yes |
| **Product functions Security** | |
| SSH protocol is supported | Yes |
| **Product functions Time** | |
| Product function: SICLOCK support | Yes |
| Protocol is supported | |
| • NTP | No |
| • SNTP | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT.., KEMA 07 ATEX, 0145 X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

## ■ Ordering data | Order No.

**SCALANCE XF-200IRT Industrial Ethernet Switches**

Managed Industrial Ethernet Switches for setting up line, star and ring topologies; Isochronous Real Time, LED diagnostics, fault signaling contact with SET button, redundant power supply; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM

| | |
|---|---|
| • SCALANCE XF204IRT 4 x 10/100 Mbit/s RJ45 electrical port; | **6GK5 204-2BA00-2BF2** |

*Accessories*

**IE FC RJ45 Plug 180**

RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface

| | |
|---|---|
| • 1 pack = 1 item | **6GK1 901-1BB10-2AA0** |
| • 1 pack = 10 items | **6GK1 901-1BB10-2AB0** |
| • 1 pack = 50 items | **6GK1 901-1BB10-2AE0** |
| **FC FO Standard Cable GP 62.5/200/230** | **6XV1 847-2A** |
| FC FO Standard Cable for fixed installation indoors with PVC sheath; sold by the meter | |
| **FC FO Trailing Cable** | **6XV1 847-2C** |
| FC FO Trailing Cable for use in tow chains and moving applications; sold by the meter | |
| **FC FO Termination Kit** | **6GK1 900-1GL00-0AA0** |
| Assembly case for local assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope | |
| **FC BFOC plug** | **6GK1 900-1GB00-0AC0** |
| Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 items + cleaning cloths) | |
| **IE TP Cord RJ45/RJ45 TP Cable 4 x 2 with two RJ45 connectors** | |
| • 0.5 m | **6XV1 870-3QE50** |
| • 1 m | **6XV1 870-3QH10** |
| • 2 m | **6XV1 870-3QH20** |
| • 6 m | **6XV1 870-3QH60** |
| • 10 m | **6XV1 870-3QN10** |
| **C-PLUG** | **6GK1 900-0AB00** |
| Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot | |
| **SIMATIC NET Manual Collection** | **6GK1 975-1AA00-3AA0** |
| Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English | |

**2**

## Overview



- The SCALANCE X-300 product line comprises compact Industrial Ethernet switches for constructing electrical and/or optical line, star and ring topologies operating at 10/100/1000 Mbit/s
- SCALANCE X-300 is available in versions
  - with integrated electrical and optical Ethernet ports
  - as a partly modular version with four integrated electrical Ethernet ports and two modular slots for equipping with 2-port media modules
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet (SCALANCE X-300, SCALANCE X-400) and Fast Ethernet (SCALANCE X-300 switches in the ring in combination with SCALANCE X-200 switches)
- Switches from the SCALANCE X-300 product line support numerous IT standards and thus permit seamless integration of automation networks into existing corporate networks. Virtual networks (VLAN) can be set up.
- The support of standardized redundancy procedures (Rapid Spanning Tree Protocol) permits redundant integration into higher-level enterprise networks.
- The devices feature PROFINET diagnostics, SNMP access, integral web server and automatic e-mail sending function for remote diagnosis and signaling over the network.

## Benefits



- High availability of the network thanks to:
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cables (redundancy manager, standby function, and RSTP are integrated)
  - Easy device replacement by means of plug-in C-PLUG swap medium
  - Very fast reconfiguration of the network in the event of a fault
- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 ports
- Protection of investment due to integration into existing network management systems by means of standardized SNMP access
- Time savings during engineering, commissioning and in the operating phase of a plant by using the configuration and diagnostics integrated in STEP 7
- Avoidance of costly failures or maintenance periods due to fanless design
- Simple adjustment to different network structures and reduction of stockkeeping costs due to the flexibility of the partly modular variants

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

**2**

### Application

SCALANCE X-300 products enable the establishment of switched networks both at the field level and at the control level where high data transfer speeds are required in addition to high network availability and extensive diagnostics facilities.

The switches are designed in degree of protection IP30 for installation in control cabinets.

The main area of application is found in high-performance plant networks with connection to the enterprise network.

### Product versions

*Switches with Fast Ethernet and Gigabit Ethernet ports*
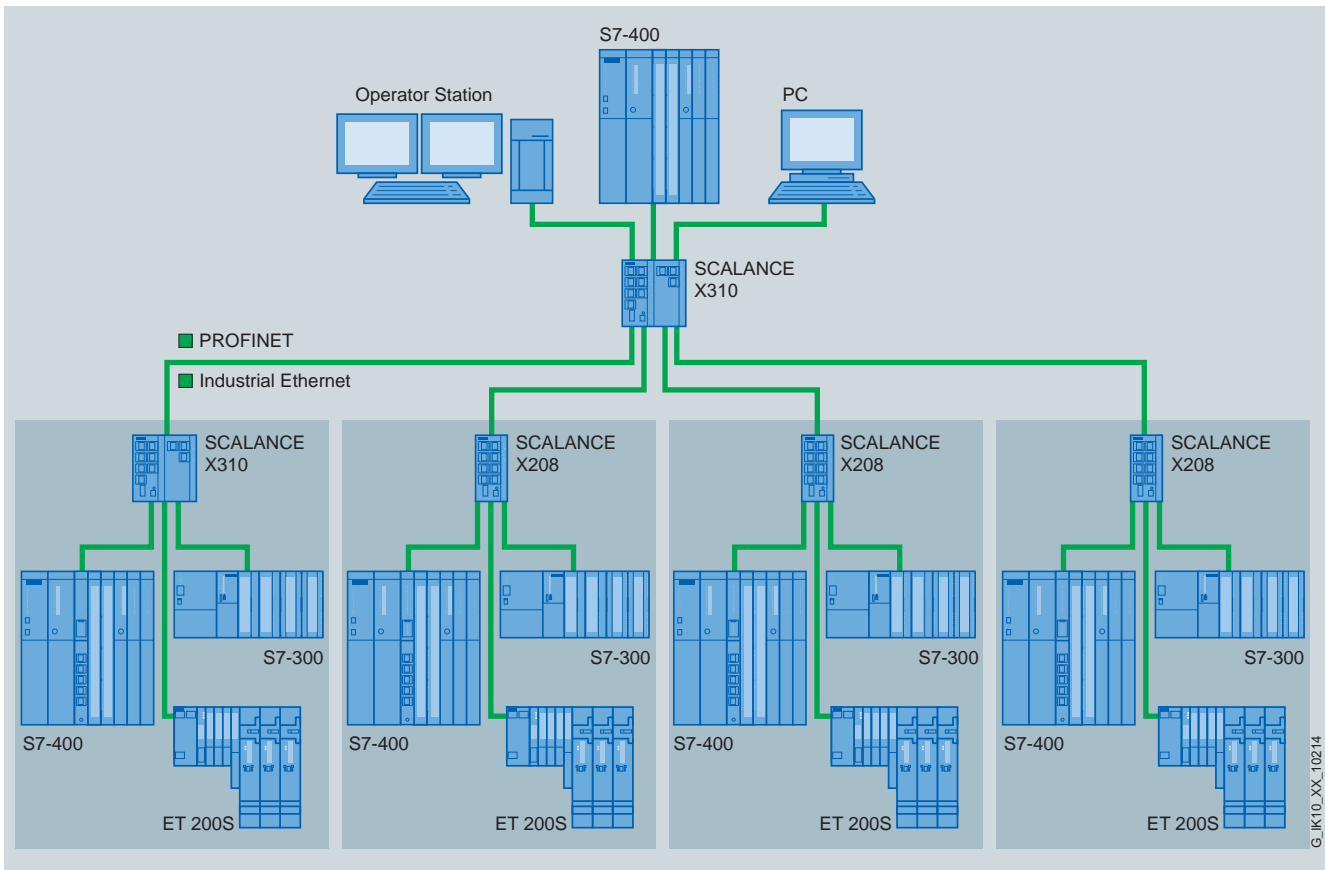


Electrical star topology with SCALANCE X310

*SCALANCE X310, SCALANCE X308-2, SCALANCE X308-2LD, SCALANCE X308-2LH, SCALANCE X308-2LH+, SCALANCE X307-3, SCALANCE X307-3LD*
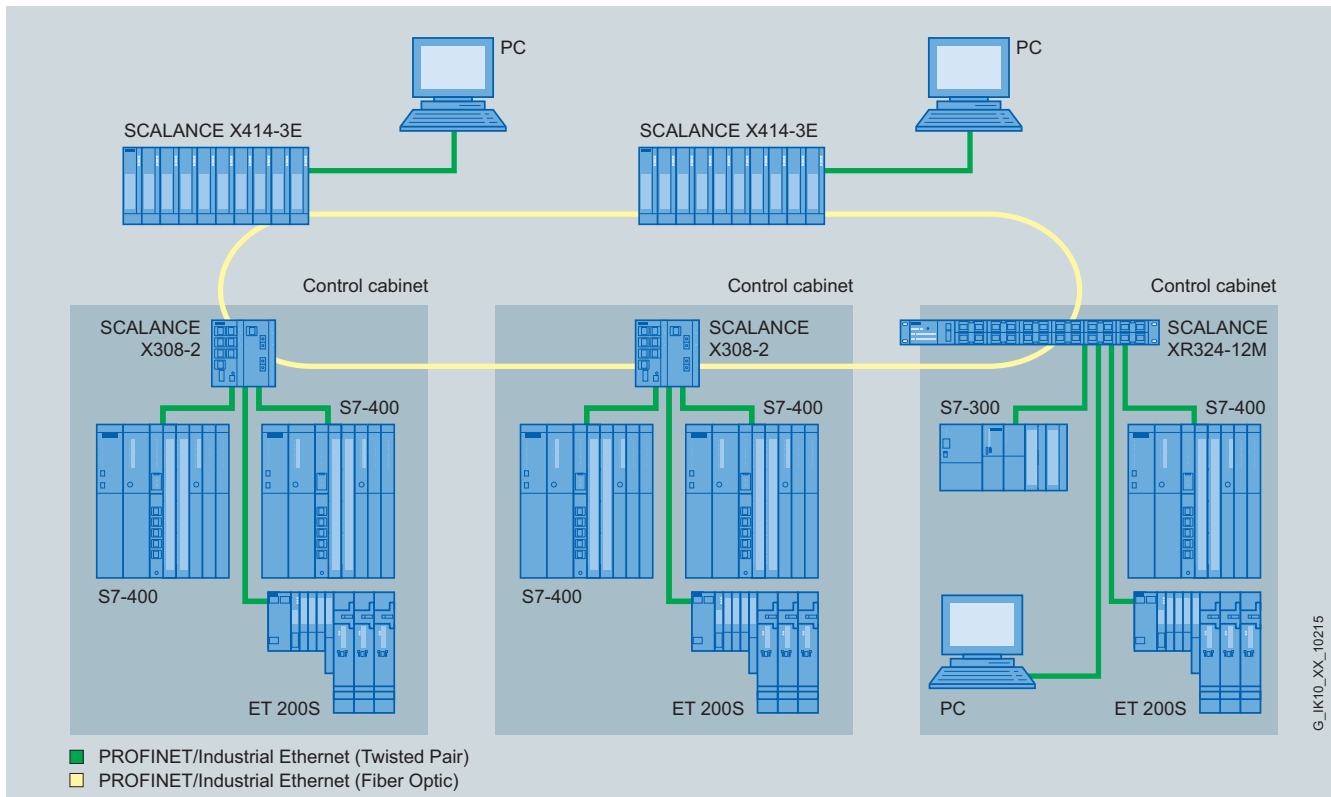
- For configuring electrical Industrial Ethernet line, star or ring structures
  - SCALANCE X310;
    with seven Fast Ethernet (10/100 Mbit/s) and three Gigabit Ethernet (10/100/1000 Mbit/s) ports
- For establishing electrical and optical line, ring, or star topologies with seven electrical 10/100 Mbit/s ports, one electrical 10/100/1000 Mbit/s port, and two or three optical 1000 Mbit/s ports
  - SCALANCE X308-2, SCALANCE X-307-3;
    for glass fiber-optic cable (multi-mode) up to 750 m
  - SCALANCE X308-2LD, SCALANCE X-307-3LD
    for glass fiber-optic cable (single-mode) up to 10 km
  - SCALANCE X308-2LH;
    for glass fiber-optic cable (single-mode) up to 40 km
  - SCALANCE X308-2LH+;
    for glass fiber-optic cable (single-mode) up to 70 km

- Device diagnostics by means of LEDs (power, link status, data traffic, fault, redundancy manager, standby manager)
- Remote diagnostics possible by means of signaling contact (signaling dialog box can be set on-site using pushbutton), PROFINET, SNMP and web browser
- The RJ45 sockets are designed for use in industry with additional retaining collars for connecting the IE FC RJ45 Plug 180

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■ **Application** (continued)



PROFINET/Industrial Ethernet (Twisted Pair)
PROFINET/Industrial Ethernet (Fiber Optic)

Connection of control cabinets with SCALANCE X308-2 in an optical gigabit ring

*Fast Ethernet switches*

*SCALANCE X310FE*
*SCALANCE X306-1LD FE* NEW
*SCALANCE X320-1FE* NEW
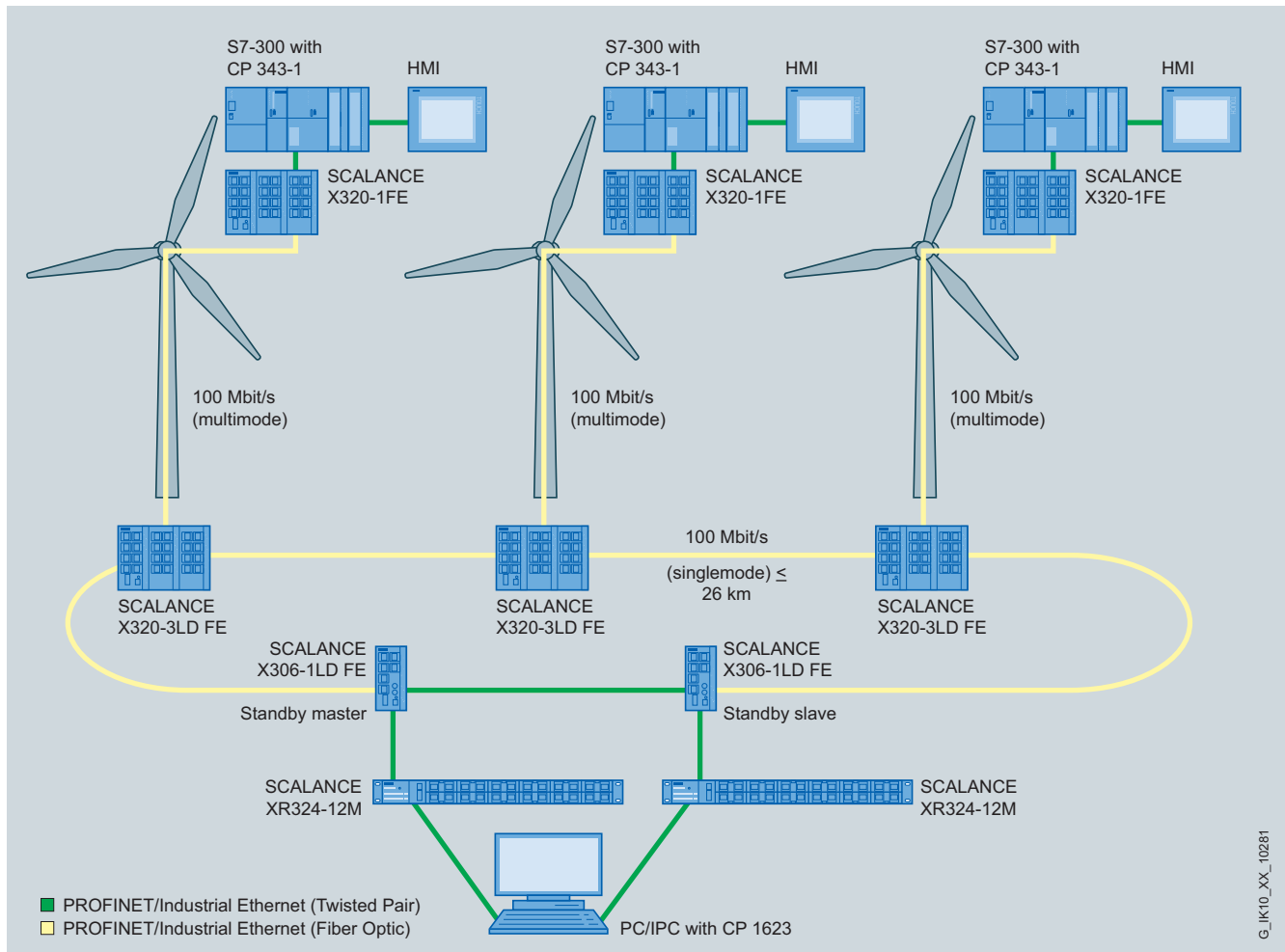*SCALANCE X320-3 LD FE* NEW

- For establishing electrical and optical line, ring, or star topologies with up to 20 electrical 10/100 Mbit/s ports and up to three optical ports (multi-mode or single-mode)
- Star hubs in the plant bus (redundant connection possible)

**SCALANCE X-300 managed**

■ **Application** (continued)

**2**



Redundant ring topology with SCALANCE X for wind farms

*Full Gigabit switches* 🔴**NEW**

SCALANCE X308-2M

- For setting up optical line, ring or star network structures with
  - four integrated electrical Gigabit Ethernet ports and four modular slots for equipping with any type 2-port media modules (see "Media modules for SCALANCE X-300")
- Star hubs in the plant bus (redundant connection possible)

■ **Design**

The SCALANCE X-300 Industrial Ethernet switches with rugged metal housing are optimized for mounting on a standard DIN rail and the S7-300 rail. Direct wall mounting in different positions is also possible. Thanks to the S7-300 housing dimensions, the devices are suitable for integration into an automation solution with S7-300 components.

The switches have:

- a 4-pin terminal block for connecting the redundant power supply (2 x 24 V DC)
- Row of LEDs for indicating the status information (power, link status, data traffic, fault, redundancy manager, standby manager)
- A 2-pin terminal block for connecting the isolated signaling contact
- SELECT/SET key for on-site configuration of the signaling contact
- Slot for optional C-PLUG swap medium on the rear of the device for easy replacement in the event of a fault

■ **Design** (continued)

The SCALANCE X-300 switches are available with the following port types:

- *10/100BaseTX, RJ45 connection;*
  RJ45 socket, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover function for the connection of IE FC cables via IE FC RJ45 Plug 180 to 100 m.

- *10/100/1000BaseTX, RJ45 connection;*
  RJ45 socket, automatic detection of the data rate (10 or 100 or 1000 Mbit/s), with Autosensing and Autocrossover function for the connection of
  - IE FC cables 2x2 for 100 Mbit/s via IE FC RJ45 Plug 180 up to 100 m
  - IE FC cables 4x2 for 1000 Mbit/s via TP Cord and IE FC RJ45 Modular Outlet up to 100 m
  - IE FC cables 4x2 for 1000 Mbit/s via IE FC RJ45 Plug 4x2 up to 100 m

- *1000BaseSX, SC connections;*
  SC sockets for direct connection to the Industrial Ethernet glass fiber-optic cable up to 750 m (multi-mode)

- *1000BaseSX, SC connections;*
  SC sockets for direct connection to the Industrial Ethernet glass fiber-optic cable up to 10 km (single-mode)

- *1000BaseLX, SC connections;*
  SC sockets for direct connection to the Industrial Ethernet glass fiber-optic cable up to 40 km (single-mode)

- *1000BaseLX, SC connections;*
  SC sockets for direct connection to the Industrial Ethernet glass fiber-optic cable up to 70 km (single-mode)

■ **Function**

- Increase of the network performance;
  by filtering the data traffic on the basis of the Ethernet (MAC) address of the data terminals, the local data traffic remains local; only data intended for users of another subnetwork are forwarded by the switch.

- Simple network configuration and expansion;
  the switch saves the data received at the ports and forwards them independently to the destination address. Collision detection (CSMA/CD method) does not restrict the expansion of the network beyond the port.

- Limiting of error spreading to the associated subnetwork;
  the SCALANCE X-300 switches only pass on data with a valid checksum (CRC).

- Integration of existing subnetworks with 10 Mbit/s into Fast Ethernet networks with 100 Mbit/s;
  at the twisted-pair ports, the SCALANCE X-300 switch automatically recognizes the conductor pairs for transmission and reception (Autocrossover), the data transfer rate of 10 or 100 or 1000 Mbit/s, as well as full-duplex and half-duplex mode (Autonegotiation).

- High-performance connection of SCALANCE X-300 switches with 1 Gbit/s;
  SCALANCE X-300 switches have three Gigabit Ethernet ports for connecting the switches to each other or with other Gigabit-Ethernet-enabled components (e.g. SCALANCE X-400).

- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy. Rings consisting of SCALANCE X-300 and X-400 switches can be operated at 1000 Mbit/s. In rings with SCALANCE X-200 or OSM/ESM it is possible to integrate SCALANCE X-300 switches at 100 Mbit/s.

- High-speed standby redundancy;
  several network segments such as rings can be connected together redundantly with SCALANCE X-300 over the integrated standby function. Two X-300 switches are configured in a ring as a master and slave over two links to the other ring. The redundant connection can be made at 1000 Mbit/s.

- Redundant interfacing to company networks;
  SCALANCE X-300 switches support the standardized redundancy procedures Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP). This enables a subnetwork to be connected redundantly to a higher level corporate network with reduced requirements for the reconfiguration time (in the order of seconds).

- Support of virtual networks (VLAN);
  for structuring Industrial Ethernet networks with a fast growing number of users, a physically existing network can be divided into several virtual networks.

- Load limiting when multicast protocols (e.g. video transmission) are used;
  through learning the multicast sources and targets (IGMP Snooping, IGMP Querier), SCALANCE X-300 switches can also filter multicast data traffic and therefore limit the load in the network.

- Configuration of the ports for terminals that support authentication in accordance to IEEE 802.1x.
  Authentication is done via a RADIUS server which has to be configured accordingly and must be able to be reached via the network.

- Support of the DHCP Option 82, 66, 67 (Dynamic Host Configuration Protocol);
  this facilitates the IP address assignment of a terminal depending on the connected switch port. The IP address is assigned via a DHCP Server, which has to be configured accordingly and must be able to be reached via the network.

- Support from the Access Control List (ACL);
  if this function is activated for one port, the switch forwards the message frames received to this port if its source address is present in the address table. All connected nodes can be automatically entered in the ACL.

- Syslog;
  Syslog according to RFC 3164 is used in the IP network for transmitting short, unencrypted text messages via UDP. To this end, a standard Syslog server is required that has to be configured accordingly and must be able to be reached via the network.

- Time synchronization;
  diagnostic messages (log table entries, e-mails) are time-stamped. The local time is standardized throughout the network by means of synchronization with a SICLOCK or SNTP time transmitter, thereby simplifying the assignment of diagnostic messages to several devices.

- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

**2**

■ **Function** (continued)

### Network topology and network configuration

The SCALANCE X-300 Industrial Ethernet switches with degree of protection IP30 are typically accommodated in a control cabinet along with the nodes to be connected. The can be mixed electrically and optically in star, line and ring topologies.

The following network structures and combinations of structures can be implemented:

- Fast Ethernet and Gigabit Ethernet rings with fast media redundancy;
  to increase network availability, as many as 50 X-200, X-300 or X-400 switches cascaded in line can be connected into a ring with a total length of up to 150 km with multi-mode or up to 3,500 km with single-mode.
- Several rings can be redundantly linked through the standby function
- In addition, SCALANCE X-300 supports redundant connection of the ring structure to the corporate network with a rapid spanning tree.
- Star topology with SCALANCE X-300 switches:
  The SCALANCE X-300 switch represents a neutral point that can connect up to 20 nodes or subnets with each other electrically or optically.

When configuring the network, it is necessary to observe the following boundary conditions:

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 750 m at 1 Gbit/s
  - 3 km at 100 Mbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 10 - 70 km at 1 Gbit/s
  - 26 km at 100 Mbit/s
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC cable 2x2 and IE FC RJ45 Plug 180
  - Max. 100 m at 1 Gbit/s with IE FC Standard Cable 4x2 (90 m), IE FC RJ45 Modular Outlet and patch cable (10 m)
  - Max. 10 m using patches with TP cord

### Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM;
  to establish a ring, a SCALANCE X-300 is switched to RM mode. The Gigabit ports (electrical or optical) are preferably used as ring ports.
- Signal mask;
  the signal mask is set to the current status of the SCALANCE X-300 (setpoint) by pushbutton operation. The signal mask defines which ports and which power supplies are to be monitored. The signaling contact only reports an error when a monitored port or a monitored feeder fails (deviation of setpoint/actual status).
- IP address;
  the IP address is assigned via DHCP (Dynamic Host Configuration Protocol). If there is no corresponding server in the network, the IP address can be assigned using an enclosed software tool.

Diagnostic options on site:

- The following status information is displayed by LEDs on site:
  - Port status
  - Port mode (10/100/1000 Mbit/s, full/half-duplex)
  - Status of the two power supplies
  - Signaling contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode

- The status of the signaling contact is routed externally by means of floating relay contacts. This enables, for example, the module to be monitored via an input module from a controller.
- Monitoring via the Industrial Ethernet network;
  the following possibilities are available:
  - Remote via standard browser (Web-based management): Selection of SCALANCE X-300 switches via the network from a PC with browser
  - Remote via SNMP V1, V2c, V3: Secure integration of SCALANCE X-300 switches via the network into a network management station, e.g. BANYnet
  - Remote via PROFINET IO diagnostics: PROFINET diagnostic alarms from SCALANCE X-300 switches can be displayed using the relevant SIMATIC engineering tools and they can also be processed in the controller. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

### Network management

The network management provides the following functions:

- Password-protected dial-up for "Administrator" (read and write authorization) and "User" (read only)
- Read-out of version and status information
- Setting the signal and standby mask and address information
- Fixed parameterization of the ports (data rates, half/full duplex)
- Setting parameters of the VLANs and multicast services
- Parameterization of the standby connections for a redundant ring link
- Setting of Rapid Spanning Tree parameters
- Parameterization of the web management services
- Security
  - Ports can be connected or disconnected
  - Authentication in accordance with IEEE 802.1x
  - Support from Access Control List (ACL)
- Parameterization of user administration of SNMP V1, V2c, V3
- Output of statistics information
- Diagnosis of data traffic by means of a parameterizable mirror port with a standard commercial network analyzer
- Loading new firmware updates or configuration data via the network from one TFTP server or directly via HTTP/HTTPs with an Internet or Web browser.
- Saving the configuration data or log table via the network on a TFTP server

If faults occur in the network, the SCALANCE X-300 switch can independently send error messages (traps) to a network management system or also e-mails to a predefined network administrator.

Remote monitoring (RMON) provides the following functions: The SCALANCE X-300 switch can collect statistics information according to the RMON groups 1 through 4. These include, for example, fault statistics that are kept for each port. This information can be read out through web-based management in the statistics sub-area.

■ **Technical specifications**

| Order No. | 6GK5 306-1BF00-2AA3 | 6GK5 307-3BL00-2AA3 | 6GK5 307-3BM00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X306-1LD FE** NEW | **SCALANCE X307-3** | **SCALANCE X307-3LD** |
| **Data transmission rate** | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | – | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 7 | 10 | 10 |
| Number of electrical connections | | | |
| • For network components or terminal equipment | 6 | 7 | 7 |
| • For signal contact | 1 | 1 | 1 |
| • For media module | | | |
| • For power supply | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 |
| Design of electrical connection | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | |
| • At 100 Mbit/s | 1 | – | – |
| • At 1000 Mbit/s | – | 3 | 3 |
| Design of optical connection for fiber-optic cables | | | |
| • At 100 Mbit/s | SC port (single-mode up to 26 km) | – | – |
| • At 1000 Mbit/s | – | SC port (multi-mode up to 0,75 km) | SC port (single-mode up to 10 km) |
| Injectable optical power referred to 1 mW | | | |
| • of the transmitter output | -15 dB ... -8 dB | -9.5 dB ... -4 dB | -9.5 dB ... -3 dB |
| • of the receiver input, maximum | -3 dB | -3 dB | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -34 dB | -17 dB | -21 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes |
| **Inputs/outputs** | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | |
| Type of power supply | DC | DC | DC |
| Redundant type of power supply | No | No | No |
| Supply voltage, external | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.2 A | 0.4 A | 0.4 A |

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# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

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■ **Technical specifications** (continued)

| Order No. | 6GK5 306-1BF00-2AA3 | 6GK5 307-3BL00-2AA3 | 6GK5 307-3BM00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X306-1LD FE** NEW | **SCALANCE X307-3** | **SCALANCE X307-3LD** |
| Product component: fusing of power supply input | Yes | Yes | Yes |
| Type of fusing of power supply input | F 3 A / 32 V | F 3 A / 32 V | F 3 A / 32 V |
| Effective power loss | | | |
| • At 24 V with DC | 4.8 W | 9.6 W | 9.6 W |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | -40 … +60 °C | -10 … +60 °C | -40 … +60 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | |
| Type of construction | Compact | Compact | Compact |
| Width | 60 mm | 120 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm |
| Depth | 123 mm | 124 mm | 124 mm |
| Net weight | 1.4 kg | 1.4 kg | 1.4 kg |
| Type of mounting | | | |
| • 19-inch installation | No | No | No |
| • 35 mm DIN rail mounting | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes |
| • S7-300 rail mounting | Yes | Yes | Yes |
| Type of mounting | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible |
| **Product properties, functions, components, general** | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | | | |
| Product function | | | |
| • CLI | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes |

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## Technical specifications (continued)

| Order No. | 6GK5 306-1BF00-2AA3 | 6GK5 307-3BL00-2AA3 | 6GK5 307-3BM00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X306-1LD FE** NEW | **SCALANCE X307-3** | **SCALANCE X307-3LD** |
| Protocol is supported | | | |
| • Telnet | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | |
| Product function | | | |
| • Port diagnostics | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes |
| **Product functions VLAN** | | | |
| Product function | | | |
| • VLAN - port-based | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes |
| **Product functions DHCP** | | | |
| Product function | | | |
| • DHCP client | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes |
| **Product functions Redundancy** | | | |
| Product function | | | |
| • Ring redundancy | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes |
| Protocol is supported | | | |
| • STP/RSTP | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes |

**SCALANCE X-300 managed**

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### ■ Technical specifications (continued)

| Order No. | 6GK5 306-1BF00-2AA3 | 6GK5 307-3BL00-2AA3 | 6GK5 307-3BM00-2AA3 |
|---|---|---|---|
| **Product type designation** | **SCALANCE X306-1LD FE** 🔴NEW | **SCALANCE X307-3** | **SCALANCE X307-3LD** |
| **Product functions Security** | | | |
| Product function | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes |
| **Product functions Time** | | | |
| Product function: SICLOCK support | Yes | Yes | Yes |
| Protocol is supported | | | |
| • NTP | No | No | No |
| • SNTP | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | – | – |
| Marine classification association | | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | No | Yes | Yes |
| • Bureau Veritas (BV) | No | Yes | Yes |
| • Det Norske Veritas (DNV) | No | Yes | Yes |
| • Germanischer Lloyd (GL) | No | Yes | Yes |
| • Lloyds Register of Shipping (LRS) | No | Yes | Yes |
| • Nippon Kaiji Kyokai (NK) | No | Yes | Yes |

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■ **Technical specifications** (continued)

| Order No. | 6GK5 308-2FL00-2AA3 | 6GK5 308-2FM00-2AA3 | 6GK5 308-2FN00-2AA3 | 6GK5 308-2FP00-2AA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X308-2** | **SCALANCE X308-2LD** | **SCALANCE X308-2LH** | **SCALANCE X308-2LH+** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 10 | 10 | 10 | 10 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 8 | 8 | 8 | 8 |
| • For signal contact | 1 | 1 | 1 | 1 |
| • For media module | – | – | – | – |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port (1 x 1GE, 7 x FE) | RJ45 port (1 x 1GE, 7 x FE) | RJ45 port (1 x 1GE, 7 x FE) | RJ45 port (1 x 1GE, 7 x FE) |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 1000 Mbit/s | 2 | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | – | – | – | – |
| • At 1000 Mbit/s | SC port (multi-mode up to 0.75 km) | SC port (single-mode up to 10 km) | SC port (single-mode up to 40 km) | SC port (single-mode up to 70 km) |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | -9.5 dB ... -4 dB | -9.5 dB ... -3 dB | -6 dB ... 0 dB | 0 dB ... 5 dB |
| • of the receiver input, maximum | -3 dB | -3 dB | -3 dB | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -17 dB | -21 dB | -23 dB | -23 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 3 dB | 8 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Redundant type of power supply | No | No | No | No |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.4 A | 0.4 A | 0.4 A | 0.4 A |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

**2**

**Technical specifications** (continued)

| Order No. | 6GK5 308-2FL00-2AA3 | 6GK5 308-2FM00-2AA3 | 6GK5 308-2FN00-2AA3 | 6GK5 308-2FP00-2AA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X308-2** | **SCALANCE X308-2LD** | **SCALANCE X308-2LH** | **SCALANCE X308-2LH+** |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | F 3A / 32V | F 3A / 32V | F 3A / 32V | F 3A / 32V |
| Effective power loss | | | | |
| • At 24 V with DC | 9.6 W | 9.6 W | 9.6 W | 9.6 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -10 … +60 °C | -40 … +60 °C | -40 … +60 °C | -40 … +60 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 120 mm | 120 mm | 120 mm | 120 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 124 mm | 124 mm | 124 mm | 124 mm |
| Net weight | 1.4 kg | 1.4 kg | 1.4 kg | 1.4 kg |
| Type of mounting | | | | |
| • 19-inch installation | No | No | No | No |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | Yes | Yes | Yes | Yes |
| Type of mounting | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Technical specifications** (continued)

| Order No.<br>Product type designation | 6GK5 308-2FL00-2AA3<br>SCALANCE X308-2 | 6GK5 308-2FM00-2AA3<br>SCALANCE X308-2LD | 6GK5 308-2FN00-2AA3<br>SCALANCE X308-2LH | 6GK5 308-2FP00-2AA3<br>SCALANCE X308-2LH+ |
|---|---|---|---|---|
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 308-2FL00-2AA3 | 6GK5 308-2FM00-2AA3 | 6GK5 308-2FN00-2AA3 | 6GK5 308-2FP00-2AA3 |
|---|---|---|---|---|
| Product type designation | SCALANCE X308-2 | SCALANCE X308-2LD | SCALANCE X308-2LH | SCALANCE X308-2LH+ |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| Marine classification association | | | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes | Yes | Yes | Yes |
| • Bureau Veritas (BV) | Yes | Yes | Yes | Yes |
| • Det Norske Veritas (DNV) | Yes | Yes | Yes | Yes |
| • Germanischer Lloyd (GL) | Yes | Yes | Yes | Yes |
| • Lloyds Register of Shipping (LRS) | Yes | Yes | Yes | Yes |
| • Nippon Kaiji Kyokai (NK) | Yes | Yes | Yes | Yes |

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## ■ Technical specifications (continued)

| Order No. | 6GK5 310-0BA00-2AA3 | 6GK5 310-0FA00-2AA3 | 6GK5 320-1BD00-2AA3 | 6GK5 320-3BF00-2AA3 |
|---|---|---|---|---|
| Product type designation | SCALANCE X310FE | SCALANCE X310 | SCALANCE X320-1FE NEW | SCALANCE X320-3LD FE NEW |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | – | 1 000 Mbit/s | – | – |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 10 | 10 | 21 | 23 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 10 | 10 | 20 | 20 |
| • For signal contact | 1 | 1 | 1 | 1 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port (3 x 1GE, 7 x FE) | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | – | – | 1 | 3 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | – | – | SC port (multi-mode up to 3 km) | SC port (1x multi-mode up to 3 km, 2x single-mode up to 26 km) |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | – | – | -15 … -8 dB | – |
| • of the receiver input, maximum | – | – | -3 dB | – |
| Minimum optical sensitivity referred to 1 mW of the receiver input | – | – | -34 dB | – |
| Minimum required attenuation factor of the FO transmission link | – | – | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Redundant type of power supply | No | No | No | No |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 18 V | 18 V | 18 V | 18 V |
| • Maximum | 32 V | 32 V | 32 V | 32 V |
| Current consumption, maximum | 0.4 A | 0.4 A | 0.4 A | 0.5 A |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

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■ **Technical specifications** (continued)

| Order No. | 6GK5 310-0BA00-2AA3 | 6GK5 310-0FA00-2AA3 | 6GK5 320-1BD00-2AA3 | 6GK5 320-3BF00-2AA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X310FE** | **SCALANCE X310** | **SCALANCE X320-1FE** NEW | **SCALANCE X320-3LD FE** NEW |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | F 3 A / 32 V | F 3 A / 32 V | F 3 A / 32 V | F 3 A / 32 V |
| Effective power loss | | | | |
| • At 24 V with DC | 9.6 W | 9.6 W | 9.6 W | 12 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +60 °C | -40 … +60 °C | -40 … +60 °C | -40 … +60 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 120 mm | 120 mm | 180 mm | 180 mm |
| Height | 125 mm | 125 mm | 125 mm | 125 mm |
| Depth | 124 mm | 124 mm | 123 mm | 123 mm |
| Net weight | 1.4 kg | 1.4 kg | 1.4 kg | 1.4 kg |
| Type of mounting | | | | |
| • 19-inch installation | No | No | No | No |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | Yes | Yes | Yes | Yes |
| Type of mounting | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible | When used in marine applications, mounting on the 35 mm DIN rail is not permissible |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |

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■ **Technical specifications** (continued)

| Order No.<br><br>Product type designation | 6GK5 310-0BA00-2AA3<br><br>SCALANCE X310FE | 6GK5 310-0FA00-2AA3<br><br>SCALANCE X310 | 6GK5 320-1BD00-2AA3<br><br>SCALANCE X320-1FE NEW | 6GK5 320-3BF00-2AA3<br><br>SCALANCE X320-3LD FE NEW |
|---|---|---|---|---|
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

**2**

### Technical specifications (continued)

| Order No. | 6GK5 310-0BA00-2AA3 | 6GK5 310-0FA00-2AA3 | 6GK5 320-1BD00-2AA3 | 6GK5 320-3BF00-2AA3 |
|---|---|---|---|---|
| Product type designation | SCALANCE X310FE | SCALANCE X310 | SCALANCE X320-1FE (NEW) | SCALANCE X320-3LD FE (NEW) |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 (Class A) | EN 61000-6-4 (Class A) | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | No | No | Yes | Yes |
| Marine classification association | | | | |
| • American Bureau of Shipping Europe Ltd. (ABS) | Yes | Yes | No | No |
| • Bureau Veritas (BV) | Yes | Yes | No | No |
| • Det Norske Veritas (DNV) | Yes | Yes | No | No |
| • Germanischer Lloyd (GL) | Yes | Yes | No | No |
| • Lloyds Register of Shipping (LRS) | Yes | Yes | No | No |
| • Nippon Kaiji Kyokai (NK) | Yes | Yes | No | No |

■ **Technical specifications** (continued)

| Order No. | 6GK5 308-2GG00-2AA2 |
|---|---|
| **Product type designation** | **SCALANCE X308-2M** NEW |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 8 |
| Number of electrical connections | |
| • For network components or terminal equipment | 4 |
| • For signal contact | 1 |
| • For media module | 2 |
| • For power supply | 1 |
| • For redundant power supply | 1 |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 4-pin terminal block |
| Design of optical connection for fiber-optic cables | |
| • At 100 Mbit/s | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules |
| Injectable optical power referred to 1 mW | |
| • of the transmitter output | -19 … -14 dB |
| • of the receiver input, maximum | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB |
| Design of the swap medium C-Plug | Yes |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of power supply | DC |
| Redundant type of power supply | No |
| Supply voltage, external | 24 ... 48 V |
| Current consumption, maximum | 0.7 A |
| Product component: fusing of power supply input | Yes |
| Type of fusing of power supply input | F 3 A / 32 V |
| Effective power loss | |
| • At 24 V with DC | 16.6 W |

| Order No. | 6GK5 308-2GG00-2AA2 |
|---|---|
| **Product type designation** | **SCALANCE X308-2M** NEW |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +70 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to +50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Type of construction | Compact |
| Width | 120 mm |
| Height | 125 mm |
| Depth | 124 mm |
| Net weight | 1.4 kg |
| Type of mounting | |
| • 19-inch installation | No |
| • 35 mm DIN rail mounting | Yes |
| • Wall mounting | Yes |
| • S7-300 rail mounting | Yes |
| Type of mounting | When using SFP plug-in transceivers, only horizontal installation is permissible, when used in marine applications, mounting on the 35 mm DIN rail is not permissible |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300 managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 308-2GG00-2AA2 | | Order No. | 6GK5 308-2GG00-2AA2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X308-2M** NEW | | **Product type designation** | **SCALANCE X308-2M** NEW |
| **Product functions Configuration/management** | | | **Product functions Redundancy** | |
| Product function | | | Product function | |
| • CLI | Yes | | • Ring redundancy | Yes |
| • Web-based management | Yes | | • Redundancy manager | Yes |
| • MIB support | Yes | | • Standby redundancy | Yes |
| • Traps via e-mail | Yes | | • Redundancy procedure HSR | Yes |
| • Configuration with STEP 7 | Yes | | • Redundancy procedure MRP | Yes |
| • RMON | Yes | | • Redundancy procedure RSTP | Yes |
| • SMTP server | Yes | | • Passive listening | Yes |
| • Port mirroring | Yes | | Protocol is supported | |
| • CoS | Yes | | • STP/RSTP | Yes |
| • PROFINET IO-Diagnostics | Yes | | • RSTP Big Network Support | Yes |
| Protocol is supported | | | • LACP | Yes |
| • Telnet | Yes | | **Product functions Security** | |
| • HTTP | Yes | | Product function | |
| • HTTPS | Yes | | • ACL - Port/MAC-based | Yes |
| • TFTP | Yes | | • IEEE 802.1x (Radius) | Yes |
| • FTP | Yes | | • Broadcast/Multicast/Unicast Limiter | Yes |
| • BOOTP | Yes | | • Broadcast blocking | Yes |
| • SNMP v1 | Yes | | Protocol is supported | |
| • SNMP v2 | Yes | | • SSH | Yes |
| • SNMP v3 | Yes | | **Product functions Time** | |
| • IGMP (snooping/querier) | Yes | | Product function | |
| • GMRP | Yes | | • SICLOCK support | Yes |
| • DCP | Yes | | Protocol is supported | |
| • LLDP | Yes | | • NTP | No |
| **Product functions Diagnostics** | | | • SNTP | Yes |
| Product function | | | **Standards, specifications, approvals** | |
| • Port diagnostics | Yes | | Standard | |
| • Packet size statistics | Yes | | • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • Packet type statistics | Yes | | • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • Error statistics | Yes | | | |
| • SysLog | Yes | | | |
| **Product functions VLAN** | | | • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 |
| Product function | | | • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • VLAN - port-based | Yes | | | |
| • VLAN - dynamic | Yes | | | |
| Maximum number of VLANs | 255 | | | |
| Maximum number of dynamic VLANs | 255 | | • For emitted interference | EN 61000-6-4 |
| GVRP protocol is supported | Yes | | • For noise immunity | EN 61000-6-2 |
| **Product functions DHCP** | | | Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| Product function | | | • CE mark | Yes |
| • DHCP client | Yes | | • C-Tick | Yes |
| • DHCP option 82 | Yes | | | |
| • DHCP option 66 | Yes | | | |
| • DHCP option 67 | Yes | | | |

■ **Ordering data**

| | Order No. | | Order No. |
|---|---|---|---|
| **SCALANCE X-300 Industrial Ethernet switches** | | **Fast Ethernet switches** | |
| Industrial Ethernet switches for setting up electrical and/or optical Industrial Ethernet networks; integrated redundancy manager, IT functions (RSTP, VLAN, etc.), network management via SNMP and web server; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; C-PLUG included in the scope of supply | | • **SCALANCE X310FE**; 10 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 310-0BA00-2AA3 |
| | | • **SCALANCE X306-1LD FE**; 1 x 100 Mbit/s SC port, optical (single-mode, glass), up to 26 km 6 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 306-1BF00-2AA3 NEW |
| • **SCALANCE X310**; 3 x 10/100/1000 Mbit/s RJ45 ports, electrical 7 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 310-0FA00-2AA3 | • **SCALANCE X320-1FE**; 1 x 100 Mbit/s SC port, optical (multi-mode, glass), up to 3 km 20 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 320-1BD00-2AA3 NEW |
| • **SCALANCE X308-2**; 2 x 1000 Mbit/s SC ports, optical (multi-mode, glass), up to 750 m 1 x 10/100/1000 Mbit/s RJ45 port, electrical 7 x 10/100 Mbit/s RJ45 ports, electrical; | 6GK5 308-2FL00-2AA3 | • **SCALANCE X320-3LD FE**; 1 x 100 Mbit/s SC port, optical (multi-mode, glass), up to 3 km 2 x 100 Mbit/s SC port, optical (single-mode, glass), up to 26 km 20 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 320-3BF00-2AA3 NEW |
| • **SCALANCE X308-2LD**; 2 x 1000 Mbit/s SC ports, optical (single-mode, glass), up to 10 km 1 x 10/100/1000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical; | 6GK5 308-2FM00-2AA3 | **Full Gigabit Ethernet switches** | |
| | | • **SCALANCE X308-2M**; 4 x 10/100//1000 Mbit/s RJ45 ports, electrical 2 x 10/100/1000 Mbit/s slots for 2-port media modules, electrical or optical | 6GK5 308-2GG00-2AA2 NEW |
| • **SCALANCE X308-2LH**; 2 x 1000 Mbit/s SC ports, optical (single-mode, glass), up to 40 km 1 x 10/100/1000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 308-2FN00-2AA3 | **Media modules** NEW | see "Media modules for modular SCALANCE X-300 managed" |
| | | *Accessories* | |
| | | **IE FC RJ45 Modular Outlet** | |
| | | FastConnect RJ45 outlet for Industrial Ethernet with interface for replaceable insert; | |
| • **SCALANCE X308-2LH+**; 2 x 1000 Mbit/s SC ports, optical (single-mode, glass), up to 70 km 1 x 10/100/1000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 308-2FP00-2AA3 | • **With insert 2FE**; replaceable insert for 2 x 100 Mbit/s interfaces | 6GK1 901-1BE00-0AA1 |
| | | • **With insert 1GE**; replaceable insert for 1 x 1000 Mbit/s interfaces | 6GK1 901-1BE00-0AA2 |
| • **SCALANCE X307-3**; 3 x 1000 Mbit/s SC ports, optical (multi-mode, glass), up to 750 m 7 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 307-3BL00-2AA3 | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | 6XV1 840-2AH10 |
| | | 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-conforming; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| • **SCALANCE X307-3LD**; 3 x 1000 Mbit/s SC ports, optical (single-mode, glass), up to 10 km 7 x 10/100 Mbit/s RJ45 ports, electrical | 6GK5 307-3BM00-2AA3 | **IE FC TP Standard Cable GP 4 x 2** | 6XV1 870-2E |
| | | 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval; sold by the meter; max quantity 1000 m, minimum order 20 m | |
| | | **IE TP Cord RJ45/RJ45** | |
| | | TP cable 4 x 2 with two RJ45 plugs | |
| | | • 0.5 m | 6XV1 870-3QE50 |
| | | • 1 m | 6XV1 870-3QH10 |
| | | • 2 m | 6XV1 870-3QH20 |
| | | • 6 m | 6XV1 870-3QH60 |
| | | • 10 m | 6XV1 870-3QN10 |

**SCALANCE X-300 managed**

| Ordering data (continued) | Order No. |
|---|---|
| **IE FC RJ45 Plug 180** | |
| RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | **6GK1 901-1BB10-2AA0** |
| • 1 pack = 10 units | **6GK1 901-1BB10-2AB0** |
| • 1 pack = 50 units | **6GK1 901-1BB10-2AE0** |
| **IE FC RJ45 Plug 4 x 2** | |
| RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | **6GK1 901-1BB11-2AA0** |
| • 1 pack = 10 units | **6GK1 901-1BB11-2AB0** |
| • 1 pack = 50 units | **6GK1 901-1BB11-2AE0** |
| **C-PLUG** | **6GK1 900-0AB00** |
| Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot | |
| **SIMATIC NET Manual Collection** | **6GK1 975-1AA00-3AA0** |
| Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English | |

**More information**

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the Switch Selection Tool is available as a free download at:

http://support.automation.siemens.com/WW/view/en/39134641

**SCALANCE XR-300 managed**

**2**

## Overview



- The SCALANCE XR-300 Industrial Ethernet switches are fully modular, high-performance, industry-standard switches for the construction of optical line, ring and star topologies operating at 10/100/1000 Mbit/s, designed for installation in 19" control cabinets.
- As many as 24 electrical and/or optical interfaces (10/100/1000 Mbit/s); up to 12 electrical and/or optical 2-port media modules can be inserted at any position in the basic unit.
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet (with SCALANCE X-300, SCALANCE X-400) and Fast Ethernet (SCALANCE X-300 switches in the ring in combination with SCALANCE X-200 switches). The redundant connection of rings by means of high-speed media redundancy is integrated in the SCALANCE XR-300.
- Switches from the SCALANCE XR-300 product line support numerous IT standard functions (VLANs, IGMP snooping querier, STP/RSTP, link aggregation, quality of service) and thus permit seamless integration of automation networks into existing corporate networks.
- The support of standardized redundancy procedures (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP) permits redundant integration into higher-level enterprise networks.
- Remote diagnostics is possible by means of PROFINET diagnostics, web browser, CLI, or SNMP.

## Benefits

- Unlimited flexibility in the case of network expansions (e.g. more terminals) or conversion (e.g. from copper to fiber-optic cable) and reduction of stockkeeping costs due to modular design with port modules
- Media modules can be replaced by the user on site
- High availability of the network thanks to:
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cables (redundancy manager, standby function, and STP/RSTP are integrated)
  - Easy device replacement by means of plug-in C-PLUG swap medium
  - Very fast reconfiguration of the network in the event of a fault
- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 port modules
- Protection of investment due to integration into existing network management systems by means of standardized SNMP access
- Time saving during engineering, commissioning and in the operating phase of a plant by using the integrated configuration and diagnostics in STEP 7, without additional software
- Avoidance of costly failures or maintenance periods due to fanless design
- Space savings in control cabinet due to flexible cable outlet on the front or rear of the device

## Application

The SCALANCE XR-300 is ideal for use in plant networks and for integrating the industrial network into an existing corporate network. Both at the field level and the control level, the switch performs the network with the distributed field devices and ensures high plant availability with extensive diagnostics options and high transmission speeds. The modularity permits perfect adaptation to the respective application through the use of electrical and also optical media modules

The SCALANCE XR-300 switch is suitable for establishing optical Industrial Ethernet line, ring, or star topologies with 24 ports that can be optionally equipped with electrical and/or optical 2-port media modules. It can also be used as a hub in the plant bus (redundant connection is possible).

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Application** (continued)
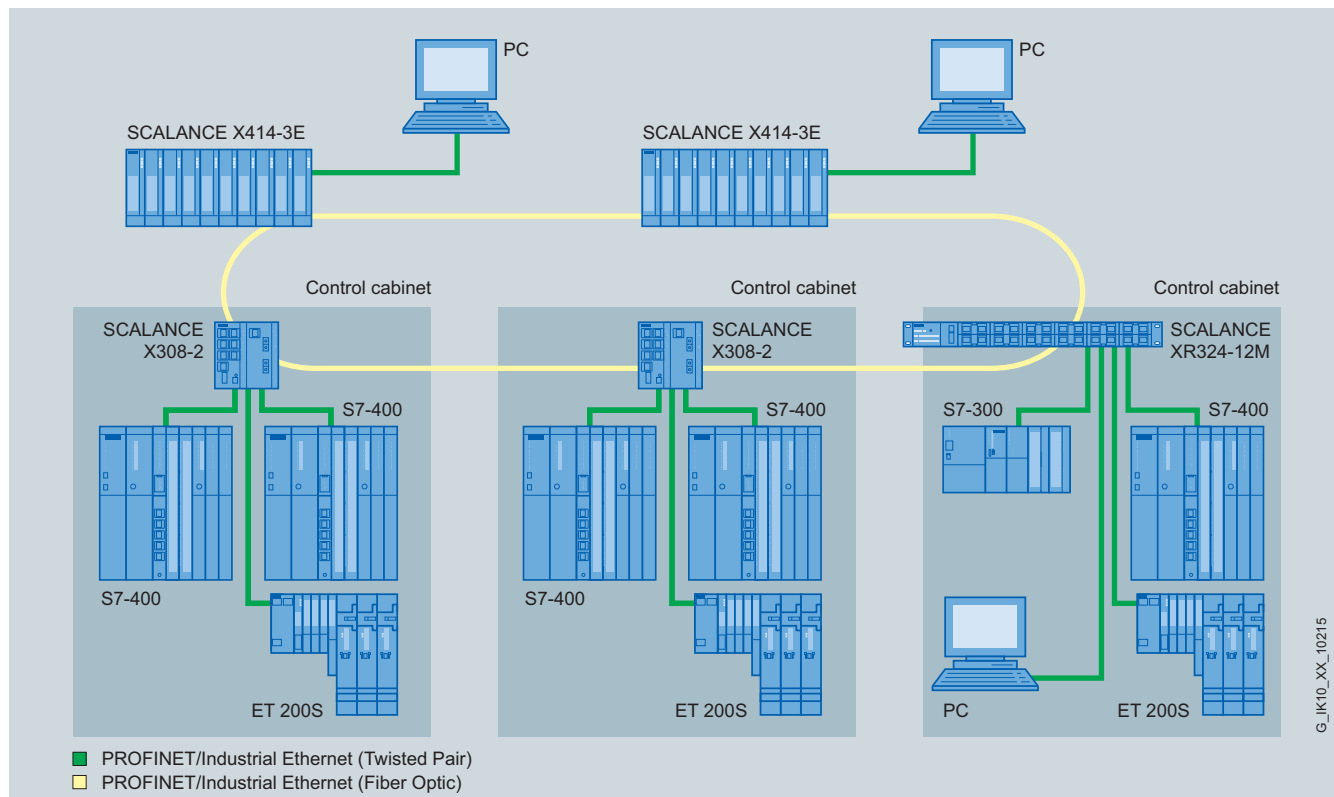


Integration of control cabinets with SCALANCE X-300 in an optical Gigabit ring

The use of media modules in partly and fully modular versions of the SCALANCE X-300 switches supports:

• The extension of networks by subsequent insertion of additional media modules in unused media module slots

• The changing of cabling technology, e.g. conversion from copper to fiber-optic cables, or from multi-mode to single-mode FOC

**2**

## ■ Design

The SCALANCE XR-300 Industrial Ethernet switches with rugged metal enclosure with degree of protection IP30 are optimized for installation in the 19" control cabinet. Versions are available with 24 V DC or 230 V AC connection. The connection of the power supply and the data cable outlet are located optionally either at the front or rear of the device.

The switches have:

- 4-pin terminal block for redundant voltage feed for protection against voltage failure in 24 V DC version
- 3-pin terminal block for voltage feed in 230 V AC version
- 2-pin terminal block for connecting the isolated signaling contact for simple display of faults
- A row of LEDs to indicate the status information (power, link status, data traffic, power supply, signaling contact)
- SELECT/SET pushbutton for simple adjustment of the fault signaling contact on the device
- Slot for optional C-PLUG swap medium on the side of the device for easy replacement in the event of a fault

The SCALANCE XR-300 switches are available with the following port types:

- 12 slots for electrical or optical 2-port media modules for multimode or single-mode connections; the optical media modules are available in various connection technologies

- The RJ45 sockets are designed to be industry-compatible with additional sleeves, for connection of the Industrial Ethernet FC RJ45 Plug 180
- All electrical Ethernet interfaces support 10/100/1000 Mbit/s, all optical Ethernet interfaces support 100 or 1000 Mbit/s
- The SCALANCE XR-300 switches support Gigabit Ethernet (1000 Mbit/s) at all ports. The 24 ports are divided into three groups of eight ports each (Gigabit Ethernet Blocking). Gigabit Ethernet is supported with full wire speed within each group, but not between the groups.

### Product versions

#### SCALANCE XR324-12M (12 media module slots)

Versions are available with

- LEDs, power supply connection and data cable outlet on the front
- LEDs, power supply connection and data cable outlet at the rear

All versions have twelve media module slots and

- 1 x 24 V DC power supply
- 1 x 230 V AC power supply



There are LED field and SELECT/SET buttons as well as connections for signal contact and power supply at the front for versions with a data cable outlet at the rear

Connection example:
IE FC RJ45 Plug FastConnect connector to MM992-2CUC media module
(with retaining collar)

Connection example:
FC BFOC Plug FastConnect connector to MM991-2 media module
(multimode)

G_IK10_XX_10283

SCALANCE XR-300 with data cable outlet at the rear

**2**

## SCALANCE XR-300 managed

### Function

- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy. Reliable communication is achieved by closing an optical or electrical line with SCALANCE X-400, X-300 or X-200 switches to form a ring. The redundancy manager (RM) integrated in the SCALANCE XR-300 switch monitors the function of the network. It recognizes the failure of a transmission link or of SCALANCE X switch in the ring and activates the substitute path within a maximum of 0.2 seconds.
  Rings consisting of SCALANCE X-300, XR-300 and X-400 switches can be operated at 1000 Mbit/s. In rings with SCALANCE X-200 or OSM/ESM it is possible to integrate SCALANCE XR-300 switches at 100 Mbit/s.

- Redundant interfacing to company networks; SCALANCE XR-300 switches support the standardized redundancy procedures Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP). This enables a subnetwork to be connected redundantly to a higher level corporate network with reduced requirements for the reconfiguration time (in the order of seconds).

- Support of virtual networks (VLAN); for structuring Industrial Ethernet networks with a fast growing number of users, a physically existing network can be divided into several virtual networks.

- Load limiting when multicast protocols (e.g. video transmission) are used; through learning the multicast sources and targets (IGMP Snooping, IGMP Querier), SCALANCE XR-300 switches can also filter multicast data traffic and therefore limit the load in the network. Multicast and broadcast traffic can be limited.

- Time synchronization; diagnostic messages (log table entries, e-mails) are time-stamped. The local time is standardized throughout the network by means of synchronization with a SICLOCK time transmitter, thereby simplifying the assignment of diagnostic messages to several devices.

- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

- Link aggregation (IEEE 802.1q) for bundling data streams

- Quality of Service (IEEE 802.1p) for prioritization of network traffic

### Network topology and network configuration

The network topology can easily be adapted to the structure of the plant using SCALANCE XR-300 Industrial Ethernet switches .

The following network structures and combinations of structures can be implemented:

- Fast Ethernet with fast media redundancy; to increase network availability, as many as 50 X-200, X-300, XR-300 or X-400 switches cascaded in line can be connected into a ring with a total length of up to 150 km. On the failure of a transmission link or of a SCALANCE X switch in the ring, the substitute path is reconfigured within a maximum of 0.2 seconds.

- Several rings can be redundantly linked through the standby function

- In addition, SCALANCE XR-300 supports redundant connection of the ring structure to the corporate network with a rapid spanning tree.

- Star topology with SCALANCE XR-300 switches: Each SCALANCE XR-300 switch represents a neutral point that can connect up to 24 nodes or subnets with each other electrically.

When configuring the network, it is necessary to observe the following boundary conditions:

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 3000 m at 100 Mbit/s

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 750 m at 1 Gbit/s

- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26,000 m at 100 Mbit/s

- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 10,000 m at 1 Gbit/s

- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC cable 2x2 and IE FC RJ45 Plug 180
  - Max. 100 m at 1 Gbit/s with IE FC Standard Cable 4x2 (90 m), IE FC RJ45 Modular Outlet and patch cable (10 m)
  - Max. 10 m using patches with TP cord

## ■ Function (continued)

### Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM;
  to establish a ring, a SCALANCE XR-300 is switched to RM mode. The Gigabit ports (electrical or optical) are preferably used as ring ports. The non-ring ports of the RM can be used freely for the connection of data terminals and networks. If the redundancy procedure MRP standardized by PROFINET is used, the RM is adjusted automatically.

- Signal mask;
  the signal mask is set to the current status of the SCALANCE XR-300 (setpoint) by pushbutton operation. The signal mask defines which ports and which power supplies are to be monitored. The signaling contact only reports an error when a monitored port or a monitored feeder fails (deviation of set-point/actual status).

- IP address;
  the IP address is assigned via DHCP (Dynamic Host Configuration Protocol). If there is no corresponding server in the network, the IP address can be assigned using an enclosed software tool.

Diagnostic options on site:

- The following status information is displayed by LEDs on site:
  - Port status
  - Port mode (10/100/1000 Mbit/s, full/half-duplex)
  - Status of the two power supplies
  - Signaling contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode

- The status of the signaling contact is routed externally by means of floating relay contacts. This enables, for example, the module to be monitored via an input module from a controller.

- Monitoring via the Industrial Ethernet network;
  the following possibilities are available:
  - Remote via standard browser (Web-based management):
    Selection of SCALANCE XR-300 switches via the network from a PC with browser
  - Remote via SNMP V1, V2c, V3:
    Secure integration of SCALANCE XR-300 switches via the network to higher-level network management station systems
  - Remote via PROFINET IO diagnostics:
    PROFINET diagnostic alarms from SCALANCE X-300 switches can be displayed using the relevant SIMATIC engineering tools and they can also be processed in the controller. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

### Network management

The network management provides the following functions:

- Password-protected dial-up for "Administrator" (read and write authorization) and "User" (read only)

- Read-out of version and status information

- Setting the signal and standby mask and address information

- Fixed parameterization of the ports (data rates, half/full duplex)

- Setting of Spanning/Rapid Spanning Tree parameters

- Parameterization of the web management services

- Security
  - Ports can be connected or disconnected
  - Port-based network access control according to IEEE 802.1x
  - Authentication in accordance with IEEE 802.1x (available soon)
  - Support of Access Control List (ACL) (available soon)

- Output of statistics information

- Diagnosis of data traffic by means of a parameterizable mirror port with a standard commercial network analyzer

- Loading of new firmware or the configuration data via the network by a FTP server

- Saving the configuration data or log table via the network on a TFTP server

If faults occur in the network, the SCALANCE XR-300 switch can independently send error messages (traps) to a network management system or also e-mails to a predefined network administrator.

Remote monitoring (RMON) provides the following functions: The SCALANCE XR-300 switch can collect statistics information according to the RMON groups 1 through 4. These include, for example, fault statistics that are kept for each port. This information can be read out through web-based management in the statistics sub-area.

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE XR-300 managed

**Technical specifications**

| Order No. | 6GK5 324-0GG00-1AR2 | 6GK5 324-0GG00-1HR2 | 6GK5 324-0GG00-3AR2 | 6GK5 324-0GG00-3HR2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 24 | 24 | 24 | 24 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | – | – | – | – |
| • For signal contact | 1 | 1 | 1 | 1 |
| • For media module | 12 | 12 | 12 | 12 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | 1 | 1 | – | – |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | – | – | – | – |
| • At 1000 Mbit/s | – | – | – | – |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules | Depends on selected media modules |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | AC | AC |
| Redundant type of power supply | No | No | No | No |
| Supply voltage, external | 24 V | 24 V | 230 V | 230 V |
| • Minimum | 18 V | 18 V | 100 V | 100 V |
| • Maximum | 32 V | 32 V | 240 V | 240 V |
| Current consumption, maximum | 1.9 A | 1.9 A | 0.6 A | 0.6 A |

**2**

## Technical specifications (continued)

| Order No. | 6GK5 324-0GG00-1AR2 | 6GK5 324-0GG00-1HR2 | 6GK5 324-0GG00-3AR2 | 6GK5 324-0GG00-3HR2 |
|---|---|---|---|---|
| Product type designation | SCALANCE XR324-12M | SCALANCE XR324-12M | SCALANCE XR324-12M | SCALANCE XR324-12M |
| Product component: fusing of power supply input | Yes | No | Yes | No |
| Type of fusing of power supply input | F 5 A / 125 V | F 5 A / 125 V | – | – |
| Effective power loss | | | | |
| • At 24 V with DC | 45.6 W | 45.6 W | – | – |
| • At 230 V with AC | – | – | 60 W | 60 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to 50 °C | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to 50 °C | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to 50 °C | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to 50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | | |
| Type of construction | 19-inch rack | 19-inch rack | 19-inch rack | 19-inch rack |
| Width | 449 mm | 449 mm | 449 mm | 449 mm |
| Height | 43.6 mm | 43.6 mm | 43.6 mm | 43.6 mm |
| Depth | 319.5 mm | 319.5 mm | 319.5 mm | 319.5 mm |
| Net weight | 5.6 kg | 5.6 kg | 5.6 kg | 5.6 kg |
| Type of mounting | | | | |
| • 19-inch installation | Yes | Yes | Yes | Yes |
| • 35 mm DIN rail mounting | No | No | No | No |
| • Wall mounting | No | No | No | No |
| • S7-300 rail mounting | No | No | No | No |
| Type of mounting | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XR-300 managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 324-0GG00-1AR2 | 6GK5 324-0GG00-1HR2 | 6GK5 324-0GG00-3AR2 | 6GK5 324-0GG00-3HR2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |

**2**

**2**

## ▮ Technical specifications (continued)

| Order No. | 6GK5 324-0GG00-1AR2 | 6GK5 324-0GG00-1HR2 | 6GK5 324-0GG00-3AR2 | 6GK5 324-0GG00-3HR2 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** | **SCALANCE XR324-12M** |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | – | – |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | – | – |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | – | – |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE XR-300 managed

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| Ordering data | Order No. |
|---|---|
| **SCALANCE XR324-12M** *Industrial Ethernet switches* | |
| Fully modular 19" Industrial Ethernet switches for setting up electrical Industrial Ethernet networks; all ports can optionally be equipped with optical or electrical 2-port media modules); all ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP-Snooping/Querier, network management via SNMP, PROFINET, and web server 12 x 10/100/1000 Mbit/s slots for 2-port media modules, electrical or optical | |
| **24 V DC power supply** | |
| Data cable outlet at front | **6GK5 324-0GG00-1AR2** |
| Data cable outlet at rear | **6GK5 324-0GG00-1HR2** |
| **110 - 230 V AC power supply** | |
| Data cable outlet at front | **6GK5 324-0GG00-3AR2** |
| Data cable outlet at rear | **6GK5 324-0GG00-3HR2** |
| **Media modules for SCALANCE X-300** | see "Media modules for modular SCALANCE X-300 managed" |

### More information

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the Switch Selection Tool is available as a free download:

http://support.automation.siemens.com/WW/view/en/39134641

**2**

## Overview



- The SCALANCE X-300EEC (**E**nhanced **E**nvironmental **C**onditions) product line comprises compact Industrial Ethernet switches with IT functions for constructing electrical and/or optical line, star and ring topologies operating at 10/100/1000 Mbit/s

- Due to the extended temperature range (-40 to +70 °C, up to +85 °C for short periods), special conformal coating of circuit boards, support of special protocols (IEEE 1588 V2, hardware-supported) and standards (IEEE 1613 and IEC 61850-3), as well as wide-range mains adapters (60 to 250 V AC/DC), they are suitable for use in extremely tough industrial environments and in low and high-voltage substations

- As many as nine integrated electrical and/or optical Ethernet interfaces (10/100/1000 Mbit/s) support the interconnection of a number of switches, the construction of optical/electrical rings, or the connection of several Industrial Ethernet nodes

- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet and Fast Ethernet

- Switches from the SCALANCE X-300EEC product line support numerous IT standard functions (VLANs, IGMP Snooping/Querier, STP/RSTP) and thus permit seamless integration of automation networks into existing corporate networks.

- The devices feature PROFINET diagnostics, SNMP access, integral web server, and CLI for remote diagnosis and signaling over the network.

## Benefits



- Increased reliability of the network due to hardware and software functions specially geared to the particular requirements of power system plants and extreme environmental conditions
- High availability of the network thanks to:
  - Redundant power supply
  - Redundant network components (optional)
  - Redundant network structures based on fiber-optic or twisted pair cables (redundancy manager, standby function, MRP and RSTP are integrated)
  - Easy device replacement by means of plug-in C-PLUG swap medium
  - Very fast reconfiguration of the network in the event of a fault
- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 ports
- Protection of investment due to integration into existing network management systems by means of standardized SNMP access
- Time saving during engineering, commissioning and in the operating phase of a plant by using the integrated configuration and diagnostics in STEP 7, without additional software
- Avoidance of costly failures or maintenance periods by means of fanless design

## Application

SCALANCE X-300EEC products enable the establishment of switched networks both at the field level and at the control level where high data transfer speeds are required in addition to high network availability and extensive diagnostics facilities. The switches are designed in degree of protection IP30 for installation in control cabinets.

The main area of application is found in high-performance plant networks with interfaces to the corporate network. Thanks to the immunity to electromagnetic interference of the SCALANCE X-300EEC switches, the devices can also be used in medium/high voltage substations. Their compact, space-saving design (19"/2) also makes them ideal for installation in control cabinets. In addition, specially selected components permit the use of the devices over a wide temperature range (-40 °C to +70 °C, temporarily up to +85 °C). All versions are also available with specially protected printed-circuit boards (conformal coating) for use in environments subject to contamination.

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

**2**

■ **Application** (continued)
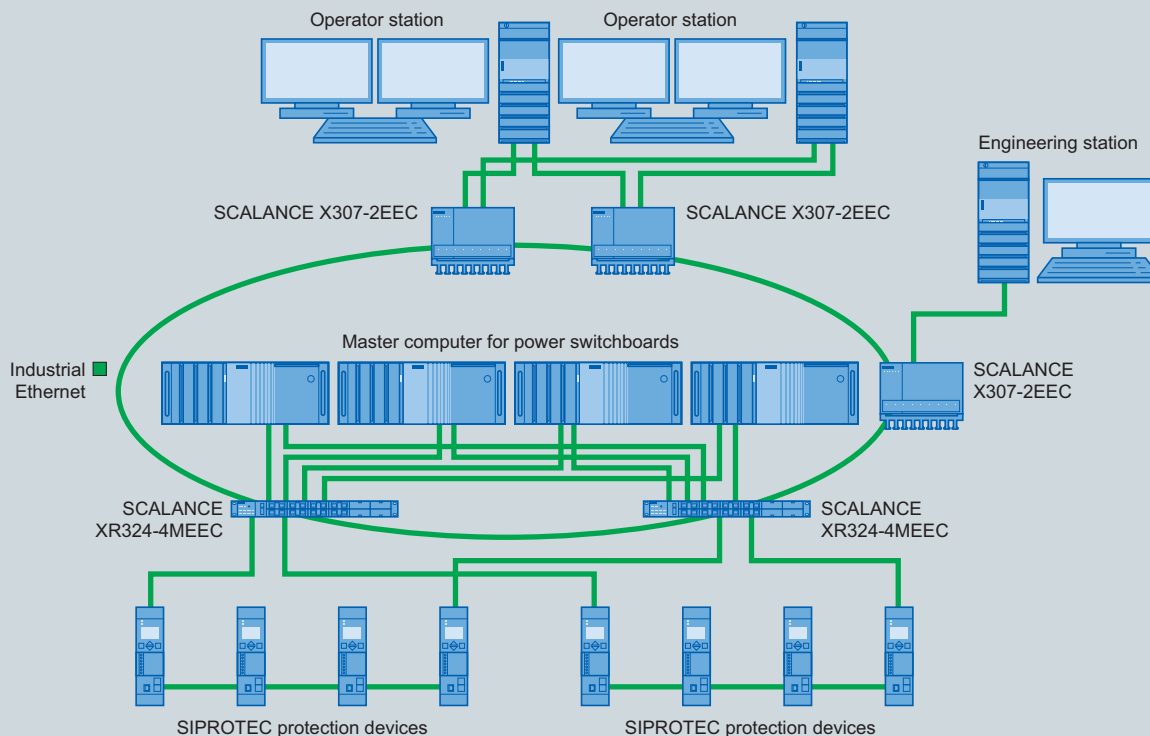


Electrical network structure in power switchgear with SCALANCE X-300EEC and XR324-4M EEC

■ **Design**

The SCALANCE X-300EEC Industrial Ethernet switches with rugged metal enclosure are optimized for mounting on a standard DIN rail. Thanks to the enclosure dimension 19"/2 (internal dimension), two devices can be mounted side by side in a 19" cabinet.

The switches have:

• a 4-pin terminal block for connecting the redundant power supply (2 x 24 V DC)

• A 2-pin terminal block for connecting the isolated signaling contact

• A row of LEDs to indicate the status information (power, link status, data traffic, power supply, signaling contact)

• SELECT/SET key for on-site configuration of the signaling contact

• Slot for optional C-PLUG swap medium on the top of the device for easy replacement in the event of a fault

• Guide rails for strain-relief attachment of the RJ45 and LC connection to the switch

The SCALANCE X-300EEC switches are available with the following port types:

• As many as seven integrated fiber-optic ports for connecting the SCALANCE X switches with one another (multi-mode). The Fast Ethernet fiber optic ports are designed using LC connection technology.

• As many as seven integrated twisted pair ports; The RJ45 sockets are designed to be industry-compatible with additional retaining mechanisms, for connection of the Industrial Ethernet FC RJ45 Plug 180.

**Product versions**

*SCALANCE X307-2EEC*

• 5 x 10/100 Mbit/s RJ45 port, electrical

• 2 x 10/100/1000 Mbit/s RJ45 port, electrical

• 2 x 100 Mbit/s LC Port optical (multi-mode, glass), up to 3 km

*SCALANCE X302-7EEC*

• 2 x 10/100/1000 Mbit/s RJ45 port, electrical

• 7 x 100 Mbit/s LC Port optical (multi-mode, glass), up to 3 km

SCALANCE X307-2EEC and X302-7EEC are available in variants for

• 24 V DC (simple or redundant) and

• with wide-range power supply for DC 60 to 250 V/ AC 100-240 V (simple or redundant) as well as

• with and without PCB coating (Conformal Coating)

## Function

- Integrated redundancy manager for constructing ring topologies with fast media redundancy Rings consisting of SCALANCE X-300 and X-400 switches can be operated at 1000 Mbit/s. In rings with SCALANCE X-200 or OSM/ESM it is possible to integrate SCALANCE X-300EEC switches at 100 Mbit/s.
- Redundant interfacing to corporate networks; SCALANCE X-300EEC switches support the standardized redundancy procedures Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP). This enables a subnetwork to be connected redundantly to a higher level corporate network with reduced requirements for the reconfiguration time (in the order of seconds).
- Support of virtual networks (VLAN); for structuring Industrial Ethernet networks with a fast growing number of users, a physically existing network can be divided into several virtual networks.
- Load limiting when multicast protocols (e.g. Querier, video transmission) are used; through learning the multicast sources and targets (IGMP Snooping, IGMP Querier), SCALANCE X-300EEC switches can also filter multicast data traffic and therefore limit the load in the network.
- Time synchronization; diagnostic messages (log table entries, e-mails) are time-stamped. The local time is standardized throughout the network by means of synchronization with a SICLOCK or SNTP time transmitter, thereby simplifying the assignment of diagnostic messages to several devices. The switches can also be used in networks with time synchronization by means of IEEE 1588 V2 (hardware-supported, 2-step procedure, accuracy 1 µsec).
- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

### Network topology and network configuration

The SCALANCE X-300EEC Industrial Ethernet switches with degree of protection IP30 can be adapted to the structure of the plant in star, line and ring topologies.

The following network structures and combinations of structures can be implemented:

- Fast Ethernet rings with fast media redundancy; to increase network availability, as many as 50 X-200, X-300, or X-400 switches cascaded in line can be connected into a ring with a total length of up to 150 km. On the failure of a transmission link or of a SCALANCE X switch in the ring, the transmission path is reconfigured within 0.3 seconds (0.2 seconds for MRP).
- Several rings can be redundantly linked through the standby function
- Construction of interconnected network structures by means of rapid spanning tree protocol (RSTP)
- At the same time, SCALANCE X-300EEC supports redundant connection of the ring structure to the corporate network with a rapid spanning tree.
- Star topology with SCALANCE X-300EEC switches: The SCALANCE X-300EEC switch represents a neutral point that can connect up to nine nodes or subnets with each other.

When configuring the network, it is necessary to observe the following constraints:

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 3000 m at 100 Mbit/s
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - max. 100 m

### Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM; to establish a ring, a SCALANCE X-300EEC is switched to RM mode. The non-ring ports of the RM can be used freely for the connection of data terminals and networks. If the redundancy procedure MRP standardized by PROFINET is used, the RM is adjusted automatically.
- Signal mask; the signal mask is set to the current status of the SCALANCE X-300EEC (setpoint) by pushbutton operation. The signal mask defines which ports and which power supplies are to be monitored. The signaling contact only reports an error when a monitored port or a monitored feeder fails (deviation of setpoint/actual status).

Diagnostic options on site:

- The following status information is displayed by LEDs on site:
  - Port status
  - Port mode (10/100 Mbit/s, full/half-duplex)
  - Status of the two power supplies
  - Signaling contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode
- The status of the signaling contact is routed externally by means of floating relay contacts. This enables, for example, the module to be monitored via an input module from a controller.
- Monitoring via the Industrial Ethernet network; the following possibilities are available:
  - Remote via standard browser (Web-based management): Selection of SCALANCE X-300 switches via the network from a PC with browser
  - Remote via SNMP V1, V2c, V3: Secure connection of SCALANCE X-300EEC switches via the network to a network management station
  - Remote via PROFINET IO diagnostics: PROFINET diagnostic alarms from SCALANCE X-300EEC switches can be displayed using the relevant SIMATIC engineering tools and they can also be processed in the controller. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

**SCALANCE X-300EEC managed**

**2**

■ **Function** (continued)

### Network management

The network management provides the following functions:

- Password-protected dial-up for "Administrator" (read and write authorization) and "User" (read only)
- Read-out of version and status information
- Setting the signal and standby mask and address information
- Parameterization of the web management services
- Setting of Rapid Spanning Tree parameters
- Fixed parameterization of the ports (data rates, half/full duplex)
- Security
  - Ports can be connected or disconnected
  - Authentication in accordance with IEEE 802.1x (available soon)
  - Support of Access Control List (ACL) (available soon)
- Parameterization of user administration of SNMP V1, V2c, V3
- Output of statistics information
- Diagnosis of data traffic by means of a parameterizable mirror port with a standard commercial network analyzer
- Loading new firmware updates or configuration data via the network from one TFTP server or directly via HTTP/HTTPs with an Internet or Web browser.
- Saving the configuration data or log table via the network on a TFTP server

If faults occur in the network, the SCALANCE X-300EEC switch can independently send error messages (traps) to a network management system or also e-mails to a predefined network administrator.

Remote monitoring (RMON) provides the following functions: The SCALANCE X-300EEC switch can collect statistics information according to the RMON groups 1 through 4. These include, for example, fault statistics that are kept for each port. This information can be read out through web-based management in the statistics sub-area.

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## ■ Technical specifications

| Order No. | 6GK5 302-7GD00-1EA3 | 6GK5 302-7GD00-1GA3 | 6GK5 302-7GD00-2EA3 | 6GK5 302-7GD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 9 | 9 | 9 | 9 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 2 | 2 | 2 | 2 |
| • For signal contact | 1 | 1 | 2 | 2 |
| • For power supply | 1 | 1 | 2 | 2 |
| • For redundant power supply | 1 | 1 | 2 | 2 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 7 | 7 | 7 | 7 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB |
| • of the receiver input, maximum | -14 dB | -14 dB | -14 dB | -14 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB | -32 dB | -32 dB | -32 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Redundant type of power supply | No | No | Yes | Yes |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 24 V | 24 V | 24 V | 24 V |
| • Maximum | 48 V | 48 V | 48 V | 48 V |
| Current consumption, maximum | 0.75 A | 0.75 A | 0.75 A | 0.75 A |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-1EA3 | 6GK5 302-7GD00-1GA3 | 6GK5 302-7GD00-2EA3 | 6GK5 302-7GD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | T 4 A / 125 V | T 4 A / 125 V | T 4 A / 125 V | T 4 A / 125 V |
| Effective power loss | | | | |
| • At 24 V with DC | 18 W | 18 W | 18 W | 18 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Ambient temperature - Note | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| Ambient condition for operation | - | Conformal Coating | - | Conformal Coating |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 217 mm | 217 mm | 217 mm | 217 mm |
| Height | 138 mm | 138 mm | 138 mm | 138 mm |
| Depth | 97 mm | 97 mm | 97 mm | 97 mm |
| Net weight | | | | |
| • 19-inch installation | Yes | Yes | Yes | Yes |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | No | No | No | No |
| Type of mounting | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-1EA3 | 6GK5 302-7GD00-1GA3 | 6GK5 302-7GD00-2EA3 | 6GK5 302-7GD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-1EA3 | 6GK5 302-7GD00-1GA3 | 6GK5 302-7GD00-2EA3 | 6GK5 302-7GD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function | | | | |
| • SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| Type of time synchronization | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

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■ **Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-3EA3 | 6GK5 302-7GD00-3GA3 | 6GK5 302-7GD00-4EA3 | 6GK5 302-7GD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 9 | 9 | 9 | 9 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 2 | 2 | 2 | 2 |
| • For signal contact | 1 | 1 | 2 | 2 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | – | – | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| • For power supply | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 7 | 7 | 7 | 7 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) |
| • At 1000 Mbit/s | | | | |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | -19 dB ... -14 dB | -19 dB ... -14 dB | -19 dB ... -14 dB | -19 dB ... -14 dB |
| • of the receiver input, maximum | -14 dB | -14 dB | -14 dB | -14 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB | -32 dB | -32 dB | -32 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 230 V | 230 V | 230 V | 230 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | AC | AC | AC | AC |
| Redundant type of power supply | No | No | Yes | Yes |
| Supply voltage with AC | 230 V | 230 V | 230 V | 230 V |
| • Rated value | 100 … 240 V | 100 … 240 V | 100 … 240 V | 100 … 240 V |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-3EA3 | 6GK5 302-7GD00-3GA3 | 6GK5 302-7GD00-4EA3 | 6GK5 302-7GD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| Type of power supply 2 | DC | DC | DC | DC |
| Supply voltage with DC | 220 V | 220 V | 220 V | 220 V |
| • Rated value | 60 … 250 V | 60 … 250 V | 60 … 250 V | 60 … 250 V |
| Current consumption, maximum | 0.08 A | 0.08 A | 0.08 A | 0.08 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | T 2A / 250V | T 2A / 250V | T 2A / 250V | T 2A / 250V |
| Effective power loss | | | | |
| • At 230 V with AC | 18 W | 18 W | 18 W | 18 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Ambient temperature - Note | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| Ambient condition for operation | – | Conformal Coating | – | Conformal Coating |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 217 mm | 217 mm | 217 mm | 217 mm |
| Height | 138 mm | 138 mm | 138 mm | 138 mm |
| Depth | 97 mm | 97 mm | 97 mm | 97 mm |
| Net weight | | | | |
| Type of mounting | | | | |
| • 19-inch installation | Yes | Yes | Yes | Yes |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | No | No | No | No |
| Type of mounting | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring | | | | |
| • With reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |

**■ Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-3EA3 | 6GK5 302-7GD00-3GA3 | 6GK5 302-7GD00-4EA3 | 6GK5 302-7GD00-4GA3 |
|---|---|---|---|---|
| Product type designation | SCALANCE X302-7 EEC | SCALANCE X302-7 EEC | SCALANCE X302-7 EEC | SCALANCE X302-7 EEC |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| Protocol is supported | | | | |
| • GVRP | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |

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### SCALANCE X-300EEC managed

**Technical specifications** (continued)

| Order No. | 6GK5 302-7GD00-3EA3 | 6GK5 302-7GD00-3GA3 | 6GK5 302-7GD00-4EA3 | 6GK5 302-7GD00-4GA3 |
| --- | --- | --- | --- | --- |
| **Product type designation** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** | **SCALANCE X302-7 EEC** |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| Type of time synchronization | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 |
| • For EMC from FM | – | – | – | – |
| • For Ex zone | – | – | – | – |
| • For CSA and UL safety | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 |
| • For Ex zone of CSA and UL | – | – | – | – |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

## ■ Technical specifications (continued)

| Order No. | 6GK5 307-2FD00-1EA3 | 6GK5 307-2FD00-1GA3 | 6GK5 307-2FD00-2EA3 | 6GK5 307-2FD00-2GA3 |
|---|---|---|---|---|
| Product type designation | SCALANCE X307-2 EEC | SCALANCE X307-2 EEC | SCALANCE X307-2 EEC | SCALANCE X307-2 EEC |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 9 | 9 | 9 | 9 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 7 | 7 | 7 | 7 |
| • For signal contact | 1 | 1 | 2 | 2 |
| • For power supply | 1 | 1 | 2 | 2 |
| • For redundant power supply | 1 | 1 | 2 | 2 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block | 2-pin terminal block |
| • For power supply | 4-pin terminal block | 4-pin terminal block | 2 x 4-pin terminal block | 2 x 4-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 2 | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB |
| • of the receiver input, maximum | -14 dB | -14 dB | -14 dB | -14 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB | -32 dB | -32 dB | -32 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 24 V | 24 V | 24 V | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | DC | DC | DC | DC |
| Redundant type of power supply | No | No | Yes | Yes |
| Supply voltage, external | 24 V | 24 V | 24 V | 24 V |
| • Minimum | 24 V | 24 V | 24 V | 24 V |
| • Maximum | 48 V | 48 V | 48 V | 48 V |
| Current consumption, maximum | 0.75 A | 0.75 A | 0.75 A | 0.75 A |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | T 4 A / 125 V | T 4 A / 125 V | T 4 A / 125 V | T 4 A / 125 V |
| Effective power loss | | | | |
| • At 24 V with DC | 18 W | 18 W | 18 W | 18 W |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

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■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-1EA3 | 6GK5 307-2FD00-1GA3 | 6GK5 307-2FD00-2EA3 | 6GK5 307-2FD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Ambient temperature - Note | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| Ambient condition for operation | - | Conformal Coating | - | Conformal Coating |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 217 mm | 217 mm | 217 mm | 217 mm |
| Height | 138 mm | 138 mm | 138 mm | 138 mm |
| Depth | 97 mm | 97 mm | 97 mm | 97 mm |
| Net weight | | | | |
| Type of mounting | | | | |
| • 19-inch installation | Yes | Yes | Yes | Yes |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | No | No | No | No |
| Type of mounting | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |

■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-1EA3 | 6GK5 307-2FD00-1GA3 | 6GK5 307-2FD00-2EA3 | 6GK5 307-2FD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

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■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-1EA3 | 6GK5 307-2FD00-1GA3 | 6GK5 307-2FD00-2EA3 | 6GK5 307-2FD00-2GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| SSH protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function: SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| Type of time synchronization | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 | UL 60950-1, CSA C22.2 No. 60950-1-03 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 | ANSI / ISA 12.12.01, CSA C22.2 No. 213-M1987, UL 1604 and 2279-15, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-3EA3 | 6GK5 307-2FD00-3GA3 | 6GK5 307-2FD00-4EA3 | 6GK5 307-2FD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| **Data transmission rate** | | | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 9 | 9 | 9 | 9 |
| Number of electrical connections | | | | |
| • For network components or terminal equipment | 7 | 7 | 7 | 7 |
| • For signal contact | 1 | 1 | 2 | 2 |
| • For power supply | 1 | 1 | 1 | 1 |
| • For redundant power supply | – | – | 1 | 1 |
| Design of electrical connection | | | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port | RJ45 port | RJ45 port |
| • For signal contact | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| • For power supply | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block | 3-pin terminal block |
| Number of optical connections for fiber-optic cables | | | | |
| • At 100 Mbit/s | 2 | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | | |
| • At 100 Mbit/s | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) | LC port (multi-mode up to 3 km) |
| Injectable optical power referred to 1 mW | | | | |
| • of the transmitter output | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB | -19 … -14 dB |
| • of the receiver input, maximum | -14 dB | -14 dB | -14 dB | -14 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB | -32 dB | -32 dB | -32 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 0 dB | 0 dB |
| Design of the swap medium C-Plug | Yes | Yes | Yes | Yes |
| **Inputs/outputs** | | | | |
| Nominal value of operating voltage of signal contacts with DC | 230 V | 230 V | 230 V | 230 V |
| Maximum operating current of signal contacts with DC | 0.1 A | 0.1 A | 0.1 A | 0.1 A |
| **Supply voltage, current consumption, power loss** | | | | |
| Type of power supply | AC | AC | AC | AC |
| Redundant type of power supply | No | No | Yes | Yes |
| Supply voltage with AC | 230 V | 230 V | 230 V | 230 V |
| • Rated value | 100 … 240 V | 100 … 240 V | 100 … 240 V | 100 … 240 V |
| Type of power supply 2 | DC | DC | DC | DC |
| Supply voltage with DC | 220 V | 220 V | 220 V | 220 V |
| • Rated value | 60 … 250 V | 60 … 250 V | 60 … 250 V | 60 … 250 V |
| Current consumption, maximum | 0.08 A | 0.08 A | 0.08 A | 0.08 A |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE X-300EEC managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-3EA3 | 6GK5 307-2FD00-3GA3 | 6GK5 307-2FD00-4EA3 | 6GK5 307-2FD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| Product component: fusing of power supply input | Yes | Yes | Yes | Yes |
| Type of fusing of power supply input | T 2A / 250V | T 2A / 250V | T 2A / 250V | T 2A / 250V |
| Effective power loss | | | | |
| • At 230 V with AC | 18 W | 18 W | 18 W | 18 W |
| **Permissible ambient conditions** | | | | |
| Ambient temperature | | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During transport | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| Ambient temperature - Note | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible | For a duration of 16 hours, a maximum operating temperature of +85 °C is permissible |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % | 95 % |
| Ambient condition for operation | - | Conformal Coating | - | Conformal Coating |
| IP degree of protection | IP 30 | IP 30 | IP 30 | IP 30 |
| **Design, dimensions and weights** | | | | |
| Type of construction | Compact | Compact | Compact | Compact |
| Width | 217 mm | 217 mm | 217 mm | 217 mm |
| Height | 138 mm | 138 mm | 138 mm | 138 mm |
| Depth | 97 mm | 97 mm | 97 mm | 97 mm |
| Net weight | | | | |
| Type of mounting | | | | |
| • 19-inch installation | Yes | Yes | Yes | Yes |
| • 35 mm DIN rail mounting | Yes | Yes | Yes | Yes |
| • Wall mounting | Yes | Yes | Yes | Yes |
| • S7-300 rail mounting | No | No | No | No |
| Type of mounting | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate | Wall mounting only possible with additional wall support, 19" mounting only with pairs of X-300EEC switches and a mounting plate |
| **Product properties, functions, components, general** | | | | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 | 50 | 50 | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) | Any (only dependent on signal propagation time) |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-3EA3 | 6GK5 307-2FD00-3GA3 | 6GK5 307-2FD00-4EA3 | 6GK5 307-2FD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| **Product functions Configuration/management** | | | | |
| Product function | | | | |
| • CLI | Yes | Yes | Yes | Yes |
| • Web-based management | Yes | Yes | Yes | Yes |
| • MIB support | Yes | Yes | Yes | Yes |
| • Traps via e-mail | Yes | Yes | Yes | Yes |
| • Configuration with STEP 7 | Yes | Yes | Yes | Yes |
| • RMON | Yes | Yes | Yes | Yes |
| • SMTP server | Yes | Yes | Yes | Yes |
| • Port mirroring | Yes | Yes | Yes | Yes |
| • CoS | Yes | Yes | Yes | Yes |
| • PROFINET IO-Diagnostics | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • Telnet | Yes | Yes | Yes | Yes |
| • HTTP | Yes | Yes | Yes | Yes |
| • HTTPS | Yes | Yes | Yes | Yes |
| • TFTP | Yes | Yes | Yes | Yes |
| • FTP | Yes | Yes | Yes | Yes |
| • BOOTP | Yes | Yes | Yes | Yes |
| • SNMP v1 | Yes | Yes | Yes | Yes |
| • SNMP v2 | Yes | Yes | Yes | Yes |
| • SNMP v3 | Yes | Yes | Yes | Yes |
| • IGMP (snooping/querier) | Yes | Yes | Yes | Yes |
| • GMRP | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes |
| **Product functions Diagnostics** | | | | |
| Product function | | | | |
| • Port diagnostics | Yes | Yes | Yes | Yes |
| • Packet size statistics | Yes | Yes | Yes | Yes |
| • Packet type statistics | Yes | Yes | Yes | Yes |
| • Error statistics | Yes | Yes | Yes | Yes |
| • SysLog | Yes | Yes | Yes | Yes |
| **Product functions VLAN** | | | | |
| Product function | | | | |
| • VLAN - port-based | Yes | Yes | Yes | Yes |
| • VLAN - dynamic | Yes | Yes | Yes | Yes |
| Maximum number of VLANs | 255 | 255 | 255 | 255 |
| Maximum number of dynamic VLANs | 255 | 255 | 255 | 255 |
| GVRP protocol is supported | Yes | Yes | Yes | Yes |
| **Product functions DHCP** | | | | |
| Product function | | | | |
| • DHCP client | Yes | Yes | Yes | Yes |
| • DHCP option 82 | Yes | Yes | Yes | Yes |
| • DHCP option 66 | Yes | Yes | Yes | Yes |
| • DHCP option 67 | Yes | Yes | Yes | Yes |
| **Product functions, Redundancy** | | | | |
| Product function | | | | |
| • Ring redundancy | Yes | Yes | Yes | Yes |
| • Redundancy manager | Yes | Yes | Yes | Yes |
| • Standby redundancy | Yes | Yes | Yes | Yes |
| • Redundancy procedure HSR | Yes | Yes | Yes | Yes |
| • Redundancy procedure MRP | Yes | Yes | Yes | Yes |
| • Redundancy procedure RSTP | Yes | Yes | Yes | Yes |
| • Passive listening | Yes | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE X-300EEC managed

**Technical specifications** (continued)

| Order No. | 6GK5 307-2FD00-3EA3 | 6GK5 307-2FD00-3GA3 | 6GK5 307-2FD00-4EA3 | 6GK5 307-2FD00-4GA3 |
|---|---|---|---|---|
| **Product type designation** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** | **SCALANCE X307-2 EEC** |
| Protocol is supported | | | | |
| • STP/RSTP | Yes | Yes | Yes | Yes |
| • RSTP Big Network Support | Yes | Yes | Yes | Yes |
| • LACP | Yes | Yes | Yes | Yes |
| **Product functions Security** | | | | |
| Product function | | | | |
| • ACL - Port/MAC-based | Yes | Yes | Yes | Yes |
| • IEEE 802.1x (Radius) | Yes | Yes | Yes | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes | Yes | Yes | Yes |
| • Broadcast blocking | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • SSH | Yes | Yes | Yes | Yes |
| **Product functions Time** | | | | |
| Product function | | | | |
| • SICLOCK support | Yes | Yes | Yes | Yes |
| Protocol is supported | | | | |
| • NTP | No | No | No | No |
| • SNTP | Yes | Yes | Yes | Yes |
| Type of time synchronization | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs | Precision Time Protocol (PTP) in accordance with IEEE1588 V2, hardware supported according to 2-step procedure, accuracy < 1 µs |
| **Standards, specifications, approvals** | | | | |
| Standard | | | | |
| • For EMC | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 | IEC 61850, IEEE 1613 |
| • For EMC from FM | – | – | – | – |
| • For Ex zone | – | – | – | – |
| • For CSA and UL safety | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 | UL 508, CSA C22.2 No. 142-M1987 |
| • For Ex zone of CSA and UL | – | – | – | – |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes | Yes |

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|

**SCALANCE X-300EEC Industrial Ethernet switches**

Compact Industrial Ethernet switches for setting up electrical and/or optical Industrial Ethernet networks; RSTP, RMON, IGMP Snooping/Querier, management functionality via SNMP, PROFINET and web server, 24 V power supply

**SCALANCE X302-7EEC**;
2 x 10/100/1000 Mbit/s RJ45 ports, electrical;
7 x 100 Mbit/s LC ports, optical (multi-mode, glass) up to 3 km

24 V DC power supply

| | |
|---|---|
| • 1 power supply | 6GK5 302-7GD00-1EA3 |
| • 2 power supplies | 6GK5 302-7GD00-2EA3 |
| • 1 power supply with conformal coating | 6GK5 302-7GD00-1GA3 |
| • 2 power supplies with conformal coating | 6GK5 302-7GD00-2GA3 |

100-240 V AC/60-250 V DC power supply

| | |
|---|---|
| • 1 power supply | 6GK5 302-7GD00-3EA3 |
| • 2 power supplies | 6GK5 302-7GD00-4EA3 |
| • 1 power supply with conformal coating | 6GK5 302-7GD00-3GA3 |
| • 2 power supplies with conformal coating | 6GK5 302-7GD00-4GA3 |

**SCALANCE X307-2EEC**;
5 x 10/100 Mbit/s RJ45 ports, electrical;
2 x 10/100/1000 Mbit/s RJ45 ports, electrical
2 x 100 Mbit/s LC ports, optical (multi-mode, glass) up to 3 km

24 V DC power supply

| | |
|---|---|
| • 1 power supply | 6GK5 307-2FD00-1EA3 |
| • 2 power supplies | 6GK5 307-2FD00-2EA3 |
| • 1 power supply with conformal coating | 6GK5 307-2FD00-1GA3 |
| • 2 power supplies with conformal coating | 6GK5 307-2FD00-2GA3 |

100-240 V AC/60-250 V DC power supply

| | |
|---|---|
| • 1 power supply | 6GK5 307-2FD00-3EA3 |
| • 2 power supplies | 6GK5 307-2FD00-4EA3 |
| • 1 power supply with conformal coating | 6GK5 307-2FD00-3GA3 |
| • 2 power supplies with conformal coating | 6GK5 307-2FD00-4GA3 |

*Accessories*

**IE FC RJ45 Modular Outlet**

FastConnect RJ45 outlet for Industrial Ethernet with interface for replaceable insert

| | |
|---|---|
| • with insert 2FE; replaceable insert for 2 x 100 Mbit/s interfaces | 6GK1 901-1BE00-0AA1 |
| • with insert 1GE; replaceable insert for 1 x 1000 Mbit/s interfaces | 6GK1 901-1BE00-0AA2 |

**IE FC TP standard cable GP 4 x 2**

8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal use; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m

| | |
|---|---|
| • AWG 22, for connection to IE FC RJ45 Modular Outlet | 6XV1 870-2E |
| • AWG 24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1 878-2A |

**IE FC TP Flexible Cable GP 4 x 2**

8-core, shielded TP installation cable for occasional movement ; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m

| | |
|---|---|
| • AWG 24, for connection to IE FC RJ45 Plug 4 x 2 | 6XV1 878-2B |

**IE TP Cord RJ45/RJ45**

TP cable 4 x 2 with two RJ45 plugs

| | |
|---|---|
| • 0.5 m | 6XV1 870-3QE50 |
| • 1 m | 6XV1 870-3QH10 |
| • 2 m | 6XV1 870-3QH20 |
| • 6 m | 6XV1 870-3QH60 |
| • 10 m | 6XV1 870-3QN10 |

**SCALANCE X-300EEC managed**

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| *Accessories* (continued) | | **C-PLUG** | **6GK1 900-0AB00** |
| **IE FC RJ45 Plug 180** | | Swap medium for simple replacement of devices in the event of a fault; for storing configuration or application data; can be used for SIMATIC NET products with C-PLUG slot | |
| RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | |
| | | **SIMATIC NET Manual Collection** | **6GK1 975-1AA00-3AA0** |
| • 1 pack = 1 unit | **6GK1 901-1BB10-2AA0** | Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English | |
| • 1 pack = 10 units | **6GK1 901-1BB10-2AB0** | | |
| • 1 pack = 50 units | **6GK1 901-1BB10-2AE0** | | |
| **IE FC TP standard cable GP 2 x 2 (Type A)** | **6XV1 840-2AH10** | | |
| 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | | | |
| **IE FC RJ45 Plug 4 x 2** | | | |
| RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | | |
| • 1 pack = 1 unit | **6GK1 901-1BB11-2AA0** | | |
| • 1 pack = 10 units | **6GK1 901-1BB11-2AB0** | | |
| • 1 pack = 50 units | **6GK1 901-1BB11-2AE0** | | |

**2**

## Overview



- The SCALANCE XR-300EEC (**E**nhanced **E**nvironmental **C**onditions) industrial Ethernet switches are partly modular, high-performance, industry-standard switches for the construction of electrical and/or optical line, ring and star topologies operating at 10/100/1000 Mbit/s, designed for installation in 19" control cabinets

- As many as 24 electrical and/or optical interfaces (10/100/1000 Mbit/s), of which 16 are integral RJ45 ports; up to four electrical and/or optical 2-port media modules can also be inserted in the media module slots of the basic device

- Due to the extended temperature range (-40 to +70 °C, up to +85 °C for short periods), support of special protocols (IEEE 1588 V2, hardware-supported) and standards (IEEE 1613 and IEC 61850-3), as well as wide-range power supplies (60 to 250 V AC/DC), they are suitable for use in extremely harsh industrial environments and in low and high-voltage substations

- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet and Fast Ethernet

- Switches from the SCALANCE XR-300EEC product line support numerous IT standards (VLANs, IGMP Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service) and thus permit seamless integration of automation networks into existing corporate networks.

- Remote diagnostics is possible by means of PROFINET diagnostics, web browser, CLI, or SNMP.

## Benefits



- Increased availability of the network due to hardware and software functions specially geared to the particular requirements of energy technology plants and extreme environmental conditions

- Unlimited flexibility in the case of network expansions (e.g. more terminals) or conversion (e.g. from copper to fiber-optic cable) and reduction of stockkeeping costs due to modular design with port modules

- High availability of the network thanks to:
  - Redundant power supply
  - Redundant network structures based on fiber-optic or twisted pair cables (redundancy manager, standby function, and STP/RSTP are integrated)
  - Easy device replacement by means of plug-in C-PLUG swap medium
  - Very fast reconfiguration of the network in the event of a fault

- Lower susceptibility to failure and higher availability of the plant networking due to latching of the RJ45 FastConnect connectors in the sleeve of the RJ45 port modules

- Protection of investment due to integration into existing network management systems by means of standardized SNMP access

- Time saving during engineering, commissioning and in the operating phase of a plant by using the integrated configuration and diagnostics in STEP 7, without additional software

- Avoidance of costly failures or maintenance periods by means of fanless design

## Application

The SCALANCE XR-300EEC is ideal for use in plant networks and for integrating the industrial network into an existing corporate network. Both at the field level and the control level, the switch performs the network with the distributed field devices and ensures high plant availability with extensive diagnostics options and high transmission speeds. The modularity permits perfect adaptation to the respective application through the use of electrical and/or optical media modules.

The main area of application is found in high-performance plant networks with interfaces to the corporate network. Thanks to the immunity to electromagnetic interference of the SCALANCE XR-300EEC switches, the devices can also be used in medium/high voltage substations.

The SCALANCE XR-300EEC switch is suitable for establishing optical Industrial Ethernet line, star or ring topologies with 24 ports, 16 of which are integrated RJ45 ports. Up to four electrical and/or optical 2-port media modules can also be inserted in the media module slots of the basic device.
The switch can also be used as a hub in the plant bus (redundant connection is possible).

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XR-300EEC managed**

**2**

### Application
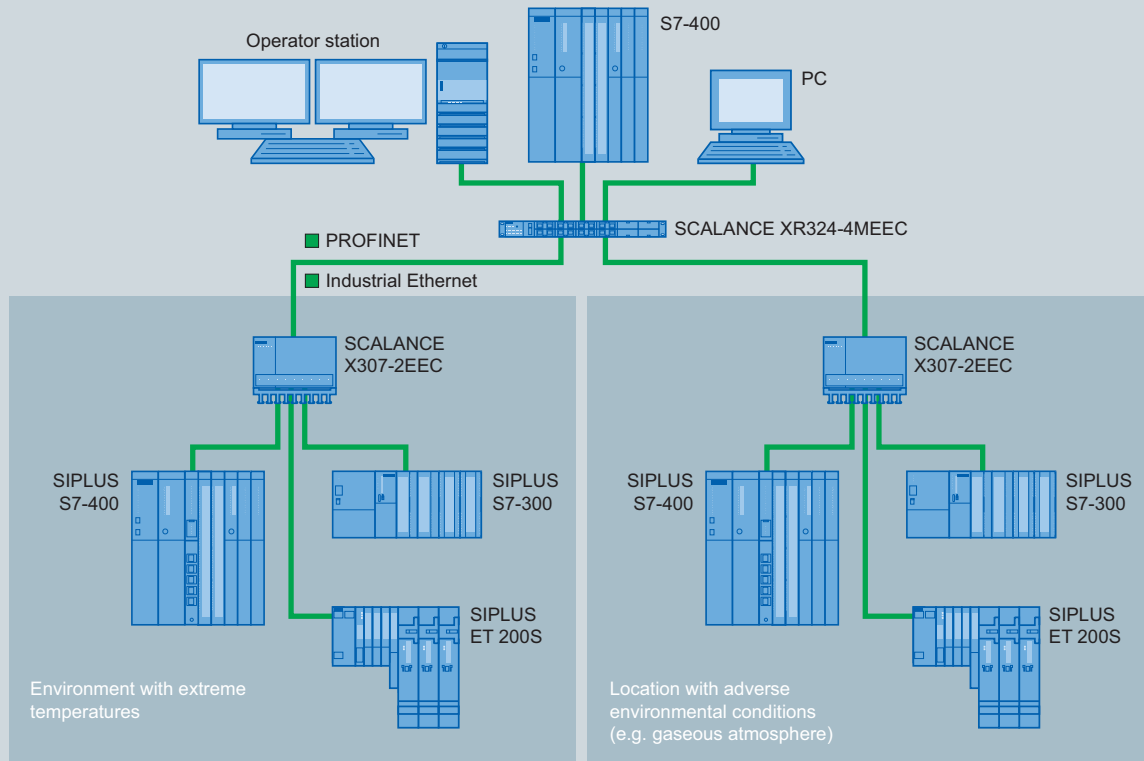


Star structure in energy switching plant under extreme environmental conditions with SCALANCE XR324-4M EEC and X-300EEC

The use of media modules in partly and fully modular versions of the SCALANCE X-300 switches supports:

- Extension of networks by subsequent insertion of additional media modules in unused media module slots
- Changing of cabling technology, such as conversion from copper to fiber-optic cables, or from multi-mode to single-mode FOC

### Design

The SCALANCE XR-300EEC Industrial Ethernet switches with rugged metal enclosure with degree of protection IP20 are optimized for installation in the 19" cabinet.

The switches have:

- 4-pin terminal block for redundant voltage feed for protection against voltage failure in 24 V DC version
- 3-pin terminal block for voltage feed in 230 V AC version
- 2-pin terminal block for connecting the isolated signaling contact for simple display of faults
- A row of LEDs to indicate the status information (power, link status, data traffic, power supply, signaling contact)
- SELECT/SET pushbutton for simple adjustment of the fault signaling contact on the device
- Slot for optional C-PLUG swap medium on the side of the device for easy replacement in the event of a fault

The SCALANCE XR-300EEC switches are available with the following port types:

- 16 integrated RJ45 ports;
  The RJ45 sockets are designed to be industry-compatible with additional sleeves, for connection of the Industrial Ethernet FC RJ45 Plug 180

- Four slots for electrical or optical 2-port media modules for multi-mode or single-mode connections; the optical media modules are available in various connection technologies
- All electrical Ethernet interfaces support 10/100/1000 Mbit/s, all optical Ethernet interfaces support 100 or 1000 Mbit/s
- The SCALANCE XR-300EEC switches support Gigabit Ethernet (1000 Mbit/s) at all ports.
  The 24 ports are divided into three groups of eight ports each (Gigabit Ethernet Blocking). Gigabit Ethernet is supported with full wire speed within each group, but not between the groups.

**Product versions**

*SCALANCE XR324-4M EEC (4 media module slots)*

Versions are available with

- LEDs, power supply connection and data cable outlet on the front
- LEDs, power supply connection on the front, data cable outlet at the rear

All versions have four media module slots and

- 1 x 24 V DC power supply
- 2 x 24 V DC power supplies
- 1 x 230 V AC power supply
- 2 x 230 V AC power supplies

**2**

## ■ Function

- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy. Reliable communication is achieved by closing an optical or electrical line with SCALANCE X-400, X-300 or X-200 switches to form a ring. The redundancy manager (RM) integrated in the SCALANCE XR-300 switch monitors the function of the network. It recognizes the failure of a transmission link or of SCALANCE X switch in the ring and activates the substitute path within a maximum of 0.2 seconds.
  Rings consisting of SCALANCE X-300, XR-300 and X-400 switches can be operated at 1000 Mbit/s. In rings with SCALANCE X-200 or OSM/ESM it is possible to integrate SCALANCE XR-300 switches at 100 Mbit/s.

- Redundant interfacing to corporate networks; SCALANCE XR-300EEC switches support the standardized redundancy procedures Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP). This enables a subnetwork to be connected redundantly to a higher level corporate network with reduced requirements for the reconfiguration time (in the order of seconds).

- Support of virtual networks (VLAN); for structuring Industrial Ethernet networks with a fast growing number of users, a physically existing network can be divided into several virtual networks.

- Load limiting when multicast protocols (e.g. video transmission) are used; through learning the multicast sources and targets (IGMP Snooping, IGMP Querier), SCALANCE XR-300EEC switches can also filter multicast data traffic and therefore limit the load in the network. Multicast and broadcast traffic can be limited.

- Time synchronization; diagnostic messages (log table entries, e-mails) are time-stamped. The local time is standardized throughout the network by means of synchronization with a SICLOCK time transmitter, thereby simplifying the assignment of diagnostic messages to several devices.

- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

- Link aggregation (IEEE 802.1q) for bundling data streams

- Quality of Service (IEEE 802.1p) for prioritization of network traffic

### Network topology and network configuration

The network topology can easily be adapted to the structure of the plant using SCALANCE XR-300 Industrial Ethernet switches .

The following network structures and combinations of structures can be implemented:

- Fast Ethernet rings with fast media redundancy; To increase network availability, as many as 50 X-200, X-300, or X-400 switches cascaded in line can be connected into a ring. On the failure of a transmission link or of a SCALANCE X switch in the ring, the transmission path is reconfigured within 0.2 seconds.

- Several rings can be redundantly linked through the standby function

- At the same time, SCALANCE XR-300EEC supports redundant connection of the ring structure to the corporate network with a rapid spanning tree.

- Star topology with SCALANCE XR-300EEC switches: The SCALANCE XR-300EEC switch represents a neutral point that can interconnect up to 24 nodes or subnets electrically.

When configuring the network, it is necessary to observe the following boundary conditions:

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 3000 m at 100 Mbit/s
  - 750 m at 1000 Mbit/s

- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26000 m at 100 Mbit/s
  - 10000 m at 1000 Mbit/s

- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC cable 2x2 and IE FC RJ45 Plug 180
  - Max. 100 m at 1000 Mbit/s with IE FC Standard Cable 4x2 (90 m), IE FC RJ45 Modular Outlet and patch cable (10 m)
  - Max. 10 m using patches with TP cord

### Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM; to establish a ring, a SCALANCE XR-300EEC is switched to RM mode. The Gigabit ports (electrical or optical) are preferably used as ring ports. The non-ring ports of the RM can be used freely for the connection of data terminals and networks. If the redundancy procedure MRP standardized by PROFINET is used, the RM is adjusted automatically.

- Signal mask; the signal mask is set to the current status of the SCALANCE XR-300EEC (setpoint) by pushbutton operation. The signal mask defines which ports and which power supplies are to be monitored. The signaling contact only reports an error when a monitored port or a monitored feeder fails (deviation of setpoint/actual status).

- IP address; the IP address is assigned via DHCP (Dynamic Host Configuration Protocol). If there is no corresponding server in the network, the IP address can be assigned using an enclosed software tool.

Diagnostic options on site:

- The following status information is displayed by LEDs on site:
  - Port status
  - Port mode (10/100/1000 Mbit/s, full/half-duplex)
  - Status of the two power supplies
  - Signaling contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode

- The status of the signaling contact is routed externally by means of floating relay contacts. This enables the module to be monitored via an input module from a controller.

- Monitoring via the Industrial Ethernet network; the following possibilities are available:
  - Remote via standard browser (Web-based management): Selection of SCALANCE XR-300EEC switches via the network from a PC with browser
  - Remote via SNMP V1, V2c, V3: Secure integration of SCALANCE XR-300EEC switches via the network to higher-level network management systems
  - Remote via PROFINET IO diagnostics: PROFINET diagnostic alarms from SCALANCE XR-300EEC switches can be displayed using the relevant SIMATIC engineering tools and they can also be processed in the controller. The engineering outlay for the PLC and HMI have been drastically reduced due to the complete integration in the SIMATIC concept for system error messages.

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE XR-300EEC managed

**■ Function** (continued)

#### Network management

The network management provides the following functions:

- Password-protected dial-up for "Administrator" (read and write authorization) and "User" (read only)
- Read-out of version and status information
- Setting the signal and standby mask and address information
- Parameterization of the web management services
- Setting of Rapid Spanning Tree parameters
- Fixed parameterization of the ports (data rates, half/full duplex)
- Security
  - Ports can be connected or disconnected
  - Port-based network access control according to IEEE 802.1x (available soon)
  - Support of Access Control List (ACL) (available soon)
- Output of statistics information
- Diagnosis of data traffic by means of a parameterizable mirror port with a standard commercial network analyzer
- Loading of new firmware or the configuration data via the network by a TFTP server
- Saving the configuration data or log table via the network on a TFTP server

If faults occur in the network, the SCALANCE XR-300EEC switch can independently send error messages (traps) to a network management system or also e-mails to a predefined network administrator.

Remote monitoring (RMON) provides the following functions: The SCALANCE X-300EEC switch can collect statistics information according to the RMON groups 1 through 4. These include, for example, fault statistics that are kept for each port. This information can be read out through web-based management in the statistics sub-area.

**■ Technical specifications**

| Order No. | 6GK5 324-4GG00-1ER2<br>6GK5 324-4GG00-1JR2 |
| --- | --- |
| Product type designation | SCALANCE XR324-4M EEC |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 24 |
| Number of electrical connections | |
| • For network components or terminal equipment | 16 |
| • For signal contact | 1 |
| • For media module | 4 |
| • For power supply | 1 |
| • For redundant power supply | 1 |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | |
| • At 100 Mbit/s | – |
| • At 1000 Mbit/s | – |
| Design of optical connection for fiber-optic cables | |
| • At 100 Mbit/s | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules |
| Design of the swap medium C-Plug | Yes |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage | |
| • of the supply voltage | DC |
| Type of power supply | |
| • Redundant power supply | No |
| Supply voltage, external | 24 V |
| Current consumption, maximum | 2.2 A |
| Effective power loss | |
| • At 24 V with DC | 50 W |

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■ **Technical specifications** (continued)

| Order No. | 6GK5 324-4GG00-1ER2<br>6GK5 324-4GG00-1JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +70 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to +50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Type of construction | 19-inch rack |
| Width | 449 mm |
| Height | 43.6 mm |
| Depth | 319.5 mm |
| Net weight | 5.6 kg |
| Type of mounting | |
| • 19-inch installation | Yes |
| • 35 mm DIN rail mounting | No |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| Type of mounting | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | |
| Product function | |
| • CLI | Yes |
| • Web-based management | Yes |
| • MIB support | Yes |
| • Traps via e-mail | Yes |
| • Configuration with STEP 7 | Yes |
| • RMON | Yes |
| • SMTP server | Yes |
| • Port mirroring | Yes |
| • CoS | Yes |
| • PROFINET IO-Diagnostics | Yes |

| Order No. | 6GK5 324-4GG00-1ER2<br>6GK5 324-4GG00-1JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| Protocol is supported | |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • FTP | Yes |
| • BOOTP | Yes |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| • IGMP (snooping/querier) | Yes |
| • GMRP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| **Product functions Diagnostics** | |
| Product function | |
| • Port diagnostics | Yes |
| • Packet size statistics | Yes |
| • Packet type statistics | Yes |
| • Error statistics | Yes |
| • SysLog | Yes |
| **Product functions VLAN** | |
| Product function | |
| • VLAN - port-based | Yes |
| • VLAN - dynamic | Yes |
| Maximum number of VLANs | 255 |
| Maximum number of dynamic VLANs | 255 |
| Protocol is supported | |
| • GVRP | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • DHCP option 82 | Yes |
| • DHCP option 66 | Yes |
| • DHCP option 67 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Standby redundancy | Yes |
| • Redundancy procedure HSR | Yes |
| • Redundancy procedure MRP | Yes |
| • Redundancy procedure RSTP | Yes |
| • Passive listening | Yes |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • RSTP Big Network Support | Yes |
| • LACP | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XR-300EEC managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 324-4GG00-1ER2<br>6GK5 324-4GG00-1JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Product functions Security** | |
| Product function | |
| • ACL - Port/MAC-based | Yes |
| • IEEE 802.1x (Radius) | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes |
| • Broadcast blocking | Yes |
| Protocol is supported | |
| • SSH | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | Yes |
| Protocol is supported | |
| • NTP | No |
| • SNTP | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC | IEC 61850, IEEE 1613 |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

| Order No. | 6GK5 324-4GG00-2ER2<br>6GK5 324-4GG00-2JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 24 |
| Number of electrical connections | |
| • For network components or terminal equipment | 16 |
| • For signal contact | 1 |
| • For media module | 4 |
| • For power supply | 1 |
| • For redundant power supply | 1 |

| Order No. | 6GK5 324-4GG00-2ER2<br>6GK5 324-4GG00-2JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 4-pin terminal block |
| Number of optical connections for fiber-optic cables | |
| • At 100 Mbit/s | – |
| • At 1000 Mbit/s | – |
| Design of optical connection for fiber-optic cables | |
| • At 100 Mbit/s | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules |
| Design of the swap medium C-Plug | Yes |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage | |
| • of the supply voltage | DC |
| Type of power supply | |
| • Redundant power supply | Yes |
| Supply voltage, external | 24 V |
| Current consumption, maximum | 2.2 A |
| Effective power loss | |
| • At 24 V with DC | 50 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +70 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to +50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |

## ■ Technical specifications (continued)

| Order No. | 6GK5 324-4GG00-2ER2<br>6GK5 324-4GG00-2JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Design, dimensions and weights** | |
| Type of construction | 19-inch rack |
| Width | 449 mm |
| Height | 43.6 mm |
| Depth | 319.5 mm |
| Net weight | 5.6 kg |
| Type of mounting | |
| • 19-inch installation | Yes |
| • 35 mm DIN rail mounting | No |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| Type of mounting | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | |
| Product function | |
| • CLI | Yes |
| • Web-based management | Yes |
| • MIB support | Yes |
| • Traps via e-mail | Yes |
| • Configuration with STEP 7 | Yes |
| • RMON | Yes |
| • SMTP server | Yes |
| • Port mirroring | Yes |
| • CoS | Yes |
| • PROFINET IO-Diagnostics | Yes |
| Protocol is supported | |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • FTP | Yes |
| • BOOTP | Yes |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| • IGMP (snooping/querier) | Yes |
| • GMRP | Yes |
| • DCP | Yes |
| • LLDP | Yes |

| Order No. | 6GK5 324-4GG00-2ER2<br>6GK5 324-4GG00-2JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Product functions Diagnostics** | |
| Product function | |
| • Port diagnostics | Yes |
| • Packet size statistics | Yes |
| • Packet type statistics | Yes |
| • Error statistics | Yes |
| • SysLog | Yes |
| **Product functions VLAN** | |
| Product function | |
| • VLAN - port-based | Yes |
| • VLAN - dynamic | Yes |
| Maximum number of VLANs | 255 |
| Maximum number of dynamic VLANs | 255 |
| Protocol is supported | |
| • GVRP | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • DHCP option 82 | Yes |
| • DHCP option 66 | Yes |
| • DHCP option 67 | Yes |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Standby redundancy | Yes |
| • Redundancy procedure HSR | Yes |
| • Redundancy procedure MRP | Yes |
| • Redundancy procedure RSTP | Yes |
| • Passive listening | Yes |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • RSTP Big Network Support | Yes |
| • LACP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - Port/MAC-based | Yes |
| • IEEE 802.1x (Radius) | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes |
| • Broadcast blocking | Yes |
| Protocol is supported | |
| • SSH | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | Yes |
| Protocol is supported | |
| • NTP | No |
| • SNTP | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**SCALANCE XR-300EEC managed**

■ **Technical specifications** (continued)

| Order No. | 6GK5 324-4GG00-2ER2<br>6GK5 324-4GG00-2JR2 |
|---|---|
| Product type designation | SCALANCE XR324-4M EEC |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC | IEC 61850, IEEE 1613 |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | ANSI / ISA 12.12.0, CSA C22.2 No. 213-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4 |
| • For emitted interference | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

| Order No. | 6GK5 324-4GG00-3ER2<br>6GK5 324-4GG00-3JR2 |
|---|---|
| Product type designation | SCALANCE XR324-4M EEC |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 24 |
| Number of electrical connections | |
| • For network components or terminal equipment | 16 |
| • For signal contact | 1 |
| • For media module | 4 |
| • For power supply | 1 |
| • For redundant power supply | – |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 2-pin terminal block |
| Number of optical connections for fiber-optic cables | |
| • At 100 Mbit/s | – |
| • At 1000 Mbit/s | – |
| Design of optical connection for fiber-optic cables | |
| • At 100 Mbit/s | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules |
| Design of the swap medium C-Plug | Yes |

| Order No. | 6GK5 324-4GG00-3ER2<br>6GK5 324-4GG00-3JR2 |
|---|---|
| Product type designation | SCALANCE XR324-4M EEC |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | AC |
| Type of power supply | |
| • Redundant power supply | No |
| Supply voltage at AC | 230 V |
| • Rated value | 100 ... 240 V |
| Type of voltage 2 of the supply voltage | DC |
| Supply voltage at DC | 220 V |
| • Rated value | 60 ... 250 V |
| Current consumption, maximum | 0.85 A |
| Effective power loss | |
| • At 230 V with AC | 50 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +70 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to +50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Type of construction | 19-inch rack |
| Width | 449 mm |
| Height | 43.6 mm |
| Depth | 319.5 mm |
| Net weight | 5.6 kg |
| Type of mounting | |
| • 19-inch installation | Yes |
| • 35 mm DIN rail mounting | No |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| Type of mounting | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications |

**2**

## ■ Technical specifications (continued)

| Order No. | 6GK5 324-4GG00-3ER2<br>6GK5 324-4GG00-3JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | |
| Product function | |
| • CLI | Yes |
| • Web-based management | Yes |
| • MIB support | Yes |
| • Traps via e-mail | Yes |
| • Configuration with STEP 7 | Yes |
| • RMON | Yes |
| • SMTP server | Yes |
| • Port mirroring | Yes |
| • CoS | Yes |
| • PROFINET IO-Diagnostics | Yes |
| Protocol is supported | |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • FTP | Yes |
| • BOOTP | Yes |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| • IGMP (snooping/querier) | Yes |
| • GMRP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| **Product functions Diagnostics** | |
| Product function | |
| • Port diagnostics | Yes |
| • Packet size statistics | Yes |
| • Packet type statistics | Yes |
| • Error statistics | Yes |
| • SysLog | Yes |
| **Product functions VLAN** | |
| Product function | |
| • VLAN - port-based | Yes |
| • VLAN - dynamic | Yes |
| Maximum number of VLANs | 255 |
| Maximum number of dynamic VLANs | 255 |
| Protocol is supported | |
| • GVRP | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • DHCP option 82 | Yes |
| • DHCP option 66 | Yes |
| • DHCP option 67 | Yes |

| Order No. | 6GK5 324-4GG00-3ER2<br>6GK5 324-4GG00-3JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Standby redundancy | Yes |
| • Redundancy procedure HSR | Yes |
| • Redundancy procedure MRP | Yes |
| • Redundancy procedure RSTP | Yes |
| • Passive listening | Yes |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • RSTP Big Network Support | Yes |
| • LACP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - Port/MAC-based | Yes |
| • IEEE 802.1x (Radius) | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes |
| • Broadcast blocking | Yes |
| Protocol is supported | |
| • SSH | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | Yes |
| Protocol is supported | |
| • NTP | No |
| • SNTP | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC | IEC 61850, IEEE 1613 |
| • For emitted interference | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE XR-300EEC managed

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 324-4GG00-4ER2<br>6GK5 324-4GG00-4JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Data transmission rate** | |
| Transmission rate 1 | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s |
| **Interfaces** | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 24 |
| Number of electrical connections | |
| • For network components or terminal equipment | 16 |
| • For signal contact | 1 |
| • For media module | 4 |
| • For power supply | 1 |
| • For redundant power supply | 1 |
| Design of electrical connection | |
| • For network components or terminal equipment | RJ45 port |
| • For signal contact | 2-pin terminal block |
| • For power supply | 2-pin terminal block |
| Number of optical connections for fiber-optic cables | |
| • At 100 Mbit/s | – |
| • At 1000 Mbit/s | – |
| Design of optical connection for fiber-optic cables | |
| • At 100 Mbit/s | Depends on selected media modules |
| • At 1000 Mbit/s | Depends on selected media modules |
| Design of the swap medium C-Plug | Yes |
| **Inputs/outputs** | |
| Nominal value of operating voltage of signal contacts with DC | 24 V |
| Maximum operating current of signal contacts with DC | 0.1 A |
| **Supply voltage, current consumption, power loss** | |
| Type of voltage of the supply voltage | AC |
| Type of power supply | |
| • Redundant power supply | Yes |
| Supply voltage at AC | 230 V |
| • Rated value | 100 ... 240 V |
| Type of voltage 2 of the supply voltage | DC |
| Supply voltage at DC | 220 V |
| • Rated value | 60 ... 250 V |
| Current consumption, maximum | 0.85 A |
| Effective power loss | |
| • At 230 V with AC | 50 W |

| Order No. | 6GK5 324-4GG00-4ER2<br>6GK5 324-4GG00-4JR2 |
|---|---|
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | -40 … +70 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | As a result of installation of media modules, the operating temperature is reduced to 0 °C to +70 °C, when using SFP plug-in transceivers, the operating temperature is reduced to 0 °C to +60 °C, with a vertical installation position, the maximum operating temperature is reduced to +50 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Type of construction | 19-inch rack |
| Width | 449 mm |
| Height | 43.6 mm |
| Depth | 319.5 mm |
| Net weight | 5.6 kg |
| Type of mounting | |
| • 19-inch installation | Yes |
| • 35 mm DIN rail mounting | No |
| • Wall mounting | No |
| • S7-300 rail mounting | No |
| Type of mounting | For 19-inch rack mounting, 4-point mounting is required for marine engineering applications |
| **Product properties, functions, components, general** | |
| Cascading with redundant ring at reconfiguration time < 0.3 s | 50 |
| Cascading with star topology | Any (only dependent on signal propagation time) |
| **Product functions Configuration/management** | |
| Product function | |
| • CLI | Yes |
| • Web-based management | Yes |
| • MIB support | Yes |
| • Traps via e-mail | Yes |
| • Configuration with STEP 7 | Yes |
| • RMON | Yes |
| • SMTP server | Yes |
| • Port mirroring | Yes |
| • CoS | Yes |
| • PROFINET IO-Diagnostics | Yes |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 324-4GG00-4ER2<br>6GK5 324-4GG00-4JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| Protocol is supported | |
| • Telnet | Yes |
| • HTTP | Yes |
| • HTTPS | Yes |
| • TFTP | Yes |
| • FTP | Yes |
| • BOOTP | Yes |
| • SNMP v1 | Yes |
| • SNMP v2 | Yes |
| • SNMP v3 | Yes |
| • IGMP (snooping/querier) | Yes |
| • GMRP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| **Product functions Diagnostics** | |
| Product function | |
| • Port diagnostics | Yes |
| • Packet size statistics | Yes |
| • Packet type statistics | Yes |
| • Error statistics | Yes |
| • SysLog | Yes |
| **Product functions VLAN** | |
| Product function | |
| • VLAN - port-based | Yes |
| • VLAN - dynamic | Yes |
| Maximum number of VLANs | 255 |
| Maximum number of dynamic VLANs | 255 |
| Protocol is supported | |
| • GVRP | Yes |
| **Product functions DHCP** | |
| Product function | |
| • DHCP client | Yes |
| • DHCP option 82 | Yes |
| • DHCP option 66 | Yes |
| • DHCP option 67 | Yes |

| Order No. | 6GK5 324-4GG00-4ER2<br>6GK5 324-4GG00-4JR2 |
| --- | --- |
| **Product type designation** | **SCALANCE XR324-4M EEC** |
| **Product functions Redundancy** | |
| Product function | |
| • Ring redundancy | Yes |
| • Redundancy manager | Yes |
| • Standby redundancy | Yes |
| • Redundancy procedure HSR | Yes |
| • Redundancy procedure MRP | Yes |
| • Redundancy procedure RSTP | Yes |
| • Passive listening | Yes |
| Protocol is supported | |
| • STP/RSTP | Yes |
| • RSTP Big Network Support | Yes |
| • LACP | Yes |
| **Product functions Security** | |
| Product function | |
| • ACL - Port/MAC-based | Yes |
| • IEEE 802.1x (Radius) | Yes |
| • Broadcast/Multicast/Unicast Limiter | Yes |
| • Broadcast blocking | Yes |
| Protocol is supported | |
| • SSH | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | Yes |
| Protocol is supported | |
| • NTP | No |
| • SNTP | Yes |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC | IEC 61850, IEEE 1613 |
| • For emitted interference | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes |
| • C-Tick | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

### SCALANCE XR-300EEC managed

**2**

| Ordering data | Order No. |
|---|---|
| ***SCALANCE XR324-4M EEC Industrial Ethernet switches*** | |
| Partially modular 19" Industrial Ethernet switches for establishing electrical and optical Industrial Ethernet networks; all ports can be optionally equipped with optical or electrical 2-port media modules; All ports support Gigabit Ethernet (blocking), integrated redundancy manager, RSTP, RMON, IGMP snooping querier, network management via SNMP, PROFINET and Web server 16 x 10/100/1000 Mbit/s RJ45 ports, electrical 4 x 10/100/1000 Mbit/s slots for 2-port media modules, electrical or optical | |
| **1 x 24 V DC power supply** | |
| • Data cable outlet at front | **6GK5 324-4GG00-1ER2** |
| • Data cable outlet at rear | **6GK5 324-4GG00-1JR2** |
| **1 x 100-240 V AC/60-250 V DC power supply** | |
| • Data cable outlet at front | **6GK5 324-4GG00-3ER2** |
| • Data cable outlet at rear | **6GK5 324-4GG00-3JR2** |
| **2 x 24 V DC power supply** | |
| • Data cable outlet at front | **6GK5 324-4GG00-2ER2** |
| • Data cable outlet at rear | **6GK5 324-4GG00-2JR2** |
| **2 x 100-240 V AC/60-250 V DC power supply** | |
| • Data cable outlet at front | **6GK5 324-4GG00-4ER2** |
| • Data cable outlet at rear | **6GK5 324-4GG00-4JR2** |
| **Media modules for SCALANCE X-300** | see "Media modules for modular SCALANCE X-300 managed" |

### More information

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the Switch Selection Tool is available as a free download:

http://support.automation.siemens.com/WW/view/en/39134641

**2**

## Overview
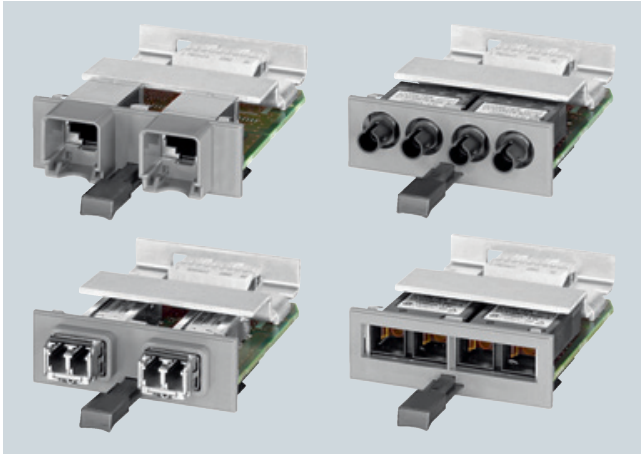


- 2-port media modules for flexible, 2-port-granular equipping of partly and fully modular versions of the SCALANCE X-300 switches (e.g. SCALANCE X308-2M, SCALANCE XR324-12M)
- Electrical versions with RJ45 ports are available as well as optical versions with BFOC, SC and LC ports for the use of multi-mode and single-mode fiber-optic cables
- A 2-port SFP media module permits the the optional use of fiber-optic SFP plug-in transceivers (**S**mall **F**orm-Factor **P**luggable) with LC connection technology

## Benefits



- Unlimited flexibility in the case of network expansions (e.g. more terminals) or conversion (e.g. from copper to fiber-optic cables) due to modular design with media modules
- Reduction of storage costs and maintenance overhead by focusing on a few basic device versions

## Application

The use of media modules in partly and fully modular versions of the SCALANCE X-300 switches supports:

- Extension of networks by subsequent insertion of additional media modules in unused media module slots
- Change of cabling technology (e.g. conversion from copper to fiber-optic cables, or from multi-mode to single-mode FOC)

## Design



Optical
2-port media modules
are inserted into the
device

Electrical
2-port media modules
are inserted into the
device

Optical
SFP pluggable transceivers
(one port) are inserted into
the SFP media module

SFP media modules
(two SFP slots) are
inserted into the device

G_IK10_XX_10282
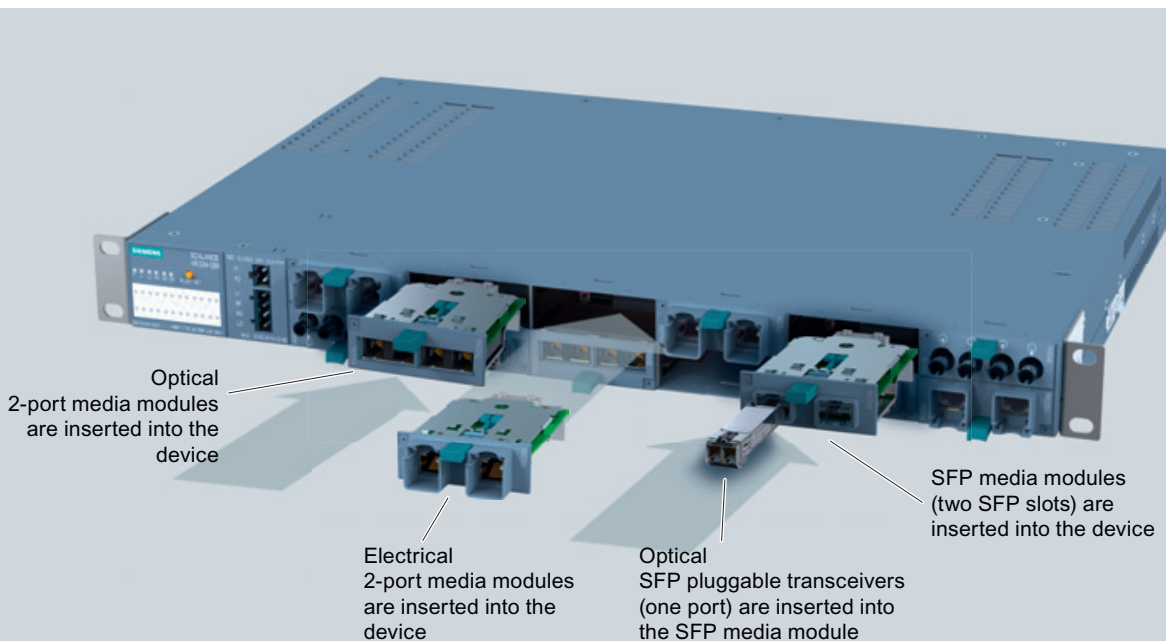
Insertion of a 2-port media module in the media module slot

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

■ **Design** (continued)

### Product versions of media modules

*Electrical media modules with 2 x 10/100/1000 Mbit/s RJ45 ports*
- MM992-2CUC with retaining sleeve
- MM992-2CU without retaining sleeve

*Optical media modules with 2 x 100 Mbit/s BFOC ports*
- MM991-2
  multi-mode, glass, up to 3 km
- MM991-2LD
  single-mode, glass, up to 26 km

*Optical media modules with 2 x 100 Mbit/s SC ports*
- MM991-2
  multi-mode, glass, up to 3 km
- MM991-2LD
  single-mode, glass, up to 26 km
- MM991-2LH+
  single-mode, glass, up to 70 km

*Optical media modules with 2 x 1000 Mbit/s SC ports*
- MM992-2
  multi-mode, glass, up to 750 m
- MM992-2LD
  single-mode, glass, up to 10 km
- MM992-2LH
  single-mode, glass, up to 40 km
- MM992-2LH+
  single-mode, glass, up to 70 km
- MM992-2ELH
  single-mode, glass, up to 120 km

*Optical media modules with 2 x 100/1000 Mbit/s
for SFP pluggable transceiver*
- MM992-2SFP
  for SFP plug-in transceivers with 1 x 100 Mbit/s or
  1 x 1000 Mbit/s multi-mode or single-mode, glass

### Product versions of SFP pluggable transceivers

The SFP plug-in transceivers (**S**mall **F**orm-factor **P**luggable)
can only be used together with the SFP media module
MM992-2SFP.

*Optical SFP pluggable transceivers with 1 x 100 Mbit/s LC port*
- SFP991-1
  multi-mode, glass, up to 3 km
- SFP991-1LD
  single-mode, glass, up to 26 km
- SFP991-1LH+
  single-mode, glass, up to 70 km

*Optical SFP pluggable transceivers with 1 x 1000 Mbit/s LC port*
- SFP992-1
  multi-mode, glass, up to 750 m
- SFP992-1LD
  single-mode, glass, up to 10 km
- SFP992-1LH
  single-mode, glass, up to 40 km
- SFP992-1LH+
  single-mode, glass, up to 70 km
- SFP992-1ELH
  single-mode, glass, up to 120 km

**2**

■ **Technical specifications**

| Order No. | 6GK5 992-2SA00-8AA0 | 6GK5 992-2GA00-8AA0 |
|---|---|---|
| **Product type designation** | **MM992-2CU** | **MM992-2CUC** |
| **Data transmission rate** | | |
| Transmission rate 1 | 10 Mbit/s | 10 Mbit/s |
| Transmission rate 2 | 100 Mbit/s | 100 Mbit/s |
| Transmission rate 3 | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 2 | 2 |
| Number of electrical connections | | |
| • For network components or terminal equipment | 2 | 2 |
| Design of electrical connection | | |
| • For network components or terminal equipment | RJ45 port | RJ45 port |
| **Permissible ambient conditions** | | |
| Ambient temperature | | |
| • During operating phase | 0 … 70 °C | 0 … 70 °C |
| • During storage | 0 … 70 °C | 0 … 70 °C |
| • During transport | 0 … 70 °C | 0 … 70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 |
| **Design, dimensions and weights** | | |
| Type of construction | Media module | Media module with retaining collar |
| Width | 60 mm | 60 mm |
| Height | 22 mm | 22 mm |
| Depth | 100 mm | 100 mm |
| Net weight | 0.08 kg | 0.08 kg |
| Type of mounting for installation at media module slot | Yes | Yes |
| **Standards, specifications, approvals** | | |
| Standard | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes |
| • C-Tick | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 991-2AB00-8AA0 | 6GK5 991-2AC00-8AA0 |
|---|---|---|
| **Product type designation** | **MM991-2** | **MM991-2LD** |
| **Data transmission rate** | | |
| Transmission rate 1 | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 2 | 2 |
| Number of optical connections for fiber-optic cables | | |
| • At 100 Mbit/s | 2 | 2 |
| Design of optical connection for fiber-optic cables | | |
| • At 100 Mbit/s | ST port (multi-mode up to 3 km) | ST port (single-mode up to 26 km) |
| Injectable optical power referred to 1 mW | | |
| • of the transmitter output | -19 dB ... -14 dB | -15 dB ... -8 dB |
| • of the receiver input, maximum | -3 dB | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -32 dB | -34 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB |
| **Permissible ambient conditions** | | |
| Ambient temperature | | |
| • During operating phase | 0 … 70 °C | 0 … 70 °C |
| • During storage | 0 … 70 °C | 0 … 70 °C |
| • During transport | 0 … 70 °C | 0 … 70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 |
| **Design, dimensions and weights** | | |
| Type of construction | Media module | Media module |
| Width | 60 mm | 60 mm |
| Height | 22 mm | 22 mm |
| Depth | 100 mm | 100 mm |
| Net weight | 0.08 kg | 0.08 kg |
| Type of mounting for installation at media module slot | Yes | Yes |
| **Standards, specifications, approvals** | | |
| Standard | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes |
| • C-Tick | Yes | Yes |

**2**

■ **Technical specifications** (continued)

| Order No. | 6GK5 991-2AD00-8AA0 | 6GK5 991-2AF00-8AA0 | 6GK5 991-2AE00-8AA0 |
|---|---|---|---|
| **Product type designation** | **MM991-2** | **MM991-2LD** | **MM991-2LH+** |
| **Data transmission rate** | | | |
| Transmission rate 1 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 2 | 2 | 2 |
| Number of optical connections for fiber-optic cables | | | |
| • At 100 Mbit/s | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | |
| • At 100 Mbit/s | SC port (multi-mode up to 3 km) | SC port (single-mode up to 26 km) | SC port (single-mode up to 70 km) |
| Injectable optical power referred to 1 mW | | | |
| • of the transmitter output | -19 … -14 dB | -15 … -8 dB | -5 … +0 dB |
| • of the receiver input, maximum | -3 dB | -3 dB | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -34 dB | -32 dB | -34 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 3 dB |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During storage | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During transport | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | |
| Type of construction | Media module | Media module | Media module |
| Width | 60 mm | 60 mm | 60 mm |
| Height | 22 mm | 22 mm | 22 mm |
| Depth | 100 mm | 100 mm | 100 mm |
| Net weight | 0.08 kg | 0.08 kg | 0.08 kg |
| Type of mounting for installation at media module slot | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

### ■ Technical specifications (continued)

| Order No.<br>Product type designation | 6GK5 992-2AL00-8AA0<br>MM992-2 | 6GK5 992-2AM00-8AA0<br>MM992-2LD | 6GK5 992-2AN00-8AA0<br>MM992-2LH |
|---|---|---|---|
| **Data transmission rate** | | | |
| Transmission rate 1 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 2 | 2 | 2 |
| Number of optical connections for fiber-optic cables | | | |
| • At 1000 Mbit/s | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | |
| • At 1000 Mbit/s | SC port (multi-mode up to 0.75 km) | SC port (single-mode up to 10 km) | SC port (single-mode up to 40 km) |
| Injectable optical power referred to 1 mW | | | |
| • of the transmitter output | -9.5 dB ... -4 dB | -9.5 dB ... -3 dB | -6 dB ... 0 dB |
| • of the receiver input, maximum | -3 dB | -3 dB | -3 dB |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -17 dB | -21 dB | -23 dB |
| Minimum required attenuation factor of the FO transmission link | 0 dB | 0 dB | 3 dB |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During storage | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During transport | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | |
| Type of construction | Media module | Media module | Media module |
| Width | 60 mm | 60 mm | 60 mm |
| Height | 22 mm | 22 mm | 22 mm |
| Depth | 100 mm | 100 mm | 100 mm |
| Type of mounting for installation at media module slot | Yes | Yes | Yes |
| Net weight | 0.08 kg | 0.08 kg | 0.08 kg |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6GK5 992-2AP00-8AA0<br>MM992-2LH+ | 6GK5 992-2AQ00-8AA0<br>MM992-2ELH | 6GK5 992-2AS00-8AA0<br>MM992-2SFP |
|---|---|---|---|
| **Data transmission rate** | | | |
| Transmission rate 1 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 2 | 2 | 2 |
| Number of optical connections for fiber-optic cables | | | |
| • At 1000 Mbit/s | 2 | 2 | 2 |
| Design of optical connection for fiber-optic cables | | | |
| • At 1000 Mbit/s | SC port (single-mode up to 70 km) | SC port (single-mode up to 120 km) | SFP slot |
| Injectable optical power referred to 1 mW | | | |
| • of the transmitter output | 0 dB ... 5 dB | 0 dB ... 5 dB | – |
| • of the receiver input, maximum | -3 dB | -3 dB | – |
| Minimum optical sensitivity referred to 1 mW of the receiver input | -23 dB | -30 dB | – |
| Minimum required attenuation factor of the FO transmission link | 8 dB | 8 dB | – |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During storage | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| • During transport | 0 … 70 °C | 0 … 70 °C | 0 … 70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | |
| Type of construction | Media module | Media module | SFP - slot |
| Width | 60 mm | 60 mm | 60 mm |
| Height | 22 mm | 22 mm | 22 mm |
| Depth | 100 mm | 100 mm | 100 mm |
| Net weight | 0.08 kg | 0.08 kg | 0.08 kg |
| Type of mounting for installation at media module slot | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For Ex zone of CSA and UL | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 | UL 1604 and UL 2279-15 (hazardous location), CSA C22.2 No. 213-M1987, Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

### ■ Technical specifications (continued)

| Order No. | 6GK5 991-1AD00-8AA0 | 6GK5 991-1AF00-8AA0 | 6GK5 991-1AE00-8AA0 |
|---|---|---|---|
| **Product type designation** | SFP991-1 | SFP991-1LH+ | SFP991-1LD |
| **Data transmission rate** | | | |
| Transmission rate 1 | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 1 | 1 | 1 |
| Number of optical connections for fiber-optic cables | | | |
| • At 100 Mbit/s | 1 | 1 | 1 |
| Design of optical connection for fiber-optic cables | | | |
| • At 100 Mbit/s | LC port (multi-mode up to 3 km) | LC port (single-mode up to 70 km) | LC port (single-mode up to 26 km) |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | |
| Type of construction | SFP - module | SFP - module | SFP - module |
| Width | 13 mm | 13 mm | 13 mm |
| Height | 12 mm | 12 mm | 12 mm |
| Depth | 57 mm | 57 mm | 57 mm |
| Net weight | 0.01 kg | 0.01 kg | 0.01 kg |
| Type of mounting for installation at media module slot | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |

■ **Technical specifications** (continued)

| Order No. | 6GK5 992-1AL00-8AA0 | 6GK5 992-1AM00-8AA0 | 6GK5 992-1AN00-8AA0 |
|---|---|---|---|
| **Product type designation** | SFP992-1 | SFP992-1LD | SFP992-1LH |
| **Data transmission rate** | | | |
| Transmission rate 1 | 1 000 Mbit/s | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 1 | 1 | 1 |
| Number of optical connections for fiber-optic cables | | | |
| • At 1000 Mbit/s | 1 | 1 | 1 |
| Design of optical connection for fiber-optic cables | | | |
| • At 1000 Mbit/s | LC port (multi-mode up to 0.75 km) | LC port (single-mode up to 10 km) | LC port (single-mode up to 40 km) |
| **Permissible ambient conditions** | | | |
| Ambient temperature | | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 | IP 20 |
| **Design, dimensions and weights** | | | |
| Type of construction | SFP - module | SFP - module | SFP - module |
| Width | 13 mm | 13 mm | 13 mm |
| Height | 12 mm | 12 mm | 12 mm |
| Depth | 57 mm | 57 mm | 57 mm |
| Net weight | 0.01 kg | 0.01 kg | 0.01 kg |
| Type of mounting for installation at media module slot | Yes | Yes | Yes |
| **Standards, specifications, approvals** | | | |
| Standard | | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes | Yes |
| • C-Tick | Yes | Yes | Yes |

**Media modules for
modular SCALANCE X-300 managed**

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## ■ Technical specifications (continued)

| Order No. | 6GK5 992-1AP00-8AA0 | 6GK5 992-1AQ00-8AA0 |
|---|---|---|
| **Product type designation** | **SFP992-1LH+** | **SFP992-1ELH** |
| **Data transmission rate** | | |
| Transmission rate 1 | 1 000 Mbit/s | 1 000 Mbit/s |
| **Interfaces** | | |
| Maximum number of electrical/optical connections for network components or terminal equipment | 1 | 1 |
| Number of optical connections for fiber-optic cables | | |
| • At 1000 Mbit/s | 1 | 1 |
| Design of optical connection for fiber-optic cables | | |
| • At 1000 Mbit/s | LC port (single-mode up to 70 km) | LC port (single-mode up to 120 km) |
| **Permissible ambient conditions** | | |
| Ambient temperature | | |
| • During operating phase | -40 … +70 °C | -40 … +70 °C |
| • During storage | -40 … +80 °C | -40 … +80 °C |
| • During transport | -40 … +80 °C | -40 … +80 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % | 95 % |
| IP degree of protection | IP 20 | IP 20 |
| **Design, dimensions and weights** | | |
| Type of construction | SFP - module | SFP - module |
| Width | 13 mm | 13 mm |
| Height | 12 mm | 12 mm |
| Depth | 57 mm | 57 mm |
| Net weight | 0.01 kg | 0.01 kg |
| Type of mounting for installation at media module slot | Yes | Yes |
| **Standards, specifications, approvals** | | |
| Standard | | |
| • For EMC from FM | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 | FM3611: Class 1, Divison 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4 |
| • For Ex zone | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X | EN 60079-0: 2006, EN60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X |
| • For CSA and UL safety | UL 60950-1, CSA C22.2 No. 60950-1 | UL 60950-1, CSA C22.2 No. 60950-1 |
| • For emitted interference | EN 61000-6-4 | EN 61000-6-4 |
| • For noise immunity | EN 61000-6-2 | EN 61000-6-2 |
| Certificate of suitability | EN 61000-6-2, EN 61000-6-4 | EN 61000-6-2, EN 61000-6-4 |
| • CE mark | Yes | Yes |
| • C-Tick | Yes | Yes |

| Ordering data | Order No. |
|---|---|
| **Electrical media modules** | |
| **with 2 x 10/100/1000 Mbit/s RJ45 ports, electrical** | |
| • MM992-2CUC with retaining sleeve | **6GK5 992-2GA00-8AA0** |
| • MM992-2CU without retaining sleeve | **6GK5 992-2SA00-8AA0** |
| **Fiber optic modules** | |
| **with 2 x 100 Mbit/s BFOC ports, optical** | |
| • MM991-2 multi-mode, glass, up to 3 km | **6GK5 991-2AB00-8AA0** |
| • MM991-2LD single-mode, glass, up to 26 km | **6GK5 991-2AC00-8AA0** |
| **with 2 x 100 Mbit/s SC ports, optical** | |
| • MM991-2 multi-mode, glass, up to 3 km | **6GK5 991-2AD00-8AA0** |
| • MM991-2LD single-mode, glass, up to 26 km | **6GK5 991-2AF00-8AA0** |
| • MM991-2LH+ single-mode, glass, up to 70 km | **6GK5 991-2AE00-8AA0** |
| **with 2 x 1000 Mbit/s SC ports, optical** | |
| • MM992-2 multi-mode, glass, up to 750 m | **6GK5 992-2AL00-8AA0** |
| • MM992-2LD single-mode, glass, up to 10 km | **6GK5 992-2AM00-8AA0** |
| • MM992-2LH single-mode, glass, up to 40 km | **6GK5 992-2AN00-8AA0** |
| • MM992-2LH+ single-mode, glass, up to 70 km | **6GK5 992-2AP00-8AA0** |
| • MM992-2ELH single-mode, glass, up to 120 km | **6GK5 992-2AQ00-8AA0** |
| **with 2 x 100/1000 Mbit/s for SFP pluggable transceiver, optical** | |
| • MM992-2SFP for SFP pluggable transceivers with 1 x 100 or 1 x 1000 Mbit/s multi-mode or single-mode, glass | **6GK5 992-2AS00-8AA0** |

| | Order No. |
|---|---|
| **SFP pluggable transceiver, optical** | |
| **with 1 x 100 Mbit/s LC port, optical** | |
| • SFP991-1 multi-mode, glass, up to 3 km | **6GK5 991-1AD00-8AA0** |
| • SFP991-1LD single-mode, glass, up to 26 km | **6GK5 991-1AF00-8AA0** |
| • SFP991-1LH+ single-mode, glass, up to 70 km | **6GK5 991-1AE00-8AA0** |
| **with 1 x 1000 Mbit/s LC port, optical** | |
| • SFP992-1 multi-mode, glass, up to 750 m | **6GK5 992-1AL00-8AA0** |
| • SFP992-1LD single-mode, glass, up to 10 km | **6GK5 992-1AM00-8AA0** |
| • SFP992-1LH single-mode, glass, up to 40 km | **6GK5 992-1AN00-8AA0** |
| • SFP992-1LH+ single-mode, glass, up to 70 km | **6GK5 992-1AP00-8AA0** |
| • SFP992-1ELH single-mode, glass, up to 120 km | **6GK5 992-1AQ00-8AA0** |

# PROFINET/Industrial Ethernet
## Industrial Ethernet switches/Media converters

**Media modules for
modular SCALANCE X-300 managed**

**2**

### Ordering data (continued)    Order No.

*Accessories*

**IE FC RJ45 Modular Outlet**

FastConnect RJ45 outlet
for Industrial Ethernet with
interface for replaceable insert;

- with insert 2FE;
  replaceable insert
  for 2 x 100 Mbit/s interfaces    **6GK1 901-1BE00-0AA1**

- with insert 1GE;
  replaceable insert
  for 1 x 1000 Mbit/s interfaces    **6GK1 901-1BE00-0AA2**

**IE FC TP standard cable GP
2 x 2 (Type A)**    6XV1 840-2AH10

4-core, shielded TP installation
cable for connection to IE
FC RJ45 outlet / IE FC RJ45 plug;
PROFINET-compliant;
with UL approval;
sold by the meter;
max. quantity 1000 m,
minimum order 20 m

**IE FC TP standard cable GP
4 x 2**    6XV1 870-2E

8-core, shielded TP installation
cable for connection to
IE FC RJ45 modular outlet
for universal application;
with UL approval;
sold by the meter;
max quantity 1000 m,
minimum order 20 m

**IE TP Cord RJ45/RJ45**

- 0.5 m    **6XV1 870-3QE50**
- 1 m    **6XV1 870-3QH10**
- 2 m    **6XV1 870-3QH20**
- 6 m    **6XV1 870-3QH60**
- 10 m    **6XV1 870-3QN10**

###    Order No.

**IE FC RJ45 Plug 180**

RJ45 plug-in connector for
Industrial Ethernet with a rugged
metal enclosure and integrated
insulation displacement contacts
for connecting Industrial Ethernet
FC installation cables;
with 180° cable outlet;
for network components and
CPs/CPUs with Industrial Ethernet
interface

- 1 pack = 1 unit    **6GK1 901-1BB10-2AA0**
- 1 pack = 10 units    **6GK1 901-1BB10-2AB0**
- 1 pack = 50 units    **6GK1 901-1BB10-2AE0**

**IE FC RJ45 Plug 4 x 2**

RJ45 plug connector for Industrial
Ethernet (10/100/1000 Mbit/s)
with a rugged metal enclosure
and integrated insulation
displacement contacts for
connecting Industrial Ethernet FC
installation cables;
180° cable outlet;
for network components and
CPs/CPUs with Industrial Ethernet
interface

- 1 pack = 1 unit    **6GK1 901-1BB11-2AA0**
- 1 pack = 10 units    **6GK1 901-1BB11-2AB0**
- 1 pack = 50 units    **6GK1 901-1BB11-2AE0**

**SIMATIC NET Manual Collection**    6GK1 975-1AA00-3AA0

Electronic manuals
for communication systems,
communication protocols,
and communication products;
on DVD;
German/English

### More information

To assist in selecting the right Industrial Ethernet switches as
well as configuration of modular variants, the Switch Selection
Tool is available as a free download:

http://support.automation.siemens.com/WW/view/en/39134641

## Overview

- The SOFTNET Security Client is a component of the industrial security concept for protecting automation devices and for security during data exchange between automation systems.
- VPN Client for programming devices, PCs and Notebooks in industrial environments;
  supports secure VPN client access to automation systems protected by SCALANCE S via LAN or even WAN (e.g. for remote maintenance via the Internet)

- Data transmission is protected against maloperation, eavesdropping/espionage and manipulation; communication can only take place between authenticated and authorized devices.
- Uses the IPSec mechanisms already tried and tested in the office sector for setting up and operating VPNs.
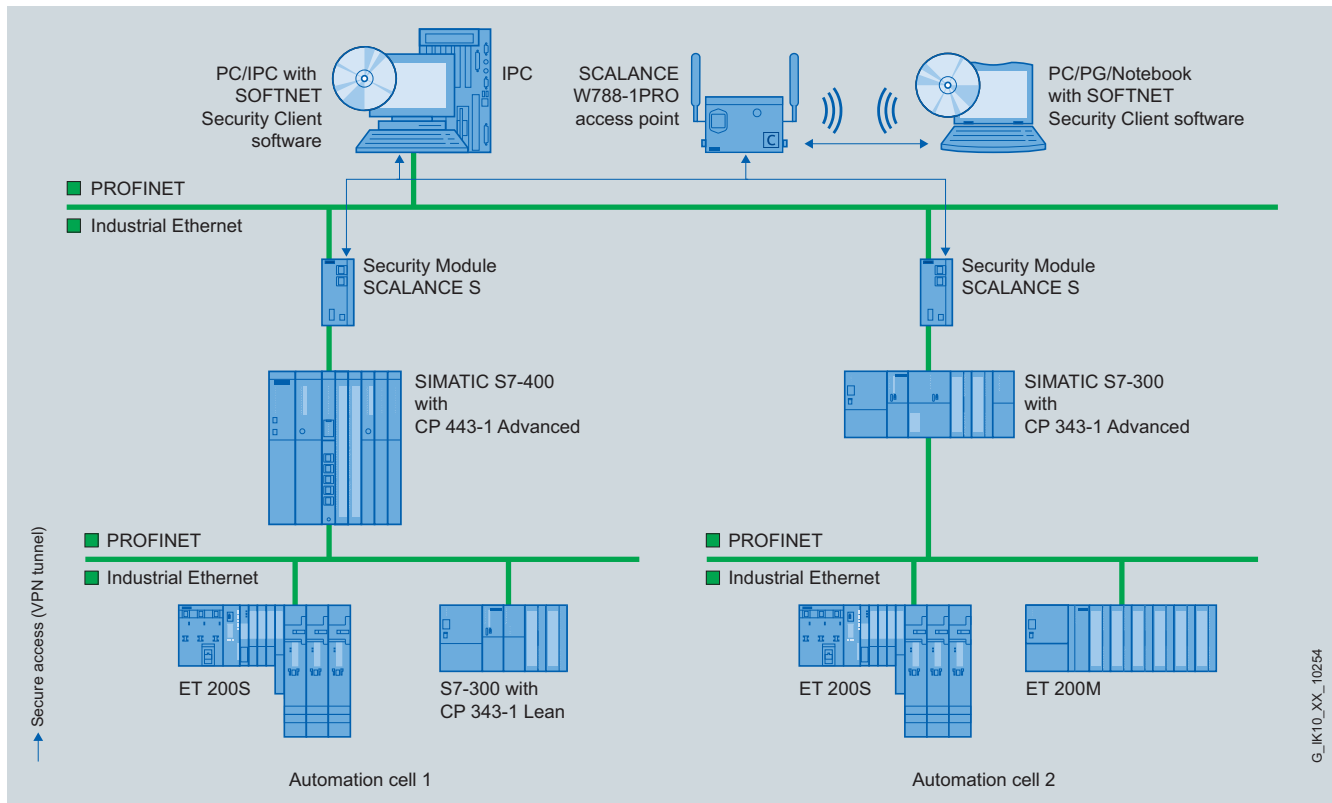


Secure access to automation cells protected by SCALANCE S612/S613 with SOFTNET Security Client

## Benefits



- Avoidance of system failures through exclusive access using approved programming devices or notebooks to automation devices or complete automation cells
- High flexibility when used on mobile PCs and use of the SOFTNET Security Client, as no hardware is required for safeguarding the communication
- Standardized configuration and integrated security concept for the automation system using SCALANCE S and SOFTNET Security Client without the need for specialized IT knowledge
- Protection of data transmission against spying and spoofing by means of certified standards.
- Considerable savings when used as remote control solution together with SCALANCE S compared to expensive service calls

## Application

Security modules of the SCALANCE S family are provided specially for use in automation, yet connect seamlessly with the security structures of the office and IT world. They offer security and meet the specific requirements of automation systems, such as easy upgrades of existing systems, simple installation and minimal downtimes in the event of a fault.

Depending on the respective security needs, various different security measures can be combined with one another. The SOFTNET Security Client allows programming devices, PCs and notebook computers access to network nodes or automation systems protected by SCALANCE S.

Note:
You can obtain support regarding the special features of WAN connections and company firewalls/security infrastructures from your local contact.
Technical advice on this subject is available from:

Industry Solutions Security Service
Customer Care Desk
Tel.: +49 (0)9131-7-28811
E-mail: professionalsupport@siemens.com

**SOFTNET Security Client**

**2**

## ■ Function

### Authentication

Each incoming item of data traffic is monitored and checked. As IP addresses can be falsified (IP spoofing), checking the IP address (of the client access) is not sufficient. In addition, Client PCs may have changing IP addresses. For this reason the authentication is performed by means of tried and tested VPN mechanisms.

### Data encryption

To protect the data traffic against espionage and manipulation secure encryption is necessary. This means that the data traffic remains incomprehensible to any eavesdropper in the network. To this end, SOFTNET Security Client sets up VPN tunnels based on IPSec to other SCALANCE S security modules.

### Performance data

- System requirements:
  Windows 2000 Professional (32 bit) + SP3, 4
  Windows XP Professional (32 bit) + SP1, 2

### Configuring

Using the associated configuration tool it is possible to handle setup and administration of security rules even without special IT knowledge. In the simplest case, only the SCALANCE S modules or SOFTNET security clients that are to communicate with one another are set up and configured. As soon as SOFTNET Security Client knows which automation device is to be accessed, a communication can be set up.

| ■ Ordering data | Order No. |
|---|---|
| **SOFTNET Security Client Edition 2008** | **6GK1 704-1VW02-0AA0** |
| Software for designing secure IP-based VPN connections from a programming device/PC to network segments which are secured by SCALANCE S; single license for 1 installation, runtime software (German/English), configuring tool (German/English) and electronic manual on CD-ROM (German/English/French/Italian/Spanish) for 32-bit Windows, XP Professional + SP1, SP2, SP3, Windows Vista Ultimate/Business + SP1 | |
| **SOFTNET Security Client Edition 2006** | **6GK1 704-1VW01-0AA0** |
| Software for designing secure IP-based VPN connections from programming device/PC to network segments which are secured by SCALANCE S; single license for 1 installation, runtime software (German/English), configuring tool (German/English) and electronic manual on CD-ROM (German/English/French/Italian/Spanish) for 32-bit Windows, XP Professional + SP1, 2 Windows 2000 Professional + SP3, 4 | |

| ■ Ordering data (continued) | Order No. |
|---|---|
| *SCALANCE S Industrial Security Modules* | |
| For protection of programmable controllers and automation networks, and for safeguarding of industrial communication; configuring tool and electronic manual on CD-ROM German, English, French, Italian, Spanish | |
| **SCALANCE S612** | **6GK5 612-0BA00-2AA3** |
| Uses Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 32 devices, up to 64 VPN tunnels simultaneously | |
| **SCALANCE S613** | **6GK5 613-0BA00-2AA3** |
| Uses Stateful Inspection Firewall to protect network segments against unauthorized access; protects up to 64 devices, up to 128 VPN tunnels simultaneously expanded temperature range from -20 °C … +70 °C | |
| *Accessories* | |
| **IE FC RJ45 Plug 180** | |
| RJ45 plug-in connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 unit | **6GK1 901-1BB10-2AA0** |
| • 1 pack = 10 units | **6GK1 901-1BB10-2AB0** |
| • 1 pack = 50 units | **6GK1 901-1BB10-2AE0** |
| **EGPRS router MD741-1** | **6NH9 741-1AA00** |
| For wireless IP communication from Ethernet-based programmable controllers via GSM mobile radio networks; integrated firewall and VPN router (IPsec); quad band GSM; EGPRS Multislot Class 12 | |
| **ANT794-4MR antenna** | **6NH9 860-1AA00** |
| Quad band antenna for MD720-3 and MD741-1, omnidirectional with 5 m cable | |

**2**

## Overview



- The clever compact solution
- With 10 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - max. 3 communication modules (CM)

## Design

The compact CPU 1211C has:

- 3 device versions with different power supply and control voltages.
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders.
  With 300 mA output current also for use as load power supply.
- 6 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking)).
- 4 integrated digital outputs, either 24 V DC or relay.
- 2 integrated analog inputs 0 to 10 V.
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz.
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz.
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 3 fast counters (100 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with separate inputs or for connecting incremental encoders.
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals.
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

| Device versions | | | | |
|---|---|---|---|---|
| Version | Supply voltage | Input voltage DI | Output voltage DO | Output current |
| • DC/DC/DC | 24 V DC | 24 V DC | 24 V DC | 0.5 A, transistor |
| • DC/DC/relay | 24 V DC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |
| • AC/DC/relay | 85 … 264 V AC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1211C**

**2**

### Technical specifications

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | CPU 1211C AC/DC/Relay | CPU 1211C DC/DC/Relay | CPU 1211C DC/DC/DC |
| **Product status** | | | |
| associated programming package | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 |
| **Supply voltages** | | | |
| Rated value | | | |
| • 24 V DC | | Yes | Yes |
| • Permissible range, lower limit (DC) | | 20.4 V | 20.4 V |
| • Permissible range, upper limit (DC) | | 28.8 V | 28.8 V |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| • Permissible range, lower limit (AC) | 85 V | | |
| • Permissible range, upper limit (AC) | 264 V | | |
| • Permissible frequency range, lower limit | 47 Hz | | |
| • Permissible frequency range, upper limit | 63 Hz | | |
| Load voltage L+ | | | |
| • Rated value (DC) | | 24 V | 24 V |
| • permissible range, lower limit (DC) | | 20.4 V | 20.4 V |
| • permissible range, upper limit (DC) | | 28.8 V | 28.8 V |
| **Current consumption** | | | |
| Current consumption (rated value) | 60 mA at 120 V AC 30 mA at 240 V AC | 300 mA; Typical | 300 mA; Typical |
| Current consumption, max. | 180 mA at 120 V AC 90 mA at 240 V AC | 0.9 A; 24 V DC | 0.9 A; 24 V DC |
| Inrush current, max. | 20 A; at 264 V | 12 A; 28.8 V DC | 12 A; 28.8 V DC |
| Current output to backplane bus (DC 5 V), max. | 750 mA; max. 5 V DC for SM and CM | 750 mA; max. 5 V DC for SM and CM | 750 mA; max. 5 V DC for SM and CM |
| **Current consumption/power loss** | | | |
| Power loss, typ. | 10 W | 8 W | 8 W |
| Usable for user data/Options | 25 kbyte | 25 kbyte | 25 kbyte |
| RAM | | | |
| • integrated | 25 kbyte | 25 kbyte | 25 kbyte |
| • expandable | No | No | No |
| Backup | | | |
| • present | Yes; entire project maintenance-free in the integral EEPROM | Yes; entire project maintenance-free in the integral EEPROM | Yes; entire project maintenance-free in the integral EEPROM |
| • without battery | Yes | Yes | Yes |
| **CPU/blocks** | | | |
| OB | | | |
| • Number, max. | Limited only by RAM for code | Limited only by RAM for code | Limited only by RAM for code |

**2**

## Technical specifications (continued)

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1211C AC/DC/Relay** | **CPU 1211C DC/DC/Relay** | **CPU 1211C DC/DC/DC** |
| **CPU/processing times** | | | |
| for bit operations, min. | 0.1 µs; / instruction | 0.1 µs; / instruction | 0.1 µs; / instruction |
| for word operations, min. | 12 µs; / instruction | 12 µs; / instruction | 12 µs; / instruction |
| for floating point arithmetic, min. | 18 µs; / instruction | 18 µs; / instruction | 18 µs; / instruction |
| **Data areas and their remanence** | | | |
| Retentive data area in total (incl. times, counters, flags), max. | 2 048 byte | 2 048 byte | 2 048 byte |
| Flag | | | |
| • Number, max. | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area |
| **Address area** | | | |
| I/O address area | | | |
| • I/O address area, overall | 1024 bytes for inputs / 1024 bytes for outputs | 1024 bytes for inputs / 1024 bytes for outputs | 1024 bytes for inputs / 1024 bytes for outputs |
| • overall | 1 024 byte | 1 024 byte | 1 024 byte |
| • Outputs | 1 024 byte | 1 024 byte | 1 024 byte |
| Process image | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| Digital channels | | | |
| • Integrated channels (DI) | 6 | 6 | 6 |
| • Integrated channels (DO) | 4 | 4 | 4 |
| Analog channels | | | |
| • Integrated channels (AI) | 2 | 2 | 2 |
| • Integrated channels (AO) | 0 | 0 | 0 |
| **Hardware config.** | | | |
| Number of modules per system, max. | 3 communication modules, 1 signal board | 3 communication modules, 1 signal board | 3 communication modules, 1 signal board |
| **Time** | | | |
| Clock | | | |
| • Hardware clock (real-time clock) | Yes | Yes | Yes |
| • Backup time | 240 h; Typical | 240 h; Typical | 240 h; Typical |
| • Deviation per day, max. | 60 s/month at 25 °C | 60 s/month at 25 °C | 60 s/month at 25 °C |
| **Test commissioning functions** | | | |
| Status/control | | | |
| • Status/control variable | Yes | Yes | Yes |
| • Variables | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters |
| Forcing | | | |
| • Forcing | Yes | Yes | Yes |
| **Communication functions** | | | |
| S7 communication | | | |
| • supported | Yes | Yes | Yes |
| • as server | Yes | Yes | Yes |
| Open IE communication | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| Number of connections | | | |
| • overall | 15; dynamically | 15; dynamically | 15; dynamically |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1211C**

**2**

■ **Technical specifications** (continued)

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1211C AC/DC/Relay** | **CPU 1211C DC/DC/Relay** | **CPU 1211C DC/DC/DC** |
| **1st interface** | | | |
| Type of interface | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| isolated | Yes | Yes | Yes |
| automatic detection of transmission speed | Yes | Yes | Yes |
| Autonegotiation | Yes | Yes | Yes |
| Autocrossover | Yes | Yes | Yes |
| **CPU/programming** | | | |
| Configuration software | | | |
| • STEP 7 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 |
| Programming language | | | |
| • LAD | Yes | Yes | Yes |
| • CSF | Yes | Yes | Yes |
| Cycle time monitoring | | | |
| • adjustable | Yes | Yes | Yes |
| **Digital inputs** | | | |
| Number of digital inputs | 6; Integrated | 6; Integrated | 6; Integrated |
| • of which, inputs usable for technological functions | 3; HSC (High Speed Counting) | 3; HSC (High Speed Counting) | 3; HSC (High Speed Counting) |
| m/p-reading | Yes | Yes | Yes |
| Number of simultanneously controllable inputs | | | |
| • all mounting positions<br>  - Number of simultaneously controllable inputs, up to 40 °C | 6 | 6 | 6 |
| Input voltage | | | |
| • Rated value, DC | 24 V | 24 V | 24 V |
| • for signal "0" | 5 V DC at 1 mA | 5 V DC at 1 mA | 5 V DC at 1 mA |
| • for signal "1" | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA |
| Input current | | | |
| • for signal "1", typ. | 1 mA | 1 mA | 1 mA |
| Input delay (for rated value of input voltage) | | | |
| • for standard inputs<br>  - programmable | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four |
|   - at " to "1", min. | 0.2 ms | 0.2 ms | 0.2 ms |
|   - at "0" to "1", max. | 12.8 ms | 12.8 ms | 12.8 ms |
| • for interrupt inputs<br>  - programmable | Yes | Yes | Yes |
| • for counter/technological functions<br>  - programmable | Single phase: 3 at 100 kHz, differential: 3 at 80 kHz | Single phase: 3 at 100 kHz, differential: 3 at 80 kHz | Single phase: 3 at 100 kHz, differential: 3 at 80 kHz |
| Cable length | | | |
| • cable length, shielded, max. | 500 m; 50 m for technological functions | 500 m; 50 m for technological functions | 500 m; 50 m for technological functions |
| • Cable length unshielded, max. | 300 m; For technological functions: No | 300 m; For technological functions: No | 300 m; For technological functions: No |

**2**

## ■ Technical specifications (continued)

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | CPU 1211C AC/DC/Relay | CPU 1211C DC/DC/Relay | CPU 1211C DC/DC/DC |
| **Digital outputs** | | | |
| Number of digital outputs | 4; Relay | 4; Relay | 4 |
| • of which, high-speed outputs | | | 2; 100 kHz Pulse Train Output |
| Short-circuit protection | No; to be provided externally | No; to be provided externally | No; to be provided externally |
| Limitation of inductive shutdown voltage to | | | L+ (-48 V) |
| Switching capacity of the outputs | | | |
| • with resistive load, max. | 2 A | 2 A | 0.5 A |
| • on lamp load, max. | 30 W DC; 200 W AC | 30 W DC; 200 W AC | 5 W |
| Output voltage | | | |
| • for signal "0" (DC), max. | | | 0.1 V; with 10k ohms load |
| • for signal "1", min. | | | 20 V |
| Output current | | | |
| • for signal "1" rated value | | | 0.5 A |
| • for signal "0" residual current, max. | | | 0.1 mA |
| Output delay with resistive load | | | |
| • 0 to "1", max. | 10 ms; max. | 10 ms; max. | 1 µs; max. |
| • 1 to "0", max. | 10 ms; max. | 10 ms; max. | 5 µs; max. |
| Parallel switching of 2 outputs | | | |
| • for increased power | No | No | |
| Switching frequency | | | |
| • of the pulse outputs, with resistive load, max. | 1 Hz | 1 Hz | 100 kHz |
| Cable length | | | |
| • Cable length, shielded, max. | 500 m | 500 m | 500 m |
| • Cable length unshielded, max. | 150 m | 150 m | 150 m |
| **Relay outputs** | | | |
| Number of relay outputs | 4 | 4 | |
| Number of operating cycles | mechanically 10 million, at rated load voltage 100,000 | mechanically 10 million, at rated load voltage 100,000 | |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| Number of analog inputs for voltage/current measurement | 2 | 2 | |
| cable length, shielded, max. | 100 m; twisted and shielded | 100 m; twisted and shielded | 100 m; twisted and shielded |
| • Voltage | Yes | Yes | Yes |
| Input ranges (rated values), voltages | | | |
| • 0 to +10 V | Yes | Yes | Yes |
| • Input resistance (0 to 10 V) | ≥100k ohms | ≥100k ohms | ≥100k ohms |
| **Analog value creation** | | | |
| Integration and conversion time/resolution per channel | | | |
| • Resolution with overload area (bit including sign), max. | 10 bit | 10 bit | 10 bit |
| • Integration time, parameterizable | Yes | Yes | Yes |
| • Conversion time (per channel) | 625 µs | 625 µs | 625 µs |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1211C**

■ **Technical specifications** (continued)

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1211C AC/DC/Relay** | **CPU 1211C DC/DC/Relay** | **CPU 1211C DC/DC/DC** |
| **Encoder supply** | | | |
| 24 V encoder supply | | | |
| • 24 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V |
| **Encoder** | | | |
| Connectable encoders | | | |
| • 2-wire BEROS | Yes | Yes | Yes |
| **Integrated functions** | | | |
| Number of counters | 3 | 3 | 3 |
| Counter frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | | 2 |
| Limit frequency (pulse) | | | 100 kHz |
| **Isolation** | | | |
| Galvanic isolation, digital inputs | | | |
| • galvanic isolation, digital inputs | 500 V AC for 1 minute | 500 V AC for 1 minute | 500 V AC for 1 minute |
| • between the channels, in groups of | 1 | 1 | 1 |
| Isolation, digital outputs | | | |
| • Galvanic isolation, digital outputs | Yes; Relays | Relays | Yes |
| • between the channels | No | No | No |
| • between the channels, in groups of | 1 | 1 | 1 |
| **Permissible potential difference** | | | |
| between different circuits | 500 V DC between 24 V DC and 5 V DC | 500 V DC between 24 V DC and 5 V DC | 500 V DC between 24 V DC and 5 V DC |
| **EMC** | | | |
| Interference immunity against discharge of static electricity | | | |
| • Interference immunity against discharge of static electricity to IEC 61000-4-2 | Yes | Yes | Yes |
| Interference immunity to cable-borne interference | | | |
| • on the supply lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • Interference immunity on signal lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • on the supply lines to IEC 61000-4-5 | Yes | Yes | Yes |
| • Interference immunity against high frequency radiation to IEC 61000-4-6 | Yes | Yes | Yes |
| • Emission of radio interferences to EN 55 011 (limit class A) | Yes; Group 1 | Yes; Group 1 | Yes; Group 1 |
| • Emission of radio interference to EN 55 011 (limit class B) | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

### CPU 1211C

**2**

■ **Technical specifications** (continued)

| Order No. | 6ES7 211-1BD30-0XB0 | 6ES7 211-1HD30-0XB0 | 6ES7 211-1AD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1211C AC/DC/Relay** | **CPU 1211C DC/DC/Relay** | **CPU 1211C DC/DC/DC** |
| **Environmental requirements** | | | |
| Operating termperature | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 45 °C | 45 °C | 45 °C |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 55 °C | 55 °C | 55 °C |
| Storage/transport temperature | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| Air pressure | | | |
| • Operation, min. | 795 hPa | 795 hPa | 795 hPa |
| • Operation, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| • Storage/transport, min. | 660 hPa | 660 hPa | 660 hPa |
| • Storage/transport, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| Relative humidity | | | |
| • Operation, max. | 95 %; no condensation | 95 %; no condensation | 95 %; no condensation |
| Vibrations | | | |
| • Vibrations | 2G wall mounting, 1G DIN rail | 2G wall mounting, 1G DIN rail | 2G wall mounting, 1G DIN rail |
| • Operation checked according to IEC 60068-2-6 | Yes | Yes | Yes |
| Shock test | | | |
| • checked according to IEC 60068-2-27 | Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms | Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms | Yes; IEC 68, Part 2-27 half-sine: Strength of the shock 15 g (peak value), duration 11 ms |
| **Degree of protection** | | | |
| IP 20 | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | |
| CE symbol | Yes | Yes | Yes |
| C-TICK | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes |
| **Dimensions and weight** | | | |
| Dimensions and weight | | | |
| • Width | 90 mm | 90 mm | 90 mm |
| • Height | 100 mm | 100 mm | 100 mm |
| • Depth | 75 mm | 75 mm | 75 mm |
| Weight | | | |
| • Weight, approx. | 420 g | 380 g | 370 g |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1211C**

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **CPU 1211C** | | **SCALANCE XB004-1** | **6GK5 004-1BD00-1AB2** |
| **Compact CPU, AC/DC/relay**; integrated program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz | **6ES7 211-1BD30-0XB0** | 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (multi-mode, glass), up to 3 km | |
| | | **FO Standard Cable GP 50/125** | |
| | | Glass fiber-optic cable, pre-assembled with 4 SC connectors | |
| | | • 80 m | **6XV1 873-6AN80** |
| | | • 100 m | **6XV1 873-6AT10** |
| | | • 150 m | **6XV1 873-6AT15** |
| **Compact CPU, DC/DC/DC**; integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7 211-1AD30-0XB0** | • 200 m | **6XV1 873-6AT20** |
| | | • 300 m | **6XV1 873-6AT30** |
| | | **SB 1223 signal board** | **6ES7 223-0BD30-0XB0** |
| | | 2 inputs, 24 V DC, IEC type 1 current sinking; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | |
| | | **SB 1232 signal board** | **6ES7 232-4HA30-0XB0** |
| | | 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | |
| | | **Simulator (optional)** | |
| | | 8 input switches, for CPU 1211C / CPU 1212C | **6ES7 274-1XF30-0XA0** |
| **Compact CPU, DC/DC/relay**; integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules and 1 signal board; digital inputs can be used as HSC at 100 kHz | **6ES7 211-1HD30-0XB0** | **SIMATIC Memory Card (optional)** | |
| | | • 2 MB | **6ES7 954 -8LB00-0AA0** |
| | | • 24 MB | **6ES7 954 -8LF00-0AA0** |
| | | **S7-1200 automation system, System Manual** | |
| | | For SIMATIC S7-1200 and STEP 7 Basic | |
| | | • German | **6ES7 298-8FA30-8AH0** |
| | | • English | **6ES7 298-8FA30-8BH0** |
| **CSM 1277 compact switch module** | **6GK7 277-1AA00-0AA0** | **STEP 7 Basic engineering software** | |
| Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM | | *Target system:* SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation | |
| **IE TP Cord RJ45/RJ45** | | | |
| TP cable 4 x 2 with two RJ45 plugs | | | |
| • 0.5 m | **6XV1 870-3QE50** | | |
| • 1 m | **6XV1 870-3QH10** | • Single license | **6ES7 822-0AA00-0YA0** |
| • 2 m | **6XV1 870-3QH20** | • STEP 7 Basic Software Update Service, 1 year | **6ES7 822-0AA00-0YL0** |
| • 6 m | **6XV1 870-3QH60** | | |
| • 10 m | **6XV1 870-3QN10** | | |

## More information

### Brochures

Information material for downloading can be found in the Internet:

http://www.siemens.com/simatic/printmaterial

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

### CPU 1212C

**2**

## ■ Overview



- The superior compact solution
- With 14 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - 2 signal modules (SM)
  - Max. 3 communication modules (CM)

## ■ Design

The compact CPU 1212C has:

- 3 device versions with different power supply and control voltages
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders.
  With 300 mA output current also for use as load power supply
- 8 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking))
- 6 integrated digital outputs, either 24 V DC or relay
- 2 integrated analog inputs 0 to 10 V
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 4 fast counters (3 with max. 100 kHz; 1 with max. 30 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Expansion by a wide range of analog and digital input and output signals via signal modules
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

| **Device versions** | | | | |
|---|---|---|---|---|
| Version | Supply voltage | Input voltage DI | Output voltage DO | Output current |
| • DC/DC/DC | 24 V DC | 24 V DC | 24 V DC | 0.5 A, transistor |
| • DC/DC/relay | 24 V DC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |
| • AC/DC/relay | 85 … 264 V AC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1212C**

■ **Technical specifications**

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | CPU 1212C AC/DC/Relay | CPU 1212C DC/DC/DC | CPU 1212C AC/DC/Relay |
| **Product status** | | | |
| associated programming package | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 |
| **Supply voltages** | | | |
| Rated value | | | |
| • 24 V DC | | Yes | Yes |
| • Permissible range, lower limit (DC) | | 20.4 V | 20.4 V |
| • Permissible range, upper limit (DC) | | 28.8 V | 28.8 V |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| • Permissible range, lower limit (AC) | 85 V | | |
| • Permissible range, upper limit (AC) | 264 V | | |
| • Permissible frequency range, lower limit | 47 Hz | | |
| • Permissible frequency range, upper limit | 63 Hz | | |
| Load voltage L+ | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • permissible range, lower limit (DC) | 5 V | 20.4 V | 5 V |
| • permissible range, upper limit (DC) | 250 V | 28.8 V | 250 V |
| **Current consumption** | | | |
| Current consumption (rated value) | 80 mA at 120 V AC<br>40 mA at 240 V AC | | 175 mA; Typical |
| Current consumption, max. | 240 mA at 120 V AC<br>120 mA at 240 V AC | 1.2 A; 24 V DC | 1.2 A; 24 V DC |
| Inrush current, max. | 20 A; At 264 V | 12 A; 28.8 V DC | 12 A; At 28.8 V |
| Current output to backplane bus (DC 5 V), max. | 1 000 mA;<br>max. 5 V DC for SM and CM | 1 000 mA;<br>max. 5 V DC for SM and CM | 1 000 mA;<br>max. 5 V DC for SM and CM |
| **Current consumption/power loss** | | | |
| Power loss, typ. | 11 W | 9 W | 9 W |
| Usable for user data/Options | 25 kbyte | 25 kbyte | 25 kbyte |
| RAM | | | |
| • integrated | 25 kbyte | 25 kbyte | 25 kbyte |
| • expandable | No | No | No |
| Backup | | | |
| • present | Yes; entire project maintenance-free in the integral EEPROM | Yes; entire project maintenance-free in the integral EEPROM | Yes; entire project maintenance-free in the integral EEPROM |
| • without battery | Yes | Yes | Yes |
| **CPU/blocks** | | | |
| OB | | | |
| • Number, max. | Limited only by RAM for code | Limited only by RAM for code | Limited only by RAM for code |
| **CPU/processing times** | | | |
| for bit operations, min. | 0.1 µs; / instruction | 0.1 µs; / instruction | 0.1 µs; / instruction |
| for word operations, min. | 12 µs; / instruction | 12 µs; / instruction | 12 µs; / instruction |
| for floating point arithmetic, min. | 18 µs; / instruction | 18 µs; / instruction | 18 µs; / instruction |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1212C**

**2**

## ■ Technical specifications (continued)

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | CPU 1212C AC/DC/Relay | CPU 1212C DC/DC/DC | CPU 1212C AC/DC/Relay |
| **Data areas and their remanence** | | | |
| Retentive data area in total (incl. times, counters, flags), max. | 2 048 byte | 2 048 byte | 2 048 byte |
| Flag | | | |
| • Number, max. | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area | 4 kbyte; Size of bit memory address area |
| **Address area** | | | |
| I/O address area | | | |
| • I/O address area, overall | 1024 bytes for inputs / 1024 bytes for outputs | 1024 bytes for inputs / 1024 bytes for outputs | 1024 bytes for inputs / 1024 bytes for outputs |
| • overall | 1 024 byte | 1 024 byte | 1 024 byte |
| • Outputs | 1 024 byte | 1 024 byte | 1 024 byte |
| Process image | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| Digital channels | | | |
| • Integrated channels (DI) | 8 | 8 | 8 |
| • Integrated channels (DO) | 6 | 6 | 6 |
| Analog channels | | | |
| • Integrated channels (AI) | 2 | 2 | 2 |
| • Integrated channels (AO) | 0 | 0 | 0 |
| **Hardware config.** | | | |
| Number of modules per system, max. | 3 comm. modules, 1 signal board, 2 signal modules | 3 comm. modules, 1 signal board, 2 signal modules | 3 comm. modules, 1 signal board, 2 signal modules |
| **Time** | | | |
| Clock | | | |
| • Hardware clock (real-time clock) | Yes | Yes | Yes |
| • Backup time | 240 h; Typical | 240 h; Typical | 240 h; Typical |
| • Deviation per day, max. | 60s/month at 25 °C | 60s/month at 25 °C | 60s/month at 25 °C |
| **Test commissioning functions** | | | |
| Status/control | | | |
| • Status/control variable | Yes | Yes | Yes |
| • Variables | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters |
| Forcing | | | |
| • Forcing | Yes | Yes | Yes |
| **Communication functions** | | | |
| S7 communication | | | |
| • supported | Yes | Yes | Yes |
| • as server | Yes | Yes | Yes |
| Open IE communication | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| Number of connections | | | |
| • overall | 15; dynamically | 15; dynamically | 15; dynamically |
| **1st interface** | | | |
| Type of interface | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| isolated | Yes | Yes | Yes |
| automatic detection of transmission speed | Yes | Yes | Yes |
| Autonegotiation | Yes | Yes | Yes |
| Autocrossover | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1212C**

**2**

### Technical specifications (continued)

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1212C AC/DC/Relay** | **CPU 1212C DC/DC/DC** | **CPU 1212C AC/DC/Relay** |
| **CPU/programming** | | | |
| Configuration software | | | |
| • STEP 7 | STEP 7 Basic V10.5 | STEP 7 Basic V10.5 | STEP 7 Basic V10.5 |
| Programming language | | | |
| • LAD | Yes | Yes | Yes |
| • CSF | Yes | Yes | Yes |
| Cycle time monitoring | | | |
| • adjustable | Yes | Yes | Yes |
| **Digital inputs** | | | |
| Number of digital inputs | 8; Integrated | 8; Integrated | 8; Integrated |
| • of which, inputs usable for technological functions | 4; HSC (High Speed Counting) | 4; HSC (High Speed Counting) | 4; HSC (High Speed Counting) |
| m/p-reading | Yes | Yes | Yes |
| Number of simultaneously controllable inputs | | | |
| • all mounting positions | | | |
| - Number of simultaneously controllable inputs, up to 40 °C | 8 | 8 | 8 |
| Input voltage | | | |
| • Rated value, DC | 24 V | 24 V | 24 V |
| • for signal "0" | 5 V DC at 1 mA | 5 V DC at 1 mA | 5 V DC at 1 mA |
| • for signal "1" | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA |
| Input current | | | |
| • for signal "1", typ. | 1 mA | 1 mA | 1 mA |
| Input delay (for rated value of input voltage) | | | |
| • for standard inputs | | | |
| - programmable | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four |
| - at " to "1", min. | 0.2 ms | 0.2 ms | 0.2 ms |
| - at "0" to "1", max. | 12.8 ms | 12.8 ms | 12.8 ms |
| • for interrupt inputs | | | |
| - programmable | Yes | Yes | Yes |
| • for counter/t echnological functions | | | |
| - programmable | Single phase: 3 at 100 kHz & 1 at 30 kHz differential: 3 at 80 kHz 1 at 30 kHz | Single phase: 3 at 100 kHz & 1 at 30 kHz differential: 3 at 80 kHz 1 at 30 kHz | Single phase: 3 at 100 kHz & 1 at 30 kHz differential: 3 at 80 kHz 1 at 30 kHz |
| Cable length | | | |
| • cable length, shielded, max. | 500 m; 50 m for technological functions | 500 m; 50 m for technological functions | 500 m; 5 0 m for technological functions |
| • Cable length unshielded, max. | 300 m; For technological functions: No | 300 m; For technological functions: No | 300 m; For technological functions: No |
| **Digital outputs** | | | |
| Number of digital outputs | 6; Relay | 6 | 6; Relay |
| • of which, high-speed outputs | | 2; 100 kHz Pulse Train Output | |
| Short-circuit protection | No; to be provided externally | No; to be provided externally | No; to be provided externally |
| Limitation of inductive shutdown voltage to | | L+ (-48 V) | |
| Switching capacity of the outputs | | | |
| • with resistive load, max. | 2 A | 0.5 A | 2 A |
| • on lamp load, max. | 30 W DC; 200 W AC | 5 W | 30 W DC; 200 W AC |
| Output voltage | | | |
| • for signal "0" (DC), max. | | 0.1 V; with 10k ohms load | |
| • for signal "1", min. | | 20 V | |
| Output current | | | |
| • for signal "1" rated value | | 0.5 A | |
| • for signal "0" residual current, max. | | 0.1 mA | |

**2**

## Technical specifications (continued)

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1212C AC/DC/Relay** | **CPU 1212C DC/DC/DC** | **CPU 1212C AC/DC/Relay** |
| Output delay with resistive load | | | |
| • 0 to "1", max. | 10 ms; max. | 1 µs | 10 ms; max. |
| • 1 to "0", max. | 10 ms; max. | 5 µs | 10 ms; max. |
| Switching frequency | | | |
| • of the pulse outputs, with resistive load, max. | 1 Hz | 100 kHz | 1 Hz |
| Cable length | | | |
| • Cable length, shielded, max. | 500 m | 500 m | 500 m |
| • Cable length unshielded, max. | 150 m | 150 m | 150 m |
| **Relay outputs** | | | |
| Number of relay outputs | 6 | | 6 |
| Number of operating cycles | mechanically 10 million, at rated load voltage 100,000 | | mechanically 10 million, at rated load voltage 100,000 |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| cable length, shielded, max. | 100 m; twisted and shielded | 100 m; twisted and shielded | 100 m; twisted and shielded |
| • Voltage | Yes | Yes | Yes |
| Input ranges (rated values), voltages | | | |
| • 0 to +10 V | Yes | Yes | Yes |
| • Input resistance (0 to 10 V) | ≥100k ohms | ≥100k ohms | ≥100k ohms |
| **Analog value creation** | | | |
| Integration and conversion time/resolution per channel | | | |
| • Resolution with overload area (bit including sign), max. | 10 bit | 10 bit | 10 bit |
| • Integration time, parameterizable | Yes | Yes | Yes |
| • Conversion time (per channel) | 625 µs | 625 µs | 625 µs |
| **Encoder supply** | | | |
| 24 V encoder supply | | | |
| • 24 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V |
| **Encoder** | | | |
| Connectable encoders | | | |
| • 2-wire BEROS | Yes | Yes | Yes |
| **Integrated Functions** | | | |
| Number of counters | 4 | 4 | 4 |
| Counter frequency (counter) max. | 100 Hz | 100 Hz | 100 Hz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 2 | |
| Limit frequency (pulse) | | 100 kHz | |
| **Isolation** | | | |
| Galvanic isolation, digital inputs | | | |
| • galvanic isolation, digital inputs | 500 V AC for 1 minute | 500 V AC for 1 minute | 500 V AC for 1 minute |
| • between the channels, in groups of | 1 | 1 | 1 |
| Isolation, digital outputs | | | |
| • Galvanic isolation, digital outputs | Yes; Relay | Yes | Relay |
| • between the channels | No | No | No |
| • between the channels, in groups of | 2 | 2 | 1 |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

### CPU 1212C

**2**

**Technical specifications** (continued)

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1212C AC/DC/Relay** | **CPU 1212C DC/DC/DC** | **CPU 1212C AC/DC/Relay** |
| **Permissible potential difference** | | | |
| between different circuits | 500 V DC between 24 V DC and 5 V DC | 500 V DC between 24 V DC and 5 V DC | 500 V DC between 24 V DC and 5 V DC |
| **EMC** | | | |
| Interference immunity against discharge of static electricity | | | |
| • Interference immunity against discharge of static electricity to IEC 61000-4-2 | Yes | Yes | Yes |
| Interference immunity to cable-borne interference | | | |
| • on the supply lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • Interference immunity on signal lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • on the supply lines to IEC 61000-4-5 | Yes | Yes | Yes |
| • Interference immunity against high frequency radiation to IEC 61000-4-6 | Yes | Yes | Yes |
| • Emission of radio interferences to EN 55 011 (limit class A) | Yes; Group 1 | Yes; Group 1 | Yes; Group 1 |
| • Emission of radio interference to EN 55 011 (limit class B) | Yes | Yes | Yes |
| **Environmental requirements** | | | |
| Operating termperature | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 45 °C | 45 °C | 45 °C |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 55 °C | 55 °C | 55 °C |
| Storage/transport temperature | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| Air pressure | | | |
| • Operation, min. | 795 hPa | 795 hPa | 795 hPa |
| • Operation, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| • Storage/transport, min. | 660 hPa | 660 hPa | 660 hPa |
| • Storage/transport, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| Relative humidity | | | |
| • Operation, max. | 95 %; no condensation | 95 %; no condensation | 95 %; no condensation |
| Vibrations | | | |
| • Vibrations | 2G panel mount, 1G DIN rail mount | 2G panel mount, 1G DIN rail mount | 2G panel mount, 1G DIN rail mount |
| • Operation checked according to IEC 60068-2-6 | Yes | Yes | Yes |
| Shock test | | | |
| • checked according to IEC 60068-2-27 | Yes; 15 G, 11 ms pulse, 6 shocks in each of 3 axes | Yes; 15 G, 11 ms pulse, 6 shocks in each of 3 axes | Yes; 15 G, 11 ms pulse, 6 shocks in each of 3 axes |

**2**

■ **Technical specifications** (continued)

| Order No. | 6ES7 212-1BD30-0XB0 | 6ES7 212-1AD30-0XB0 | 6ES7 212-1HD30-0XB0 |
|---|---|---|---|
| **Product type designation** | **CPU 1212C AC/DC/Relay** | **CPU 1212C DC/DC/DC** | **CPU 1212C AC/DC/Relay** |
| **Degree of protection** | | | |
| IP 20 | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | |
| CE symbol | Yes | Yes | Yes |
| C-TICK | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes |
| **Dimensions and weight** | | | |
| Dimensions and weight | | | |
| • Width | 90 mm | 90 mm | 90 mm |
| • Height | 100 mm | 100 mm | 100 mm |
| • Depth | 75 mm | 75 mm | 75 mm |
| Weight | | | |
| • Weight, approx. | 425 g | 370 g | 385 g |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1212C**

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **CPU 1212C** | | **SCALANCE XB004-1** | **6GK5 004-1BD00-1AB2** |
| **Compact CPU, AC/DC/relay;** integral program/data memory 25 KB, load memory 1 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 μs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz | **6ES7 212-1BD30-0XB0** | 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (multi-mode, glass), up to 3 km | |
| | | **FO Standard Cable GP 50/125** Glass fiber-optic cable, pre-assembled with 4 SC connectors | |
| | | • 80 m | **6XV1 873-6AN80** |
| | | • 100 m | **6XV1 873-6AT10** |
| | | • 150 m | **6XV1 873-6AT15** |
| | | • 200 m | **6XV1 873-6AT20** |
| | | • 300 m | **6XV1 873-6AT30** |
| **Compact CPU, DC/DC/DC;** integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 μs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | **6ES7 212-1AD30-0XB0** | **SB 1223 signal board** 2 inputs, 24 V DC, IEC type 1 current sinking; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | **6ES7 223-0BD30-0XB0** |
| | | **SB 1232 signal board** 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | **6ES7 232-4HA30-0XB0** |
| | | **Simulator (optional)** 8 input switches, for CPU 1211C / CPU 1212C | **6ES7 274-1XF30-0XA0** |
| | | **SIMATIC Memory Card (optional)** | |
| | | • 2 MB | **6ES7 954 -8LB00-0AA0** |
| | | • 24 MB | **6ES7 954 -8LF00-0AA0** |
| **Compact CPU, DC/DC/relay;** integrated program/data memory 25 KB, load memory 1 MB; power supply 24 V DC; Boolean execution times 0.1 μs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 2 signal modules, and 1 signal board; digital inputs can be used as HSC at 100 kHz | **6ES7 212-1HD30-0XB0** | **Starter box CPU 1212C AC/DC/relay** Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simulator, STEP 7 BASIC CD, manual CD, info material, in Systainer | **6ES7 212-1BD30-4YB0** |
| | | **S7-1200 automation system, System Manual** For SIMATIC S7-1200 and STEP 7 Basic | |
| | | • German | **6ES7 298-8FA30-8AH0** |
| | | • English | **6ES7 298-8FA30-8BH0** |
| **CSM 1277 compact switch module** Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM | **6GK7 277-1AA00-0AA0** | **STEP 7 Basic engineering software** *Target system:* SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation | |
| **IE TP Cord RJ45/RJ45** TP cable 4 x 2 with two RJ45 plugs | | | |
| • 0.5 m | **6XV1 870-3QE50** | | |
| • 1 m | **6XV1 870-3QH10** | | |
| • 2 m | **6XV1 870-3QH20** | • Single license | **6ES7 822-0AA00-0YA0** |
| • 6 m | **6XV1 870-3QH60** | • STEP 7 Basic Software Update Service, 1 year | **6ES7 822-0AA00-0YL0** |
| • 10 m | **6XV1 870-3QN10** | | |

## More information

### Brochures

Information material for downloading can be found in the Internet:

http://www.siemens.com/simatic/printmaterial

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

## Overview



- The compact high-performance CPU
- With 24 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - 8 signal modules (SM)
  - max. 3 communication modules (CM)

## Design

The compact CPU 1214C has:

- 3 device versions with different power supply and control voltages
- Integrated power supply either as wide-range AC or DC power supply (85 to 264 V AC or 24 V DC)
- Integrated 24 V encoder/load current supply:
  For direct connection of sensors and encoders. With 400 mA, the output current can also be used as load power supply
- 14 integrated digital inputs 24 V DC (current sinking/current sourcing (IEC type 1 current sinking))
- 10 integrated digital outputs, either 24 V DC or relay
- 2 integrated analog inputs 0 to 10 V
- 2 pulse outputs (PTO) with a frequency of up to 100 kHz
- Pulse-width modulated outputs (PWM) with a frequency of up to 100 kHz
- Integrated Ethernet interface (TCP/IP native, ISO-on-TCP)
- 6 fast counters (3 with max. 100 kHz; 3 with max. 30 kHz), with parameterizable enable and reset inputs, can be used simultaneously as up and down counters with 2 separate inputs or for connecting incremental encoders
- Expansion by additional communication interfaces, e.g. RS485 or RS232
- Expansion by analog or digital signals directly on the CPU via signal board (with retention of CPU mounting dimensions)
- Expansion by a wide range of analog and digital input and output signals via signal modules
- Optional memory expansion (SIMATIC Memory Card)
- PID controller with auto-tuning functionality
- Integral real-time clock
- Interrupt inputs:
  For extremely fast response to rising or falling edges of process signals
- Removable terminals on all modules
- Simulator (optional):
  For simulating the integrated inputs and for testing the user program.

### Device versions

| Version | Supply voltage | Input voltage DI | Output voltage DO | Output current |
|---|---|---|---|---|
| • DC/DC/DC | 24 V DC | 24 V DC | 24 V DC | 0.5 A, transistor |
| • DC/DC/relay | 24 V DC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |
| • AC/DC/relay | 85 … 264 V AC | 24 V DC | 5 … 30 V DC / 5 … 250 V AC | 2 A; 30 W DC / 200 W AC |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

■ **Technical specifications**

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| **Product status** | | | |
| associated programming package | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 |
| **Supply voltage** | | | |
| Rated value | | | |
| • 24 V DC | | Yes | Yes |
| • Permissible range, lower limit (DC) | | 20.4 V | 20.4 V |
| • Permissible range, upper limit (DC) | | 28.8 V | 28.8 V |
| • 120 V AC | Yes | | |
| • 230 V AC | Yes | | |
| • Permissible range, lower limit (AC) | 85 V | | |
| • Permissible range, upper limit (AC) | 264 V | | |
| • Permissible frequency range, lower limit | 47 Hz | | |
| • Permissible frequency range, upper limit | 63 Hz | | |
| Load voltage L+ | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V |
| • permissible range, lower limit (DC) | 5 V | 20.4 V | 5 V |
| • permissible range, upper limit (DC) | 250 V | 28.8 V | 250 V |
| **Current consumption** | | | |
| Current consumption (rated value) | 100 mA at 120 V AC<br>50 mA at 240 V AC | | 500 mA; Typical |
| Current consumption, max. | 300 mA at 120 V AC<br>150 mA at 240 V AC | 1.5 A; 24 V DC | 1.2 A; 24 V DC |
| Inrush current, max. | 20 A; At 264 V | 12 A; At 28.8 V | 12 A; At 28.8 V |
| Current output to backplane bus (DC 5 V), max. | 1 600 mA;<br>5 V DC max. for SM and CM | 1 600 mA;<br>5 V DC max. for SM and CM | 1 600 mA;<br>5 V DC max. for SM and CM |
| **Current consumption/power loss** | | | |
| Power loss, typ. | 14 W | 12 W | 12 W |
| Usable for user data/Options | 50 kbyte | 50 kbyte | 50 Kibyte |
| RAM | | | |
| • integrated | 50 kbyte | 50 kbyte | 50 kbyte |
| • expandable | No | No | No |
| Backup | | | |
| • present | entire project maintenancefree in the integral EEPROM | entire project maintenancefree in the integral EEPROM | entire project maintenancefree in the integral EEPROM |
| • without battery | Yes | Yes | Yes |
| **CPU/blocks** | | | |
| OB | | | |
| • Number, max. | Limited only by RAM for code | Limited only by RAM for code | Limited only by RAM for code |
| **CPU/processing times** | | | |
| for bit operations, min. | 0.1 µs; / instruction | 0.1 µs; / instruction | 0.1 µs; / instruction |
| for word operations, min. | 12 µs; / instruction | 12 µs; / instruction | 12 µs; / instruction |
| for floating point arithmetic, min. | 18 µs; / instruction | 18 µs; / instruction | 18 µs; / instruction |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| **Data areas and their remanence** | | | |
| Retentive data area in total (incl. times, counters, flags), max. | 2 048 byte | 2 048 byte | 2 048 byte |
| Flag | | | |
| • Number, max. | 8 kbyte;<br>Size of bit memory address area | 8 kbyte;<br>Size of bit memory address area | 8 kbyte;<br>Size of bit memory address area |
| **Address area** | | | |
| I/O address area | | | |
| • I/O address area, overall | 1024 byte for inputs /<br>1024 byte for outputs | 1024 byte for inputs /<br>1024 byte for outputs | 1024 byte for inputs /<br>1024 byte for outputs |
| • overall | 1 024 byte | 1 024 byte | 1 024 byte |
| • Outputs | 1 024 byte | 1 024 byte | 1 024 byte |
| Process image | | | |
| • Inputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| • Outputs, adjustable | 1 kbyte | 1 kbyte | 1 kbyte |
| Digital channels | | | |
| • Integrated channels (DI) | 14 | 14 | 14 |
| • Integrated channels (DO) | 10 | 10 | 10 |
| Analog channels | | | |
| • Integrated channels (AI) | 2 | 2 | 2 |
| • Integrated channels (AO) | 0 | 0 | 0 |
| **Hardware config.** | | | |
| Number of modules per system, max. | 3 comm. modules, 1 signal board, 8 signal modules | 3 comm. modules, 1 signal board, 8 signal modules | 3 comm. modules, 1 signal board, 8 signal modules |
| **Time** | | | |
| Clock | | | |
| • Hardware clock (real-time clock) | Yes | Yes | Yes |
| • Backup time | 240 h; Typical | 240 h; Typical | 240 h; Typical |
| • Deviation per day, max. | 60s/month at 25 °C | 60s/month at 25 °C | 60s/month at 25 °C |
| **Test commissioning functions** | | | |
| Status/control | | | |
| • Status/control variable | Yes | Yes | Yes |
| • Variables | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters | Inputs/outputs, memory bits, DB, distributed I/Os, timers, counters |
| Forcing | | | |
| • Forcing | Yes | Yes | Yes |
| **Communication functions** | | | |
| S7 communication | | | |
| • supported | Yes | Yes | Yes |
| • as server | Yes | Yes | Yes |
| Open IE communication | | | |
| • TCP/IP | Yes | Yes | Yes |
| • ISO-on-TCP (RFC1006) | Yes | Yes | Yes |
| Number of connections | | | |
| • overall | 15; dynamically | 15; dynamically | 15; dynamically |
| **1st interface** | | | |
| Type of interface | PROFINET | PROFINET | PROFINET |
| Physics | Ethernet | Ethernet | Ethernet |
| isolated | Yes | Yes | Yes |
| automatic detection of transmission speed | Yes | Yes | Yes |
| Autonegotiation | Yes | Yes | Yes |
| Autocrossover | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| **CPU/programming** | | | |
| Configuration software | | | |
| • STEP 7 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 | STEP 7 Basic V 10.5 |
| Programming language | | | |
| • LAD | Yes | Yes | Yes |
| • CSF | Yes | Yes | Yes |
| Cycle time monitoring | | | |
| • adjustable | Yes | Yes | Yes |
| **Digital inputs** | | | |
| Number of digital inputs | 14; Integrated | 14; Integrated | 14; Integrated |
| • of which, inputs usable for technological functions | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) | 6; HSC (High Speed Counting) |
| m/p-reading | Yes | Yes | Yes |
| Number of simultanneously controllable inputs | | | |
| • all mounting positions | | | |
| - Number of simultaneously controllable inputs, up to 40 °C | 14 | 14 | 14 |
| Input voltage | | | |
| • Rated value, DC | 24 V | 24 V | 24 V |
| • for signal "0" | 5 V DC at 1 mA | 5 V DC at 1 mA | 5 V DC at 1 mA |
| • for signal "1" | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA | 15 V DC at 2.5 mA |
| Input current | | | |
| • for signal "1", typ. | 1 mA | 1 mA | 1 mA |
| Input delay (for rated value of input voltage) | | | |
| • for standard inputs | | | |
| - programmable | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four | 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, and 12.8 ms, selectable in groups of four |
| - at " to "1", min. | 0.2 ms | 0.2 ms | 0.2 ms |
| - at "0" to "1", max. | 12.8 ms | 12.8 ms | 12.8 ms |
| • for interrupt inputs | | | |
| - programmable | Yes | Yes | Yes |
| • for counter/ technological functions | | | |
| - programmable | Single phase: 3 at 100 kHz & 3 at 30 kHz differential: 3 at 80 kHz & 3 at 30 kHz | Single phase: 3 at 100 kHz & 3 at 30 kHz differential: 3 at 80 kHz & 3 at 30 kHz | Single phase: 3 at 100 kHz & 3 at 30 kHz differential: 3 at 80 kHz & 3 at 30 kHz |
| Cable length | | | |
| • Cable length, shielded, max. | 500 m; 50 m for technological functions | 500 m; 50 m for technological functions | 500 m; 50 m for technological functions |
| • Cable length unshielded, max. | 300 m; For technological functions: No | 300 m; For technological functions: No | 300 m; For technological functions: No |
| **Digital outputs** | | | |
| Number of digital outputs | 10; Relay | 10 | 10; Relay |
| • of which, high-speed outputs | | 2; 100 kHz Pulse Train Output | |
| Short-circuit protection | No; to be provided externally | No; to be provided externally | No; to be provided externally |
| Limitation of inductive shutdown voltage to | | L+ (-48 V) | |
| Switching capacity of the outputs | | | |
| • with resistive load, max. | 2 A | 0.5 A | 2 A |
| • on lamp load, max. | 30 W DC; 200 W AC | 5 W | 30 W DC; 200 W AC |
| Output voltage | | | |
| • for signal "1", min. | | 20 V | |
| Output current | | | |
| • for signal "1" rated value | | 0.5 A | |
| • for signal "0" residual current, max. | | 0.1 mA | |

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| Output delay with resistive load | | | |
| • 0 to "1", max. | 10 ms; max. | 1 µs | 10 ms; max. |
| • 1 to "0", max. | 10 ms; max. | 5 µs | 10 ms; max. |
| Switching frequency | | | |
| • of the pulse outputs,<br>with resistive load, max. | 1 Hz | 100 kHz | 1 Hz |
| Cable length | | | |
| • Cable length, shielded, max. | 500 m | 500 m | 500 m |
| • Cable length unshielded, max. | 150 m | 150 m | 150 m |
| **Relay outputs** | | | |
| Number of relay outputs | 10 | | 10 |
| Number of operating cycles | mechanically 10 million,<br>at rated load voltage 100,000 | | mechanically 10 million,<br>at rated load voltage 100,000 |
| **Analog inputs** | | | |
| Number of analog inputs | 2 | 2 | 2 |
| Cable length, shielded, max. | 100 m; twisted and shielded | 100 m; twisted and shielded | 100 m; twisted and shielded |
| • Voltage | Yes | Yes | Yes |
| Input ranges (rated values), volt-ages | | | |
| • 0 to +10 V | Yes | Yes | Yes |
| • Input resistance (0 to 10 V) | ≥100 KOhm | ≥100 KOhm | ≥100 KOhm |
| **Analog value creation** | | | |
| Integration and conversion time/resolution per channel | | | |
| • Resolution with overload area<br>(bit including sign), max. | 10 bit | 10 bit | 10 bit |
| • Integration time, parameterizable | Yes | Yes | Yes |
| • Conversion time (per channel) | 625 µs | 625 µs | 625 µs |
| **Encoder supply** | | | |
| 24 V encoder supply | | | |
| • 24 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V | permissible range: 20.4 to 28.8 V |
| **Encoder** | | | |
| Connectable encoders | | | |
| • 2-wire BEROS | Yes | Yes | Yes |
| **Integrated Functions** | | | |
| Number of counters | 6 | 6 | 6 |
| Counter frequency (counter) max. | 100 kHz | 100 kHz | 100 kHz |
| Frequency meter | Yes | Yes | Yes |
| controlled positioning | Yes | Yes | Yes |
| PID controller | Yes | Yes | Yes |
| Number of alarm inputs | 4 | 4 | 4 |
| Number of pulse outputs | | 2 | |
| Limit frequency (pulse) | | 100 kHz | |
| **Isolation** | | | |
| Galvanic isolation, digital inputs | | | |
| • galvanic isolation, digital inputs | 500 V AC for 1 minute | 500 V AC for 1 minute | 500 V AC for 1 minute |
| • between the channels,<br>in groups of | 1 | 1 | 1 |
| Isolation, digital outputs | | | |
| • Galvanic isolation, digital outputs | Relay | Yes | Relay |
| • between the channels | No | No | No |
| • between the channels,<br>in groups of | 2 | 2 | 1 |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| **Permissible potential difference** | | | |
| between different circuits | 500 V DC<br>between 24 V DC and 5 V DC | 500 V DC<br>between 24 V DC and 5 V DC | 500 VDC<br>between 24 V DC and 5 V DC |
| **EMC** | | | |
| Interference immunity against discharge of static electricity | | | |
| • Interference immunity against discharge of static electricity to IEC 61000-4-2 | Yes | Yes | Yes |
| Interference immunity to cable-borne interference | | | |
| • on the supply lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • Interference immunity on signal lines to IEC 61000-4-4 | Yes | Yes | Yes |
| • on the supply lines to IEC 61000-4-5 | Yes | Yes | Yes |
| • Interference immunity against high frequency radiation to IEC 61000-4-6 | Yes | Yes | Yes |
| • Emission of radio interferences to EN 55 011 (limit class A) | Yes; Group 1 | Yes; Group 1 | Yes; Group 1 |
| • Emission of radio interference to EN 55 011 (limit class B) | Yes | Yes | Yes |
| **Environmental requirements** | | | |
| Operating termperature | | | |
| • min. | 0 °C | 0 °C | 0 °C |
| • max. | 55 °C | 55 °C | 55 °C |
| • vertical installation, min. | 0 °C | 0 °C | 0 °C |
| • vertical installation, max. | 45 °C | 45 °C | 45 °C |
| • horizontal installation, min. | 0 °C | 0 °C | 0 °C |
| • horizontal installation, max. | 55 °C | 55 °C | 55 °C |
| Storage/transport temperature | | | |
| • min. | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C |
| Air pressure | | | |
| • Operation, min. | 795 hPa | 795 hPa | 795 hPa |
| • Operation, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| • Storage/transport, min. | 660 hPa | 660 hPa | 660 hPa |
| • Storage/transport, max. | 1 080 hPa | 1 080 hPa | 1 080 hPa |
| Relative humidity | | | |
| • Operation, max. | 95 %; no condensation | 95 %; no condensation | 95 %; no condensation |
| Vibrations | | | |
| • Vibrations | 2G panel mount, 1G DIN rail mount | 2G panel mount, 1G DIN rail mount | 2G panel mount, 1G DIN rail mount |
| • Operation checked according to IEC 60068-2-6 | Yes | Yes | Yes |
| Shock test | | | |
| • checked according to IEC 60068-2-27 | Yes; 15 G, 11 ms pulse,<br>6 shocks in each of 3 axes | Yes; 15 G, 11 ms pulse,<br>6 shocks in each of 3 axes | Yes; 15 G, 11 ms pulse,<br>6 shocks in each of 3 axes |

**2**

■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6ES7 214-1BE30-0XB0<br>CPU 1214C AC/DC/Relay | 6ES7 214-1AE30-0XB0<br>CPU 1214C DC/DC/DC | 6ES7 214-1HE30-0XB0<br>CPU 1214C DC/DC/Relay |
|---|---|---|---|
| **Degree of protection** | | | |
| IP 20 | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | |
| CE symbol | Yes | Yes | Yes |
| C-TICK | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes |
| **Dimensions and weight** | | | |
| Dimensions and weight | | | |
| • Width | 110 mm | 110 mm | 110 mm |
| • Height | 100 mm | 100 mm | 100 mm |
| • Depth | 75 mm | 75 mm | 75 mm |
| Weight | | | |
| • Weight, approx. | 455 g | 415 g | 435 g |

# PROFINET/Industrial Ethernet
## SIMATIC S7-1200 modular controllers

**CPU 1214C**

**2**

| Ordering data | Order No. |
|---|---|
| **CPU 1214C** | |
| **Compact CPU, AC/DC/relay**; integral program/data memory 50 KB, load memory 2 MB; wide-range power supply 85 ... 264 V AC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules and 1 signal board; digital inputs can be used as HSC at 100 kHz | 6ES7 214-1BE30-0XB0 |
| **Compact CPU, DC/DC/DC**; integrated program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board; digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or pulse-width modulated outputs (PWM) at 100 kHz | 6ES7 214-1AE30-0XB0 |
| **Compact CPU, DC/DC/relay**; integrated program/data memory 50 KB, load memory 2 MB; power supply 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; expandable by up to 3 communication modules, 8 signal modules, and 1 signal board; digital inputs can be used as HSC at 100 kHz | 6ES7 214-1HE30-0XB0 |
| **CSM 1277 compact switch module** Unmanaged switch for connecting a SIMATIC S7-1200 and up to three further nodes to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, diagnostics on LEDs, S7-1200 module including electronic manual on CD-ROM | 6GK7 277-1AA00-0AA0 |
| **IE TP Cord RJ45/RJ45** TP cable 4 x 2 with two RJ45 plugs | |
| • 0.5 m | 6XV1 870-3QE50 |
| • 1 m | 6XV1 870-3QH10 |
| • 2 m | 6XV1 870-3QH20 |
| • 6 m | 6XV1 870-3QH60 |
| • 10 m | 6XV1 870-3QN10 |

| Ordering data | Order No. |
|---|---|
| **SCALANCE XB004-1** 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (multi-mode, glass), up to 3 km | 6GK5 004-1BD00-1AB2 |
| **FO Standard Cable GP 50/125** Glass fiber-optic cable, pre-assembled with 4 SC connectors | |
| • 80 m | 6XV1 873-6AN80 |
| • 100 m | 6XV1 873-6AT10 |
| • 150 m | 6XV1 873-6AT15 |
| • 200 m | 6XV1 873-6AT20 |
| • 300 m | 6XV1 873-6AT30 |
| **SB 1223 signal board** 2 inputs, 24 V DC, IEC type 1 current sinking; 2 24 V DC transistor outputs, 0.5 A, 5 W; can be used as HSC at up to 30 kHz | 6ES7 223-0BD30-0XB0 |
| **SB 1232 signal board** 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits | 6ES7 232-4HA30-0XB0 |
| **Simulator (optional)** 8 input switches, for CPU 1211C / CPU 1212C | 6ES7 274-1XH30-0XA0 |
| **SIMATIC Memory Card (optional)** | |
| • 2 Mbyte | 6ES7 954 -8LB00-0AA0 |
| • 24 Mbyte | 6ES7 954 -8LF00-0AA0 |
| **S7-1200 automation system, System Manual** For SIMATIC S7-1200 and STEP 7 Basic | |
| • German | 6ES7 298-8FA30-8AH0 |
| • English | 6ES7 298-8FA30-8BH0 |
| **STEP 7 Basic engineering software** *Target system:* SIMATIC S7-1200 controllers and the associated I/O. The WinCC Basic which is included permits configuration of the SIMATIC Basic Panels *Requirement:* MS Windows XP SP3 / MS Windows Vista SP1 *Type of delivery:* German, English, with online documentation | |
| • Single license | 6ES7 822-0AA00-0YA0 |
| • STEP 7 Basic Software Update Service, 1 year | 6ES7 822-0AA00-0YL0 |

■ **More information**

*Brochures*

Information material for downloading can be found in the Internet:

http://www.siemens.com/simatic/printmaterial

**2**

## ◼ Overview SIPLUS CPU 1211C



- The clever compact solution
- With 10 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - max. 3 communication modules (CM)

|  | **SIPLUS CPU 1211C** | | |
|---|---|---|---|
| **Order No.** | **6AG1 211-1BD30-2XB0**<br>**6AG1 211-1BD30-5XB0** | **6AG1 211-1AD30-2XB0**<br>**6AG1 211-1AD30-5XB0** | **6AG1 211-1HD30-2XB0**<br>**6AG1 211-1HD30-5XB0** |
| **Order No. based on** | **6ES7 211-1BD30-0XB0** | **6ES7 211-1AD30-0XB0** | **6ES7 211-1HD30-0XB0** |
| Ambient temperature range | -25 ... +55 °C/+70 °C; condensation permitted | | |
| Environmental conditions | With conformal coating.<br>Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere) | | |
| Technical specifications | The technical data are identical with those of the based-on modules. | | |

For further technical documentation on SIPLUS, see: http://www.siemens.com/siplus-techdoku

## ◼ Overview SIPLUS CPU 1212C



- The superior compact solution
- With 14 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - 2 signal modules (SM)
  - max. 3 communication modules (CM)

|  | **SIPLUS CPU 1212C** | | |
|---|---|---|---|
| **Order No.** | **6AG1 212-1BD30-2XB0**<br>**6AG1 212-1BD30-5XB0** | **6AG1 212-1AD30-2XB0**<br>**6AG1 212-1AD30-5XB0** | **6AG1 212-1HD30-2XB0**<br>**6AG1 212-1HD30-5XB0** |
| **Order No. based on** | **6ES7 212-1BD30-0XB0** | **6ES7 212-1AD30-0XB0** | **6ES7 212-1HD30-0XB0** |
| Ambient temperature range | -25 ... +55 °C/+70 °C; condensation permitted | | |
| Environmental conditions | With conformal coating.<br>Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere) | | |
| Technical specifications | The technical data are identical with those of the based-on modules. | | |

For further technical documentation on SIPLUS, see: http://www.siemens.com/siplus-techdoku

# PROFINET/Industrial Ethernet
## SIPLUS S7-1200 modular controllers

### SIPLUS CPU 1211C, CPU 1212C, CPU 1214C

**2**

■ **Overview SIPLUS CPU 1214C**



- The compact high-performance CPU
- With 24 integral input/outputs
- Expandable by:
  - 1 signal board (SB)
  - 8 signal modules (SM)
  - max. 3 communication modules (CM)

| | SIPLUS CPU 1214C | | |
|---|---|---|---|
| Order No. | 6AG1 214-1BE30-2XB0<br>6AG1 214-1BE30-5XB0 | 6AG1 214-1AE30-2XB0<br>6AG1 214-1AE30-5XB0 | 6AG1 214-1HE30-2XB0<br>6AG1 214-1HE30-5XB0 |
| Order No. based on | 6ES7 214-1BE30-0XB0 | 6ES7 214-1AE30-0XB0 | 6ES7 214-1HE30-0XB0 |
| Ambient temperature range | -25 ... +55 °C/+70 °C; condensation permitted | | |
| Environmental conditions | With conformal coating.<br>Suited for exceptional medial exposure (e.g. by chlorine sulfur atmosphere) | | |
| Technical specifications | The technical data are identical with those of the based-on modules. | | |

For further technical documentation on SIPLUS, see: http://www.siemens.com/siplus-techdoku

■ **Ordering data**     **Order No.**                       **Order No.**

**SIPLUS CPU 1211C** (extended temperature range and medium exposure)

**Compact CPU, AC/DC/relay**;
Integral program/data memory
25 KB, load memory 1 MB;
wide-range power supply
85 ... 264 V AC;
Boolean execution times 0.1 ms
per operation;
6 DI 4 DO (relays), 2 AI;
expandable by up to
3 communication modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used      **6AG1 211-1BD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used      **6AG1 211-1BD30-5XB0**

**SIPLUS CPU 1211C** (extended temperature range and medium exposure)

**Compact CPU, DC/DC/DC**;
integral program/data memory
25 KB, load memory 1 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation; 6 DI, 4 DO, 2 AI;
expandable by up to 3 communi-
cation modules and 1 signal board;
digital inputs can be used as HSC
at 100 kHz, 24 V DC digital outputs
can be used as pulse outputs (PTO)
or pulse-width modulated outputs
(PWM) with 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used      **6AG1 211-1AD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used      **6AG1 211-1AD30-5XB0**

**Compact CPU, DC/DC/relay**;
integral program/data memory
25 KB, load memory 1 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation; 6 DI, 4 DO (relays),
2 AI; expandable by up to
3 communication modules and
1 signal board; digital inputs can
be used as HSC at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used      **6AG1 211-1HD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used      **6AG1 211-1HD30-5XB0**

# PROFINET/Industrial Ethernet
## SIPLUS S7-1200 modular controllers

### SIPLUS CPU 1211C, CPU 1212C, CPU 1214C

**2**

| ■ Ordering data | Order No. | | Order No. |
|---|---|---|---|

**SIPLUS CPU 1212C** (extended temperature range and medium exposure)

**Compact CPU, AC/DC/relay**;
integral program/data memory
25 KB, load memory 1 MB;
wide-range power supply
85 ... 264 V AC;
Boolean execution times 0.1 ms
per operation; 8 DI, 6 DO (relays),
2 AI; expandable by up to
3 communication modules,
2 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 212-1BD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 212-1BD30-5XB0**

**Compact CPU, DC/DC/DC**;
integral program/data memory
25 KB, load memory 1 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation;
8 DI, 6 DO, 2 AI;
expandable by up to
3 communication modules,
2 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz, 24 V DC digital
outputs can be used as pulse
outputs (PTO) or pulse-width
modulated outputs (PWM) with
100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 212-1AD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 212-1AD30-5XB0**

**Compact CPU, DC/DC/relay**;
integral program/data memory
25 KB, load memory 1 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation;
8 DI, 6 DO (relays), 2 AI;
expandable by up to
3 communication modules,
2 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 212-1HD30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 212-1HD30-5XB0**

**SIPLUS CPU 1214C** (extended temperature range and medium exposure)

**Compact CPU, AC/DC/relay**;
integral program/data memory
50 KB, load memory 2 MB;
wide-range power supply
85 ... 264 V AC;
Boolean execution times 0.1 ms
per operation;
14 DI 10 DO (relays), 2 AI;
expandable by up to
3 communication modules,
8 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 214-1BE30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 214-1BE30-5XB0**

**Compact CPU, DC/DC/DC**;
integral program/data memory
50 KB, load memory 2 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation;
14 DI, 10 DO, 2 AI;
expandable by up to
3 communication modules,
8 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz, 24 V DC digital
outputs can be used as pulse
outputs (PTO) or pulse-width
modulated outputs (PWM) with
100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 214-1AE30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 214-1AE30-5XB0**

**Compact CPU, DC/DC/relay**;
integral program/data memory
50 KB, load memory 2 MB;
power supply 24 V DC;
Boolean execution times 0.1 ms
per operation;
14 DI, 10 DO (relays), 2 AI;
expandable by up to
3 communication modules,
8 signal modules and
1 signal board;
digital inputs can be used as HSC
at 100 kHz

- -25 ... +70 °C;
  Number of inputs and outputs
  that can be addressed at the
  same time is max. 50%;
  SB module cannot be used ......... **6AG1 214-1HE30-2XB0**

- -25 ... +55 °C;
  without limitations;
  SB module can be used ......... **6AG1 214-1HE30-5XB0**

**Accessories** ......... see S7-1200 CPUs,
pages 2/132, 2/140, 2/148

# PROFINET/Industrial Ethernet
## Embedded Automation

**SIMATIC S7-modular Embedded Controller**

### Overview

- Quick start in automation solutions with embedded PC platforms.
  - SIMATIC WinAC RTX or WinAC RTX F preinstalled on EC31 ready for switch-on
  - Prepared for use in a SIMATIC environment with PROFINET and Industrial Ethernet
  - Commissioning, as for S7-300, by automation specialists
  - Configuring and programming with SIMATIC STEP 7 over Industrial Ethernet
  - Optional visualization
- Modular expansion capability:
  Central expansion with
  - S7-300 I/O (SM modules of S7-300)
  - Expansion modules for additional PC interfaces, e.g. DVI-I, USB, Gigabit Ethernet networks and memory card slots, as well as PCI-104
- Rugged operation
  - Operation without a hard disk, based on flash disk and Windows XP embedded
  - Operation without a fan
- Flexibility of a PC-based automation environment
  - Free memory space on flash disk can be used for other PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX and WinAC RTX F (read-only in safety-related program part)
  - Connection option for USB devices
  - Memory capacity expandable using multimedia card
- Data retentivity for WinAC RTX and RTX F without uninterruptible power supply (UPS)

### Technical specifications

| Product type designation | 6ES7 677-1DD00-0BA0 SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0 S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0 S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0 S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0 S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| **Product status** | | | | | |
| HW product status | 04 | 04 | 04 | 04 | 04 |
| Firmware version | V1.3 | V1.3 | V1.3 | V1.3 | V1.3 |
| **PC configuration** | | | | | |
| Computer platform | SIMATIC S7-modular Embedded Controller | SIMATIC S7-modular Embedded Controller | SIMATIC S7-modular Embedded Controller | SIMATIC S7-modular Embedded Controller | SIMATIC S7-modular Embedded Controller |
| Processor selection | Intel Core Duo 1.2 GHz | Intel Core Duo 1.2 GHz | Intel Core Duo 1.2 GHz | Intel Core Duo 1.2 GHz | Intel Core Duo 1.2 GHz |
| Main memory | 1 GB RAM | 1 GB RAM | 1 GB RAM | 1 GB RAM | 1 GB RAM |
| Operating systems | Windows XP embedded SP2 FP2007 | Windows XP embedded SP2 FP2007 | Windows XP embedded SP2 FP2007 | Windows XP embedded SP2 FP2007 | Windows XP embedded SP2 FP2007 |
| **Power supply** | | | | | |
| Input voltage | | | | | |
| • Rated value, DC 24 V | Yes | Yes | Yes | Yes | Yes |
| • permissible range, lower limit (DC) | 20.4 V | 20.4 V | 20.4 V | 20.4 V | 20.4 V |
| • permissible range, upper limit (DC) | 28.8 V | 28.8 V | 28.8 V | 28.8 V | 28.8 V |
| Input current | | | | | |
| • Rated value at DC 24 V | 800 mA; without backplane bus and USB power supply | 800 mA; without backplane bus and USB power supply | 800 mA; without backplane bus and USB power supply | 800 mA; without backplane bus and USB power supply | 800 mA; without backplane bus and USB power supply |

**2**

## ■ Technical specifications (continued)

| Product type designation | 6ES7 677-1DD00-0BA0<br><br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br><br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br><br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br><br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br><br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| **Supply voltages** | | | | | |
| Power supply and voltage jumpering | | | | | |
| • Mains/voltage failure jumpering | 5 ms | 5 ms | 5 ms | 5 ms | 5 ms |
| Power loss, typ. | 34 W | 34 W | 34 W | 34 W | 34 W |
| **Memory** | | | | | |
| Memory type | 256 KB non-volatile memory for retentive data | 512 KB non-volatile memory for retentive data | 512 KB non-volatile memory for retentive data | 512 KB non-volatile memory for retentive data | 512 KB non-volatile memory for retentive data |
| **CPU/blocks** | | | | | |
| DB | | | | | |
| • Number, max. | | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each |
| • Size, max. | | 64 Kibyte | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| FB | | | | | |
| • Number, max. | | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each |
| • Size, max. | | 64 Kibyte | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| FC | | | | | |
| • Number, max. | | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each |
| • Size, max. | | 64 Kibyte | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| OB | | | | | |
| • Number, max. | | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each |
| • Size, max. | | 64 Kibyte | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| • Number of free cycle OBs | | 1; OB 1 | 1; OB 1 | 1; OB 1 | 1; OB 1 |
| • Number of time alarm OBs | | 1; OB 10 | 1; OB 10 | 1; OB 10 | 1; OB 10 |
| • Number of delay alarm OBs | | 1; OB 20 | 1; OB 20 | 1; OB 20 | 1; OB 20 |
| • Number of watchdog interrupts | | 9; OB 30 -38 | 9; OB 30 -38 | 9; OB 30 -38 | 9; OB 30 -38 |
| • Number of process alarm OBs | | 1; OB 40 | 1; OB 40 | 1; OB 40 | 1; OB 40 |
| • Number of startup OBs | | 2; OB 100, 102 | 2; OB 100, 102 | 2; OB 100, 102 | 2; OB 100, 102 |
| • Number of asynchronous error OBs | | 7; OB 80, 82-85, 86, 88 | 7; OB 80, 82-85, 86, 88 | 7; OB 80, 82-85, 86, 88 | 7; OB 80, 82-85, 86, 88 |
| • Number of synchronous error OBs | | 2; OB 121, 122 | 2; OB 121, 122 | 2; OB 121, 122 | 2; OB 121, 122 |
| Nesting depth | | | | | |
| • per priority class | | 24 | 24 | 24 | 24 |
| • additional within an error OB | | 24 | 24 | 24 | 24 |
| **CPU/processing times** | | | | | |
| for bit operations, min. | | 0.004 µs; typ. | 0.004 µs; typ. | 0.004 µs; typ. | 0.004 µs; typ. |
| for fixed point arithmetic, min. | | 0.003 µs; typ. | 0.003 µs; typ. | 0.003 µs; typ. | 0.003 µs; typ. |
| for floating point arithmetic, min. | | 0.004 µs; typ. | 0.004 µs; typ. | 0.004 µs; typ. | 0.004 µs; typ. |

# PROFINET/Industrial Ethernet
## Embedded Automation

**SIMATIC S7-modular Embedded Controller**

**■ Technical specifications** (continued)

**2**

| Product type designation | 6ES7 677-1DD00-0BA0<br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| **Times/counters and their remanence** | | | | | |
| S7 counter | | | | | |
| • Number | | 2 048 | 2 048 | 2 048 | 2 048 |
| • Remanence | | | | | |
| - adjustable | | Yes | Yes | Yes | Yes |
| - lower limit | | 0 | 0 | 0 | 0 |
| - upper limit | | 2 047 | 2 047 | 2 047 | 2 047 |
| - preset | | 8 | 8 | 8 | 8 |
| • Counting range | | | | | |
| - adjustable | | Yes | Yes | Yes | Yes |
| - lower limit | | 0 | 0 | 0 | 0 |
| - upper limit | | 999 | 999 | 999 | 999 |
| IEC counter | | | | | |
| • present | | Yes | Yes | Yes | Yes |
| • Type | | SFB | SFB | SFB | SFB |
| S7 times | | | | | |
| • Number | | 2 048 | 2 048 | 2 048 | 2 048 |
| • Remanence | | | | | |
| - adjustable | | Yes | Yes | Yes | Yes |
| - lower limit | | 0 | 0 | 0 | 0 |
| - upper limit | | 2 047 | 2 047 | 2 047 | 2 047 |
| • Time range | | | | | |
| - lower limit | | 10 ms | 10 ms | 10 ms | 10 ms |
| - upper limit | | 9 990 s | 9 990 s | 9 990 s | 9 990 s |
| IEC timer | | | | | |
| • present | | Yes | Yes | Yes | Yes |
| • Type | | SFB | SFB | SFB | SFB |
| **Data areas and their remanence** | | | | | |
| remanent data area, total | | 512 KByte | 512 KByte | 512 KByte | 512 KByte |
| Flag | | | | | |
| • Number, max. | | 16 Kibyte | 16 Kibyte | 16 Kibyte | 16 Kibyte |
| • of which remanent without battery | | MB 0 to MB 16383 | MB 0 to MB 16383 | MB 0 to MB 16383 | MB 0 to MB 16383 |
| • Remanence preset | | MB 0 to MB 15 | MB 0 to MB 15 | MB 0 to MB 15 | MB 0 to MB 15 |
| • Number of clock memories | | 8 | 8 | 8 | 8 |
| Data blocks | | | | | |
| • Number, max. | | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each | Max. code size and max. data size: 4 MB each |
| • Size, max. | | 64 Kibyte | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| **Address area** | | | | | |
| I/O address area | | | | | |
| • overall | | 16 Kibyte | 16 Kibyte | 16 Kibyte | 16 Kibyte |
| • Outputs | | 16 Kibyte | 16 Kibyte | 16 Kibyte | 16 Kibyte |
| • of which, distributed | | | | | |
| - Inputs | | 8 Kibyte | 8 Kibyte | 8 Kibyte | 8 Kibyte |
| - Outputs | | 8 Kibyte | 8 Kibyte | 8 Kibyte | 8 Kibyte |
| Process image | | | | | |
| • Inputs, adjustable | | 16 Kibyte | 8 Kibyte | 8 Kibyte | 8 Kibyte |
| • Outputs, adjustable | | 16 Kibyte | 8 Kibyte | 8 Kibyte | 8 Kibyte |
| • Inputs, preset | | 512 byte | 512 byte | 512 byte | 512 byte |
| • Outputs, preset | | 512 byte | 512 byte | 512 byte | 512 byte |

■ **Technical specifications** (continued)

| Product type designation | 6ES7 677-1DD00-0BA0<br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| Subprocess images | | | | | |
| • Number of subprocess images, max. | | 15 | 15 | 15 | 15 |
| Digital channels | | | | | |
| • Inputs | | 128 000 | 128 000 | 128 000 | 128 000 |
| • Outputs | | 128 000 | 128 000 | 128 000 | 128 000 |
| Analog channels | | | | | |
| • Inputs | | 8 000 | 8 000 | 8 000 | 8 000 |
| • Outputs | | 8 000 | 8 000 | 8 000 | 8 000 |
| **Time** | | | | | |
| Clock | | | | | |
| • Hardware clock (real-time clock) | | Yes; Resolution: 1 s | Yes; Resolution: 1 s | Yes; Resolution: 1 s | Yes; Resolution: 1 s |
| Clock synchronization | | | | | |
| • supports | | Yes | Yes | Yes | Yes |
| • on Ethernet via NTP | | Yes | Yes | Yes | Yes |
| **S7 message functions** | | | | | |
| Number of login stations for message functions, max. | | 62;<br>The alarm functions cannot currently be used for central bus modules | 62;<br>The alarm functions cannot currently be used for central bus modules | 62;<br>The alarm functions cannot currently be used for central bus modules | 62;<br>The alarm functions cannot currently be used for central bus modules |
| Process diagnostic messages | | Yes; Alarm_S | Yes; Alarm_S | Yes; Alarm_S | Yes; Alarm_S |
| **Test commissioning functions** | | | | | |
| Status/control | | | | | |
| • Status/control variable | | Yes | Yes | Yes | Yes |
| Forcing | | | | | |
| • Forcing | | No | No | No | No |
| Diagnostic buffer | | | | | |
| • present | | Yes | Yes | Yes | Yes |
| **Monitoring functions** | | | | | |
| Status LEDs | | Yes | Yes | Yes | Yes |
| **Communication functions** | | | | | |
| PG/OP communication | | Yes | Yes | Yes | Yes |
| Global data communication | | | | | |
| • supported | | No | No | No | No |
| S7 basic communication | | | | | |
| • supported | | No | No | No | No |
| S7 communication | | | | | |
| • supported | | Yes | Yes | Yes | Yes |
| • as server | | Yes | Yes | Yes | Yes |
| • as client | | Yes | Yes | Yes | Yes |
| Open IE communication | | | | | |
| • TCP/IP | | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks |
| - Number of connections, max. | | 32 | 32 | 32 | 32 |
| - Data length, max. | | 8 192 byte | 8 192 byte | 8 192 byte | 8 192 byte |
| • ISO-on-TCP (RFC1006) | | No | No | No | No |
| • UDP | | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks | Yes; via integrated PROFINET interface (X1) and loadable function blocks |
| - Number of connections, max. | | 32 | 32 | 32 | 32 |
| - Data length, max. | | 1 472 byte | 1 472 byte | 1 472 byte | 1 472 byte |

# PROFINET/Industrial Ethernet
## Embedded Automation

**SIMATIC S7-modular Embedded Controller**

■ **Technical specifications** (continued)

| Product type designation | 6ES7 677-1DD00-0BA0<br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| Number of connections | | | | | |
| • overall | | 64 | 64 | 64 | 64 |
| • usable for PG communication | | | | | |
| - reserved for PG communication | | 1 | 1 | 1 | 1 |
| • usable for OP communication | | | | | |
| - reserved for OP communication | | 1 | 1 | 1 | 1 |
| **1st interface** | | | | | |
| Type of interface | | PROFINET | PROFINET | PROFINET | PROFINET |
| Physics | | 2x RJ45 | 2x RJ45 | 2x RJ45 | 2x RJ45 |
| automatic detection of transmission speed | | Yes | Yes | Yes | Yes |
| Autonegotiation | | Yes | Yes | Yes | Yes |
| Autocrossover | | Yes | Yes | Yes | Yes |
| Number of connection resources | | 32 | 32 | 32 | 32 |
| Functionality | | | | | |
| • MPI | | No | No | No | No |
| • DP master | | No | No | No | No |
| • DP slave | | No | No | No | No |
| • PROFINET IO device | | No | No | No | No |
| • PROFINET IO controller | | Yes | Yes | Yes | Yes |
| • PROFINET CBA | | Yes | Yes | Yes | Yes |
| • Open IE communication | | Yes | Yes | Yes | Yes |
| • Point-to-point coupling | | No | No | No | No |
| PROFINET IO-Controller | | | | | |
| • Services | | | | | |
| - PROFINET PG/OP communication | | Yes | Yes | Yes | Yes |
| - S7-Routing | | Yes | Yes | Yes | Yes |
| - S7 communication | | Yes | Yes | Yes | Yes |
| - Isochronous?mode | | No | No | No | No |
| • Total number of connectable IO Devices, max. | | 256 | 256 | 256 | 256 |
| • Number of I/O devices with IRT and the option "high flexibility", max. | | 64 | 64 | 64 | 64 |
| • IRT, supported | | Yes | Yes | Yes | Yes |
| • prioritized poer up | | Yes | Yes | Yes | Yes |
| - Number of connectable IO devices, max. | | 32 | 32 | 32 | 32 |
| • Activation/deactivation of IO devices | | Yes | Yes | Yes | Yes |
| - Number of IO devices that can be activated/deactivated, max. | | 8 | 8 | 8 | 8 |
| • IO devices changing during operation (partner ports), supported | | Yes | Yes | Yes | Yes |
| - Maximum number of IO devices per tool | | 8 | 8 | 8 | 8 |
| • 1st interface | | | | | |
| - Inputs, max. | | 16 Kibyte | 16 Kibyte | 16 Kibyte | 16 Kibyte |
| - Outputs, max. | | 16 Kibyte | 16 Kibyte | 16 Kibyte | 16 Kibyte |
| • Useful data per address area, max. | | 2 Kibyte | 2 Kibyte | 2 Kibyte | 2 Kibyte |
| - Useful data consistency, max. | | 256 byte | 256 byte | 256 byte | 256 byte |

**SIMATIC S7-modular Embedded Controller**

**2**

■ **Technical specifications** (continued)

| Product type designation | 6ES7 677-1DD00-0BA0<br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| PROFINET CBA | | | | | |
| • non-cyclical transmission | | Yes | Yes | Yes | Yes |
| • cyclical transmission | | Yes | Yes | Yes | Yes |
| Open IE communication | | | | | |
| • open IE communication | | Yes | Yes | Yes | Yes |
| • Number of connections, max. | | 32 | 32 | 32 | 32 |
| • at interface 1 | | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 | 0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535 |
| **2nd interface** | | | | | |
| automatic detection of transmission speed | | Yes | Yes | Yes | Yes |
| Autonegation | | Yes | Yes | Yes | Yes |
| Autocrossing | | No | No | No | No |
| Functionality | | | | | |
| • PROFINET IO controller | | No | No | No | No |
| • PROFINET IO device | | No | No | No | No |
| • PROFINET CBA | | No | No | No | No |
| • PROFINET CBA-SRT | | No | No | No | No |
| **CPU/programming** | | | | | |
| Configuration software | | | | | |
| • STEP 7 | | Yes;<br>V5.4 SP4 or higher<br>+ HW update/iMap<br>V3.0 SP1 | Yes;<br>V5.4 SP4 or higher<br>+ HW update/iMap<br>V3.0 SP1 | Yes;<br>V5.4 SP4 or higher<br>+ HW update/iMap<br>V3.0 SP1 | Yes;<br>V5.4 SP4 or higher<br>+ HW update/iMap<br>V3.0 SP1 |
| Programming language | | | | | |
| • STEP 7 | | Yes | Yes | Yes | Yes |
| • LAD | | Yes | Yes | Yes | Yes |
| • CSF | | Yes | Yes | Yes | Yes |
| • STL | | Yes | Yes | Yes | Yes |
| • SCL | | Yes | Yes | Yes | Yes |
| • CFC | | Yes | Yes | Yes | Yes |
| • GRAPH | | Yes | Yes | Yes | Yes |
| • HiGraph® | | Yes | Yes | Yes | Yes |
| **Installed software** | | | | | |
| Visualization | | | WinCC flexible RT 2008 | WinCC flexible RT 2008 | WinCC flexible RT 2008 |
| Control | | SIMATIC WinAC RTX 2009 | SIMATIC WinAC RTX 2009 | SIMATIC WinAC RTX 2009 | SIMATIC WinAC RTX 2009 |
| Communication | | Yes | Yes | Yes | Yes |
| **Environmental requirements** | | | | | |
| Operating termperature | | | | | |
| • min. | 0 °C | 0 °C | 0 °C | 0 °C | 0 °C |
| • max. | 50 °C | 50 °C | 50 °C | 50 °C | 50 °C |
| Storage/transport temperature | | | | | |
| • min. | -40 °C | -40 °C | -40 °C | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C | 70 °C | 70 °C | 70 °C |

■ **Technical specifications** (continued)

| Product type designation | 6ES7 677-1DD00-0BA0<br>SIMATIC S7-mEC, EC31 | 6ES7 677-1DD00-0BB0<br>S7-mEC, EC31-RTX | 6ES7 677-1DD00-0BF0<br>S7-mEC, EC31-HMI/RTX 128PT | 6ES7 677-1DD00-0BG0<br>S7-mEC, EC31-HMI/RTX 512PT | 6ES7 677-1DD00-0BH0<br>S7-mEC, EC31-HMI/RTX 2048PT |
|---|---|---|---|---|---|
| Vibrations | | | | | |
| • Operation checked according to IEC 60068-2-6 | Yes | Yes | Yes | Yes | Yes |
| • Transport tested checked to IEC 60068-2-6 | Yes | Yes | Yes | Yes | Yes |
| Shock test | | | | | |
| • checked according to IEC 60068-2-27 | Yes | Yes | Yes | Yes | Yes |
| • checked according to IEC 60068-2-29 | Yes | Yes | Yes | Yes | Yes |
| Shock testing | | | | | |
| • tested according to IEC 60068-2-29 | Yes | Yes | Yes | Yes | Yes |
| • Operation checked according to IEC 60068-2-29 | Operation checked according to IEC 60068-2-27 | Operation checked according to IEC 60068-2-27 | Operation checked according to IEC 60068-2-27 | Operation checked according to IEC 60068-2-27 | Operation checked according to IEC 60068-2-27 |
| • Storage/transport, checked to IEC 60068-2-29 | Yes | Yes | Yes | Yes | Yes |
| **Degree of protection** | | | | | |
| IP 20 | Yes | Yes | Yes | Yes | Yes |
| **Standards, approvals, certificates** | | | | | |
| CE symbol | Yes | Yes | Yes | Yes | Yes |
| CSA approval | Yes; included in cULus | Yes; included in cULus | Yes; included in cULus | Yes; included in cULus | Yes; included in cULus |
| C-TICK | Yes | Yes | Yes | Yes | Yes |
| cULus | Yes | Yes | Yes | Yes | Yes |
| FM approval | Yes | Yes | Yes | Yes | Yes |
| **Dimensions and weight** | | | | | |
| Dimensions and weight | | | | | |
| • Width | 160 mm | 160 mm | 160 mm | 160 mm | 160 mm |
| • Height | 125 mm | 125 mm | 125 mm | 125 mm | 125 mm |
| • Depth | 115 mm | 115 mm | 115 mm | 115 mm | 115 mm |
| Weight | | | | | |
| • Weight | 1.5 kg; Approx. | 1.5 kg; Approx. | 1.5 kg; Approx. | 1.5 kg; Approx. | 1.5 kg; Approx. |

**■ Technical specifications** (continued)

| Product type designation | 6ES7 677-1DD40-1AA0<br>EM PCI-104 | 6ES7 677-1DD50-2AA0<br>EM PC |
|---|---|---|
| **Product status** | | |
| Hardware product status | 01 | 01 |
| **Power supply** | | |
| Input voltage | | |
| • Rated value, DC 24 V | Yes; Optional: external infeed | |
| • permissible range,<br>  lower limit (DC) | 20.4 V | |
| • permissible range,<br>  upper limit (DC) | 28.8 V | |
| Power loss, max. | | 14 W |
| Power loss, typ. | 2.4 W; Without inserted PCI-104 cards | 9 W |
| **Interrupts/diagnostics/<br>status information** | | |
| Diagnoses | | |
| • Diagnostics functions | Yes; POWER LED, status LED | Yes; POWER LED,<br>CARD LED for indicating access to SD/MMC |
| **Environmental requirements** | | |
| Operating termperature | | |
| • min. | 0 °C | 0 °C |
| • max. | 50 °C | 50 °C |
| Storage/transport temperature | | |
| • min. | -40 °C | -40 °C |
| • max. | 70 °C | 70 °C |
| Vibrations | | |
| • Operation checked according<br>  to IEC 60068-2-6 | Yes | Yes |
| • Transport tested checked<br>  to IEC 60068-2-6 | Yes | Yes |
| Shock test | | |
| • checked according<br>  to IEC 60068-2-27 | Yes | Yes |
| • checked according<br>  to IEC 60068-2-29 | Yes | Yes |
| Shock testing | | |
| • tested according<br>  to IEC 60068-2-29 | Yes | Yes |
| • Operation, ckecked<br>  to IEC 60068-2-29 | Yes | Yes |
| • Storage/transport, checked<br>  to IEC 60068-2-29 | Yes | Yes |
| **Degree of protection** | | |
| IP 20 | Yes | Yes |
| **Standards, approvals,<br>certificates** | | |
| CE symbol | Yes | Yes |
| CSA approval | Yes | Yes |
| C-TICK | Yes | Yes |
| cULus | Yes | Yes |
| FM approval | Yes | Yes |
| **Dimensions and weight** | | |
| Dimensions and weight | | |
| • Width | 120 mm; Without bus connector Extension-Bus | 80 mm; Without bus connector Extension-Bus |
| • Height | 125 mm; Without external voltage connecting terminal | 125 mm |
| • Depth | 115 mm | 115 mm |
| Weight | | |
| • Weight | 0.5 kg | 0.4 kg |

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC S7-modular Embedded Controller

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **SIMATIC S7-modular Embedded Controller** | | **EM PCI-104 extension module** | **6ES7 677-1DD40-1AA0** |
| **EC31** | **6ES7 677-1DD00-0BA0** | For fitting up to 3 additional PCI-104 cards | |
| Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 2 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows XP embedded pre-installed, Software Development Kit (SDK) for creating C/C++ applications with accesses to central I/O modules | | **EM PC extension module** | **6ES7 677-1DD50-2AA0** |
| | | Additional connection options: 2 USB interfaces, 1 Gigabit Ethernet interface, 1 serial interface, 1 slot for CF card, 1 slot for SD card/Micro Memory Card | |
| | | **CP 5603 mEC Package** | **6GK1 560-3AE00** |
| | | consisting of CP 5603 and insert plate for CP 5603 | |
| **EC31-RTX** | **6ES7 677-1DD00-0BB0** | **Development Kit DK-5613** | See http://www.siemens.com/ simatic-net/dk5613 |
| Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 2 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows XP embedded and WinAC RTX 2009 preinstalled | | Software development kit for CP 5603 / CP 5613 / CP 5614 / CP 5613 A2 / CP 5623 / CP 5614 A2 / CP 5624 / CP 5613 FO for integration into other operating system environments on systems with an PCI slot | |
| **EC31-RTX F** | **6ES7 677-1FD00-0FB0** | **Compact Switch Module CSM 377** | **6GK7 377-1AA00-0AA0** |
| Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 2 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows XP embedded and WinAC RTX F 2009 preinstalled | | Unmanaged switch for the connection of a SIMATIC S7-300, ET 200M and as many as three other nodes to an Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 Ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic equipment manual on CD-ROM | |
| **EC31-HMI/RTX** | | **IE FC TP Standard Cable GP 2 x 2 (Type A)** | **6XV1 840-2AH10** |
| Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 2 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows XP embedded, WinAC RTX 2009, SIMATIC SOFTNET-S7/V7.0 Lean preinstalled | | 4-core, shielded TP installation cable for connection to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m | |
| • With WinCC flexible 2008 RT 128 PT | **6ES7 677-1DD00-0BF0** | **PROFIBUS FastConnect bus connector RS485 Plug 180** | **6GK1 500-0FC10** |
| • With WinCC flexible 2008 RT 512 PT | **6ES7 677-1DD00-0BG0** | with 180° cable outlet | |
| • With WinCC flexible 2008 RT 2048 PT | **6ES7 677-1DD00-0BH0** | **IE FC RJ45 Plug 180** | |
| | | RJ45 plug-in connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| | | • 1 pack = 1 unit | **6GK1 901-1BB10-2AA0** |
| | | • 1 pack = 10 units | **6GK1 901-1BB10-2AB0** |
| | | • 1 pack = 50 units | **6GK1 901-1BB10-2AE0** |

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC IPC427C bundles

**2**

## Overview



- Quick start in automation solutions with embedded PC platforms.
  - SIMATIC WinAC RTX or SIMATIC WinAC RTX F preinstalled on SIMATIC IPC427C ready for switch-on
  - PROFINET, PROFIBUS and Industrial Ethernet prepared for use in a SIMATIC environment
  - Optional WinCC flexible for visualization tasks in parallel with SIMATIC WinAC RTX.
  - Configuration and programming with SIMATIC STEP 7 via Industrial Ethernet, PROFINET, or PROFIBUS
- Safety requirements up to SIL 3 according to IEC 61508/62061 or according to EN ISO 13849-1 up to PL e can be implemented with WinAC RTX F.
- Rugged operation
  - Operation without a hard disk, based on Compact Flash Card (CF Card) or Solid State Disk and Windows Embedded Standard
  - Operation without a fan
  - 128 KB retentive data for WinAC RTX, also without uninterruptible power supply (UPS)
- Flexibility of a PC-based automation environment
  - Free memory space on CF Card can be used for other PC applications
  - Use of WinAC ODK with SIMATIC WinAC RTX or SIMATIC WinAC RTX F (read-only for fail-safe program part)
  - Connection option for USB devices, flat panel monitor or screen
  - PCI 104 cards can be plugged in
- High-performance service concept
  - Replacement parts for preferred types available in exchange, ex stock

### *New*

- New hardware basis SIMATIC IPC427C
- Cost-effective variants with PROFINET, based on the standard Ethernet interface
- Current product versions of the pre-installed software:
  - SIMATIC WinAC RTX 2009 or SIMATIC WinAC RTX F
  - SIMATIC WinCC flexible 2008 SP1 (WinAC RTX 2009 only)
  - SIMATIC NET Edition 2008

## Application

The SIMATIC IPC427C bundles combine the advantages of the PC-based controller solutions with those of the classical PLC world: They offer the flexibility for integrating the different tasks of an automation solution on one hardware platform. The disk-less and fanless design of the IPC427C enable the solution to be used directly at the machine in a harsh environment. Using the PROFINET and PROFIBUS interfaces, the system can be integrated with minimal outlay in existing automation landscapes (SIMATIC world, Siemens drive systems).

The SIMATIC IPC427C bundles are the preferred platform when the following criteria must be fulfilled for the automation solution:

- Ultra-compact and operation without an operator ("headless operation")
- For use with remote screen
- Integration of different tasks such as control, visualization, technology functions, or data processing in one hardware unit
- Use of application-specific hardware and software
- Use at machine level
- Safety functions up to SIL 3 according to IEC 61508/62061 or according to EN ISO 13849-1 up to PL e with WinAC RTX F

## Function

Controlling:

- For the optimum control of processes with WinAC RTX, several processing levels are available:
  - Cyclic program processing
  - Interrupt processing
  - Time and date-controlled processing
- The controller can save up to 128 KB of retentive data on an integrated, non-volatile memory, without the need for a UPS. The complete retentivity of all process values of SIMATIC WinAC RTX can be achieved with a generally available UPS.

Functional safety with WinAC RTX F:

- The functional safety is implemented by means of targeted safety functions in the software. Safety functions are implemented with the S7 Distributed Safety system, to place the plant in a safe state or to hold it in a safe state. The safety functions are mainly contained within the following components:
  - In the safety-related user program (safety program) in WinLC RTX F
  - In the fail-safe inputs and outputs (F I/O).
- The F I/O ensures safety-related processing of the field information (emergency stop pushbutton, light barriers, motor pre-control) It features all the hardware and software components required for reliable processing, according to the required safety class. The user only programs the user safety functions. The safety functions for the process can be implemented with a user safety function or a system-internal fault reaction function. If the F system is unable to perform the actual user safety function in the event of a fault, it performs instead the fault response function, e.g. the associated outputs are switched off and the F CPU enters the STOP state.

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC IPC427C bundles

**■ Function** (continued)

Visualization:

- SIMATIC WinCC flexible can also be ordered as an option pre-installed and ready to switch on. WinCC flexible offers powerful functions for visualizing the processes at the machine.

Open access to process values:

- SIMATIC NET OPC server supplied with the SIMATIC IPC427C bundles (variants with WinAC RTX) provides open access to all process values. Any visualization systems or data processing systems can be linked to SIMATIC WinAC RTX via this interface.

Communication:

- Programming of WinAC RTX with SIMATIC STEP 7 and transfer of the WinCC flexible project is performed via the integral Industrial Ethernet interface. The communication package SIMATIC NET SOFTNET S7 Lean is installed for this purpose. The S7 program can alternatively be downloaded to WinAC RTX via the PROFIBUS DP interface.

Use of other software:

- The customer can install supporting software products. Windows XP Embedded is designed so that typical add-on packages can be installed.

**■ Ordering data** — **Order No.**

| SIMATIC IPC427C bundles | |
|---|---|
| **Preferred version with SIMATIC WinAC RTX F 2009** | |
| (Replacement hardware unit available in exchange) | |
| **SIMATIC IPC427C bundle with WinAC RTX F 2009** | **6ES7 675-1DK30-0EP0** |
| Processor Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 8 GB CompactFlash | |
| **Preferred versions with SIMATIC WinAC RTX 2009 and WinCC flexible 2008** | |
| (Replacement hardware unit available in exchange) | |
| **SIMATIC IPC427C bundles** | **6ES7 675-1D■■ 0-■■■ 0** |

| | 6ES7 675-1D | ■ | ■ | 0- | ■ | ■ | ■ | 0 |
|---|---|---|---|---|---|---|---|---|
| Processor | | | | | | | | |
| • Celeron M, 1.2 GHz, 2x PROFINET (IE) | | A | | | | | | |
| • Celeron M, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | | B | | | | | | |
| • Core2Solo, 1.2 GHz, 2x PROFINET (IE) | | E | | | | | | |
| • Core2Solo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | | F | | | | | | |
| • Core2Duo, 1.2 GHz, 2x PROFINET (IE) | | J | | | | | | |
| • Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | | K | | | | | | |
| Main memory | | | | | | | | |
| • 2 GB RAM | | | 3 | | | | | |
| Internal mass storage | | | | | | | | |
| • Without | | | | 0 | | | | |
| Externally accessible mass storage | | | | | | | | |
| • 4 GB CompactFlash, Windows Embedded 2009 and preinstalled software | | | | | D | | | |
| • 8 GB CompactFlash, Windows Embedded 2009 and preinstalled software | | | | | E | | | |
| Software configurations | | | | | | | | |
| • WinAC RTX | | | | | | | B | |
| • WinCC flexible RT 128 PT | | | | | | | C | |
| • WinCC flexible RT 512 PT | | | | | | | D | |
| • WinCC flexible RT 2048 PT | | | | | | | E | |
| • WinCC flexible RT 4096 PT | | | | | | | F | |
| • WinAC RTX, WinCC flexible RT 128 PT | | | | | | | K | |
| • WinAC RTX, WinCC flexible RT 512 PT | | | | | | | L | |
| • WinAC RTX, WinCC flexible RT 2048 PT | | | | | | | M | |
| • WinAC RTX, WinCC flexible RT 4096 PT | | | | | | | N | |

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## ■ Ordering data

| Ordering data | Order No. | | Delivery versions (ex stock) | Order No. |
|---|---|---|---|---|

**All versions with SIMATIC WinAC RTX 2009 and WinCC flexible 2008**
(Hardware: repair only is possible)

| | | | | |
|---|---|---|---|---|
| **SIMATIC IPC427C bundles** | **6ES7 675-1D ■ ■ 0- ■ ■ ■ 0** | | | |

Processor

| | | |
|---|---|---|
| • Celeron M, 1.2 GHz, 2x PROFINET (IE) | **A** | |
| • Celeron M, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | **B** | |
| • Core2Solo, 1.2 GHz, 2x PROFINET (IE) | **E** | |
| • Core2Solo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | **F** | |
| • Core2Duo, 1.2 GHz, 2x PROFINET (IE) | **J** | |
| • Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS | **K** | |

Main memory

| | |
|---|---|
| • 1 GB RAM | **2** |
| • 2 GB RAM | **3** |
| • 4 GB RAM | **4** |

Internal mass storage

| | |
|---|---|
| • None (can only be ordered with externally accessible mass storage) | **0** |
| • 80 GB HDD SATA, also with externally accessible CF | **1** |
| • 32 GB Solid State Disk SATA, Windows Embedded 2009 and preinstalled software | **2** |
| • 4 GB internal CompactFlash, Windows Embedded 2009 and preinstalled software | **6** |
| • 8 GB internal CompactFlash, Windows Embedded 2009 and preinstalled software | **7** |

Externally accessible mass storage

| | |
|---|---|
| • None (can only be ordered with internal mass storage) | **A** |
| • 4 GB CompactFlash, Windows Embedded 2009 and preinstalled software | **D** |
| • 8 GB CompactFlash, Windows Embedded 2009 and preinstalled software | **E** |

Software configurations

| | |
|---|---|
| • WinAC RTX | **B** |
| • WinCC flexible RT 128 PT | **C** |
| • WinCC flexible RT 512 PT | **D** |
| • WinCC flexible RT 2048 PT | **E** |
| • WinCC flexible RT 4096 PT | **F** |
| • WinAC RTX, WinCC flexible RT 128 PT | **K** |
| • WinAC RTX, WinCC flexible RT 512 PT | **L** |
| • WinAC RTX, WinCC flexible RT 2048 PT | **M** |
| • WinAC RTX, WinCC flexible RT 4096 PT | **N** |

**Delivery versions (ex stock)**

(Replacement hardware units available in exchange)

**SIMATIC IPC427C bundle with WinAC RTX 2009**

| | |
|---|---|
| Processor Core2Solo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash | **6ES7 675-1DF30-0DB0** |
| Processor Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash | **6ES7 675-1DK30-0DB0** |
| Processor Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 8 GB CompactFlash | **6ES7 675-1DK30-0EP0** |

**SIMATIC IPC427C bundle with WinAC RTX 2009 and WinCC flexible 2008 512 PT**

| | |
|---|---|
| Processor Core2Duo, 1.2 GHz, 2x PROFINET (IE), 1x PROFIBUS, 2 GB RAM, 4 GB CompactFlash | **6ES7 675-1DK30-0DL0** |

# PROFINET/Industrial Ethernet
## Embedded Automation

**SIMATIC IPC427C bundles**

**2**

| Ordering data | Order No. |
|---|---|
| *Accessories* | |
| **CP 5603 Microbox Package** | **6GK1 560-3AU00** |
| Package for using the PROFIBUS CP 5603 in Microbox PCs; comprising a CP 5603 module and a Microbox expansion rack | |
| **CP 1604 Microbox Package** | **6GK1 160-4AU00** |
| Package for using the PROFINET CP 1604 in Microbox PCs; comprising CP 1604, connection board, power supply and expansion rack for Microbox PC; implemented with Development Kit DK-16xx PN IO; NCM PC | |
| **Expansion kit PC/104** | **6AG4 070-0BA00-0XA0** |
| Expansion rack incl. mounting hardware; 6 items | |
| **CompactFlash Cards** | |
| • 4 GB | **6ES7 648-2BF02-0XG0** |
| • 8 GB | **6ES7 648-2BF02-0XH0** |
| **SIMATIC PC keyboard** | |
| German/international, USB connection | **6ES7 648-0CB00-0YA0** |
| German/International, USB connection, with 4-way USB HUB | **6ES7 648-0CD00-0YA0** |
| **SIMATIC PC USB mouse** | **6ES7 790-0AA01-0XA0** |
| Optical, 3 buttons, with PS/2 adapter | |
| **SIMATIC PC USB flash drive** | **6ES7 648-0DC40-0AA0** |
| 2 GB, USB 2.0, incl. SIMATIC PC BIOS manager, bootable, metal enclosure | |
| **Book mounting kit** | **6ES7 648-1AA20-0YB0** |
| Interfaces at the front | |
| **IE TP Cord RJ45/RJ45** | |
| TP cable 4 x 2 with two RJ45 plugs | |
| • 0.5 m | **6XV1 870-3QE50** |
| • 1 m | **6XV1 870-3QH10** |
| • 2 m | **6XV1 870-3QH20** |
| • 6 m | **6XV1 870-3QH60** |
| • 10 m | **6XV1 870-3QN10** |

**More information**

*Delivery*

Production and delivery of the devices will typically be completed within 13 working days after receipt of order. The hardware and mass memory with the complete, pre-installed software ready-to-use are supplied fully assembled.

*Commissioning*

Before the control or visualization application is complete, simply perform the following steps:
• Optional: Install and setup additional hardware on the device (e.g. an additional SIMATIC CP 5603 PROFIBUS interface)
• Optional: Install and setup other software on the device
• Transfer the engineering projects from STEP 7 or WinCC flexible
• Transfer the supplied license keys for SIMATIC software
• Back up the installed software and protect the flash based mass memory by switching on the enhanced write filter

*Spare parts*

For a selection of preferred variants, replacement parts are available in exchange immediately, ex stock Preferred variants offer the following options:
• All processor variants with PROFINET or PROFIBUS option
• 2 GB RAM
• Replaceable CompactFlash memory only
• All software configurations

## Overview

Embedded PC platform with extremely high industrial compatibility for demanding tasks in the field of PC-based automation

- Maintenance-free (no rotating components such as fan and hard disk)
- Rugged construction: The PC is resistant to the harshest mechanical stress and is extremely reliable in operation
- Compact design (only 61-69 mm mounting depth for 12"-19")
- High degree of investment protection
- Fast integration capability
- Front panel versions:
  - 12" and 15" TFT Touch
  - 12" and 15" TFT Key
  - 19" Touch

## Benefits

- Maximum industrial compatibility due to rugged construction, even when subjected to extreme vibration and shocks
- High degree of investment protection thanks to assured availability of spare parts (for a period of 5 years following the end of active marketing)
- High continuity of components for long-term machine concepts without renewed engineering outlay
- Savings in time and costs thanks to service-friendly device design:
  - USB 2.0 interfaces on the front and rear for quick and easy connection of additional hardware components
- High degree of industrial functionality thanks to integrated PROFIBUS DP/MPI and PROFINET (IE, RT/IRT) interfaces
- Maintenance-free due to lack of rotating components (fan and hard disk)
- Minimized downtimes thanks to high system availability
  - Efficient self-diagnostics (DiagBase and SIMATIC PC DiagMonitor)
  - High reliability and security of an embedded platform
- Integral component of Totally Integrated Automation (TIA):
  - Enhanced productivity, reduction of engineering overhead, reduction of lifecycle costs
- Complete turnkey solutions are supplied (the software is already installed and preconfigured) for visualization and automation in combination with WinCC flexible and WinAC RTX.

## Application

SIMATIC HMI IPC477C embedded is designed for use direct at the machine, where the focus is on a combination of ruggedness and maximum reliability (the reliability of an embedded platform), and the openness of a PC is also required (e.g. module expansion and the connection of I/O devices such as printers, keyboards, etc.).

Due to the minimal mounting depth, it can also be used in confined spaces.

The PC can be used in production automation as well as in process automation and can be mounted in control cabinets, control desks, 19" cabinets/racks and as PRO version direct on swivel arms (gantries).

A SIMATIC Panel PC is the ideal platform for PC-based automation:

- PC-based visualization, on-site at the machine with SIMATIC WinCC flexible
- PC-based control with SIMATIC WinAC RTX
- SIMATIC WinCC Web Client for web-based solutions with WinCC/Web Navigator
- SIMATIC WinCC Standard Client as single-user station

Siemens offers a complete modular system of automation components that complement one another perfectly.

## Design

The HMI IPC477C embedded is a compact unit comprising an operator control unit with an integrated computing unit.

### Standard components of the computer unit:

- Rugged metal enclosure, resistant to vibrations and shocks, with high electromagnetic compatibility.
- Processors:
  - Intel Celeron M 1.2 GHz, Intel Core2Solo 1.2 GHz or Intel Core2Duo 1.2 GHz
- Main memory basic configuration:
  - 1.2 or 4 GB (DDR3)
  - Battery-backed retentive memory 2 MB
- Compact Flash Drive (internal) with preinstalled Windows XP embedded operating system (Image) and optional software or Solid State Disk (SSD) with Windows XP embedded or Windows XP Professional (MUI)
- Graphics onboard (VGA analog, 1280 x 1024)
- Interfaces:
  - 2 x PROFINET (IE) onboard (10/100/1000 Mbit/s)
  - Optionally PROFIBUS DP/MPI onboard, CP 5611-compatible, isolated
  - Optionally PROFINET (iRT) onboard, CP 1616-compatible, 3 ports
  - 5 x USB 2.0 port, 500 mA (1 x on front)
  - 1 x COM1 (RS232)
  - 1 x DVI-I (for connecting a second display unit)
- Free slots for expansions:
  - 1 x CompactFlash slot (accessible from outside)
  - 3 x PC/104 (over expansion frame)
- Power supply: 24 V DC

# PROFINET/Industrial Ethernet
## Embedded Automation

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### SIMATIC HMI IPC477C embedded

■ **Design** (continued)

*Components of the operator control unit:*

The operator control units are available in the following versions:

**12" Key**
- 12" TFT color display, 800 x 600 pixels (SVGA)
- Membrane keyboard with international PC character set and 36 additional function keys, as well as integrated mouse
- USB interface

**12" Touch**
- 12" TFT color display, 800 x 600 pixels (SVGA)
- Resistive analog touch screen
- USB interface

**15" Key**
- 15" TFT color display, 1024 x 768 pixels (XGA)
- Membrane keyboard with international PC character set and 36 additional function keys, as well as integrated mouse
- USB interface

**15" Touch**
- 15" TFT color display, 1024 x 768 pixels (XGA)
- Resistive analog touch screen
- USB interface

**19" Touch**
- 19" TFT color display, 1280 x 1024 (SXGA)
- Resistive analog touch screen
- USB interface

**PRO 15" Touch**
- All-round-protected device with degree of protection IP65 for mounting on a support arm/supporting foot
- 15" TFT color display, 1024 x 768 pixels (XGA)
- Resistive analog touch screen

**PRO 19" Touch**
- All-round-protected device with degree of protection IP65 for mounting on a support arm/supporting foot
- 19" TFT color display, 1280 x 1024 pixels (SXGA)
- Resistive analog touch screen

The built-in devices are equipped with an USB 2.0 interface at the front for connecting external I/O devices such as a mouse or keyboard and fulfill the requirements of degrees of protection IP65 and NEMA 4.

*Expansion components (accessories)*

**SIMATIC IPC DiagMonitor**
- PC diagnostics/alarm software for the early detection and diagnosis of PC problems
- Comprehensive monitoring of temperature, watchdog
- Runtime meter for preventive maintenance
- Integrated log functions, comprehensive text messages, online help (English/German)
- Network-wide monitoring via SNMP and OPC interface possible

**SIMATIC IPC Image and Partition Creator**
- Software tool for preventive back-up of the content of mass storage media (CF cards, hard disks)
- High-speed and accurate (to a bit) restoring of system and data partitions;User software and specific insallations are also backed up
- Software tool for the adaption of mass storage partitioning

**3.5" USB disk drive**

The USB disk drive is provided for fast exchange of user data, e.g. recipes, or of files. The drive must not be used as a cyclic archiving drive. The front-panel installation and degree of protection IP54 permit data exchange from the front without opening the control cabinet door.

The device is connected via the USB interface of the Panel PC. The power is also supplied over the USB interface. A USB cable of 1 m length is included in the scope of supply. The disk drive complies with the USB 1.1 standard. 3.5" high density disks can be used (1.44 MB).

Operation of the USB disk drive with SIMATIC Panel PCs:
- Windows XP: possible without separate driver
- The driver is included in the scope of supply of the operating system

**SIMATIC IPC USB FlashDrive**
- Mobile memory medium for SIMATIC PC/PG
- Fast data transfer (USB 2.0) and high memory capacity
- Ultra-compact and rugged

**Industrial USB Hub 4**
- Industry-standard USB 2.0 hub, front IP65
- Installation in control cabinet door or on DIN rail
- Inspection window and LEDs for each of the four interfaces

Note:
For further information, see "Expansion components"

■ **Function**
- DiagBase: Integrated, parameterizable monitoring functions (program execution/watchdog, internal enclosure temperature, DIAG bit for CF cards similar to S.M.A.R.T for hard disks)
- Expanded diagnostics/messages via Ethernet, e-mail, SMS and for direct transfer to SIMATIC software via OPC (optionally via SIMATIC PC DiagMonitor)

■ **Integration**

Integrated interfaces:
- Ethernet

The integrated PROFINET interfaces (10/100/1000 Mbit/s) can be used for IT communication and for exchanging data with programmable controllers such as SIMATIC S7 (with the "SOFTNET S7" software packages). Available options: PROFINET (iRT) with 3 ports instead of an PROFINET (IE).

- PROFIBUS onboard (option)

The floating PROFIBUS interface (12 Mbit/s) can be used for connecting distributed field devices or for coupling to SIMATIC S7 (with software packages "SOFTNET for PROFIBUS").

- Other interfaces

For connecting additional I/O devices, 5 USB (Universal Serial Bus) interfaces and one serial interface are available.

**SIMATIC HMI IPC477C embedded**

**2**

■ **Technical specifications**

| | 6AV7 884.. | 6AV7 883..PRO |
|---|---|---|
| **General features** | | |
| Processors | Intel Celeron M 1.2 GHz, Intel Core2Solo 1.2 GHz or Core2Duo 1.2 GHz | Intel Celeron M 1.2 GHz, Intel Core2Solo 1.2 GHz or Core2Duo 1.2 GHz |
| Memory type | DDR3-RAM | DDR3-RAM |
| Main memory | 1 GB, 2 GB or 4 GB | 1 GB, 2 GB or 4 GB |
| Free slots | 1 x CF card slot (externally accessible) | 1 x CF card slot (externally accessible) |
| Operating system | Windows Embedded Standard 2009 (EN/DE) or Windows XP Professional Multi-Language | Windows Embedded Standard 2009 (EN/DE) or Windows XP Professional Multi-Language |
| Additional OS information | Language: EN/DE | Language: EN/DE |
| SIMATIC Software | Optional with preinstalled bundle software SIMATIC WinCC flexible 2008 SP1 and/or WinAC RTX 2009 SIMATIC WinAC RTX F SIMATIC WinCC as web client or single-user station | Optional with preinstalled bundle software SIMATIC WinCC flexible 2008 SP1 and/or WinAC RTX 2009 SIMATIC WinAC RTX F |
| **Drives** | | |
| Floppy drive | Optional via external USB floppy drive | Optional via external USB floppy drive |
| Optical drives | Possible as external drive via USB | Possible as external drive via USB |
| Hard disk/mass storage | Compact Flash drive with 2, 4, or 8 GB and/or SSD (Solid State Disk) with 32 GB | Compact Flash drive with 2, 4, or 8 GB and/or SSD (Solid State Disk) with 32 GB |
| **Interfaces** | | |
| Graphics interface | DVI-I for additional display unit: Color depth 32 bits | DVI-I for additional display unit: Color depth 32 bits |
| Connection for keyboard/mouse | USB / USB | USB / USB |
| Serial interface | COM1: 1 x V.24 (RS232) | COM1: 1 x V.24 (RS232) |
| PROFIBUS/MPI | Optionally onboard, isolated, max. 12 Mbit/s, no plug-in card required, CP 5611-compatible, not upgradable | Optionally onboard, isolated, max. 12 Mbit/s, no plug-in card required, CP 5611-compatible, not upgradable |
| PROFINET (RT/IRT) | Optional: 3 x RJ45, CP1616-compatible; not upgradable | Optional: 3 x RJ45, CP1616-compatible; not upgradable |
| USB | 1 x on front, 4 x on rear, USB 2.0 (500 mA) | 1 x on front, 4 x on rear, USB 2.0 (500 mA) |
| PROFINET (IE), Ethernet | onboard, 2 x 10/100/1000 Mbit (RJ45 with/without PROFIBUS), 1 x 10/100/1000 Mbit (RJ45 with PROFINET), no plug-in card required | onboard, 2 x 10/100/1000 Mbit (RJ45 with/without PROFIBUS), 1 x 10/100/1000 Mbit (RJ45 with PROFINET), no plug-in card required |
| Multimedia | No | No |
| **Supply voltage** | | |
| Supply voltage | 24 V DC | 24 V DC |
| **Monitoring functions** | | |
| Temperature | Yes | Yes |
| Watchdog | Yes | Yes |
| DiagBit (similar to S.M.A.R.T.) | Yes (for CF cards and SSD) | Yes (for CF cards and SSD) |
| Status LEDs | Yes (on rear) | Yes |
| Front side according to EN 60529 | IP65 (on the front) according to EN 60529 and NEMA4 | IP65 all around according to EN 60529 and NEMA4 |
| **Ambient conditions** | | |
| Vibration load during operation | Tested according to DIN IEC 60068-2-6: 10 … 58 Hz: 0.075 mm, 58 … 200 Hz: 9.8 m/s$^2$ (1 g) | Tested according to DIN IEC 60068-2-6: 10 … 58 Hz: 0.075 mm, 58 … 200 Hz: 9.8 m/s$^2$ (1 g) |
| Shock loading during operation | Tested according to DIN IEC 60068-2-7: 50 m/s$^2$ (5 g), 30 ms, 100 shocks | Tested according to DIN IEC 60068-2-7: 50 m/s$^2$ (5 g), 30 ms, 100 shocks |
| Relative humidity | Tested according to DIN IEC 60068-78, DIN IEC 60068-2-30: 5% to 80% at 25 °C (no condensation) | Tested according to DIN IEC 60068-78, DIN IEC 60068-2-30: 5% to 80% at 25 °C (no condensation) |
| Maximum permissible installation angle +/- | 30° over vertical | 45° over vertical |
| Ambient temperature during operation | 0 °C … +50 °C in maximum configuration; no fan | 15": 0 °C … +45°C in maximum configuration; no fan 19": 0 °C … +40°C in maximum configuration; no fan |
| **Certifications & standards** | | |
| Approvals | CE, cULus(508), marine engineering | CE, cULus(508) |
| EMC | CE, 55022A, EN 61000-6-4, EN 61000-6-2 | CE, 55022A, EN 61000-6-4, EN 61000-6-2 |

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC HMI IPC477C embedded

**Technical specifications** (continued)

| | 6AV7 884-0 | 6AV7 884-1 | 6AV7 884-2 | 6AV7 884-3 | 6AV7 884-5 | 6AV7 883-6 (PRO) | 6AV7 883-7 (PRO) |
|---|---|---|---|---|---|---|---|
| Front panel | 12" TFT Touch | 12" TFT Key | 15" TFT Touch | 15" TFT Key | 19" TFT Touch | 15" TFT Touch | 19" TFT Touch |
| **Display** | | | | | | | |
| Resolution (W x H in pixels) | 800 x 600 | 800 x 600 | 1024 x 768 | 1024 x 768 | 1280 x 1024 | 1024 x 768 | 1280 x 1024 |
| MTBF backlit display (at 25 °C) | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent | 50000 h at 24 h continuous operation, temperature-dependent |
| **Type of operation** | | | | | | | |
| Function keys | No | 36 | No | 36 | No | No | No |
| Alphanumeric keyboard | No | Yes | No | Yes | No | No | No |
| Touch screen (analog/resistive) | Yes | No | Yes | No | Yes | Yes | Yes |
| Mouse on the front | No | Yes | No | Yes | No | No | No |
| **Design** | | | | | | | |
| Centralized configuration | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Distributed configuration | No | No | No | No | No | No | No |
| **Dimensions** | | | | | | | |
| Mounting dimensions in centralized configuration (W x H x D, without optical drive) in mm | 368 x 290 x 61 | 450 x 290 x 61 | 450 x 290 x 65 | 450 x 321 x 60 | 450 x 380 x 71 | 400 x 310 x 98 | 483 x 400 x 115 |
| Operator control unit (W x H) in mm | 400 x 310 (7 HE) | 483 x 310 (19", 7 HE) | 483 x 310 (19", 7 HE) | 483 x 355 (19", 8 HE) | 483 x 400 (19", 9 HE) | 483 x 400 (19", 9 HE) | 483 x 400 (19", 9 HE) |
| **Weights** | 6.1 kg | 6.6 kg | 7.0 kg | 6.6 kg | 7.2 kg | 7.4 kg | 10.9 kg |
| **General features** | | | | | | | |
| Accessories | Touch protective membranes | Insertable strips for keyboard | Touch protective membranes | Insertable strips for keyboard | Touch protective membranes | Touch protective membranes | Touch protective membranes |
| Power loss in maximum configuration | 24 V DC: max. 45 W | 24 V DC: max. 45 W | 24 V DC: max. 55 W | 24 V DC: max. 55 W | 24 V DC: max. 60 W | 24 V DC: max. 55 W | 24 V DC: max. 55 W |

**2**

**2**

## ■ Ordering data

| | Order No. |
|---|---|
| ***Preferred versions*** | |
| ("Built to order" max. delivery time 15 working days and replacement hardware units in exchange) | |
| **SIMATIC HMI IPC477C embedded** | **6AV7 884-■ A ■ ■ ■ - ■ ■ ■ 0** |
| operated without fan; 5 x USB 2.0 (500 mA), 1 of which on the front, 1 x COM (RS232) 24 V DC power supply with on/off-switch | |
| Front panels | |
| • 12" TFT Touch | **0** |
| • 15" TFT Touch | **2** |
| • 19" TFT Touch | **5** |
| Processors and fieldbus | |
| • Celeron M 1.2 GHz, 2 x PROFINET (IE) | **A** |
| • Celeron M 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 | **B** |
| • Core2Solo 1.2 GHz, 2 x PROFINET (IE) | **D** |
| • Core2Solo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 | **E** |
| • Core2Duo 1.2 GHz, 2 x PROFINET (IE) | **G** |
| • Core2Duo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 | **H** |
| Main memory (DDR3 RAM), 1 database | |
| • 2 GB | **2** |
| Second mass storage (formatted, without software) | |
| • without | **0** |
| • CompactFlash 2 GB | **2** |
| • CompactFlash 4 GB | **3** |
| • CompactFlash 8 GB | **4** |
| • SSD (Solid State Disk), min. 32 GB | **6** |
| First mass storage (pre-installed with SIMATIC software) | |
| • CompactFlash 2 GB | **2** |
| • CompactFlash 4 GB | **3** |
| • CompactFlash 8 GB | **4** |
| • SSD (Solid State Disk), min. 32 GB | **6** |

[1] not with Celeron M 1.2 GHz processor

| | Order No. |
|---|---|
| **SIMATIC HMI IPC477C embedded** | **6AV7 884-■ A ■ ■ ■ - ■ ■ ■ 0** |
| operated without fan; 5 x USB 2.0 (500 mA), 1 of which on the front 1 x COM (RS232) 24 V DC power supply with on/off-switch | |
| Operating system | |
| • Windows Embedded 2009, pre-installed | **B** |
| • Windows XP Professional Multi Language, only with SSD; without SIMATIC Software | **D A** |
| Software packages, only with CF 4 GByte or higher | |
| • Without SIMATIC software | **B A** |
| • with operating system and RTX [1] WinAC RTX 2009 pre-installed and configured | **B B** |
| • with operating system and HMI [1] WinCC flexible 2008 SP1 RT (incl. archives/recipes) pre-installed and configured | |
| - Number of tags 128 PT | **B C** |
| - Number of tags 512 PT | **B D** |
| - Number of tags 2048 PT | **B E** |
| - Number of tags 4096 PT | **B F** |
| • with operating system and HMI [1] WinCC flexible 2008 SP1 RT (incl. archives/recipes) pre-installed and configured | |
| - Number of tags 128 PT | **B K** |
| - Number of tags 512 PT | **B L** |
| - Number of tags 2048 PT | **B M** |
| - Number of tags 4096 PT | **B N** |

# PROFINET/Industrial Ethernet
## Embedded Automation

**SIMATIC HMI IPC477C embedded**

| Ordering data | Order No. |
|---|---|

*More bundles
with SIMATIC HMI IPC477C
and WinCC V7.0 SP1*

**SIMATIC HMI IPC477C**
operated without fan;
4 x USB 2.0 on the rear,
1 x USB 2.0 on the front,
2 x 10/100/1000 MBit/s Ethernet
(RJ45);
Software pre-installed on CF/SSD
Windows Embedded Standard
SIMATIC WinCC V7.0 SP1

| **Client** | **6AV7 884-■ AA10 - 4 B X 0** |
|---|---|
| Celeron M 1.2 GHz processor, 1 GByte DDR3 RAM, CF Card 8 GByte, RT-License 128 PT on USB stick | |
| • 15" TFT Touch | **2** |
| • 19" TFT Touch | **5** |

| **Client and Single Station** | **6AV7 884-■ AE20 - 4 B X 0** |
|---|---|
| Core2Solo processor 1.2 GHz, PROFIBUS DP, 2 GByte DDR3 RAM-, CF Card 8 GByte, RT-License 128 PT | |
| • 15" TFT Touch | **2** |
| • 19" TFT Touch | **5** |

| Ordering data | Order No. |
|---|---|

| **Single Station** | **6AV7 884-■ AH30 - ■ B ■ 0** |
|---|---|
| Core2Duo 1.2 GHz processor, PROFIBUS DP, 4 GByte DDR3 RAM- | |
| • 15" TFT Touch | **2** |
| • 19" TFT Touch | **5** |
| • 8 GByte CF Card | **4** |
| • 32 GByte SSD | **6** |
| • RT-License 128 PT on USB stick | **X** |
| • RT-License 2048 PT on USB stick | **W** |

| **SIMATIC HMI IPC477C with WinAC RTX F** | **6AV7 884-■ AH20 - 4 B P 0** |
|---|---|
| Core2Duo 1.2 GHz processor, 2 x PROFINET (IE), 1 x PROFIBUS DP, 2 GByte DDR3 RAM CompctFlashCard inserted (internal); 8 GByte. Software pre-installed on CF card RTX F: WinAC RTX F 2009 | |
| • 12" TFT Touch | **0** |
| • 12" TFT Key | **1** |
| • 15" TFT Touch | **2** |
| • 15" TFT Key | **3** |
| • 19" TFT Touch | **5** |

**2**

## Ordering data

| | Order No. |
|---|---|
| *Further HMI IPC477C and IPC477C PRO as "built to order"-versions* (max. delivery time 15 working days and repair of the unit) | |
| **SIMATIC HMI IPC477C** embedded and operated without fan, 5 x USB 2.0 (500 mA), one of which on the front, 1 x COM (RS232) 24 V DC power supply with on/off-switch | 6AV7 884-■ A ■ ■ ■ - ■ ■ ■ 0 |
| **SIMATIC HMI IPC477C PRO** embedded and operated without fan in a all-round protected IP65 housing, 5 x (500 mA), one of which on the front, 24 V DC power supply with on/off-switch | 6AV7 883-■ A ■ ■ ■ - ■ ■ ■ 0 |
| Front panels | |
| • 12" TFT Touch (not for PRO versions) | **0** |
| • 12" TFT Key (not for PRO versions) | **1** |
| • 15" TFT Touch (not for PRO versions) | **2** |
| • 15" TFT Key (not for PRO versions) | **3** |
| • 19" TFT Touch (not for PRO versions) | **5** |
| • 15" TFT Touch (IP65 housing; PRO) | **6** |
| • 15" TFT Key (IP65 housing; PRO) | **7** |
| Processors and fieldbus | |
| • Celeron M 1.2 GHz, 2 x PROFINET (IE) | **A** |
| • Celeron M 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS DP 12 | **B** |
| • Core2Solo 1.2 GHz, 2 x PROFINET (IE) | **D** |
| • Core2Solo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS | **E** |
| • Core2Solo 1.2 GHz, 1 x PROFINET (IE), 1 x PROFINET (3 ports) | **F** |
| • Core2Duo 1.2 GHz, 2 x PROFINET (IE) | **G** |
| • Core2Duo 1.2 GHz, 2 x PROFINET (IE), 1 x PROFIBUS | **H** |
| • Core2Duo 1.2 GHz, 1 x PROFINET (IE), 1 x PROFINET (3 ports) | **J** |
| Main memory (DDR3 RAM), 1 database | |
| • 1 GB | **1** |
| • 2 GB | **2** |
| • 4 GB | **3** |
| Second mass storage (formatted, without software) | |
| • without | **0** |
| • CompactFlash 2 GB | **2** |
| • CompactFlash 4 GB | **3** |
| • CompactFlash 8 GB | **4** |
| • SSD (Solid State Disk), min. 32 GB | **6** |

| | Order No. |
|---|---|
| **SIMATIC HMI IPC477C** embedded and operated without fan, 5 x USB 2.0 (500 mA), one of which on the front, 1 x COM (RS232) 24 V DC power supply with on/off-switch | 6AV7 884-■ A ■ ■ ■ - ■ ■ ■ 0 |
| **SIMATIC HMI IPC477C PRO** embedded and operated without fan in a all-round protected IP65 housing, 5 x USB 2.0 (500 mA), one of which on the front 1 x COM (RS232) 24 V DC power supply with on/off-switch | 6AV7 883-■ A ■ ■ ■ - ■ ■ ■ 0 |
| Mass storage (built-in, Windows XP embedded (DE/EN) pre-installed and optional with SIMATIC software) | |
| • CompactFlash 2 GB | **2** |
| • CompactFlash 4 GB | **3** |
| • CompactFlash 8 GB | **4** |
| • SSD (Solid State Disk), min. 32 GB | **6** |
| Operating system | |
| • Windows Embedded 2009, pre-installed | **B A** |
| • Windows XP Professional Multi Language, only with SSD; without SIMATIC software | **D A** |
| Software packages for CF 4 GByte or higher | |
| • with operating system and RTX [1] Windows XP embedded pre-installed, WinAC RTX 2009 pre-installed and configured for PROFIBUS | **B B** |
| • with operating system and HMI Windows XP embedded pre-installed, WinCC flexible 2008 SP1 RT (incl. archives/recipes) pre-installed and configured | |
| - Number of tags 128 PT | **B C** |
| - Number of tags 512 PT | **B D** |
| - Number of tags 2048 PT | **B E** |
| - Number of tags 4096 PT | **B F** |
| • with operating system and HMI/RTX [1] Windows XP embedded pre-installed, WinCC flexible 2008 SP1 RT (incl. archives/recipes) and WinAC RTX 2009 pre-installed and configured | |
| - Number of tags 128 PT | **B K** |
| - Number of tags 512 PT | **B L** |
| - Number of tags 2048 PT | **B M** |
| - Number of tags 4096 PT | **B N** |

[1] not with Celeron M 1.2 GHz processor

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC HMI IPC477C embedded

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| *Accessories* | | *Expansion components* | |
| **Protective membrane for Panel PCs 477/577/677/877** | | **SIMATIC IPC DiagMonitor V4.1** | **6ES7 648-6CA04-1YX0** |
| For protecting the touch screen against dirt/scratches | | Software tool for monitoring SIMATIC PCs, incl. manual, on CD-ROM (German/English) | |
| • for 12" Touch | **6AV7 671-2BA00-0AA0** | | |
| • for 15" Touch | **6AV7 671-4BA00-0AA0** | **SIMATIC IPC Image & Partition Creator V3.0** | **6ES7 648-6AA03-0YA0** |
| • for 19" Touch | **6AV7 672-1CE00-0AA0** | Software tool for preventive data backup and hard disk partitioning for SIMATIC PCs, incl. manual on CD-ROM (German, English) | |
| **Labeling membranes for Panel PCs 477/577/677/877** | **6AV7 672-0DA00-0AA0** | | |
| For labeling soft keys and function keys, blank, supplied in sets of 10 | | **SIMATIC IPC USB FlashDrive** | **6ES7 648-0DC40-0AA0** |
| | | 2 GB, USB 2.0, metal enclosure, bootable | |
| **Touch pen** | **6AV7 672-1JB00-0AA0** | **3.5" USB disk drive** | **6FC5 235-0AA05-1AA2** |
| Undetachable pen for operation of the touch devices, mounting of the support on the control cabinet | | With 1 m connecting cable | |
| | | **Industrial USB Hub 4** | **6AV6 671-3AH00-0AX0** |
| | | 4 x USB 2.0, IP65 for control cabinet door or DIN rail | |
| | | **SIMATIC IPC Compact Flash Card** | |
| | | • 2 GB | **6ES7 648-2BF02-0XF0** |
| | | • 4 GB | **6ES7 648-2BF02-0XG0** |
| | | • 8 GB | **6ES7 648-2BF02-0XH0** |
| | | **IE TP Cord RJ45/RJ45** | |
| | | TP cable 4 x 2 with two RJ45 plugs | |
| | | • 0.5 m | **6XV1 870-3QE50** |
| | | • 1 m | **6XV1 870-3QH10** |
| | | • 2 m | **6XV1 870-3QH20** |
| | | • 6 m | **6XV1 870-3QH60** |
| | | • 10 m | **6XV1 870-3QN10** |

Please note:

The scope of supply of the HMI IPC477C mainly comprises a Panel PC and license package. The CompactFlash card with preinstalled and configured software is already inserted in the Panel PC.

The required license keys are on the USB flash drive in the license package.

**2**

## Overview



- WinAC MP, the software PLC based on Windows CE
- An optimized version is available for all current MP platforms
- The economical solution for all applications in combination with a rugged hardware platform
- Ideal for tasks on the machine level, saves space and costs
- Best service concept, backup/restore of all data on a standard SD card, standard Multi Media Card or standard USB stick

## Design

The WinAC MP is functionally very closely based on a hardware CPU and is a real alternative for price-sensitive applications that require the stability and ruggedness of a hardware solution.

The functions of the WinAC MP are integrated directly in WinCC flexible and STEP 7 during the installation on the configuration computer. This ensures that every user can freely configure and if necessary block access to, for example, the start/stop button or the LEDs in the SIMATIC HMI project. Of course a prefabricated user interface will be delivered as an example.

Retentivity of the timers, counters, flags and data blocks is ensured by the Multi Panel hardware as with a hardware CPU. A UPS is not required.

The time distribution on the Multi Panel between WinAC MP and HMI Runtime is predefined and can be adapted to the relevant application.

For time-critical applications, an OB35 time block (min. clock-pulse rate 1 ms) is available for processing the time-critical signals. Direct responses can be integrated into the process with OB40 (I/O alarms) as well. For service and optimization purposes, there are diverse functions available such as a histogram for cycle times that can be embedded in the user's SIMATIC HMI project.

### Versions

Different WinAC MP versions are available. The versions define new CPU performance classes.

- The versions are optimized for the Multi Panel platforms. These versions, namely WinAC MP 177, 277 to 377 are based roughly on the hardware CPUs 314, 315 and 317. They have similar quantity frameworks but are not a 1:1 copies.
- All limit values, e.g. number of bit memories, DBs, FCs, I/Os, etc., are preset as with a hardware CPU and cannot be changed by the user. Detailed technical data is provided in chapter "Technical Data".

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC WinAC MP

**Technical specifications**

| Product type designation | 6ES7 671-4EE00-0YA0<br>WinAC MP 177 | 6ES7 671-5EF00-0YA0<br>WinAC MP 277 | 6ES7 671-7EG00-0YA0<br>WinAC MP 377 |
|---|---|---|---|
| **Memory** | | | |
| RAM | | | |
| • integrated | 128 Kibyte | 256 Kibyte | 512 Kibyte |
| • expandable | No | No | No |
| Load memory | | | |
| • integrated RAM, max. | 8 Mbyte | 1.2 Mbyte | 1.2 Mbyte |
| **CPU/blocks** | | | |
| DB | | | |
| • Number, max. | 512; FBs+FCs+DBs=512 | 1 024; FBs+FCs+DBs=1024 | 2 048; FBs+FCs+DBs=2048 |
| • Size, max. | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| FB | | | |
| • Number, max. | 512; FBs+FCs+DBs=512 | 1 024; FBs+FCs+DBs=1024 | 2 048; FBs+FCs+DBs=2048 |
| • Size, max. | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| FC | | | |
| • Number, max. | 512; FBs+FCs+DBs=512 | 1 024; FBs+FCs+DBs=1024 | 2 048; * max. 2048 in Summe |
| • Size, max. | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| OB | | | |
| • Number, max. | 18 | 18 | 18 |
| • Size, max. | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| Nesting depth | | | |
| • per priority class | 8 | 8 | 16 |
| • additional within an error OB | 2 | 2 | 2 |
| **Times/counters**<br>**and their remanence** | | | |
| S7 counter | | | |
| • Number | 128 | 256 | 512 |
| • of which remanent without battery | | | |
|   - adjustable | Yes | Yes | Yes |
|   - lower limit | 0 | 0 | 0 |
|   - upper limit | 127 | 256 | 512 |
| • Remanence | | | |
|   - adjustable | Yes | Yes | Yes |
|   - preset | 8 | 8 | 8 |
| • Counting range | | | |
|   - lower limit | 0 | 0 | 0 |
|   - upper limit | 999 | 999 | 999 |
| IEC counter | | | |
| • present | Yes; SFB0, SFB1, SFB2 | Yes; SFB0, SFB1, SFB2 | Yes; SFB0, SFB1, SFB2 |
| S7 times | | | |
| • Number | 128 | 256 | 512 |
| • of which remanent without battery | | | |
|   - adjustable | Yes | Yes | Yes |
|   - lower limit | 0 | 0 | 0 |
|   - upper limit | 127 | 256 | 512 |
| • Remanence | | | |
|   - adjustable | Yes | Yes | Yes |
|   - preset | 0 | 0 | 0 |
| • Time range | | | |
|   - lower limit | 10 ms | 10 ms | 10 ms |
|   - upper limit | 9 990 s | 9 990 s | 9 990 s |
| IEC timer | | | |
| • present | Yes; SFB3, SFB4, SFB5 | Yes; SFB3, SFB4, SFB5 | Yes; SFB3, SFB4, SFB5 |

**2**

■ **Technical specifications** (continued)

| Product type designation | 6ES7 671-4EE00-0YA0<br>WinAC MP 177 | 6ES7 671-5EF00-0YA0<br>WinAC MP 277 | 6ES7 671-7EG00-0YA0<br>WinAC MP 377 |
|---|---|---|---|
| **Data areas and their remanence** | | | |
| Retentive data area in total (incl. times, counters, flags), max. | 64 Kibyte | 128 Kibyte | 256 Kibyte |
| Flag | | | |
| • Number, max. | 2 Kibyte | 2 Kibyte | 4 Kibyte |
| • Remanence available | Yes | Yes | Yes |
| Data blocks | | | |
| • Number, max. | 512 | 1 024 | 2 048 |
| • Size, max. | 64 Kibyte | 64 Kibyte | 64 Kibyte |
| Local data | | | |
| • per priority class, max. | 16 384 byte;<br>for all priority classes | 16 384 byte;<br>Max. for all priority classes | 16 384 byte;<br>Max. for all priority classes |
| **Address area** | | | |
| I/O address area | | | |
| • overall | 2 Kibyte | 4 Kibyte | 8 Kibyte |
| • Outputs | 2 Kibyte | 4 Kibyte | 8 Kibyte |
| Process image | | | |
| • Inputs | 1 Kibyte | 2 Kibyte | 2 Kibyte |
| • Outputs | 1 Kibyte | 2 Kibyte | 2 Kibyte |
| • Inputs, adjustable | 1 Kibyte | 2 Kibyte | 2 Kibyte |
| • Outputs, adjustable | 1 Kibyte | 2 Kibyte | 2 Kibyte |
| • Inputs, preset | 512 byte | 512 byte | 512 byte |
| • Outputs, preset | 512 byte | 512 byte | 512 byte |
| • consistent data, max. | 32 byte | 32 byte | 32 byte |
| **Hardware config.** | | | |
| Number of DP masters | | | |
| • integrated | 1 | 1 | 1 |
| **Time** | | | |
| Operating hours counter | | | |
| • Number | 8 | 8 | 8 |
| • Number/Number range | 0 to 7 | 0 to 7 | 0 to 7 |
| **S7 message functions** | | | |
| Process diagnostic messages | Yes | Yes | Yes |
| **Test commissioning functions** | | | |
| Status/control | | | |
| • Status/control variable | Yes; Status blocks, single step, breakpoint | Yes; Status blocks, single step, breakpoint | Yes; Status blocks, single step, breakpoint |
| Forcing | | | |
| • Forcing | No | No | No |
| Diagnostic buffer | | | |
| • present | Yes | Yes | Yes |
| • Number of entries, max. | 1 000; preset 120 | 1 000; preset 120 | 1 000; preset 120 |
|   - adjustable | Yes | Yes | Yes |

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC WinAC MP

**Technical specifications** (continued)

| Product type designation | 6ES7 671-4EE00-0YA0<br>WinAC MP 177 | 6ES7 671-5EF00-0YA0<br>WinAC MP 277 | 6ES7 671-7EG00-0YA0<br>WinAC MP 377 |
|---|---|---|---|
| **Communication functions** | | | |
| Number of logical connections (also in network), max. | 8 | 16 | 32 |
| PG/OP communication | Yes | Yes | Yes |
| Routing | Yes | Yes | Yes |
| Global data communication | | | |
| • supported | No | No | No |
| S7 basic communication | | | |
| • supported | No | No | No |
| S7 communication | | | |
| • supported | Yes; PUT/GET, BSEND/BRCV, USEND/URCV | Yes; PUT/GET, without BSEND/BRCV | Yes |
| • as server | Yes | Yes | Yes |
| • as client | Yes | Yes | Yes |
| • Useful data per job, max. | 480 byte | 0.48 Kibyte | 0.48 Kibyte |
| Number of connections | | | |
| • overall | 8; (max. 8 DP, rest PROFINET) | 16; (DP max.8, rest PN) | 32; (DP max.8, rest PN) |
|   - of which static | | 14; DP max.6, rest PN | 30; DP max.6, rest PN |
| • usable for PG communication | | | |
|   - reserved for PG communication | 1 | 1 | 1 |
| • usable for OP communication | | | |
|   - reserved for OP communication | 1 | 1 | 1 |
| • usable for routing | 6 | 6 | 16 |
| **1st interface** | | | |
| DP master | | | |
| • Number of connections, max. | 4 | 8 | 8 |
| • Services | | | |
|   - PG/OP communication | Yes | Yes | Yes |
|   - Routing | Yes | Yes | Yes |
|   - Global data communication | No | No | No |
|   - S7 basic communication | No | No | No |
|   - S7 communication | Yes | Yes | Yes |
|   - Equidistance support | No | No | No |
|   - SYNC/FREEZE | Yes | Yes | Yes |
|   - Activation/deactivation of DP slaves | Yes | Yes | Yes |
|   - DPV1 | Yes | Yes | Yes |
| • Transmission rates, max. | 12 Mbit/s | 12 000 kbit/s | 12 000 kbit/s |
| • Number of DP slaves, max. | 32 | 32 | 32 |
| • Address area | | | |
|   - Inputs, max. | 2 Kibyte | 2,048 Kibyte | 8,192 Kibyte |
|   - Outputs, max. | 2 Kibyte | 2,048 Kibyte | 8,192 Kibyte |

**2**

## Technical specifications (continued)

| Product type designation | 6ES7 671-4EE00-0YA0<br>WinAC MP 177 | 6ES7 671-5EF00-0YA0<br>WinAC MP 277 | 6ES7 671-7EG00-0YA0<br>WinAC MP 377 |
|---|---|---|---|
| **CPU/programming** | | | |
| Configuration software | | | |
| • STEP 7 | Yes; STEP7 V5.4 SP4 or higher | Yes | Yes |
| • WinCC flexible Compact | Yes; WinCC flexible 2008 SP1 | No | No |
| • WinCC flexible Standard | Yes; WinCC flexible 2008 SP1 | Yes | Yes |
| • WinCC flexible Advanced | Yes; WinCC flexible 2008 SP1 | Yes | Yes |
| Programming language | | | |
| • LAD | Yes | Yes | Yes |
| • CSF | Yes | Yes | Yes |
| • STL | Yes | Yes | Yes |
| • SCL | Yes | | |
| • CFC | Yes | | |
| Software libraries | | | |
| • Process diagnostics | Yes; System error messages | | |
| Cycle time monitoring | | | |
| • adjustable | Yes | Yes | Yes |
| • preset | 6 000 ms | 6 000 ms | 6 000 ms |
| **Operating systems** | | | |
| Operating system | | | |
| • Win CE | Yes; Version 5.0 or higher | Yes | Yes |
| **Online languages** | | | |
| Number | 1; English | 1; English | 1; English |

## Ordering data

| | Order No. | | Order No. |
|---|---|---|---|
| **WinAC MP,**<br>**version WinAC MP 177** [2]<br><br>incl. a Single License<br>for MP 177 on USB stick[1]<br>and electronic documentation | **6ES7 671-4EE00-0YA0** | *Complete pre-assembled packages* | |
| | | **Package MP 177 6" Touch**<br>• MP 177 6" Touch<br>• WinAC MP Version 177<br>• Electronic documentation<br>• Single License for MP 177<br>on USB flash drive[1]<br>• Standard SD card 256 MB (empty) | **6AV6 652-2JC01-2AA0** |
| **WinAC MP,**<br>**version WinAC MP 277** [2]<br><br>incl. a Single License<br>for MP 277 on USB stick[1]<br>and electronic documentation | **6ES7 671-5EF01-0YA0** | | |
| | | **Package MP 277 8" Touch**<br>• MP 277 8" Touch<br>• WinAC MP Version 277<br>• Electronic documentation<br>• Single License for MP 277<br>on USB stick[1]<br>• Standard SD card 256 MB (empty) | **6AV6 652-3MC01-1AA0** |
| **WinAC MP,**<br>**version WinAC MP 377** [2]<br><br>incl. a Single License<br>for MP 377 on USB stick[1]<br>and electronic documentation | **6ES7 671-7EG01-0YA0** | | |
| | | **Package MP 277 8" Key**<br>• MP 277 8" Key<br>• WinAC MP Version 277<br>• Electronic documentation<br>• Single License for MP 277<br>on USB stick[1]<br>• Standard SD card 256 MB (empty) | **6AV6 652-3LC01-1AA0** |

[1] Can only be used for license handling
[2] UCL version on request

# PROFINET/Industrial Ethernet
## Embedded Automation

### SIMATIC WinAC MP

**2**

| **Ordering data** (continued) | Order No. | | Order No. |
|---|---|---|---|

*Complete pre-assembled packages* (continued)

*Starter packages* (continued)

| **Package MP 277 10" Touch** | 6AV6 652-3PC01-1AA0 |
|---|---|
| • MP 277 10" Touch | |
| • WinAC MP Version 277 | |
| • Electronic documentation | |
| • Single License for MP 277 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

| **Package MP 277 10" Key** | 6AV6 652-3NC01-1AA0 |
|---|---|
| • MP 277 10" Key | |
| • WinAC MP Version 277 | |
| • Electronic documentation | |
| • Single License for MP 277 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

| **Package MP 377 12" Touch** | 6AV6 652-4FC01-2AA0 |
|---|---|
| • MP 377 12" Touch | |
| • WinAC MP Version 377 | |
| • Electronic documentation | |
| • Single License for MP 377 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

| **Package MP 377 12" Key** | 6AV6 652-4EC01-2AA0 |
|---|---|
| • MP 377 12" Key | |
| • WinAC MP Version 377 | |
| • Electronic documentation | |
| • Single License for MP 377 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

| **Package MP 377 15" Touch** | 6AV6 652-4GC01-2AA0 |
|---|---|
| • MP 377 15" Touch | |
| • WinAC MP Version 377 | |
| • Electronic documentation | |
| • Single License for MP 377 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

| **Package MP 377 19" Touch** | 6AV6 652-4HC01-2AA0 |
|---|---|
| • MP 377 19" Touch | |
| • WinAC MP Version 377 | |
| • Electronic documentation | |
| • Single License for MP 377 on USB stick[1] | |
| • Standard SD card 256 MB (empty) | |

*Starter packages*

| **Starter package 613 WinAC MP** | 6AV6 652-2JD01-2AA0 |
|---|---|
| • SIMATIC MP 177 6" Touch with installation accessories, mounting seal, power supply connector | |
| • SIMATIC WinAC MP incl. Single License on USB flash drive and electronic documentation | |
| • SD card 256 KB (empty) | |
| • ET 200M incl. | |
| • 16 DI, 16 DO, 8 AI, 2 AO | |
| • FM 350-2 8-channel counter | |
| • Front connector, bus connector, and mounting rail | |

| **Starter package 635T WinAC MP** | 6AV6 652-2JD01-2AA1 |
|---|---|
| • SIMATIC MP 177 6" Touch with installation accessories, mounting seal, power supply connector | |
| • SIMATIC WinAC MP incl. Single License on USB flash drive and electronic documentation | |
| • SD card 256 KB (empty) | |
| • ET 200M incl. | |
| • 32 DI, 16 DO, 8 AI, 2 AO | |
| • FM 350-2 8-channel counter | |
| • Front connector, bus connector, and mounting rail | |

| **Starter package 635K WinAC MP** | 6AV6 652-3LD01-1AA1 |
|---|---|
| • SIMATIC MP 277 8" Key with installation accessories, mounting seal, power supply connector | |
| • SIMATIC WinAC MP incl. Single License on USB flash drive and electronic documentation | |
| • SD card 256 KB (empty) | |
| • ET 200M incl. | |
| • 32 DI, 16 DO, 8 AI, 2 AO | |
| • FM 350-2 8-channel counter | |
| • Front connector, bus connector, and mounting rail | |

| **Starter package 636K WinAC MP** | 6AV6 652-3LD01-1AA0 |
|---|---|
| • SIMATIC MP 277 8" Key with installation accessories, mounting seal, power supply connector | |
| • SIMATIC WinAC MP incl. Single License on USB flash drive and electronic documentation | |
| • SD card 256 KB (empty) | |
| • ET 200M incl. | |
| • 32 DI, 16 DO, 8 AI, 2 AO | |
| • Front connector, bus connector, and mounting rail | |

| **Starter package 636T WinAC MP** | 6AV6 652-3PD01-1AA0 |
|---|---|
| • SIMATIC MP 277 10" Touch with installation accessories, mounting seal, power supply connector | |
| • SIMATIC WinAC MP incl. Single License on USB flash drive and electronic documentation | |
| • SD card 256 KB (empty) | |
| • ET 200M incl. | |
| • 32 DI, 16 DO, 8 AI, 2 AO | |
| • Front connector, bus connector, and mounting rail | |

[1] Can only be used for license handling

[2] UCL version on request

**2**

## ■ Data communication

### *Standard communication*

This comprises standardized protocols for data communication.

### ISO, TCP/IP, UDP transport protocols

ISO, TCP/IP and UDP are available as transport protocols.

### PROFINET

Based on Industrial Ethernet, PROFINET enables direct communication of field devices (IO Devices) with controllers (IO Controllers) as well the solution of isochronous drive controls for motion control applications.

PROFINET also supports distributed automation with the help of component engineering (Component Based Automation).

### Media Redundancy Protocol (MRP)

Procedure specified in the IEC 61158 Type 10 standard for increasing the network availability in a ring topology.

### Information technology (IT)

IT integrates SIMATIC into the information technology via Industrial Ethernet. These communication media and paths are also available to SIMATIC as a result of the TCP/IP protocol. Depending on the product and stage of expansion, communications processors support technologies from the IT environment such as:

- *E-mail;*
  Via the integral e-mail client, network components, communications processors and network transitions can send emails to provide information about plant states, e.g. plant standstill or imminent overload, or to automatically request a service call.

- *Freely definable HTML pages;*
  Communications processors can perform web diagnostics using static HTML pages and a user-specific display is supported with by means of freely definable HTML pages.

- *FTP;*
  the File Transfer Protocol (FTP) permits simple, universal coupling, e.g. the PLC can be connected to different computers or embedded systems

### IP routing (IP-R)

The connection for the SIMATIC S7 to Industrial Ethernet (CP 343-1 Advanced and CP 443-1 Advanced), with two separate interfaces (integrated network separation) and SCALANCE S and SCALANCE X414-3E, supports the forwarding of IP messages between Gigabit and PROFINET interfaces.

### OPC (Openness, Productivity & Collaboration)

OPC is a standardized, open and manufacturer-independent interface and allows OPC-capable Windows applications to interface to S7 communication (SEND/ RECEIVE). Internet communication can be implemented over the OPC XML DA interface.

### PG/OP communication

Integral communication functions that are used by the SIMATIC automation systems to perform data communication with HMI devices (e.g. TP/OP) and SIMATIC PGs.

### S7 communication

S7 communication is the integral communications function (SFB) that has been optimized within the SIMATIC S7/C7. It enables PCs and workstations to be connected. The maximum volume of user data per task is 64 KB. S7 communication offers simple, powerful communication services and provides a network independent software interface for all networks.

### Open communication

The open communication (SEND/RECEIVE) allows the SIMATIC S7 controller to communicate with other SIMATIC S7 and SIMATIC S5 controllers, PCs and third-party systems. In addition, for the simple connection of HMI stations, FETCH and WRITE are offered.

### BACnet communication

BACnet (**B**uilding **A**utomation and **C**ontrol **Net**works) is a communication protocol for data networks in building automation and control developed by ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers Inc.). It is equally suitable for both the management and automation level and is recognized as an ANSI, CEN and ISO standard.

### MES/ERP communication

Communication with ERP- or MES systems via databases such as ORACLE, MySQL, MS-SQL, DB2, with a firmware extension to be ordered separately.

### *System connections*

For many data terminals, communications processors (CPs) are available that already have the communications functions implemented as firmware and which therefore relieve the data terminal of communication tasks (e.g. flow control, blocking, etc.).

### *Time synchronization*

By means of SIMATIC procedures or NTP (Network Time Protocol), plant-wide time synchronization is achieved.

| ISO | TCP/ UDP | PN | MRP | IT | IP-R | OPC | PG/ OP | S7/ S5 |
|-----|----------|-----|-----|-----|------|-----|--------|--------|
| ● | ● | ● | ● | ● | ● | ● | ● | ● |

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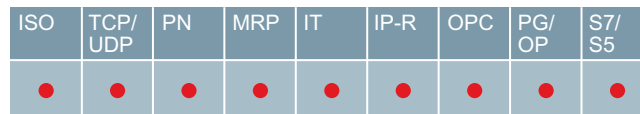
# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

## Overview

■ **Communications processors for SIMATIC and SINUMERIK**



S7-400

S7-300

S7-200

SIMATIC S7-200/S7-300/S7-400

STEP 7
Micro/Win

STEP 7

• CP 243-1
• CP 243-1 IT

• CP 343-1 Lean
• CP 343-1
• CP 343-1 Advanced
• CP 343-1 BACnet
• CP 343-1 ERPC

• CP 443-1
• CP 443-1
Advanced

For the protocols (support depending on type of CP)

► PG/OP communication
► S7 communication
► Open communication (SEND/RECEIVE)
► PROFINET
► Web diagnostics
► IP: HTTP (proprietary Web pages), emails, FTP
► BACnet protocol (CP 343-1 BACnet only)
► Platform for protocols to data bases etc. by means of partner software (CP 343-1 ERPC only)
► Additional services for time synchronization, SNMP, media redundancy etc.

Multiprotocol:
• all protocols of a CP simultaneously operable
• several CPs operable in one S7-200, S7-300 or S7-400

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System connections for SIMATIC

*CPs with standard functions*

• CP 243-1 for SIMATIC S7-200, CP 343-1 Lean and CP 343-1 for SIMATIC S7-300, CP 443-1 for SIMATIC S7-400
• Designed for use in harsh industrial environments
• Shipbuilding certification for use on ships and offshore units
• Additional integrated 2-port switch for setting up small local networks with CP 343-1 Lean, CP 343-1 and CP 443-1
• Can be used via RJ45 interface for the industrial-standard SIMATIC NET FastConnect cabling system
• High-speed data transfer even with large volumes of data (10/100 Mbit/s)

*CPs with function expansions*

• CP 243-1 IT for SIMATIC S7-200
  - With IT functionality
• CP 343-1 Advanced for SIMATIC S7-300
  - With IT functionality
  - Can be used as a PROFINET IO Controller and IO Device with real-time characteristics
  - PROFINET CBA
  - With Gigabit connection, incl. routing functionality (10/100/1000 Mbit/s)
  - Network separation with IP-routing functionality
  - Additional integrated 2-port switch for setting up small local networks
  - Access protection via IP access list
  - Comprehensive diagnostics capabilities
• CP 443-1 Advanced for SIMATIC S7-400
  - With IT functionality
  - Can be used as a PROFINET IO Controller with real-time characteristics
  - With Gigabit connection, incl. routing functionality (10/100/1000 Mbit/s)
  - Network separation with IP-routing functionality
  - Additional integrated 4-port switch for setting up small local networks
  - Access protection via IP access list
  - Comprehensive diagnostics capabilities
  - Operation in SIMATIC H system for redundant S7 communication
  - Operation in fail-safe applications (PROFIsafe) together with SIMATIC S7-400 CPU 416F

*CPs for special areas of operation "Value Added CP"*

Special "Value Added" CPs are available for special communication tasks and to support the SIMATIC CPU.

The product range of the S7-300 system has been expanded by two new CP versions:

• The CP 343-1 ERPC has been optimized with additional partner software for connection to MES or ERP systems.
• CP 343-1 BACnet (Building Automation and Control Networks) for building automation.

2

## ■ Communication overview for SIMATIC and Telecontrol

| | Hardware | ISO | TCP | UDP | IO Controller | IO Device | CBA | MRP | Diagnostics (Web, SNMP) | FTP, e-mail, freely definable HTML pages | IP-R | PG/OP | Standard system | High-availability communication | SEND/RECEIVE | Fetch/Write | TSEND/TRECV | Sending stations | Receiving stations | with NTP | SINAUT ST7 | BACnet | ERP-Connect |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIMATIC S7-200 | CP 243-1 | | | | | | | | • 5) | • | | • | • | | | | | | | | | | |
| SIMATIC S7-300/C7 | CP 343-1 Lean | | • | • | | • | | • 6) | • | | | • | • 4) | | • | • | | • 3) | • | • | | | |
| | CP 343-1 | • | • | • | • 2) | • 2) | | • 6) | • | | | • | • | | • | • | | • 3) | • | • | | | |
| | CP 343-1 Advanced | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | | • 3) | • | • | | | |
| | CP 343-1 BACnet | | • | • | | | | | | | | • | • | | • | • | | | • | • | | • | |
| | CP 343-1 ERPC | | • | • | | | | | • | | | • | • | | • | • | | • 3) | • | • | | | • |
| | TIM 4R/RD 7) | | | | | | | | | | | • | | | | | | | | | • | | |
| | TIM 3V-IE | | | | | | | | | | | • | | | | | | | | | • | | |
| | TIM 3V-IE Advanced | | | | | | | | | | | • | | | | | | | | | • | | |
| | TIM 4R-IE 7) | | | | | | | | | | | • | | | | | | | | | • | | |
| SIMATIC S7-400 | CP 443-1 | • | • | • | • | | | • | • | | | • | • | • 1) | • | • | • | • 3) | • | • | | | |
| | CP 443-1 Advanced | • | • | • | • | | • | • | • | • | • | • | • | • 1) | • | • | • | • 3) | • | • | | | |
| | TIM 4R/RD 7)8) | | | | | | | | | | | • | | | | | | | | | • | | |
| | TIM 4R-IE 7)8) | | | | | | | | | | | • | | | | | | | | | • | | |

1) ISO protocol only
2) IO Controller or IO Device
3) if S7-CPU is clock master
4) S7 server only
5) only standard page for system diagnosis

6) Firmware V2.2 or higher
7) Stand alone can be used
8) S7-300 module format, connection to S7-400 CPU using MP or Industrial Ethernet

• suitable

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Communication overview for SIMATIC and Telecontrol SINAUT

**2**

## CP 343-1 ERPC

### Overview



| ISO | TCP/UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|-----|---------|-----|-----|-----|------|-------|-------|
|  | ● |  |  |  |  | ● | ● |

- The CP 343-1 ERPC (Enterprise Connect) is a communications processor for connecting the SIMATIC S7-300 to an Industrial Ethernet
- Support of a connection of the SIMATIC S7-300 to various database systems for the vertical integration by means of a firmware expansion from ILS-Technology to be ordered separately
- RJ45 interface for 10/100/1000 Mbit/s full/half duplex with autosensing/autonegotiation/autocrossover and sleeve
- Communication services
  - Open communication (SEND/RECEIVE)
  - PG/OP communication
  - S7 communication (client, server, multiplexing) incl. routing
- Access protection by means of a configurable IP access list
- Remote programming and first commissioning via Industrial Ethernet
- Configuring with STEP 7
- Time synchronization by means of NTP or SIMATIC procedure (SNAP)
- Support of module replacement without programming device; all configuration data is stored on the C-PLUG. When using the database function, the CP 343-1 ERPC must be prepared for the exchange, i.e. the firmware extension from ILS-Technology must already be installed on the replacement module.
- Extensive diagnostics functions via STEP 7 or web browser
- Integration into network management systems through the support of SNMP V1 MIB-II

### Benefits



- Protection of investment for existing systems through the integration of the SIMATIC S7-300 by means of open communication services
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via LAN/WAN (e.g. Internet)
  - Monitoring by network management tools (SNMP)
  - Module exchange without programming device using the C-PLUG swap medium
- Protection against unauthorized access without changing passwords, through device-specific IP address lists
- Reliable network connection through industry-standard device connection with IE FC RJ45 plug 145/180 and additional strain relief by latching the connector onto housing
- Flexible use thanks to absence of slot rules

### Application

The CP 343-1 ERPC (Enterprise Connect) is the communication module for supporting the database interface of the SIMATIC S7-300 to various ERP or MES systems for vertical integration by means of a firmware extension to be ordered separately .

With its own processor, the module relieves the CPU of communications tasks and facilitates additional connections.

The CP 343-1 ERPC permits communication of the S7-300 with:

- PG/PC
- HMI devices
- SIMATIC S5/S7/C7 systems
- ERP or MES systems by means of database interface, e.g. ORACLE, MySQL, MS-SQL, DB2 by means of a firmware extension to be ordered separately

**2**

## Design

The CP 343-1 ERPC offers all the advantages of the SIMATIC S7-300 design:

- Compact design;
  the rugged plastic enclosure features the following on the front panel:
  - RJ45 socket for connection to Industrial Ethernet;
    Automatic detection of data transfer rate by means of auto-sensing function;
    The RJ45 socket is designed to be industry-compatible with an additional sleeve for connection of the IE FC RJ45 Plug 145/180;
    Integral autocrossover function permits use of uncrossed connecting cables
  - 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
  - Diagnostics LEDs for indicating the operational and communication status
- Easy installation;
  the CP 343-1 ERPC is mounted on the rail of the S7-300 and connected to the adjacent modules by means of the bus connectors. No slot rules apply.
- Fanless operation;
  no backup battery required.
- The CP 343-1 ERPC can also be used in the expansion rack (ER) in conjunction with the IM 360/361
- The C-PLUG (configuration plug) is included in the scope of delivery as replacement medium (operation without C-PLUG is not possible)

## Function

The CP 343-1 ERPC independently handles data traffic over Industrial Ethernet. The module has its own processor and can be put into service directly using the unique preset Ethernet address (MAC) via the network.

Due to the support of the dynamic host configuration protocol (DHCP), the IP address can be assigned from a central DHCP server.

For connection monitoring (keep alive), an adjustable time can be configured for all TCP transport connections.

The CP 343-1 Advanced works in multi-protocol mode for the following communication services:

- PG/OP communication
  Access by HMI systems to the SIMATIC S7-300 by means of OP communication;
  With the aid of PG/OP communication all S7-stations connected to the network can be remotely programmed.
  - S7 routing;
    With the aid of S7 routing it is possible to use programming device communication across networks.
- S7-communication for the connection of the S7-300 (server and client) to S7-200/300/400, HMI devices and PCs (SOFTNET-S7 or CP 1613 A2 / CP 1623 with S7-1613).
- Open communication (SEND/RECEIVE);
  - A large number of stations can be accessed thanks to the multicast function
  - Use of the socket interface in the partner system possible without RFC 1006

### Enterprise Connect (ERPC)

Based on TCP/IP, a universal database interface is made available with a firmware extension to be ordered separately. This supports the coupling with ERP/MES systems via databases such as ORACLE, MySQL, MS-SQL, DB2 and massage queue functions of IBM Websphere.

For further information on firmware expansion, refer to "device-WISE Embedded Edition for SIMATIC S7".

### Diagnostics

Extensive diagnostics options are available via STEP 7 or web browser, including:

- Operating status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- LAN controller statistics
- Diagnostic buffer

Additional diagnostics options:

- Scanning the status of connections by means of a function block
- Integration into network management systems through the support of SNMP V1 MIB-2 objects;
  this allows the current status of the Ethernet interface to be called up, e.g. for network management.

### Security

The CP 343-1 ERPC offers the possibility of restricting access to the local S7 station on the partner with quite specific IP addresses. Unauthorized partners have no access to data of the S7 station via this CP.

### Configuration

STEP 7 V5.4 SP5 or higher and the associated hardware support package are required for configuring the CP 343-1 ERP.

For the configuration of the database objects, see "deviceWISE Embedded Edition for SIMATIC S7".

# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

**CP 343-1 ERPC**

■ **Integration**
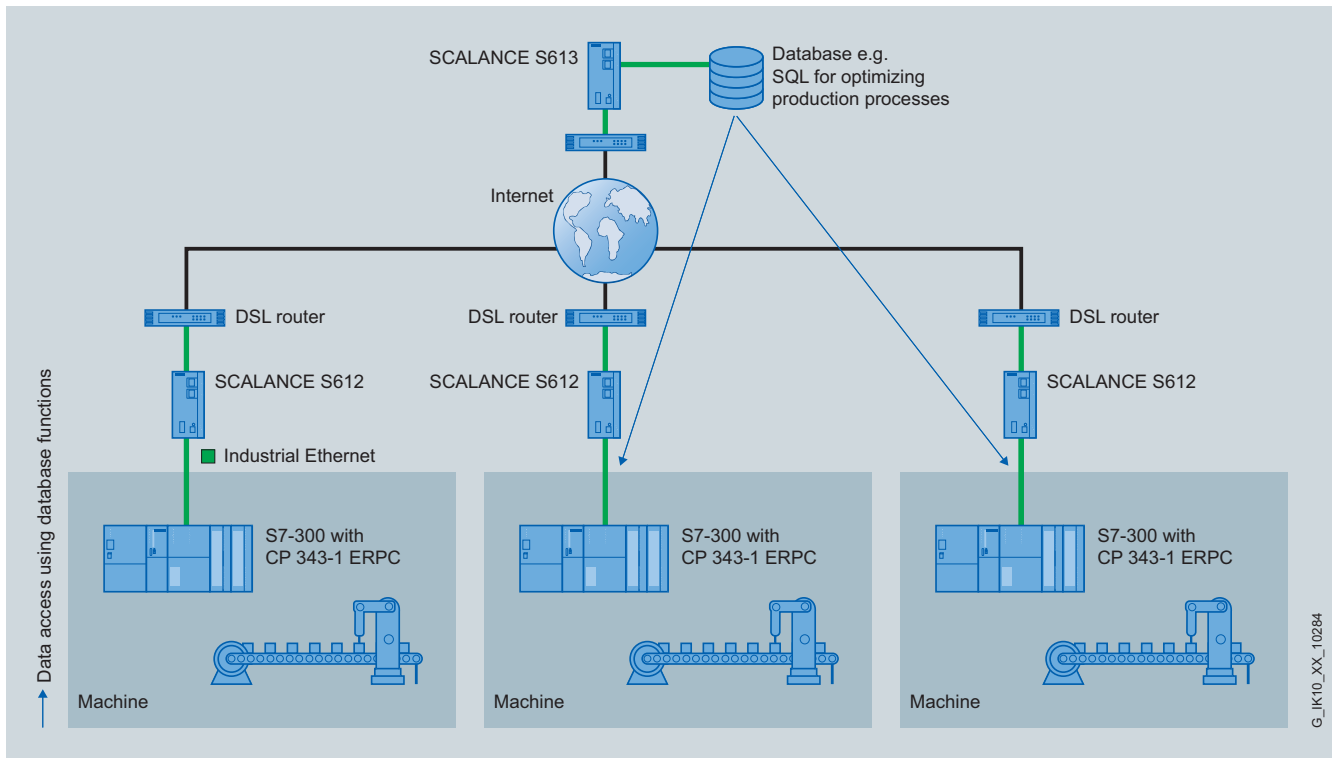
Configuration example for optimizing production processes with CP 343-1 ERPC
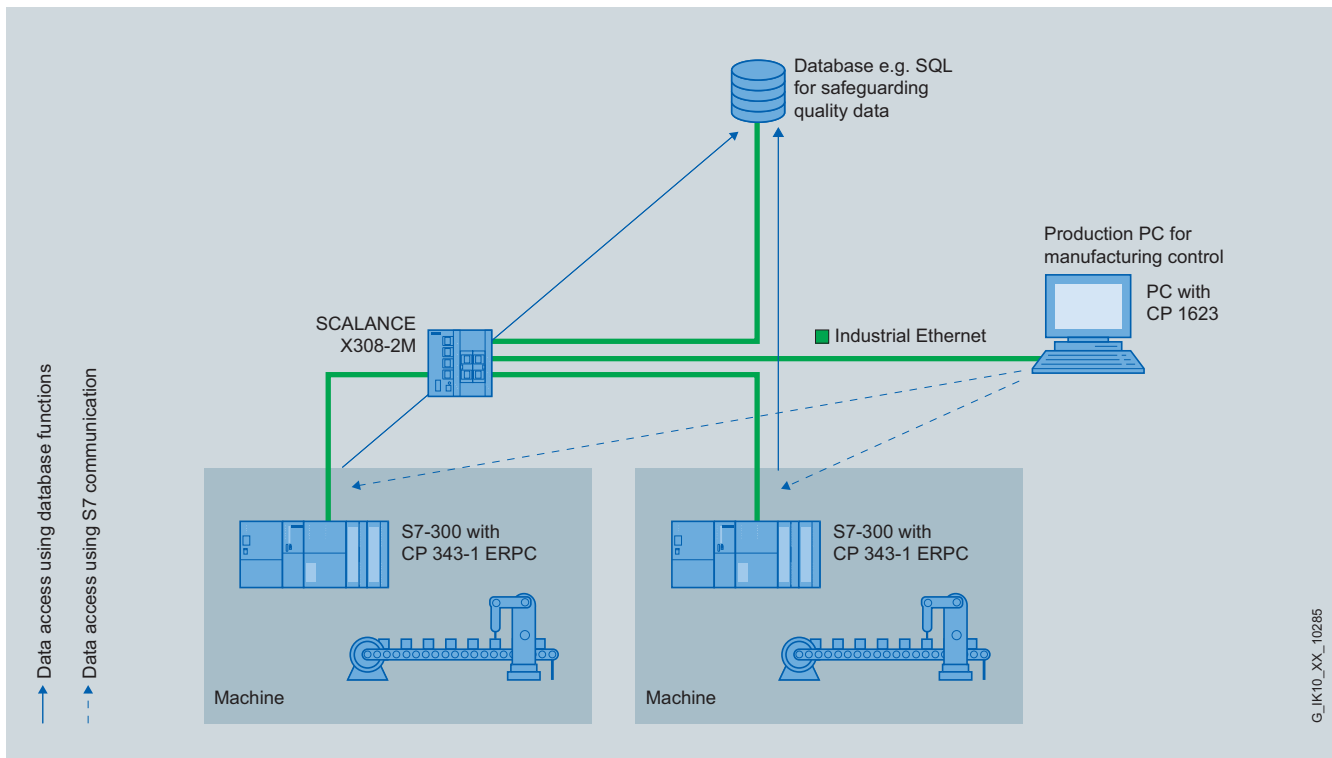


Configuration example for the safeguarding of quality data with CP 343-1 ERPC

# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

**2**

## ■ Technical specifications

| Order No. | 6GK7 343-1FX00-0XE0 |
| --- | --- |
| **Product type designation** | **CP 343-1 ERPC** |
| **Data transmission rate** | |
| Transmission rate at interface 1 | 10 … 1 000 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • at interface 1 in accordance with Industrial Ethernet | 1 |
| • For power supply | 1 |
| Design of electrical connection | |
| • at interface 1 in accordance with Industrial Ethernet | RJ45 port |
| • For power supply | 2-pin pluggable terminal strip |
| Design of the swap medium C-Plug | Yes |
| **Supply voltage, current consumption, power loss** | |
| Type of power supply | DC |
| Power supply | |
| • 1 from backplane bus | 5 V |
| • External | 24 V |
| Relative positive tolerance at 24 V DC | 20 % |
| Relative negative tolerance at 24 V DC | 15 % |
| Current consumed | |
| • Typical from backplane bus at 5 V DC | 0.3 A |
| • Maximum from external power supply for 24 V DC | 0.6 A |
| Effective power loss | 14.7 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | 0 … 60 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | – |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Module format | Compact module S7-300 double width |
| Width | 80 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.8 kg |

| Order No. | 6GK7 343-1FX00-0XE0 |
| --- | --- |
| **Product type designation** | **CP 343-1 ERPC** |
| **Performance data** | |
| Performance data Open communication | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum | 8 |
| Data volume | |
| • As user data per ISO connection for open communication by means of SEND/RECEIVE blocks, maximum | 8 Kibyte |
| • As user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks, maximum | 8 Kibyte |
| • As user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum | 8 Kibyte |
| • As user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum | 2 Kibyte |
| Number of multicast stations | 8 |
| Performance data S7 communication | |
| Number of possible connections for S7 communication | |
| • Maximum | 8 |
| • For PG/OP connections, maximum | 8 |
| Number of possible connections for S7 communication - Note | – |
| Performance data Multiprotocol operation | |
| Number of active connections for multiprotocol operation | 32 |
| Performance data IT functions | |
| Number of possible connections as server with HTTP, maximum | 1 |
| Number of possible write cycles of the flash memory cells | 100 000 |
| Performance data ERPC functions | |
| Number of configurable ERPC symbols for database access | |
| • Per CPU, maximum | 2 000 |
| • Per logical trigger, maximum | 255 |
| Data quantity as user data and header information per logical trigger | 8 Kibyte |

# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

**CP 343-1 ERPC**

**2**

## ■ Technical specifications (continued)

| Order No. | 6GK7 343-1FX00-0XE0 |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Product functions Management, configuration, programming** | |
| Product function: MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software required | NCM S7 for Industrial Ethernet (is delivered with STEP 7 V5.x) |
| **Product functions Diagnostics** | |
| Product function: Web-based diagnostics | Yes |

| Order No. | 6GK7 343-1FX00-0XE0 |
|---|---|
| Product type designation | CP 343-1 ERPC |
| **Product functions Security** | |
| Product function | |
| • ACL - IP-based | Yes |
| • Switching-off of nonrequired services | Yes |
| • Blocking of communication via physical ports | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | No |
| • Passing-on of time synchronization | Yes |
| NTP protocol is supported | Yes |

## ■ Ordering data

| | Order No. | | Order No. |
|---|---|---|---|
| **CP 343-1 communications processor ERPC (Enterprise Connect)** | 6GK7 343-1FX00-0XE0 | **SOFTNET-S7 Lean Edition 2008 for Industrial Ethernet** up to 8 connections | |
| For the connection of SIMATIC S7-300 to Industrial Ethernet and for the support of the database connection of the SIMATIC S7-300 to various databases; TCP/UDP, S7 communication, open communication (SEND/RECEIVE), with and without RFC 1006, multicast, web server, setting of CPU's clock using SIMATIC procedures and NTP, access protection via IP access list, SNMP, DHCP, initialization over LAN 10/100/1000 Mbit/s; with electronic manual on DVD, C-PLUG included in scope of delivery | | • Single license for 1 installation | 6GK1 704-1LW71-3AA0 |
| | | • Software Update Service for 1 year, with automatic extension; requirement: current software version | 6GK1 704-1LW00-3AL0 |
| | | • Upgrade from Edition 2006 and higher to Edition 2008 | 6GK1 704-1LW00-3AE0 |
| | | • Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 | 6GK1 704-1LW00-3AE1 |
| | | **S7-1613 Edition 2008** | |
| **C-PLUG** | 6GK1 900-0AB00 | Software for S7 and open communication, incl. PG/OP communication, OPC server and NCM PC; up to 120 connections, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; for CP 1613/CP 1613 A2/CP 1623; German/English | |
| Swap medium for simple replacement of devices in the event of a fault; for recording configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot | | | |
| *SOFTNET Edition 2008 for Industrial Ethernet* | | | |
| Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English | | • Single license for 1 installation | 6GK1 716-1CB71-3AA0 |
| | | • Software Update Service for 1 year, with automatic extension; requirement: current software version | 6GK1 716-1CB00-3AL0 |
| | | • Upgrade S7-1613, Edition 2006 or higher, to S7-1613 Edition 2008 | 6GK1 716-1CB00-3AE0 |
| | | • Upgrade S7-1613 from V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2008 | 6GK1 716-1CB00-3AE1 |
| **SOFTNET-S7 Edition 2008 for Industrial Ethernet** up to 64 connections | | **IE FC RJ45 Plug 180** | |
| • Single license for 1 installation | 6GK1 704-1CW71-3AA0 | RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | |
| • Software Update Service for 1 year, with automatic extension; requirement: current software version | 6GK1 704-1CW00-3AL0 | | |
| • Upgrade from Edition 2006 and higher to Edition 2008 | 6GK1 704-1CW00-3AE0 | • 1 pack = 1 item | 6GK1 901-1BB10-2AA0 |
| | | • 1 pack = 10 items | 6GK1 901-1BB10-2AB0 |
| • Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 | 6GK1 704-1CW00-3AE1 | • 1 pack = 50 items | 6GK1 901-1BB10-2AE0 |

■ **Ordering data**

| | Order No. | | Order No. |
|---|---|---|---|
| **IE FC TP Standard Cable GP 2 x 2 (Type A)**<br><br>4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; <u>Sold by the meter</u> max. length 1,000 m; minimum order 20 m | **6XV1 840-2AH10** | **IE FC TP Flexible Cable GP 4 x 2**<br><br>8-core, shielded TP installation cable for occasional movement; with UL approval; <u>Sold by the meter</u> max. length 1,000 m; minimum order 20 m | |
| | | • AWG 24, for connection to IE FC RJ45 Plug 4 x 2 | **6XV1 878-2B** |
| **SCALANCE X308-2 Industrial Ethernet Switch**<br><br>2 x 1000 Mbit/s multi-mode fiber-optic cable ports (SC sockets), 1 x 10/100/1000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multi-mode) up to 750 m long | **6GK5 308-2FL00-2AA3** | **STEP 7 Version 5.4**<br><br>*Target system*: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC<br>*Requirement*: Windows 2000 Prof./XP Prof.<br>*Type of delivery:* German, English, French, Spanish, Italian; including 3.5" authorization diskette, without documentation | |
| | | • Floating License on CD | **6ES7 810-4CC08-0YA5** |
| **IE FC RJ45 Plug 4 x 2**<br><br>RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface | | • Rental License for 50 hours | **6ES7 810-4CC08-0YA6** |
| | | • Software Update Service on CD (requires current software version) | **6ES7 810-4BC01-0YX2** |
| | | • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD | **6ES7 810-4CC08-0YE5** |
| • 1 pack = 1 item | **6GK1 901-1BB11-2AA0** | • Trial License STEP 7 V5.4; on CD, runs for 14 days | **6ES7 810-4CC08-0YA7** |
| • 1 pack = 10 items | **6GK1 901-1BB11-2AB0** | **deviceWISE Embedded Edition for SIMATIC S7** | See deviceWISE Embedded Edition for SIMATIC S7 |
| • 1 pack = 50 items | **6GK1 901-1BB11-2AE0** | | ILS Technology LLC; 5300 Broken Sound Blvd. Suite 150 Boca Raton, FL, USA, 33487 |
| **IE FC TP Standard Cable GP 4 x 2**<br><br>8-core, shielded TP installation cable for universal applications; with UL approval; <u>Sold by the meter</u> max. length 1,000 m; minimum order 20 m | | | Tel.: +1-561-982-9898 x124 Fax: +1-561-982-8638 E-mail: <u>devicewise@ilstechnology.com</u> |
| • AWG 22, for connection to IE FC RJ45 Modular Outlet | **6XV1 870-2E** | | |
| • AWG 24, for connection to IE FC RJ45 Plug 4 x 2 | **6XV1 878-2A** | | |

## CP 343-1 BACnet

### Overview



| BACnet | TCP/ UDP | PN | MRP | IT | IP-R | PG/OP | S7/S5 |
|--------|----------|-----|-----|-----|------|-------|-------|
| ● | ● | | | | | ● | ● |

- BACnet (**B**uilding **A**utomation and **C**ontrol **Net**works) is a communication protocol for data networks in building automation and control developed by ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers Inc.). It is equally suitable for both the management and automation level and is recognized as an ANSI, CEN and ISO standard.
- The CP 343-1 BACnet is a communications processor for the connection of the SIMATIC S7-300 to the Industrial Ethernet and via the BACnet protocol it also permits the integration in systems that support the BACnet protocol
- 2 x RJ45 interfaces for 10/100 Mbit/s full/half duplex connection with autosensing/autonegotiation/autocrossover functionality
- Integrated 2-port switch
- Communication services
  - Open communication (SEND/RECEIVE)
  - PG/OP communication (TCP/IP)
  - S7 communication (server)
  - BACnet communication based on TCP/IP, BACnet server according to EN 16484, Part 5
- Extensive diagnostics functions via STEP 7
- Integration into network management systems through the support of SNMP V1 MIB-II

### Benefits



- Direct integration of SIMATIC S7-300 into industrial plants or building systems by means of Industrial Ethernet/BACnet at up to 100 Mbit/s
- Protection of investment for existing systems through the integration of the SIMATIC S7-300 by means of open communication
- Flexible use thanks to absence of slot rules
- Optimum support of maintenance through
  - Remote programming via LAN/WAN (e.g. Internet)
  - Monitoring by network management tools (SNMP)
- Easy module replacement
- Reliable network connection through industry-standard device connection with IE FC RJ45 plug 145/180 and additional strain relief by latching the connector onto housing

### Application

The CP 343-1 BACnet is the communication module for the connection of SIMATIC S7-300 to Industrial Ethernet and is used for the integration of the SIMATIC S7 into BACnet systems. Via BACnet communications, the CP can also communicate with a third-party system such as heating or ventilation controllers.

With its own processor, the module relieves the CPU of communications tasks and facilitates additional connections.

The CP 343-1 BACnet permits the S7-300 to communicate with:

- PG/PC
- HMI devices
- SIMATIC S5/S7/C7 systems

Possible fields of application:

- Industrial building automation
- HVAC (heating, ventilation and air conditioning) solutions using PLCs at the automation level
- Infrastructure markets
- Airports
- Tunnels
- Totally Integrated Automation (TIA)
- Totally Integrated Power (TIP)

### Design

The CP 343-1 BACnet offers all the advantages of the SIMATIC S7-300 design:

- Compact design;
  the rugged plastic enclosure features the following on the front panel:
  - Two RJ45 sockets for connection to Industrial Ethernet/ BACnet;
    the RJ45 sockets are industrially compatible and designed with additional holding collars, for connecting the IE FC RJ45 Plug 145/180;
    automatic sensing of the data transmission rate by means of the Autosensing function;
  - 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
  - Diagnostics LEDs for each port for indicating the operational and communication status
- Easy installation;
  the CP 343-1 BACnet is installed on the mounting rail of the S7-300 and is connected to adjacent modules via the bus connector. No slot rules apply.
- The CP 343-1 BACnet can be operated without a fan; no back-up battery is required.
- The CP 343-1 BACnet can also be used in the expansion rack (ER) in conjunction with the IM 360/361
- The module can be replaced without using a programming device

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## ■ Function

The CP 343-1 BACnet independently handles data traffic via Industrial Ethernet and BACnet protocol. The module has its own processor and can be put into service directly using the unique preset Ethernet address (MAC) via the network.

Due to the support of the dynamic host configuration protocol (DHCP), the IP address can be assigned from a central DHCP server.

The CP 343-1 BACnet works in multi-protocol mode for the following communication services:

- PG/OP communication
  PG/OP communication allows all S7 stations connected to the network to be remotely programmed.
  - S7 routing;
    with the aid of S7 routing it is possible to use PG communication across networks.
- S7 communication
- Open communication (SEND/RECEIVE)
- A large number of stations can be accessed thanks to the multicast function
- Use of the socket interface in the partner system possible without RFC 1006
- Integral autocrossover function permits use of uncrossed connecting cables
- BACnet communication based on TCP/IP, BACnet server according to EN 16484, Part 5

Siemens completes its building control system DESIGO with the SIMATIC S7. DESIGO S7 introduces two new performance packages to building automation:

- Building Solution
- Building Integration

These enable projects to be implemented for "Industrial Building Automation" where programmable logic controllers (PLCs) are required at the automation level.

The <u>DESIGO S7 Building Solution</u> performance package permits the use of SIMATIC S7 within a DESIGO system (control system for building automation) with an S7-HVAC library (**H**eating, **V**entilation and **A**ir Conditioning), that is based on the library of DESIGO PX. Communication with the DESIGO system is by means of BACnet. This permits efficient engineering of HVAC applications.

With <u>DESIGO S7 Building Integration</u>, existing SIMATIC S7 (software without HVAC library) components are efficiently integrated into a DESIGO system by means of BACnet communication.

### BACnet communication

Based on TCP/IP, a BACnet server compliant with EN 16484, Part 5 is made available. The CP processes the protocol autonomously as far as possible so that the CPU is not burdened with the BACnet protocol. The CP 343-1 BACnet optionally supports:

- BACnet communication for any SIMATIC software by mapping SIMATIC data onto BACnet
- HVAC functions with BACnet communication by using corresponding function blocks;
  these HVAC function blocks are a component of the block library and are to be incorporated in the S7 user program.
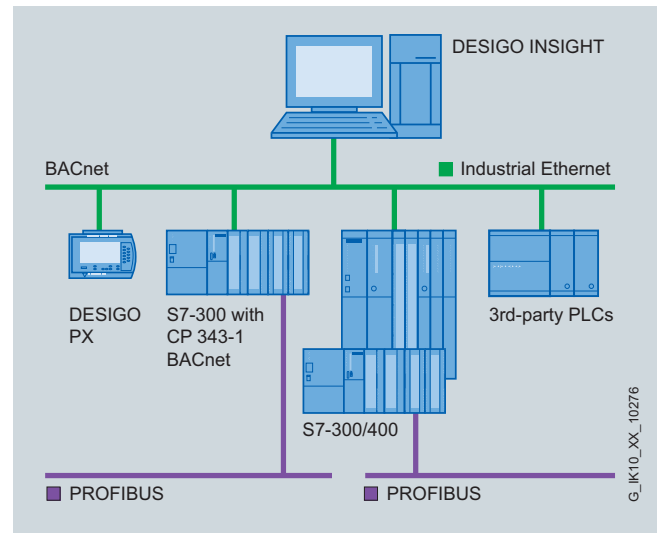


Linear structure with CP 343-1 BACnet with integral switch

BACnet consists of:

- Standardized services that are processed autonomously by the CP
- Standardized objects that present a user view of the automation

The actual configuration of the BACnet objects and their mapping to S7 data is performed by a BACnet mapping tool

The configuration data of the BACnet objects generated by the mapping tool can be downloaded to the SIMATIC S7 using the general download function or using Delta download. The mapping tool can be obtained free of charge from your local Siemens I BT office.

The standardized transport protocol UDP is used for BACnet, as it already has sufficient transport checking mechanisms available. Like TCP, UDP is a transport protocol, but unlike TCP it operates on a connectionless basis. BACnet devices may only work with the UDP port number permanently assigned to them. The UDP port number 47808 = 0xBAC0 is registered for BACnet.

The Ethernet IP addressing consists of the IP address, the subnet mask and the default gateway. BACnet devices within one subnet have the same subnet address. In the case of devices with integral BBMD functionality (**B**ACnet **B**roadcast **M**anagement **D**evice), e.g. DESIGO automation stations, DHCP – the automatic assignment of IP addresses in networks – is generally not permitted.

BACnet uses broadcast messages for the communication, i.e. all devices are addressed directly. As a rule, Ethernet IP routers block these broadcast messages so that a direct connection of Ethernet subnets is not possible. By using BBMD, broadcast messages can still be distributed.

# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

**CP 343-1 BACnet**

**2**

## Function (continued)

### Diagnostics

Extensive diagnostics options are available via NCM, including:

- Operating status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- LAN controller statistics
- Diagnostic buffer

Diagnostic options during operation

- Integration into network management systems through the support of SNMP V1 MIB-2 objects;
  this allows the current status of the Ethernet interface to be called up, e.g. for network management.

### Configuration

STEP 7 V5.4 SP4 or higher and NCM S7 for Industrial Ethernet (supplied with STEP 7 V5.x) plus a hardware support package (HSP) are required for configuring the CP 343-1 BACnet. The configuration data of the CP is stored on the CPU. This means a module can be replaced without a PG.
An additional "Building Integration" runtime license (reference number S55372-C107) is required in order to use the BACnet protocol on the module. Please contact your regional Siemens representative for ordering the license.

## Technical specifications

| Order No. | 6FL4 343-1CX10-0XE0 |
|---|---|
| **Product type designation** | **CP 343-1 BACnet** |
| **Data transmission rate** | |
| Transmission rate at interface 1 | 10 … 100 Mbit/s |
| **Interfaces** | |
| Number of electrical connections | |
| • at interface 1 in accordance with Industrial Ethernet | 2 |
| • For power supply | 1 |
| Design of electrical connection | |
| • at interface 1 in accordance with Industrial Ethernet | RJ45 port |
| • For power supply | 2-pin pluggable terminal strip |
| **Supply voltage, current onsumption, power loss** | |
| Type of power supply | DC |
| Power supply | |
| • 1 from backplane bus | 5 V |
| • External | 24 V |
| Relative positive tolerance at 24 V DC | 20 % |
| Relative negative tolerance at 24 V DC | 15 % |
| Current consumed | |
| • Typical from backplane bus at 5 V DC | 0.2 A |
| • Maximum from external power supply for 24 V DC | 0.2 A |
| Effective power loss | 5.8 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | 0 … 60 °C |
| • During storage | -40 … +70 °C |
| • During transport | -40 … +70 °C |
| Ambient temperature - Note | – |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 95 % |
| IP degree of protection | IP 20 |
| **Design, dimensions and weights** | |
| Module format | Compact module S7-300, single-width |
| Width | 40 mm |
| Height | 125 mm |
| Depth | 120 mm |
| Net weight | 0.22 kg |
| **Product properties, functions, components, general** | |
| Maximum number of modules per CPU | 1 |
| Number of modules - Note | Max. 8 per station |

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■ **Technical specifications** (continued)

| Order No.<br>Product type designation | 6FL4 343-1CX10-0XE0<br>CP 343-1 BACnet |
|---|---|
| **Performance data** | |
| Performance data<br>Open communication | |
| Number of possible connections for open communication by means of SEND/RECEIVE blocks, maximum | 8 |
| Data volume | |
| • As user data per TCP connection for open communication by means of SEND/RECEIVE blocks, maximum | 8 Kibyte |
| • As user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks, maximum | 2 Kibyte |
| Number of multicast stations | 8 |
| Performance data<br>S7 communication | |
| Number of possible connections for S7 communication | |
| • Maximum | 4 |
| • For PG connections, maximum | 2 |
| • For PG/OP connections, maximum | 2 |
| Number of possible connections for S7 communication - Note | – |
| Performance data<br>Multiprotocol operation | |
| Number of active connections for multiprotocol operation | 12 |
| Performance data<br>BACnet | |
| BACnet/IP protocol is supported | Yes |
| Product function | |
| • BACnet device type AAC (Advanced Application Controller) | |
| • Peer-to-peer between BACnet automation stations | Yes |
| • BBMD (BACnet Broadcast Management Device) | Yes |
| Maximum number of BACnet I/O objects | 800 |
| Maximum number of BACnet objects, total | 1 500 |
| Influence on the cycle time of the automation system | No effect |
| Required storage capacity of S7 CPU's main memory | 4 Kibyte |
| Standard for BACnet | Communication based on TCP/IP, BACnet server in accordance with EN 16484, Part 5 |

| Order No.<br>Product type designation | 6FL4 343-1CX10-0XE0<br>CP 343-1 BACnet |
|---|---|
| **Product functions Management, configuration, programming** | |
| Product function: MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| Configuration software required | NCM S7 for Industrial Ethernet (is delivered with STEP 7 V5.x). An additional runtime license "Building Integration" (reference number S55372-C107) is required to use the BACnet protocol on the module.<br>To order the license, please contact your regional Siemens partner. |
| **Product functions Switch** | |
| Product function: Switch | Yes |
| Product function | |
| • Switch-managed | No |
| • Configuration with STEP 7 | Yes |
| **Product functions Time** | |
| Product function | |
| • SICLOCK support | Yes |
| • Passing-on of time synchronization | Yes |
| NTP protocol is supported | Yes |

# PROFINET/Industrial Ethernet
## System interfacing for SIMATIC and SINUMERIK

**2**

## CP 343-1 BACnet

| Ordering data | Order No. |
|---|---|
| **CP 343-1 BACnet communications processor** | **6FL4 343-1CX10-0XE0** |
| for the connection of SIMATIC S7-300 to Industrial Ethernet and for the integration of the SIMATIC S7 into BACnet systems; BACnet protocol, S7 communication, open communication (SEND/RECEIVE), with/without RFC 1006; UDP, PG/OP communication | |
| **IE FC TP Standard Cable GP 2 x 2 (Type A)** | |
| 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; | |
| Sold by the meter; max. length 1000 m, minimum order 20 m | **6XV1 840-2AH10** |
| **IE FC RJ45 Plug 145** | |
| RJ45 plug connector 2 x 2 for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 145° cable outlet | |
| • 1 pack = 1 unit | **6GK1 901-1BB30-0AA0** |
| • 1 pack = 10 units | **6GK1 901-1BB30-0AB0** |
| • 1 pack = 50 units | **6GK1 901-1BB30-0AE0** |
| **SCALANCE X204-2 Industrial Ethernet switch** | **6GK5 204-2BB10-2AA3** |
| Industrial Ethernet switches with integrated SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; four 10/100 Mbit/s RJ45 ports and two fiber-optic cable ports | |
| **STEP 7 Version 5.4** | |
| *Target system:* SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement:* Windows 2000 Prof./XP Prof. *Type of delivery:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation | |
| • Floating License on CD | **6ES7 810-4CC08-0YA5** |
| • Rental License for 50 hours | **6ES7 810-4CC08-0YA6** |
| • Software Update Service on CD (requires current software version) | **6ES7 810-4BC01-0YX2** |
| • Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD | **6ES7 810-4CC08-0YE5** |
| • Trial License STEP 7 V5.4; on CD, runs for 14 days | **6ES7 810-4CC08-0YA7** |

### More information

If you have any technical questions on the CP 343-1 BACnet, please contact:

Common Support Entry:
Siemens AG
SBT HQ
Phone: +41 (0) 41 724 5500
Fax: +41 (0) 41 724 5501
E-mail: fieldsupport-zug.ch.sbt@siemens.com
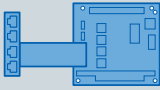
To order the performance packages, please contact your local Siemens I BT office.

■ **Communications processors for PG/PC**

*CPs with an internal microprocessor*

- Protocol software executes on the CP
- Free PC resources for applications
- Suitable for comprehensive applications
- Recommended for applications with HMI systems which have high performance requirements, e.g. WinCC
- Recommended for large systems (eight stations or more, e.g. SIMATIC)
- Constant communication throughput
- Can be used for redundant communication
- Use for PROFINET IO real-time applications (RT, IRT with CP 1616/CP 1604)
- Time synchronization

*CPs without an internal microprocessor*

- Protocol software executes on the PG/PC
- PC resources are divided between communications and applications
- Suitable for less comprehensive applications
- Recommended for smaller applications (up to eight stations, e.g. SIMATIC)
- Communications performance depends on PC resources and PC loading

| Software | Hardware |
|---|---|

**Software**

► You will find software products on the SIMATIC NET/Windows CD.

► Development Kits are available for use in various operating system environments (e.g. for CP 1616 or CP 1604).

► As a rule, the necessary configuration tools are included in the software packages.

► Manuals in PDF format and extensive supplementary information on SIMATIC NET products and communication can be found in the SIMATIC NET Manual Collection which is enclosed with the software products.

SIMATIC NET Manual Collection

**Hardware**

CPs with an internal microprocessor

CP 1613 A2 (PCI)

CP 1623 (PCIe)

CP 1616 (PCI)

CP 1604 (PC/104-Plus)

CP without an internal microprocessor

CP 1612 A2 (PCI 32 Bit)

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System connections for PG/PC

# PROFINET/Industrial Ethernet
## System interfacing for PG/PC

### Introduction

**Communication overview for SIMATIC PCs**

The operating systems listed in the table refer exclusively to the communication products specified! Please refer to the description of the relevant IPC for the operating system that is available and has been released for that IPC.

| Communication hardware | Communication software | Operating system environment of the communication software | | | | | SIMATIC Industrial PC / Field PG | | | | | Embedded Systems — Op. sys. | | Embedded Systems — SIMATIC Industrial PCs [2] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Windows XP Pro + SP2/3 | Windows Server 2003 R2 / SP2 | Windows Server 2008 | Vista Business / Ultimate + SP1 | other operating systems | Field PG M | Rack PC 847B | Rack PC 547B / 547C, Panel PC 577B / 577C | Box PC 627B | Box PC 827B | Microbox 427B / 427C | Windows XPembedded + SP1/SP2/FP 2007 | Microbox 427C | Panel PC 477B / 477C | Panel PC 677B / 677C | Box PC 627B |
| **CPs and software for Industrial Ethernet** | | | | | | | | | | | | | | | | | |
| CP 1613 A2 (PCI 32 Bit) | S7-1613 | ● | ● | ● | ● | – | – | ● | ● | ● | ● | – | – | – | – | ○[6] | ● |
| | S7-REDCONNECT [3] | ● | ● | ● | ● | – | – | ○[3] | ○[3] | ○[5][6] | – | – | – | – | – | ○[4][6] | ○[5][6] |
| CP 1623 (PCIe x1) | S7-1613 | ● | ● | ● | ● | – | – | ○[6] | ● | ○[6] | ○[6] | – | – | – | – | ○[6] | ○[6] |
| | S7-REDCONNECT [3] | ● | ● | ● | ● | – | – | ○[3][6] | ○[3] | ○[5][6] | ○[6] | – | – | – | – | ○[5][6] | ○[5][6] |
| CP 1612 A2 (PCI 32 Bit) | SOFTNET-S7 | ● | ● | ● | ● | – | – | ● | ● | ● | ● | – | – | ● | – | ○[6] | – |
| | SOFTNET-S7 Lean | ● | ● | ● | ● | – | – | ● | ● | ● | ● | – | – | ● | – | ○[6] | – |
| | SOFTNET-S7 | ● | ● | ● | ● | – | – | ● | ● | ● | ● | – | – | ● | – | ○[6] | – |
| SIMATIC PG/PC with integral Ethernet interface | SOFTNET-S7 | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● |
| | SOFTNET-S7 Lean | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● |
| | SOFTNET-PG | ● | ● | ● | ● | – | ● | ● | ● | ● | ● | ● | – | ● | ● | ● | ● |
| **CPs and software for PROFINET** | | | | | | | | | | | | | | | | | |
| CP 1616 [1] (PCI 32 Bit) | DK-16xx PN IO [1] V2.1 | ● | ○ | ○ | ○ | ○ | – | ○ | ○ | ○ | ○ | – | ○ | – | – | ○ | ○ |
| CP 1604 [1] (PCI-104) | DK-16xx PN IO [1] V2.1 | ● | ○ | ○ | ○ | ○ | – | – | – | – | – | ○[2] | ○ | ○[2] | ○[2] | – | – |
| SIMATIC PG/PC with integral Ethernet interface | SOFTNET PN IO | ● | ● | ● | ● | ○[7] | ● | ● | ● | ○ | ○ | ○[2] | ● | ●[2] | ●[2] | ● | ● |
| | PN CBA OPC-Server | ● | ● | ● | ● | – | ● | ● | ● | ○ | ○ | ○[2] | – | – | – | – | – |

1) Use of these CPs requires porting of the Development Kit DK-16xx PN IO to the relevant operating system environment. You can order the DK-16xx PN IO at www.siemens.com/simatic-net/dk16xx on the Internet. It contains sample software for Linux Suse 10 and Windows XP Professional. For IRT operation an exclusive interrupt is necessary; this is not available in all slots. The additional use of CP 1616/CP 1604 is not approved for SIMATIC Industrial PC versions and integrated PROFINET interface.
2) possible with restrictions, if necessary, depending on memory expansion and processor capacity.
3) requires at least 2 PCI or 2 PCIe slots (4-way redundancy requires 4 free PCI or 4 PCIe slots!); hybrid configurations with CP 1613 A2 (PCI) and CP 1623 (PCIe) are possible, depending on PC expansion
4) not possible for 677B/677C in version with 1x PCI or 1x PCIe slot
5) without 4-way redundancy as there are only 2 slots
6) depending on the slots of the selected PC version
7) with SOFTNET PN IO Linux

Notes
- Please always note the supplementary conditions for the specified SIMATIC NET products that you can view on the Internet pages shown below.
- for further details on XP embedded, see http://support.automation.siemens.com/WW/view/de/21661049
- further details on system requirements and operating environments can be found in the Readme file of the communication products on the SIMATIC NET PC Software CD, 2008 SP2 Edition or at http://support.automation.siemens.com/WW/view/de/26610954
- Updates and supplements to the catalog entries, as well as the above tables can be viewed at http://www.siemens.com/simatic-net/ik-info

Legend:
● suitable
– not suitable
● suitable under certain conditions
⊚ on SIMATIC NET CD 2008 SP2 Edition

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Options for connecting Industrial Ethernet CPs to PG/PC

## Overview
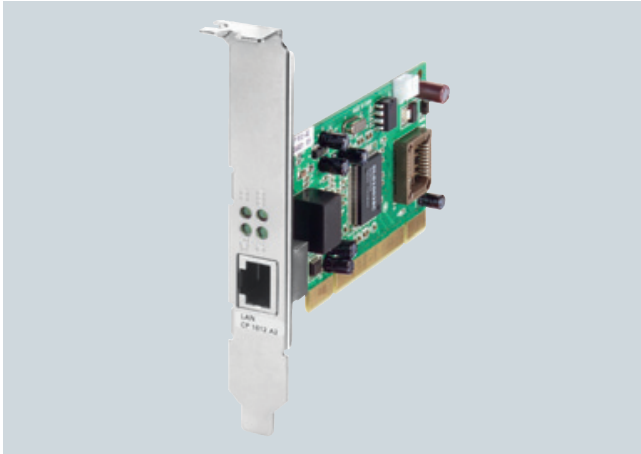


| ISO | TCP/ UDP | PN | MRP | OPC | PG/OP | S7/S5 | IT |
|-----|----------|-----|------|-----|-------|-------|-----|
| ● | ● | ● | | ● | ● | ● | ● |

- PCI card (32 bit; 33 MHz/66 MHz; 3.3 V/5 V Universal Key) for the connection of PG/PC to Industrial Ethernet
- 1 x 10/100/1000 Mbit/s RJ45 port, electrical
- Automatic data transmission rate detection (10/100/1000 Mbit/s), with autosensing and autocrossover function
- Communication services via
  - PROFINET
  - ISO or TCP/IP transport protocol
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Designed for use in industrial environments
- The appropriate OPC servers and configuration tools are included in the scope of supply of the respective communication software.

## Benefits



- Low commissioning overhead due to plug & play and auto-sensing/autocrossover/autonegotiation (10/100/1000 Mbit/s)
- Particularly suitable for industrial use in PCs that require a smaller quantity structure and no integrated switching functionality
- Ideally suited to SOFTNET for Industrial Ethernet and SOFTNET PN IO
- Simple access to automation data via OPC as standard interface
- Uniform procedure and configuration functionality with NCM PC and STEP 7

## Application

The CP 1612 A2 supports the connection to Industrial Ethernet (10/100/1000 Mbit/s) for SIMATIC PG/PC and PCs with a PCI slot. It is designed for use in an industrial environment and can be operated with all SOFTNET for Industrial Ethernet and SOFTNET PN IO packages.

## Design

The CP 1612 A2 module (PCI card 32-bit; 33 MHz/66 MHz; 3.3 V/5 V Universal Key) is inserted directly into a SIMATIC PG/PC or in a PC and requires a PCI slot.

- 1 x RJ45 connection with 10/100/1000 Mbit/s (half/full duplex)
- Installation through PCI standard mechanisms (Plug & Play)

## Function

The CP 1612 A2 offers the following accesses:

- Level 2:
  interface for PC networks in the industrial environment
- Level 4 and Level 7:
  economical access to Industrial Ethernet, e.g. to SIMATIC S5/S7 in connection with SOFTNET packages for Industrial Ethernet.

In addition, the protocols for Industrial Ethernet provided by the operating system are supported.

The IT functionality emerges in connection with the PC's Windows software.

### User interfaces

OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the protocols S7 communication and open communication, in order to connect automation technology applications to OPC-compatible Windows applications (Office, HMI systems, etc.)

### Diagnostics

- Integration into network management systems through the support of SNMP

### Configuration

- The S7 communication and open communication protocols are configured in STEP 7 V5.1 SP3 or higher or NCM PC V5.1 SP2 or higher.
- The NCM PC configuration tool is included in the scope of delivery of the CP 1612 A2 software packages.
- NCM PC is an integral component of Advanced PC Configuration.

# PROFINET/Industrial Ethernet
## System interfacing for PG/PC

**CP 1612 A2**

**2**

### ■ Technical specifications

| Order No.<br>Product type designation | 6GK1 161-2AA01<br>CP 1612 A2 |
|---|---|
| **Data transmission rate** | |
| Transmission rate at interface 1 | 10 … 1 000 Mbit/s |
| **Interfaces** | |
| Number of electrical connections at interface 1 in accordance with Industrial Ethernet | 1 |
| Design of electrical connection | |
| • at interface 1 in accordance with Industrial Ethernet | RJ45 port |
| • of the backplane bus | PCI (32 bits, 3.3 V / 5 V universal key 33/66 MHz) |
| **Supply voltage, current consumption, power loss** | |
| Type of power supply | DC |
| Power supply | |
| • 1 from backplane bus | 5 V |
| • 2 from backplane bus | 12 V |
| Relative symmetrical tolerance | |
| • At 5 V with DC | 5 % |
| • At 12 V with DC | 5 % |
| Current consumed | |
| • Maximum 1 from backplane bus with DC | 0.45 A |
| • Maximum 2 from backplane bus with DC | 0.5 A |
| Effective power loss | 3.65 W |
| **Permissible ambient conditions** | |
| Ambient temperature | |
| • During operating phase | 0 … 55 °C |
| • During storage | -10 … +70 °C |
| • During transport | -10 … +70 °C |
| Relative humidity at 25 °C without condensation during operating phase, maximum | 90 % |
| IP degree of protection | IP00 |
| **Design, dimensions and weights** | |
| Module format | PCI |
| Width | 18 mm |
| Height | 59 mm |
| Depth | 140 mm |
| Net weight | 60 g |
| **Product properties, functions, components, general** | |
| Number of plug-in cards of same design which can be inserted per PC station | 2 |
| Number of modules - Note | – |
| **Performance data** | |
| Performance data Open communication | |
| Software required for open communication by means of SEND/RECEIVE | Yes, SOFTNET-S7 (64 connections) / SOFTNET-S7 Lean (8 connections) |
| Number of possible connections for open communication by means of SEND/RECEIVE, maximum | 64 |

| Order No.<br>Product type designation | 6GK1 161-2AA01<br>CP 1612 A2 |
|---|---|
| Performance data S7 communication | |
| Software required for S7 communication | Yes, SOFTNET-S7 (64 connections) / SOFTNET-S7 Lean (8 connections) |
| Number of possible connections for S7/PG communication, maximum | 64 |
| Performance data Multiprotocol operation | |
| Number of active connections for multiprotocol operation | 64 |
| Number of configurable connections per PC station | 207 |
| Performance data PROFINET communication as PN IO-Controller | |
| Software required for PROFINET IO communication | Yes, SOFTNET PN IO |
| Total number of PN IO-Devices that can be operated on the PROFINET IO-Controller | 64 |
| Number of PN IO IRT-Devices that can be operated on the PROFINET IO-Controller | 0 |
| Data volume | |
| • As user data for input variables as PROFINET IO-Controller, max. | 4 096 byte |
| • As user data for output variables as PROFINET IO-Controller, max. | 4 096 byte |
| • As user data for input variables per PN IO-Device as PROFINET IO-Controller, maximum | 1 472 byte |
| • As user data for output variables per PN IO-Device as PROFINET IO-Controller, maximum | 1 472 byte |
| Performance data PROFINET CBA | |
| Software required for PROFINET CBA communication | Yes, PN CBA OPC-Server |
| Number of remote interconnecting partners for PROFINET CBA | 228 |
| Number of interconnections for PROFINET CBA, total | 10 000 |
| **Product functions Management, configuration, programming** | |
| Product function: MIB support | Yes |
| Protocol is supported | |
| • SNMP v1 | Yes |
| • DCP | No |
| • LLDP | No |
| Configuration software | |
| • Required | NCM PC included in scope of delivery |
| • Required for PROFINET CBA | Yes, SIMATIC iMAP |
| **Product functions Time** | |
| Product function: SICLOCK support | No |
| **Standards, specifications, approvals** | |
| Standard | |
| • For EMC | 2004/108/EC |
| • For CSA and UL safety | CAN/CSA C22.2 & UL 60950-1, UL 1950 |
| • For emitted interference | EN 61000-6-3, EN 61000-6-4 |
| • For noise immunity | EN 61000-6-1, EN 61000-6-2 |
| Certificate of suitability | |
| • CE mark | Yes |
| • C-Tick | Yes |

**CP 1612 A2**

**2**

## ■ Ordering data

| | Order No. | | Order No. |
|---|---|---|---|
| **CP 1612 A2 communications processor** | **6GK1 161-2AA01** | **SOFTNET-S7 Edition 2008 for Industrial Ethernet** | |
| PCI card (32 bit, 33 MHz/66 MHz; 3.3 V/5 V universal keyed) for connection to Industrial Ethernet (10/100/1000 Mbit/s) with RJ45 interface, incl. driver for 32-bit Windows XP Professional SP2/3, 2003 R2 Server SP2, Vista Business/Ultimate SP1, Windows 2008 Server; German/English | | up to 64 connections | |
| | | • Single license for 1 installation | **6GK1 704-1CW71-3AA0** |
| | | • Software Update Service for 1 year, with automatic extension; requirement: current software version | **6GK1 704-1CW00-3AL0** |
| | | • Upgrade from Edition 2006 and higher to Edition 2008 | **6GK1 704-1CW00-3AE0** |
| **SOFTNET Security Client Edition 2008** | **6GK1 704-1VW02-0AA0** | • Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 | **6GK1 704-1CW00-3AE1** |
| Software for designing secure IP-based VPN connections from a programming device/PC to network segments which are secured by SCALANCE S in bridge mode; Single License for 1 installation, runtime software (German/English), configuring tool (German/English) and electronic manual on CD-ROM (German/English/ French/Italian/Spanish) for 32-bit Windows, XP Professional + SP1, SP2, SP3, Windows Vista Ultimate/ Business + SP1 | | **SOFTNET-S7 Lean Edition 2008 for Industrial Ethernet** | |
| | | up to 8 connections | |
| | | • Single license for 1 installation | **6GK1 704-1LW71-3AA0** |
| | | • Software Update Service for 1 year, with automatic extension; requirement: current software version | **6GK1 704-1LW00-3AL0** |
| | | • Upgrade from Edition 2006 and higher to Edition 2008 | **6GK1 704-1LW00-3AE0** |
| | | • Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2007 | **6GK1 704-1LW00-3AE1** |
| **SOFTNET PN IO Edition 2008** | | **SOFTNET-PG Edition 2008 for Industrial Ethernet** | |
| Software for PROFINET IO Controller with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English | | Software for PG/OP communication, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP 2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English | |
| • Single License for one installation | **6GK1 704-1HW71-3AA0** | • Single license for 1 installation | **6GK1 704-1PW71-3AA0** |
| • Software Update Service for 1 year, with automatic extension; requirement: current software version | **6GK1 704-1HW00-3AL0** | • Software Update Service for 1 year, with automatic extension; requirement: current software version | **6GK1 704-1PW00-3AL0** |
| • Upgrade SOFTNET PN IO Edition 2006 or higher to SOFTNET PN IO Edition 2008 | **6GK1 704-1HW00-3AE0** | • Upgrade from Edition 2006 and higher to Edition 2008 | **6GK1 704-1PW00-3AE0** |
| • Upgrade SOFTNET PN IO from V6.0, V6.1, V6.2 or V6.3 to SOFTNET PN IO Edition 2008 | **6GK1 704-1HW00-3AE1** | • Upgrade from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 | **6GK1 704-1PW00-3AE1** |
| **SOFTNET Edition 2008 for Industrial Ethernet** | | **IE TP Cord RJ45/RJ45** | |
| Software for S7 and open communication, incl. OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English | | TP cable 4 x 2 with two RJ45 plugs | |
| | | • 0.5 m | **6XV1 870-3QE50** |
| | | • 1 m | **6XV1 870-3QH10** |
| | | • 2 m | **6XV1 870-3QH20** |
| | | • 6 m | **6XV1 870-3QH60** |
| | | • 10 m | **6XV1 870-3QN10** |

**CP 1612 A2**

**2**

| ■ **Ordering data** (continued) | Order No. | | Order No. |
|---|---|---|---|

**PN CBA OPC Server Edition 2008**

PROFINET OPC server for CBA; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP 2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English

- Single license for 1 installation — **6GK1 706-0HB71-3AA0**
- Software Update Service for 1 year, with automatic extension; requirement: current software version — **6GK1 706-0HB00-3AL0**
- Upgrade from Edition 2006 and higher to Edition 2008, single license — **6GK1 706-0HB00-3AE0**
- Upgrade from V6.0 to Edition 2008, single license — **6GK1 706-0HB00-3AE1**

**SNMP OPC Server Edition 2008**

Including MIB compiler; single license for 1 installation of the runtime software, software and electronic manual on CD-ROM; license key on USB flash drive, Class A, for 32-bit Windows XP Professional SP 2/3; Windows 2003 Server R2, SP2; Windows Vista Business/Ultimate SP1; Windows 2008 Server; German/English

- **Basic 2008** Administration of up to 20 IP addresses; Single license for 1 installation — **6GK1 706-1NW71-3AA0**
  - Software Update Service for 1 year, with automatic extension; requirement: current software version — **6GK1 706-1NW00-3AL0**
  - Upgrade from Edition 2006 and higher to Edition 2008, single license — **6GK1 706-1NW00-3AE0**
  - Upgrade from V6.0 to Edition 2008, single license — **6GK1 706-1NW00-3AE1**
- **Extended 2008** Administration of up to 200 IP addresses — **6GK1 706-1NX71-3AA0**
  - Software Update Service for 1 year, with automatic extension; requirement: current software version — **6GK1 706-1NX00-3AL0**
  - Upgrade from Edition 2006 and higher to Edition 2008, single license — **6GK1 706-1NX00-3AE0**
  - Upgrade from V6.0 to Edition 2008, single license — **6GK1 706-1NX00-3AE1**
- **Power Pack 2008**; upgrade from SNMP OPC Server Basic to SNMP OPC Server Extended Edition 2008 — **6GK1 706-1NW71-3AC0**

## Overview



- SICLOCK TC 400/TC 100 or SICLOCK TS central plant clock as the central component for time synchronization of a plant over Ethernet
- SICLOCK TC 400;
  - Four independent Ethernet interfaces for supporting several Ethernet subnets
  - Significantly extended redundancy functions
  - Designed for PROFINET
- SICLOCK TC 100;
  - An Ethernet interface
  - Designed for mini and small plants
- Designed for PROFINET
- GPS or DCF77 radio clocks for direct connection to PCs, SIMATIC S7 controllers and to the SICLOCK TC 400/TC 100 and SICLOCK TS central plant clocks
- Pulse converter for electrical and optical distribution and interface conversion
- Complete packages for common applications

## Application

Time synchronization of all components plays an important part in the automation of production plants. The SICLOCK system is a parameterizable, modular system with perfectly matched components for the time synchronization of plants. GPS (world-wide) as well as DCF77 (Germany) can be used for external radio synchronization

The modular SICLOCK system supports the time synchronization of an individual PLC through to the large plant with multiple redundancy.

### Time synchronization concepts

The automation systems and operator stations of a SIMATIC PCS 7 plant or WinCC stations can be synchronized as follows with DCF77 or GPS time signals:

- Large plants;
  for larger plants with many network stations and stringent requirements for timekeeping, the time synchronization is performed using a SICLOCK TC 400 or SICLOCK TS central plant clock on the plant bus.

- Small plants;
  for small to medium-sized plants, the PCS 7 Operator Station or the WinCC Station are used as the time master, connecting the corresponding DCF or GPS radio clock directly to the COM interface of the PC.
  An alternative to the PC solution is the option of synchronizing the plant over the NTP via the SICLOCK central plant clocks. The SICLOCK TC 100 is recommended for use with these small plants.

- Stand-alone systems;
  for SIMATIC S7 controllers or small systems, e.g. for laboratory automation, SICLOCK DCFS7 is a low-cost alternative to DCF77 synchronization directly over an S7 digital input.

## Design

SICLOCK TC 400/TC 100 and SICLOCK TS are designed for mounting on a SIMATIC rail. Sets of materials for installation in 19-inch racks are also available.

## Function

### Central plant clocks

The SICLOCK TC 400/TC 100 and SICLOCK TS central plant clocks support the synchronization of CPs and PCs with the SIMATIC procedure as well as the NTP procedure over Industrial Ethernet.

### SICLOCK TC 400

SICLOCK TC 400 is used as a central plant clock for highly accurate timekeeping and distributes the time to all synchronized systems over Industrial Ethernet, as well as over three additional point-to-point connections with TTY/24 V and RS422/5 V.

The devices are equipped with four independent Ethernet interfaces. This enables separate or redundant automation networks and I&C networks to be synchronized in parallel with just one device. Apart from the well-proven standard networks such as SIMATIC NET or NTP, TC 400 is also prepared for use in PROFINET and PTCP.

Interfaces, signal types, redundancy, etc. are parameterized over the Internet/HMI. The display of statuses on the device provides fast access to the operating status and any faults.

SICLOCK TC 400 has interrupt capability and can be integrated into the I&C.

### SICLOCK TC 100

SICLOCK TC 100 is the "little brother" of the TC 400 and is used as a central plant clock for highly accurate time synchronization. It distributes the time to all systems to be synchronized over (Industrial) Ethernet.

Like the TC 400, the interfaces, signal types, redundancy, etc. are parameterized over the Internet/HMI. The display of statuses on the device provides fast access to the operating status and any faults.

SICLOCK TC 100 has interrupt capability and can be integrated into the I&C.

### SICLOCK TS

SICLOCK TS is used as a central plant clock for highly accurate timekeeping and distributes the time to all synchronized systems over Industrial Ethernet, as well as over three individually parameterizable outputs for point-to-point connections and IRIG A and B.

If the antenna of a radio clock fails, all SICLOCK central plant clocks continue to provide reliable timekeeping thanks to automatic changeover to highly accurate quartz operation. When the radio clock is returned to service, they accept the time signal without a time step.

# PROFINET/Industrial Ethernet
## Accessories

**SICLOCK time synchronization**

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| ***SICLOCK TC 400 central plant clock*** | | ***DCF radio clocks*** | |
| **SICLOCK TC 400 preferred package** | 2XV9 450-2AR10 | **SICLOCK DCFRS, radio clock, industrial version** | 2XV9 450-1AR21 |
| Package comprises<br>• SICLOCK TC 400<br>• SICLOCK GPS1000 system with antenna frame<br>• Lightning protection for GPS<br><br>Complete solution,<br>e.g. for use in PCS 7 | | DCF radio clock for time synchro-nization of individual PCs or servers in industrial environments with high levels of interference; distances of up to 1000 m are possible between the DCF radio clock and the PC,<br>package comprises<br>• Active DCF77 antenna with TTY output (20 mA line current) and antenna frame<br>• TTY/RS232 converter<br>• Plug-in power supply<br>• Two junction boxes<br>• 1 m connecting cable mounted, extendable to 1000 m<br>• DCF77 receiving service for Windows | |
| **SICLOCK TC 400 DCF77** | 2XV9 450-2AR20 | | |
| SICLOCK TC 400 central plant clock with Ethernet interface + DCFRS radio clock, industrial version;<br>package comprises<br>• SICLOCK TC 400<br>• Active DCF77 antenna with TTY output (20 mA line current) and antenna frame<br>• Junction box<br>• 1 m connecting cable mounted, extendable to 1000 m | | | |
| | | **SICLOCK DCFRS, radio clock for Windows** | 2XV9 450-1AR14 |
| | | DCF radio clock for the time synchronization of individual PCs over short distances,<br>package comprises<br>• Active DCF77 antennas with RS232 interface Mounting bracket<br>• 20 m connecting cable mounted<br>• DCF77 receiving service for Windows | |
| **SICLOCK TC 400 single device** | 2XV9 450-2AR01 | | |
| **SICLOCK TC 100 single device** | 2XV9 450-2AR22 🔴NEW | | |
| ***SICLOCK TS central plant clock*** | | | |
| **SICLOCK TS GPS1000** | | **SICLOCK DCFEMP, receiver with TTY interface** | 2XV9 450-1AR61 |
| SICLOCK TS central plant clock with Ethernet interface and IRIG A and B + GPS1000 radio clock,<br>package comprises<br>• SICLOCK TS in stainless steel housing for rail mounting<br>• GPS1000 radio clock with antenna frame<br>• Junction box | | DCF receiver for connection to existing HF cable system in the plant for DCF77 time signals for time synchronization of individual PCs or servers at distances of up to 1000 m,<br>package comprises<br>• Active DCF77 receiver with mounting bracket and TTY interface<br>• 1 m connecting cable mounted | |
|   - with SICLOCK TS 24 … 110 V DC | 2XV9 450-1AR54 | | |
|   - with SICLOCK TS 90 … 230 V AC/DC | 2XV9 450-1AR55 | | |
| **SICLOCK TS single device** | | **SICLOCK DCFS7** | 2XV9 450-1AR36 |
| SICLOCK TS central plant clock with Ethernet interface and IRIG A and B in stainless steel housing for rail mounting | | Low-cost solution for time synchronization of SIMATIC S7-300/400 over DCF77 over one digital input,<br>package comprises<br>• SICLOCK DCFRS, radio clock with RS232 output, 20 m connecting cable and mounting bracket<br>• SICLOCK DCFS7 interface<br>• SICLOCK DCFS7 receiving ervice (STEP 7 function block for integration in S7 software) | |
| • SICLOCK TS 24 … 110 V DC | 2XV9 450-1AR52 | | |
| • SICLOCK TS 90 … 230 V AC/DC | 2XV9 450-1AR53 | | |
| | | ***Accessories for SICLOCK DCFS7*** | |
| | | **SICLOCK DCFS7 interface + receiving service** | 2XV9 450-1AR30 |
| | | (STEP 7 function block for integration in S7 software) | |
| | | **SICLOCK DCFS7 interface** | 2XV9 450-1AR35 |
| | | **SICLOCK DCFS7 receiving service** | 2XV9 450-1AR32 |
| | | (STEP 7 function block for integration in S7 software) | |

**2**

## ◼ Ordering data

| | Order No. | | Order No. |
|---|---|---|---|

### GPS radio clocks

**SICLOCK WINGPS, radio clock for Windows** — 2XV9 450-1AR13

GPS radio clock for the time synchronization of individual PCs in industrial environments with high levels of interference, package comprises
- GPS antenna with antenna frame
- WINGPS decoder with power supply
- 22 m coax antenna cable (max. length 70 m, see accessories)
- 20 m PC connection cable WINGPS
- DCF77 receiving service for Windows

**SICLOCK GPSDEC, radio clock for Windows** — 2XV9 450-1AR00

GPS radio clock for the time synchronization of the SICLOCK TS central plant clocks or programmable controllers in industrial environments with high levels of interference, package comprises
- GPS antenna with antenna frame
- GPSDEC decoder with power supply
- 22 m coax antenna cable (max. length 70 m, see accessories)
- 5 m RS232 connecting cable
- Parameterization program

**GPS1000 + power supply, radio clock for Windows** — 2XV9 450-1AR82

GPS radio clock for time synchronization of PCs, programmable controllers as well as SICLOCK TC 400/TC 100 and SICLOCK TS central plant clocks in industrial environments with high levels of interference with distances up to 1000 m between the antenna and device, package comprises
- GPS1000 antenna head with antenna frame
- GPS1000 power supply
- Junction box
- 5 m RS232 connecting cable
- DCF77 receiving service for Windows

### Accessories

**Set of materials for SICLOCK TM/TS**
- for desktop housing — 2XV9 450-1AR80
- for 19" mounting frame (4 HU) — 2XV9 450-1AR81

**Lightning protection for antenna cable**
- Lightning protection for coaxial antenna cable (SICLOCK GPSDEC/WINGPS) — 2XV9 450-1AR11
- Lightning protection for TTY connecting cable (SICLOCK GPS1000/DCFRS industrial version) — 2XV9 450-1AR83
- Lightning protection for RS232 antenna cable (SICLOCK DCFS7/DCFRS with RS232 interface) — 2XV9 450-1AR15

**Coaxial antenna cable SICLOCK GPSDEC/WINGPS**
- 30 m — 2XV9 450-1AR12
- 70 m — 2XV9 450-1AR07

### Software

**SICLOCK DCF77 receiving service for Windows** — 2XV9 450-1AR28

**SICLOCK Ethernet receiving service for Windows NT** — 2XV9 450-1AR44

### Pulse converter

**SICLOCK EOPC**
Electrical/optical pulse converter for industrial applications with 32 fiber-optic cable outlets for transparent operation and pulse mode
- SICLOCK EOPC 24 … 110 V DC — 2XV9 450-1AR72
- SICLOCK EOPC 90 … 230 V AC/DC — 2XV9 450-1AR73

**SICLOCK PCON**
Single-channel electrical/optical pulse converter for industrial applications
- SICLOCK PCON 24 … 230 V AC/DC, with multi-mode fiberglass connection, 820 nm — 2XV9 450-1AR63-1SA3
- SICLOCK PCON 24 … 230 V AC/DC, long distance, with multi-mode fiberglass connection, 1310 nm — 2XV9 450-1AR63-1MA3

**SICLOCK DCFHF** — 2XV9 450-1AR64
HF modulator for DCF77 signals for industrial applications

## ◼ More information

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http://www.siemens.com/siclock

# PROFINET/Industrial Ethernet
## Distributed I/O ET 200eco

### ET 200eco PN

■ **Overview**



- Compact block I/O for processing digital, analog and IO-Link signals for connecting to the PROFINET bus system
- Cabinet-free design with degree of protection IP65/66/67 with M12 connections
- Very rugged and resistant metal enclosure and encapsulated

- Compact module in two types of enclosures:
  - 30 mm x 200 mm x 37 mm (W x H x D, long and narrow enclosure), with 4 x M12 for digital signals
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure), with 8 x M12 for digital signals and IO-Link
  - 60 mm x 175 mm x 37 mm (W x H x D, short and wide enclosure) with 4 x M12 or 8 x M12 for analog signals
- PROFINET connection: 2 x M12 and automatic PROFINET address assignment
- Data transmission rate 100 Mbit/s
- LLDP proximity detection without PG and Fast Startup (boot up within approx 0.5 seconds)
- Supply and load voltage connection: 2 x M12
- Module variance:
  - 8 DI
  - 16 DI
  - 8 DO (2 A)
  - 8 DO (1.3 A)
  - 8 DO (0.5 A)
  - 16 DO (1.3 A)
  - 8 DI/DO (1.3 A),
  - 8 AI (U, I, TC, RTD)
  - 4 AO (U, I)
  - 4 IO-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnostics

■ **Technical specifications**

| | 6ES7 141-6BF00-0AB0 | 6ES7 141-6BG00-0AB0 | 6ES7 141-6BH00-0AB0 |
|---|---|---|---|
| **Supply voltages** | | | |
| Rated value | | | |
| • DC 24 V | Yes | Yes | Yes |
| • permissible range, lower limit (DC) | 20.4 V | 20.4 V | 20.4 V |
| • permissible range, upper limit (DC) | 28.8 V | 28.8 V | 28.8 V |
| • Reverse polarity protection | Yes | Yes | Yes |
| **Current consumption** | | | |
| Current consumption, typ. | 100 mA | 100 mA | 100 mA |
| **Current consumption/power loss** | | | |
| Power loss, typ. | 5.5 W | 4.5 W | 6.5 W |
| **interfaces** | | | |
| Number of PROFINET interfaces | 2 | 2 | 2 |
| automatic detection of transmission speed | Yes | Yes | Yes |
| Transmission speed, max. | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Protocols** | | | |
| PROFINET IO | Yes | Yes | Yes |
| Protocols (Ethernet) | | | |
| • SNMP | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes |
| • ping | Yes | Yes | Yes |
| • arp | Yes | Yes | Yes |

**2**

## Technical specifications (continued)

| | 6ES7 141-6BF00-0AB0 | 6ES7 141-6BG00-0AB0 | 6ES7 141-6BH00-0AB0 |
|---|---|---|---|
| **Digital inputs** | | | |
| Number of digital inputs | 8 | 8 | 16 |
| Number of simultanneously controllable inputs | | | |
| • Number of simultaneously controllable inputs, up to 60 °C | 8 | 8 | 16 |
| Input voltage | | | |
| • Rated value, DC | 24 V | 24 V | 24 V |
| • for signal "0" | -3 to +5 V | -3 to +5 V | -3 to +5 V |
| • for signal "1" | 11 to 30 V | 11 to 30 V | 11 to 30 V |
| Input current | | | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA | 1.5 mA | 1.5 mA |
| • for signal "1", typ. | 7 mA | 7 mA | 7 mA |
| Input delay (for rated value of input voltage) | | | |
| • for standard inputs | | | |
|   - at "0" to "1", max. | Typ. 3 ms | Typ. 3 ms | Typ. 3 ms |
|   - at "1" to "0", max. | Typ. 3 ms | Typ. 3 ms | Typ. 3 ms |
| Cable length | | | |
| • Cable length unshielded, max. | 30 m | 30 m | 30 m |
| **Encoder supply** | | | |
| Number of outputs | 4 | 8 | 8 |
| Output current, rated value | 100 mA; Per output | 100 mA; Per output | 100 mA; Per output |
| 24 V encoder supply | | | |
| • Short-circuit protection | Yes | Yes | Yes |
| **Interrupts/diagnostics/ status information** | | | |
| Status indicator | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| Alarms | | | |
| • Diagnostic alarm | Yes | Yes | Yes |
| Diagnoses | | | |
| • Diagnostic functions | Yes | Yes | Yes |
| • Diagnostic information readable | Yes | Yes | Yes |
| • Monitoring the voltage supply to the electronics | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire break in signal encoder cable | Yes | Yes | Yes |
| • Short circuit encoder supply | Yes; Per channel group | Yes; Per channel group | Yes; Per channel group |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |
| **Isolation** | | | |
| tested with | | | |
| • 24 V DC circuits | 500 V | 500 V | 500 V |

# PROFINET/Industrial Ethernet
## Distributed I/O ET 200eco

**ET 200eco PN**

**Technical specifications** (continued)

| | 6ES7 141-6BF00-0AB0 | 6ES7 141-6BG00-0AB0 | 6ES7 141-6BH00-0AB0 |
|---|---|---|---|
| **Isolation** | | | |
| between the load voltages | Yes | Yes | Yes |
| between load voltage and all other switching components | No | No | No |
| between Ethernet and electronics | Yes | Yes | Yes |
| Galvanic isolation, digital inputs | | | |
| • between the channels | No | No | No |
| **Permissible potential difference** | | | |
| between different circuits | 75 V DC/60 V AC | 75 V DC/60 V AC | 75 V DC/60 V AC |
| **Degree of protection** | | | |
| IP 65 | Yes | Yes | Yes |
| IP 66 | Yes | Yes | Yes |
| IP 67 | Yes | Yes | Yes |
| **General information** | | | |
| Vendor identification (VendorID) | 002AH | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H | 0306H |
| **Dimensions and weight** | | | |
| Dimensions and weight | | | |
| • Width | 30 mm | 60 mm | 60 mm |
| • Height | 200 mm | 175 mm | 175 mm |
| • Depth | 49 mm | 49 mm | 49 mm |
| Weight | | | |
| • Weight | 550 g | 910 g | 910 g |

| | 6ES7 142-6BF50-0AB0 | 6ES7 142-6BF00-0AB0 | 6ES7 142-6BG00-0AB0 | 6ES7 142-6BR00-0AB0 | 6ES7 142-6BH00-0AB0 |
|---|---|---|---|---|---|
| **Supply voltages** | | | | | |
| Load voltage 1L+ | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |
| Load voltage 2L+ | | | | | |
| • Rated value (DC) | 24 V | 24 V | 24 V | 24 V | 24 V |
| • Reverse polarity protection | Yes | Yes | Yes | Yes | Yes |
| **Current consumption** | | | | | |
| from load voltage 1L+ (unswitched voltage) | 100 mA | 4 A | 4 A | 4 A | 4 A |
| **Current consumption/power loss** | | | | | |
| Power loss, typ. | 3 W | 5.5 W | 5.5 W | 5 W | 5.5 W |

**2**

## ■ Technical specifications (continued)

| | 6ES7 142-6BF50-0AB0 | 6ES7 142-6BF00-0AB0 | 6ES7 142-6BG00-0AB0 | 6ES7 142-6BR00-0AB0 | 6ES7 142-6BH00-0AB0 |
|---|---|---|---|---|---|
| **interfaces** | | | | | |
| Number of PROFINET interfaces | 2 | 2 | 2 | 2 | 2 |
| automatic detection of transmission speed | Yes | Yes | Yes | Yes | Yes |
| Autocrossing | Yes | Yes | Yes | Yes | Yes |
| Transmission speed, max. | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s | 100 Mbit/s |
| **Connection point** | | | | | |
| M12 | Yes | Yes | Yes | Yes | Yes |
| **Protocols** | | | | | |
| PROFINET IO | Yes | Yes | Yes | Yes | Yes |
| Protocols (Ethernet) | | | | | |
| • SNMP | Yes | Yes | Yes | Yes | Yes |
| • DCP | Yes | Yes | Yes | Yes | Yes |
| • LLDP | Yes | Yes | Yes | Yes | Yes |
| • ping | Yes | Yes | Yes | Yes | Yes |
| • arp | Yes | Yes | Yes | Yes | Yes |
| **Digital outputs** | | | | | |
| Number of digital outputs | 8 | 8 | 8 | 8 | 16 |
| Short-circuit protection of the output | Yes; Electronic | Yes; Electronic | Yes; Electronic | Yes; Electronic | Yes; Electronic |
| • Response threshold, typ. | 0.7 A | 1.8 A | 1.8 A | 2.8A | 1.8 A |
| Limitation of inductive shutdown voltage to | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V | Typ. (L1+, L2+) -47 V |
| Switching capacity of the outputs | | | | | |
| • on lamp load, max. | 5 W | 5 W | 5 W | 10 W | 5 W |
| Controlling a digital input | Yes | Yes | Yes | Yes | Yes |
| Output current | | | | | |
| • for signal "1" rated value | 0.5 A | 1.3 A; maximum | 1.3 A; maximum | 2 A | 1.3 A; maximum |
| • for signal "0" residual current, max. | 1.5 mA | 1.5 mA | 1.5 mA | 1.5 mA | 1.5 mA |
| Parallel switching of 2 outputs | | | | | |
| • for increased power | No | No | No | No | No |
| • for redundant control of a load | Yes | Yes | Yes | Yes | Yes |
| Switching frequency | | | | | |
| • with resistive load, max. | 100 Hz | 100 Hz | 100 Hz | 100 Hz | 100 Hz |
| • with inductive load, max. | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz | 0.5 Hz |
| • on lamp load, max. | 1 Hz | 1 Hz | 1 Hz | 1 Hz | 1 Hz |
| Aggregate current of the outputs (per group) | | | | | |
| • up to 55 °C, max. | | 3.9 A | | | |
| • up to 60 °C, max. | 4 A | 2.6 A | 3.9 A | 3.9 A | 3.9 A |
| Cable length | | | | | |
| • Cable length unshielded, max. | 30 m | 30 m | 30 m | 30 m | 30 m |

**Technical specifications** (continued)

| | 6ES7 142-6BF50-0AB0 | 6ES7 142-6BF00-0AB0 | 6ES7 142-6BG00-0AB0 | 6ES7 142-6BR00-0AB0 | 6ES7 142-6BH00-0AB0 |
|---|---|---|---|---|---|
| **Interrupts/diagnostics/status information** | | | | | |
| Status indicator | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED | Yes; Green LED |
| Alarms | | | | | |
| • Diagnostic alarm | Yes | Yes | Yes | Yes | Yes |
| Diagnoses | | | | | |
| • Diagnostic functions | Yes | Yes | Yes | Yes | Yes |
| • Diagnostic information readable | Yes | Yes | Yes | Yes | Yes |
| • Monitoring the voltage supply to the electronics | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED | Yes; Green "ON" LED |
| • Wire break in acutator cable | Yes | Yes | Yes | Yes | Yes |
| • Short circuit | Yes | Yes | Yes | Yes | Yes |
| • Group error | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED | Yes; Red/yellow "SF/MT" LED |
| **Isolation** | | | | | |
| tested with | | | | | |
| • 24 V DC circuits | 500 V | 500 V | 500 V | 500 V | 500 V |
| **Isolation** | | | | | |
| between the load voltages | Yes | Yes | Yes | Yes | Yes |
| between load voltage and all other switching components | No | No | No | No | No |
| between Ethernet and electronics | Yes | Yes | Yes | Yes | Yes |
| Isolation, digital outputs | | | | | |
| • between the channels | No | No | No | No | No |
| **Permissible potential difference** | | | | | |
| between different circuits | 75 V DC/60 V AC | 75 V DC/60 V AC | 75 V DC/60 V AC | 75 V DC/60 V AC | 75 V DC/60 V AC |
| **Degree of protection** | | | | | |
| IP 65 | Yes | Yes | Yes | Yes | Yes |
| IP 66 | Yes | Yes | Yes | Yes | Yes |
| IP 67 | Yes | Yes | Yes | Yes | Yes |
| **General information** | | | | | |
| Vendor identification (VendorID) | 002AH | 002AH | 002AH | 002AH | 002AH |
| Device identifier (DeviceID) | 0306H | 0306H | 0306H | 0306H | 0306H |
| **Dimensions and weight** | | | | | |
| Dimensions and weight | | | | | |
| • Width | 30 mm | 30 mm | 60 mm | 60 mm | 60 mm |
| • Height | 200 mm | 200 mm | 175 mm | 175 mm | 175 mm |
| • Depth | 49 mm | 49 mm | 49 mm | 49 mm | 49 mm |
| Weight | | | | | |
| • Weight | 550 g | 550 g | 910 g | 910 g | 910 g |

**2**

## ◼ Technical specifications (continued)

| | 6ES7 147-6BG00-0AB0 |
|---|---|
| **Supply voltages** | |
| Rated value | |
| • 24 V DC | Yes |
| • Permissible range, lower limit (DC) | 20.4 V |
| • Permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| Load voltage 2L+ | |
| • Rated value (DC) | 24 V |
| • Permissible range, lower limit (DC) | 20.4 V |
| • Permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| **Current consumption** | |
| from load voltage 1L+ (unswitched voltage) | 4 A |
| from load voltage 2L+, max. | 4 A |
| **Current consumption/power loss** | |
| Power loss, typ. | 6.5 W |
| **interfaces** | |
| Number of PROFINET interfaces | 2 |
| automatic detection of transmission speed | Yes |
| Autocrossing | Yes |
| Integrated switch | Yes |
| Transmission rate, max. | 100 Mbit/s |
| **Connection point** | |
| M12 | Yes |
| **Protocols** | |
| PROFINET IO | Yes |
| Protocols (Ethernet) | |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • arp | Yes |
| **PROFINET IO-Device** | |
| with option "high flexibility", supported | Yes |
| Prioritized power up, supported | Yes |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| • in groups of | 4 |

| | 6ES7 147-6BG00-0AB0 |
|---|---|
| Number of simultanneously controllable inputs | |
| • all mounting positions | |
|   - Number of simultaneously controllable inputs, up to 60 °C | 8 |
| Input characteristic according to IEC 1131, type 3 | Yes |
| Input voltage | |
| • Rated value, DC | 24 V |
| • for signal "0" | -3 to +5 V |
| • for signal "1" | 11 to 30 V |
| Input current | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA |
| • for signal "1", typ. | 7 mA |
| Cable length | |
| • Cable length unshielded, max. | 30 m |
| **Digital outputs** | |
| Number of digital outputs | 8 |
| • in groups of | 4 |
| Short-circuit protection | Yes |
| Switching capacity of the outputs | |
| • on lamp load, max. | 5 W |
| Controlling a digital input | Yes |
| Output current | |
| • for signal "1" rated value | 1.3 A; maximum |
| • for signal "0" residual current, max. | 1.5 mA |
| Parallel switching of 2 outputs | |
| • for increased power | No |
| • for redundant control of a load | Yes |
| Switching frequency | |
| • with resistive load, max. | 100 Hz |
| • with inductive load, max. | 0.5 Hz |
| • on lamp load, max. | 1 Hz |
| Aggregate current of the outputs (per group) | |
| • up to 60 °C, max. | 3.9 A |
| Cable length | |
| • Cable length unshielded, max. | 30 m |
| **Encoder supply** | |
| Number of outputs | 8 |
| Output current, rated value | 100 mA; per output |
| 24 V encoder supply | |
| • Short-circuit protection | Yes |

# PROFINET/Industrial Ethernet
## Distributed I/O ET 200eco

### ET 200eco PN

■ **Technical specifications** (continued)

2

| | 6ES7 147-6BG00-0AB0 |
|---|---|
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes; green LED |
| Alarms | |
| • Diagnostic alarm | Yes |
| Diagnoses | |
| • Diagnostics functions | Yes |
| • Diagnostics information readable | Yes |
| • Monitoring the voltage supply of the electronics | Yes; green LED "ON" |
| • Wire break in acutator cable | Yes |
| • Wire break in signal encoder cable | Yes |
| • Short circuit | Yes |
| • Short circuit encoder supply | Yes |
| • Group error | Yes; red/yellow LED "SF/MT" |
| **Isolation** | |
| tested with | |
| • 24 V DC circuits | 500 V |
| • Interface | 1 500 µV; according to IEEE 802.3 |
| **Isolation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| Galvanic isolation, digital inputs | |
| • between the channels | No |
| Isolation, digital outputs | |
| • between the channels | No |
| **Degree of protection** | |
| IP 65 | Yes |
| IP 66 | Yes |
| IP 67 | Yes |
| **Dimensions and weight** | |
| Dimensions and weight | |
| • Width | 60 mm |
| • Height | 175 mm |
| • Depth | 49 mm |
| Weight | |
| • Weight | 910 g |

| | 6ES7 144-6KD00-0AB0 |
|---|---|
| **Supply voltages** | |
| Rated value | |
| • DC 24 V | Yes |
| • permissible range, lower limit (DC) | 20.4 V |
| • permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| **Current consumption** | |
| Current consumption, typ. | 110 mA |
| **Current consumption/ power loss** | |
| Power loss, typ. | 2.8 W |
| **interfaces** | |
| Number of PROFINET interfaces | 2 |
| automatic detection of transmission speed | Yes |
| Transmission speed, max. | 100 Mbit/s |
| **Connection point** | |
| M12 | Yes |
| **Protocols** | |
| PROFINET IO | Yes |
| Protocols (Ethernet) | |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • arp | Yes |
| **Analog inputs** | |
| Number of analog inputs | 8 |
| Number of analog inputs for voltage/current measurement | 4 |
| Number of analog inputs for resistance/temperature measurement | 4 |
| cable length, shielded, max. | 30 m |
| Input ranges (rated values), voltages | |
| • 0 to +10 V | Yes |
| • 1 to 5 V | Yes |
| • -10 V to +10 V | Yes |
| • -80 mV to +80 mV | Yes |

■ **Technical specifications** (continued)

| | 6ES7 144-6KD00-0AB0 |
|---|---|
| Input ranges (rated values), currents | |
| • 0 to 20 mA | Yes |
| • -20 to +20 mA | Yes |
| • 4 to 20 mA | Yes |
| Input ranges (rated values), thermoelements | |
| • Type E | Yes |
| • Type J | Yes |
| • Type K | Yes |
| • Type N | Yes |
| Input ranges (rated values), resistance thermometers | |
| • Ni 100 | Yes |
| • Ni 1000 | Yes |
| • Ni 120 | Yes |
| • Ni 200 | Yes |
| • Ni 500 | Yes |
| • Pt 100 | Yes |
| • Pt 1000 | Yes |
| • Pt 200 | Yes |
| • Pt 500 | Yes |
| Input ranges (rated values), resistors | |
| • 0 to 150 Ohm | Yes |
| • 0 to 300 Ohm | Yes |
| • 0 to 600 Ohm | Yes |
| • 0 to 3000 Ohm | Yes |
| Voltage input | |
| • permissible input frequency for voltage input (destruction limit), max. | 28.8 V permanent, 35 V for max. 500 ms |
| Temperature compensation | |
| • programmable | Yes |
| • internal temperature compensation | Yes |
| • external temperature compensation with compensations socket | Yes |
| **Analog value creation** | |
| Analog value display | SIMATIC S7 format |
| Measurement principle | Integrating |
| Integration and conversion time/resolution per channel | |
| • Resolution (incl. overload area) | 15 bits + sign |
| • Integration time, parameterizable | Yes |
| • Integration time, ms | 2 / 16.67 / 20 / 100 ms |
| • Interference voltage suppression for interference frequency f1 in Hz | 500 / 60 / 50 / 10 Hz |
| • Conversion time (per channel) | 4 / 19 / 22 / 102 ms |
| Smoothing of measured values | |
| • parameterizable | Yes |
| • Level: none | Yes; 1 x cycle time |
| • Level: weak | Yes; 4 x cycle time |
| • Level: middle | Yes; 16 x cycle time |
| • Level: strong | Yes; 64 x cycle time |

| | 6ES7 144-6KD00-0AB0 |
|---|---|
| **Encoder supply** | |
| Number of outputs | 4 |
| 24 V encoder supply | |
| • Short-circuit protection | Yes; Electronic at 1.4 A |
| • Output current, max. | 1 A |
| **Encoder** | |
| Number of connectable encoders, max. | 8 |
| Connection of signal encoders | |
| • for voltage measurement | Yes |
| • for current measurement as 2-wire transducer | Yes |
| • for current measurement as 4-wire transducer | Yes |
| • for resistance measurement with 2-conductor connection | Yes |
| • for resistance measurement with 3-conductor connection | Yes |
| • for resistance measurement with 4-conductor connection | Yes |
| **Errors/accuracies** | |
| linearity error (based on input rage) | +/- 0,01 % |
| Temperature error (relative to input areas) | U: 0,0035%/°C; I:0,006%/°C; RTD: 0,0005%/°C; TC: 0,0035%/°C |
| Crosstalk between the inputs, min. | 85 dB |
| Interference voltage suppression for f = n x (fl +/- 1 %), fl = interference frequency | |
| • Series mode interference (peak value of interference < rated value of input range), min. | 46 dB |
| • common mode voltage, min. | 70 dB |
| **Interrupts/diagnostics/ status information** | |
| Alarms | |
| • Diagnostic alarm | Yes |
| Diagnoses | |
| • Diagnostic functions | Yes |
| • Diagnostic information readable | Yes |
| • Monitoring the voltage supply to the electronics | Yes; Green "ON" LED |
| • Short circuit encoder supply | Yes; Per module |
| • Group error | Yes; Red/yellow "SF/MT" LED |
| • Overflow/underflow | Yes |
| **Isolation** | |
| tested with | |
| • 24 V DC circuits | 500 V |
| • Interface | 1 500 V; according to IEEE 802.3 |

# PROFINET/Industrial Ethernet
## Distributed I/O ET 200eco

■ **Technical specifications** (continued)

| | 6ES7 144-6KD00-0AB0 |
|---|---|
| **Isolation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| Isolation, analog inputs | |
| • between the channels | No |
| **Permissible potential difference** | |
| between inputs and MANA (UCM) | 10 Vpp AC |
| **Degree of protection** | |
| IP 65 | Yes |
| IP 66 | Yes |
| IP 67 | Yes |
| **General information** | |
| Vendor identification (VendorID) | 002AH |
| Device identifier (DeviceID) | 0306H |
| **Dimensions and weight** | |
| Dimensions and weight | |
| • Width | 60 mm |
| • Height | 175 mm |
| • Depth | 49 mm |
| Weight | |
| • Weight | 930 g |

| | 6ES7 145-6HD00-0AB0 |
|---|---|
| **Supply voltages** | |
| Rated value | |
| • DC 24 V | Yes |
| • permissible range, lower limit (DC) | 20,.4 V |
| • permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| **Current consumption** | |
| Current consumption, typ. | 280 mA |
| **Current consumption/power loss** | |
| Power loss, typ. | 5.5 W |
| **interfaces** | |
| Number of PROFINET interfaces | 2 |
| automatic detection of transmission speed | Yes |
| Autocrossing | Yes |
| integrated switch | Yes |
| Transmission speed, max. | 100 Mbit/s |
| **Connection point** | |
| M12 | Yes |

| | 6ES7 145-6HD00-0AB0 |
|---|---|
| **Protocols** | |
| PROFINET IO | Yes |
| Protocols (Ethernet) | |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • arp | Yes |
| **Analog outputs** | |
| Number of analg outputs | 4 |
| cable length, shielded, max. | 30 m |
| Voltage output, Short-circuit protection | Yes |
| Voltage output, short-circuit current, max.. | 30 mA |
| Current output, no-load voltage, max. | 20 V |
| Output ranges, voltage | |
| • 0 to 10 V | Yes |
| • 1 to 5 V | Yes |
| • -10 to +10 V | Yes |
| Output ranges, current | |
| • 0 to 20 mA | Yes |
| • -20 to +20 mA | Yes |
| • 4 to 20 mA | Yes |
| Connection of actuators | |
| • for voltage output 2-conductor connection | Yes |
| • for current output 2-conductor connection | Yes |
| Load impedance (in rated range of output) | |
| • with voltage outputs, min. | 1 kΩ |
| • with voltage outputs, capacitive load, max. | 1 µF |
| • with current outputs, max. | 600 Ω |
| • with current outputs, inductive load, max. | 1 mH |
| Destruction limits against externally applied voltages and currents | |
| • Voltages at the outputs towards MANA | 28.8 V permanent, 35 V for max. 500 ms |
| **Analog value creation** | |
| Analog value display | SIMATIC S7 format |
| Measurement principle | Resistor network |
| Integration and conversion time/resolution per channel | |
| • Resolution (incl. overload area) | 15 bits + sign |
| • Conversion time (per channel) | 1 ms |
| Settling time | |
| • for resistive load | 2 ms |
| • for capacitive load | 1.8 ms |
| • for inductive load | 2 ms |

## ■ Technical specifications (continued)

| | 6ES7 145-6HD00-0AB0 |
|---|---|
| **Encoder supply** | |
| Number of outputs | 4 |
| 24 V encoder supply | |
| • Short-circuit protection | Yes; Electronic at 1.4 A |
| • Output current, max. | 1 A |
| **Errors/accuracies** | |
| Output ripple (based on output range, bandwidth 0 to 50 kHz) | U: ±0.6 mVrms; I: ±0.4 nArms |
| Temperature error (relative to output area) | U: 0.001%/°C; I: 0.0025%/°C |
| Crosstalk between the outputs, min. | 70 dB |
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes |
| Substitute values connectable | Yes |
| Alarms | |
| • Diagnostic alarm | Yes |
| Diagnoses | |
| • Diagnostic functions | Yes |
| • Diagnostic information readable | Yes |
| • Monitoring the voltage supply to the electronics | Yes; Green "ON" LED |
| • Wire break | Yes; Channel-by-channel with current output |
| • Short circuit | Yes; Channel-by-channel with voltage output |
| • Group error | Yes; Red/yellow "SF/MT" LED |
| **Isolation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| Isolation, analog outputs | |
| • between the channels | No |
| **Permissible potential difference** | |
| between M internally and the outputs | 10 Vpp AC |
| **Degree of protection** | |
| IP 65 | Yes |
| IP 66 | Yes |
| IP 67 | Yes |
| **General information** | |
| Vendor identification (VendorID) | 002AH |
| Device identifier (DeviceID) | 0306H |
| **Dimensions and weight** | |
| Dimensions and weight | |
| • Width | 60 mm |
| • Height | 175 mm |
| • Depth | 49 mm |
| Weight | |
| • Weight | 930 g |

| | 6ES7 148-6JA00-0AB0 |
|---|---|
| **Supply voltages** | |
| Rated value | |
| • 24 V DC | Yes |
| • Permissible range, lower limit (DC) | 20.4 V |
| • Permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| Load voltage 2L+ | |
| • Rated value (DC) | 24 V |
| • Permissible range, lower limit (DC) | 20.4 V |
| • Permissible range, upper limit (DC) | 28.8 V |
| • Reverse polarity protection | Yes |
| **Current consumption** | |
| from load voltage 1L+ (unswitched voltage) | 4 A |
| from load voltage 2L+, max. | 4 A |
| **Current consumption/power loss** | |
| Power loss, typ. | 8 W |
| **interfaces** | |
| Number of PROFINET interfaces | 2 |
| automatic detection of transmission speed | Yes |
| Autocrossing | Yes |
| integrated switch | Yes |
| Transmission rate, max. | 100 Mbit/s |
| **Connection point** | |
| M12 | Yes |
| **Protocols** | |
| PROFINET IO | Yes |
| Protocols (Ethernet) | |
| • SNMP | Yes |
| • DCP | Yes |
| • LLDP | Yes |
| • ping | Yes |
| • arp | Yes |
| **PROFINET IO-Device** | |
| IRT with option "high flexibility", supported | Yes |
| **Digital inputs** | |
| Number of digital inputs | 8 |
| Number of simultanneously controllable inputs | |
| • all mounting positions | |
| - Number of simultaneously controllable inputs, up to 60 °C | 8 |
| Input characteristic according to IEC 1131, type 3 | Yes |
| Input voltage | |
| • Rated value, DC | 24 V |
| • for signal "0" | -3 to +5 V |
| • for signal "1" | 11 to 30 V |

## ET 200eco PN

**Technical specifications** (continued)

| | 6ES7 148-6JA00-0AB0 |
|---|---|
| Input current | |
| • for signal "0", max. (permissible quiescent current) | 1.5 mA |
| • for signal "1", typ. | 7 mA |
| Cable length | |
| • Cable length unshielded, max. | 30 m |
| **Digital outputs** | |
| Number of digital outputs | 4 |
| Short-circuit protection | Yes |
| Switching capacity of the outputs | |
| • on lamp load, max. | 5 W |
| Controlling a digital input | Yes |
| Output current | |
| • for signal "1" rated value | 1.3 A; maximum |
| • for signal "0" residual current, max. | 1.5 mA |
| Parallel switching of 2 outputs | |
| • for increased power | No |
| • for redundant control of a load | Yes |
| Switching frequency | |
| • with resistive load, max. | 100 Hz |
| • with inductive load, max. | 0.5 Hz |
| • on lamp load, max. | 1 Hz |
| Aggregate current of the outputs (per group) | |
| • up to 60 °C, max. | 3.9 A |
| Cable length | |
| • Cable length unshielded, max. | 30 m |
| **Encoder supply** | |
| Number of outputs | 6 |
| Output current, rated value | 200 mA; 100 mA per output on X5-X6 |
| 24 V encoder supply | |
| • Short-circuit protection | Yes |

| | 6ES7 148-6JA00-0AB0 |
|---|---|
| **Interrupts/diagnostics/ status information** | |
| Status indicator | Yes; green LED |
| Alarms | |
| • Diagnostic alarm | Yes |
| Diagnoses | |
| • Diagnostics functions | Yes |
| • Diagnostics information readable | Yes |
| • Monitoring the voltage supply of the electronics | Yes; green LED "ON" |
| • Wire break in acutator cable | Yes |
| • Wire break in signal encoder cable | Yes |
| • Short circuit | Yes |
| • Short circuit encoder supply | Yes |
| • Group error | Yes; red/yellowLED "SF/MT" |
| **Isolation** | |
| tested with | |
| • 24 V DC circuits | 500 V |
| • interface | 1 500 µV; according to IEEE 802.3 |
| **Isolation** | |
| between the load voltages | Yes |
| between load voltage and all other switching components | No |
| between Ethernet and electronics | Yes |
| Galvanic isolation, digital inputs | |
| • between the channels | No |
| Isolation, digital outputs | |
| • between the channels | No |
| **Degree of protection** | |
| IP 65 | Yes |
| IP 66 | Yes |
| IP 67 | Yes |
| **Dimensions and weight** | |
| Dimensions and weight | |
| • Width | 60 mm |
| • Height | 175 mm |
| • Depth | 49 mm |
| Weight | |
| • Weight | 910 g |

■ **Ordering data**

| | Order No. | | Order No. |
|---|---|---|---|
| **ET 200eco PN digital input module** | | | |
| • 8 DI 24 V DC; 4 x M12, dual assignment, degree of protection IP67 | **6ES7 141-6BF00-0AB0** | **IE FC TP Standard Cable GP 2 x 2 (Type A)** 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug; PROFINET-compatible; with UL approval; Sold by the meter; max. length 1000 m, minimum order 20 m | **6XV1 840-2AH10** |
| • 8 DI 24 V DC; 8 x M12, degree of protection IP67 | **6ES7 141-6BG00-0AB0** | | |
| • 16 DI 24 V DC; 8 x M12, dual assignment, degree of protection IP67 | **6ES7 141-6BH00-0AB0** | | |
| **ET 200eco PN digital output module** | | **IE FC TP Trailing Cable GP 2 x 2 (Type C)** 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use in trailing cables; PROFINET-compatible; with UL approval; Sold by the meter; max. length 1000 m, minimum order 20 m | **6XV1 870-2D** |
| • 8 DO 24 V DC/0.5 A; 4 x M12, dual assignment, 1 load voltage supply DO; degree of protection IP67 | **6ES7 142-6BF50-0AB0** | | |
| • 8 DO 24 V DC/1.3 A; 4 x M12, dual assignment, degree of protection IP67 | **6ES7 142-6BF00-0AB0** | | |
| • 8 DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67 | **6ES7 142-6BG00-0AB0** | **PROFINET M12 connector, can be assembled** IE FC M12 connector PRO, can be assembled | |
| • 8 DO 24 V DC/2 A; 8 x M12, degree of protection IP67 | **6ES7 142-6BR00-0AB0** | • 1 unit | **6GK1 901-0DB20-6AA0** |
| • 16 DO 24 V DC/1.3 A; 8 x M12, dual assignment, degree of protection IP67 | **6ES7 142-6BH00-0AB0** | • 8 units | **6GK1 901-0DB20-6AA8** |
| **ET 200eco PN digital input/output modules** | | **PROFINET M12 connecting cables** Pre-assembled connecting cable with two M12 connectors (D-coded) in various lengths: | |
| • 8 DI/DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67 | **6ES7 147-6BG00-0AB0** | • 0.3 m | **6XV1 870-8AE30** |
| **ET 200eco PN analog input modules** | | • 0.5 m | **6XV1 870-8AE50** |
| • 8 AI 4 U/I + 4 RTD/TC; 8 x M12, degree of protection IP67 | **6ES7 144-6KD00-0AB0** | • 1.0 m | **6XV1 870-8AH10** |
| | | • 1.5 m | **6XV1 870-8AH15** |
| **ET 200eco PN analog output modules** | | • 2.0 m | **6XV1 870-8AH20** |
| • 4 AO U/I; 4 x M12, degree of protection IP67 | **6ES7 145-6HD00-0AB0** | • 3.0 m | **6XV1 870-8AH30** |
| | | • 5.0 m | **6XV1 870-8AH50** |
| **ET 200eco PN IO-Link master module** | | • 10.0 m | **6XV1 870-8AN10** |
| • 4 IO-L + 8 DI + 4 DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67 | **6ES7 148-6JA00-0AB0** | • 15.0 m | **6XV1 870-8AN15** |
| *Accessories* | | **M12 connector for load supply 24 V DC** | |
| • PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12 | **6ES7 148-6CB00-0AA0** | Connection socket for infeed of 24 V DC; 4-pin, A-coded, 3 units | **6GK1 907-0DC10-6AA3** |
| • Terminal block for ET 200eco PN, 10 A insulation piercing connecting devices | **6ES7 194-6CA00-0AA0** | Connector for passing on the 24 V DC; 4-pin, A-coded, 3 units | **6GK1 907-0DB10-6AA3** |
| • Spare fuses for terminal block, 10 units | **6ES7 194-6HB00-0AA0** | **M12 power connection cables** Pre-assembled power connection cables on both sides with M12 socket and connector $4 \times 0.75 \text{ mm}^2$, in various lengths: | |
| • Mounting rail 0.5 m | **6ES7 194-6GA00-0AA0** | • 0.3 m | **6XV1 801-5DE30** |
| • Profile screw for mounting rail, 50 units | **6ES7 194-6MA00-0AA0** | • 0.5 m | **6XV1 801-5DE50** |
| • Cap M12 for modules IP67, 10 units | **3RK1 901-1KA00** | • 1.0 m | **6XV1 801-5DH10** |
| • Labels 10 × 7 mm, pastel turquoise, 816 units | **3RT1 900-1SB10** | • 1.5 m | **6XV1 801-5DH15** |
| | | • 2.0 m | **6XV1 801-5DH20** |
| | | • 3.0 m | **6XV1 801-5DH30** |
| | | • 5.0 m | **6XV1 801-5DH50** |
| | | • 10.0 m | **6XV1 801-5DN10** |
| | | • 15.0 m | **6XV1 801-5DN15** |

# PROFINET/Industrial Ethernet
## Distributed I/O ET 200eco

### ET 200eco PN

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **M12 coupling plug** | | **M12 connecting cables (PUR jacket)** | |
| Can be assembled | | Pre-assembled connecting cables for connecting digital sensors and actuators | |
| • for connecting actuators or sensors, 4-pin | **3RX8 000-0CD40** | on both sides with M12 socket and connector 3 x 0.34 mm$^2$, in various lengths: | |
| • for connecting actuators or sensors, 5-pin | **3RX8 000-0CD55** | • 0.6 m | **3RX8 000-0GF32-1AA6** |
| **M12 angular circular connector** | | • 1.0 m | **3RX8 000-0GF32-1AB0** |
| Can be assembled; for connecting actuators or sensors, 5-pin | **3RX8 000-0CE55** | • 1.5 m | **3RX8 000-0GF32-1AB5** |
| **Y cable M12** | | on both sides with M12 socket and connector 4 x 0.34 mm$^2$, in various lengths: | |
| for double connection of I/O by means of single cable to ET 200, 5-pin | **6ES7 194-6KA00-0XA0** | • 0.6 m | **3RX8 000-0GF42-1AA6** |
| | | • 1.0 m | **3RX8 000-0GF42-1AB0** |
| | | • 1.5 m | **3RX8 000-0GF42-1AB5** |

**Summary**

**2**

## Overview

SIMOTION C is the controller variant of the SIMOTION family with the proven design of the SIMATIC S7-300. Flexible modular expansion of SIMOTION C is possible thanks to use of the SIMATIC S7 module spectrum. The SIMOTION C240 and C240 PN designs represent two powerful motion controllers for advanced control and motion control tasks.

Depending on the SIMOTION C platform, HMI devices can be operated directly on the onboard PROFIBUS, Ethernet or PROFINET interfaces for operator control and monitoring. Functions such as remote maintenance, diagnostics and tele-service can also be used via these interfaces.

## Benefits

- Mounting flexibility thanks to the SIMATIC S7 module spectrum and thus optimal adaptation to automation task
- For universal use with digital and analog coupling to servo/vector, stepper and hydraulic drives (depending on the variant)
- User-friendly mounting and simple design with no moving parts
- Flexible networking through onboard PROFIBUS DP, Industrial Ethernet and PROFINET IO interfaces
- Powerful thanks to a range of integrated functions
- Easy engineering of logic and motion control applications in the same program

## Application

SIMOTION C can be used wherever

- Motion Control, technology and PLC functionalities are to be programmed, configured and executed in a single unit,
- a modularly expandable device is to be placed near or in the machine,
- communication with other programmable controllers is necessary.

SIMOTION C is universally applicable and meets the highest standards with respect to suitability for industrial use, thanks to high EMC compatibility and resistance against shock and vibration loads.

*Important applications include:*

- Packaging machines
- Plastic and rubber processing machines
- Presses, wire-drawing machines
- Textile machines
- Printing machines
- Wood, glass, ceramics and stone working machines
- Retrofit

Due to the increasing use of servo drives, these machines require a high degree of integration of PLC, Motion Control and technology functions.

## Design



*) for SIMOTION C240 PN also PROFINET IO
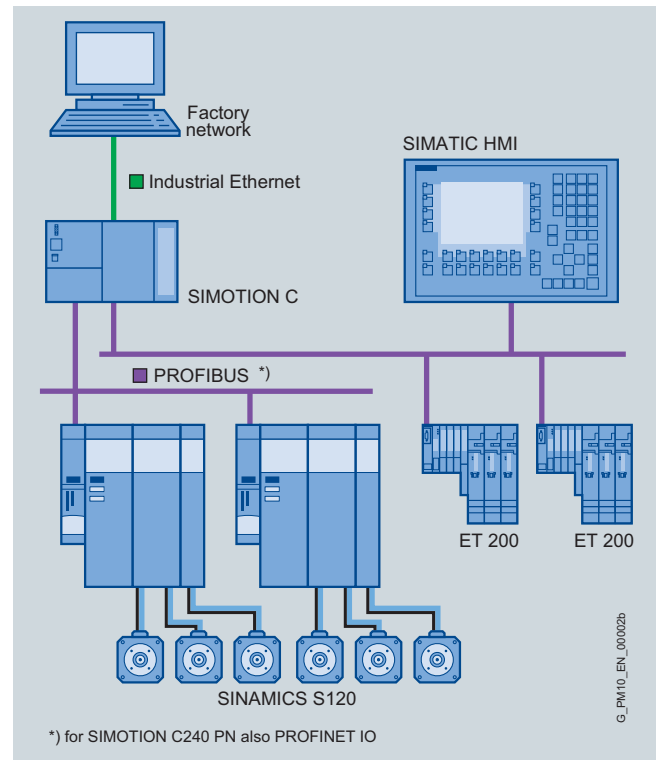
SIMOTION C with central and distributed I/O

The SIMOTION C motion control system is designed with modular principles in mind. It consists of a comprehensive and individually combinable hardware spectrum that uses components of the SIMATIC S7-300 series and Siemens drive technology.

*Components and interfaces of the SIMOTION C motion controller:*

- Analog drive interfaces (C240 only)
  - For setpoint outputs to servo/vector drives
  - For setpoint outputs to the actuating valves of hydraulic drives
  - As freely assignable analog outputs
- Pulse outputs for controlling stepper drives (C240 only)
- Interfaces for incremental/absolute encoders for cyclic acquisition of an actual position value or as freely assignable up/down counter (C240 only)
- Onboard I/O for high-speed I/O signals
- SIMOTION Micro Memory Card (MMC) for storing:
  - SIMOTION Kernel
  - User programs
  - User variables
- Integrated communications interfaces for linking:
  - Distributed I/Os
  - HMI systems
  - PG/PC
  - Other motion control and automation systems
  - Drives with digital setpoint interface
- Various status/error displays and mode selectors

# PROFINET/Industrial Ethernet
## SIMOTION Motion Control System – SIMOTION C – Controller-based

## Summary

### Design (continued)

*The following components make up a SIMOTION C system:*

- Motion Controller and Micro Memory Card (MMC)
- As well as other system components (depending on requirements) such as:
  - Load power supplies (PS) for connecting SIMOTION C to a power supply of 120 V/230 V AC
  - Central (not onboard) and distributed I/O components
  - Servo/vector drives with analog or digital setpoint interface or stepper drives

### Mounting and connection technology

The simple design makes SIMOTION C flexible and easy to maintain:

- Rail mounting
  Simply attach the module to the standard mounting rail, swing it in and screw it tight.
- Integrated backplane bus
  The backplane bus is integrated in the Motion Controller. The motion controller is connected to the I/O modules via bus connectors which are plugged into the rear of the housing.
- The front connector coding prevents front connectors from being plugged into the wrong module type.
- Screw-type terminals, spring-loaded terminals or FastConnect system for I/O modules
- TOP connect
  This connection method provides preassembled wiring with 1 to 3-wire connection systems with screw-type or spring-loaded terminal as an alternative to wiring directly on the I/O module.
- This system uses a defined mounting depth since all connections and connectors are recessed in the module and are protected and covered by doors on the front.
- No slot rules.

### Expansion with central I/O modules

Up to 8 slots can be used to the right of the motion controller for SIMATIC S7-300 I/O modules.

The IM 365 can be used to connect an expansion rack (two-tier design) to increase the number of slots available for I/O modules from 8 to 16. Multitier configuration with IM 360/IM 361 is not supported by SIMOTION C.



1) Power supply
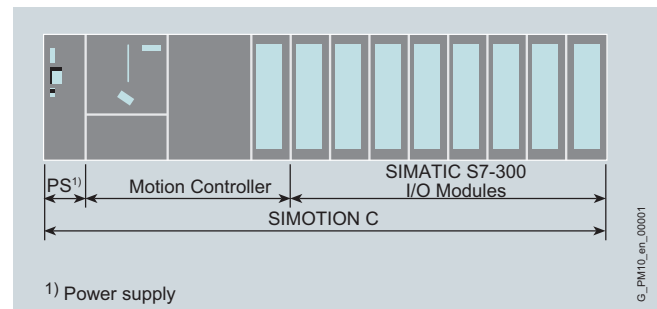
SIMOTION C can be mounted horizontally or vertically.

If additional I/O modules are required, the distributed SIMATIC ET 200 I/O can be connected to a SIMOTION C via PROFIBUS DP or PROFINET IO (for C240 PN).

The number of pluggable I/O modules is also limited by the power required from the backplane bus. The power consumption of all modules which are connected to the same backplane bus must not exceed 1.2 A.

### Expansion using distributed I/Os

Distributed I/Os can be assembled with intelligent I/O system components:

- SIMATIC ET 200S
- SIMATIC ET 200M
- SIMATIC ET 200pro
- SIMATIC ET 200eco

**2**

## ■ Function

SIMOTION C provides the following basic functionality for the various automation requirements:

- SIMOTION runtime system
  - User-programmable with several languages conforming to IEC 61131
  - Various methods of program execution (cyclic, sequential, event-driven)
  - PLC and arithmetic functionality
  - Communication and management functions
  - Motion control functions (Motion Control Basic)
- Testing and diagnostic tools

This basic functionality can be expanded with loadable technology packages, if required.

### Technology packages (TP)

A special feature of SIMOTION is that the operating system functionality can be expanded by loading technology packages, such as:

- Motion control with the functions:
  - POS – Positioning
  - GEAR – Synchronous operation/electronic gear
  - CAM – Cam
  - PATH - Path interpolation
- TControl – Temperature controller

Since the technology functions have modular licenses, you only pay for what you use.

### Configuring/parameterizing/programming

SIMOTION SCOUT is a powerful and user-friendly engineering tool. It is an integrated system for all engineering steps, from configuring and parameterization, through programming, to testing and diagnostics. Graphical operator prompting, using dialog boxes and wizards, as well as text-based and graphical languages for programming, considerably reduce the familiarization and training periods.

### Operator control and monitoring (HMI)

Communication utilities which support user-friendly data exchange with HMI devices are integrated in the basic functionality of the SIMOTION C Controller. Operator control and monitoring can be implemented using SIMATIC HMI devices, such as TPs (Touch Panels), OPs (Operator Panels) or MPs (Multi Panels).

These devices can be connected to a SIMOTION C via Industrial Ethernet, PROFIBUS or PROFINET (for C240 PN) and they are configured using ProTool/Pro or WinCC flexible.

With the SIMATIC NET communication software, the open, standardized OPC interface is available for accessing SIMOTION from other Windows-based HMI systems.

SIMOTION IT provides SIMOTION C with an integrated Web server on which, for example, user-specific Web pages can be stored. Read and write access can be made to the motion controller variables. Java scripts or applets also allow the implementation of active operation and display functions in the Web pages that can be executed on a client PC with an Internet browser.

### Process and data communication

Thanks to its integrated interfaces, SIMOTION C supports both process and data communication. The SCOUT engineering system is provided for user-friendly communication configuration and diagnostics.

## ■ More information

Further information

- on power supplies and I/O modules can be found under "SIMOTION I/O components".
- on TOP connect can be found in Catalog KT 10.2 and in the A&D Mall under "Automation Systems/System cabling – control cabinets/SIMATIC TOP connect system cabling".
- on the functionality of SIMOTION platforms can be found under "Overview of functions".
- on runtime software and engineering software can be found under "SIMOTION Software".
- on the communication functions of the motion controllers can be found under "SIMOTION Runtime Software".
- on HMI can be found under "SIMOTION Human Machine Interface (HMI)".
- on SIMATIC NET Communication Software can be found under "SIMOTION Runtime Software".

**2**

## Overview



SIMOTION C is a motion controller in S7-300 design. In addition to the already integrated interfaces, the controller can be expanded using I/O modules from the SIMATIC S7-300 range.

The motion controller is available in two versions: SIMOTION C240 and SIMOTION C240 PN. Although the two C240 and C240 PN versions have the same PLC and motion control performance, they differ in their interfaces.

## Design

### *Interfaces*

Operation, display and diagnostics
- 1 mode selector
- 1 LED strip for fault and status indicators

Integrated I/Os
- 18 digital inputs
  (C240: of which two for local measuring inputs and four for global measuring inputs / zero marks C240 PN: of which four for global measuring inputs)
- 8 digital outputs

Drive interfaces (C240 only)
- 1 setpoint output interface for up to 4 axes (alternatively analog, stepper or hydraulic drives; also as freely assignable analog outputs)
- 4 encoder inputs for incremental or absolute encoders (can also be used as freely assignable up/down counter)

Communication
- 1 interface for Industrial Ethernet
- 2 interfaces for PROFIBUS DP
  (of which one interface is for MPI)
- 3 x ports for PROFINET IO (C240 PN)

Data backup
- 1 slot for SIMOTION Micro Memory Card (MMC)

Additional interfaces
- Power supply terminals

### *Data storage/data backup*

The SIMOTION C Motion Controller has an integrated non-volatile data memory for storing process variables.

The data is backed up on a SIMOTION Micro Memory Card (MMC).

### *Expansion with central I/O modules*

The central I/O is directly plugged into the SIMOTION C Motion Controller. The I/O configuration for centralized I/O can comprise of two tiers (second tier using IM 365 interface) with up to 8 I/O modules each and a total of 4 analog modules. I/O modules from the SIMATIC S7-300 spectrum can be used here.

### *Expansion using distributed I/Os*

The following can be used as distributed I/O components:

PROFIBUS DP:
- All certified PROFIBUS standard slaves
  (DP-V0, DP-V1, DP-V2)
- SIMATIC ET 200S/M/eco/pro distributed I/O systems
- Servo converters of the MASTERDRIVES, SIMODRIVE and SINAMICS series over PROFIBUS DP interface with PROFIdrive
- MICROMASTER and COMBIMASTER frequency inverters
- Stepper drives over PROFIBUS DP interface with PROFIdrive

PROFINET IO: (C240 PN)
- SIMATIC ET 200S/M/pro distributed I/O systems
- SINAMICS S120 servo converters over PROFINET IO with IRT (PROFIdrive)

## ■ Function

The control and motion control functionality runs centrally on the SIMOTION C controller.

The functionality ranges from simple positioning up to complex motion control tasks over cams.

### *Position-controlled motion control*

Setpoint output/actual value acquisition

- Position control with analog setpoint output
  The SIMOTION C240 motion controller has one analog output for the speed setpoint and one encoder input for cyclic detection of the actual position value for each axis. In the case of hydraulic drives, the setpoint for the positioning valve is specified via the analog output.

- Position control with pulse direction output for stepper drives
  The SIMOTION C240 motion controller has one pulse output for the position setpoint for each axis. Stepper drives can either be operated without an encoder or be position-controlled with an encoder.

- Position control with digital setpoint output
  The PROFIBUS DP interface with PROFIdrive or the PROFINET interface for the C240 PN is available for this purpose.
  The actual position value is fetched over PROFIBUS DP or PROFINET and the speed setpoint is output.

- Position control with mixed setpoint output
  The analog, stepper and PROFIBUS drives can be used in a mixed configuration for the SIMOTION C240 motion controller. The channels of the 4 onboard interfaces can be used for analog, stepper or hydraulic drives. PROFIBUS and PROFINET drives can be operated as mixed configuration for the C240 PN.

- Incremental position sensing (C240)
  Incremental encoders supply counter pulses for the traversed distance in accordance with their resolution.
  It is usually necessary to search for homing references.
  The following can be used:
  - Rotary encoders
  - Translatory encoders (length dimensions)

- Absolute position detection (C240)
  Absolute encoders with serial interfaces can be used (SSI absolute encoders).
  It is not necessary to search for homing references.

- Position control/position sensing over ADI 4 or IM 174
  The ADI 4 (Analog Drive Interface for 4 axes) or IM 174 (Interface Module for 4 axes) module can be used to connect drives with analog setpoint interfaces.
  The IM 174 also supports the connection of stepper drives with a pulse direction interface.
  Both modules are connected over PROFIBUS DP.
  The following can be connected to an ADI 4 or IM 174 module:
  - 4 drives
  - 4 encoders
  - Digital inputs and outputs

- Isochronous PROFIBUS encoder

## ■ Integration
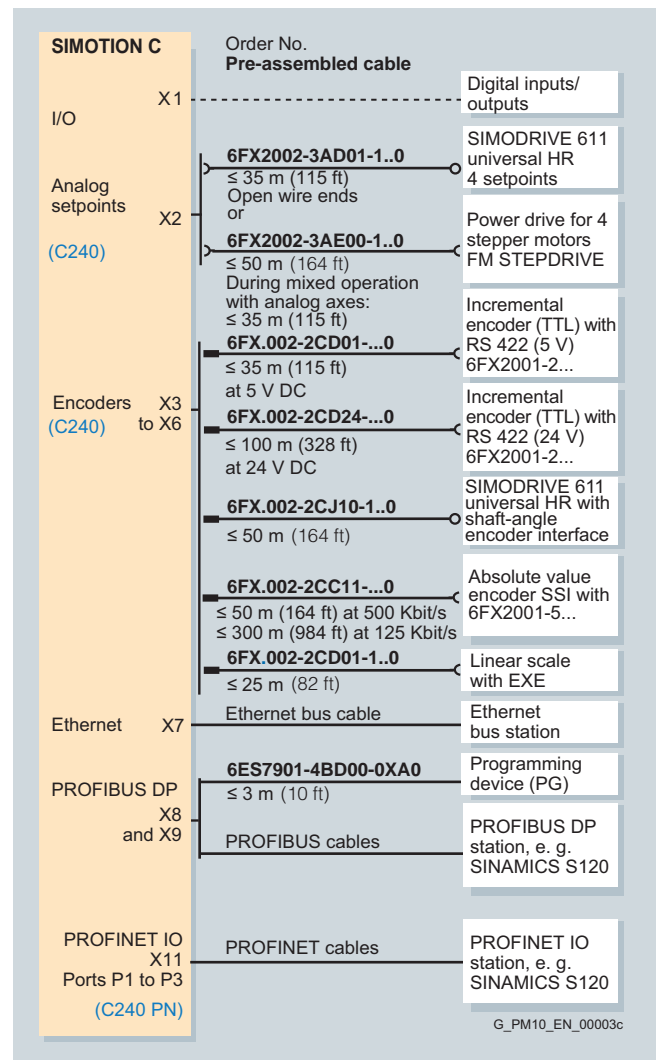


Overview of connections for SIMOTION C

The maximum permissible cable lengths should be taken into account when planning the cable layout.

Functional faults can occur when using longer cables.

The permissible length of PROFIBUS DP cables depends on the configuration.

**2**

## ■ Technical specifications (continued)

| | |
|---|---|
| Derated loading | |
| • at 40 °C (104 °F) | 4 A |
| • at 55 °C (131 °F) | 2 A |
| Switching frequency of the outputs | |
| • With resistive load | 100 Hz |
| • With inductive load | 2 Hz |
| Lamp load | 5 W |
| Purge energy/channel | 400 mJ (not simultaneous) |
| Typ. output delay | 150 µs |
| Short-circuit protection | Yes |
| Encoder inputs, max. (C240 only) | **4** |
| • Alternatively for incremental or absolute encoder | |
| • can be used alternatively as up/down counter | |
| Incremental encoder inputs | |
| Interface type (RS 422) | 5 V |
| Encoder supply | 5 V/0.3 A |
| Galvanic isolation | No |
| Encoder frequency, max. | 1 MHz |
| Max. cable length | |
| • at 1 MHz | 10 m (32.81 ft) |
| • at 500 kHz and 300 mA | 25 m (82.03 ft) |
| • at 500 kHz and 210 mA | 35 m (114 ft) |
| Inputs, SSI absolute encoder | |
| Interface type (RS 422) | 5 V synchronous serial, single or multiturn |
| Encoder supply | 24 V/0.3 A |
| Galvanic isolation | No |
| Transfer rate | 187.5/375/750/1500 kbit/s |
| Message length, max. | 25 bit |
| Max. cable length | |
| • at 187.5 kbit/s | 250 m (820 ft) |
| • at 1500 kbit/s | 10 m (32.81 ft) |
| Monitoring | |
| • Short-circuit of the sensor supply | Yes |
| • Wire break | Yes |
| *Additional technical specifications* | |
| Real-time clock buffering | |
| • Buffer time, typ. | 4 weeks |
| • Charging time, typ. | 1 h |
| Approvals | cULus (File No. E164110) |

## ■ Ordering data — Order No.

| | Order No. |
|---|---|
| **SIMOTION C240 Motion Controller** (SIMOTION V4.0 HF2 is required) | **6AU1240-1AA00-0AA0** |
| **SIMOTION Multiaxes Bundle C240** Consists of 1 item each • SIMOTION C240 • SIMOTION Micro Memory Card (MMC) 64 MB with MultiAxes Package license for SIMOTION C | **6AU1240-1AA00-0CA0** |
| **SIMOTION C240 PN Motion Controller** (SIMOTION V4.1 SP2 HF 3/4 is required) | **6AU1240-1AB00-0AA0** |
| **SIMOTION Multiaxes Bundle C240 PN** Consists of 1 item each • SIMOTION C240 PN • SIMOTION Micro Memory Card (MMC) 64 MB with MultiAxes Package license for SIMOTION C | **6AU1240-1AB00-0CA0** |
| **SIMOTION Micro Memory Card (MMC) 64 MB** For SIMOTION C240 / C240 PN Pre-installed license using Z options [1] | **6AU1720-1KA00-0AA0** |
| **SIMOTION Micro Memory Card (MMC) 64 MB** for SIMOTION C240 / C240 PN with MultiAxes Package license for SIMOTION C | **6AU1720-1KA00-0AA0 -Z M24** |
| **Front connector, 40-pin** • With screw contacts • With spring-loaded contacts • with Fast Connect fast connection method | **6ES7392-1AM00-0AA0** **6ES7392-1BM01-0AA0** **6ES7392-1CM00-0AA0** |
| **Connecting comb PS – C2xx** for PS307 power supply | **6ES7390-7BA00-0AA0** |
| **IM 365 Interface Module** for expanding the motion controller with max. 1 EU, 2 modules with permanent connecting cable (1 m - 3.28 ft) | |
| • Standard temperature range | **6ES7365-0BA01-0AA0** |
| **Mounting rail, SIMATIC S7-300** | |
| • L = 160 mm (6.30 in) | **6ES7390-1AB60-0AA0** |
| • L = 480 mm (18.90 in) | **6ES7390-1AE80-0AA0** |
| • L = 530 mm (20.87 in) | **6ES7390-1AF30-0AA0** |
| • L = 830 mm (32.68 in) | **6ES7390-1AJ30-0AA0** |
| • L = 2000 mm (78.74 in) | **6ES7390-1BC00-0AA0** |

[1] Notes regarding runtime software
Licenses for runtime software can be ordered either pre-installed on a SIMOTION Micro Memory Card (MMC) or separately.
For further information, refer to the "Runtime software licensing" section.

# PROFINET/Industrial Ethernet
## SIMOTION Motion Control System – SIMOTION C – Controller-based

**SIMOTION C240/C240 PN**

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### Accessories

The following PROFINET connectors and cables are recommended:

| Description | Order No. |
|---|---|
| **RJ45 FastConnect connector for Industrial Ethernet / PROFINET** | |
| • 145° cable outlet | |
|   - 1 pack = 1 unit | **6GK1901-1BB30-0AA0** |
|   - 1 pack = 10 units | **6GK1901-1BB30-0AB0** |
| **FastConnect cables for Industrial Ethernet / PROFINET [1]** | |
| • IE FC Standard Cable GP 2x2 | **6XV1840-2AH10** |
| • IE FC Flexible Cable GP 2x2 | **6XV1870-2B** |
| • IE FC Trailing Cable GP 2x2 | **6XV1870-2D** |
| • IE FC Trailing Cable 2x2 | **6XV1840-3AH10** |
| • IE FC Marine Cable 2x2 | **6XV1840-4AH10** |
| **Stripping tool for Industrial Ethernet / PROFINET FastConnect cables** | |
| • IE FC stripping tool | **6GK1901-1GA00** |

[1] Sold by the meter; max. length 1000 m (3281 ft);
minimum order 20 m (65.62 ft).

### More information

Further information
• on I/O modules can be found under "SIMOTION I/O components".
• on PROFIBUS DP/MPI cables and MOTION-CONNECT can be found under "Connection system MOTION CONNECT".
• on I/O modules from the SIMATIC S7-300 range can be found under "SIMOTION I/O components".
• on PROFIBUS DP, Industrial Ethernet and PROFINET can be found in Catalog IK PI or in the A&D Mall under "Communication/Networks/SIMATIC NET communication systems".

*SIZER configuration tool*

With the SIZER configuration tool, you can easily configure the SINAMICS S120 drive family including SIMOTION. It provides you with support for selecting and dimensioning the components required for a motion control task. You can also determine the possible number of axes and the resulting load with SIZER in accordance with your performance requirements.

For further information about SIZER, refer to the section "System description – Dimensioning: SIZER configuration tool".

**2**

## ■ Overview



### Multi Panels (MP)

Multi Panels on the basis of Windows CE combine the ruggedness of operator panels with the flexibility of PCs. Due to their extremely high performance capability, they are suitable for demanding applications and their functionality can be expanded even more by installing additional Windows CE applications.

### SIMATIC MP 177

- PLC functionality can be integrated directly into the MP 177 platform as an option
- The multi panel can be expanded with the options Sm@rtService and Sm@rtAccess
- Pixel-graphics 5.7" TFT display, color (64k colors)
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board
- The MP 177 6" Touch can also be delivered as a package, complete with a WinAC MP 177. WinCC flexible 2008 SP1 Compact, Standard or Advanced is required for configuring the MP 177.

### SIMATIC MP 277

- Multi Panel with comprehensive functionality for machine operation and monitoring on site
- Pixel-graphics 7.5" and 10.4" TFT displays with 64k colors
- Key or Touch versions available
- Onboard MPI, USB, PROFIBUS and PROFINET interfaces
- Content of message buffer is retained even when panel is disconnected without batteries
- SD/Multi Media Card slot
- Windows CE 5.0 operating system
- Can be configured using SIMATIC WinCC flexible 2005 SP1 Standard or Advanced
- Also available with stainless steel front (DIN EN 1672-2), thus meeting the high requirements of, for example, the food, beverages and tobacco industries.

### SIMATIC MP 377

- PLC functionality can be integrated directly into the MP 377 platform as an option
- Pixel-graphics 12.1", 15.1" or 19" TFT display, color (64k colors)
- MP 377 12" Touch, MP 377 15" Touch and MP 377 19" Touch: touch screen (analog/resistive)
- MP 377 12" Key: 38 system keys, 36 user-configurable and freely inscribable function keys (36 with LEDs)
- The MP 377 15" Touch is also available with a stainless steel front (DIN EN 1672-2). The stainless steel front is appropriate, for example, for the increased demands of the food and beverage industry
- All interfaces, e.g. MPI, PROFIBUS DP, USB, PROFINET (Ethernet TCP/IP), are on-board

# PROFINET/Industrial Ethernet
## SIMATIC Panels – Operator control and monitoring devices

### SIMATIC Multi Panels (MP)

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **SIMATIC MP 177** | | **SIMATIC MP 377** | |
| • **SIMATIC HMI MP 177 6" Touch** min. WinCC flexible 2008 is required | 6AV6 642-0EA01-3AX0 | • **12" color TFT display, Touch** | 6AV6 644-0AA01-2AX0 |
| **SIMATIC MP 277** | | • **12" color TFT display, Key** | 6AV6 644-0BA01-2AX1 |
| • **8" TFT color display, Touch** Touch screen, (analog/resistive) | 6AV6 643-0CB01-1AX1 | • **15" color TFT display, Touch** | 6AV6 644-0AB01-2AX0 |
| • **8" TFT color display, Key** 38 system keys, 26 user-configurable and freely inscribable function keys (18 with LEDs) | 6AV6 643-0DB01-1AX1 | • **15" color TFT display, Touch, INOX** Touch screen, (analog/resistive), with stainless steel front | 6AV6 644-0CB01-2AX0 |
| • **10" TFT color display, Touch** Touch screen (analog/resistive) | 6AV6 643-0CD01-1AX1 | • **19" color TFT display, Touch** | 6AV6 644-0AC01-2AX1 |
| • **10" TFT color display, Touch, INOX** Touch screen, (analog/resistive), with stainless steel front | 6AV6 643-0ED01-2AX0 | | |
| • **10" TFT color display, Key** 38 system keys, 36 user-configurable and freely inscribable function keys (28 with LEDs) | 6AV6 643-0DD01-1AX1 | | |

Note:

Multi Panel packages and accessories for Multi Panels can be found in catalog ST 80, in the CA 01 offline mall and in the Industry Mall under:
http://www.siemens.com/industrymall

**2**

## Overview



Interface module for handling communication between ET 200pro and host PROFINET IO controllers over Industrial Wireless LAN (IWLAN) radio networks for 2.4 GHz or 5 GHz with data transfer rates up to 54 Mbit/s.

- Protection against illegal access, espionage, tapping and falsification through use of effective encryption mechanisms
- Fast exchange of devices through use of interchangeable medium MICRO MEMORY CARD

## Technical specifications

| IM 154-6 PN IWLAN interface module | 6ES7 154-6AB00-0AB0 6ES7 154-6AB50-0AB0 |
|---|---|
| Supply voltage for electronic components 1L+ | |
| • Rated value | 24 V DC |
| • Valid range, lower limit | 20.4 V DC |
| • Valid range, upper limit | 28.8 V DC |
| • Short-circuit protection | Yes; replaceable fuse |
| • Reverse polarity protection | Yes; against destruction |
| • Max. infeed current | 5 A |
| Load voltage 2L+ | |
| • Rated value (DC) | 24 V DC |
| • Lower limit of permissible range (DC) | 20.4 V DC |
| • Upper limit of permissible range (DC) | 28.8 V DC |
| • Short-circuit protection | Yes, for potential group |
| • Reverse polarity protection | Yes; against destruction |
| • Max. infeed current | 8 A |
| Current consumption from supply voltage 1L+, typ. | 335 mA |
| Power loss, typ. | 8.5 W |
| Memory type | Micro Memory Card, is required |
| Address range/address volume | |
| • Outputs | 256 byte |
| • Inputs | 256 byte |
| Reports | |
| • PROFINET IO | Yes |
| • Industrial Wireless LAN | Yes |
| PROFINET IO services | ARP, PING, SNMP |
| Industrial Wireless LAN | |
| • Transmission rate, max. | 54 Mbit/s |
| • Standards for wireless communication | IEEE 802.11a |
| | IEEE 802.11b |
| | IEEE 802.11g |
| | IEEE 802.11h (not valid for 6ES7 154-6AB50-0AB0) |
| | IEEE 802.11e |
| | IEEE 802.11i |
| • Radio frequency for WLAN in 2.4 GHz frequency band | 2,4 ... 2.4835 GHz |
| • Radio frequency for WLAN in 5 GHz frequency band | 5,15 ... 5.825 GHz |
| • Transmission method | Direct Sequence Spread Spectrum (DSSS) |
| | Complementary Code Keying (CCK) |
| | Orthogonal Frequency Division Multiplexing (OFDM) |
| • Supported IWLAN services | Current approvals can be found in the Internet at http://support.automation. siemens.com/WW/view/de/ 19812553 |
| • Connection for external antenna | |

## PROFINET/Industrial Ethernet
### Industrial Wireless Communication – Wireless Devices – ET 200pro IWLAN

**IM 154-6 PN IWLAN**

**2**

### ■ Technical specifications (continued)

| IM 154-6 PN IWLAN interface module | 6ES7 154-6AB00-0AB0 6ES7 154-6AB50-0AB0 |
|---|---|
| Parameters | |
| • Diagnostic interrupt | Yes |
| • Maintenance alarm | Yes |
| • Hardware interrupt | Yes |
| • Swapping interrupt | Yes |
| • Identifier-related diagnostic data | Yes |
| • Module status | Yes |
| • Channel-specific diagnostics | Yes |
| • Start-up if preset configuration is not equal to actual configuration | Yes |
| • Module replacement during operation | Yes |
| Diagnostics indication (LED) | Yes |
| • Group fault (red) | Yes |
| • Bus fault (red) | Yes |
| • Maintenance information (yellow) | Yes |
| • Monitoring 24 V power supply ON (green) | Yes |
| • Load voltage monitoring 24 V DC (green) | Yes |
| • Connection to an Access Point R1 LINK (green) | Yes |
| • Data exchange R1 RX/TX (yellow) | Yes |
| • Connection to a PG/PC (green) | Yes |
| • Data exchange with a PG/PC (yellow) | Yes |
| Insulation tested at | 500 V DC |
| Isolation | |
| • Between the backplane bus and supply voltage 1L+ and 2L+ | Yes |
| • Between Ethernet and supply voltage 1L+ and 2L+ | Yes |
| • Between the supply voltage and electronic components | Yes |
| Operating temperature | |
| • Minimum | -25 °C |
| • Maximum | 55 °C |
| Storage/transport temperature | |
| • Minimum | -40 °C |
| • Maximum | 70 °C |
| Degree of protection | IP65, IP66, IP67 |
| General information | |
| • Manufacturer's code (VendorID) | 0x002A |
| • Device ID | 0x0305 |
| Dimensions | |
| • Width | 135 mm |
| • Height | 130 mm |
| • Depth | 60 mm |
| Weight, approx. | 1085 g |

### ■ Ordering data

| | Order No. |
|---|---|
| **IM 154-6 PN HF IWLAN interface module** | |
| For communication between ET 200pro and host controllers over Industrial Wireless LAN (IWLAN) radio networks; support of PROFIsafe | |
| With various national approvals; refer to the current list of approvals | **6ES7 154-6AB00-0AB0** |
| With approval for U.S.A. | **6ES7 154-6AB50-0AB0** |
| **Antennas with omnidirectional characteristic** | |
| Mounting directly on IM154-6 PN HF IWLAN | |
| • ANT IM 154-6 IWLAN; 2 units | **6ES7 194-4MA00-0AA0** |
| For wall or pipe mounting | |
| • ANT 792-6MN; rod antenna N-Connect female 2.4 GHz; 1 unit | **6GK5 792-6MN00-0AA6** |
| • ANT793-6MN; rod antenna N-Connect female 5 GHz; 1 unit | **6GK5 793-6MN00-0AA6** |
| For use with the RCoax antenna system | |
| • ANT 792-4DN; RCoax N-Connect female 2.4 GHz; 1 unit | **6GK5 792-4DN00-0AA6** |
| • ANT793-4MN; RCoax N-Connect female 5 GHz; 1 unit | **6GK 5793-4MN00-0AA6** |
| **Antenna cables IWLAN RCoax; N-Connect / R-SMA** | |
| • 1 m long | **6XV1 875-5CH10** |
| • 2 m long | **6XV1 875-5CH20** |
| • 5 m long | **6XV1 875-5CH50** |
| • 10 m long | **6XV1 875-5CN10** |
| IWLAN terminating resistor 50 Ohm for second R-SMA antenna socket, 3 items | **6GK5 795-1TR10-0AA6** |

**2**

## Ordering data

| Accessories | Order No. |
|---|---|
| **7/8" connecting cable to power supply** | |
| 5-core, 5 x 1.5 mm$^2$, trailing type, pre-assembled with two 7/8" connectors | |
| • 1.5 m long | **6XV1 822-5BH15** |
| • 2.0 m long | **6XV1 822-5BH20** |
| • 3.0 m long | **6XV1 822-5BH30** |
| • 5.0 m long | **6XV1 822-5BH50** |
| • 10 m long | **6XV1 822-5BN10** |
| • 15 m long | **6XV1 822-5BN15** |
| • Other special lengths with 90° or 180° cable outlet | See http://support.automation.siemens.com/WW/view/en/26999294 |
| **Power line** | **6XV1 830-8AH10** |
| 5-core, 5 x 1.5 mm$^2$, trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1,000 m | |
| **7/8" cable connector** | **6GK1 905-0FB00** |
| For ET 200eco, with axial cable outlet; with socket insert, pack of 5 | |
| **Twisted Pair cables 4x2 with RJ45 connectors** | |
| • 0.5 m long | **6XV1 870-3QE50** |
| • 1 m long | **6XV1 870-3QH10** |
| • 2 m long | **6XV1 870-3QH20** |
| • 6 m long | **6XV1 870-3QH60** |
| • 10 m long | **6XV1 870-3QN10** |
| **Crossed Twisted Pair cables 4x2 with RJ45 connectors** | |
| • 0.5 m long | **6XV1 870-3RE50** |
| • 1 m long | **6XV1 870-3RH10** |
| • 2 m long | **6XV1 870-3RH20** |
| • 6 m long | **6XV1 870-3RH60** |
| • 10 m long | **6XV1 870-3RN10** |
| **IE FC RJ45 Plug 180** | |
| 180° cable outlet; for line components and CPs/CPUs with Industrial Ethernet interface | |
| • 1 pack = 1 item | **6GK1 901-1BB10-2AA0** |
| • 1 pack = 10 items | **6GK1 901-1BB10-2AB0** |
| **IE FC RJ45 Plug 90** | |
| 90° cable outlet; e.g. for ET 200S | |
| • 1 pack = 1 item | **6GK1 901-1BB20-2AA0** |
| • 1 pack = 10 items | **6GK1 901-1BB20-2AB0** |

| General accessories | Order No. |
|---|---|
| **ET 200pro rack** | |
| • Narrow, for interface, electronics and power modules | |
|   - 500 mm | **6ES7 194-4GA00-0AA0** |
|   - 1000 mm | **6ES7 194-4GA60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7 194-4GA20-0AA0** |
| • Compact, for interface, electronics and power modules | |
|   - 500 mm | **6ES7 194-4GC70-0AA0** |
|   - 1000 mm | **6ES7 194-4GC60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7 194-4GC20-0AA0** |
| • Wide, for interface, electronics, power modules and motor starters | |
|   - 500 mm | **6ES7 194-4GB00-0AA0** |
|   - 1000 mm | **6ES7 194-4GB60-0AA0** |
|   - 2000 mm, can be cut to length | **6ES7 194-4GB20-0AA0** |
| • Wide, for I/O modules and motor starters | |
|   - 500 mm | **6ES7 194-4GD00-0AA0** |
|   - 1000 mm | **6ES7 194-4GD10-0AA0** |
|   - 2000 mm | **6ES7 194-4GD20-0AA0** |
| **Spare fuse** | **6ES7 194-4HB00-0AA0** |
| 12.5 A quick-response, for interface and power modules, 10 items per package unit | |
| **Labels** | **3RT1 900-1SB20** |
| 20 x 7 mm, pale turquoise, 340 items per pack | |
| **SIMATIC Micro Memory Card** | |
| • 64 KB | **6ES7 953-8LF20-0AA0** |
| • 128 KB | **6ES7 953-8LG11-0AA0** |
| • 512 KB | **6ES7 953-8LJ20-0AA0** |
| **SIMATIC Manual Collection** | **6ES7 998-8XC01-8YE0** |
| Electronic manuals on DVD, multi-language: S7-200, TD 200, S7-300, M7-300, C7, S7-400, M7-400, STEP 7, Engineering Tools, Runtime Software, SIMATIC DP (Distributed I/O), SIMATIC HMI (Human Machine Interface), SIMATIC NET (Industrial Communication) | |
| **SIMATIC Manual Collection – Update service for 1 year** | **6ES7 998-8XC01-8YE2** |
| Scope of supply: Current DVD "S7 Manual Collection" and the three subsequent updates | |

## More information

### Radio approvals

Current approvals can be found in the Internet.

In Germany

You can find more information in the Internet at:

http://intranet.automation.siemens.com/net/html_00/ftp/support/lz_laenderliste_wlan_de.pdf

Outside Germany:

You can find more information in the Internet at:

http://intranet.automation.siemens.com/net/html_00/ftp/support/lz_laenderliste_wlan_en.pdf

# PROFINET/Industrial Ethernet
## Production sensors – RFID systems

**SIMATIC RF180C/RF182C**

### ■ Overview



SIMATIC RF180C/RF182C are communication modules for direct connection of Siemens RFID systems to PROFINET IO/Ethernet. The readers (SLGs) of the RFID systems MOBY E (only RF180C), D, U, and SIMATIC RF300/RF600 can be operated on the SIMATIC RF180C/RF182C.

Due to the high degree of protection and its ruggedness, SIMATIC RF180C/RF182C is ideally suited to use at the machine level. The uniform plug-in connection system ensures rapid commissioning.

### ■ Benefits

- Two parallel MOBY channels ensure real-time operation of the dynamic read points
- Reader connection with an 8-pole M12 connector for rapid assembly of all components
- Different connection systems to suit any application
  - M12, 7/8", the well-proven round connectors
  - Push-pull connectors for quick assembly with RJ45 data connectors
- Easy changeover from PROFIBUS applications to PROFINET with SIMATIC RF180C thanks to software compatibility
- The integrated switch allows several PROFINET/Ethernet modules to be installed in a star or bus topology. Each application can then be built up quickly and inexpensively
- Powerful hardware ensures rapid data communication with the reader (SLG). So that the data are available to the application more quickly
- Simple firmware downloading in the case of function expansions and error rectification ensures high availability of the RFID system
- Adjustable and parameterizable RFID-specific diagnostics facilitate commissioning and troubleshooting
- A broad selection of pre-assembled connecting cables can be ordered for connecting PROFINET/Ethernet and readers to SIMATIC RF180C/RF182C. This saves time and money during installation and increases the quality

### ■ Application

The PROFINET SIMATIC RF180C/RF182C communication module has been specially designed for a wide range of applications in industrial automation and logistics. Due to its high degree of protection IP67, SIMATIC RF180C/RF182C can be installed in the process outside the control cabinet.

Main applications for SIMATIC RF180C/RF182C:

- Machine manufacturing, automation systems, conveyor systems
- Ancilliary assembly lines in the automotive industry / suppliers
- Small assembly lines

### ■ Design

**2**
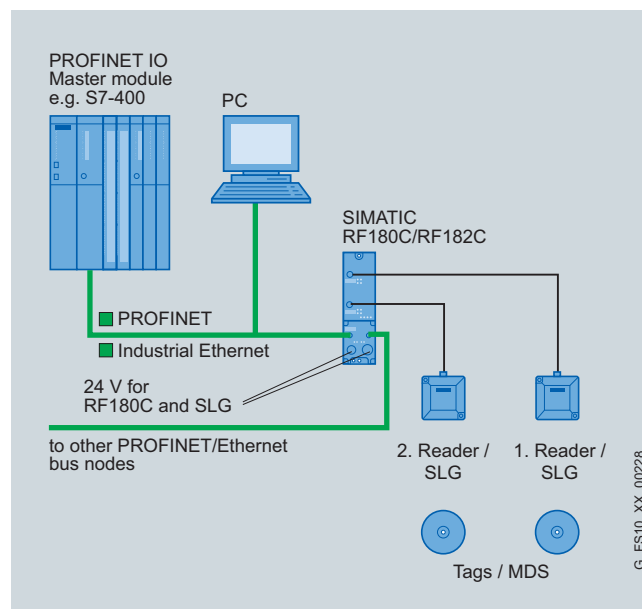
## ◼ Function

The SIMATIC RF180C/RF182C comprises a basic module and a connection block that must be ordered separately.

The connection block is available in three versions:

- M12, 7/8" (5-pole):
  PROFINET/Ethernet is connected by means of an M12 connector, the power supply is connected by means of a 5-pole 7/8" connector. There are 2 connections each for PROFINET/Ethernet as well as for the power supply. This ensures that the SIMATIC RF180C/RF182C can be connected to additional bus nodes without the need for external distributors.
  The removable connection block allows a base module to be replaced without interrupting the supply voltage to other bus stations.

- Push-pull connector (according to IEC 61918):
  PROFINET/Ethernet and the power supply are connected by means of a push-pull connector. There are 2 connections each for PROFINET/Ethernet as well as for the power supply.
  This ensures that the SIMATIC RF180C/RF182C can be connected to additional bus nodes without the need for external distributors. The supply voltage connectors can conduct currents of up to 12 A (1L+ and 2L+). The removable connection block allows a base module to be replaced without interrupting the supply voltage to other bus stations.

- M12, 7/8" (4-pole; only RF182C):
  Ethernet is connected by means of an M12 connector, the power supply is connected by means of a 4-pole 7/8" connector. There are 2 connections for Ethernet and one connection is available for the power supply. This connection block can be used in applications where the 5-pole 7/8" connector is already being used for other functions and therefore cannot be used for the power supply.

A pre-assembled reader cable is used to connect one or two readers to the communication module. The standard cable length is 2 m. If other reader cable lengths are required, an extension cable from 2 to 50 m in length can be used. The cable can also be assembled by the customer as required.

The data in the transponder can be accessed in the following manner: Direct addressing via absolute addresses.

Error messages and operating states (tag in field, transfer, etc.) are also displayed on LEDs and support commissioning and service.

SIMATIC RF180C/RF182C has two reader interfaces from which the readers are also supplied with voltage. There is an electronic fuse in SIMATIC RF180C/RF182C for the readers' power supply. The maximum current permitted for the readers per SIMATIC RF180C/RF182C is 1 A. It is not important here whether the current is drawn by one or 2 readers.

### SIMATIC RF180C

The SIMATIC RF180C is designed for use in PROFINET networks. SIMATIC RF180C is integrated in SIMATIC STEP 7 via the GSDML file. SIMATIC RF180C can then be configured via the SW tool HW Config of SIMATIC Manager or another PROFINET tool.

The application accesses the tag via FB45. FB45 accesses the tag via absolute addresses. For large volumes of data and complex tag operations, the FB45 can process chained commands.

Data is exchanged between SIMATIC RF180C and the application by means of acyclic data records. This ensures that a large quantity of data can be transferred from/to SIMATIC RF180C without loading the bus cycle. This is advantageous when large volumes of data are being transferred. SIMATIC RF180C can also process chained tag commands in this mode extremely quickly.

### SIMATIC RF182C 🆕

The SIMATIC RF182C is designed for use in Ethernet networks based on TCP/IP. The IP address of the SIMATIC RF182C is set using the "Primary Setup Tool". The RF182C is then ready for operation. This tool can be downloaded at http://support.automation.siemens.com/WW/view/de/19440762.

Communication with the SIMATIC RF182C is implemented using XML commands. XML commands have a very simple structure. This makes programming of the RF182C under any operating system very easy. The simple command command set of the RF182C can also be programmed easily in any Ethernet-capable controller.

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## SIMATIC RF180C/RF182C

### ■ Technical specifications

| Type | SIMATIC RF180C | SIMATIC RF182C NEW |
|---|---|---|
| Ethernet connection | | |
| Protocol | PROFINET IO | Ethernet TCP/IP |
| Data rate | 10/100 Mbit/s | |
| Connection versions | M12, 7/8" (5-pole) Push-pull | M12, 7/8" (5-pole) Push-pull M12, 7/8" (4-pole) |
| Programming | FB 45 | XML-structured data |
| Supply voltage | | |
| • Nominal value | 24 V DC | |
| • Permissible range | 20 … 30 V DC | |
| Current consumption | | |
| • without reader, typ. | 100 mA | |
| • with two readers, max. | 1000 mA | |
| Serial reader interface (gross transmission rate) | | |
| • MOBY E | 19200 bit/s | – |
| • MOBY U/D, RF300 | 19200, 57600, 115200 bit/s | |
| Cable connector for reader | 2 x connector plug M12, 8-pin | |
| Cable length to reader | | |
| • Standard length | 2 m | |
| • Optional preassembled cables | 5 m, 10 m, 20 m, 50 m | |
| Self-assembled cables | Reader/SLG-dependent. Up to 1000 m | |
| Supply voltage to reader | 24 V | |
| Max. current per reader | | |
| • 2 readers connected | 0.5 A | |
| • 1 reader connected | 1.0 A | |
| Ambient temperature | | |
| • Operation | -0 ... 60 °C | |
| • Storage | -40 ... +70 °C, 20 K/h | |
| Shock load during operation acc. to IEC 61131-2 | 30 $g$ | |
| Vibratory load during operation acc. to IEC 61131-2 | 0.75 mm (10 … 58 Hz) 10 $g$ (58 … 150 Hz) | |
| Enclosure | | |
| • Material | Thermoplastic (fiberglass reinforced) | |
| • Color | IP Basic 714 | |
| • Degree of protection | IP67 | |
| Dimensions (W x H x D) in mm | | |
| • SIMATIC RF180C without connection block | 60 x 210 x 30 | |
| • SIMATIC RF180C with M12, 7/8" connection block | 60 x 210 x 54 | |
| • SIMATIC RF180C with push pull connection block | 60 x 216 x 100 | |
| Weight | | |
| • Base module only | 210 g | |
| • M12, 7/8" connection block only | 230 g | |
| • Push pull connection block only | 120 g | |

**2**

| Ordering data | Order No. | | Order No. |
|---|---|---|---|
| **SIMATIC RF180C communication module** | **6GT2 002-0JD00** | *Accessories for network connection M12, 7/8" (5-pole)* | |
| for PROFINET, for connecting 2 readers; without a connection block | | PROFINET cable with M12 connectors, pre-assembled; for trailing | **6XV1 870-8Axxx[1]** |
| **SIMATIC RF182C communication module** | **6GT2 002-0JD10** 🔴NEW | Cable for supply voltage pre-assembled with 7/8" connectors | **6XV1 822-5Bxxx[1]** |
| for Ethernet for connecting 2 readers, without connection block | | PROFINET M12 plug connector; rugged metal housing; fast connect system; D-coded (pack of 1) | **6GK1 901-0DB10-6AA0** |
| PROFINET connection block for SIMATIC RF180C/RF182C, M12 D-coded, 7/8" (5-pole) | **6GT2 002-1JD00** | 7/8" cable connector; for voltage (pack of 5) | |
| PROFINET connection block for SIMATIC RF180C/RF182C, push pull RJ45 | **6GT2 002-2JD00** | • with pin insert | **6GK1 905-0FA00** |
| PROFINET connection block for SIMATIC RF182C, M12 D-coded, 7/8" (4-pole) | **6GT2 002-4JD00** | • with socket insert | **6GK1 905-0FB00** |
| | | IE M12 cabinet bushing for conversion from M12 (D-coded) to RJ45; (pack of 5) | **6GK1 901-0DM20-2AA5** |
| **Accessories for MOBY** | | PROFINET cable from M12 (D-coded) to RJ45; especially for commissioning and testing; 2 m | **6GF3440-8BB1** |
| SLG cable for MOBY E/U; 2 m | **6GT2 091-0FH20** | | |
| SLG cable for MOBY E/U; 5 m | **6GT2 091-0FH50** | IE FC RJ45 PLUG 180 RJ45 plug connector with rugged metal housing and FC connection system; straight cable outlet (pack of 1) | **6GK1 901-1BB10-2AA0** |
| SLG cable for MOBY D; 2 m | **6GT2 691-0FH20** | | |
| Reader cable RF300/RF600 Extension cable MOBY E/U/D, RF300/RF600; 2 m | **6GT2 891-0FH20** | Sealing caps 7/8" (10 units) | **6ES7 194-3JA00-0AA0** |
| Reader cable RF300/RF600 Extension cable MOBY E/U/D, RF300/RF600; 5 m | **6GT2 891-0FH50** | *Accessories for push pull RJ45 network connection* | |
| Reader cable RF300/RF600 Extension cable MOBY E/U/D, RF300/RF600; 10 m | **6GT2 891-0FN10** | Push-pull cable connector for 1L+/ 2L+, not pre-assembled | **6GK1 907-0AB10-6AA0** |
| Reader cable RF300/RF600 Extension cable MOBY E/U/D, SIMATIC RF300/RF600; 20 m | **6GT2 891-0FN20** | Push-pull cable connector for RJ45, not pre-assembled | **6GK1 901-1BB10-6AA0** |
| Reader cable RF300/RF600 Extension cable MOBY E/U/D, RF300/RF600; 50 m | **6GT2 891-0FN50** | Cover caps for push pull sockets (1L+/ 2L+), 5 units per pack | **6ES7 194-4JA50-0AA0** |
| Reader cable RF300 Prefabricated, between ASM 456, RF170C, RF180C, RF182C and reader, angled connector; 2 m | **6GT2 891-0JH20** | Cover caps for push pull sockets RJ45, 5 units per pack | **6ES7 194-4JD50-0AA0** |
| | | *Accessories for network connection M12, 7/8" (4-pole)* | |
| M12 sealing caps for unused reader connections (10 units) | **3RX9 802-0AA00** | Network wiring with M12 | Similar accessories, as M12, 7/8" (5-pole) |
| | | Power supply with 7/8" (4-pole) | |
| | | *Accessories for network connection cable* | |
| | | PROFINET standard cable 2x2, Type A, not pre-assembled; minimum order quantity 20 m | **6XV1 840-2AH10** |
| | | Energy cable 5 x 1.5; not pre-assembled, stranded wire, trailing capability; minimum order quantity 20 m | **6XV1 830-8AH10** |
| | | **CD "RFID Systems Software & Documentation"** | **6GT2 080-2AA10** |
| | | FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation | |

[1] This cable is available in different lengths (see key length in the appendix or Catalog IK PI · 2009)

# PROFINET/Industrial Ethernet
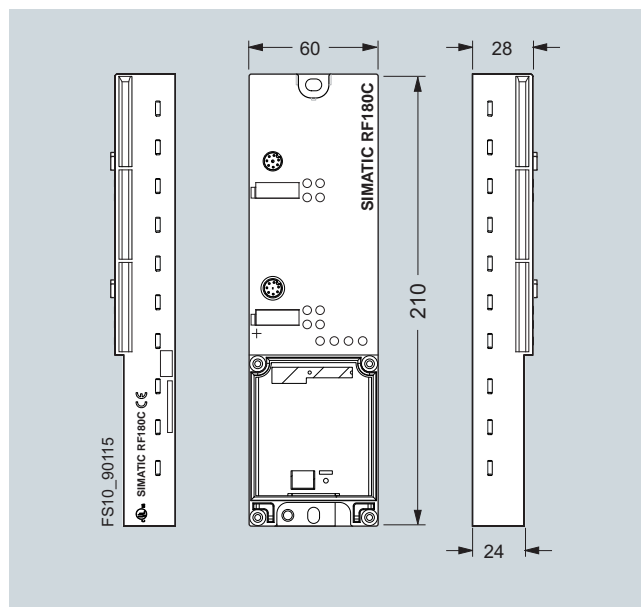## Production sensors – RFID systems

### ■ Dimensions

#### CAD data

Dimension drawing available as CAD graphic (DXF format).

You can find more information in the Internet at:

http://www.automation.siemens.com/bilddb/
index.asp?objKey=G_FS10_XX_90115

**2**

## Overview



The SIMATIC MV440 is an optical code reading system specially designed for recognizing and evaluating a variety of machine-readable codes in industrial production. The list of readable codes includes all standard matrix codes and bar codes which are reliably detected - mostly independent of the printing technology applied and carrier medium used. One of the main functions of the device is Data Matrix Code (DMC) reading. The SIMATIC MV440 device family stands out due to its ruggedness, reliability, and user-friendliness. This applies both to its mechanical properties and its ability to reliably detect codes on many different carrier materials. In addition, MV440 code readers can verify the quality of codes in accordance with the prevalent standards. The device determines the quality of the applied code and thus the quality of the marking process can be checked.

- 1D codes (barcodes):
  - Int. 2/5 (without checksum)
  - Int. 2/5+CS (with checksum)
  - Code 128
  - Code 39 (without checksum)
  - Code 39+CS (with checksum)
  - EAN 13
  - EAN 8
  - UPC-A
  - UPC-E
  - UPC Suppl.
  - GS1 Databar 14
  - GS1 Databar Stacked
  - GS1 Databar Limited
  - GS1 Databar Expanded
- 2D codes:
  - DMC
  - PDF417
  - QR
  - Vericode
- SIMATIC MV440 reads codes on many different components and surfaces, e.g.:
  - Paper or plastic labels
  - Plastic parts
  - Printed circuit boards
  - Metallic objects
- SIMATIC MV440 reads codes applied in many different ways, e.g.:
  - Printed
  - Dot-peened
  - Lasered
  - Drilled

Further important product characteristics are:

- No expert knowledge is required for the reliable parameterization of the reading properties. "Setup" is performed automatically by presenting a readable code pattern. Programming and parameterization are not required.
- Can be used in principle for the following applications:
  - Readout of coded information
  - Comparison of coded information with a defined character string
  - Quality assessment of the marking process
- Web-based operator interface which runs on various platforms with the following requirements: browser (IE6.0 or higher), JAVA-VM (MS, SUN).
- Password-protected user interface with integrated access rights administration.
- A web-based user interface can be integrated in an HMI device. In this case, the requirements mentioned above also apply with regard to the browser and JAVA VM
- Remote maintenance concept
- Connection of PLC and host via PROFIBUS, PROFINET IO, and open interfaces.
- 6 language versions are available (operator interface, manual and online help are available in German, English, French, Spanish, Italian, and Chinese).

## Application

The main functions of SIMATIC MV440 are

- code reading
- measurement of code quality
- comparison of the read result with a default value
- formatting of the read result for forwarding

The application range of the SIMATIC MV440 product family covers nearly all areas of industrial production. Applications range from the identification of unmoved parts to parts that are transported very quickly on a conveyor system. A very compact installation is possible due to the built-in powerful lighting. All components, including the exchangeable C-mount lenses, are protected against environmental influences (IP67 degree of protection). MV440 code readers are therefore suitable for all industrial applications where direct part marking (DPM), tracking, and serialization of production parts are implemented. This applies both to the production process and the logistics process.

MV440 code readers feature all standard communications interfaces such as Ethernet or PROFINET and can therefore be connected to many different systems. All RFID communication modules, e.g. for connecting to PROFIBUS, can be used via an integrated RS422 interface. A code reader and RFID read-write device can also be combined on a communication module. Despite numerous possible applications, it is very easy to operate and commission the read devices. Parameters are set automatically for most applications. If nevertheless a readjustment is necessary, parameterization can be implemented easily by means of the integrated web server via an Internet browser. No software needs to be installed for this purpose.

## SIMATIC MV440

**2**

### ■ Application (continued)

The characteristics of the readable codes are listed below:

#### Barcodes

SIMATIC MV440 reads barcodes in different sizes (see "Overview").

The codes can be in any position within the image.

- The codes can be dark-colored codes with a bright background or light-colored codes with a dark background.
- Codes with a height of 25 pixels and a height/length ratio of ≥ 0.15 can be read.
- The sensor's angle of view relative to the surface can be between 80° and 90°.
- The codes must not be printed on a convex surface.
- There must be no interferences in the code area.
- The code trailing and leading edges must be uninterrupted.
- The code and background must have a uniform brightness gradient.
- The width of a bar must not exceed 2 pixels.
- For the maximum bar width, the following limit values must not be exceeded:
  - Code 39: 8 pixels
  - Code 128: 12 pixels
  - Int. 2/5: 5 pixels
  - EAN 13/UPC-A/UPC-E/EAN 8: 12 pixels
  - Code 93: 14 pixels
  - Codabar: 9 pixels

#### Data matrix code

The SIMATIC MV440 can decode data matrix codes with the following characteristics:

- Any rotational position of the code in the image.
- The codes can be dark-colored codes with a bright background or light-colored codes with a dark background.
- Reading of mirror-inverted codes.
- The lower limit of the angle of view relative to the printed surface is approx. 40 degrees.
- Dot sizes from 5 to 35 pixels.

The reader can be used flexibly for many types of product markings and is resistant to many types of disturbances. The list of default characteristics is therefore especially short.

#### PDF417

The SIMATIC MV440 can decode PDF417 with the following characteristics:

- The following code types are not supported: Truncated PDF417, Macro PDF417, Micro PDF417.
- The codes can be in any position within the image.
- The codes can be dark-colored codes with a bright background or light-colored codes with a dark background.
- Codes with a bar width of ≥ 3 pixels and individual symbol sets with a height of ≥ 9 pixels can be read.
- The sensor's angle of view relative to the surface can be between 70° and 90°.
- The code must not touch any other objects in the image – ensure that the code trailing and leading edges are 2 columns wide.
- The image background must have a uniform brightness gradient (e.g. no texture such as grooves).
- Error correction codes must not be hidden (i.e. the lower part of the bar code).
- The following maximum number of codes can be read with the following image resolutions:
  - MV440 SR read device: up to 40 code lines and up to 6 code columns.
  - MV440 HR read device: up to 60 code lines and up to 12 code columns.

#### QR

The SIMATIC MV440 can decode QR with the following characteristics:

- A size of 5 to 35 pixels per dot.
- Codes with a maximum code dimension of 89x89 can be read.
- The following code types are not supported: Micro QR code, Macro QR code.
- The codes can be in any position within the image.
- The codes can be dark-colored codes with a bright background or light-colored codes with a dark background.
- The reader's angle of view relative to the surface can be between 70° and 90°.
- The diameters of the dots must be equal in the entire code field.
- The contrast between dots and the background must not differ considerably in the entire code field.
- The image background must have a uniform brightness gradient, e.g. no texture (grooves).

The list of characteristics for determining the field of application per code type can only be used for a preliminary decision. For further important information, refer to the supplied manual.

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## ■ Design

The SIMATIC MV440 is a compact system. However, the device can be configured using single components and thus adapted to the specific application conditions. The following component types and components are are available for configuration:

- Base unit (camera)
  - Standard resolution
  - High resolution
- Lens
  - Pentax mini lens (6 different focal lengths 12 mm to 75 mm, without barrel)
- Lamp
  - Built-in ring lamp
  - External ring lamp (5 types)
- Protective barrel for lens
  - IP67 protective barrel for lens D = 65 mm
  - IP65 protective barrel for lens D = 50 mm
- Connecting cables
  - Power-DIO-RS232 cable
  - ASM cable (different lengths)
  - Ethernet cable (different lengths)
- CD with assembly/operating instructions

Two basic types of configuration exist:

- Near field
- Distant field

For near field configuration, a protective lens barrel with a diameter of 65 mm is used. In the barrel there is space for the built-in ring lamp and lens. This configuration is therefore the smallest configurable version and suitable for close-up ranges up to approx. 80 cm. The built-in ring lamp can be replaced by an external lamp with a greater range whenever required. Without a lamp, the protective lens barrel can also accommodate lens types that are not specified as standard accessories.

The distant field configuration is based on the IP65 protective lens barrel with a diameter of 50 mm. The protective barrel offers space for the max. focal length f = 75 mm from the range of accessories and can therefore be used for large distances. That indicated max. distance of 300 cm is derived from the available ring lamps. The ring lamp version with the highest performance for lenses with medium reflection permits code reading over this distance. Deviations are also possible in this configuration. A built-in ring lamp cannot be used with the protective lens barrel.

| The following can be used for communication service: | |
| --- | --- |
| PROFINET IO (FB79) | Onboard MV440-PROFINET interface |
| PROFINET IO (FB45, PIB) | Via the MV440 ASM interface using the RF180C ASM module |
| PROFIBUS DP V0/1 (FB45, PIB) | Via the MV440 ASM interface using the ASM456 module |
| TCP/IP native | Onboard MV440-PROFINET interface |

For further information, refer to the supplied manual.

## ■ Function

The main functions of SIMATIC MV440 are

**Reading codes** (see "Overview" and "Application")

**Measuring of the code quality** – the following quality standards are supported:

- SIMATIC MV440-SR and SIMATIC MV440-HR support:
  - Verification according to ISO/IEC 16022 (previously AIM specification)
- SIMATIC MV440-SR V and MV440-HR V support:
  - Data matrix verification according to ISO/IEC 15415
  - Data matrix verification according to AS9132 Rev. A (previously IAQG) for dot-peened codes
  - Siemens DPM
  - Data matrix verification according to AIM DPM-1-2006
  - Barcode verification according to ISO/IEC 15416 (previously ANSI X3.182-1990)

**Formatting of the read result** for forwarding and/or comparing

**Comparison** of the read result with a default value

- Default setting of the comparison string via one of the serial interfaces (PROFINET (ASM and onboard), PROFIBUS (ASM), RS232).
- Comparison of the formatted read result with a default string.

The functions can be used individually and combined.

### Mode of operation

The following steps are required for using the SIMATIC MV440:

- Mounting of the SIMATIC MV440 and connecting the plug-in cables (and additional external lighting, if applicable).
- Alignment of the camera, lighting check:

This is handled using the web server integrated in the unit and the web-based operator interface contained within. The operator interface displays the camera image and the decoding result. The sensor head is aligned based on the live image. The user interface executes on any PC with Microsoft Internet Explorer V6.0 or higher and JVM.

- If the code is completely visible in the camera image and rich in contrast, the MV400 automatically continues with the following:
  - Optimization of lighting control.
  - Adapting the image processing parameters by presenting a sample code.
- Storage of the image processing parameters (max. 15 memory spaces).
- Parameterization of the automation integration (e.g. trigger source, target).
- Start of the automated evaluation mode (RUN mode) by activating the automation environment.

### Programming

The SIMATIC MV440 is not programmed or parameterized like standard image processing systems – see "Mode of operation".
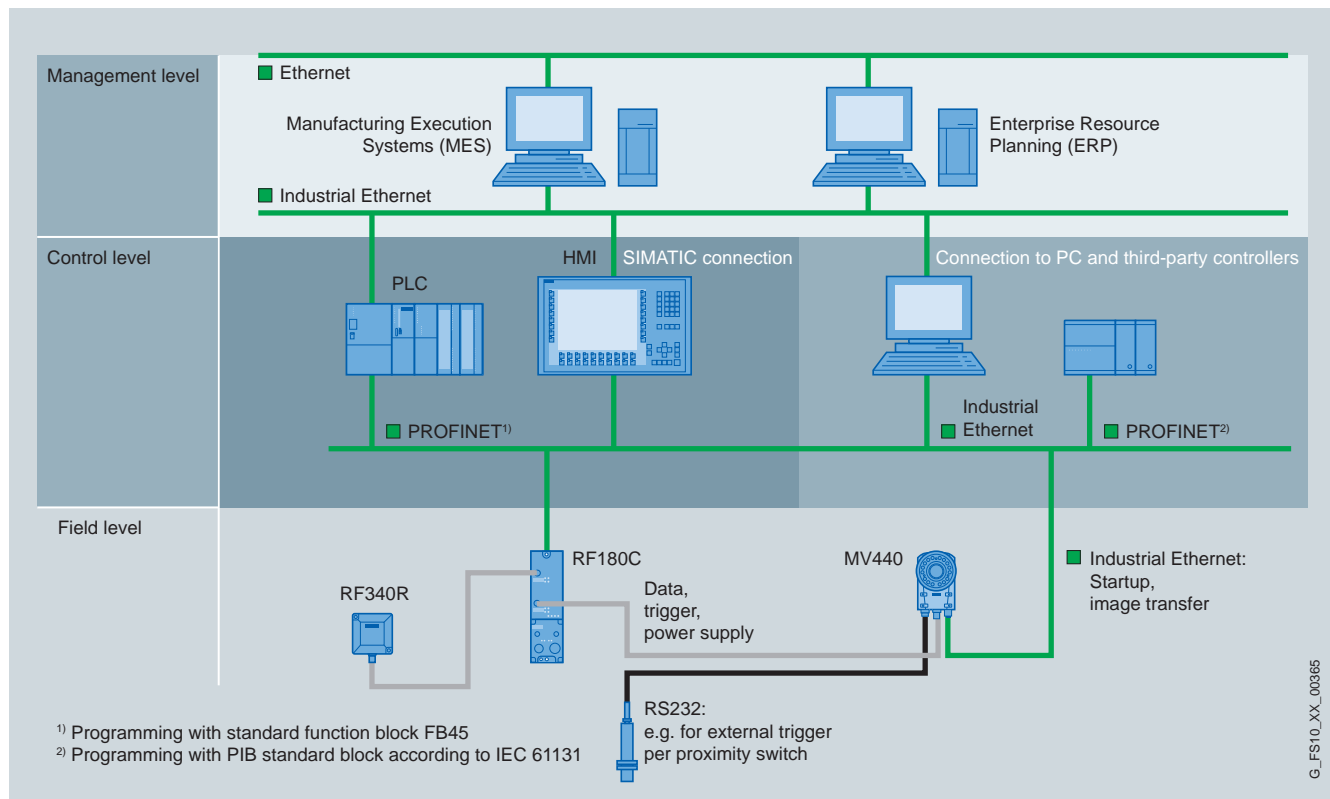
# PROFINET/Industrial Ethernet
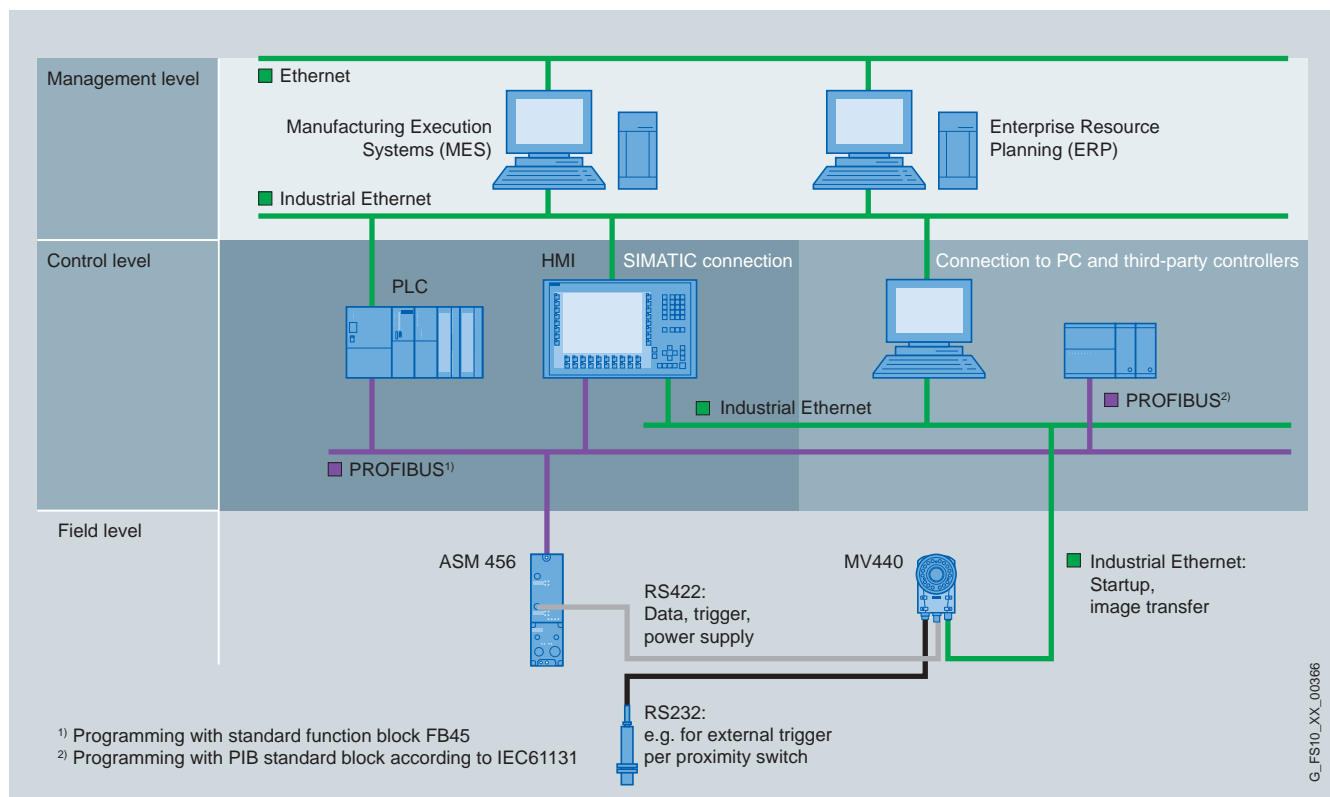## Production sensors – Code reading systems

**SIMATIC MV440**

■ **Integration**

**2**



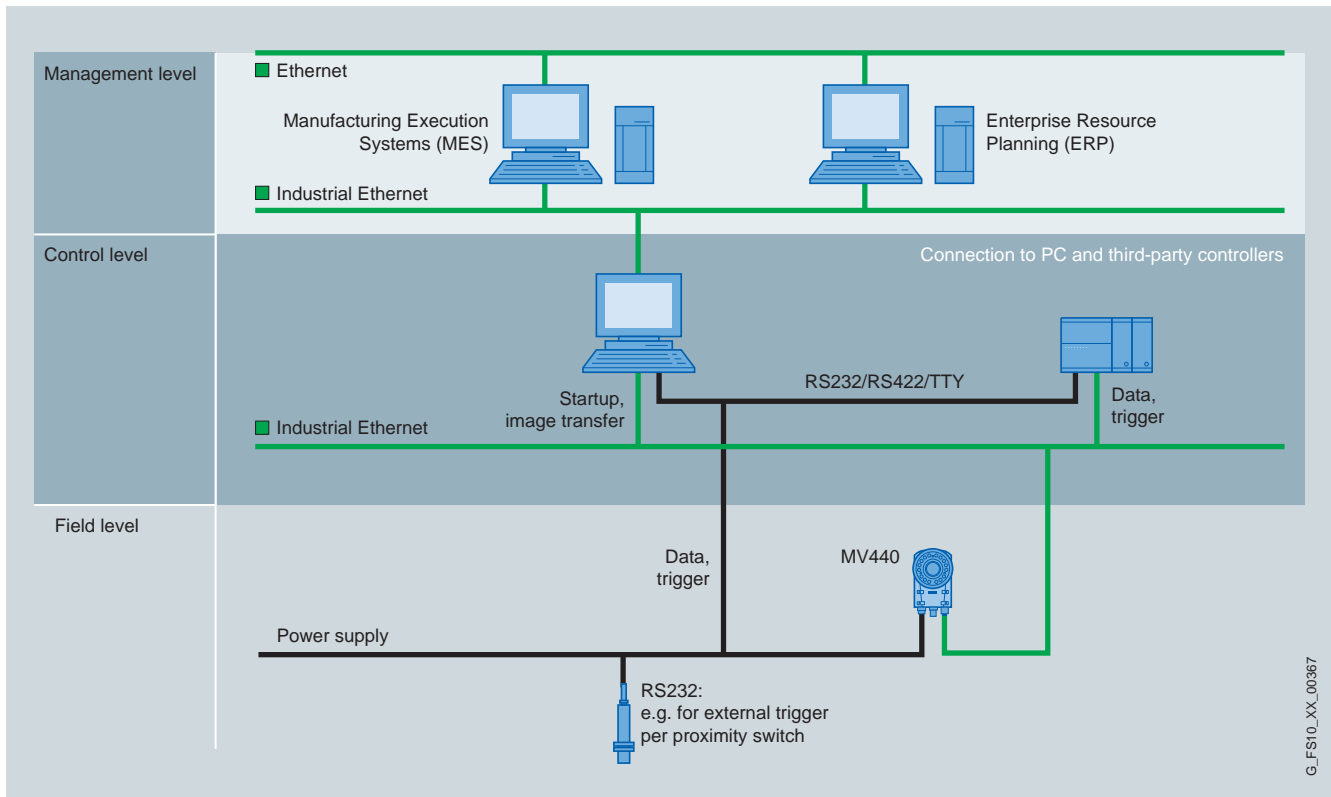Integration of SIMATIC MV440 with the SIMATIC RF180C communications module



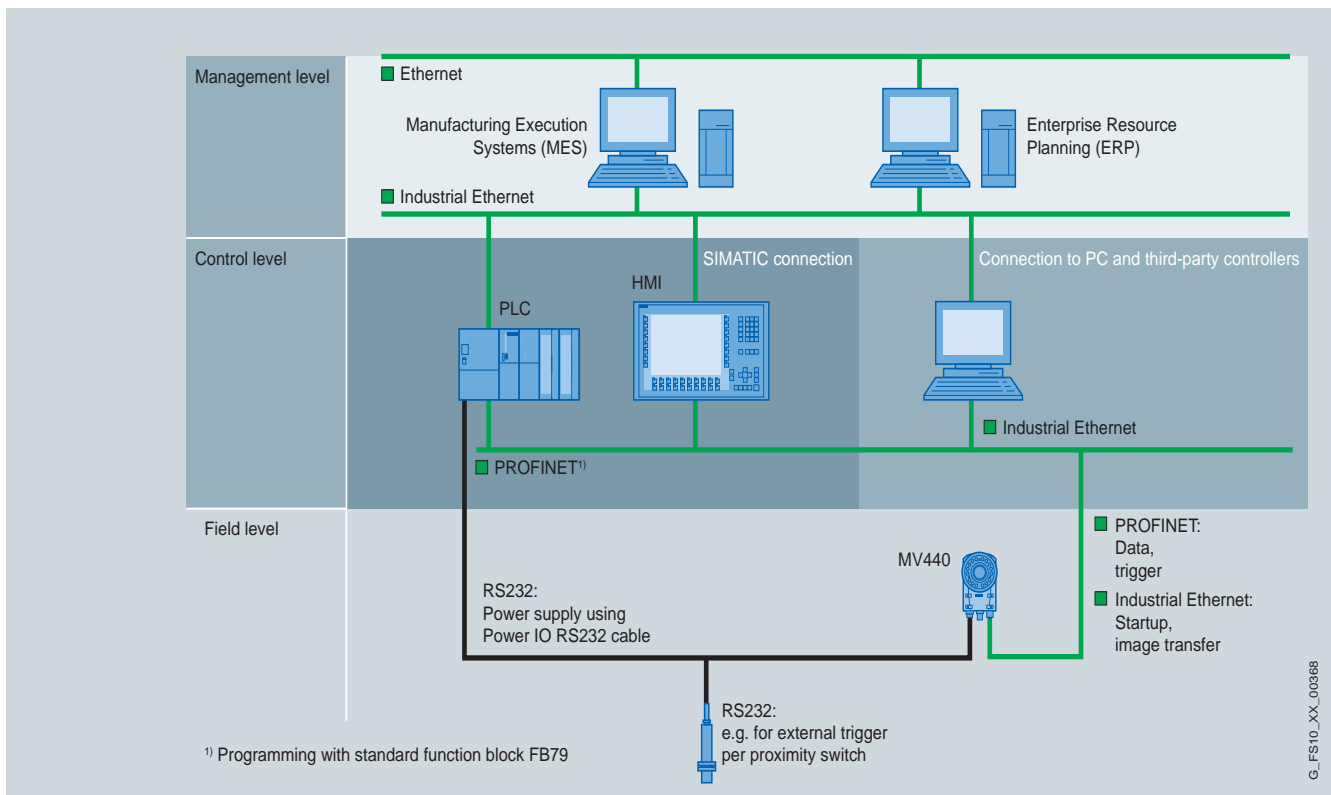Integration of SIMATIC MV440 with ASM 456 communications module

**2**

## ■ Integration (continued)



Integration of SIMATIC MV440 with a third-party controller



[1] Programming with standard function block FB79

Integration of SIMATIC MV440 with a direct connection to PROFINET or Ethernet

# PROFINET/Industrial Ethernet
## Production sensors – Code reading systems

**SIMATIC MV440**

**2**

### Technical specifications

| Type | SIMATIC MV440 |
|---|---|
| **Basic unit** | |
| Image capture | • CCD chip 1/3", 640 x 480 square pixels<br>• CCD chip 1/3", 1024 x 768 square pixels<br>• Full frame shutter with automatic exposure time |
| Image-data transfer | Triggered-frame transfer |
| Available versions | |
| • Variable lens coverage | Freely selectable lens coverage, scanning distance, and sensor resolution, depending on:<br>• Selected lens<br>• Selected sensor head resolution: 640 x 480 pixels or 1024 x 768 pixels<br>See "Application" |
| Input voltage range | 24 V DC, + 20% … - 15% |
| Max. current input (at 24 V DC) | 250 mA (without I/O signals) |
| Max. starting current | Max. 4 A; < 1 ms |
| Mains buffering time (at 24 V DC) | 10 ms |
| Ambient temperature | 0 ... 50 °C |
| **Mechanical strength** | |
| Vibration according to IEC 60068-2-6 | |
| • 10 Hz <= f < 58 Hz | Const. 0.0075 mm amplitude |
| • 58 Hz <= f < 500Hz | Const. 1 g acceleration |
| • 10 Hz <= f < 58 Hz | Const. 1 mm amplitude |
| Shock according to IEC 60068-2-29 | Type of shock: half-sine<br>Severity of shock for reader:<br>• 10 g peak value<br>• 16 ms duration<br>Direction of shock:<br>100 shocks in each of the 3 axes arranged vertically to each other |
| **Digital output signals**<br>(all output signal values refer to the OUTPUT_COMMON signal) | |
| • OUTPUT1 … OUTPUT5 | |
| - Isolated and short-circuit proof | Yes |
| - Max. load current | 50 mA |
| - Max. short-circuit current | 240 mA |
| - Delay times when switching on and off | 0 … 2 ms |

| Type | SIMATIC MV440 |
|---|---|
| **Input signals**<br>(all output signal values refer to the OUTPUT_COMMON signal) | |
| • INPUT1 | |
| - Input resistance at 24 V DC | 16 kΩ |
| - Input voltage for "1" signal | 15 ... 30 V |
| - Input current for "1" signal | 2 ... 5 mA |
| - Input voltage for "0" signal | 0 ... 5 V |
| - Input current for "0" signal | 0 … 1.4 mA |
| • INPUT2 ... INPUT5 | |
| - Input resistance at 24 V DC | 16 kΩ |
| - Input voltage for "1" signal | 15 ... 30 V |
| - Input current for "1" signal | 0.6 ... 2 mA |
| - Input voltage for "0" signal | 0 ... 5 V |
| - Input current for "0" signal | 0 … 0.3 mA |
| **Strobe signal**<br>(all strobe signal values refer to the ground of the power supply) | |
| Rapid strobe output<br>(max. load current at 24 V DC) | 25 mA |
| **Interfaces** | |
| • Digital, isolated inputs/outputs | • 6 parameterizable inputs/outputs; one as rapid input for triggering the image capture,<br>• 1 image-synchronous output for controlling an external light |
| • ASM interface | M12 (8-pin) for connecting to an ASM module (PROFIBUS/PROFINET) |
| • Ethernet/PROFINET I/O interface | M12 (4-pin) for operator software, real-time transfer of test results and process interfacing |
| • Lighting control | 10-pin female multipoint connector (socket) for power supply and triggering the built-in ring lamp |
| **Supply voltage** | |
| • Rated value | 24 V DC |
| • Permitted range | 20.4 ... 28.8 V DC (safety extra-low voltage, SELV) |
| Fusing | Max. 10 A |
| **Enclosure** | |
| Material/color | Cast aluminum, petrol |
| Dimensions (W x H x D) in mm | 65 x 122 x 55 |
| Degree of protection | IP67 according to DIN EN 60529 |
| Weight, approx. | • 0.45 kg (without protective lens barrel)<br>• 0.55 kg (with protective lens barrel) |

**2**

| Ordering data | Order No. |
|---|---|
| **SIMATIC MV440 SR** | **6GF3440-0CD10** |
| For one and two-dimensional codes, variable image field and distance | |
| Resolution: 640 x 480 pixels, IP67 (with 6GF34408AC11), IP40 (without 6GF34408AC11), incl. documentation package | |
| **SIMATIC MV440 HR** | **6GF3440-0GE10** |
| Resolution: 1024 x 768 pixels, IP67 (with 6GF34408AC11), IP40 (without 6GF34408AC11), incl. documentation package | |
| **SIMATIC MV440 SR-V** | **6GF3440-0CD11** |
| Resolution: 640 x 480 pixels, includes verification package, incl. calibration plate (6GF3440-8CE), IP67 (with 6GF34408AC11), IP40 (without 6GF34408AC11), incl. documentation package | |
| **SIMATIC MV440 HR-V** | **6GF3440-0GE11** |
| Resolution: 1024 x 768 pixels, includes verification package, incl. calibration plate (6GF3440-8CE), IP67 (with 6GF34408AC11), IP40 (without 6GF34408AC11), incl. documentation package | |

*Accessories*

**Lenses**

with fixed focal length, adjustable aperture and focus

| | Order No. |
|---|---|
| • Mini lens 8.5 mm, 1:1.5 PENTAX C815B (TH) D = 42 mm, L = 47 mm | **6GF9001-1BE01** |
| • Mini lens 16 mm, 1:1.4 PENTAX C1614-M (KP) D = 29.5 mm, L = 37.2 mm | **6GF9001-1BF01** |
| • Mini lens 25 mm, 1:1.4 PENTAX C2514-M (KP) D = 29.5 mm, L = 38.9 mm | **6GF9001-1BG01** |
| • Mini lens 35 mm, 1:1.6 PENTAX C3516-M (KP) D = 29.5 mm, L = 41.4 mm | **6GF9001-1BH01** |
| • Mini lens 50 mm, 1:2.8 PENTAX C5028-M (KP) D = 29.5 mm, L = 38 mm | **6GF9001-1BJ01** |
| • Telephoto lens 75 mm, 1:2.8 PENTAX C7528-M (KP) D = 34 mm, L = 63.6 mm | **6GF9001-1BK01** |
| • Mini lens 12 mm, 1:1.4 PENTAX H1214-M (KP) D = 29.5 mm, L = 35.7 mm | **6GF9001-1BL01** |

| | Order No. |
|---|---|
| **Protective barrel for lens** | |
| • Protective barrel for lens D = 65, for built-in ring lamps, front plate: glass, internal diameter: 57 mm, max. lens length: 57 mm, IP67 | **6GF3440-8AC11** |
| • VS100 protective barrel for lens D = 55, for built-in lamps, front plate: glass, internal diameter: 41 mm, length from mount: 65 mm, IP65 | **6GF9002-7AA** |
| • VS100 protective barrel for lens D = 55, for built-in lamps, front plate: PMMA, internal diameter: 41 mm, length from mount: 65 mm, IP65 | **6GF9002-7AA01** |
| **Lighting** | |
| • Built-in ring lamp, white, illuminant: Red LED (440 nm … 650 nm), flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, lens protection required: IP67 (with 6GF34408AC11), IP20 (without 6GF34408AC11) | **6GF3440-8DA2** |
| • LED ring lamp, metal, IR, diffused, illuminant: 850 nm, range of illumination: 750 mm … 250 mm, for VS100 lens protection D=55, dimensions (W x H x D): 116 x 116 x 42 mm, degree of protection IP67 | **6GF9004-7AA01** |
| • LED ring lamp, metal, IR, clear, illuminant: 850 nm, range of illumination: 500 mm … 3000 mm, for VS100 lens protection D=55, dimensions (W x H x D): 116 x 116 x 42 mm, degree of protection IP67D | **6GF9004-7BA01** |
| • LED ring lamp, metal, red, diffused, range of illumination: 75 mm … 250 mm, for VS100 lens protection D=55, dimensions (W x H x D): 116 x 116 x 42 mm, d egree of protection IP67 | **6GF9004-8BA01** |
| • LED ring lamp, metal, red, clear, range of illumination: 150 mm to 2000 mm, for VS100 lens protection D=55, dimensions (W x H x D): 116 x 116 x 42 mm, degree of protection IP67 | **6GF9004-8CA01** |
| • LED ring lamp, metal, red, clear, range of illumination: 500 mm … 3000 mm, for VS100 lens protection D=55, dimensions (W x H x D): 116 x 116 x 42 mm, degree of protection IP67 | **6GF9004-8DA01** |

**SIMATIC MV440**

| Ordering data | Order No. |
|---|---|
| *Additional accessories* | |
| Mounting plate for reader, W x H x D (mm): 80 x 80 x 60, plate thickness: 4 mm | **6GF3440-8CA** |
| Rail-mounted power supply for external ring lamps, order numbers: 6GF9004-7AA01,-7BA01, ...-8BA01, ...-8CA01, ...-8DA01, input voltage: 110 … 230 V AC, output voltage: 16.5 V DC | **6GF9002-8PS** |
| Power IORS232 cable for installation and commissioning, M16 pre-assembled at one end, open end, length: 10 m | **6GF3440-8BA2** |
| Cables for external ring lamps, order numbers: 6GF9004-7AA01,-7BA01, ...-8BA01, ...-8CA01, ...-8DA01, M12, 4-pin, length: 10 m | **3RX8000-0CC42-1AL0** |
| **Cable** | |
| Power IORS232 cable for installation and commissioning, M16 pre-assembled at one end, open end, length: 10 m | **6GF3440-8BA2** |
| Ethernet cable for commissioning and service, M12 connector, 8-pin, RJ45 connector, length: 2 m | **6GF3440-8BB1** |
| Ethernet cable (M12/M12-180) for installation, pre-assembled IE FC P trailing cable GP 2 x 2 (PROFINET type C) with two 4-pin M12 connectors (D-coded), degree of protection IP65/67, RJ45 assembly possible with 6GK1901-1BB10-2AA0 | |
| • Length 0.3 m | **6XV1870-8AE30** |
| • Length 0.5 m | **6XV1870-8AE50** |
| • Length 1 m | **6XV1870-8AH10** |
| • Length 1.5 m | **6XV1870-8AH15** |
| • Length 2 m | **6XV1870-8AH20** |
| • Length 3 m | **6XV1870-8AH30** |
| • Length 5 m | **6XV1870-8AH50** |
| • Length 10 m | **6XV1870-8AN10** |
| • Length 15 m | **6XV1870-8AN15** |
| IE FC RJ45 Plug 180 | **6GK1901-1BB10-2AA0** |
| ASM cable for installation, plug-in cable pre-assembled for ASM 456, RF170C, RF180C and SIMATIC MV440 | **6GT2891-0FH20** |
| • Length 2 m | **6GT2891-0FH20** |
| • Length 5 m | **6GT2891-0FH50** |
| • Length 10 m | **6GT2891-0FN10** |
| • Length 20 m | **6GT2891-0FN20** |
| • Length 50 m | **6GT2891-0FN50** |

**Dimensions**
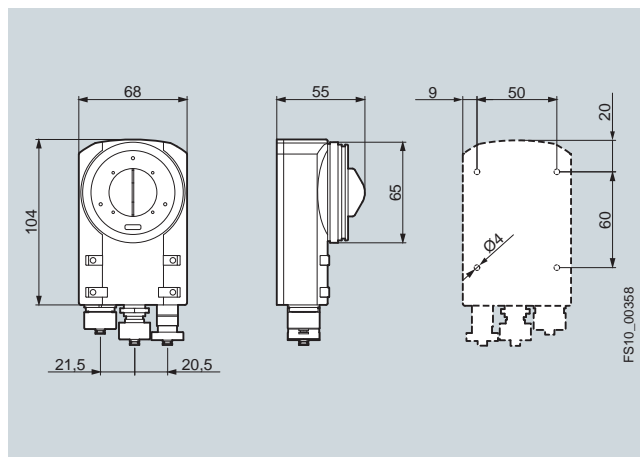


Stationary SIMATIC MV440 code reading system
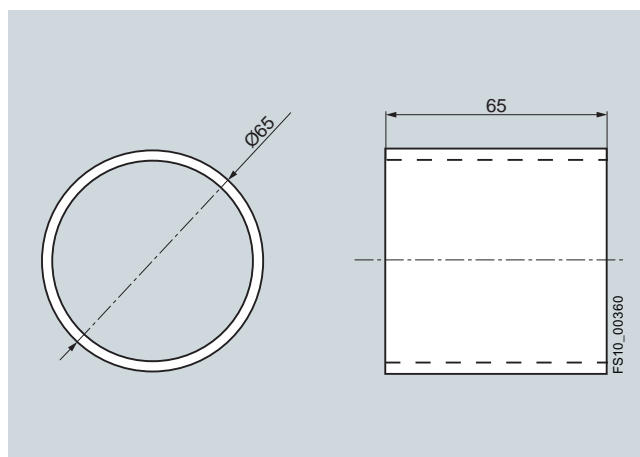


Protective barrel for lens for SIMATIC MV440

**deviceWISE Embedded Edition for SIMATIC S7**

**2**

## Overview
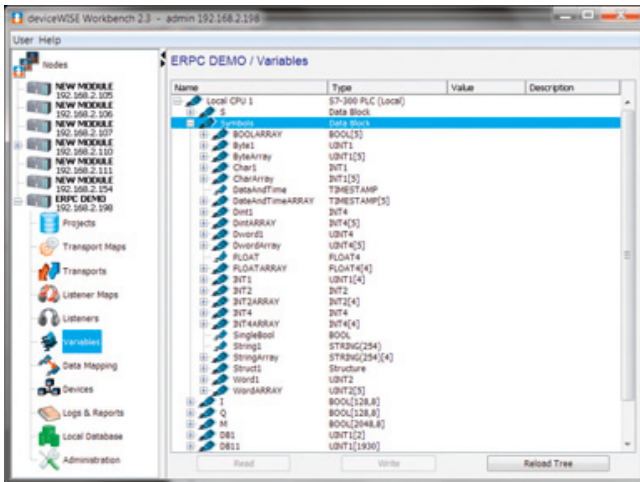


- deviceWISE Embedded for S7 is a software package that can be loaded into the CP 343-1 ERPC communications processor as a firmware extension
- It facilitates intelligent and direct communication from the S7-300 to IT applications at the management level (e.g. databases)
- No programming is required in SIMATIC

## Benefits

- High-speed integration of machine controllers into IT applications, e.g. reading or writing to databases by means of parameterization without any programming effort in the S7-300
- Reliable delivery of critical process data by means of store & forward functionality as well as in-built local database.
- Complex preprocessing of data in the PLC with numerous trigger options
- Supports standard protocols such as OPC UA or XML-DA directly from the PLC

## Application

deviceWISE Embedded for S7 offers the database interface of the SIMATIC S7 with CP343-1 ERPC to various ERP or MES systems for the vertical integration. Database communication

deviceWISE Embedded for S7 establishes direct connections from the PLC to the leading database systems. The user can perform a host of operations on the linked databases, such as:

- Documentation of production data in the database
- Updating of existing entries, e.g. recording and saving new data as the production of a component progresses
- Retrieval of data from the database, e.g. recipes or configuration data for the current production

Message-queue communication

The software enables the user to communicate directly with the Enterprise Service Bus (ESB) and transfer data from the controller to applications in the enterprise IT system. Messages can be sent and received in ASCII or XML. User-specific data formats can also be defined.

Device communication

deviceWISE Embedded for S7 is used predominantly for communication with enterprise applications. In addition, the software can establish connections to other automation devices and transfer data from other PLC systems, RFID readers, or cameras into the data area of the S7-CPU. This is done via the backplane bus and enables flexible mapping of data from the widest variety of devices into the data blocks of the PLC.

### deviceWISE Embedded Edition for SIMATIC S7

**2**

#### Function

The deviceWISE Embedded for S7 software includes a user-friendly tool – the workbench – for the configuration and management of data.

This enables one or more deviceWISE modules to be addressed without any programming overhead.

The workbench offers a wide range of drag & drop mechanisms and enables trigger conditions to be defined. This significantly reduces the possibilities of errors when entering addresses or field names. In addition, it is possible in the workbench to process raw data into useful information and transport it from programmable controllers to databases or message queues in the IT environment of an enterprise.

deviceWISE Embedded for S7 offers the following functions:

**Direct connection to the following SQL databases:**
- IBM DB2
- IBM DB2/400 (for OS/400 systems)
- Oracle
- Oracle Manufacturing Operations Center
- Microsoft SQL Server
- MySQL

**Direct connection to the following messaging systems:**
- IBM Websphere MQ
- IBM MQTT
- IBM SIB/JMS
- TCP

#### Extensive preprocessing of the data

Using deviceWISE Embedded for S7, extensive preprocessing of data (e.g. mathematical operations, flow diagram processing), the use of a local SQL database, and an in-built FTP server/client functionality are possible.

**Error handling and correction by means of:**
- Store and forward for all enterprise transactions
- E-mail notification in the event of faults
- Fault signaling to the PLC

#### Direct connection to other terminals

deviceWISE Embedded for S7 allows the direct connection of the CP 343-1 ERPC communications processor to the following terminals:
- PLC systems (Siemens, Rockwell, Mitsubishi, Omron)
- Camera systems
- RFID readers

In addition, open-standard protocols such as Modbus TCP, OPC UA or XML-DA are supported.

#### Ordering data

| Ordering data | Order No. |
|---|---|
| **deviceWISE Embedded Edition for SIMATIC S7** | **3011-1-002-21** |
| **IBM DB2 Transport** | **3011-4-201-0** |
| **IBM DB2/400 Transport** | **3011-4-202-0** |
| **Oracle Manufacturing Operations Center** | **3011-4-203-0** |
| **Oracle Transport** | **3011-4-204-0** |
| **MySQL Transport** | **3011-4-205-0** |
| **Microsoft MSSQL Transport** | **3011-4-206-0** |
| **IBM WebsphereMQ Transport/Listener** | **3011-4-402-0** |
| **IBM SIB Transport/Listener** | **3011-4-403-3** |
| **Other drivers** | Request from ILS Technology |
| | **Order from:** ILS Technology LLC; 5300 Broken Sound Blvd. Suite 150 Boca Raton, FL, U.S.A., 33487 Phone: +1-561-982-9898 x124 Fax: +1-561-982-8638 E-mail: devicewise@ilstechnology.com |
| **CP 343-1 communications processor ERPC (Enterprise Connect)** | **6GK7 343-1FX00-0XE0** |

For the connection of SIMATIC S7-300 to Industrial Ethernet and for the support of the database connection of the SIMATIC S7-300 to various databases; TCP/UDP, S7 communication, open communication (SEND/RECEIVE), with and without RFC 1006, multicast, web server, setting of CPU's clock using SIMATIC procedures and NTP, access protection via IP access list, SNMP, DHCP, initialization over LAN 10/100/1000 Mbit/s; with electronic manual on DVD, C-PLUG included in scope of delivery

#### More information

You can find further information in the Internet under:
www.ilstechnology.com/erpc