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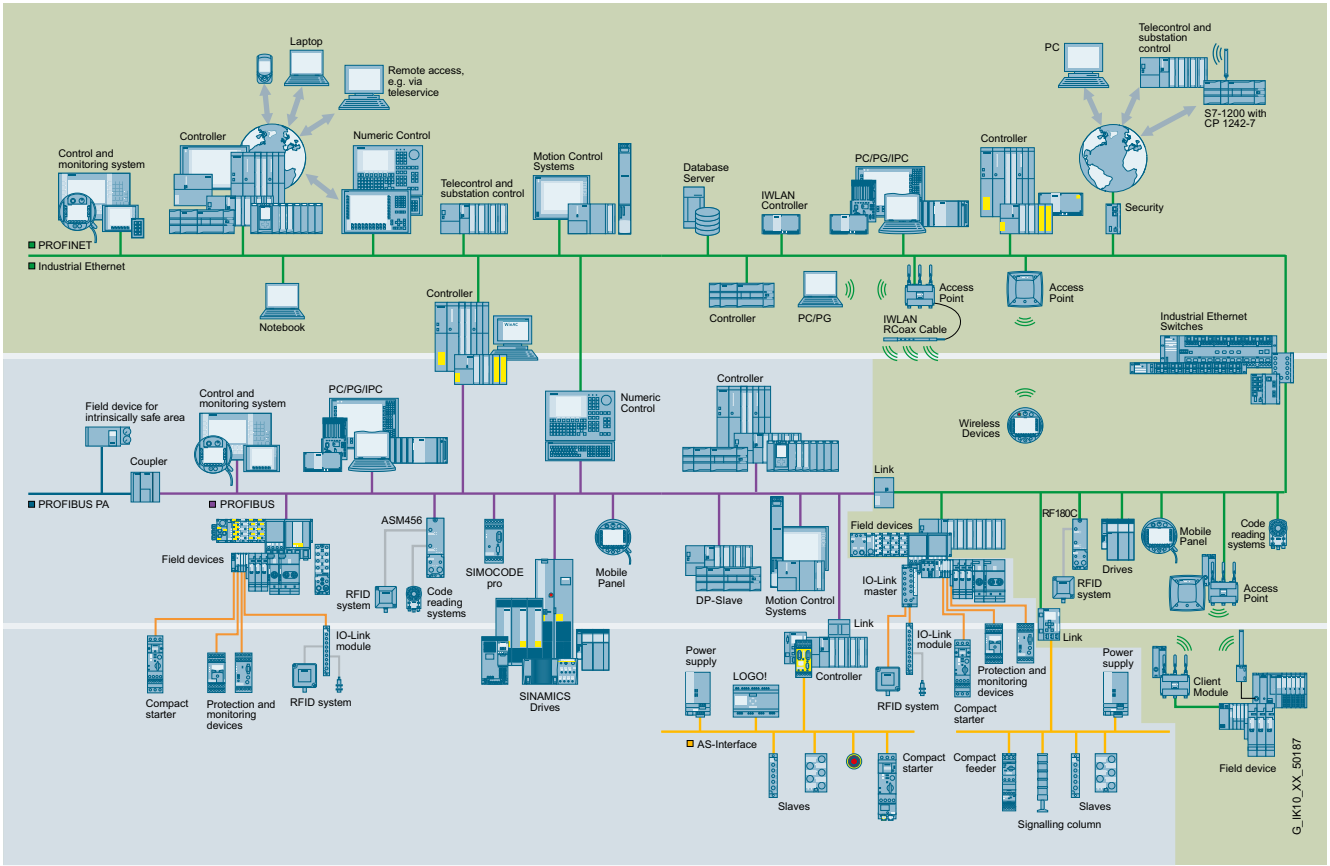
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Introduction

Overview

- Area and cell network according to the international standards IEEE 802.3 (Ethernet) and IEEE 802.11 a/b/g/h/n (wireless LAN) designed for the industrial environment right down to the field level
- Connection of automation components (controllers and field devices) to each other and to PCs and workstations as well as components for wireless communication
- PROFINET, the Industrial Ethernet standard for automation, is based on Standard Ethernet (IEEE 802.3) and supports the connection of devices from field level up to management level
- Comprehensive open network solutions can be implemented
- High transmission performance at up to 10 Gigabit/s
- Integration of conventional IT functionalities such as Web server and e-mail in the automation sector
- A security solution especially for industrial automation thanks to the industrial security concept with the security products of SIMATIC NET (SIMATIC NET CPs with Security Integrated, SCALANCE S and SCALANCE M)



Industrial Ethernet in the communications landscape

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Overview (continued)

Ethernet

The LAN standard from the office sector

Ethernet currently has a market share of over 90% with a rising trend, thus placing it in the pole position in the LAN landscape worldwide. The specification of this baseband LAN was developed in the 70s and standardized in the international IEEE 802.3 standard. Ethernet has continued to experience rapid development and established itself in all speed ranges and application areas.

Milestones include:

- Almost unlimited and very easily scalable data transmission performance thanks to
  - switching technology, full duplex, redundancy
  - continuously rising data rates (10/100 Mbit/s, 1/10 Gbit/s)
- High availability of the network, because:
  - existing networks can be expanded without any adverse effects
  - network structures with any form of meshing compensate for the failure of individual network components (e.g. by means of the Rapid Spanning Tree Protocol)
- Compatible protocol expansions, e.g. support of virtual subnetworks and prioritized data traffic through the use of VLANs
- Structured cabling concept
  - Standardized connection technology
  - Simplest connection technology due to use of preassembled twisted pair cables
  - Glass fiber-optic cables for long distances, areas subject to RFI and inter-building cabling

Ethernet forms the basis for overlaid network protocols such as TCP/IP. TCP/IP is responsible for the transport of data between LANs and represents the basis for IT services (e.g. Internet). In addition, this enables different LAN technologies to be easily integrated, e.g. Ethernet with Wireless LAN.

Ethernet components for the office sector are offered by a large number of vendors, but do not always meets the specific requirements of the industrial sector.

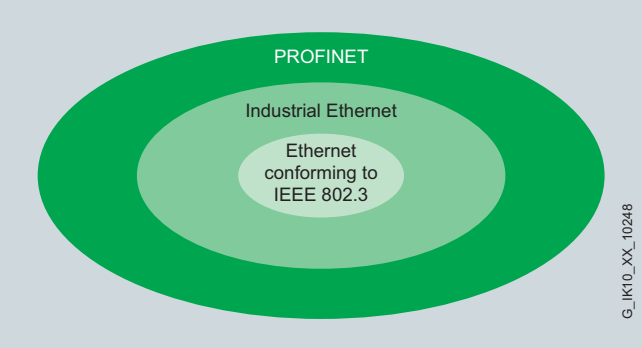
For planning, operation and maintenance of Ethernet networks, sufficiently qualified personnel are available worldwide.

Industrial Ethernet

The industry-standard version of Ethernet.

The widespread use of Ethernet in the office sector and the associated wide distribution of technology and know-how have also made this technology interesting for the industrial environment. In order to adapt the networks for the sometimes extremely harsh requirements in the industrial environment, Siemens has made further drastic improvements to their industrial capability, availability, reliability and real-time capability and added rugged connection technology. This gave rise to the "Industrial Ethernet". All Industrial Ethernet devices from Siemens are also extremely easy to operate. This supports implementation without any special IT knowledge.

By means of these additions for tough industrial use, Siemens has shown that Ethernet can also be used successfully in such applications. This approach has been consistently and successfully applied not only for Industrial Ethernet and PROFINET, but also for Industrial WLAN.



PROFINET/Industrial Ethernet/Ethernet conforming to IEEE 802.3

Industrial Ethernet offers a powerful network, compliant with the IEEE 802.3 standard (Ethernet), for industrial applications. This ensures that the widest range of application areas, such as office and production, can be networked with one another.

Industrial Ethernet utilizes Ethernet technology and strengthens it for use in the industrial sector by means of:

- Network components for use in tough industrial environments (dust, moisture, extreme temperatures, impact loads, vibrations)
- Rugged and simple connection technology for on-site assembly
  - FastConnect cabling system with RJ45 technology
  - On-site assembly of POF and PCF fiber-optic cables
- Failsafe networks through redundancy
- Failsafe devices through redundant design and redundant power supplies
- Connection of automation components (controllers and field devices) to each other and to PCs and workstations
- Optimized communication between automation components and simultaneously open communication according to TCP/IP standard
- Simple connection to the Wireless LAN and Industrial Wireless LAN (IWLAN) networks in accordance with IEEE 802.11
- A security solution specially designed for industrial automation in the form of the Industrial Security concept

Among the Siemens Ethernet components for industrial use, the focus is on compatible successor products and spare parts availability of up to 10 years.

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Overview (continued)

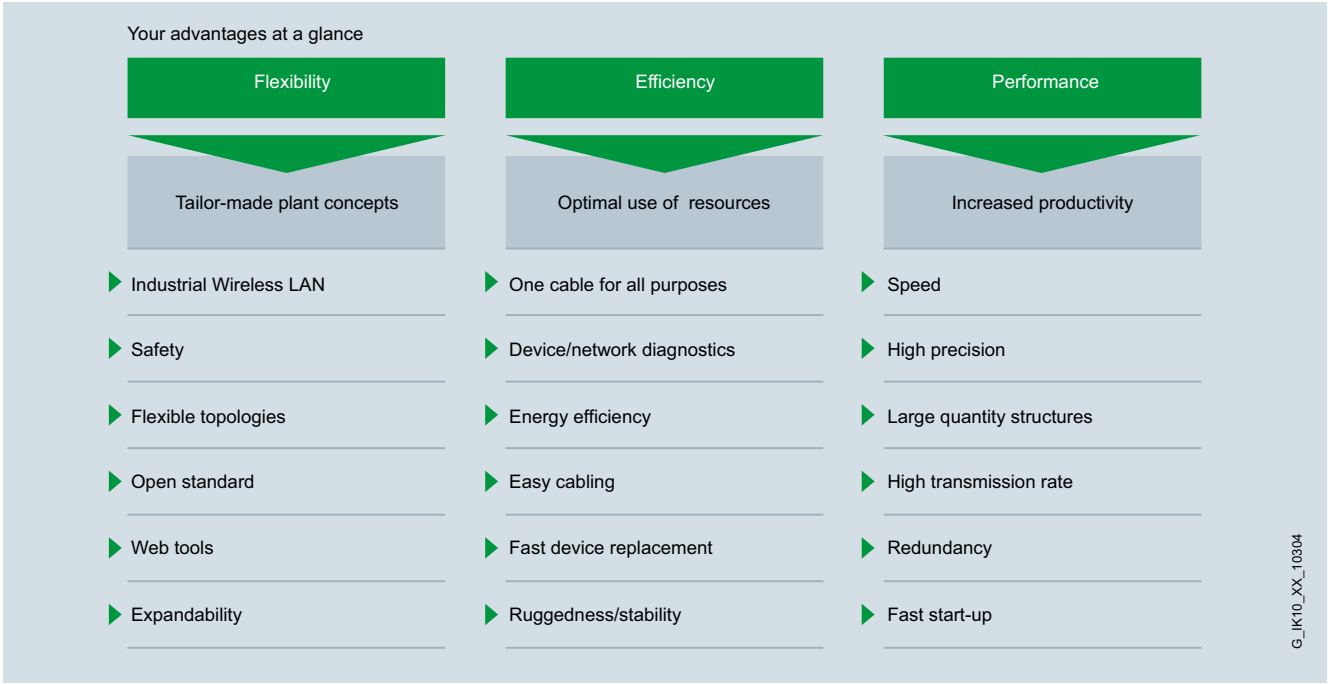
PROFINET

The open Industrial Ethernet standard for automation

With more than six million nodes worldwide (Dec. 2012), PROFINET is the leading cross-vendor Industrial Ethernet standard (IEC 61158/61784) for automation.

PROFINET increases companies' success by accelerating processes, boosting productivity, and increasing plant availability.

Advantages at a glance

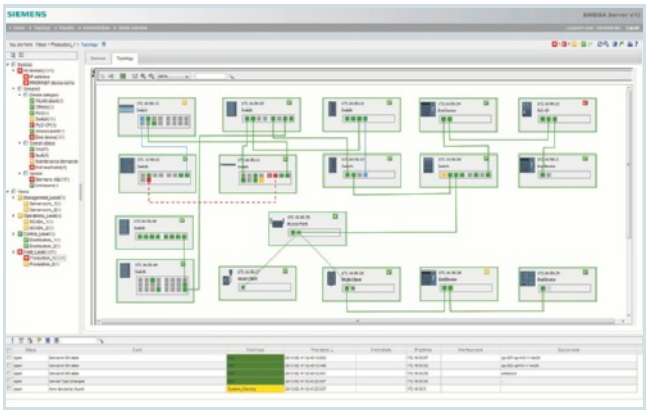


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Overview (continued)

Network diagnostics

Failures in the network not only prevent access by plant operators to the field devices, but often mean that these devices can no longer communicate with one another. In the worst-case scenario, this can result in production downtimes. With the SINEMA Server network monitoring software developed especially for industry, problems can be detected and cleared at an early stage.



The number of nodes of Ethernet-based devices in production networks is growing continuously. Long, time-consuming searches for faults in large industrial networks during commissioning or during a standstill in production are unforeseeable cost drivers, to be avoided where possible. For this reason, network transparency through the continuous diagnosis of Ethernet-based production networks should be part of every efficient production system.

However, with a suitable network management system, such as SINEMA Server, which has been especially designed for industrial applications, problems can be detected at an early stage and appropriate measures taken in good time.

Even a single failure in the network during operation can result in a rush of alarms from various network nodes which are connected together. The combination of topology know-how with the diagnostics values of individual network nodes is decisive in order to rapidly identify the location and eliminate the cause of a network fault. A complete physical map of the network permits analysis of the possible effects of cable or device faults. This is helpful when planning high-availability applications.

This established system, that has already been an essential component of network availability in the IT sector for years, is now also becoming a worthwhile addition to the production environment.

The SINEMA Server software provides maximum transparency in industrial networks through automatic topology recognition, constant network monitoring as well as comprehensive diagnostics and reporting functions.

The most important applications at a glance:

- Automatic documentation of networks:
  Do you have up-to-date and complete documentation for your networked automation system?
- Application-specific structuring and visualization of a network:
  Do you have a simple, graphical overview of the devices in your plant network?
- Reporting of changes and faults in the network:
  Are you notified about new devices and network faults in plant operation?
- Analysis of changes and faults in the network:
  Have you already had a plant standstill caused by a sporadic network failure?
- Integration of network diagnostics into HMI/SCADA:
  Can you also monitor the status of the network with your HMI SCADA system?
- Adaptation of monitoring functionality to devices and users:
  Can you adapt your network diagnostics to the individual devices and the users?

More information

Further information on SINEMA Server Basic can be found at:
www.siemens.com/sinema

SINEMA Server V12 software (including 21 trial license); download at:
http://support.automation.siemens.com/WW/view/en/74758725

Note:

In many SIMATIC NET components with a management function, extensive parameterization and diagnostics functions are provided over open protocols and interfaces (e.g. Web server, network management).

These open interfaces provide access to those components, which can also be used for illicit activities.

When the above-mentioned functions and the open interfaces and protocols are used (e.g. SNMP, HTTP and Telnet), appropriate security precautions must be implemented to suppress unauthorized access to the components or network, especially from the WAN/Internet.

For this reason, automation networks should be isolated from the remaining corporate network using appropriate security products (e.g. SCALANCE S).

For further information, see the section on "Industrial Security".

It is important to note the boundary conditions for use of the specified SIMATIC Net products (order numbers 6GK..., 6XV1) which you can view on the Internet.

You will find more information on the Internet at:
http://www.siemens.com/simatic-net/ik-info

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2

Overview

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.

Media Redundancy Protocol (MRP)

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

Parallel Redundancy Protocol (PRP)

Procedure for smooth redundancy in accordance with the IEC 62439-3 standard to set up parallel, separate networks in which high availability is demanded. The PRP redundancy procedure is based on double transmission of frames over two separate networks (LAN A, LAN B).

Information technology (IT)

IT integrates SIMATIC into the information technology via Industrial Ethernet. These means of communication and communication paths are also available to SIMATIC. Depending on the product and stage of expansion, SIMATIC or the appropriate communication 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 with the aid of static HTML pages and a user-specific display is supported with the aid 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 system connections for the SIMATIC S7 to Industrial Ethernet, such as CP 343-1 Advanced or CP 443-1 Advanced, with two separate interfaces (integrated network separation) and SCALANCE S and SCALANCE XM-400/XR-500, support the forwarding of IP messages between Gigabit and PROFINET interfaces. The SCALANCE M mobile wireless routers support routing between the mobile Internet and the connected LAN.

OPC *(Openness, Productivity & Collaboration)*

OPC is a standardized, open, and vendor-independent interface that is widely used in automation. It permits the connection of OPC-capable applications using many different protocols such as S7-communication, PROFINET, and SNMP.

PG/OP communication

The SIMATIC automation systems can handle data communication with HMI devices (e.g. TP/OP) and programming devices (with STEP 7, STEP 5) via the integral communication functions. PG/OP communication is supported by MPI, PROFIBUS and Industrial Ethernet.

S7 communication

S7 communication is the integral communications function (SFB), which has been optimized within the SIMATIC S7. 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 (Building Automation and Control Networks) is an ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers Inc.) communication protocol for data networks used for building automation and control. It is equally suitable for the management and automation levels, and is approved as an ANSI, CEN and ISO standard.

MES/ERP communication (ERPConnect)

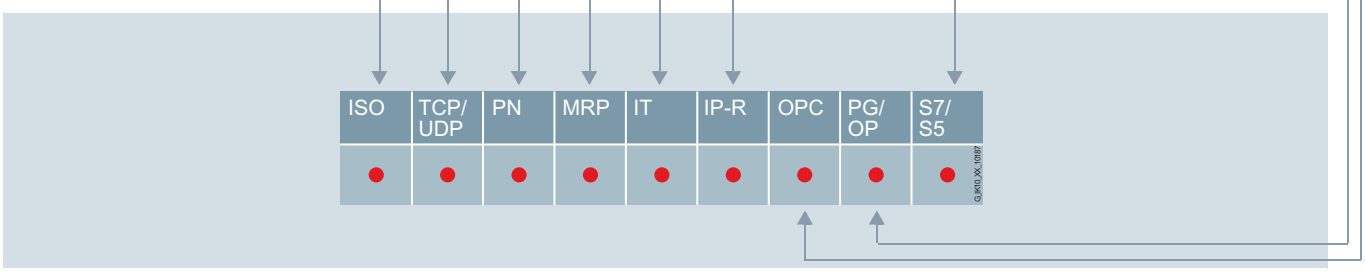
Communication with ERP or MES systems via database link, e.g. ORACLE, MySQL, MS-SQL, DB2 using a firmware expansion which must be ordered separately

System connections

For many data terminals, communications modules (CPs, CMs, TIMs) 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

With SIMATIC procedures, the Network Time Protocol (NTP/SNTP) or IEEE1588, various procedures for clock time synchronization are available.



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Overview

	Hardware	PROFINET						Ethernet communication						IT communication						Security			Transport protocol						Time			Other			
		IO Controller	IO Device	IRT real-time	CBA	MRP	MRPD	Send/Receice	Fetch/Write	TSend/TReceive	S7 communication	PG/OP communication	S7 routing	Web diagnosis	own web pages	send e-mail	receive e-mail	Filetransfer client	Filetransfer server	Access List ACL	SPI firewall	VPN (IP-Sec)	ISO	TCP	UDP	IPv4	IPv6	IP routing	Sender	Receiver	Transfer	PRP	ERP Connect	SNMP	NTP
SIMATIC S7-200	CP 243-1										•	•		•	•	•		•	•					•		•							○	
SIMATIC S7-1200	S7-1200 CPUs	•								•	•	•	•	•	•									•	•	•				•			○	•
	CP 1243-1									•	•	•	•	•2)						•	•	•		•	•	•	○			•			○	•
SIMATIC S7-1500	CPU 1511-1 PN	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CPU 1513-1 PN	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CPU 1516-3 PN/DP	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CP 1543-1							•	•	•	•	•	•	•2)		•		•	•	•	•	•	•	•	•	•	○			•	•			•	•
	CM 1542-1	•		•		•					•	•	•	•2)		○1)								•	•	•				•	•			•	•
SIMATIC S7-300	S7-300 PN CPUs	•	•	•	•	•				•	○3)	•	•	•	•									•	•	•			•	•				•
	CP 343-1 Lean		•			•		•	•		•	•	•	•						•				•	•	•				•	•			•	•
	CP 343-1	•	•			•		•	•		•	•	•	•						•			•	•	•	•				•	•			•	•
	CP 343-1 Adv	•	•	•	•	•		•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•		•	•			•	•
	CP 343-1 ERPC							•	•		•	•	•	•						•				•	•	•			•	•	•		•	○	•
SIMATIC S7-400	S7-400 PN CPUs	•	•	•	•	•				•	•	•	•	•	•									•	•	•			•	•				•
	CP 443-1	•		•		•		•	•	○4)	•	•	•	•						•			•	•	•	•					•			•	•
	CP 443-1 Adv	•		•	•	•		•	•	○4)	•	•	•	•	•	•		•	•	•		•	•	•	•	•		•			•			•	•
	CP 443-1 RNA							•	•	•	•	•	•	•						•			•	•	•	•					•	•		•	•

1) SMTP pass-through only
2) via S7-1200/1500 CPU
3) Server (S) only
4) pass-through only

• applies
○ with reservations

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Communications overview for SIMATIC

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Communication overview

Overview (continued)

Hardware	Software	Operation system (64 bit)				Operation system (32 bit)							Other operation systems	OPC	Transport protocol			PROFINET		MRP	IT	PG/OP	S7 communication		Open communication		Time	
		Windows 8 Pro	Windows 7 Professional / Ultimate + SP 1	Windows Server 2012	Windows Server 2008 R2	Windows 8 Pro	Windows 7 Professional / Ultimate + SP 1	Vista Business / Ultimate + SP1/2 [8]	Windows XP Pro + SP3 [8]	Windows Server 2008 + SP1/2	Windows Server 2003 R2 / SP2 [8]	Linux			ISO	TCP	UDP	IO Controller	IO Device		Diagnostics (Web, SNMP)		Standard system	High-availability communication	SEND/RECV	Fetch/Write	SICLOCK	NTP
CP 1604 (PCI 104) CP 1616 (PCI 32 Bit)	DK-16xx PN IO	●	●				●		●			●[4]	○[5]			●		●	●	●	●							
CP 1613 A2 (PCI 32 Bit) CP 1623 (PCIe x1)	HARDNET-IE S7 (S7-1613)	●	●	●	●	●	●	●	●	●	●			●	●	●	○[3]				○[6]	●	●		●	●	●	
	HARDNET-IE S7-REDCONNECT (S7-REDCONNECT)	●	●	●	●	●	●	●	●	●	●			●	●		○[3]				○[6]	●	●	●	●	●	●	
	S7 OPC Redundancy for Industrial Ethernet				●									●									●					
CP 1628 (PCIe x1)	HARDNET-IE S7 (S7-1613)	●	●	●	●	●	●							●	●	●	○[3]				○[6]	●	●		●	●	●	●
	HARDNET-IE S7-REDCONNECT (S7-REDCONNECT)	●	●	●	●	●	●							●	●		○[3]				○[6]	●	●	●	●	●	●	●
	S7 OPC Redundancy for Industrial Ethernet				●									●									●					
CP 1612 A2 [7] (PCI 32 Bit) SIMATIC PG/PC with integrated interface [1]	SOFTNET-IE S7 (SOFTNET-S7)	●	●	●	●	●	●	●	●	●	●			●	●	●	○[3]				○[3]	●	●		●	●		
	SOFTNET-IE S7 Lean (SOFTNET-S7 Lean)	●	●	●	●	●	●	●	●	●	●			●	●	●	○[3]				○[3]	●	●		●	●		
	SOFTNET-IE PG (SOFTNET-PG)	●	●	●	●	●	●	●	●	●	●			●	●[2]	●[2]					○[3]	●						
	SOFTNET-IE RNA	●	●	●	●	●	●		●					●							○[6]							
	SOFTNET-IE S7-REDCONNECT/M	●	●	●	●	●	●							●	●						○[3]		●	●				
	SOFTNET-IE PN IO (SOFTNET PN IO)	●	●	●	●	●	●	●	●	●	●			●				●			○[3]							
	S7 OPC Redundancy for Industrial Ethernet				●									●									●					

1) For info on other hardware, see www.siemens.com/simatic-net/ik-info
2) PG/OP communication
3) IT, FTP and UDP functionalities arise in conjunction with the hardware/the CPs and the Windows/Linux software of the PC
4) Software source of the card driver included; for Suse 12
5) by means of driver porting
6) with SNMP
7) CP 1612 A2 is not approved for Win 8
8) on SIMATIC NET DVD

● suitable
○ suitable under certain conditions

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Communications overview for PG/PC

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Overview

Network performance and network technologies for Industrial Ethernet

When combined, the current Industrial Ethernet technologies can significantly boost performance on the network in comparison with the original 10 Mbit/s technology. These technologies are:

- Fast Ethernet with 100 Mbit/s:
  Compared to 10 Mbit/s, messages are transported much faster and therefore only occupy the cable for an extremely short time. For Fast Ethernet, a 4-wire FastConnect cabling system (Cat5e) is available with cable, plug and outlet.
- Gigabit Ethernet at 1 Gbit/s:
  As Gigabit Ethernet is faster than Fast Ethernet by a factor of 10, the cable is occupied for only one tenth of the time.
  For Gigabit Ethernet, an 8-wire FastConnect cabling system (Cat6) is available with cable, plug and outlet.
- Gigabit Ethernet at 10 Gbit/s:
  Compared to Ethernet with 1 Gbit/s, Ethernet with 10 Gbit/s is faster again by a factor of 10.
- Full Duplex prevents collisions:
  Data can be sent and received simultaneously between two switches. The data throughput for a full-duplex connection therefore rises to 200 Mbit/s with Fast Ethernet and to 2 Gbit/s with Gigabit Ethernet. With full duplex, a greater length of the network is possible. This means, for example, that when glass fiber-optic cables are used, distances of up to 200 km can be achieved.
  The data throughput increases enormously because the usual frame repetitions are avoided.
- Switching reduces the network data traffic:
  The switch dynamically "connects" those stations that are currently communicating. In the overall network, several messages can therefore be en-route simultaneously. The gain in performance derives from the fact that several message frames can pass the switch simultaneously (as they are in parallel).
- Autocrossover automatically crosses the send and receive cables on Twisted Pair interfaces.
- Autosensing describes the characteristic of network nodes (data terminals and network components) that automatically detect the transmission rate of a signal (10 Mbit/s, 100 Mbit/s or 1 Gbit/s) and support autonegotiation.
- Autonegotiation is a configuration protocol on Fast Ethernet. Before initiating the actual data transmission, network devices automatically negotiate a transmission mode which is supported by any device (1 000 Mbit/s, 100 Mbit/s or 10 Mbit/s, full duplex or half duplex)

Ethernet Switching

The Industrial Ethernet switch has the following functionality:

- Depending on the number of available interfaces, switches are able to simultaneously interconnect several pairs of subnetworks or stations temporarily and dynamically, with each connection possessing the full data throughput.
- By filtering the data traffic on the basis of the Ethernet (MAC) address of the terminals, the data traffic remains local and only data intended for nodes of another subnetwork is forwarded by the switch.
- More data terminals can be connected than in a classic Ethernet network.
- Error propagation is limited to the subnetwork concerned.

The switching technology offers definite advantages:

- Subnetworks and network segments can be created.
- The data throughput is increased and with it the network performance as a result of structuring the data communication.
- Easy rules for network configuration.
- Unlimited extension of the network by connecting individual collision domains/subnetworks.
- Easy, reaction-free extension of existing networks.

Full duplex

Full duplex (FDX) is an operating mode in the network that, in contrast to half duplex, allows stations to send and receive data simultaneously. When FDX is used, collision detection is automatically deactivated in the participating stations.

For FDX, transmission media with separate send and receive channels must be used, e.g. FOC and TP, and the participating components must be able to store data packages. With an FDX connection collisions do not occur, so components that support FDX can send and receive simultaneously at the nominal transmission rate. The data throughput therefore increases to twice the nominal transmission rate of the network, to 20 Mbit/s with the classic Ethernet and 200 Mbit/s with Fast Ethernet. With Gigabit Ethernet, up to 2 000 Mbit/s are achieved.

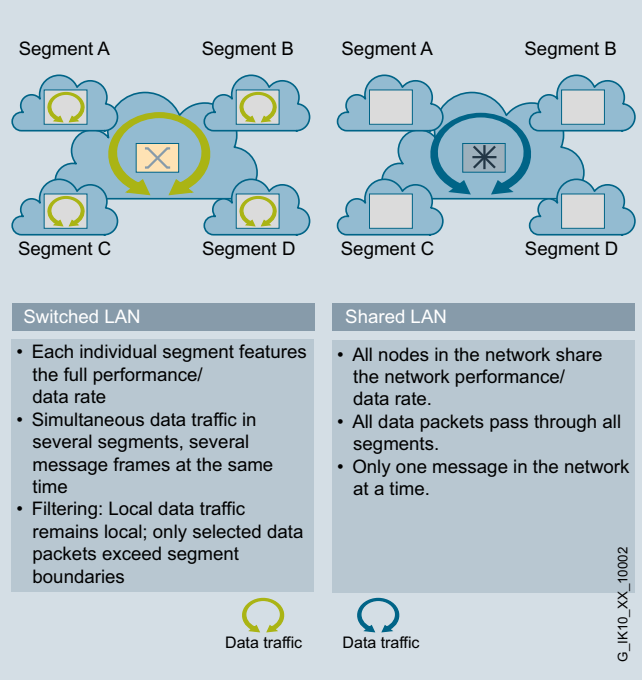
A further advantage of FDX is the increase in the network extension.

By deactivating the collision principle, the distance between two components can be increased by the size of a collision domain or more. With full duplex, the maximum distance can extend as far as the performance limit of the send and receive components. This is especially the case in connection with fiber-optic cables. When glass fiber-optic cables are used, distances of up to 200 km can be achieved between two switches.

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2

Overview (continued)



Increased performance through switching, full duplex

Autosensing/Autonegotiation

Autosensing describes the characteristic of network nodes (data terminals and network components) that automatically detect the transmission rate of a signal (10 Mbit/s, 100 Mbit/s or 1 000 Mbit/s) and support autonegotiation.

Autonegotiation is the configuration protocol for Twisted Pair. It enables the participating nodes to negotiate and agree the transmission rate before the first data packages are transferred:

- 10 Mbit/s, 100 Mbit/s, 1 Gbit/s or 10 Gbit/s
- Full duplex or half duplex

Autonegotiation can also be deactivated if a specific transmission rate has to be defined.

The advantage with Autosensing lies in the interoperability of all Ethernet components.
Classic Ethernet components that do not support Autosensing work together with Fast Ethernet and new Gigabit Ethernet components that do support Autosensing.

Autocrossover

The Autocrossover function automatically crosses the send and receive cables on Twisted Pair interfaces. This means that crossed connecting lines (e.g. TP XP Cords) are no longer required.

High Speed Redundancy Protocol (HRP)

Extremely fast reconfiguration of the network following an error is indispensable for industrial applications, because the connected data terminals will otherwise disconnect logical communication links. This would result in a process running out of control or emergency shutdown of the plant.

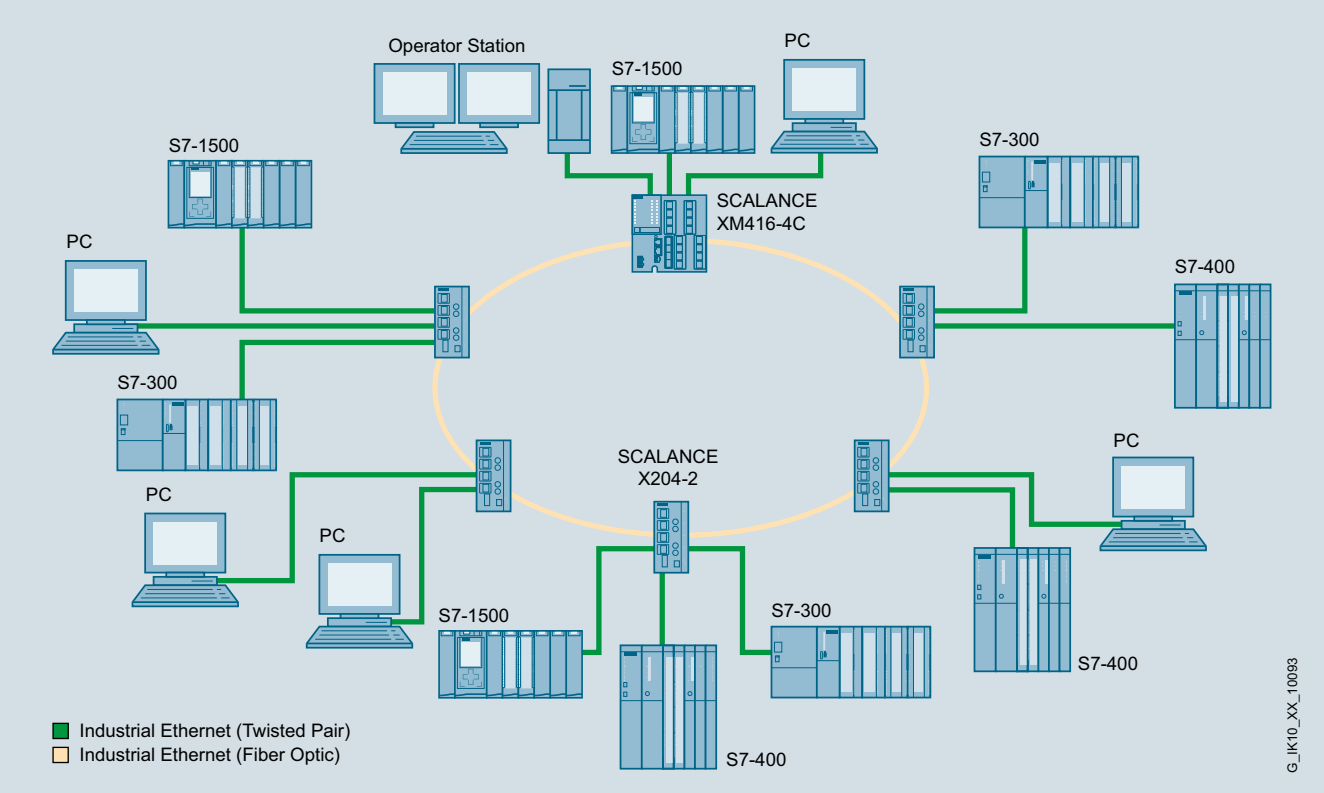
In order to achieve the very fast reaction times required, various standardized procedures are used. A network can then be reconfigured to form a functional network infrastructure again in a fraction of a second.

In an optical ring comprising 50 switches, the network will be reconfigured after a fault (cable break or switch failure) in less than 300 ms.

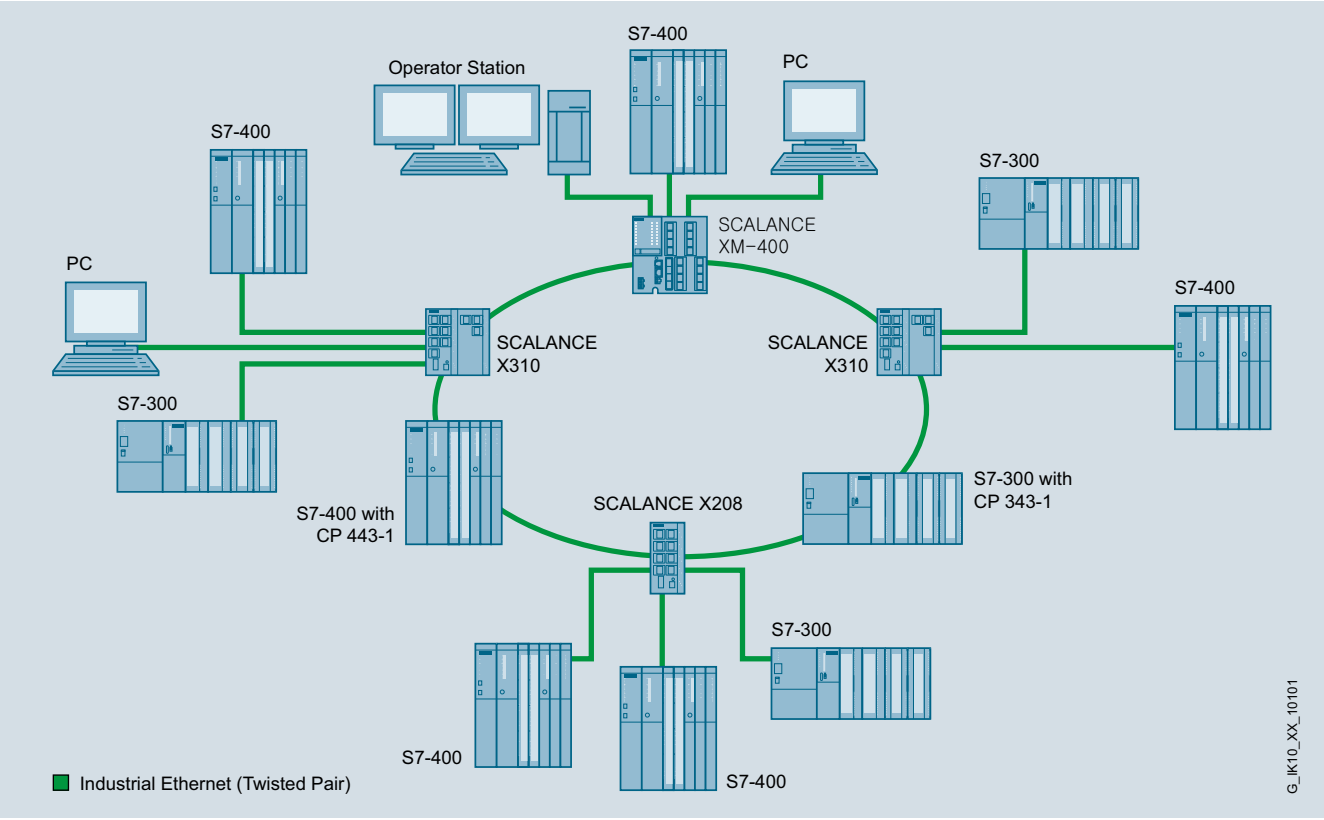
In addition to implementing high-speed media redundancy in the ring, Industrial Ethernet switches also offer the functions required for high-speed redundant coupling of rings or network segments. Network segments in any topology or rings can be coupled via two switches in each case.

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Overview (continued)



Configuration with high-speed redundancy in the optical ring



Configuration with high-speed redundancy in the electrical ring

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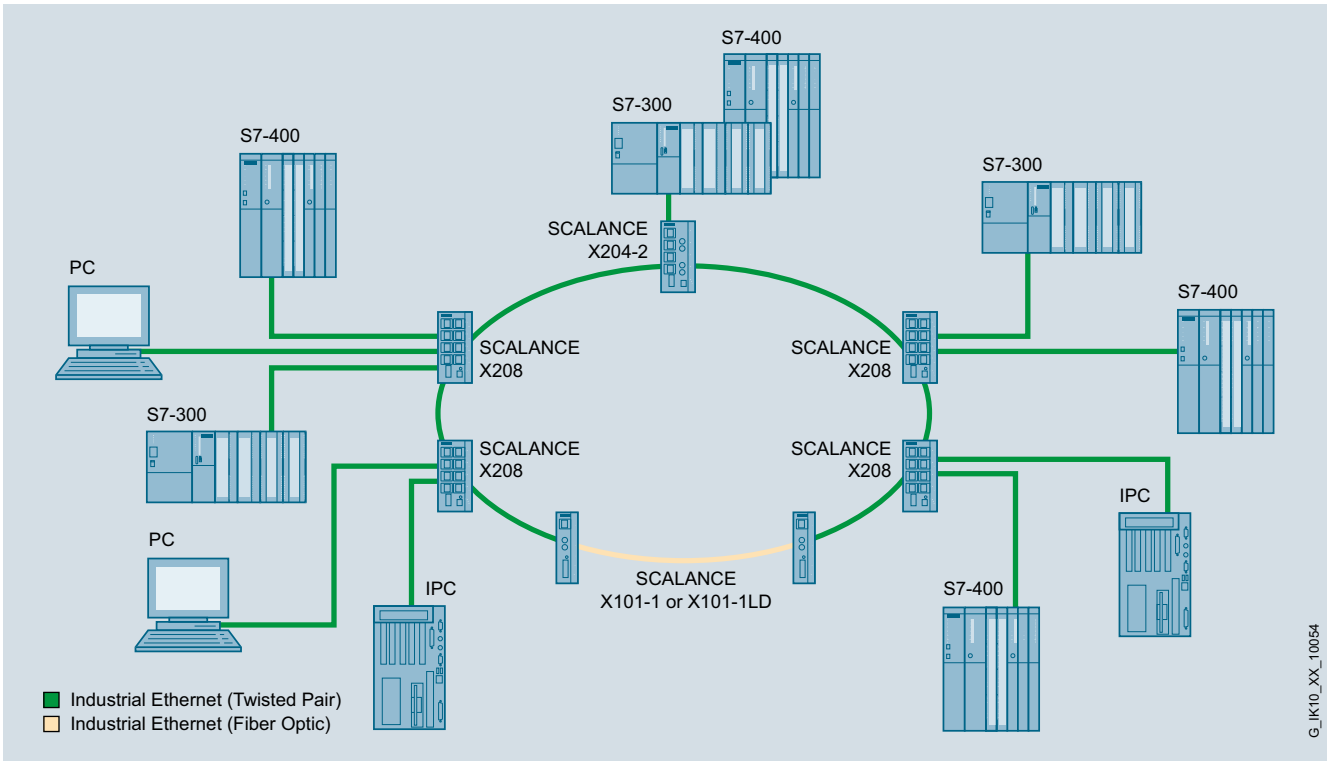
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Overview (continued)

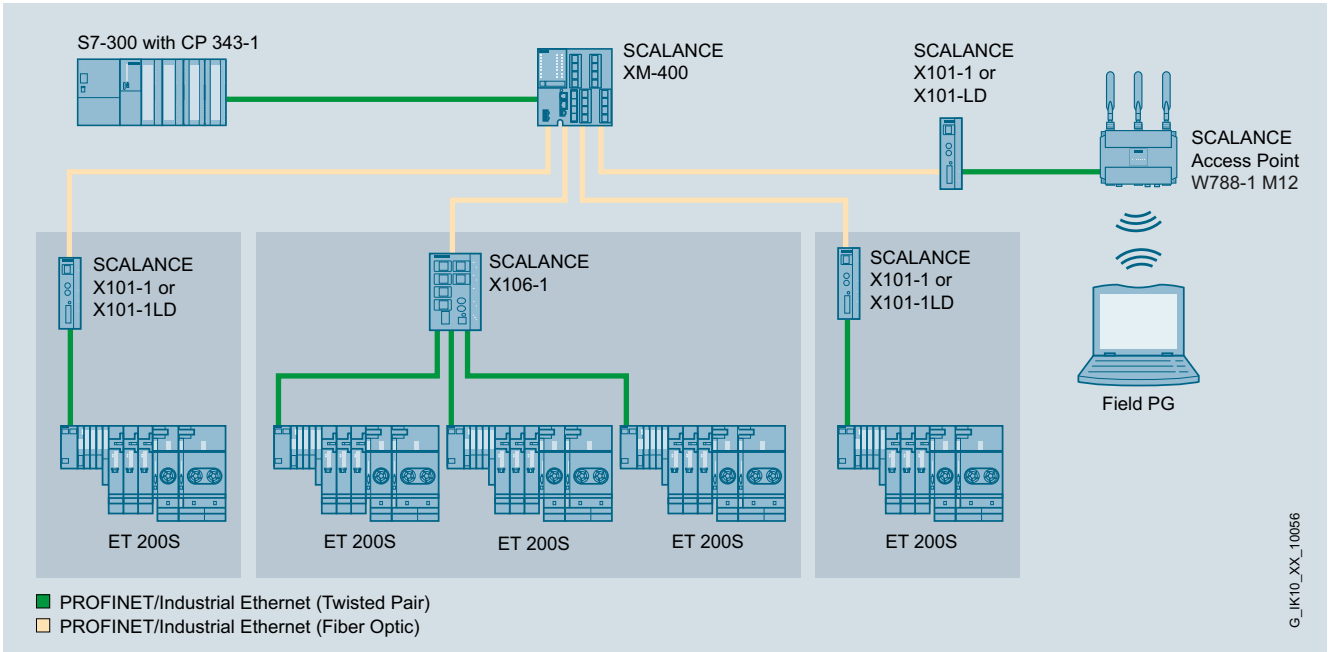
Media Redundancy Protocol (MRP)

A further option for attaining greater system availability is PROFINET MRP. The media redundancy can be created on the one hand by means of switches, and on the other hand direct via the PROFINET interfaces on SIMATIC controllers and distributed inputs/outputs. Thanks to the MRP protocol (IEC 61158 Type 10), reconfiguration times of less than 200 ms can be achieved, depending on the number of stations.

If the ring is interrupted at one point, immediate reconfiguration takes place and all communication nodes continue to be accessible.



Electrical/optical ring topology with SCALANCE X101-1/X101-1LD



Optical star topology with SCALANCE X101-1/X101-1LD and remote SCALANCE W Access Point

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Overview (continued)

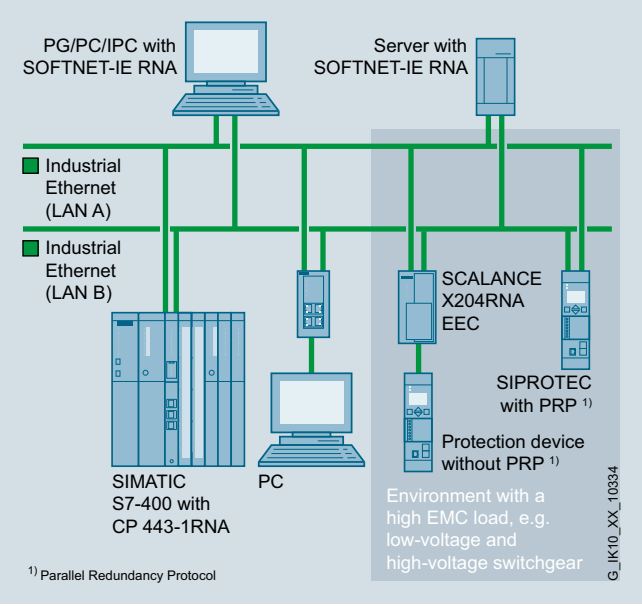
Seamless redundancy

For some applications with particularly high requirements in terms of the reconfiguration time, there is the possibility of setting up a redundant network without any reconfiguration time at all (seamless redundancy).

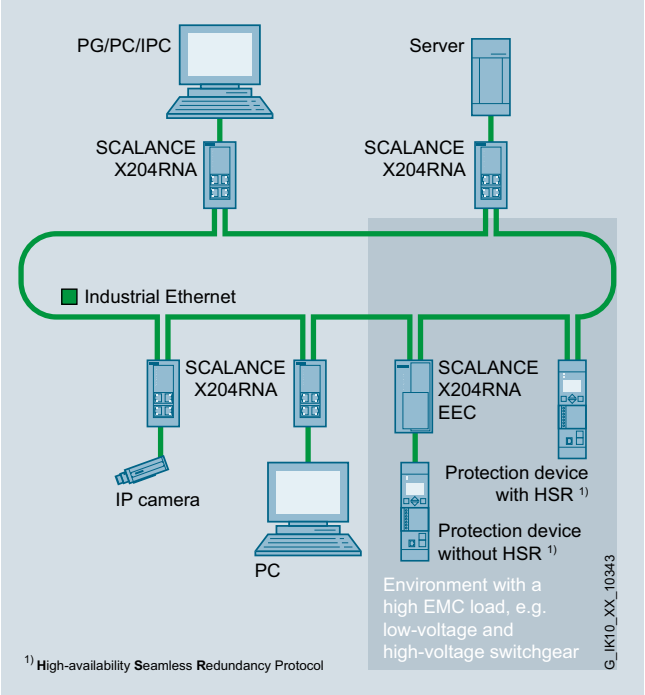
For this purpose, PROFINET offers the MRPD standard (Media Redundancy for Planned Duplication). This method is based on the topology-optimized IRT communication.

Two other solutions that can be used are High-availability Seamless Redundancy (HSR) and Parallel Redundancy Protocol (PRP) of the IEC 62439-3 standard.

All methods facilitate networks that continue to function in the event of a fault (e.g.: cable break) WITHOUT interruption. This is achieved by duplicating the data packets at the sender and then transmitting them to the recipient over two different paths.



Bumpless, parallel networks with PRP redundancy procedure



Bumpless, ring-shaped network with HSR redundancy procedure

Redundancy with the Spanning Tree algorithm

The Spanning Tree algorithm is described in the IEEE 802.1D standard; it organizes any number of meshed Ethernet structures comprising bridges and switches.

To prevent data packages circulating in the network, in the case of closed meshes different connections are switched to standby so that an open tree structure results from the meshed structure.

For this purpose, switches communicate with each other using the Spanning Tree Protocol. This protocol is extremely complex because it has to handle any type of network structure.

The organization of network structures with the Spanning Tree protocol can take from 30 to 60 seconds. During this period, productive communication for reliable visualization or process control in the network is not possible.

In the time-optimized variant "Rapid Reconfiguration Spanning Tree“ according to IEEE 802.1, the time is shortened to between 1 and 3 seconds for up to 10 series-connected switches.

Due to the comparatively long reconfiguration time, this protocol is used predominantly in office networks. For connecting to such office networks, some SIMATIC NET switches support the Rapid Spanning Tree Protocol.

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2

Overview (continued)

Switched network

Switched industrial networks can be configured electrically or optically with a linear, star or ring structure, or a combination.

They are constructed with SCALANCE X switches and with switches integrated into terminal devices, e.g. in communications processors.

As the transmission medium between the switches and for connection to the terminal devices electrical cables (e.g. twisted pair cables) or fiber optic cables are used.

Switched networks can be of any size. In networks of a larger scale (depending on the application) the signal delays are to be considered.

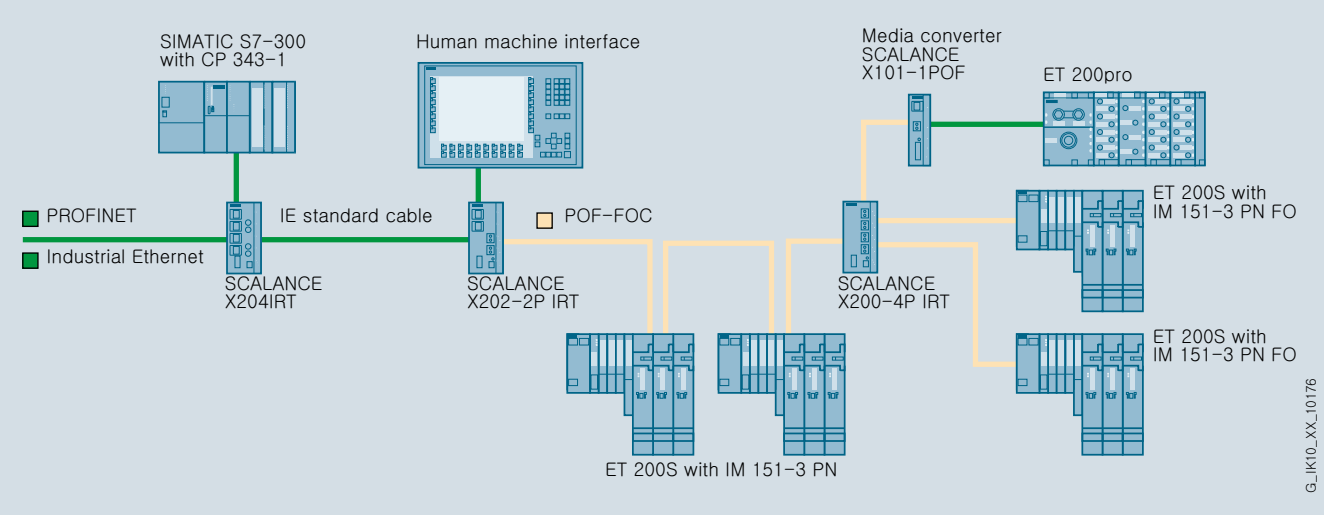
Optical cabling with POF/PCF or glass fiber optic cable

Fiber-optic cables are always recommended as an alternative to copper cables in environments subject to strong electromagnetic interference (EMI) if reliable equipotential bonding cannot be guaranteed, or if the system is in the open air.

Glass fiber optic cables are used for data transmission over long distances, while for shorter distances, plastic fiber optic cable made of light-conducting plastics like polymer optical fiber (POF), or plastic covered glass fibers such as polymer cladded fiber (PCF), are used.

Simple fiber-optic cabling for machine-level use is implemented with the SC RJ connection system for polymer optical fiber and PCF. The SC RJ connectors can be assembled especially quickly and simply on-site. The plastic fiber optic cables designed for this purpose can be used universally or specifically in festoon cable systems.

For optical cabling, e.g. for a PROFINET system, products with POF or PCF connection are used, e.g. the Industrial Ethernet Switch SCALANCE X200-4P IRT, ET 200S distributed I/O, or the SCALANCE X101-1POF media converter.



Mixed network with SCALANCE X202-2P IRT and SCALANCE X101-1POF media converter

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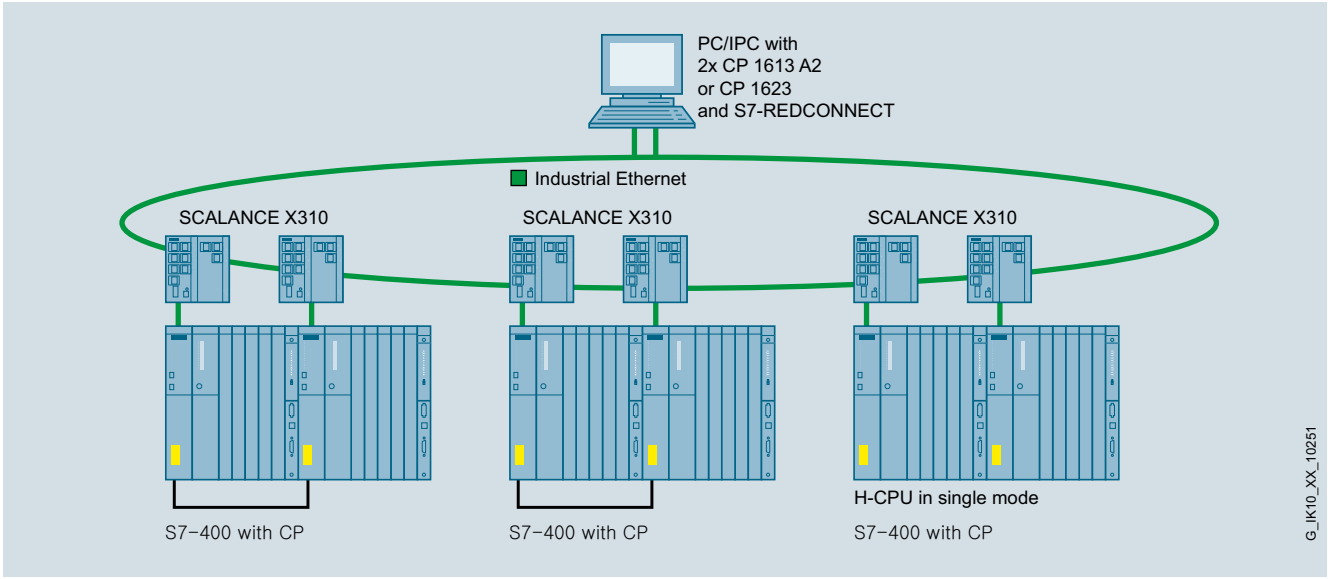
Overview (continued)

Fault-tolerant communication

The availability of the communication is increased by means of redundant communication connections, to which the data transmission can be switched quickly in the event of a fault.

Fault-tolerant S7-connections can be set up from S7-400H stations to

- Other H stations (one- or two-channel)
- PCs (S7-REDCONNECT software required)



Increased availability by means of redundant communication connections

Gigabit at the control level

Whereas in the field level, short response times and small data message frames are in the forefront, the need for high data throughput is constantly increasing in the control level. The reason for this is the rapidly growing number of nodes and data-intensive systems such as HMI, SCADA, code reading systems, web applications or multimedia applications.

In addition to the Gigabit-capable network infrastructure, there are also Gigabit-capable system connections for PCs or SIMATIC S7-300/400/1500. The CP 1623 communications processor for PCI Express supports a high-performance connection of the HMI/SCADA systems and simultaneously increases the reliability of the network by means of an optional external power supply.

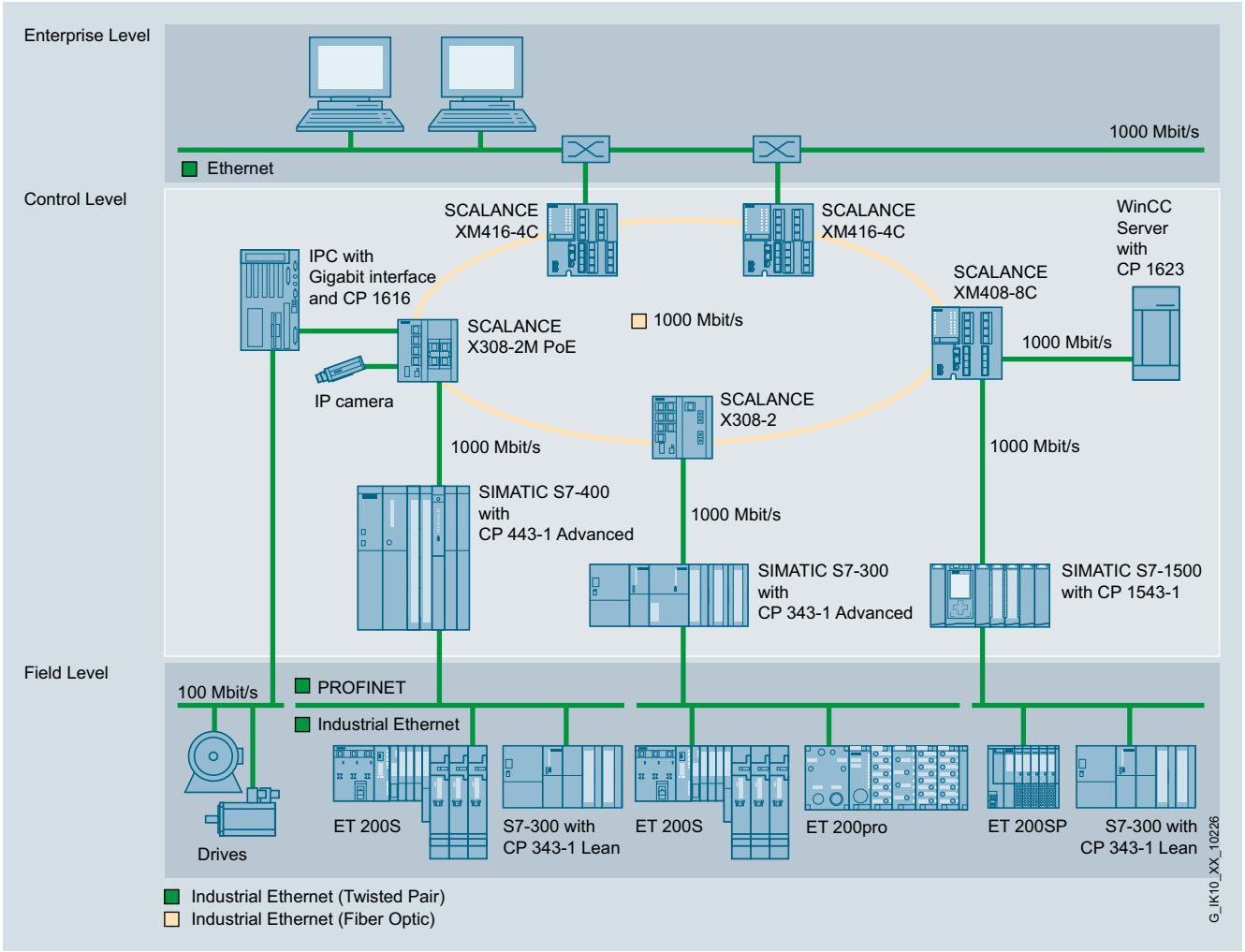
The CP 343-1 Advanced and CP 443-1 Advanced communications processors for SIMATIC S7-300/400 implement integral network separation between the control level and field level and provide:

- Separate network connections on a module for the connection of two independent IP-subnetworks, e.g. control level is IP subnetwork 1 (Gigabit Ethernet) and the field level is IP subnetwork 2 (Fast Ethernet)
- Cross-network utilization of IT services through IP routing, such as access to Web servers
- Short response times for the lower-level field device connection with PROFINET
- Firewall for protecting the programmable controllers from unauthorized access regardless of the size of the network to be protected
- Supplementary or alternative VPN tunnel (**V**irtual **P**rivate **N**etwork) for secure authentication of the communication partners and encryption of the transmitted data

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2

Overview (continued)



Network separation between field level and control level including Gigabit communication at the control level

Network separation between field level and control level

Networks often have to be separated physically from one another, but nevertheless have to communicate with one another. Reasons for network separation are deliberate load decoupling or different responsibilities within an enterprise (e.g. office and production network).

When using the CP 343-1 Advanced and CP 443-1 Advanced communications processors for S7 controllers this requirement can easily be met. With the introduction of interfaces for separate IP subnetworks in Gigabit Ethernet and Fast Ethernet on one module, the cross-network use of IT services is possible by means of static IP routing. A firewall protects programmable controllers against unauthorized access regardless of the size of the network to be protected. As an alternative or supplement, secure authentication of the communication partners and encryption of the transmitted data can be handled via a VPN (**V**irtual **P**rivate **N**etwork).

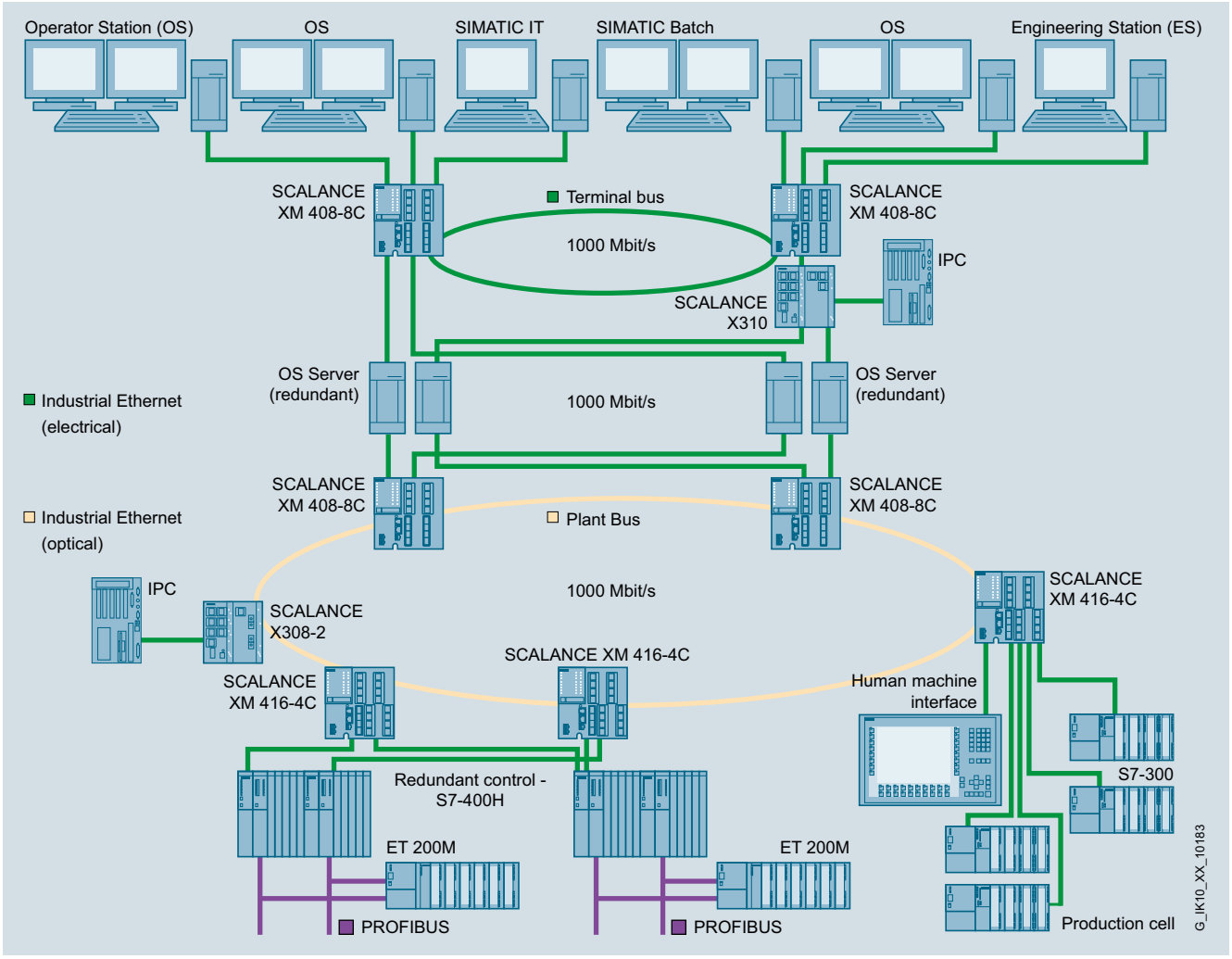
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Overview (continued)

SIMATIC PCS 7 process control system with Gigabit

In the control room, two SCALANCE X-400 switches are used on the terminal bus. If a high number of nodes are connected to the plant bus, SCALANCE XR-500 or XM-400 switches, for example, can be used with port extenders. These are connected together to create an electrical ring with a transfer rate of 1 Gbit/s.

Several operator panels are provided and divided between the two switches so that the system can still be operated in the event of a failure. The terminal and plant buses are connected using redundant servers, e.g. with SCALANCE X408-2 also via high-performance Gigabit lines.

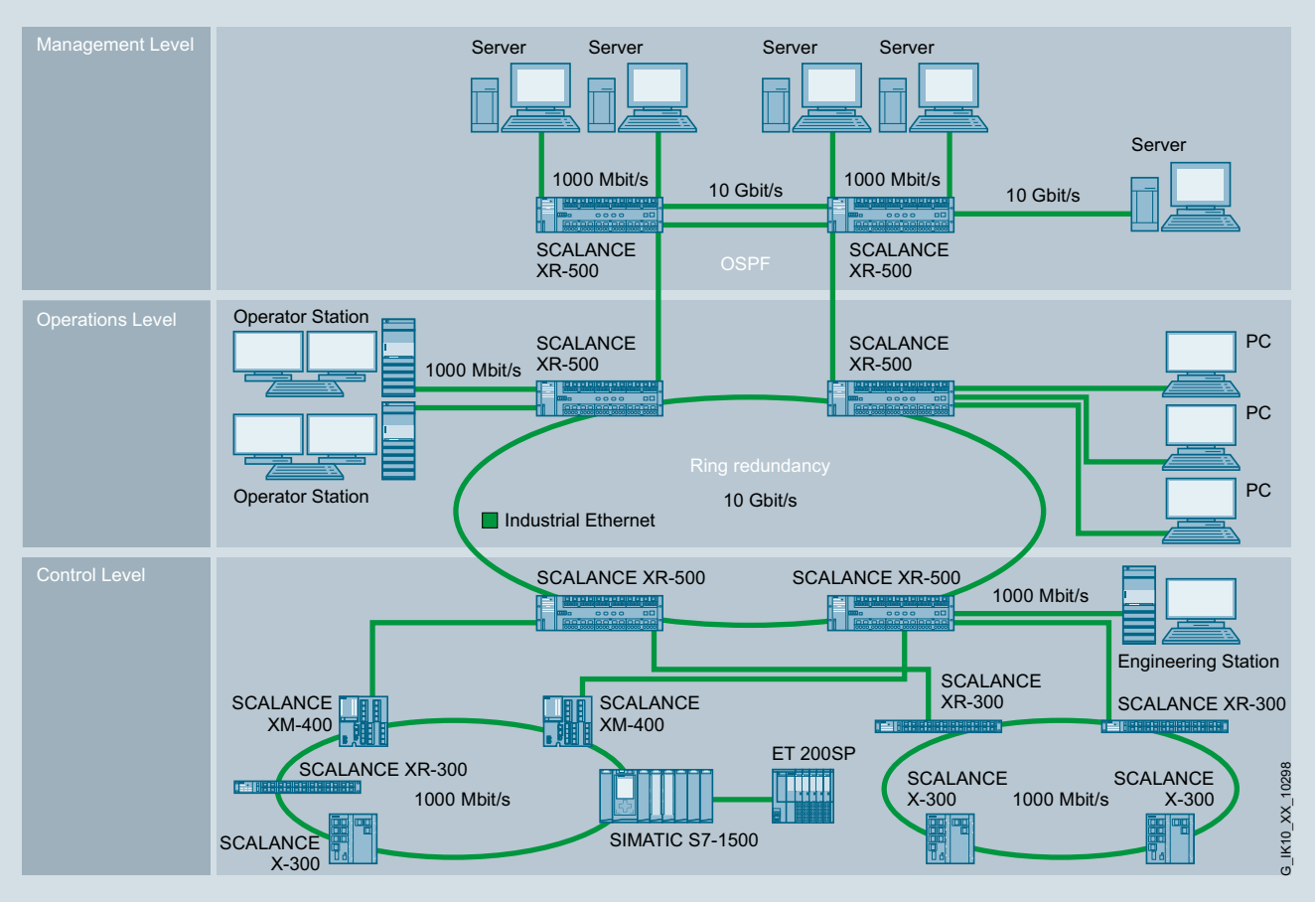


Use of the SCALANCE X switches in a process control system, e.g. PCS 7

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Overview (continued)



Plant network with connection to the management level or the corporate network with SCALANCE X-500

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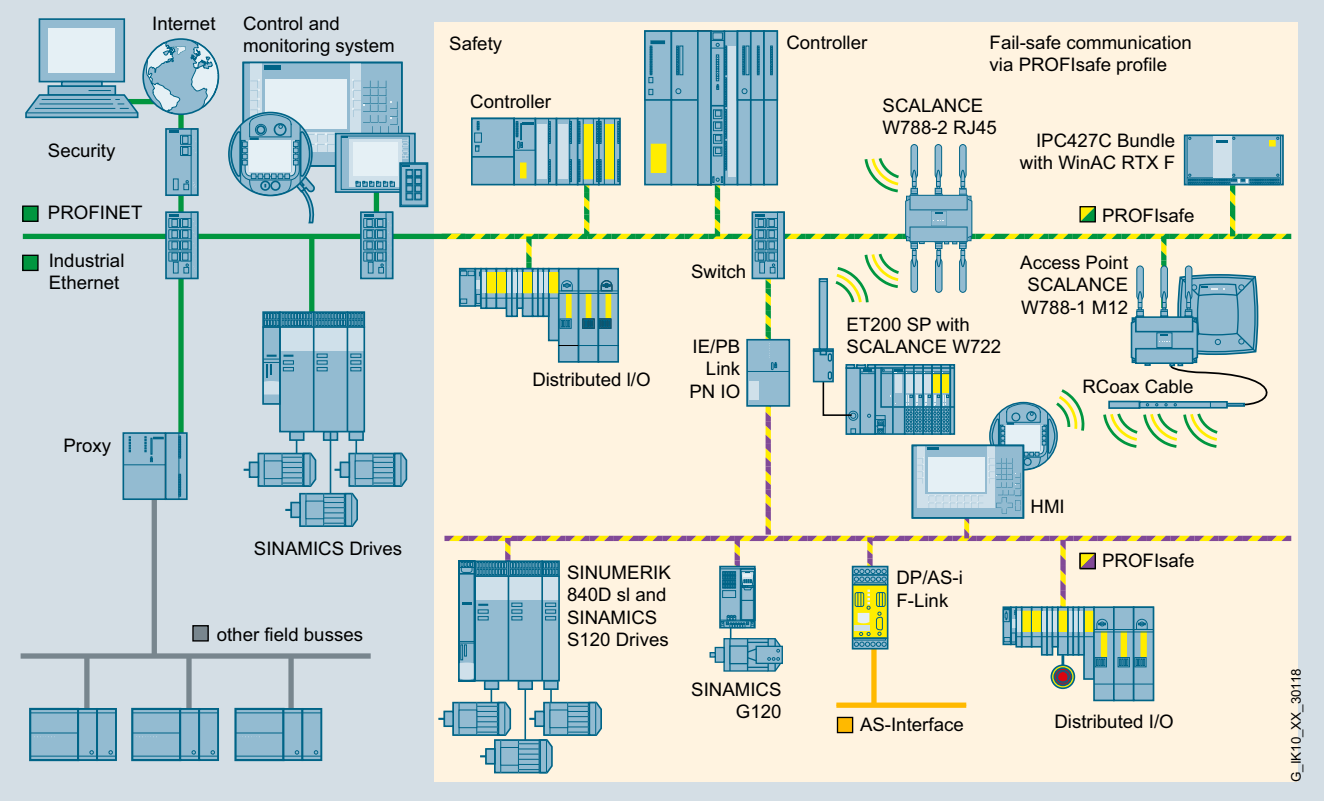
Overview (continued)

Fail-safe wireless communication with PROFIsafe

For several years, safety engineering has been integrating into standard automation on the basis of SIMATIC S7 controllers, PROFIBUS and PROFIsafe.

This range has been expanded by PROFINET-enabled components, thus providing a complete product range with failsafe controllers, failsafe I/O and a corresponding engineering environment.

PROFIsafe prevents errors such as address corruption, loss, delay, etc., when transmitting messages through continuous numbering of the PROFIsafe data, time monitoring, and authenticity monitoring using passwords and optimized cyclic redundancy check (CRC).



Fail-safe wireless communication with PROFIsafe

Coupling of networks

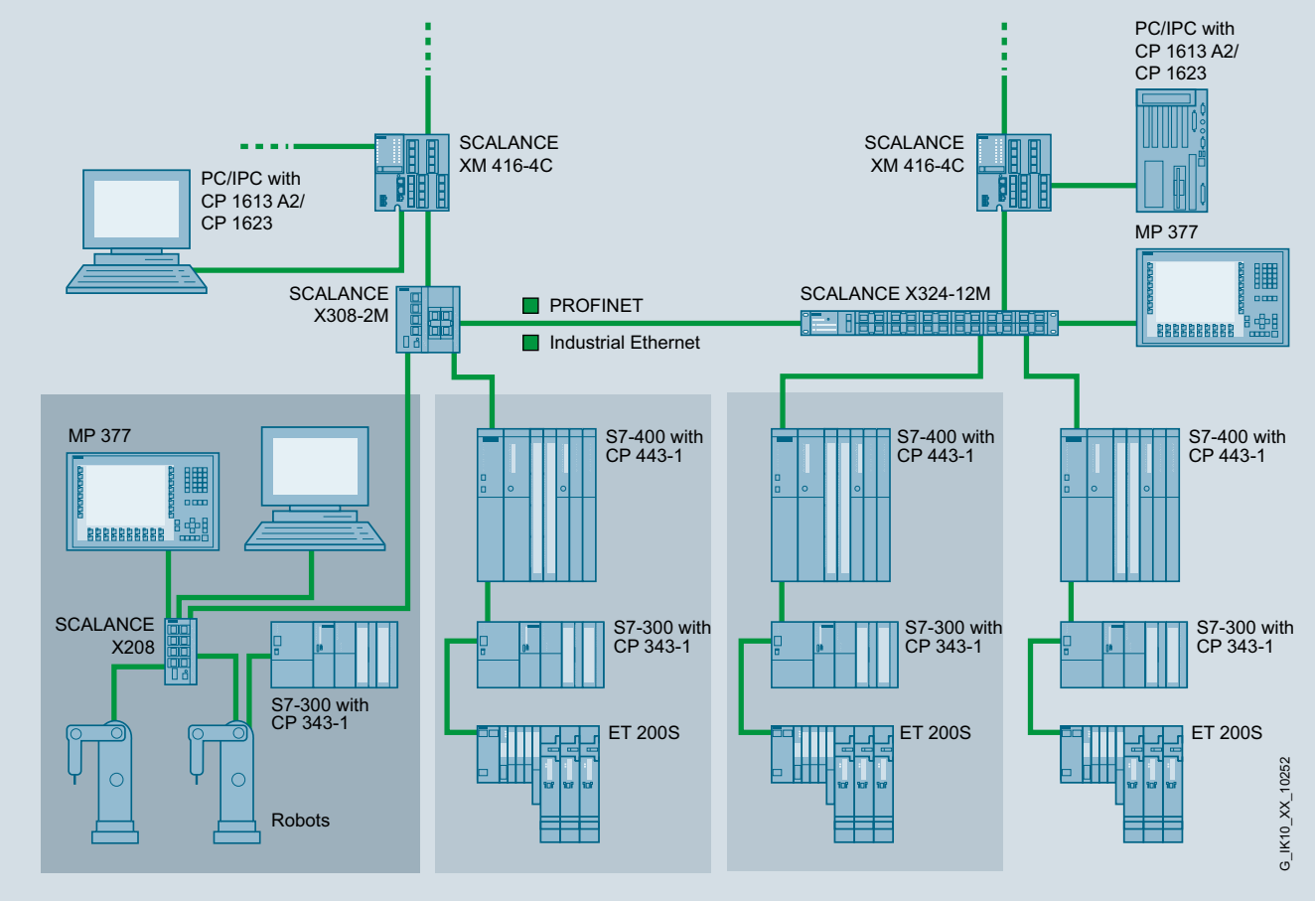
For a high-performance coupling of networks, the modular Industrial Ethernet Switch SCALANCE XM-400 is available. In the case of SCALANCE XM-400, high-speed IP routing permits communication between different IP subnetworks and routers. Methods supported for this include:

- Static routing
- Dynamic routing OSPF (open shortest path first) and
- RIPv1/2 (routing information protocol)
- Redundant routing VRRP (Virtual Router Redundancy Protocol)

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Overview (continued)



High-performance Layer 3 switching paired with redundant routing (VRRP)

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Overview

	Twisted pair network	Fiber optic network	Wireless network
Flexibility of the network topology	● ● ● ●	● ● ● ●	● ● ● ●
Suitability for high transmission rates	● ● ● ○ 1)	● ● ● ● 1)	● ● ○ ○
Inter-building networking	○ ○ ○ ○	● ● ● ●	● ● ● ○
EMC	● ● ● ○	● ● ● ●	● ● ● ●
Simple cable laying	● ● ● ○	● ● ● ○	–
Performance spectrum for special applications	Cables for indoor area; trailing cable; marine cable; FastConnect cables	Cables for indoor and outdoor area; trailing cable; halogen-free cable	–
Effect of voltage failure	Failure of a subnetwork 2)	Failure of a subnetwork 2)	Failure of a subnetwork 2)
Effect of path failure	Network breaks down into two sub-networks functioning in isolation 3)	Network breaks down into two sub-networks functioning in isolation 3)	–
Max. network expansion	5000 m 4)	Up to 150 km 4); over 150 km, consider signal propagation time	–
Max. distance between two network nodes / Access Points	100 m	50 m POF 100 m PCF 4000-5000 m multimode 120 km single mode	30 m indoors per segment 100 m indoors per segment
Pre-assembled cables	Yes	Yes	–
Assembly on site	without special tool; FastConnect technology	without special tool; FastConnect technology	–
Integrated diagnostics support	LED indicators; signaling contact; SNMP network management; Web-based management, PROFINET diagnostics	LED indicators; signaling contact; SNMP network management; Web-based management, PROFINET diagnostics	LED indicators; SNMP network management; Web-based management, PROFINET diagnostics
Redundant network structures	Electrical ring or doubling of the infrastructure (linear, star, tree)	Optical ring or doubling of the infrastructure (linear, star, tree)	Multiple illumination or use of different frequency bands (2.4 and 5 GHz)

1) suitable for 10 Mbit/s to 10 Gbit/s
2) Safeguard against subnetwork failure by means of redundant voltage supply
3) no effect in the case of ring structure
4) if there are 50 switches in the ring

● ● ● ● suitable
● ● ● ○ partly suitable
● ● ○ ○
● ○ ○ ○
○ ○ ○ ○ not applicable

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Comparison of networking media

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Overview

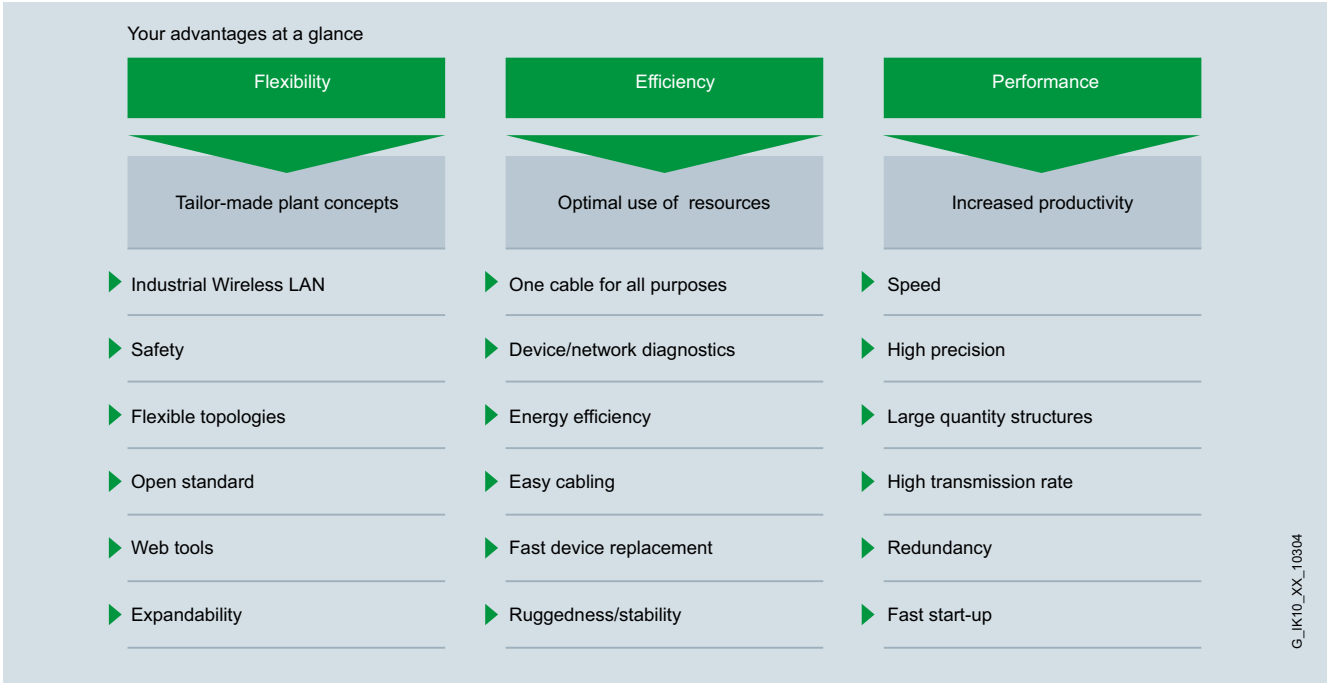
PROFINET – the Ethernet standard for automation

PROFINET is the leading Industrial Ethernet standard with more than 5.8 [1] million nodes worldwide.

PROFINET increases companies' success by accelerating processes, boosting productivity, and increasing plant availability.

[1] Source: PROFIBUS & PROFINET International (PI) Edition 2013

Advantages at a glance



Flexibility

Short response times and optimized processes are prerequisites for competitiveness in global markets, because product life-cycles are becoming shorter and shorter.

PROFINET ensures maximum flexibility in plant structures and production processes, and it enables you to implement innovative machine and plant concepts. Mobile devices, for example, can be integrated into relatively inaccessible locations.

IWLAN

PROFINET also supports wireless communication with Industrial Wireless LAN and thus opens up new application fields.
For example, technologies subject to wear such as contact wires can be replaced and automated guided vehicle systems and mobile operator panels can be used.

Safety

The PROFIsafe safety profile, which has been tried and tested with PROFIBUS and which permits the transmission of standard and safety-related data on a single bus cable, can also be used with PROFINET. No special network components are required for fail-safe communication, standard switches and standard network transitions can be used without restrictions. In addition, fail-safe communication is equally possible via Industrial Wireless LAN (IWLAN).

Flexible topologies

PROFINET also enables the use of star, tree, and ring topologies in addition to the linear topology characterized by the established fieldbuses. This is made possible by means of switching technology via active network components, such as Industrial Ethernet switches and media converters, or by integrating switch functionality into field devices. This results in an increased machine and plant planning flexibility, as well as savings in cabling.

The PROFINET network can be installed without any specialist knowledge and meets all requirements relevant to the industrial environment. The PROFINET Guideline "Cabling and Interconnection Technology" provides network installation support for manufacturers and users. Symmetrical copper cables or RFI-resistant fiber-optic cables are used depending on the application. Devices from different manufacturers are easily connected via standardized and rugged plug-in connectors (up to IP65/IP67).

Thanks to the integration of switch functionality into the devices, linear topologies can be formed that are configured based on an existing machine or plant structure. This results in savings in cabling overhead and cuts down on components such as external switches.

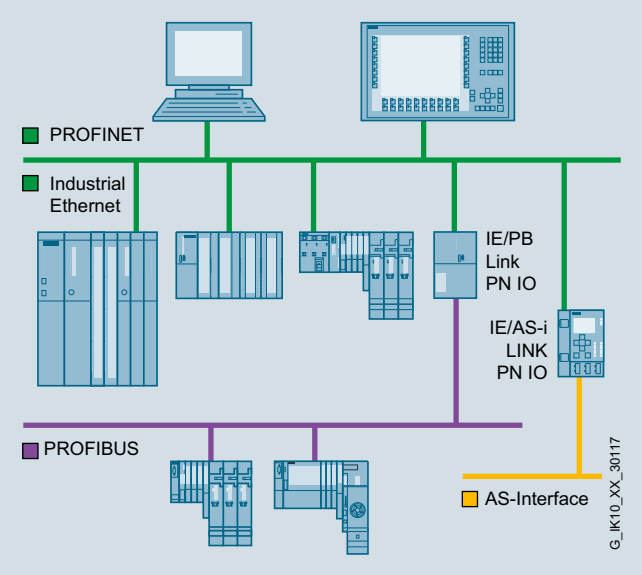
Open standard

PROFINET, the open vendor-independent standard (IEC 61158/61784), is supported by PROFIBUS and PROFINET International (PI). It stands for maximum transparency, open IT communication, network security and simultaneous real-time communication.

Due to its openness, PROFINET creates the basis for a uniform automation network in the plant to which all of the machines and devices can be connected. The integration of existing parts of the plant, using PROFIBUS for example, can also be achieved without any problems through the use of network transitions.

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Overview (continued)



Fieldbus integration via a proxy

Use of web tools

PROFINET's unrestricted support for TCP/IP permits the use of standard web services such as web servers in the device. Independently of the tool used, information from the automation level can be accessed from almost anywhere at any time using a commercially available Internet browser. This considerably simplifies commissioning and diagnostics.

Each user can decide for himself how much openness to the IT world he will permit for his machine or plant. Thus, PROFINET can be easily operated as an isolated plant network or it can be connected to the office network or the Internet via suitable security modules, such as the SCALANCE S modules. This allows new teleservice concepts or even the fast exchange of production data.

Expandability

On the one hand, PROFINET permits the easy integration of existing systems and networks without great effort. Thus, PROFINET protects the investments in existing plant units which communicate via PROFIBUS and other fieldbuses such as AS-Interface, for example.

On the other hand, additional PROFINET stations can be added at any time. Network infrastructures can be expanded using additional network components, both wired and wireless versions, even during operation.

Efficiency

Global competition means that companies must deploy their resources economically and efficiently. This applies in particular to production. PROFINET ensures more efficiency here.

Simple engineering guarantees fast commissioning, and reliable devices enable high plant availability. Comprehensive diagnostics and maintenance concepts help to reduce plant downtimes and maintenance costs to a minimum.

One cable for all purposes

PROFINET permits simultaneous fieldbus communication in isochronous mode and standard IT communication (TCP/IP) via one cable. This real-time communication for the transmission of user/process data and diagnostic data is performed on a single cable. Specific profile communication (PROFIsafe, PROFIdrive and PROFIenergy) can be integrated without additional cabling overhead. This solution provides a wide range of functions with a low degree of complexity.

Device and network diagnostics

By retaining the field-proven PROFIBUS device model, the same diagnostic information is available with PROFINET. In addition, device diagnostics also includes read-out of module-specific and channel-specific data from the devices. This enables simple and fast location of faults. In addition to the availability of device information, the top priority in network management is reliability of network operation.

The Simple Network Management Protocol (SNMP) has become established in existing networks as the de-facto standard for the maintenance and monitoring of network components and their functions. PROFINET uses this standard and provides users with the option of servicing networks using familiar tools such as the SINEMA Server network management software.

In order to facilitate the maintenance of PROFINET devices, both locally and also remotely via a secure VPN connection, application-specific Web sites in the familiar HTML standard can be created on the integral Web server of the field devices.

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Overview (continued)

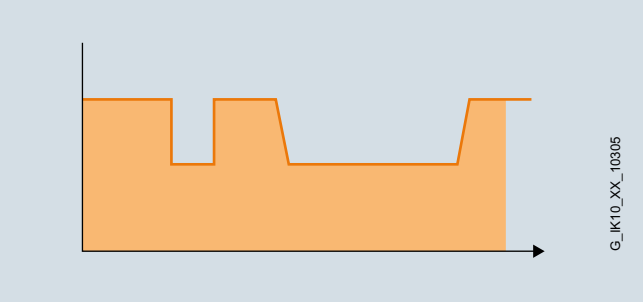
Energy efficiency

Moving toward the green factory: PROFIenergy

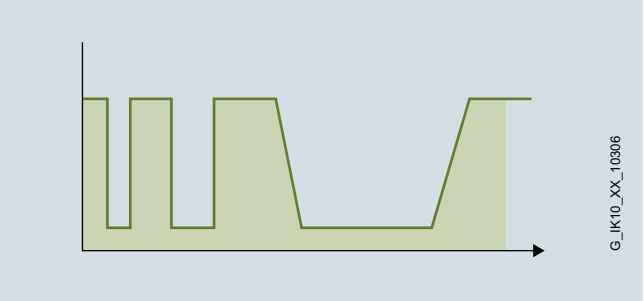
PROFIenergy is a profile that provides functions and mechanisms for PROFINET field devices that support energy-efficient production.

The vendor and device-independent profile defined by PNO allows the user to significantly reduce the energy consumption and costs: PROFIenergy enables specific loads that are not required to be switched off. This noticeably reduces energy costs during pauses in production. PROFIenergy facilitates automated activation and deactivation of technologically related plant sections. The coordination is performed centrally by means of a higher-level controller, and the networking via PROFINET. This means that during long pauses, as much energy as possible is saved. Plant sections that are switched off for short periods contribute to the even distribution and most efficient use of energy.

The use of PROFIenergy is made easier for the machine builder by its integration into well-known series of products. In addition, PROFIenergy is defined in such a way that the necessary function blocks can be integrated into existing automation systems at a later date.



Energy consumption without PROFIenergy



Energy consumption with PROFIenergy

Easy cabling

Stringent demands are placed on the installation of cables in the industrial environment. There is also the requirement to set up error-free industry-standard networks in the shortest possible time without specialist knowledge.

Siemens offers FastConnect, a system that meets all these requirements: FastConnect is the standards-compliant, industry-standard cabling system consisting of cables, connectors, and assembly tools for PROFINET networks.

The time spent for connecting the terminal devices is minimized thanks to the easy installation using only a single tool, and installation errors can be avoided thanks to the practical color-coding. Both copper cables and glass fiber-optic cables can be assembled on-site in this way.

Fast device replacement

PROFINET devices are identified via a name that is assigned in the configuration. When replacing a defective device, a new device can be recognized by the IO Controller by means of topology information and have a name automatically assigned to it. An engineering tool is therefore not required when replacing devices.

This mechanism can also be used during the initial commissioning of a complete plant. Quick commissioning is thus especially possible for series machines.

Ruggedness

An automation network must be able to withstand most external sources of interference. The use of Switched Ethernet prevents faults in one section of the network from influencing the entire plant network. PROFINET enables the use of fiber-optic cables especially for areas that are critically sensitive to EMI.

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Overview (continued)

Performance

Productivity and product quality determine market success. Precise motion control, dynamic drives, high-speed controllers, and the deterministic synchronization of devices are therefore key factors in achieving superior production. They allow high production speeds and simultaneously optimized product quality.

Speed and precision

Fast motion control applications need precise and deterministic data exchange. This is implemented thanks to isochronous drive controls using Isochronous Real-Time (IRT).

PROFINET permits high-speed and deterministic communication due to IRT and isochronous mode. The different cycles of a system (input, network, CPU processing and output) are also synchronized in the case of parallel TCP/IP traffic. PROFINET's short cycle times make it possible to increase the productivity of machines and plants, and to ensure product quality through high precision.

The standardized PROFIdrive drive profile enables vendor-independent communication between CPUs and drives.

Large quantity structures

Previous limitations in the scope of the machines and systems to be implemented can be easily overcome through the use of PROFINET. With PROFINET, up to 256 field devices can now be managed by one SIMATIC Controller.

In a network, several controllers can interact with their assigned field devices. The number of field devices per PROFINET network is virtually unlimited – the entire band of IP addresses is available.

High transmission rate

By using 100 Mbit/s in full duplex mode, PROFINET achieves a significantly higher transmission rate than previous fieldbuses. Thanks to this, both the process data and other plant data can be transferred via TCP/IP without any problems. In this way, PROFINET combines the industrial requirements of simultaneously transferring fast IO data and large data quantities for other parts of the application. Even the transfer of large quantities of data such as by cameras does not affect the speed and the precision of the IO data transfer thanks to PROFINET mechanisms.

Redundancy

Higher plant availability can be achieved by means of a redundant installation (ring topology). The media redundancy can be implemented both with the help of external switches and direct via integral PROFINET interfaces. Reconfiguration times of 200 ms can be achieved. In the case of an interruption to the communication in only one part of the ring installation, this means that a plant standstill is prevented and the necessary servicing and repair work can be carried out without time pressure.

MRPD

High network availability can be achieved without reconfiguration time using the PROFINET-compatible MRPD procedure (Media Redundancy for Planned Duplication). The MRPD protocol is an extension to the MRP protocol for sending message frames in duplicate within a ring topology. Networks can only be constructed with SCALANCE X-200IRT switches and additional components with the real-time feature Isochronous Real-Time IRT (PROFINET standard), such as SIMATIC controllers, ET 200, SIMOTION and SINAMICS drives.

Fast start-up

The Fast Start-Up function allows rapid start-up of PROFINET IO Devices that are connected to SIMATIC Controllers. The communication connection between the controller and the device is established in less than a second. For modular plants, individual plant parts can therefore be connected or disconnected in the shortest time. For example, the tool change can be accelerated significantly in robot applications.

Benefits

- PROFINET is the open Industrial Ethernet standard for automation
- PROFINET is based on Industrial Ethernet
- PROFINET uses TCP/IP and IT standards
- PROFINET is Real-Time Ethernet
- PROFINET permits seamless integration of fieldbus systems
- PROFINET supports fail-safe communication via PROFIsafe over IWLAN as well

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Overview of passive network components

Overview

Industrial Ethernet	Maximum cable lengths for industrial Ethernet connections									
	Type of fiber	0 - 10 m	0 - 50 m	0 - 55 m	0 - 85 m	0 - 100 m	0 - 750 m	0 - 4.000 m	0 - 5.000 m	0 - 26.000 m
IE FC cables 2x2 at 100 Mbit/s										
FC RJ45 outlet with 2x2 cable (additional 10 m patch cable can be connected in total)				● (0 - 45 m; Torsion Cable)	● (0 - 75 m; Marine/Traling/ Flexible/ FRNC/Food/ Festoon Cable)	● (0 - 90 m; Standard Cable GP)				
Patch cable		●								
TP FC Standard Cable GP 2x2						●				
TP Ground Cable 2x2						●				
TP Train Cable GP 2x2						●				
TP FC Flexible Cable GP 2x2					●					
TP FC Marine Cable 2x2 GP					●					
TP FC Trailing Cable 2x2					●					
TP FC Trailing Cable GP 2x2					●					
TP Torsion Cable 2x2				●						
TP FC FRNC Cable GP					●					
TP FC Food Cable					●					
TP FC Festoon Cable GP					●					
IE FC cables 4x2 at 1000 Mbit/s										
FC RJ45 outlet with 4x2 cable (AWG 22) (additional 10 m patch cable can be connected in total)						● (0 - 90 m; Standard Cable GP)				
TP Standard Cable GP 4x2 (AWG 24)						●				
TP Flexible Cable GP 4x2 (AWG 24)					●					
TP Train Cable GP 4x2 (AWG 24)						●				
Patch cable		●								
IE Glass FOC										
FO FRNC Cable GP	Multimode (50/125)						●2)		●1)	
FO Standard Cable GP	Multimode (50/125)						●2)		●1)	
FO Ground Cable	Multimode (50/125)						●2)		●1)	
FO Trailing Cable	Multimode (50/125)						●2)		●1)	
FO Trailing Cable GP	Multimode (50/125)						●2)		●1)	
FO Robust Cable GP	Multimode (50/125)						●2)		●1)	
INDOOR FO Cable	Multimode (62,5/125)							●1)		
FO Standard Cable	Multimode (62,5/125)							●1)		
Flexible FO Trailing Cable	Multimode (62,5/125)							●1)		
FO Robust Cable GP 3)	Multimode (4E9/125)									●1)
IE POF/PCF Fiber Optic Cable										
POF Standard Cable GP 980/1000	POF (980/1000)		●1)							
POF Trailing Cable 980/1000	POF (980/1000)		●1)							
PCF Standard Cable GP	PCF (200/230)					●1)				
PCF Trailing Cable	PCF (200/230)					●1)				
PCF Trailing Cable GP	PCF (200/230)					●1)				

1) at 100 Mbit/s 2) at 1000 Mbit/s 3) 10 km at 10GBase-LR and 40 km at 10GBase-ER

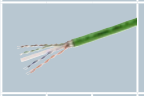
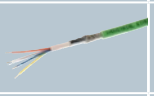
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Overview (continued)

Options for connecting Industrial Ethernet cables with plugs, terminals ordevices (IE)

electrical

			IE FC Cable 4x2			IE FC Cable 2x2	IE TP Cord 2x2	IE TP Cord 4x2	IE Connecting Cable RJ45	IE Connecting Cable M12	Hybrid cable	Energy Cable	
													
			IE FC Standard Cable GP 4x2 (AWG22)	IE FC Standard Cable GP 4x2 (AWG24) IE FC Flexible Cable GP 4x2 (AWG24)	IE Train Cable GP 422 (AWG24)	IE FC TP Standard Cable GP 2x2 IE FC TP Flexible Cable GP 2x2 IE FC TP FRNC Cable GP 2x2 IE FC TP Trailing Cable GP 2x2 IE FC TP Trailing Cable 2x2 IE FC TP Festoon Cable GP 2x2 IE TP Torsion Cable 2x2 IE FC TP Food Cable GP 2x2 IE FC TP Marine Cable 2x2 IE Train Cable GP 2x2 IE Ground Cable 2x2	IE TP Cord 9/RJ45 IE TP XP Cord 9/RJ45 IE TP Cord 9-45/RJ45 IE TP XP Cord 9-45/RJ45 IE TP Cord RJ45/15 IE TP XP Cord RJ45/15 IE TP XP Cord 9/9	IE TP Cord RJ45/RJ45 IE TP XP Cord RJ45/RJ45	IE FC RJ45 PLUG-180/IE FC RJ45 PLUG-180	M12-180/M12-180 M12-180/IE FC RF45 PLUG-145	Hybrid cable 2x2 + 4x0,34	Hybrid cable 2x2 + 4x0,34	Energy Cable 5 x 1,5	
	IE FC RJ45 Modular Outlet		●					●			●		
	IE FC Outlet RJ45					●	●	●					
	IE FC RJ45 Plug 2x2					●							
	IE FC RJ45 Plug 4x2			●									
	M12-power and data connector	A-coded										●	
		2x2 D-coded				●							
		4x2 X-coded		●	●								
	IP67 hybrid connector										●		
	Devices with M12 connection						●			●			
	Devices with RJ45 connection						●	●	●				
	Power Plug PRO											●	
	7/8“ plug-in connector											●	
	IE FC RJ45 Plug PRO					●							

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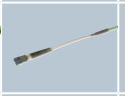
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Overview of passive network components

Overview (continued)

Options for connecting Industrial Ethernet cables with plugs, terminals or devices

Optical

	Fiber-optic cable 50/125/1400 µm	Fiber-optic cable 62.5/125 µm	PCF fiber optic cable 200/230 µm	Fiber-optic cable with BFOC connector	Fiber-optic cable with SC plug	POF-FOC 980/1000 µm	Fiber-optic cable with SC RJ plug	Fiber-optic cable with LC plug	Fiber-optic cable with FC plug	
										
	FO Standard Cable GP FO Trailing Cable FO Trailing Cable GP FO Ground Cable	FIBER OPTIC standard cable INDOOR Fiber Optic indoor cable Flexible Fiber Optic trailing cable SIENOPYR marine duplex fiber opticcable	PCF Standard Cable GP PCF Trailing Cable GP PCF Trailing Cable	Preassembled FOC with BFOC plug	Preassembled FOC with SC plug	POF Standard Cable GP POF Trailing Cable	Preassembled FOC with SC RJ plug	FO Robust Cable GP (4E9/125/900)	FO Robust Cable GP (50/125/900)	FO FC Standard Cable GP (62,5/200/230)	FO FC Trailing Cable (62,5/200/230)
 BFOC connector	●	●									
IE devices with BFOC connection				●							
 SC plug	●	●									
IE devices with SC connection					●						
 SC RJ plug			●			●					
IE devices with SC RJ connection							●				
 IE SC RJ POF Plug PRO						●					
 IE SC RJ PCF Plug PRO			●								
 Multimode FO LC Plug									●		
 Singlemode FO LC Plug								●			
 FO FC BFOC Plug										●	●
 FO FC SC Plug										●	●

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Overview

Structured cabling

- Structured cabling to ISO IEC 118011/EN 50173 describes the non-application-specific, tree-like cabling of building complexes for IT purposes. A site is subdivided into the following areas:
  - Primary area (connecting the buildings of a site)
  - Secondary area (connecting the floors of a building)
  - Tertiary area (IT connection of data terminals on a floor)

The structured cabling that can be achieved with the Industrial Ethernet FastConnect System corresponds to the structure of the tertiary cabling in accordance with EN 50173 for Ethernet.

FastConnect Twisted Pair (FC)

- For structured cabling in the production hall, the FastConnect Twisted Pair cabling system is ideal (RJ45 and M12 connections). With the fast installation system for Industrial Ethernet, structured cabling from the office environment not only becomes industry compatible for installation in the production hall;
- FastConnect cables can also be assembled extremely quickly and easily on site. The RJ45 cabling technique, an existing standard, is also available in an industry-standard version that supports structured cabling (patch cables, patch field, installation cables, connection socket, connecting cable).
- With the FastConnect plugs and FastConnect cables as an alternative to structured cabling, up to 100 m cable length can be achieved for a point-to-point link (requires less patch technology).

Benefits

- Extensive product range for flexible cabling in industry
- Faster connection of data terminals thanks to safe stripping of the outer sheath and braided shield in one step
- Easy connection method (insulation-piercing contacts) for 4-core (Cat5) and 8-core (Cat6) Industrial Ethernet FC Twisted Pair installation cables
- Easy assembly for all cable types with the preadjusted FC stripping tool
- Reliable shield contacting and strain relief

Application

	10/100 Mbit/s	10/100/1 000 Mbit/s
IE FC TP Cable 2x2	•	–
IE FC TP Cable 4x2	–	•
IE FC RJ45 Plug 2x2	•	–
IE FC M12 Plug PRO 2x2	•	–
IE FC RJ45 Plug 4x2	–	•
IE FC M12 Plug PRO 4x2	–	•
IE FC Outlet RJ45	•	–
IE FC RJ45 Modular Outlet	–	•
IE TP Cord	•[1]	•[2]
IE Connecting Cable	•	–

[1] All TP Cord types with a Sub D interface

[2] IE TP Cord RJ45/RJ45 and IE TP Cord XP

UL approvals

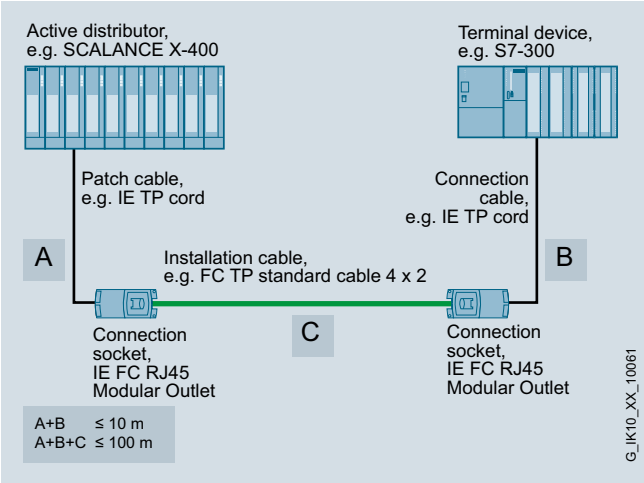
UL listing (safety standard) for network cables is especially necessary for the American and Canadian markets. The requirements for the appropriate approvals depend on where the cable is routed within the building. This applies to all cables which have to be routed from a machine to a remote control cabinet and are positioned on cable racks secured on the building. Cables with UL approval have "GP" (**G**eneral **P**urpose) added to their name.

Design

The FastConnect system comprises:

- **Industrial Ethernet FastConnect cables** specially designed for fast connection (UL and CAT5e certified) as FC TP Standard, FC TP Flexible, FC TP Trailing, TP Torsion, FC Ground Cable, FC Food Cable, FC FRNC Cable, FC Festoon Cable and FC TP Marine Cable.
- Easy stripping with the **FastConnect Stripping Tool**; the outer sheath and the braided shield are stripped accurately in one step
- The prepared cable is connected in the **FastConnect products** using the insulation displacement method.

Integration



Structured cabling according to EN 50173

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Industrial Ethernet FastConnect

Overview



- With the FastConnect (FC) system for Industrial Ethernet, structured cabling from the office environment becomes industry-compatible for installation in the production hall.
- Time-saving, error-free installation on-site
- RJ45 cabling technology is used as the permanent standard
- The ideal solution for assembly of RJ45 and M12 connectors in the field area with 4-core (2 x 2) Industrial Ethernet FC cables
- The ideal solution for assembly of the IE FC RJ45 Modular Outlet with 8-core (4 x 2) Industrial Ethernet FC cables
- Mistakes are prevented thanks to color coding and the transparent contact cover
- Coordinated system of FC plug-in connectors and an extensive FC cable spectrum with appropriate UL approvals

Benefits

get Designed for Industry

- Compliance with the Industrial Ethernet Standard PROFINET (PROFINET Cabling and Interconnection Technology Guideline[1])
- Faster connection of data terminals thanks to safe stripping of the outer sheath and braided shield in one step
- Reliable shield contact and strain relief thanks to bolt-on cover
- Excellent EMC shielding and deflection (metal housing)
- Mistakes are prevented thanks to color coding and the transparent contact cover

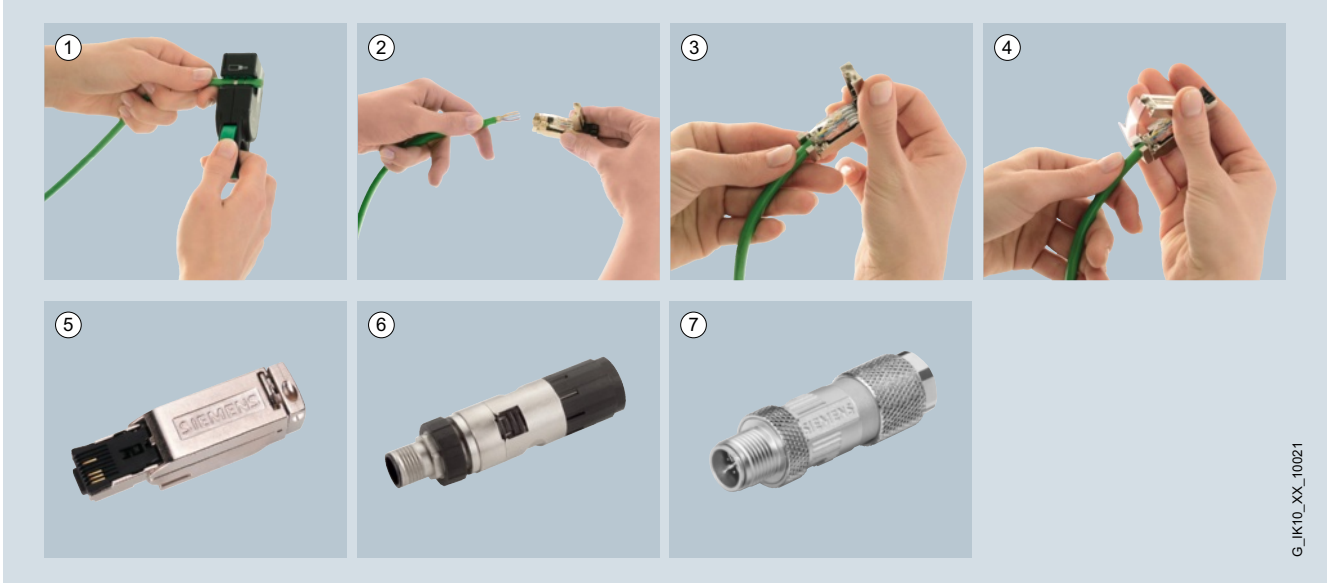
[1] Available as a download under www.profinet.com

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Application

Industrial Ethernet FastConnect is a quick-assembly system for easy assembly of 4-core and 8-core Industrial Ethernet FC cables.

After stripping, the IE FC cable can be directly mounted in the IE FC RJ45 Plug (4-core), the IE M12 Plug PRO 2x2 or 4x2, the IE FC Outlet RJ45 (4-core), or the IE RJ45 Modular Outlet (8-core).



Steps for assembly of Industrial Ethernet copper cables with Industrial Ethernet FastConnect

Design

The complete system:

- Industrial Ethernet FC installation cables designed for fast assembly; 4-core (2x2) Cat5e;
  - IE FC TP standard cable GP
  - IE FC TP flexible cable GP
  - IE FC TP trailing cable GP
  - IE FC TP Trailing Cable
  - IE TP Torsion Cable
  - IE FC TP Marine Cable
  - IE FC TP FRNC cable GP
  - IE FC TP Food Cable
  - IE FC TP festoon cable GP
  - IE TP Ground Cable
  - IE TP Train Cable
- 8-core (4 x 2) Cat6 certified, with appropriate UL approval:
  - IE FC TP Standard Cable GP (AWG 22/AWG 24)
  - IE FC TP Flexible Cable (AWG 24)
  - IE TP Train Cable (AWG 24)
- User-friendly stripping technique with FC Stripping Tool
- Noise-resistant FC RJ45 and FC M12 Plugs (10/100/1000 Mbit/s), an ideal solution for installation on 4 or 8-core IE FC cables at the field level thanks to the rugged metal enclosure
- The prepared cable is connected in the Industrial Ethernet FC Outlet RJ45 (10/100 Mbit/s; 4-core) or IE FC RJ45 Modular Outlet (10/100/1 000 Mbit/s; 8-core) using insulation displacement

Function

The FastConnect stripping technique supports fast and easy connection of the Industrial Ethernet FC cables

- IE FC RJ45 Plug (10/100/1 000 Mbit/s)
- IE FC M12 Plug PRO (10/100/1 000 Mbit/s)
- IE FC Outlet RJ45 (10/100 Mbit/s)
- IE FC RJ45 Modular Outlet (10/100/1 000 Mbit/s)

The data terminals and network components are connected using outlets via TP Cords.

The Industrial Ethernet FastConnect cables are specially designed for use of the Industrial Ethernet FastConnect Stripping Tool, with which the outer insulation and the braided shield can be stripped accurately in one step. The prepared cable is then connected using insulation displacement.

Approvals

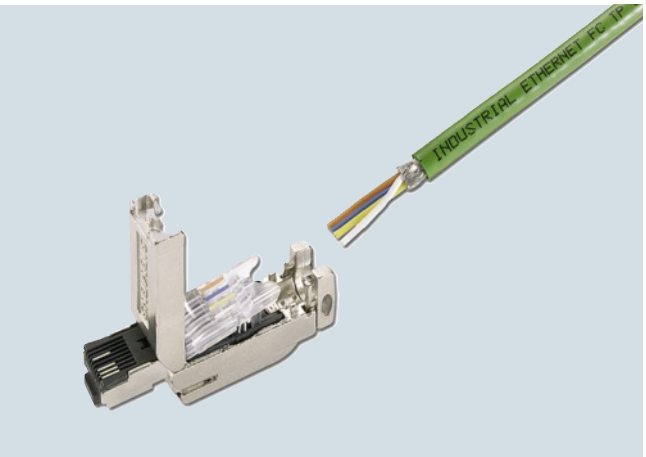
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The various connectors and cables from the FastConnect cabling system can also be used in hazardous areas (EX-Zone 2). No special approval is necessary.

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IE FC RJ45 Plug 2 x 2

Overview



- Implementation of direct device connections over distances of up to 100 m with Industrial Ethernet FC installation cable 2 x 2 without patching
- Easy connection (insulation displacement contacts) for 4-core Twisted Pair installation cables (100 Mbit/s) without the need for special tools
- Error-preventing connection technique thanks to visible connection area as well as colored blade terminals
- Industry-compatible design (rugged metal housing, no easily lost small parts)
- Excellent EMC shielding and deflection (metal housing)
- Integrated strain-relief for installation cables
- Compatible to the EN 50173 (RJ45) / ISO IEC 11801 standard
- Additional strain and bending relief of plug connector possible through latching of plug on device housing, e.g. with SCALANCE X, SCALANCE S, ET 200S.

Benefits

get Designed for Industry

- Ideal solution for installing RJ45 plug-in connectors in the field level
- Time-saving, error-free installation using the FastConnect system
- RJ45 plug-in connector is resistant to interference thanks to the rugged metal housing
- Reliable shield attachment and strain relief are integrated
- Mistakes are prevented thanks to color coding and the transparent contact cover
- A compatible system of Industrial Ethernet FastConnect plug-in connectors and a comprehensive range of FastConnect cables with the appropriate UL approvals and PROFINET compatibility

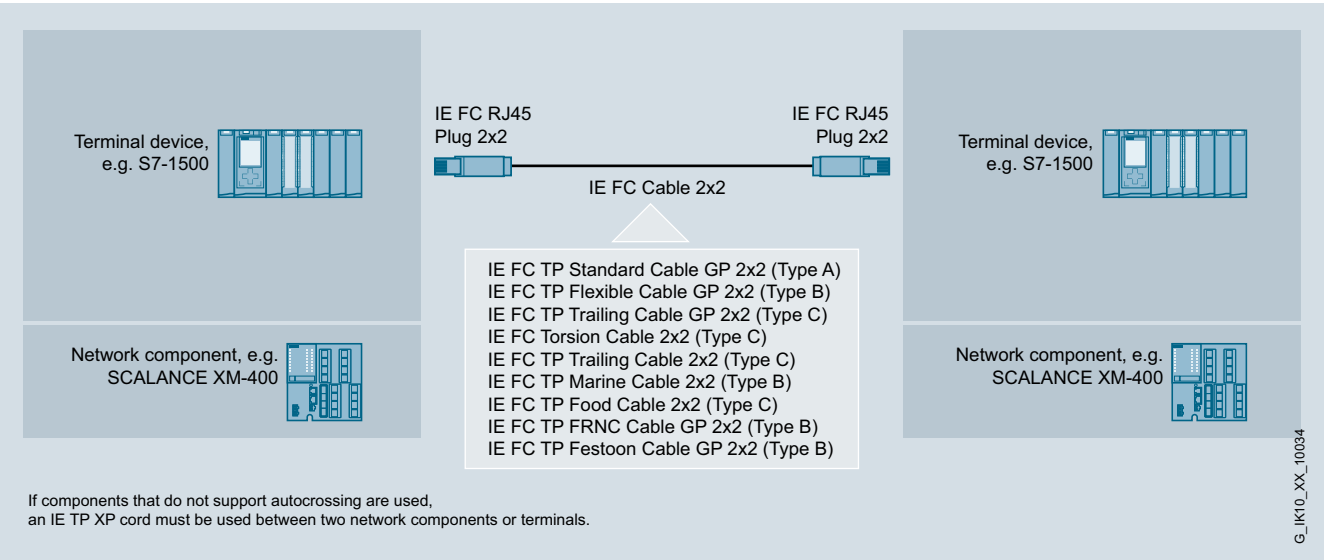
Application

The compact, rugged design of the connectors makes the FC RJ45 Plug suitable for use in both industrial environments and on office equipment.

The Industrial Ethernet FastConnect RJ45 Plugs 2 x 2 permit quick and easy installation of the Industrial Ethernet FastConnect installation cables 2 x 2 (4-core twisted pair cables) in the field.

The Industrial Ethernet FastConnect Stripping Tool for preparing the end of a cable (stripping the jacket and shield in one step) allows simple handling and fast, reliable fitting of the cable connector to the cable. As all the cable connector parts are captive, it can also be fitted in difficult conditions.

The plug-in connectors enable point-to-point links to be implemented (100 Mbit/s) for Industrial Ethernet between two data terminals/network components up to 100 m without the need for patches.



Use of FastConnect cables 2 x 2 with IE FC RJ45 Plug 2 x 2

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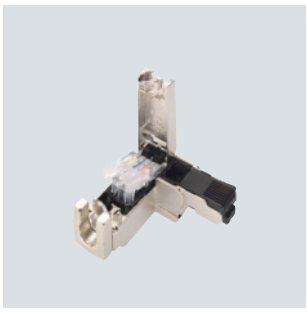
Design

Industrial Ethernet FC RJ45 Plugs are available in three designs:

- With 180° (straight) cable outlet
- With 145° (angled) cable outlet (SIMOTION and SINAMICS, for example)
- With 90° (angled) cable outlet (for ET 200S, for example)







They are used for optimized connection of Industrial Ethernet FastConnect cables to data terminals and network components. The plugs have a rugged, industry-compatible metal housing that provides optimum protection against faults in data communication.

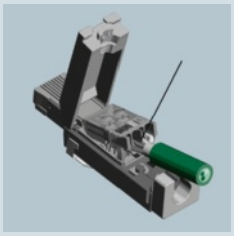
The 4 integrated insulation displacement contacts make contacting of the FC cable variants easy and error-free.

After the stripped cable end has been inserted into the insulation displacement terminations (which have been hinged open), the latter are pressed down for reliable contacting of the conductors.

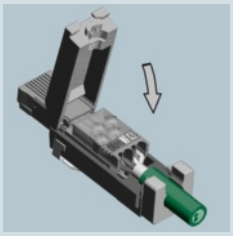
Thanks to their compactness, the plug-in connectors (IE FC Plug 180°) can be used on devices with individual sockets and on devices with multiple sockets (blocks).

① 

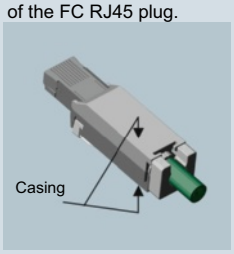
Strip the IE FC cable 2x2 using stripping tool and fan out the wires according to color coding on the contact cover of the FC RJ45 plug.

② 

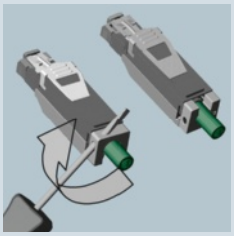
Open casing of the FC RJ45 plug and insert wires according to color coding as far as the end stop.

③ 

Press down contact cover to make contact with the wires.

④ 

Close casing cover and press together with lower connector casing.

⑤ 

Using a screwdriver, turn locking ring through 90° to ensure that cable is gripped tightly.

G_IK10_XX_30026

Data terminals with a suitable bracket on the housing provide additional tension and bending relief for the plug-in cable.

Function

The IE FC RJ45 Plugs are used to install uncrossed 100 Mbit/s Ethernet connections up to 100 m without the use of patches. Crossed cables can also be installed by swapping the transmit and receive pair in a plug.

When the housing is open, color markings on the contact cover make it easier to connect the cores to the blade terminals. The user can check that contact has been made correctly through the transparent plastic material of the contact cover.

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IE FC RJ45 Plug 2 x 2

Technical specifications

Article No.	6GK1901-1BB20-2AA0	6GK1901-1BB10-2AA0	6GK1901-1BB30-0AA0
Product-type designation	**IE FC RJ45 Plug 90 (2x2)**	**IE FC RJ45 Plug 180 (2x2)**	**IE FC RJ45 Plug 145 (2x2)**
Product description	RJ45 data plug-in connector	RJ45 data plug-in connector	RJ45 data plug-in connector
Acceptability for application	For connection to IE FC TP cables 2x2, suitable for fast assembly with the FastConnect system	For connection to IE FC TP cables 2x2, suitable for fast assembly with the FastConnect system	For connection to IE FC TP cables 2x2, suitable for fast assembly with the FastConnect system
Transmission rate			
Transfer rate			
• 1 for Industrial Ethernet	10 Mbit/s	10 Mbit/s	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s	100 Mbit/s	100 Mbit/s
• 3 for Industrial Ethernet	-	-	-
Interfaces			
Number of electrical connections for Industrial Ethernet FC TP cables	4	4	4
Design of the electrical connection			
• for Industrial Ethernet FC TP cables	integrated cut-and-clamp contacts for 4-wire TP FC installation cable	integrated cut-and-clamp contacts for 4-wire TP FC installation cable	integrated cut-and-clamp contacts for 4-wire TP FC installation cable
• for network components and terminal equipment	RJ45 connector	RJ45 connector	RJ45 connector
• FastConnect	Yes	Yes	Yes
Mechanical data			
Material of the enclosure	metal	metal	metal
Design, dimensions and weight			
Type of cable outlet	90 degree cable outlet	180 degree cable outlet	145 degree cable outlet
Width	13.7 mm	13.7 mm	13.9 mm
Height	16 mm	16 mm	16 mm
Depth	42 mm	55 mm	55.6 mm
Net weight	35 g	35 g	35 g
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Chemical resistance to water	-	-	-
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes
• UL-registration	Yes	Yes	Yes
Standard for structured cabling	Cat5	Cat5	Cat5

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Ordering data	Article No.
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180	
180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 90	
90° cable outlet; e.g. for ET 200S	
• 1 pack = 1 unit	**6GK1901-1BB20-2AA0**
• 1 pack = 10 units	**6GK1901-1BB20-2AB0**
• 1 pack = 50 units	**6GK1901-1BB20-2AE0**
IE FC RJ45 Plug 145	
145° cable outlet; e.g. for SIMOTION and SINAMICS	
• 1 pack = 1 unit	**6GK1901-1BB30-0AA0**
• 1 pack = 10 units	**6GK1901-1BB30-0AB0**
• 1 pack = 50 units	**6GK1901-1BB30-0AE0**
IE FC stripping tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
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 1 000 m; minimum order 20 m	**6XV1840-2AH10**
Preferred length	
• 1 000 m	**6XV1840-2AU10**
IE FC TP Flexible Cable GP 2 x 2 (Type B)	**6XV1870-2B**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Trailing Cable GP 2 x 2 (Type C)	**6XV1870-2D**
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 1 000 m, minimum order 20 m	
IE FC TP Trailing Cable 2 x 2 (Type C)	**6XV1840-3AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use in trailing cables; PROFINET-compatible; without UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE TP Torsion Cable GP 2 x 2 (Type C)	**6XV1870-2F**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use with robots; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Marine Cable 2 x 2 (Type B)	**6XV1840-4AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90; marine approval; max. length 1 000 m, minimum order 20 m	
IE FC TP FRNC Cable GP 2 x 2 (Type B)	**6XV1871-2F**
4-core, shielded, halogen-free TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	

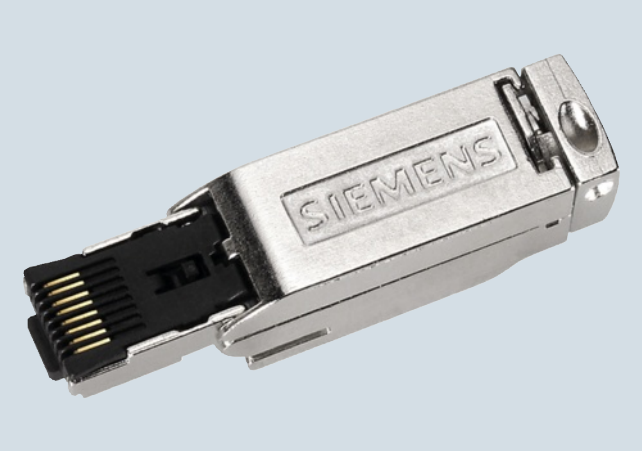
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IE FC RJ45 Plug 2 x 2

Ordering data	Article No.
IE FC TP Festoon Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 for use in festoon applications; PROFINET-compatible; with UL approv al; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2S**
IE FC TP Food Cable GP 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for the food and beverages industry; PROFINET-compliant; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2L**
IE TP ground cable 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 (after removal of additional outer sheath) for laying in soil; PROFINET-compliant; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2G**
IE TP train cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 for railway applications; PROFINET-compliant; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2T**
IE FC Blade Cassettes (5 mm) Replacement blade cassette for the Industrial Ethernet stripping tool; for use with IE FC RJ45 Plugs and Modular Outlet, 5 items	**6GK1901-1GB01**

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Overview



- Implementation of direct device connections of up to 90 m with Industrial Ethernet FC installation cable 4 x 2 without using patch technology
- Easy connection (insulation displacement contacts) for 8-core twisted pair installation cables (10/100/1000 Mbit/s) without the need for special tools
- Error-minimizing connection technique thanks to visible connection area as well as colored insulation displacement termination
- Industry-compatible design (rugged metal housing, no easily lost small parts)
- Excellent EMC shielding and deflection (metal housing)
- Integrated strain-relief for installation cables
- Compatible with the EN 50173 (RJ45) / ISO IEC 11801 standard
- Additional strain and bending relief of plug connector possible through latching of plug on device housing, e.g. with SCALANCE X, SCALANCE S.

Benefits

get Designed for Industry

- Ideal solution for installation of RJ45 plugs in the field
- Time-saving, error-free installation due to FastConnect system
- Noise-resistant RJ45 plug connector due to rugged metal housing
- Reliable shield attachment and strain relief are integrated
- Mistakes are prevented thanks to color coding and the transparent contact cover
- Coordinated system comprising Industrial Ethernet FastConnect plug-in connectors and an extensive range of FastConnect cables with corresponding UL approvals

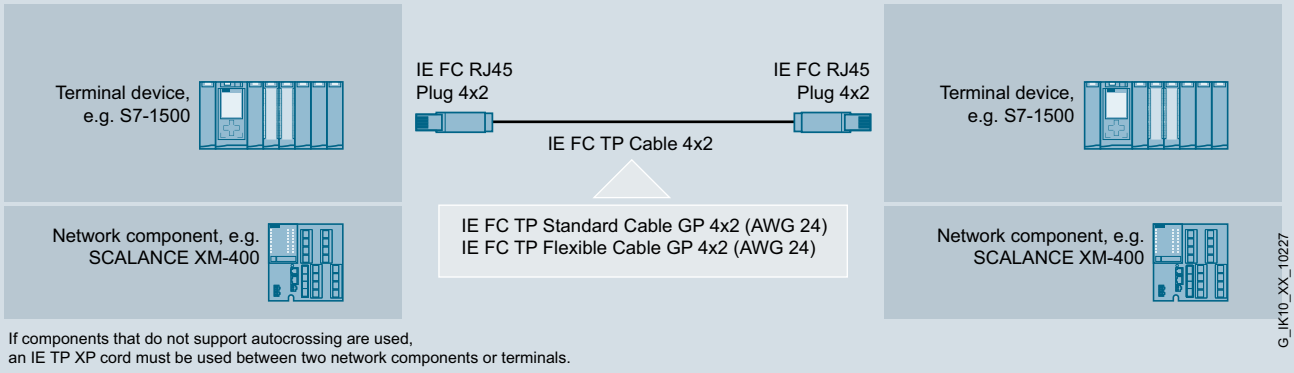
Application

The compact, rugged design of the connectors makes the FC RJ45 Plug suitable for use in both industrial environments and on office equipment.

The Industrial Ethernet FastConnect RJ45 Plug 4 x 2 permits quick and easy installation of the Industrial Ethernet FastConnect installation cables 2 x 4 (8-core twisted pair cables) in the field.

The Industrial Ethernet FastConnect Stripping Tool for preparing the end of a cable (stripping the jacket and shield in one step) allows simple handling and fast, reliable fitting of the cable connector to the cable. As all the cable connector parts are captive, it can also be fitted in difficult conditions.

The new plug-in connector enables point-to-point links to be implemented (10/100/1000 Mbit/s) for Industrial Ethernet between two data terminals/network components up to 90 m apart without the need for patches.



Use of FastConnect cables 4 x 2 with IE FC RJ45 plug 4 x 2

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IE FC RJ45 Plug 4 x 2

Design

The Industrial Ethernet FC RJ45 Plug 4 x 2 is available with a 180° (straight) cable outlet.

It is the ideal method of connecting an Industrial Ethernet FastConnect cable to data terminals and network components. The plug has a rugged, industry-compatible metal housing that provides optimum protection against faults in data communication.

The eight integrated insulation displacement contacts make contacting of the FC cable variants 4 x 2 and 2 x 2 easy and error-free. After the stripped cable end has been inserted in the insulation displacement terminals, the conductors make contact when the casing is closed.

Owing to their compact size, the plug connectors can be used both on devices with individual jacks and on devices with multiple jacks (blocks).

Data terminals with a suitable bracket on the housing provide additional tension and bending relief for the plug-in cable.

Function

The IE FC RJ45 Plug 4 x 2 is used to install uncrossed 10/100/1000 Mbit/s Ethernet connections up to 90 m without the use of patches. Crossed cables can also be installed by swapping the transmit and receive pair in a plug.

With the casing open, colored markers on the contact element make it simple to connect the cores to the insulation displacement contacts. The transparent synthetic material of the contact element allows users to check the contacts themselves.

Technical specifications

Article No.	**6GK1901-1BB11-2AA0**
Product-type designation	**IE FC RJ45 Plug 180 (4x2)**
Product description	RJ45 data plug-in connector
Acceptability for application	For connection to IE FC TP cables 4x2, suitable for fast assembly with the FastConnect system
Transmission rate	
Transfer rate	
• 1 for Industrial Ethernet	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s
• 3 for Industrial Ethernet	1 000 Mbit/s
Interfaces	
Number of electrical connections for Industrial Ethernet FC TP cables	8
Design of electrical connection	
• for Industrial Ethernet FC TP cables	integrated cut-and-clamp contacts for 8-wire TP FC installation cable
• for network components and terminal equipment	RJ45 connector
• FastConnect	Yes
Mechanical data	
Material of the enclosure	metal
Design, dimensions and weight	
Type of cable outlet	180 degree cable outlet
Width	13.7 mm
Height	16 mm
Depth	55 mm
Net weight	35 g
Permitted ambient conditions	
Ambient temperature	
• during operating	-40 … +85 °C
• during storage	-40 … +85 °C
• during transport	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Chemical resistance to water	-
Product properties, functions, components general	
Product feature silicon-free	Yes
Product component strain relief	Yes
Standards, specifications, approvals	
Verification of suitability	
• RoHS conformity	Yes
• UL-registration	Yes
Standard for structured cabling	Cat6

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Ordering data

	Article No.
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbit/s) with a rugged metal housing 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
IE FC stripping tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	

	Article No.
IE FC TP Standard Cable GP 4 x 2	
8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
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 1 000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2B**
IE FC blade cassettes (5 mm)	**6GK1901-1GB01**
Replacement blade cassette for the Industrial Ethernet stripping tool; for use with IE FC RJ45 Plugs and Modular Outlet, 5 units	

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IE Push Pull Plug PRO

Overview



- Data plug-in connectors suitable for on-site assembly for IE FC TP and POF/PCF cables for transmitting data up to 100 Mbit/s
- Power plug-in connector suitable for on-site assembly for transmitting 2 x 24 V between Industrial Ethernet stations
- Degree of protection IP65/67
- The plug-in connectors make contact using a push-pull mechanism.

IE FC RJ45 Plug PRO / IE RJ45 Plug PRO

- FastConnect Industrial Ethernet RJ45 plug-in connector suitable for on-site assembly for SCALANCE X-200IRT PRO switches, ET 200pro and SIMATIC RF systems
- Easy connection (insulation displacement contacts) for 4-core twisted pair installation cables (100 Mbit/s) with or without FastConnect quick-assembly system, without the need for special tools
- Industrial design (rugged plastic housing)
- Good EMC shielding and discharge

IE SC RJ Plug PRO

- Industrial Ethernet SC RJ plug-in connector suitable for on-site assembly of:
  - POF cables for SCALANCE X-200IRT PRO and SIMATIC ET 200pro switches
  - PCF cables for SCALANCE X-200IRT PRO switches
- Industrial design (rugged plastic housing)

Power Plug PRO

- 5-pin power plug-in connector suitable for on-site assembly, for 2 x 24 V voltage supply of the SCALANCE X-200IRT PRO switches, SIMATIC ET 200pro and SIMATIC RF systems

Benefits

get Designed for Industry

- Simple and flexible assembly on site for application-specific plug-in cables through data and power plug-in connectors suitable for on-site assembly in degree of protection IP65/67

Application

IE FC RJ45 Plug PRO and IE SC RJ Plug PRO (POF or PCF) are plug-in connectors with push pull device connection that thanks to their high degree of protection (IP65/67) are used outside cabinets along with suitable end devices and network components with a high degree of protection. Their silicon-free design enables them to also be used in the automobile industry, e.g. in paint shops.

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Technical specifications

Article No.	**6GK1901-1BB20-6AA0**	**6GK1901-1BB10-6AA0**
Product-type designation	**IE FC RJ45 Plug PRO (Push Pull)**	**IE RJ45 Plug PRO (Push Pull)**
Product description	RJ45 data plug-in connector	RJ45 data plug-in connector
Acceptability for application	Field-assembly connector for push-pull device connection in high degree of protection	Field-assembly connector for push-pull device connection in high degree of protection
Transmission rate		
Transfer rate		
• 1 for Industrial Ethernet	10 Mbit/s	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s	100 Mbit/s
Interfaces		
Number of electrical connections		
• for Industrial Ethernet FC TP cables	4	4
• for network components and terminal equipment	1	1
Design of electrical connection		
• for Industrial Ethernet FC TP cables	integrated cut-and-clamp contacts for 4-wire TP FC installation cable	integrated cut-and-clamp contacts for 4-wire TP FC installation cable
• for network components and terminal equipment	RJ45 connector (Push Pull device connection)	RJ45 connector (Push Pull device connection)
Number of optical interfaces for optical waveguide	-	-
Design of optical connections for network components or terminal devices	-	-
Design of the electrical connection FastConnect	Yes	No
Mechanical data		
Material of the enclosure	plastic	plastic
Design, dimensions and weight		
Type of cable outlet	180 degree cable outlet	180 degree cable outlet
Width	22 mm	22 mm
Height	29 mm	30 mm
Depth	73 mm	67.7 mm
Net weight	68.8 g	68.8 g
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	-	-
Protection class IP	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant
Product properties, functions, components general		
Product feature silicon-free	Yes	Yes
Product component strain relief	Yes	Yes
Standards, specifications, approvals		
Verification of suitability		
• RoHS conformity	Yes	Yes
• UL-registration	Yes	Yes

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2

Technical specifications (continued)

Article No.	6GK1900-0MB00-6AA0	6GK1900-0NB00-6AA0	6GK1907-0AB10-6AA0
Product-type designation	**IE SC RJ POF Plug PRO (Push Pull)**	**IE SC RJ PCF Plug PRO (Push Pull)**	**Power Plug PRO (Push Pull)**
Product description	SC RJ plug-in connector for POF fiber-optic cables	SC RJ plug-in connector for PCF fiber-optic cables	Power plug-in connector, 5-pole
Acceptability for application	Field-assembly connector for push-pull device connection in high degree of protection	Field-assembly connector for push-pull device connection in high degree of protection	Field-assembly connector for push-pull device connection in high degree of protection, for voltage supply with 2 x 24 V DC
Transmission rate			
Transfer rate			
• 1 for Industrial Ethernet	100 Mbit/s	100 Mbit/s	-
• 2 for Industrial Ethernet	-	-	-
Interfaces			
Number of electrical connections			
• for Industrial Ethernet FC TP cables	-	-	-
• for network components and terminal equipment	-	-	1
Design of electrical connection			
• for Industrial Ethernet FC TP cables	-	-	-
• for network components and terminal equipment	-	-	Power contacts (Push Pull casing)
Number of optical interfaces for optical waveguide	1	1	-
Design of optical connections for network components or terminal devices	SC RJ connector (Push Pull device connection)	SC RJ connector (Push Pull device connection)	-
Design of the electrical connection FastConnect	No	No	No
Mechanical data			
Material of the enclosure	plastic	plastic	plastic
Design, dimensions and weight			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Width	22 mm	22 mm	36 mm
Height	30 mm	30 mm	30 mm
Depth	62.5 mm	62.5 mm	66.3 mm
Net weight	63.5 g	63.5 g	83.1 g
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °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 maximum	-	-	-
Protection class IP	IP65/67	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant	resistant
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes
• UL-registration	No	No	Yes

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Ordering data

	Article No.
IE FC RJ45 Plug PRO FastConnect RJ45 plug-in connector suitable for on-site assembly in degree of protection IP65/67; plastic enclosure, insulation displacement technology, for SCALANCE X-200IRT PRO and SIMATIC ET 200pro switches; 1 package = 1 unit	**6GK1901-1BB20-6AA0**
IE RJ45 Plug PRO RJ45 plug-in connector suitable for on-site assembly in degree of protection IP65/67; plastic enclosure, insulation displacement technology, for SCALANCE X-200IRT PRO and SIMATIC ET 200pro switches; 1 package = 1 unit	**6GK1901-1BB10-6AA0**
IE SC RJ POF Plug PRO SC RJ plug-in connector suitable for on-site assembly in degree of protection IP65/67 for POF fiber optic cables; plastic housing, for SCALANCE X-200IRT PRO and SIMATIC ET 200pro switches; 1 package = 1 unit	**6GK1900-0MB00-6AA0**
IE SC RJ POF Plug PRO SC RJ plug-in connector suitable for on-site assembly in degree of protection IP65/67 for PCF fiber optic cables; plastic housing, for SCALANCE X-200IRT PRO switches; 1 package = 1 unit	**6GK1900-0NB00-6AA0**
Power Plug PRO 5-pole power plug-in connector suitable for on-site assembly in degree of protection IP65/67 for 2 x 24 V voltage supply; plastic housing, for SCALANCE X-200IRT PRO and SIMATIC ET 200pro switches; 1 package = 1 unit	**6GK1907-0AB10-6AA0**
IE FC TP cables	
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 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC TP Flexible Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2B**
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 as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2D**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-3AH10**
IE TP Torsion Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use with robots; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2F**
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90; marine approval; max. length 1 000 m, minimum order 20 m	**6XV1840-4AH10**
IE FC TP Food Cable GP 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for the food and beverages industry; PROFINET-compatible; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2L**
IE FC TP Festoon Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use in festoon applications; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2S**
IE FC TP FRNC Cable GP 2 x 2 (Type B) 4-core, shielded, halogen-free TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2F**

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IE Push Pull Plug PRO

Ordering data

	Article No.
FO cables	
POF Standard Cable GP 980/1000 POF standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	**6XV1874-2A**
POF Trailing Cable 980/1000 POF trailing cable for use in cable carriers, with rugged PUR sheath; sold by the meter Delivery unit max. 1 000 m; minimum order 20 m	**6XV1874-2B**
PCF Standard Cable GP 200/230 Standard cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m	**6XV1861-2A**
PCF Trailing Cable 200/230 Trailing cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m	**6XV1861-2C**
POF Trailing Cable GP 200/230 Trailing cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m	**6XV1861-2D**

	Article No.
Power cables	
Energy Cable 5 x 1.5 Trailable power cable with 5 copper cores (1.5 mm^2) for connecting to 7/8" plug-in connectors; sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1830-8AH10**
Pre-assembled cables	
SIMATIC RF600 connecting cable Preassembled connecting cable (10 m) with RJ45 Plug PRO and RJ45 Plug	**6GT2891-1HN10**
PROFINET Cabling and Interconnection Technology Guideline	http://www.profinet.com

More information

Note:

Supplementary components for the SIMATIC NET cable range can be ordered from your local contact person.
Technical advice on this subject is available from:
J. Hertlein
I IA SC CI PRM 4
Phone: +49 (911) 750-4465
E-mail: juergen.hertlein@siemens.com

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Overview



FastConnect (FC) plug-in connectors that can be assembled in the field for transmission of data (up to 1000 Mbit/s) between Industrial Ethernet nodes with IP65/IP67 degree of protection

Industrial Ethernet FC M12 Plug PRO (D coded)

- Industrial Ethernet M12 plug-in connector with FastConnect connection system for on-site assembly for SCALANCE X208PRO, IM 154-4 PN and SIMATIC RF systems
- Easy connection (insulation displacement contacts) for 4-core twisted pair FC installation cables (10/100 Mbit/s) without the need for special tools
- Fault-preventing connection method thanks to visible contacting area and color-coded insulation piercing connecting devices
- Industry-compatible design (rugged metal enclosure)
- Excellent EMC shielding and deflection (metal enclosure)
- Integrated strain-relief for installation cables

Industrial Ethernet FC M12 Plug PRO 4 x 2 (X-coded)

- Industrial Ethernet M12 plug connectors, which can be assembled in the field, for on-site installation for SCALANCE W
- Easy connection (insulation displacement contacts) for 8-core twisted pair FC installation cables (10/100/1000 Mbit/s) without the need for special tools
- Fault-preventing connection method thanks to visible contacting area and color-coded insulation piercing connecting devices
- Industry-compatible design (rugged metal enclosure)
- Excellent EMC shielding and deflection (metal enclosure)
- Integrated strain-relief for installation cables

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Overview (continued)



Control cabinet feedthrough IE Panel Feedthrough and IE Panel Feedthrough PRO

Industrial Ethernet panel feedthrough

- Control cabinet feedthrough for conversion from M12 connection method (D coded, IP65/IP67) to RJ45 connection method (IP20)

Industrial Ethernet panel feedthrough PRO

- Coupling of M12 plug-in connectors (D-coded, IP65/IP67); can be used as cabinet bushing or for connecting two M12 plug-in connectors outside the control cabinet

Benefits

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- Easy installation on-site for application-specific M12 plug-in cables by means of FastConnect M12 plug-in connectors (IE FC M12 Plug PRO, D-coded, and IE M12 Plug PRO 4x2, X-coded), which can be assembled in the field
- Simple assembly of adapter cables for the transition from IP65/67 degree of protection into the IP20 area within the same control cabinet by connecting the IE FC M12 Plug PRO and IE FC RJ45 Plug 2x2
- Reliable screen contact and strain relief are integrated
- Harmonized system made up of Industrial Ethernet FastConnect plug-in connectors and an extensive range of FastConnect cables with corresponding UL approvals and PROFINET conformity

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Technical specifications

Article No.	**6GK1901-0DB20-6AA0**	**6GK1901-0DB30-6AA0**
Product-type designation	**IE FC M12 Plug PRO (PROFINET)**	**IE FC M12 Plug PRO (PROFINET)**
Product description	M12 plug-in connector, high degree of protection, 4-pole, D-coded	M12 plug-in connector, high degree of protection, 8-pole, X-coded
Acceptability for application	For connecting electrical cables to SCALANCE X208PRO, ET200 PRO PN or ET200 eco PN for fast assembly with the FastConnect system	For connecting electrical cables to SCALANCE W (M12 gigabit interface) for fast assembly with the FastConnect system
Transmission rate		
Transfer rate		
• 1 for Industrial Ethernet	10 Mbit/s	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s	100 Mbit/s
• 3 for Industrial Ethernet	-	1 000 Mbit/s
Interfaces		
Number of electrical connections for Industrial Ethernet FC TP cables	4	8
Design of the electrical connection		
• for Industrial Ethernet FC TP cables	integrated cut-and-clamp contacts for 4-wire TP FC installation cable	integrated cut-and-clamp contacts for 8-wire TP FC installation cable
• for network components and terminal equipment	M12 connector (D-coded)	M12 connector (X-coded)
• FastConnect	Yes	Yes
Mechanical data		
Material of the enclosure	metal	metal
Design, dimensions and weight		
Type of cable outlet	180 degree cable outlet	180 degree cable outlet
Width	19 mm	16 mm
Height	19 mm	16 mm
Depth	73 mm	53 mm
Net weight	40 g	40 g
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	-
Protection class IP	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant
Product properties, functions, components general		
Product feature silicon-free	Yes	Yes
Product component strain relief	Yes	Yes
Standards, specifications, approvals		
Verification of suitability		
• RoHS conformity	Yes	Yes
• UL-registration	Yes	No
Standard for structured cabling	Cat5	Cat5

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Technical specifications (continued)

Article No.	6GK1901-0DM20-2AA5	6GK1901-0DM30-2AA5
Product-type designation	**IE M12 Panel Feedthrough**	**IE M12 Panel Feedthrough PRO**
Product description	M12 panel feedthrough (D-coded) / RJ45	M12/M12 coupler (D-coded)
Acceptability for application	Panel feedthrough for conversion from M12 connection method (D-coded, IP65/IP67) to RJ45 connection method (IP20)	M12/M12 coupler and panel feedthrough (D-coded)
Transmission rate		
Transfer rate		
• 1 for Industrial Ethernet	10 Mbit/s	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s	100 Mbit/s
• 3 for Industrial Ethernet	-	-
Interfaces		
Number of electrical connections for Industrial Ethernet FC TP cables	-	-
Design of electrical connection		
• for Industrial Ethernet FC TP cables	-	-
• for network components and terminal equipment	M12 socket (D-coded) and RJ45	2 x M12 socket (D-coded)
• FastConnect	No	No
Mechanical data		
Material of the enclosure	plastic	metal
Design, dimensions and weight		
Type of cable outlet	90 degree cable outlet	180 degree cable outlet
Width	24 mm	35.6 mm
Height	45 mm	22.6 mm
Depth	35.4 mm	44.5 mm
Net weight	0.04 kg	0.036 kg
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 70 °C	-5 … +60 °C
• during storage	0 … 70 °C	-5 … +60 °C
• during transport	0 … 70 °C	-5 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	-	-
Protection class IP	IP65/67 (M12) / IP20 (RJ45)	IP65/67 (M12) / IP65/67 (M12)
Chemical resistance to water	-	resistant
Product properties, functions, components general		
Product feature silicon-free	Yes	Yes
Product component strain relief	Yes	Yes
Standards, specifications, approvals		
Verification of suitability		
• RoHS conformity	Yes	Yes
• UL-registration	Yes	No
Standard for structured cabling	Cat5	Cat5

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Ordering data

	Article No.
IE FC M12 Plug PRO 2 x 2	
M12 plug-in connector (D-coded, IP65/IP67) that can be assembled in the field, metal enclosure, FastConnect connection method, for SCALANCE X208PRO and IM 154-4 PN	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 unit	**6GK1901-0DB20-6AA8**
IE FC M12 Plug PRO 4 x 2	
M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
IE panel feedthrough	
Control cabinet feedthrough for conversion from M12 connection method (D coded, IP65/IP67) to RJ45 connection method (IP20)	
• 1 pack = 5 units	**6GK1901-0DM20-2AA5**
IE panel feedthrough PRO	
Coupling of M12 plug-in connectors (D-coded, IP65/IP67); can be used as cabinet bushing or for connecting two M12 plug-in connectors outside the control cabinet	
• 1 pack = 5 units	**6GK1901-0DM30-2AA5**
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
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 1 000 m, minimum order 20 m	
Preferred length	
• 1 000 m	**6XV1840-2AU10**
IE FC TP Flexible Cable GP 2 x 2 (Type B)	**6XV1870-2B**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Trailing Cable 2 x 2 (Type C)	**6XV1840-3AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use in trailing cables; PROFINET-compatible; without UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE TP Torsion Cable GP 2 x 2 (Type C)	**6XV1870-2F**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use with robots; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order length 20 m	
IE FC TP Marine Cable 2 x 2 (Type B)	**6XV1840-4AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90; marine approval; max. length 1 000 m, minimum order 20 m	
IE FC TP Trailing Cable GP 2 x 2 (Type C)	**6XV1870-2D**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Festoon Cable GP 2 x 2 (Type B)	**6XV1871-2S**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use in festoon applications; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Food Cable GP 2 x 2 (Type C)	**6XV1871-2L**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 for the food and beverages industry; PROFINET-compatible; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP FRNC cable GP 2x2 (Type B)	**6XV1871-2F**
4-core, shielded, halogen-free TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	

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IE FC M12 Plug PRO

Ordering data	Article No.
IE TP train cable GP 2x2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 with railways approval; PROFINET-compliant; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2T**
IE FC Standard Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4x2 and IE M12 Plug PRO 4x2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1878-2A**
IE FC Flexible Cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC RJ45 Plug 4x2 and IE M12 Plug PRO 4x2 for occasional movement; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1878-2B**
IE train cable GP 4x2 8-core, shielded TP installation cable for connection to IE FC M12 plug PRO 4x2 for use in railway applications; with railway; sold by the meter; max length 1 000 m, minimum order 20 m	**6XV1878-2T**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC blade cassettes (5 mm) Replacement blade cassette for the Industrial Ethernet stripping tool; for use with IE FC RJ45 Plugs and IE FC RJ45 Modular Outlet, 5 units	**6GK1901-1GB01**
PROFINET Cabling and Interconnection Technology Guideline	http://www.profinet.com

More information

Note:

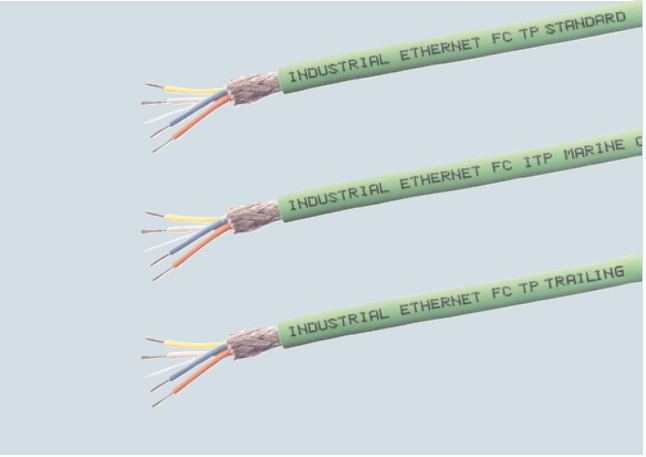
You can order components supplementary to the SIMATIC NET cabling range from your local contact.

Technical advice on this subject is available from:

J. Hertlein
I IA SC CI PRM 4
Phone: +49 (911) 750-4465
E-mail: juergen.hertlein@siemens.com

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Overview



- 4-core FastConnect installation cables for structured Fast Ethernet cabling with special design for fast installation
- Easy stripping with the FastConnect Stripping Tool; the outer sheath and the braided shield are stripped accurately in one step
- Connection to FastConnect products using insulation displacement
- Exceeds Category 5 (Cat5e) of the international cabling standards ISO/IEC 11801 and EN 50173
- PROFINET-compatible
- UL approval
- Different versions for different fields of application (e.g. trailing, food, marine, railways)
- High interference immunity thanks to double shielding
- Easy length measurement thanks to printed meter markings

Benefits

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- Time-saving due to simple and quick assembly with FastConnect cables 2 x 2 to Industrial Ethernet FC Outlet RJ45 (10/100 Mbit/s), Industrial Ethernet FC RJ45 Plug 180/145/90, or IE FC M12 Plug PRO 2x2
- Versatile application due to special bus cables
- Network is immune to interference thanks to double shielded cables and a uniform grounding concept
- Silicone-free, therefore suitable for use in the automotive industry (for example on paint lines)

Application

For the construction of Industrial Ethernet networks (4-core), different cable types are offered to suit the different types of application.

In general, the listed Industrial Ethernet FC cables IE FC Cable 2 x 2 must be used.

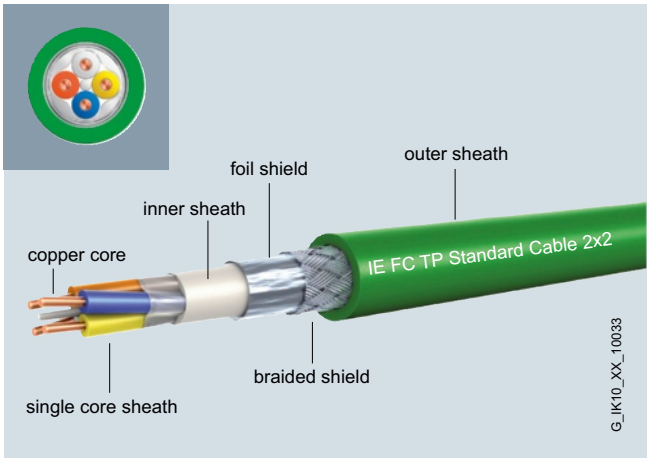
Note:

You will find other specifications of the network topology in the manual for TP and fiber optic networks and in the Industrial Ethernet/PROFINET system manual.

UL approvals

Different cable variants are offered with appropriate UL/ETL approvals for laying in cable bundles and cable racks according to the specifications of NEC (National Electrical Code) Article 800/725. These are identified as GP (General Purpose).

Design



The FastConnect (FC) Industrial Ethernet cables IE FC Cable 2 x 2 are designed with radial symmetry and therefore allow the use of the FC Stripping Tool The IE FC Outlet RJ45 and the IE FC Plugs can therefore be attached quickly and easily.

- The double shield makes it especially suitable for routing through industrial areas with strong electro-magnetic fields
- Easy connection to the insulation displacement contacts of the IE FC plug without the need for special tools
- System-wide grounding concept can be implemented through the outer shield of the bus cable as well as through the grounding concept of the IE FC Outlet RJ45 and the IE FC Plugs
- Printed meter marks

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Design (continued)

Cable types

- ***IE FC TP Standard Cable GP 2 x 2:***
  Standard bus cable with rigid cores specially designed for fast installation;
  four rigid cores connected in a four branch star
- ***IE FC TP Robust Standard Cable GP 2x2:***
  Standard bus cable with rigid cores specially designed for fast installation;
  four rigid cores connected in a four branch star with a rugged TPE outer sheath (thermoplastic elastomer)
- ***IE FC TP Flexible Cable GP 2 x 2:***
  Flexible bus cable for the special application of occasional motion control;
  four stranded cores connected in a four branch star
- ***IE FC TP Robust Flexible Cable GP 2x2:***
  Flexible bus cable for the special application of occasional motion control;
  four rigid cores connected in a four branch star with a rugged TPE outer sheath (thermoplastic elastomer)
- ***IE FC TP FRNC Cable GP 2 x 2:***
  Flexible, halogen-free cable for use in buildings (FRNC= Flame Retardant Non Corrosive); four conductors (flexible leads) stranded into star-quad for occasional movement
- ***IE FC TP Trailing Cable GP / IE FC TP Trailing Cable 2 x 2:***
  Highly flexible bus cable for the special application of constant motion control in a cable carrier, e.g. for continuously moving machine parts; four stranded cores connected in a four branch star
- ***IE FC Festoon Cable GP 2 x 2:***
  Flexible cable for special use in constant movement in a cable trail/festoon arrangement, e.g. on crane systems; four cores (stranded) in twisted quads
- ***IE TP Torsion Cable 2 x 2:***
  Highly flexible bus cable for the special application of continuous motion control, e.g. for use with robots; stranded cores
- ***IE FC TP Food Cable 2 x 2:***
  Flexible cable for special use in the food and beverages industry;
  four cores (stranded) in twisted quads
- ***IE FC TP Marine Cable 2 x 2:***
  Bus cable for marine applications; four cores (stranded) connected in a four branch star, halogen-free, certified for marine applications
- ***IE TP Ground Cable 2 x 2:***
  Bus cable for fixed routing in soil; four rigid cores connected in a four branch star, additional outer PE sheath (internal FC cable design)
- ***IE TP Train Cable 2 x 2:***
  Bus cable for special applications in trains; four cores (tin-coated stranded wires) connected in a four branch star, certified for railway applications

Product overview IE FC TP Cable 2 x 2 (PROFINET-compatible according to "PROFINET Cabling and Interconnection Technology Guideline"[1])

	PROFINET Type A	**PROFINET Type B**	**PROFINET Type C**
	AWG 22/1 rigid laying	AWG 22/7 flexible cable for occasional movement	AWG 22 highly flexible cable for continuous motion, e.g. cable carrier or robots
IE FC TP Standard Cable GP 2 x 2 (Type A) 6XV1 840-2AH10	●	–	–
IE FC TP Robust Standard Cable GP 2 x 2 (Type A) 6XV1841-2A	●	–	–
IE FC TP Flexible Cable GP 2 x 2 (Type B) 6XV1 870-2B	–	●	–
IE FC TP Robust Flexible Cable GP 2 x 2 (Type B) 6XV1841-2B	–	●	–
IE FC TP FRNC Cable GP 2 x 2 (Type B) 6XV1 871-2F)	–	●	–
IE FC TP Trailing Cable GP 2 x 2 (Type C) 6XV1 870-2D	–	–	●
IE FC TP Trailing Cable 2 x 2 (Type C) 6XV1 840-3AH10	–	–	●
IE FC TP Festoon Cable GP 2 x 2 (Type B) 6XV1871-2S	–	●	–
IE TP Torsion Cable 2 x 2 (Type C) 6XV1 870-2F	–	–	●
IE FC TP Food Cable 2 x 2 (Type C) 6XV1871-2L	–	–	●
IE FC TP Marine Cable 2 x 2 (Type B) 6XV1 840-4AH10	–	●	–
IE TP Ground Cable 2 x 2 (Type C) 6XV1871-2G	–	–	●
IE TP Train Cable 2 x 2 (Type C) 6XV1871-2T	–	–	●

[1] Available as a download under http://www.profinet.com

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Technical specifications

Article No.	**6XV1840-2AH10**	**6XV1841-2A**	**6XV1870-2B**	**6XV1841-2B**
Product-type designation	**IE FC TP Standard Cable GP 2 x 2 (Type A)**	**IE FC TP Robust Standard Cable GP 2 x 2 (Type A)**	**IE FC TP Flexible Cable GP 2 x 2 (Type B)**	**IE FC TP Robust Flexible Cable GP 2 x 2 (Type B)**
Product description	Standard bus cable (4-core), sold by the meter, not assembled	Standard bus cable (4-core), sold by the meter, not assembled	Flexible bus cable (4-core), sold by the meter, not assembled	Flexible bus cable (4-core), sold by the meter, not assembled
Acceptability for application	Standard cable with rigid cores for fast installation	Standard cable with rigid cores for fast installation	For occasionally moved machine parts	For occasionally moved machine parts
Cable designation	2YY (ST) CY 2x2x0,64/1,5-100 GN	2YH (ST) C99Y 2x2x0,64/1,5-100 GN	2YY (ST) CY 2x2x0,75/1,5-100 LI GN	2YH (ST) C99Y 2x2x0,75/1,5-100 LI GN
Electrical data				
Damping ratio per length				
• at 10 MHz	52 dB/km	52 dB/km	60 dB/km	60 dB/km
• at 100 MHz	195 dB/km	195 dB/km	210 dB/km	210 dB/km
Impedance for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω	100 Ω	100 Ω
Relative symmetrical tolerance of the surge impedance at 1 MHz … 100 MHz	15 %	15 %	15 %	15 %
Near-end crosstalk per length at 1 MHz ... 100 MHz	500 dB/km	0.5 dB/m	500 dB/km	0.5 dB/m
Transfer impedance at 10 MHz	10 mΩ/m	10 mΩ/m	20 mΩ/m	20 mΩ/m
Loop resistance per length	115 Ω/km	115 Ω/km	120 Ω/km	120 Ω/km
Insulation resistance coefficient	-	-	-	-
Operating voltage RMS value	100 V	100 V	100 V	100 V
Percentage NVP value	66 %	66 %	66 %	66 %
Mechanical data				
Number of electrical wires	4	4	4	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	Yes	Yes	Yes	Yes
AWG number	-	-	-	-
Core diameter of the AWG22 core	0.64 mm	0.64 mm	0.75 mm	0.75 mm
Outer diameter				
• of the inner conductor	0.64 mm	0.64 mm	0.75 mm	0.75 mm
• of the wire insulation	1.5 mm	1.5 mm	1.5 mm	1.5 mm
• of the inner sheath of the cable	3.9 mm	3.9 mm	3.9 mm	3.9 mm
• of the cable sheath	6.5 mm	6.5 mm	6.5 mm	6.5 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm	0.2 mm	0.2 mm
Material				
• of the wire insulation	PE	PE	PE	PE
• of the inner sheath of the cable	PVC	FRNC	PVC	FRNC
• of the cable sheath	PVC	TPE (FR-TPE)	PVC	TPE (FR-TPE)
Color				
• of the insulation of data wires	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
• of the cable sheath	green	green	green	green
Bending radius				
• with single bend	19.5 mm	19.5 mm	32.5 mm	32.5 mm
• with multiple bends	49 mm	49 mm	52 mm	52 mm
• with continuous bending	-	-	-	-
Number of bending cycles	-	-	-	-
• Note	-	-	-	-
Number of torsion cycles with torsion by ± 180° on 1 m cable length	-	-	-	-
Traction stress maximum	150 N	150 N	150 N	150 N
Weight per length	67 kg/km	67 kg/km	68 kg/km	68 kg/km

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Technical specifications (continued)

Article No.	6XV1840-2AH10	6XV1841-2A	6XV1870-2B	6XV1841-2B
Product-type designation	**IE FC TP Standard Cable GP 2 x 2 (Type A)**	**IE FC TP Robust Standard Cable GP 2 x 2 (Type A)**	**IE FC TP Flexible Cable GP 2 x 2 (Type B)**	**IE FC TP Robust Flexible Cable GP 2 x 2 (Type B)**
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +75 °C	-40 … +75 °C	-25 … +75 °C	-40 … +75 °C
• during storage	-40 … +75 °C	-40 … +75 °C	-25 … +75 °C	-40 … +75 °C
• during transport	-40 … +75 °C	-40 … +75 °C	-25 … +75 °C	-40 … +75 °C
• during installation	-20 … +60 °C	-20 … +60 °C	-10 … +60 °C	-20 … +60 °C
Burning behaviour	flame resistant according to UL 1685 (CSA FT 4)	flame resistant according to IEC 60332-1-2	flame resistant according to UL 1685 (CSA FT 4)	flame resistant according to IEC 60332-1-2
Chemical resistance				
• to mineral oil	Conditional resistance	oil resistant according to DIN EN 50290-2-22 (VDE 0819), (7x24 h/90 °C), UL13 Sec.40 (96 h/100 °C)	Conditional resistance	oil resistant according to DIN EN 50290-2-22 (VDE 0819), (7x24 h/90 °C), UL13 Sec.40 (96 h/100 °C)
• to grease	Conditional resistance	Conditional resistance	Conditional resistance	Conditional resistance
• to water	Conditional resistance	Conditional resistance	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant	Resistant	Resistant
Product properties, functions, components general				
Product feature				
• halogen-free	No	No	No	No
• silicon-free	Yes	Yes	Yes	Yes
Cable length with 100BaseTX for Industrial Ethernet	100 m	100 m	85 m	85 m
Standards, specifications, approvals				
UL/ETL listing with 300 V rating	Yes: cULus / CMG / PLTC/ ITC(UL) / Sun Res	Yes: c(ETL)us, CM, PLTC, SUN RES	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES	Yes: c(ETL)us, CM, PLTC, SUN RES
UL/ETL style with 600 V rating	yes	No	No	No
Verification of suitability				
• CE mark	Yes	Yes	Yes	Yes
• RoHS conformity	Yes	Yes	Yes	Yes
Standard for structured cabling	Cat5e	Cat5e	Cat5e	Cat5e
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No	No
• Bureau Veritas (BV)	No	No	No	No
• Det Norske Veritas (DNV)	No	No	No	No
• Germanische Lloyd (GL)	No	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No	No

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Technical specifications (continued)

Article No.	6XV1870-2F	6XV1870-2D	6XV1840-3AH10	6XV1871-2S
Product-type designation	**IE TP Torsion Cable 2 x 2 (Type C)**	**IE FC TP Trailing Cable GP 2 x 2 (Type C)**	**IE FC TP Trailing Cable 2 x 2 (Type C)**	**IE FC TP Festoon Cable GP 2 x 2 (Type B)**
Product description	Highly flexible bus cable (4-core), sold by the meter, not assembled	Patch cable, preferred length, pre-assembled with a 15-pole Sub-D connector and a RJ45 connector	Highly flexible bus cable (4-core), sold by the meter, not assembled	Flexible bus cable (4-core), sold by the meter, not assembled
Acceptability for application	Continuous motion control when using robots	Continuous motion control in a cable carrier	Continuous motion control in a cable carrier	For continuous motion in a trailing cable, festoon mounting
Cable designation	02YS C11Y 1x4x0,75/1,5-100 LI VZN FRNC GN	2YY (ST) CY 2x2x0,75/1,5-100 LI GN	2YH (ST) C11Y 2x2x0,75/1,5-100 LI GN VZN FRNC	2YY (ST) CY 2x2x0,75/1,5 LI GN
Electrical data				
Damping ratio per length				
• at 10 MHz	81 dB/km	63 dB/km	60 dB/km	63 dB/km
• at 100 MHz	410 dB/km	213 dB/km	220 dB/km	213 dB/km
Impedance for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω	100 Ω	100 Ω
Relative symmetrical tolerance of the surge impedance at 1 MHz … 100 MHz	15 %	5 %	15 %	5 %
Near-end crosstalk per length at 1 MHz ... 100 MHz	0.5 dB/m	500 dB/km	500 dB/km	500 dB/km
Transfer impedance at 10 MHz	100 mΩ/m	20 mΩ/m	10 mΩ/m	100 mΩ/m
Loop resistance per length	120 Ω/km	0.12 Ω/m	0.12 Ω/m	0.12 Ω/m
Insulation resistance coefficient	-	-	-	-
Operating voltage RMS value	100 V	100 V	100 V	100 V
Percentage NVP value	70 %	66 %	66 %	66 %
Mechanical data				
Number of electrical wires	4	4	4	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	No	Yes	Yes	Yes
Core diameter of the AWG22 core	0.76 mm	0.75 mm	0.75 mm	0.75 mm
Outer diameter				
• of the inner conductor	0.76 mm	0.75 mm	0.75 mm	0.75 mm
• of the wire insulation	1.5 mm	1.5 mm	1.5 mm	1.5 mm
• of the inner sheath of the cable	-	3.9 mm	3.9 mm	3.9 mm
• of the cable sheath	6.5 mm	6.5 mm	6.5 mm	6.5 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm	0.2 mm	0.2 mm
Material				
• of the wire insulation	PE	PE	PE	PE
• of the inner sheath of the cable	-	PVC	FRNC	PVC
• of the cable sheath	PUR (TPE-U)	PVC	PUR (TPE-U)	PVC
Color				
• of the insulation of data wires	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
• of the cable sheath	green	green	green	green
Bending radius				
• with single bend	32.5 mm	32.5 mm	19.5 mm	30 mm
• with multiple bends	65 mm	49 mm	49 mm	70 mm
• with continuous bending	-	100 mm	100 mm	70 mm
Number of bending cycles	-	3 000 000	4 000 000	5 000 000
• Note	Not suitable for installation in festoons	For use in cable carriers, for 3 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s, and an acceleration of 4 m/s²	For use in cable carriers, for 4 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s, and an acceleration of 4 m/s²	5 million bending cycles for a bending radius of 70 mm and an acceleration of 4 m/s²
Number of torsion cycles with torsion by ± 180° on 1 m cable length	5 000 000	-	-	-
Traction stress maximum	130 N	150 N	150 N	150 N
Weight per length	54 kg/km	68 kg/km	63 kg/km	68 kg/km

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Technical specifications (continued)

Article No.	6XV1870-2F	6XV1870-2D	6XV1840-3AH10	6XV1871-2S
Product-type designation	**IE TP Torsion Cable 2 x 2 (Type C)**	**IE FC TP Trailing Cable GP 2 x 2 (Type C)**	**IE FC TP Trailing Cable 2 x 2 (Type C)**	**IE FC TP Festoon Cable GP 2 x 2 (Type B)**
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +80 °C	-25 … +75 °C	-40 … +75 °C	-40 … +75 °C
• during storage	-40 … +80 °C	-25 … +75 °C	-50 … +75 °C	-50 … +75 °C
• during transport	-40 … +80 °C	-25 … +75 °C	-50 … +75 °C	-50 … +75 °C
• during installation	-20 … +60 °C	-10 … +60 °C	-20 … +60 °C	-20 … +60 °C
Burning behaviour	flame resistant according to IEC 60332-1-2	flame resistant according to UL 1685 (CSA FT 4)	flame resistant according to IEC 60332-1-2	flame resistant according to UL 1685 (CSA FT 4)
Chemical resistance				
• to mineral oil	oil resistant according to IEC 60811-2-1 (7x24h/90°C)	Conditional resistance	oil resistant according to IEC 60811-2-1 (7x24h/90°C)	Conditional resistance
• to grease	Resistant	Conditional resistance	Resistant	Conditional resistance
• to water	Resistant	Conditional resistance	resistant	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant	Resistant	Resistant
Product properties, functions, components general				
Product feature				
• halogen-free	Yes	No	Yes	No
• silicon-free	Yes	Yes	Yes	Yes
Cable length with 100BaseTX for Industrial Ethernet	55 m	85 m	85 m	85 m
Standards, specifications, approvals				
UL/ETL listing with 300 V rating	Yes: UL Style 21161	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES	Yes: cULus / CMX	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES
UL/ETL style with 600 V rating	No	yes	No	yes
Verification of suitability				
• CE mark	Yes	Yes	Yes	Yes
• RoHS conformity	-	Yes	Yes	Yes
Standard for structured cabling	Cat5e	Cat5e	Cat5e	Cat5e
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No	No
• Bureau Veritas (BV)	No	No	No	No
• Det Norske Veritas (DNV)	No	No	No	No
• Germanische Lloyd (GL)	No	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No	No

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Technical specifications (continued)

Article No.	6XV1871-2F	6XV1871-2L	6XV1840-4AH10
Product-type designation	**IE FC TP FRNC Cable GP 2x2 (Type B)**	**IE FC TP Food Cable 2 x 2 (Type C)**	**IE FC TP Marine Cable 2 x 2 (Type B)**
Product description	Flexible, halogen-free bus cable (4-core), sold by the meter, not assembled	Flexible bus cable (4-core), sold by the meter, not assembled	Bus cable (4-core), sold by the meter, not assembled
Acceptability for application	For occasionally moved machine parts	Food and beverages industry	For marine and offshore use
Cable designation	L-9YH (ST) CH 2x2x0,34/1,5-100 GN VZN FRNC	2YH (ST) C2Y 2X2X0,75/1,5-100 LI	L-9YH (ST) CH 2 x 2 x 0,34/1,5-100 GN VZN FRNC
Electrical data			
Damping ratio per length			
• at 10 MHz maximum	60 dB/km	63 dB/km	60 dB/km
• at 100 MHz maximum	220 dB/km	213 dB/km	220 dB/km
Impedance for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω	100 Ω
Relative symmetrical tolerance of the surge impedance at 1 MHz … 100 MHz	15 %	5 %	15 %
Near-end crosstalk per length at 1 MHz ... 100 MHz	500 dB/km	500 dB/km	500 dB/km
Transfer impedance at 10 MHz	10 mΩ/m	10 mΩ/m	10 mΩ/m
Loop resistance per length	120 Ω/km	120 Ω/km	120 Ω/km
Operating voltage RMS value	100 V	100 V	100 V
Percentage NVP value	66 %	66 %	66 %
Mechanical data			
Number of electrical wires	4	4	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	Yes	Yes	Yes
AWG number	-	-	-
Core diameter of the AWG22 core	0.75 mm	0.75 mm	0.75 mm
Outer diameter			
• of the inner conductor	0.75 mm	0.75 mm	0.75 mm
• of the wire insulation	1.5 mm	1.5 mm	1.5 mm
• of the inner sheath of the cable	3.9 mm	3.9 mm	3.9 mm
• of the cable sheath	6.5 mm	6.5 mm	6.5 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm	0.2 mm
Material			
• of the wire insulation	PP	PE	PP
• of the inner sheath of the cable	FRNC	FRNC	FRNC
• of the cable sheath	FRNC	PE	FRNC
- Note	-	-	-
Color			
• of the insulation of data wires	white / yellow / blue / orange	white / yellow / blue / orange	white / yellow / blue / orange
• of the cable sheath	green	Black	green
Bending radius			
• with single bend minimum permissible	39 mm	20 mm	39 mm
• with multiple bends minimum permissible	97.5 mm	49 mm	97.5 mm
Traction stress maximum	150 N	150 N	150 N
Weight per length	68 kg/km	55 kg/km	68 kg/km

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Technical specifications (continued)

Article No.	6XV1871-2F	6XV1871-2L	6XV1840-4AH10
Product-type designation	**IE FC TP FRNC Cable GP 2x2 (Type B)**	**IE FC TP Food Cable 2 x 2 (Type C)**	**IE FC TP Marine Cable 2 x 2 (Type B)**
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +70 °C	-40 … +75 °C	-25 … +70 °C
• during storage	-40 … +75 °C	-50 … +75 °C	-40 … +85 °C
• during transport	-40 … +75 °C	-50 … +75 °C	-40 … +85 °C
• during installation	0 … 50 °C	-20 … +60 °C	0 … 50 °C
Ambient condition for (standard) operation mode	-	-	Temperature range for permanent installation -40 °C to 85 °C
Burning behaviour	flame resistant according to IEC 60332-3-22 (Category A/F), IEC 61034	inflammable	flame resistant according to IEC 60332-3-22 (Category A/F)
Chemical resistance			
• to mineral oil	oil resistant according to IEC 60811-2-1 (4 h / 70°C)	oil resistant according to IEC 60811-2-1 (4 h / 70°C)	Conditional resistance, IEC 60811-2-1 (4 hours / 70 °C)
• to grease	Conditional resistance	Conditional resistance	Conditional resistance
• to water	Conditional resistance	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant	Resistant
Product properties, functions, components general			
Product feature			
• halogen-free	Yes	Yes	Yes
• silicon-free	Yes	Yes	Yes
Cable length with 100BaseTX for Industrial Ethernet	85 m	85 m	85 m
Standards, specifications, approvals			
UL/ETL listing with 300 V rating	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES	No	Yes: cULus / CMG / PLTC / Sun Res
UL/ETL style with 600 V rating			
Verification of suitability			
• CE mark	Yes	Yes	-
• RoHS conformity	Yes	Yes	Yes
Standard for structured cabling	Cat5e	Cat5e	Cat5e
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	Yes
• Bureau Veritas (BV)	No	No	Yes
• Det Norske Veritas (DNV)	No	No	Yes
• Germanische Lloyd (GL)	No	No	Yes
• Lloyds Register of Shipping (LRS)	No	No	Yes

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Technical specifications (continued)

Article No.	6XV1871-2G	6XV1871-2T
Product-type designation	**IE TP Ground Cable 2x2 (Typ C)**	**IE TP Train Cable 2x2 (Typ C, AWG22/7)**
Product description	Standard bus cable (4-core), for laying in soil, sold by the meter, not assembled	Flexible bus cable with tin-coated stranded wires, (4-core) for applications in trains, sold by the meter, not assembled
Acceptability for application	Standard cable with rigid cores for fast installation	For laying in rail vehicles and buses
Cable designation	2YY(ST)CY2Y2x2x0.64/1.50-100	-
Electrical data		
Damping ratio per length		
• at 10 MHz	0.063 dB/m	0.053 dB/m
• at 100 MHz	0.213 dB/m	0.188 dB/m
Impedance for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω
Relative symmetrical tolerance of the surge impedance at 1 MHz … 100 MHz	5 %	5 %
Near-end crosstalk per length at 1 MHz ... 100 MHz	0.5 dB/m	0.5 dB/m
Transfer impedance at 10 MHz	10 mΩ/m	8 mΩ/m
Loop resistance per length	124 Ω/km	124 Ω/km
Operating voltage RMS value	100 V	125 V
percentage NVP value	64 %	-
Mechanical data		
Number of electrical wires	4	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	Yes	No
AWG number	-	-
Core diameter of the AWG22 core	0.64 mm	0.75 mm
Outer diameter		
• of the inner conductor	0.64 mm	0.75 mm
• of the wire insulation	1.5 mm	1.5 mm
• of the inner sheath of the cable	4 mm	-
• of the cable sheath	9 mm	6.6 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm
Outer diameter of the cable sheath Note	Cable diameter > 6.5 mm due to additional PE protective jacket. Cable can only be connected in the RJ45/M12 connector after stripping the protective jacket.	-
Material		
• of the wire insulation	PE	PE
• of the inner sheath of the cable	PVC	-
• of the cable sheath	PVC	Elastomer meshed electron beam
Color		
• of the insulation of data wires	white / yellow / blue / orange	white / yellow / blue / orange
• of the cable sheath	Black	Black
Bending radius		
• with single bend	80 mm	40 mm
• with multiple bends	80 mm	40 mm
Traction stress maximum	150 N	150 N
Weight per length	97 kg/km	71 kg/km

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Technical specifications (continued)

Article No.	6XV1871-2G	6XV1871-2T
Product-type designation	**IE TP Ground Cable 2x2 (Typ C)**	**IE TP Train Cable 2x2 (Typ C, AWG22/7)**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +80 °C
• during storage	-40 … +70 °C	-40 … +80 °C
• during transport	-40 … +70 °C	-40 … +80 °C
• during installation	-5 … +50 °C	-20 … +60 °C
Ambient condition for (standard) operation mode	-	Electrical characteristics measured at 20 °C, tests according to EN 50288-2-1
Burning behaviour	inflammable	BS6853, DIN5510-2 levels of protection 1-4, prEN45545-2 Hazard Level HL1-HL3, EN50306-4, NF F 16-101, NFPA130
Chemical resistance		
• to mineral oil	Conditional resistance	EN 50306-4 (72h/100 °C, IRM 902, 168h/70 °C, IRM 903)
• to grease	Conditional resistance	Conditional resistance
• to water	Resistant	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	Yes
• silicon-free	Yes	Yes
Cable length with 100BaseTX for Industrial Ethernet	100 m	100 m
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	No	No
UL/ETL style with 600 V rating	No	No
Verification of suitability		
• CE mark	Yes	Yes
• UL-registration	-	-
• RoHS conformity	Yes	Yes
Standard for structured cabling	Cat5e	Cat5
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	No	No
• Bureau Veritas (BV)	No	No
• Det Norske Veritas (DNV)	No	No
• Germanische Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	No	No

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Ordering data	Article No.
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/M12 Plug; PROFINET-compatible; with UL approval; Sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
Preferred length • 1000 m	**6XV1840-2AU10**
IE FC TP Robust Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable with TPE outer sheath for connection to IE FC Outlet RJ45/ IE FC RJ45/M12 Plug; PROFINET-compatible; with UL approval Sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1841-2A**
IE FC TP Flexible Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug for occasional movement; PROFINET-compatible; with UL approval; Sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2B**
IE FC TP Robust Flexible Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable with TPE outer sheath for connection to IE FC Outlet RJ45/ IE FC RJ45/M12 Plug for occasional movement; PROFINET-compatible; with UL approval; Sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1841-2B**
IE FC TP FRNC Cable GP 2 x 2 (Type B) 4-core, shielded, halogen-free TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/ M12 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2F**
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/M12 Plug for use in trailing cables; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2D**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug for use in trailing cables; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-3AH10**
IE FC TP Festoon Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug for use in festoon applications; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2S**
IE TP torsion cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug for use with robots; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2F**
IE FC TP Food Cable GP 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/ M12 Plug for the food and beverages industry; PROFINET-compatible; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2L**
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug marine approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-4AH10**
IE TP Ground Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45/M12 Plug (additional outer sheath must be removed) for laying in soil; sold by the meter, max. length 1 000 m, minimum order 20 m	**6XV1871-2G**
IE TP Train Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC RJ45 Plug and IE FC M12 Plug PRO; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2T**
IE Hybrid Cable 2x2 + 4x0.34 Flexible cable, 4 x Cu Cat5, shielded (0.75 mm) and 4 x Cu (0.34 mm^2) with IE FC modular outlet and power insert and IP67 hybrid plug connector; sold by the meter; up to 1 000 m; minimum order 20 m	**6XV1870-2J**

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IE FC TP Cable 2 x 2

Ordering data	Article No.
Accessories	
IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
IE FC Blade Cassettes (12 mm) Replacement blade cassette for the Industrial Ethernet stripping tool; for use with IE FC Outlet RJ45, ELS TP40, 5 units	**6GK1901-1GB00**
IE FC Blade Cassettes (5 mm) Replacement blade cassette for the Industrial Ethernet stripping tool; for use with IE FC RJ45 Plugs and IE FC RJ45 Modular Outlet, 5 units	**6GK1901-1GB01**
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 plug 90 90° cable outlet; e.g. for ET 200S	
• 1 pack = 1 unit	**6GK1901-1BB20-2AA0**
• 1 pack = 10 units	**6GK1901-1BB20-2AB0**
• 1 pack = 50 units	**6GK1901-1BB20-2AE0**
IE FC RJ45 Plug 145 145° cable outlet; e.g. for SIMOTION and SINAMICS	
• 1 pack = 1 unit	**6GK1901-1BB30-0AA0**
• 1 pack = 10 units	**6GK1901-1BB30-0AB0**
• 1 pack = 50 units	**6GK1901-1BB30-0AE0**
IE FC M12 Plugs	
IE FC M12 Plug PRO 2x2 M12 plug-in connector (D-coded, IP65/IP67) that can be assembled in the field, metal enclosure, FastConnect connection method, for SCALANCE X208PRO and IM 154-4 PN	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB20-6AA8**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1975-1AA00-3AA0**
PROFINET Cabling and Interconnection Technology Guideline	http://www.profinet.com

More information

Installation instructions

The bus cables are supplied by the meter with meter marks printed on them.

FastConnect

With the help of Industrial Ethernet FastConnect Stripping Tool, it is possible to strip the outer sheath and shield of Industrial Ethernet FastConnect cables 2 x 2 to the right length in one step. The IE Outlet RJ45 and the PROFINET-compatible plug-in connectors IE FC RJ45 and IE FC M12 can be connected quickly and easily to the Industrial Ethernet FC cable 2 x 2.

Cable routing

During storage, transport and cable laying, keep both ends sealed with a shrink-on cap; comply with the permissible bending radii and tensile load.

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Overview



- 8-core FastConnect installation cables for cabling system with Gigabit capability (AWG22 and AWG24 versions)
- Easy stripping with the FastConnect Stripping Tool; the outer sheath and the braided shield are stripped accurately in one step
- Connection to IE FC RJ45 Modular Outlet (AWG22) or IE FC RJ45 Plug 4 x 2 (AWG24) using insulation displacement
- Satisfies Category 6 (Cat6) of the international cabling standards ISO/IEC 11801 and EN 50173
- UL approval
- Easy length measurement thanks to printed meter markings

Benefits

get Designed for Industry

- Time-saving due to quick and easy assembly using FastConnect cables 4 x 2 on IE FC RJ 45 Modular Outlet or IE FC RJ45 Plug 4 x 2 or IE FC M12 Plug PRO 4x2 (X-coded)
- Simple and error-free construction of an 8-core cabling system with Gigabit capability
- Due to the 8-core cabling, you can either implement two Industrial Ethernet connections for Fast Ethernet (with IE FC RJ 45 Modular Outlet) or one Gigabit Ethernet
- Noise-immune network due to a consistent grounding concept.

Application

The 8-core cabling system of SIMATIC NET allows transmission rates of 10/100/1 000 Mbit/s for Ethernet as with the service-independent cabling from the office environment. This permits the transition from the 4-core Industrial Ethernet cabling system to the 8-core cabling system with Gigabit capability.

The IE FC TP Standard Cable GP 4 x 2 (AWG22) must be used in conjunction with the IE FC Modular Outlet and the TP Cords for constructing Industrial Ethernet networks (8-core) up to 100 m.

IE FC TP Standard Cable 4x2 (AWG22)

The IE FC TP Standard Cable GP 4 x 2 (AWG22) must be used in conjunction with the IE FC Modular Outlet and the TP Cords for constructing Industrial Ethernet networks (8-core) up to 100 m.

IE FC TP Cable 4x2 (AWG24)

For direct connection without using patch technology, the IE FC RJ45 Plug 4 x 2 and the IE FC TP Cable 4 x 2 (AWG24) of up to 90 m can be used.

IE TP Train Cable 4x2 (AWG24)

For the construction of Industrial Ethernet networks (8-core) up to 100 m in railway applications (cable is approved for railway applications)

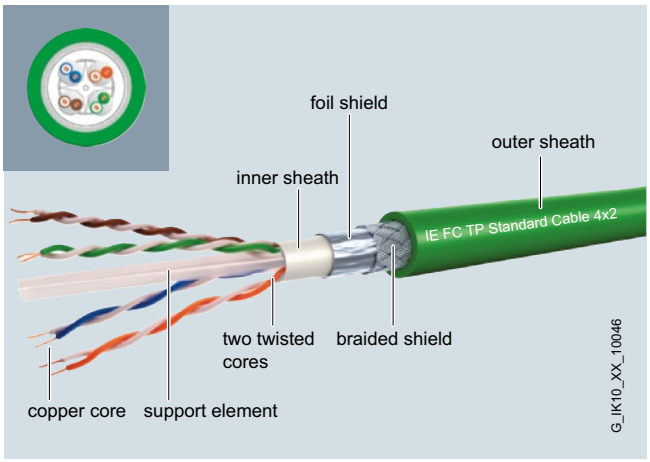
Note:

Further information on the network configuration can be found in the manual for TP and fiber-optic networks.

UL approvals

The IE FC TP cable GP 4 x 2 (AWG22 and AWG24) has the relevant UL / ETL approvals for laying in cable bundles and cable racks according to the specifications of NEC (National Electrical Code) Article 800/725.

Design



The FastConnect (FC) Industrial Ethernet cables IE FC Cable 4 x 2 (AWG22 and AWG24) are designed with radial symmetry and therefore allow the use of the IE FC Stripping Tool.
The IE FC RJ45 Modular Outlet and the IE FC RJ45 Plug 4 x 2 can then be connected quickly and easily by means of insulation displacement contacts without the need for special tools.

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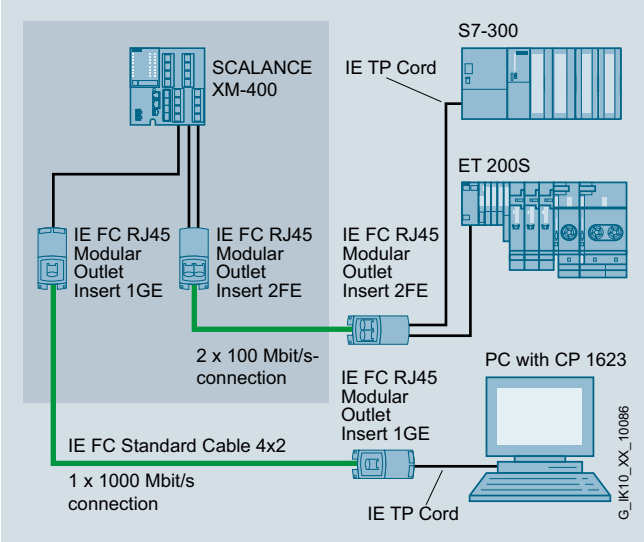
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Design (continued)

Cable types

- ***IE FC Standard Cable GP 4 x 2 (AWG22):***
  Standard bus cable with rigid cores specially designed for fast mounting on IE FC RJ45 Modular Outlet; with appropriate UL approval (General Purpose) for laying in cable bundles and on cable racks, according to the specifications of the NEC (National Electrical Code) Article 800/725
- ***IE FC Standard Cable GP 4 x 2 (AWG24):***
  Standard bus cable with rigid cores specially designed for fast mounting on IE FC RJ45 Plug 4 x 2; with appropriate UL approval (General Purpose) for laying in cable bundles and on cable racks, according to the specifications of the NEC (National Electrical Code) Article 800/725
- ***IE FC Flexible Cable GP 4 x 2 (AWG24/7):***
  Bus cable with flexible cores for occasional movement and specially designed for fast mounting on IE FC RJ45 Plug 4 x 2; with appropriate UL approval (General Purpose) for laying in cable bundles and on cable racks, according to the specifications of the NEC (National Electrical Code) Article 800/725
- ***IE Train Cable GP 4 x 2 (AWG24/7):***
  Bus cable with flexible cores for laying in trains (railway applications) with appropriate approval, connection only possible via IE FC M12 Plug PRO 4x2 (x-coded)

Integration



System configuration with IE FC RJ45 Modular Outlet 100 Mbit/s and 1000 Mbit/s

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Technical specifications

Article No.	**6XV1870-2E**	**6XV1878-2A**
Product-type designation	**IE FC TP Standard Cable GP 4x2 (AWG 22)**	**IE FC TP Standard Cable GP 4x2 (AWG 24)**
Product description	Standard bus cable (8-core), sold by the meter, not assembled	Shielded TP installation cable (8-core), sold by the meter, not assembled
Acceptability for application	Standard cable with rigid cores for fast, permanent installation	Standard cable with rigid cores for fast, permanent installation
Cable designation	2YH (ST) C 4X2X0.64/1.25-100 GN 4x2xAWG22	2YH (ST) CY 4x2x0,5/1,0- 100 GN
Electrical data		
Damping ratio per length		
• at 10 MHz	60 dB/km	63 dB/km
• at 100 MHz	190 dB/km	210 dB/km
• at 250 MHz	330 dB/km	350 dB/km
Near-end crosstalk per length at 1 MHz ... 250 MHz	383 dB/km	383 dB/km
Transfer impedance at 10 MHz	10 mΩ/m	20 mΩ/m
Loop resistance per length	118 Ω/km	180 Ω/km
Insulation resistance coefficient	5 000 GΩ·m	5 000 GΩ·m
Operating voltage RMS value	100 V	100 V
Percentage NVP value	68 %	66 %
Mechanical data		
Number of electrical wires	8	8
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	Yes	Yes
AWG number	-	-
Core diameter		
• of the AWG22 core	0.64 mm	-
• of the AWG24 core	-	0.51 mm
Outer diameter		
• of the inner conductor	0.64 mm	0.51 mm
• of the wire insulation	1.25 mm	1 mm
• of the inner sheath of the cable	7.6 mm	5.8 mm
• of the cable sheath	9.6 mm	8 mm
Symmetrical tolerance of outer diameter of cable sheath	0.3 mm	0.2 mm
Material		
• of the wire insulation	PE	PE
• of the inner sheath of the cable	PVC	FRNC
• of the cable sheath	PVC	PVC
Color		
• of the insulation of data wires	white/blue, white/orange, white/green, white/brown	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	38 mm	24 mm
• with multiple bends minimum permissible	80 mm	40 mm
Traction stress maximum	180 N	100 N
Weight per length	104 kg/km	78 kg/km

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Technical specifications (continued)

Article No.	6XV1870-2E	6XV1878-2A
Product-type designation	**IE FC TP Standard Cable GP 4x2 (AWG 22)**	**IE FC TP Standard Cable GP 4x2 (AWG 24)**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +80 °C	-40 … +85 °C
• during storage	-40 … +80 °C	-40 … +85 °C
• during transport	-40 … +80 °C	-40 … +85 °C
• during installation	-40 … +80 °C	-40 … +80 °C
Burning behaviour	flame resistant according to IEC 60332-1	flame resistant according to IEC 60332-3-24 (Category C)
Chemical resistance		
• to mineral oil	oil resistant according to IEC 60811-2-1 (4 h / 70°C)	oil resistant according to IEC 60811-2-1 (4 h / 70°C)
• to grease	Conditional resistance	Conditional resistance
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Cable length		
• with 100BaseTX for Industrial Ethernet	90 m	100 m
• with 1000BaseT for Industrial Ethernet	90 m	100 m
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	Yes: c(UL)us, CMG, Sun Res	Yes: c(UL)us, CMG
UL/ETL style with 600 V rating	No	No
Verification of suitability		
• CE mark	Yes	Yes
• RoHS conformity	Yes	Yes
Standard for structured cabling	Cat6	Cat6

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Technical specifications (continued)

Article No.	6XV1878-2B	6XV1878-2T
Product-type designation	**IE FC TP Flexible Cable GP 4x2 (AWG 24)**	**IE TP Train Cable 4x2 (AWG24/7)**
Product description	Bus cable (8-core) with flexible cores, sold by the meter, not assembled	Flexible bus cable with tin-coated stranded wires (8-core), for applications in trains, sold by the meter, not assembled
Acceptability for application	Flexible cable for quick assembly, for occasionally moving machine parts	For laying in rail vehicles and buses
Cable designation	LI02YSH (ST) CY 4x2x0,22/1,1- 100 GN	-
Electrical data		
Damping ratio per length		
• at 10 MHz	90 dB/km	63 dB/km
• at 100 MHz	299 dB/km	207 dB/km
• at 250 MHz	495 dB/km	343 dB/km
Near-end crosstalk per length at 1 MHz ... 250 MHz	383 dB/km	-
Transfer impedance at 10 MHz	20 mΩ/m	5 mΩ/m
Loop resistance per length	180 Ω/km	124 Ω/km
Insulation resistance coefficient	5 000 GΩ·m	5 000 GΩ·m
Operating voltage RMS value	100 V	125 V
percentage NVP value	70 %	-
Mechanical data		
Number of electrical wires	8	8
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a protective braided shield of tin-plated copper wires with additional pair shielding
Design of the electrical connection FastConnect	Yes	No
Core diameter		
• of the AWG24 core	0.51 mm	0.51 mm
Outer diameter		
• of the inner conductor	0.6 mm	-
• of the wire insulation	1.1 mm	0.15 mm
• of the inner sheath of the cable	6.1 mm	-
• of the cable sheath	8 mm	8.8 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm
Material		
• of the wire insulation	PE	PE
• of the inner sheath of the cable	FRNC	-
• of the cable sheath	PVC	Elastomer meshed electron beam
Color		
• of the insulation of data wires	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown	white/blue, white/green, white/brown, white/orange
• of the cable sheath	green	Black
Bending radius		
• with single bend	24 mm	53 mm
• with multiple bends	40 mm	53 mm
Traction stress maximum	100 N	100 N
Weight per length	72 kg/km	79 kg/km

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Technical specifications (continued)

Article No.	6XV1878-2B	6XV1878-2T
Product-type designation	**IE FC TP Flexible Cable GP 4x2 (AWG 24)**	**IE TP Train Cable 4x2 (AWG24/7)**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +80 °C	-40 … +80 °C
• during storage	-40 … +80 °C	-40 … +80 °C
• during transport	-40 … +80 °C	-40 … +80 °C
• during installation	-40 … +80 °C	-20 … +60 °C
Ambient condition for (standard) operation mode	Temperature range for permanent installation -40 °C to +85 °C	-
Burning behaviour	flame resistant according to IEC 60332-3-24 (Category C)	BS 6853, DIN5510-2 levels of protection 1-4, prEN 45545-2 Hazard Level HL 1-HL 3, EN 50306-4, NF F 16-101, NFPA130
Chemical resistance		
• to mineral oil	oil resistant according to IEC 60811-2-1 (4 h / 70°C)	EN 50306-4 (72h/100 °C, IRM 902, 168h/70 °C, IRM 903)
• to grease	Conditional resistance	Conditional resistance
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	Yes
• silicon-free	Yes	Yes
Cable length		
• with 100BaseTX for Industrial Ethernet	80 m	100 m
• with 1000BaseT for Industrial Ethernet	80 m	100 m
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	Yes: c(ETL)us, CMG	No
UL/ETL style with 600 V rating	No	No
Verification of suitability		
• CE mark	Yes	Yes
• RoHS conformity	Yes	Yes
Standard for structured cabling	Cat6	Cat7

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Ordering data

	Article No.
IE FC TP Standard Cable GP 4 x 2	
8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2, IE FC M12 Plug PRO 4 x 2	**6XV1878-2A**
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. length 1 000 m, minimum order 20 m	
• AWG24, for connection to IE FC RJ45 Plug 4 x 2, IE FC M12 Plug PRO 4 x 2	**6XV1878-2B**
IE TP Train Cable GP 4 x 2	
8-core, shielded TP installation cable for use in trains; sold by the meter; max. length 1 000 m, minimum order 20 m	
• AWG24, for connection to IE M12 RJ45 Plug PRO 4 x 2	**6XV1878-2T**
IE FC stripping tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables 4 x 2	
IE FC Blade Cassettes (5 mm)	**6GK1901-1GB01**
Replacement blade cassette for the Industrial Ethernet stripping tool, for use with IE FC RJ45 Plugs and IE FC RJ45 Modular Outlet, 5 units	

	Article No.
IE FC RJ45 Modular Outlet	
FastConnect RJ45 Outlet for Industrial Ethernet with interface for a replaceable insert;	
• **without replaceable insert**	**6GK1901-1BE00-0AA0**
• **With 2FE insert;** replaceable insert for 2 x 100 Mbit/s interfaces	**6GK1901-1BE00-0AA1**
• **With 1GE insert;** replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
• **With power insert;** replaceable insert for 1 x 24 V DC and 1 x 100 Mbit/s interface	**6GK1901-1BE00-0AA3**
IE FC RJ45 Modular Outlet Insert 2FE	**6GK1901-1BK00-0AA1**
Replaceable insert for FC Modular Outlet Base; 2 x RJ45 for 2 x 100 Mbit/s interfaces; 1 pack = 4 items	
IE FC RJ45 Modular Outlet Insert 1GE	**6GK1901-1BK00-0AA2**
Replaceable insert for FC Modular Outlet Base; 1 x RJ45 for 1 x 1000 Mbit/s interface; 1 pack = 4 items	
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables 4 x 2; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
IE FC M12 Plug PRO 4 x 2	
M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W	
• 1 unit	**6GK1901-0DB30-6AA0**
• 8 units	**6GK1901-0DB30-6AA8**
SIMATIC NET Manual Collection	**6GK1975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

More information

Installation instructions

The bus cable is supplied by the meter with meter marks printed on it.

FastConnect

With the help of Industrial Ethernet FastConnect Stripping Tool, it is possible to strip the outer sheath and shield of the Industrial Ethernet FastConnect cable 4 x 2 to the right length in one step. This allows the IE FC RJ45 Modular Outlet to be attached quickly and easily to the Industrial Ethernet FC cable 4 x 2.

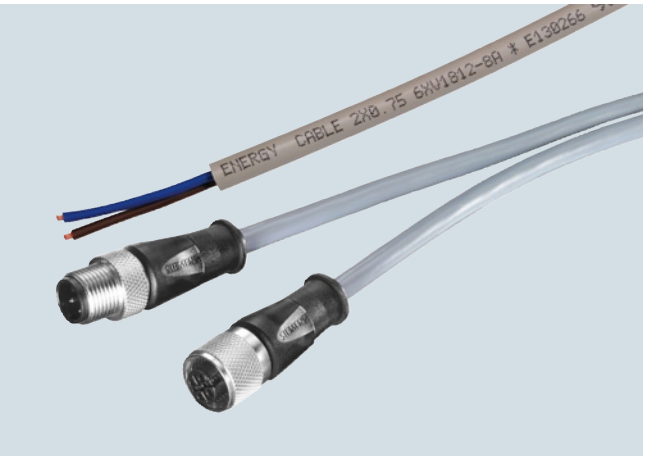
Cable routing

During storage, transport and cable laying, keep both ends sealed with a shrink-on cap; comply with the permissible bending radii and tensile load.

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2

Overview



- Different versions (5-core, 2-core) for different fields of application
- Pre-assembled M12 plug-in cables for energy transfer
- Rugged cable design for installation in industrial applications
- UL approvals
- Easy length measurement thanks to printed meter markings

Benefits

get Designed for Industry

- Flexible application possibilities thanks to rugged cable design
- Silicon-free, therefore particularly suitable for use in the automotive industry (e.g. on paint shop conveyors)

Application

Different cable types are needed to supply power to Industrial Ethernet/PROFINET or PROFIBUS. The listed power cables should always be used. They are used for devices with IP65/67 degree of protection to connect the signaling contact or 24-V supply of the SCALANCE X and SCALANCE W components (power cable 2x0.75) and for the power supply (power cable 5x1.5 for ET 200).

In addition, preassembled power connecting cables (4 x 0.75) are available in different lengths for the power supply of the ET 200 (M12 Power Connecting Cable).

UL approvals

As a result of appropriate UL styles, the cables can be used worldwide.

Design

Rugged 2-core, 4-core or 5-core cable with circular cross-section for connection of signaling contact and power supply to IP65/67 components in industrial areas.

Cable types

The following cables with industrial capability are available for connection of the power supply and signaling contact:

- Power cable 2 x 0.75;
  power cable for connection of signaling contact and 24 V supply voltage to SCALANCE X and SCALANCE W components
- Power cable 5 x 1.5;
  power cable for connection of 24 V power supply of ET 200 using 7/8" plug connectors
- M12 Power Connecting Cable M12-180/M12-180;
  4-core M12 power connecting cables (A-coded) with straight cable outlet for 24 V power supply of the ET 200 (pre-assembled)

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Technical specifications

Article No.	**6XV1812-8A**	**6XV1830-8AH10**
Product-type designation	**Energy Cable 2 x 0.75**	**Energy Cable 5 x 1.5**
Product description	Energy cable (2-core), sold by the meter, not assembled	Energy cable (5-core), sold by the meter, not assembled
Acceptability for application	Connection of signaling contact and 24 V power supply to SCALANCE X and SCALANCE W	Power supply of ET 200 modules with 7/8" power port
Cable designation	L-YY-2x1x0.75 GR	L-Y11Y-Z 5x1x1.5 GR
Electrical data		
Operating voltage RMS value	600 V	600 V
Conductor cross section of the power wires	0.75 mm^2	1.5 mm^2
Continuous current of the power wires	6 A	16 A
Mechanical data		
Number of electrical wires	2	5
Design of the electrical connection FastConnect	-	No
Outer diameter		
• of the inner conductor	1.3 mm	1.55 mm
• of the wire insulation	2.5 mm	2.73 mm
• of the cable sheath	7.4 mm	10.5 mm
Material		
• of the wire insulation	PVC	PVC
• of the cable sheath	PVC	PUR
Symmetrical tolerance of outer diameter of cable sheath	0.3 mm	0.3 mm
Color		
• of the power wire insulation	Brown/blue	4x black, 1x green / yellow
• of the cable sheath	gray	gray
Bending radius		
• with single bend	19 mm	27 mm
• with multiple bends	45 mm	63 mm
• with continuous bending	-	75 mm
Number of bending cycles	-	5 000 000
• Note	-	For use in cable carriers, for 5 million bending cycles with a bending radius of 75 mm, an acceleration of 4 m/s^2 and a speed of 180 m/min
Traction stress maximum	100 N	500 N
Weight per length	70 kg/km	149 kg/km
Permitted ambient conditions		
Ambient temperature		
• during operating	-20 … +80 °C	-40 … +80 °C
• during storage	-20 … +80 °C	-40 … +80 °C
• during transport	-20 … +80 °C	-40 … +80 °C
• during installation	-20 … +80 °C	-40 … +80 °C
Burning behaviour	Flame retardant acc. to IEC 60332-1	Flame retardant acc. to IEC 60332-1
Chemical resistance		
• to mineral oil	Conditional resistance	Resistant
• to grease	Conditional resistance	Resistant
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	Yes: CL3	No
UL/ETL style with 600 V rating	Yes	Yes
Verification of suitability		
• CE mark	Yes	Yes
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6XV1801-5DH10
Product-type designation	**POWER CONNECTING CABLE M12-180/M12-180**
Product description	Flexible power connecting cable (4-core), preferred length, assembled with A-coded 5-pin M12 connector and A-coded, 5-pin M12 socket
Acceptability for application	Cable for connecting the 24 V power supply to ET 200eco PN to IP 65/67 degree of protection
Cable designation	LI9YH-Y 4x0,75
Cable length	1 m
Electrical data	
Operating voltage RMS value	300 V
Conductor cross section of the power wires	0.75 mm^2
Continuous current of the power wires	-
Mechanical data	
Number of electrical wires	4
Outer diameter	
• of the inner conductor	1.1 mm
• of the wire insulation	1.7 mm
• of the cable sheath	5.7 mm
Outer diameter of the cable sheath Note	-
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm
Material	
• of the wire insulation	PP
• of the cable sheath	PVC
- Note	-
Color	
• of the power wire insulation	Brown / white / blue / black
• of the cable sheath	gray
Bending radius	
• with single bend minimum permissible	57 mm
• with multiple bends minimum permissible	57 mm
Traction stress maximum	15 N
Weight per length	54 kg/km

Article No.	6XV1801-5DH10
Product-type designation	**POWER CONNECTING CABLE M12-180/M12-180**
Permitted ambient conditions	
Ambient temperature	
• during operating	-25 … +80 °C
• during storage	-25 … +80 °C
• during transport	-25 … +80 °C
• during installation	-5 … +80 °C
• Comment	With moving applications, the permissible operating temperature range is -5 to +80 degrees Celsius
Ambient condition for (standard) operation mode	-
Protection class IP	IP65/67
Burning behaviour	Flame resistant acc. to UL 758 (CSA FT 1)
Chemical resistance	
• to mineral oil	Conditional resistance
• to grease	Conditional resistance
• to water	Conditional resistance
Radiological resistance to UV radiation	Not resistant
Product properties, functions, components general	
Product feature	
• halogen-free	No
• silicon-free	Yes
Standards, specifications, approvals	
Verification of suitability	
• UL-registration	Yes
• RoHS conformity	Yes

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Technical specifications (continued)

Article No.	**6GK1905-0FA00**	**6GK1905-0FB00**	**6GK1905-0FC00**
Product-type designation	**7/8-inch connector**	**7/8-inch connector**	**7/8-inch Power T-Tap PRO**
Product description	7/8" plug-in connector with pin insert, 5-pole	7/8" plug-in connector with socket insert, 5-pole	Power T-piece with two 7/8" socket inserts and one 7/8" pin insert, 5-pole both
Acceptability for application	For field assembly with ET 200	For field assembly with ET 200	For power connection and distribution to ET 200pro modules
Interfaces			
Number of electrical connections for network components and terminal equipment	1	1	3
Design of electrical connection for network components and terminal equipment	7/8 inch plug (male insert)	7/8 inch plug (female insert)	7/8 inch plug (2 x female insert, 1 x male insert)
Mechanical data			
Material of the enclosure	metal	metal	metal
Design, dimensions and weight			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	-
Width	27 mm	27 mm	58.5 mm
Height	27 mm	27 mm	73.5 mm
Depth	83 mm	83 mm	26.5 mm
Net weight	50 g	50 g	112 g
Permitted ambient conditions			
Ambient temperature			
• during operating	-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
Protection class IP	IP65/67	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant	resistant
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability RoHS conformity	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK1908-0DC10-6AA3	6GK1907-0DC10-6AA3	6GK1907-0DB10-6AA3
Product-type designation	**Signaling Contact M12 Cable Connector**	**Power M12 Cable Connector PRO**	**Power M12 Plug PRO**
Product description	M12 connection socket for signaling contact; 5-pole, B-coded	M12 connection socket; 4-pole, A-coded	M12 power plug, 4-pole, A-coded
Acceptability for application	For connection to SCALANCE X208PRO for signaling contact	For connection to SCALANCE W-700 / X208PRO for 24 V DC voltage supply	For connection to PS791-1PRO power supply for 24 V DC voltage supply
Interfaces			
Number of electrical connections for network components and terminal equipment	1	1	1
Design of electrical connection for network components and terminal equipment	M12 connector (B-coded, 5-pin)	M12 connector (female insert, A-coded, 4-pin)	M12 connector (male insert, A-coded, 4-pin)
Mechanical data			
Material of the enclosure	plastic	plastic	plastic
Design, dimensions and weight			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Width	14 mm	19 mm	19 mm
Height	14 mm	19 mm	19 mm
Depth	59 mm	73 mm	73 mm
Net weight	37 g	40 g	40 g
Permitted ambient conditions			
Ambient temperature			
• during operating	-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 maximum	-	-	-
Protection class IP	IP65/67	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant	resistant
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability RoHS conformity	Yes	Yes	Yes

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Ordering data

	Article No.
Power cable 2 x 0.75 Power cable with trailing capability with 2 copper cores (0.75 mm^2) for connecting to M12 plug-in connector; sold by the meter; max. 1 000 m, minimum order quantity 20 m	**6XV1812-8A**
Power cable 5 x 1.5 Power cable with trailing capability with 5 copper cores (1.5 mm^2) for connecting to 7/8" plug-in connector; sold by the meter; max. 1 000 m; minimum order quantity 20 m	**6XV1830-8AH10**
M12 Power Connecting Cable M12-180/M12-180 Flexible 4-core power connecting cable, assembled with A-coded 5-pin M12 connector and A-coded, 5-pin M12 socket to supply the ET 200 with 24 V DC; length:	
• 0.3 m	**6XV1801-5DE30**
• 0.5 m	**6XV1801-5DE50**
• 1.0 m	**6XV1801-5DH10**
• 1.5 m	**6XV1801-5DH15**
• 2.0 m	**6XV1801-5DH20**
• 3.0 m	**6XV1801-5DH30**
• 5.0 m	**6XV1801-5DH50**
• 10 m	**6XV1801-5DN10**
• 15 m	**6XV1801-5DN15**

	Article No.
Additional components	
7/8" plug-in connector Plug with axial cable outlet for field assembly for ET 200, 5-core, plastic enclosure, 1 pack = 5 items	
• Male pins	**6GK1905-0FA00**
• Socket insert	**6GK1905-0FB00**
7/8" Power T-Tap PRO Power T-piece for ET 200 with two 7/8" socket inserts and one 7/8" pin insert 1 pack = 5 items	**6GK1905-0FC00**
Signaling Contact M12 Cable Connector PRO Socket for connection of SCALANCE X208PRO for signaling contact; 5-pole, B-coded, with assembly instructions; 3 items	**6GK1908-0DC10-6AA3**
Power M12 Cable Connector PRO Socket for connection of SCALANCE W-700 for 24 V DC supply voltage; 4-pole, A-coded, with assembly instructions, 3 items	**6GK1907-0DC10-6AA3**
Power M12 Plug PRO Plug for connection to PS791-1PRO power supply for 24 V DC supply voltage; 4-pole, A-coded, with assembly instructions, 3 items	**6GK1907-0DB10-6AA3**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD, German/English	**6GK1975-1AA00-3AA0**

More information

Cable routing:

During storage, transport and cable laying, keep both ends sealed with a shrink-on cap.

Comply with the permissible bending radii and tensile load!

Note:

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 CI PRM 4
Phone: +49 (911) 750-4465
E-mail: juergen.hertlein@siemens.com

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IE TP Cord

Overview



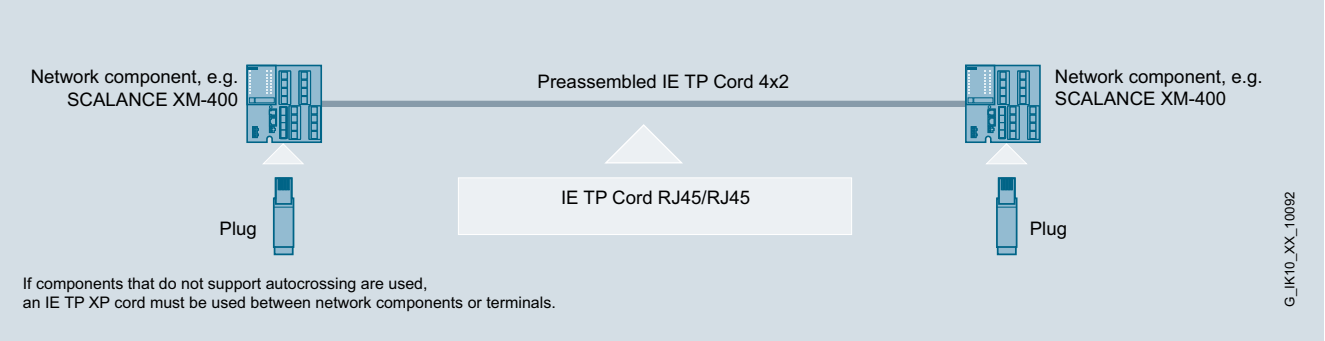
- Patch cable, available as preassembled cables (max. length 10 m)
- With 2 x 2 cores for 10/100 Mbit/s and 4 x 2 cores for 10/100/1 000 Mbit/s Ethernet
- Small cable diameter
- Category Cat5e (2 x 2) and Cat6 (4 x 2) of the international cabling standards ISO/IEC 11801 and EN 50173

Benefits

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- Simple connection of terminals with an RJ45 interface to the interference-proof Industrial Ethernet FC cabling system (10/100/1 000 Mbit/s)
- Quick and error-free commissioning thanks to pre-assembled, factory-tested patch cables
- Simple cable laying due to small cable diameter
- Silicone-free, therefore suitable for use in the automotive industry (for example on paint lines)
- Color-coded RJ45 connectors for differentiation between twisted and non-twisted lines
  - Twisted: RJ45 connector red on both sides
  - Non-twisted: RJ45 connector green on both sides

Application



IE TP Cord RJ45/RJ45 can be used to directly connect individual components (10/100/1 000 Mbits/s)

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Design

- 2 x 2 cores for 10/100 Mbit/s transmission rate;
  4 x 2 cores for 10/100/1 000 Mbit/s transmission rate
- Two cores with two dummy elements twisted into a pair.
- Each pair is encased in plastic film and shielded with a plastic-clad aluminum foil
- Outer woven shield around all pairs comprising tinned copper wires
- Plastic sheath (PVC)

IE TP Cord is available as TP Cord 4 x 2, pre-assembled cables in the following versions:

- ***IE TP Cord RJ45/RJ45***
  with 2 x RJ45 plugs
- ***IE TP XP Cord RJ45/RJ45***
  with 2 x RJ45 plugs, send and receive cables are twisted.

IE TP Cord is available as TP Cord 2 x 2, pre-assembled cables in the following versions:

- ***IE TP Cord 9/RJ45***
  with one 9-pole Sub-D connector and one RJ45 connector
- ***IE TP XP Cord 9/RJ45***
  with one RJ45 connector and one 9-pole Sub-D connector, send and receive cable are twisted
- ***IE TP Cord 9-45/RJ45***
  with one RJ45 connector and one 9-pole Sub-D connector, 45° cable outlet
- ***IE TP XP Cord 9-45/RJ45***
  with one RJ45 connector and one 9-pole Sub-D connector, 45° cable outlet; send and receive cable are twisted
- ***IE TP XP Cord 9/9***
  with two 9-pole Sub-D connectors, send and receive cable are twisted.
- ***IE TP Cord RJ45/15***
  with one RJ45 connector and one 15-pole Sub-D connector; this is used to directly connect data terminals with ITP interfaces to network components with an RJ45 interface.
- ***IE TP XP Cord RJ45/15***
  with one RJ45 connector and one 15-pole Sub-D connector, twisted send and receive cable; used for direct connection of a data terminal with 15-pole Sub-D connector to a data terminal with RJ45 plug.
- ***IE TP Converter Cord 15/RJ45***
  with a 15-pole Sub-D socket with slide locking and an RJ45 plug. A retaining clip clamps it in place.
  IE TP Converter Cord 15/RJ45 2 x 2 is used to connect data terminals with an RJ45 interface to the ITP cabling system, e.g. over the ITP Standard 9/15 cable.

Function

The flexibility of the cable ensures easy installation, for example in a control cabinet, or to connect equipment in a control room. The maximum length of an IE TP Cord is 10 m.

Adapter cables are used to connect devices with a 9-pin ITP interface to devices with an RJ45 interface.

The IE TP Converter Cord 15/RJ45 is used to connect devices with a 15-pin ITP interface to devices with an RJ45 interface.

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Technical specifications

Article No.	**6XV1870-3QH10**	**6XV1850-2JH10**
Product-type designation	**IE TP Cord RJ45/RJ45, 4x2**	**IE TP Cord 9/RJ45, 2x2**
Product description	Patch cable, preferred length, preassembled with two RJ45 connectors	Patch cable, preferred length, preassembled with one 9-pole Sub-D connector an one RJ45 connector
Acceptability for application	Easy connection of data terminals to the IE FC cabling system	Easy connection of data terminals to the IE FC cabling system
Cable designation	LI 02YSCH 4x2x0,15 PIMF GN FRNC	LI 02YSCY 2x2x0,15/0,98 PIMF ICCS GN
Cable length	1 m	1 m
Electrical data		
Damping ratio per length		
• at 10 MHz maximum	86 dB/km	85 dB/km
• at 100 MHz maximum	28 dB/km	278 dB/km
• at 300 MHz maximum	501 dB/km	5 dB/km
• at 600 MHz maximum	735 dB/km	733 dB/km
Impedance		
• for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω
• for frequency range 10 MHz … 600 MHz	100 Ω	100 Ω
Relative symmetrical tolerance		
• of the surge impedance at 1 MHz … 100 MHz	15 %	15 %
• of the surge impedance at 10 MHz … 600 MHz	10 %	6 %
Transfer impedance at 10 MHz	10 mΩ/m	10 mΩ/m
Loop resistance per length maximum	290 Ω/km	300 Ω/km
Insulation resistance coefficient	500 GΩ·m	500 GΩ·m
Mechanical data		
Number of electrical wires	8	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
AWG number	-	-
Core diameter		
• of AWG26 core	0.5 mm	0.48 m
Outer diameter		
• of the inner conductor	0.5 mm	0.48 mm
• of the wire insulation	1 mm	0.98 mm
• of the cable sheath	6.2 mm	-
Symmetrical tolerance of outer diameter of cable sheath	0.3 mm	-
Width of the cable sheath	-	5.8 mm
Symmetrical tolerance of width of cable sheath	-	0.2 mm
Thickness of the cable sheath	-	3.7 mm
Symmetrical tolerance of thickness of cable sheath	-	0.2 mm

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Technical specifications (continued)

Article No.	**6XV1870-3QH10**	**6XV1850-2JH10**
Product-type designation	**IE TP Cord RJ45/RJ45, 4x2**	**IE TP Cord 9/RJ45, 2x2**
Material		
• of the wire insulation	PE	PE
• of the cable sheath	FRNC	PVC
Color		
• of the insulation of data wires	white/blue, white/orange, white/green, white/brown	white/blue, white/orange
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	31 mm	24 mm
• with multiple bends minimum permissible	43.5 mm	42 mm
Weight per length	50 kg/km	32 kg/km
Permitted ambient conditions		
Ambient temperature		
• during operating	-25 … +80 °C	-40 … +70 °C
• during storage	-25 … +80 °C	-40 … +70 °C
• during transport	-25 … +80 °C	-40 … +70 °C
• during installation	-25 … +80 °C	-40 … +70 °C
Protection class IP	IP20	IP20
Burning behaviour	flame resistant according to IEC 60332-1	flame resistant according to IEC 60332-1
Chemical resistance		
• to mineral oil	oil resistant according to IEC 60811-2-1 (4 h / 70°C)	oil resistant according to IEC 60811-2-1 (4 h / 70°C)
• to grease	Conditional resistance	Conditional resistance
Product properties, functions, components general		
Product feature		
• halogen-free	Yes	No
• silicon-free	Yes	Yes
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	No	No
UL/ETL style with 600 V rating	No	No
Verification of suitability		
• UL-registration	Yes	Yes

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IE TP Cord

Ordering data

	Article No.
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 plugs	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE TP XP Cord RJ45/RJ45	
Twisted TP cable 4 x 2 with 2 RJ45 plugs	
• 0.5 m	**6XV1870-3RE50**
• 1 m	**6XV1870-3RH10**
• 2 m	**6XV1870-3RH20**
• 6 m	**6XV1870-3RH60**
• 10 m	**6XV1870-3RN10**
IE TP Cord 9/RJ45	
TP cable 2 x 2 with one 9-pole sub D connector and one RJ45 connector	
• 0.5 m	**6XV1850-2JE50**
• 1 m	**6XV1850-2JH10**
• 2 m	**6XV1850-2JH20**
• 6 m	**6XV1850-2JH60**
• 10 m	**6XV1850-2JN10**
IE TP XP Cord 9/RJ45	
Twisted TP cable 2 x 2 with one 9-pole sub D connector and one RJ45 connector	
• 0.5 m	**6XV1850-2ME50**
• 1 m	**6XV1850-2MH10**
• 2 m	**6XV1850-2MH20**
• 6 m	**6XV1850-2MH60**
• 10 m	**6XV1850-2MN10**
IE TP Cord 9-45/RJ45	
TP cable 2 x 2 with one RJ45 connector and one Sub D connector with 45° cable outlet (not for OSM/ESM)	
• 1 m	**6XV1850-2NH10**
IE TP XP Cord 9-45/RJ45	
Twisted TP cable 2 x 2 with one RJ45 connector and one Sub D connector with 45° cable outlet (not for OSM/ESM)	
• 1 m	**6XV1850-2PH10**
IE TP XP Cord 9/9	
Twisted TP cable 2 x 2 for direct connection of two Industrial Ethernet components with an ITP interface with two 9-pole Sub D connectors	
• 1 m	**6XV1850-2RH10**

	Article No.
IE TP Cord RJ45/15	
TP cable 2 x 2 with one 15-pole Sub D connector and one RJ45 connector	
• 0.5 m	**6XV1850-2LE50**
• 1 m	**6XV1850-2LH10**
• 2 m	**6XV1850-2LH20**
• 6 m	**6XV1850-2LH60**
• 10 m	**6XV1850-2LN10**
IE TP XP Cord RJ45/15	
Crossed TP cable 2 x 2 with one 15-pole sub D connector and one RJ45 connector	
• 0.5 m	**6XV1850-2SE50**
• 1 m	**6XV1850-2SH10**
• 2 m	**6XV1850-2SH20**
• 6 m	**6XV1850-2SH60**
• 10 m	**6XV1850-2SN10**
IE TP Converter Cord 15/RJ45	
TP connecting cable 2 x 2 for connecting data terminals with RJ45 interfaces to the ITP cabling system; with a 15-pole Sub D socket with slide locking and an RJ45 connector.	
• 0.5 m	**6XV1850-2EE50**
• 2 m	**6XV1850-2EH20**
IE FC Outlet RJ45	**6GK1901-1FC00-0AA0**
For connection Industrial Ethernet FC cables and TP Cords; graded prices from 10 and 50 units	
IE FC RJ45 Modular Outlet	
FastConnect RJ45 Outlet for Industrial Ethernet with interface for a replaceable insert;	
• **With 2FE insert** ; replaceable insert for 2 x 100 Mbit/s interfaces	**6GK1901-1BE00-0AA1**
• **With 1GE insert**; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
• **With power insert**; replaceable insert for 1 x 24 V DC and 1 x 100 Mbit/s interface	**6GK1901-1BE00-0AA3**
SIMATIC NET Manual Collection	**6GK1975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

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:

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Overview



Connecting cables with M12 plug or RJ45 plugs for transferring data or power between Industrial Ethernet nodes.

Industrial Ethernet Connecting Cable M12-180/M12-180 (D-coded)

- Pre-assembled connecting cable (IE FC TP Trailing Cable GP) for connecting Industrial Ethernet nodes (such as SIMATIC ET 200, SCALANCE X208PRO and SIMATIC RF systems) with IP65/IP67 degree of protection
- For transmission rates of 10/100 Mbit/s

Industrial Ethernet Connecting Cable M12-180 (D-coded)/ IE FC RJ45 Plug-145

- Pre-assembled connecting cable (IE FC TP Trailing Cable GP) for connecting Industrial Ethernet nodes (such as SIMATIC ET 200, SCALANCE X208PRO and SIMOTION) with IP65/IP67 degree of protection
- For transmission rates of 10/100 Mbit/s

Industrial Ethernet Connecting Cable IE FC RJ45 plug-180/ IE FC RJ45 plug-180

- Pre-assembled connecting cable (IE FC TP trailing cable GP) for connecting Industrial Ethernet nodes (e.g. SIMATIC ET 200 and SCALANCE X208) with IP20 degree of protection

Power Connecting Cable M12-180/M12-180 (A-coded)

- Pre-assembled connecting cable (4-core power cable, 4 x 0.75 mm^2) for connecting Industrial Ethernet nodes (such as SIMATIC ET 200, SCALANCE X208PRO) with IP65/IP67 degree of protection
- For power transfer (24 V DC, 4-pin)

Benefits

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- Time-saving and fault-free connection of terminal stations by means of pre-fabricated connection cables
- Reliable screen contact and strain relief are integrated
- Comprehensive product range with different lengths and corresponding UL approvals and PROFINET conformity

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Technical specifications

Article No.	6XV1870-8AH10	6XV1871-5TN10
Product-type designation	**IE Connecting Cable M12-180/M12-180**	**IE Connecting Cable M12-180/IE FC RJ45-145**
Product description	Flexible connecting cable (4-core), preferred length, preassembled with two 4-pole M12 connectors (D-coded)	Flexible connecting cable (4-core), preferred length, preassembled with one 4-pole M12 connector (D-coded) and one IE FC RJ45 Plug 145
Acceptability for application	For connecting Industrial Ethernet stations (e.g. SIMATIC ET200pro and SCALANCE X208PRO) to IP 65/67 degree of protection	For connecting Industrial Ethernet stations (e.g. SIMATIC ET200pro, SCALANCE X208PRO and SIMOTION)
Cable designation	2YY (ST) CY 2x2x0,75/1,5-100 LI GN	2YY (ST) CY 2x2x0,75/1,5-100 LI GN
Cable length	1 m	10 m
Electrical data		
Damping ratio per length		
• at 10 MHz maximum	63 dB/km	63 dB/km
• at 100 MHz maximum	213 dB/km	213 dB/km
Impedance for frequency range 1 MHz … 100 MHz	100 Ω	100 Ω
Relative symmetrical tolerance of the surge impedance at 1 MHz … 100 MHz	5 %	5 %
Near-end crosstalk per length at 1 MHz ... 100 MHz	500 dB/km	500 dB/km
Transfer impedance at 10 MHz	20 mΩ/m	20 mΩ/m
Loop resistance per length maximum	120 Ω/km	120 Ω/km
Percentage NVP value	66 %	66 %
Mechanical data		
Number of electrical wires	4	4
Design of shield	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires	Overlapped aluminum-clad foil, sheathed in a braided screen of tin-plated copper wires
Design of the electrical connection FastConnect	-	-
AWG number	-	-
Core diameter of the AWG22 core	0.75 mm	0.75 mm
Outer diameter		
• of the inner conductor	0.75 mm	0.75 mm
• of the wire insulation	1.5 mm	1.5 mm
• of the inner sheath of the cable	3.9 mm	3.9 mm
• of the cable sheath	6.5 mm	6.5 mm
Symmetrical tolerance of outer diameter of cable sheath	0.2 mm	0.2 mm
Material		
• of the wire insulation	PE	PE
• of the inner sheath of the cable	PVC	PVC
• of the cable sheath	PVC	PVC
Color		
• of the insulation of data wires	white / yellow / blue / orange	white / yellow / blue / orange
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	32.5 mm	32.5 mm
• with multiple bends minimum permissible	49 mm	49 mm
• with continuous bending	100 mm	100 mm
Number of bending cycles	3 000 000	3 000 000
• Note	For use in cable carriers, for 3 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s, and an acceleration of 4 m/s²	For use in cable carriers, for 3 million bending cycles with a bending radius of 100 mm, a speed of 4 m/s, and an acceleration of 4 m/s²
Traction stress maximum	150 N	150 N
Weight per length	68 kg/km	68 kg/km

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Technical specifications (continued)

Article No.	6XV1870-8AH10	6XV1871-5TN10
Product-type designation	**IE Connecting Cable M12-180/M12-180**	**IE Connecting Cable M12-180/IE FC RJ45-145**
Permitted ambient conditions		
Ambient temperature		
• during operating	-25 … +75 °C	-25 … +75 °C
• during storage	-25 … +75 °C	-25 … +75 °C
• during transport	-25 … +75 °C	-25 … +75 °C
• during installation	-10 … +60 °C	-10 … +60 °C
Protection class IP	IP65/67	-
Burning behaviour	flame resistant according to UL 1685 (CSA FT 4)	flame resistant according to UL 1685 (CSA FT 4)
Chemical resistance		
• to mineral oil	Conditional resistance	Conditional resistance
• to grease	Conditional resistance	Conditional resistance
• to water	-	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Standards, specifications, approvals		
UL/ETL listing with 300 V rating	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES	Yes: c(UL)us, CMG / PLTC / Sun Res / OIL RES
UL/ETL style with 600 V rating	Yes	Yes
Verification of suitability		
• RoHS conformity	Yes	Yes
Standard for structured cabling	Cat5e	Cat5e
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	No	No
• Bureau Veritas (BV)	No	No
• Det Norske Veritas (DNV)	No	No
• Germanische Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	No	No

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Pre-assembled IE Connecting Cables

Ordering data

	Article No.
IE Connecting Cable M12-180/M12-180	
Pre-assembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (D-coded) up to 85 m, IP65/IP67 degree of protection Length:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1.0 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2.0 m	**6XV1870-8AH20**
• 3.0 m	**6XV1870-8AH30**
• 5.0 m	**6XV1870-8AH50**
• 10 m	**6XV1870-8AN10**
• 15 m	**6XV1870-8AN15**
IE Connecting Cable M12-180/IE FC RJ45 Plug-145	
Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection Length:	
• 2.0 m	**6XV1871-5TH20**
• 3.0 m	**6XV1871-5TH30**
• 5.0 m	**6XV1871-5TH50**
• 10 m	**6XV1871-5TN10**
• 15 m	**6XV1871-5TN15**

	Article No.
IE Connecting Cable IE FC RJ45 Plug-180/IE FC RJ45 Plug-180	
Preassembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 plug-180, IP20 degree of protection; length:	
• 1.0 m	**6XV1871-5BH10**
• 2.0 m	**6XV1871-5BH20**
• 3.0 m	**6XV1871-5BH30**
• 5.0 m	**6XV1871-5BH50**
• 10 m	**6XV1871-5BN10**
• 15 m	**6XV1871-5BN15**
• 20 m	**6XV1871-5BN20**
M12 Power Connecting Cable M12-180/M12-180	
Flexible 4-core power connecting cable, assembled with A-coded 5-pin M12 connector and A-coded, 5-pin M12 socket to supply the ET 200 with 24 V DC; length:	
• 0.3 m	**6XV1801-5DE30**
• 0.5 m	**6XV1801-5DE50**
• 1.0 m	**6XV1801-5DH10**
• 1.5 m	**6XV1801-5DH15**
• 2.0 m	**6XV1801-5DH20**
• 3.0 m	**6XV1801-5DH30**
• 5.0 m	**6XV1801-5DH50**
• 10 m	**6XV1801-5DN10**
• 15 m	**6XV1801-5DN15**
Additional special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
PROFINET Cabling and Interconnection Technology Guideline	http://www.profinet.com

More information

Note:

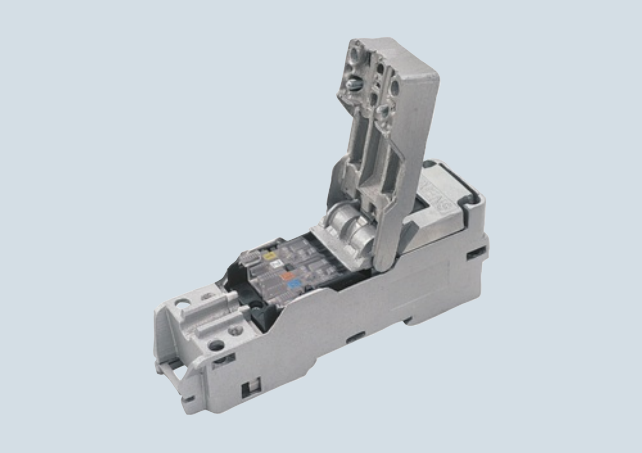
You can order components supplementary to the SIMATIC NET cabling range from your local contact.

Technical advice on this subject is available from:

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E-mail: juergen.hertlein@siemens.com

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Overview



- Simple design of structured twisted-pair cabling
- Extremely short installation times thanks to insulation displacement method
- Rugged full-metal module certified according to Category 5
- Reliable shield contact and strain relief thanks to bolt-on cover
- Color marking prevents errors

Benefits

get Designed for Industry

- Simple connection of network components or terminals to the interference-proof Industrial Ethernet FC cabling system
- Time-saving and error-free installation thanks to FC cables and pre-assembled TP Cords (10/100 Mbit/s)
- Noise-resistant due to rugged metal enclosure
- Flexible mounting options (DIN rail, direct mounting)
- Reliable shield contact and strain relief thanks to bolt-on cover
- Color marking prevents errors

Application

The IE FC Outlet RJ45 is used as a transition from the rugged Industrial Ethernet FC cables used in the industrial environment to prefabricated TP Cord cables (10/100 Mbit/s) using an RJ45 socket.

By connecting several IE FC Outlet RJ45 devices in series, a patch field can be constructed with the required connection density (e.g. 16 outlets over 19" width).

Design

The IE FC Outlet RJ45 has a rugged metal housing and satisfies Category 5 of the international cable standard ISO/IEC 11801 and EN 50173. It is suitable both for mounting on rails and wall mounting by means of four through holes.

The Outlet RJ45 can also be mounted behind a metal plate with a cutout (e.g. in a control cabinet).

The Outlet RJ45 has the following connections

- 4 insulation-piercing contacts for connecting the Industrial Ethernet FC cable 2 x 2 (contacts are color coded)
- RJ45 socket with dust protection cap for connecting different TP Cord cables (10/100 Mbit/s).

Function

The Industrial Ethernet FC Outlet RJ45 is attached directly to the Industrial Ethernet FC cable 2 x 2.

For connection between IE Outlet RJ45 and network components or a terminal device, various preassembled RJ45 patch cables (10/100 Mbit/s) are available.

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Technical specifications

Article No.	6GK1901-1FC00-0AA0
Product-type designation	**IE FC outlet RJ45**
Electrical data	
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Interfaces	
Number of electrical connections	
• for Industrial Ethernet FC TP cables	1
• for network components and terminal equipment	1
Design of the electrical connection	
• for Industrial Ethernet FC TP cables	integrated insulation displacement contacts
• FastConnect	Yes
Mechanical data	
Material of the enclosure	metal
Design, dimensions and weight	
Width	31.7 mm
Height	107 mm
Depth	30 mm
Net weight	300 g
Mounting type	
• 35 mm DIN rail mounting	Yes
• wall mounting	Yes

Article No.	6GK1901-1FC00-0AA0
Product-type designation	**IE FC outlet RJ45**
Permitted ambient conditions	
Ambient temperature	
• during operating	-25 … +70 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Protection class IP	IP20
Standards, specifications, approvals	
Verification of suitability UL-registration	Yes
Standard for structured cabling	Cat5

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Ordering data	Article No.
IE FC Outlet RJ45 For connection of Industrial Ethernet FC cables and TP Cords; graded prices from 10 and 50 units on	**6GK1901-1FC00-0AA0**
IE TP Cord RJ45/RJ45 TP cable 2 x 2 with two RJ45 plugs	
• 0.5 m	**6XV1850-2GE50**
• 1 m	**6XV1850-2GH10**
• 2 m	**6XV1850-2GH20**
• 6 m	**6XV1850-2GH60**
• 10 m	**6XV1850-2GN10**
IE TP XP Cord RJ45/RJ45 TP cable 2 x 2 with two RJ45 plugs	
• 0.5 m	**6XV1850-2HE50**
• 1 m	**6XV1850-2HH10**
• 2 m	**6XV1850-2HH20**
• 6 m	**6XV1850-2HH60**
• 10 m	**6XV1850-2HN10**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1975-1AA00-3AA0**
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 1 000 m; minimum order 20 m	**6XV1840-2AH10**
Preferred length	
• 1000 m	**6XV1840-2AU10**
IE FC TP Flexible Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2B**
IE FC TP FRNC Cable GP 2 x 2 (Type B) 4-core, shielded, halogen-free TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for occasional movement; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2F**
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 as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2D**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-3AH10**
IE FC TP Festoon Cable GP 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use in festoon applications; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2S**
IE FC TP Torsion Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug for use with robots; PROFINET-compatible; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1870-2F**
IE FC TP Food Cable GP 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug 180/90 for the food and beverages industry; PROFINET-compatible; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2L**
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90; marine approval; max. length 1 000 m, minimum order 20 m	**6XV1840-4AH10**
IE TP Ground Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 (additional outer sheath must be removed) for laying in soil; sold by the meter, max. length 1 000 m, minimum order 20 m	**6XV1871-2G**
IE TP Train Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC RJ45 Plug and IE FC M12 Plug PRO; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1871-2T**

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IE FC RJ45 Modular Outlet

Overview



- Simple connection technology (insulation displacement contacts) for 8-core Industrial Ethernet FastConnect twisted pair installation cables (Cat6)
- Safe connection technology thanks to visible connection area
- Industry-standard design
  - Rugged metal housing
  - Dust caps
- Wall and DIN rail mounting inside or outside control cubicles thanks to IP40 protection
- Good electromagnetic shielding and conduction due to metal housing
- Integral strain relief for 8-core installation cables
- Replaceable inserts for
  - 2 x Fast Ethernet connection
    IE FC RJ45 Modular Outlet Insert 2FE
  - 1 x Gigabit Ethernet connection
    IE FC RJ45 Modular Outlet insert 1GE

Benefits

get Designed for Industry

- Easy and problem-free assembly due to integrated color-coded insulation displacement contacts
- Time-saving and trouble-free installation with 8-core Industrial Ethernet FC TP installation cables
- Universal use due to replaceable inserts (insert for two 10/100 Mbit/s ports, one 1 000 Mbit/s port or one 24 V DC power supply and 100 Mbit/s port)
- Wide operating temperature range (-20 °C to +70 °C)
- Reliable shield contact and strain relief thanks to bolt-on cover
- Protection of investment, as a 100 Mbit/s network can be upgraded without difficulty to a 1 000 Mbit/s network by replacing the insert without having to release the cable contacts

Application

The 8-core cabling system of SIMATIC NET allows transfer rates of 10/100/1000 Mbit/s for Ethernet and for the service-independent cabling from this office environment. Thanks to the 8-core cabling it is now possible to implement two Industrial Ethernet connections for Fast Ethernet, but in future it will also be possible to upgrade to a Gigabit Ethernet connection. This implements the transition from 4-core Industrial Ethernet FastConnect TP cabling system to the 8-core Gigabit cabling system.

The FC RJ45 Modular Outlet base module can optionally be equipped with two different replaceable inserts, as follows:

- IE FC RJ45 Modular Outlet Insert 2FE with 2 x RJ45 sockets for 100 Mbit/s systems
- IE FC RJ45 Modular Outlet Insert 1GE with 1 x RJ45 socket for 1 000 Mbit/s systems

Thus it is possible not only to implement individual device connections, but also 100 Mbit/s dual connections.

By replacing the insert, it is possible to switch from network structures that are operated at transfrer rates of 100 Mbit/s to structures with rates of 1 000 Mbit/s. Replacement of the cabling is not necessary (permanent cabling).

Like the 4-wire cabling system, the Gigabit cabling system with the IE FC RJ45 Modular Outlet also takes the conditions in the field of industrial automation into account. No special tools are required for the assembly; the same FC stripping tool is used as for the 4-wire system.

8-wire FC installations cables are used for the cabling (AWG 22):

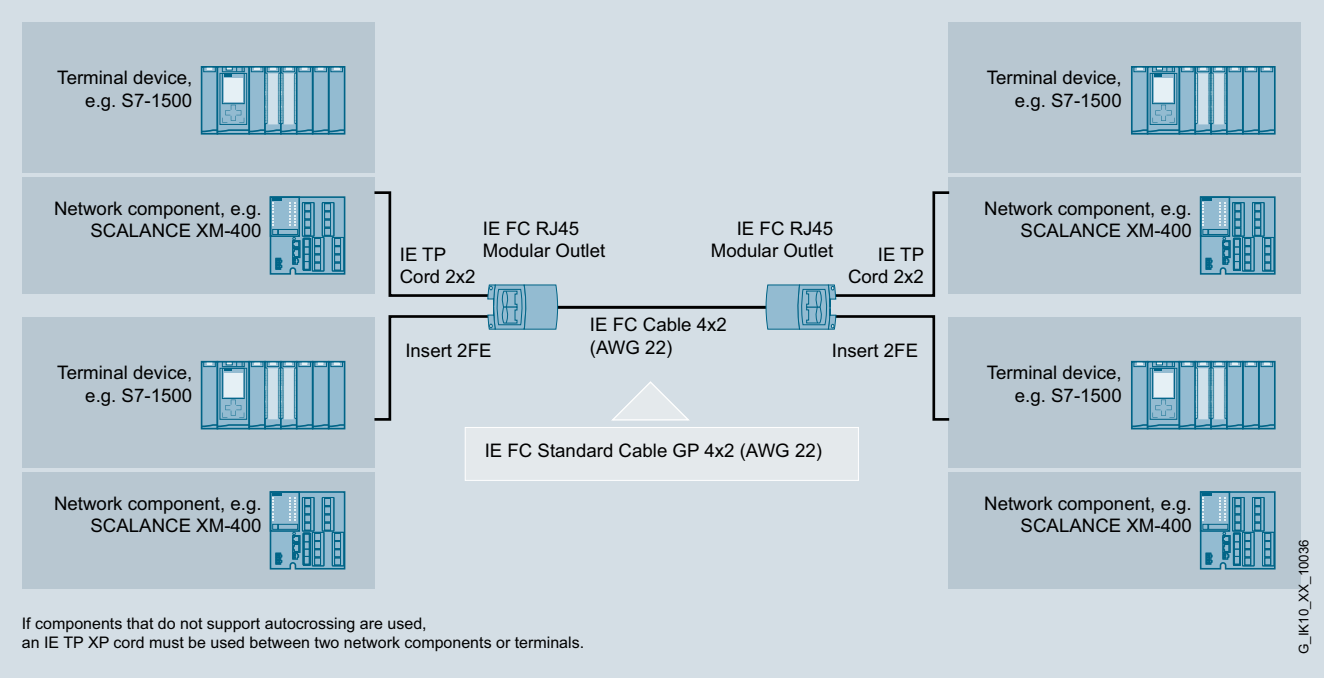
- IE FC Standard Cable 4 x 2;
  for fixed routing as standard type for the IE FC RJ45 Modular Outlet Inserts 2FE and 1GE

Max. distance which can be covered between two IE FC Modular Outlets using IE FC Standard Cable is 90 m; the total length of the patch cords to the terminal units at each end must not exceed 10 m.

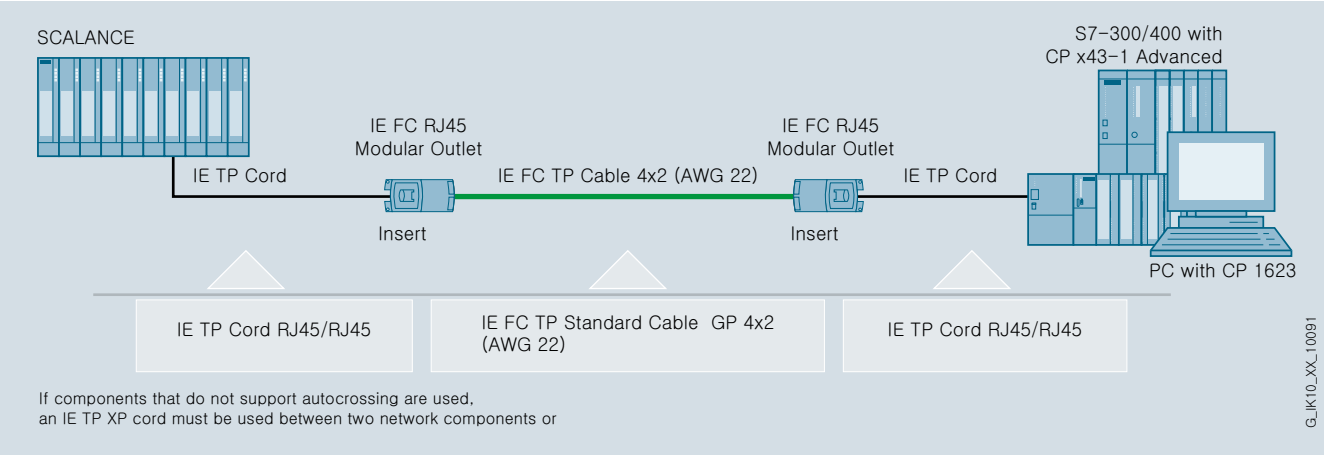
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Application (continued)

Application examples



IE TP Cord can be used with IE FC RJ45 Modular Outlet with Insert 2FE (10/100 Mbit/s)



IE TP Cord RJ45/RJ45 can be used for patch technology with IE FC RJ45 Modular Outlet with Insert 1GE (10/100/1 000 Mbit/s)

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IE FC RJ45 Modular Outlet

2

Design

IE FC RJ45 Modular Outlet (base modules)

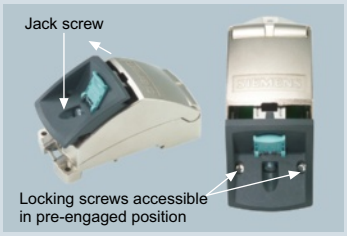
- Robust metal housing, complies with Category 6 of the international cabling standards ISO/IEC 11801 and EN 50173
- Suitable both for DIN rail and wall mounting
- Thanks to its high degree of protection IP40, it can be mounted directly on site

Ports:

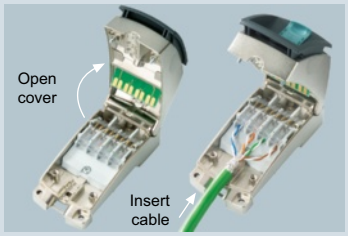
- 8 insulation displacement contacts for connection of the 8-core Industrial Ethernet FC installation cables
- Interface for insertion of a replaceable insert with one or two RJ45 sockets or one RJ45 socket and one terminal for 24 V DC voltage supply (outlet insert, outlet power insert).

① 

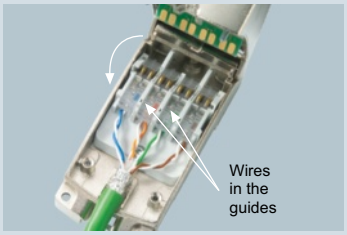
As delivered

② 

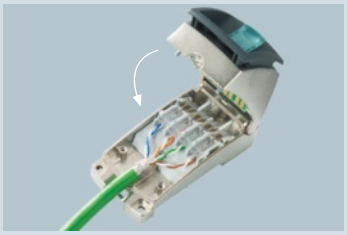
Release insert with jack screw and pull into pre-engaged position

③ 

Connect cable

④ 

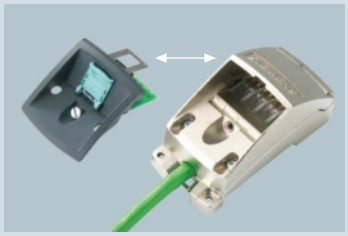
Connect cable:
Press down insulation displacement contacts

⑤ 
Close cover

⑥ 
Push insert into end position. Tighten the interlocking screws of the strain-relief, push insert in, tighten jack screw

⑦ 
Outlet assembly complete

⑧ 
Outlet ready for use

⑨ 
Exchanging the insert: Insert can be replaced while basic housing is closed by pulling it past the pre-engaged position.

G_IK10_XX_30029

Mounting instructions

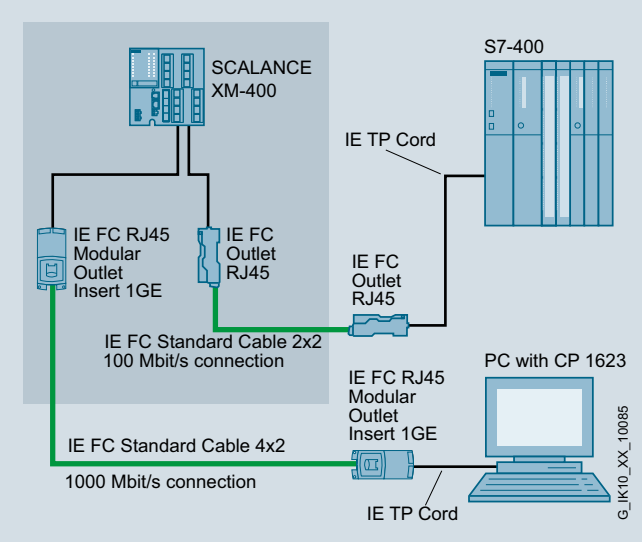
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Function

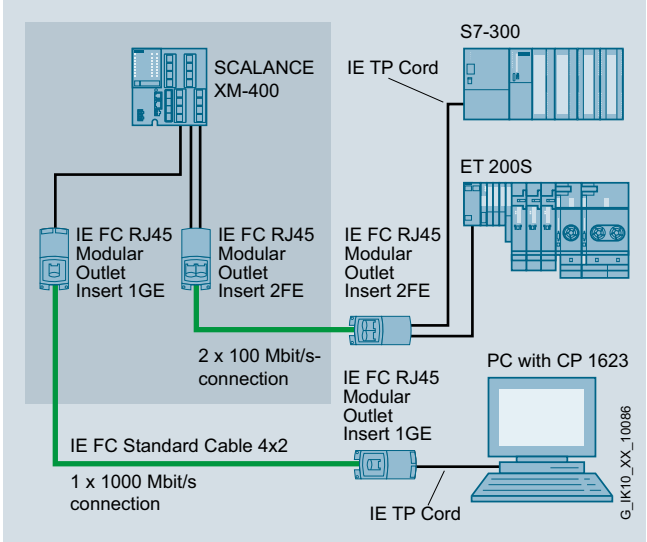
The IE FC RJ45 Modular Outlet is connected direct to the 8-core Industrial Ethernet FC cables 4 x 2. Pre-assembled RJ45 patch cables (TP cord) are available for the connection between outlet and network component or data terminal. These conform with Cat6 of the international cabling standards.

When housing is opened, colored markings on the contact element simplify connection of the individual wires to the insulation displacement contacts.

A maximum of 80 m can be covered between the Outlet and the IP67 hybrid connector. The connection between Outlet and data terminal can be established using a patch cable with a maximum length of 6 m.



System configuration with IE FC RJ45 Modular Outlet and IE FC Outlet RJ45



System configuration with IE FC RJ45 Modular Outlet 100 Mbit/s and 1 000 Mbit/s

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Technical specifications

Article No.	6GK1901-1BE00-0AA0	6GK1901-1BE00-0AA1	6GK1901-1BE00-0AA2	6GK1901-1BE00-0AA3
Product-type designation	**IE FC RJ45 modular outlet (without insert)**	**IE FC RJ45 modular outlet (insert 2FE)**	**IE FC RJ45 modular outlet (insert 1GE)**	**IE FC RJ45 modular outlet (power insert)**
Electrical data				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	-	1 000 Mbit/s	-
Interfaces				
Number of electrical connections				
• for Industrial Ethernet FC TP cables	1	1	1	1
• for network components and terminal equipment	-	2	1	1
Design of the electrical connection				
• for Industrial Ethernet FC TP cables	integrated insulation displacement contacts	integrated insulation displacement contacts	integrated insulation displacement contacts	integrated insulation displacement contacts
• for FC RJ45 modular outlet insert 2FE	-	2 x RJ45 socket (10/100 Mbit/s)	-	-
• for FC RJ45 modular outlet insert 1GE	-	-	1 x RJ45 socket (10/100 Mbit/s)	-
• for FC RJ45 modular outlet power insert	-	-	-	1 x RJ45 socket (10/100 Mbit/s), 1 x 24 V DC terminal
• FastConnect	Yes	Yes	Yes	Yes
Mechanical data				
Material of the enclosure	metal	metal	metal	metal
Design, dimensions and weight				
Width	50 mm	50 mm	50 mm	50 mm
Height	115.25 mm	115.25 mm	115.25 mm	115.25 mm
Depth	58.95 mm	58.95 mm	58.95 mm	58.95 mm
Net weight	450 g	450 g	450 g	450 g
Mounting type				
• 35 mm DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes
Permitted ambient conditions				
Ambient temperature				
• during operating	-20 … +70 °C	-20 … +70 °C	-20 … +70 °C	-20 … +70 °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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP40	IP40	IP40	IP40
Standards, specifications, approvals				
Verification of suitability RoHS conformity	Yes	Yes	Yes	Yes
Verification of suitability UL-registration	Yes	Yes	Yes	Yes
Standard for structured cabling	Cat 6	Cat 6	Cat 6	Cat 6

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Ordering data

	Article No.
IE FC RJ45 Modular Outlet FastConnect RJ45 Outlet for Industrial Ethernet with interface for a replaceable insert;	
• without replaceable insert	**6GK1901-1BE00-0AA0**
• **With 2FE insert**; replaceable insert for 2 x 100 Mbit/s interfaces	**6GK1901-1BE00-0AA1**
• **With 1GE insert**; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
IE FC RJ45 Modular Outlet Insert 2FE Replaceable insert for FC Modular Outlet Base; 2 x RJ45 for 2 x 100 Mbit/s interfaces; 1 pack = 4 items	**6GK1901-1BK00-0AA1**
IE FC RJ45 Modular Outlet Insert 1GE Replaceable insert for FC Modular Outlet Base; 1 x RJ45 for 1 x 1 000 Mbit/s interface; 1 pack = 4 items	**6GK1901-1BK00-0AA2**

	Article No.
IE FC TP Standard Cable 4 x 2 8-core FastConnect cable (Cat6) for permanent wiring; sold by the meter	**6XV1870-2E**
IE TP Cord 8-core patch cable for connection between FC Modular Outlet base modules and data terminal; available in different lengths	see IE TP Cord
IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**

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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

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.

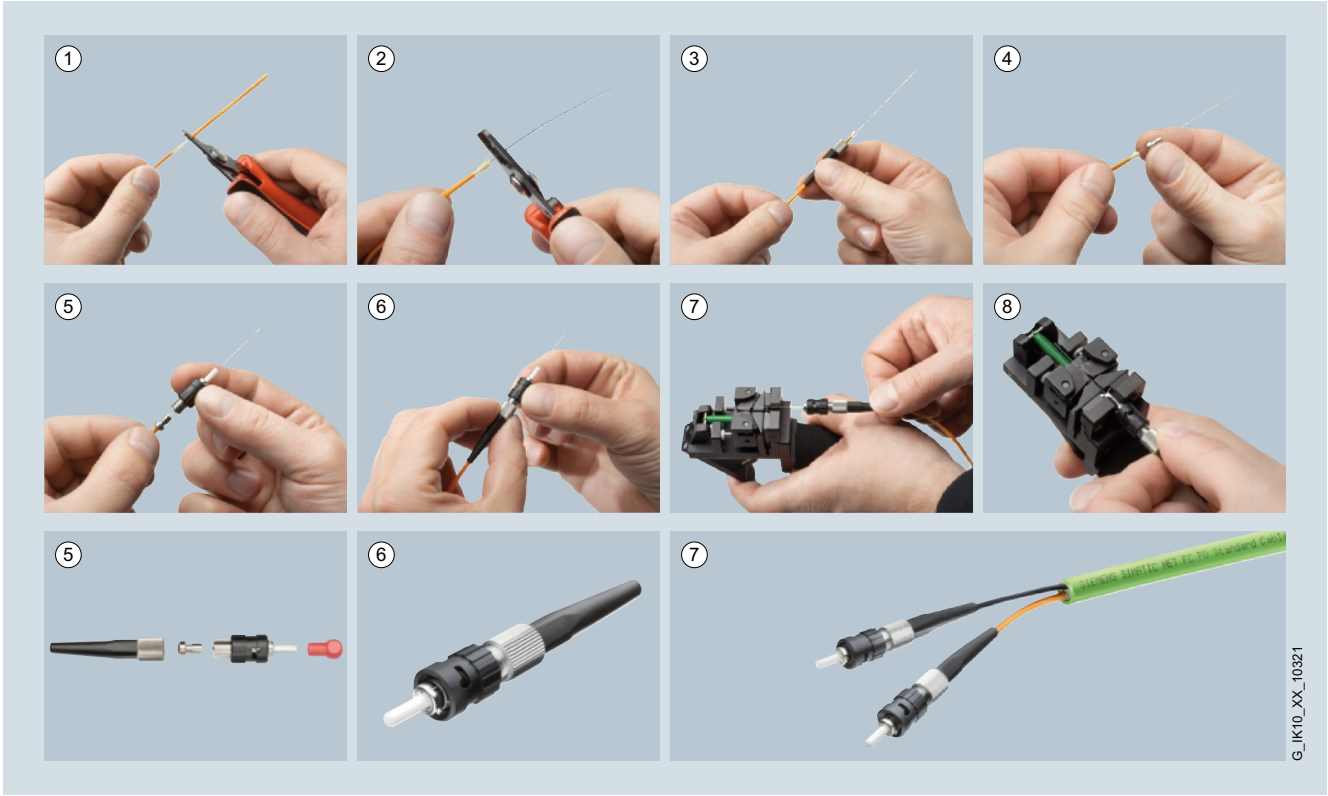
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Application

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

Assembly with FastConnect for glass fiber-optic cables



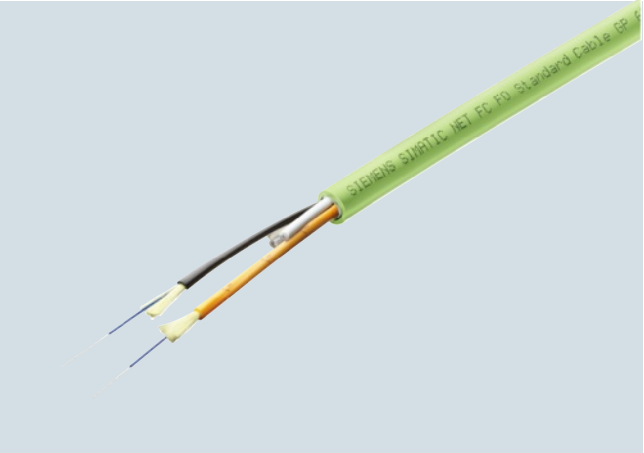
Steps for assembly of Industrial Ethernet fiber-optic cables with Industrial Ethernet FastConnect

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FC glass fiber-optic cables

2

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

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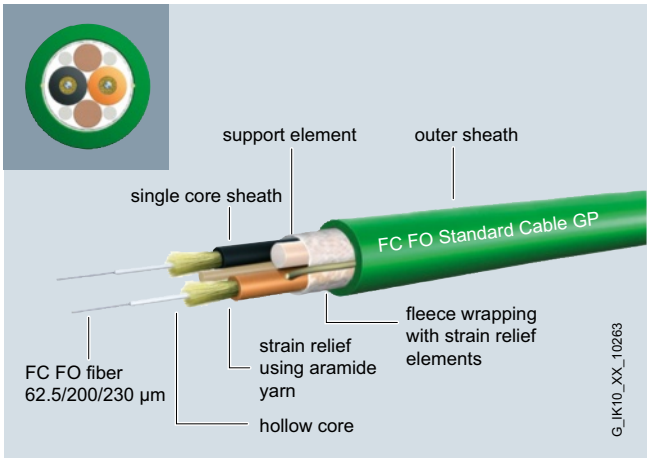
- Avoidance of excessive cable lengths in the control cabinet, as the fiber-optic cables can be assembled to the right length on site
- Easy installation of cables in buildings, as cables can be pulled in without connectors attached
- Simple extension of installed glass fiber-optic cables via SC and BFOC couplers
- 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 Industrial Ethernet 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. To extend existing lines, a BFOC or SC coupler may be used depending on the connection technology.

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:

- 3 000 m for 100 Mbit/s Ethernet or for PROFIBUS
- 350 m for 1 000 Mbit/s Ethernet (1000Base-SX)
- 550 m for 1 000 Mbit/s Ethernet (1000Base-LX)

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

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Technical specifications

Article No.	**6XV1847-2A**	**6XV1847-2C**
Product-type designation	**FC FO standard cable GP**	**FC FO trailing cable**
Product description	Glass fiber-optic cable for assembly in the field, sold by the meter, unassembled	Flexible glass fiber-optic cable for assembly in the field, sold by the meter, unassembled
Acceptability for application	Cable for fixed routing in cable ducts and conduits, UL approval	Cable for high mechanical loading for use in trailing cables indoors and outdoors
Version of the assembled FO cable	can be assembled with four BFOC or SC connectors	can be assembled 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		
Damping ratio 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
Bandwidth length product		
• at 850 nm	200 GHz·m	200 GHz·m
• at 1300 nm	500 GHz·m	500 GHz·m
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	2
Version of the FO conductor fiber	Multi-mode gradient fiber 62.5/200/230 µm	Multi-mode gradient fiber 62.5/200/230 µm
Design of the FOC core	Fixed core	Fixed core
Design of the fiber-optic cable	Segmentable cable	Segmentable cable
Outer diameter		
• of optical fibers	62.5 µm	62.5 µm
• of the optical fiber sheath	230 µm	230 µm
• of the FOC core sheath	2.2 mm	2.2 mm
• of the cable	7.2 mm	8.8 mm
Symmetrical deviation		
• of the outer diameter of the FOC core sheath	0.1 mm	0.1 mm
• of the outer diameter of the line	0.5 mm	0.5 mm
Material		
• of the fiber-optic cable core	Quartz glass	Quartz glass
• of the optical fiber sheath	ETFE	ETFE
• of the FOC core sheath	PVC	PVC
• of the fiber-optic cable sheath	PVC	PUR
• of the strain relief	Aramide fibers	Aramide fibers (double-ply)
Color		
• of the FOC core sheath	orange / black	orange / black
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	70 mm	88 mm
• with multiple bends minimum permissible	105 mm	88 mm
• with continuous bending	-	88 m
Number of bending cycles	-	5 000 000
Number of torsion cycles in the case of torsion by ± 360° on 1 m cable length	-	-
Traction stress maximum	100 N	800 N
Short-term shear force per length	500 N/cm	500 N/cm
Continuous lateral force per length	300 N/cm	300 N/cm
Weight per length	49 kg/km	65 kg/km

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Technical specifications (continued)

Article No.	6XV1847-2A	6XV1847-2C
Product-type designation	**FC FO standard cable GP**	**FC FO trailing cable**
Permitted ambient conditions		
Ambient temperature		
• during operating	-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
Burning behaviour	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	Conditional resistance	Resistant
• to grease	Conditional resistance	Resistant
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	Resistant	Resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Product component Rodent protection	No	No
Cable length for glass FOC		
• for 100BaseFX for Industrial Ethernet maximum	3 000 m	3 000 m
• for 1000BaseSX for Industrial Ethernet maximum	350 m	350 m
• for 1000BaseLX for Industrial Ethernet maximum	550 m	550 m
• for PROFIBUS maximum	3 000 m	3 000 m
Standards, specifications, approvals		
Verification of suitability	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN 90 Cel, FT1, FT4 (CSA standard C22.2 No232-M1988)	-
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6GK1900-1LB00-0AC0	6GK1900-1GB00-0AC0	6GK1900-1LP00-0AB0	6GK1900-1GP00-0AB0
Product-type designation	**IE SC RJ PCF Plug PRO (Push Pull)**	**FC FO BFOC Plug**	**FC FO SC Coupler**	**FC FO BFOC Coupler**
Product description	SC plug for FastConnect assembly	BFOC plug for FastConnect assembly	SC duplex coupler for FastConnect assembly	BFOC coupler for FastConnect assembly
Acceptability for application	For connecting glass fiber-optic cables, suitable for fast assembly with the FastConnect FO system	For connecting glass fiber-optic cables, suitable for fast assembly with the FastConnect FO system	-	-
Transmission rate				
Transfer rate				
• 1 for Industrial Ethernet	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
• 3 for Industrial Ethernet	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
• with PROFIBUS	9.6 kbit/s … 12 Mbit/s	9.6 kbit/s … 12 Mbit/s	9.6 kbit/s … 12 Mbit/s	9.6 kbit/s … 12 Mbit/s
Interfaces				
Number of optical interfaces for optical waveguide	1	1	1	1
Design of optical connections for network components or terminal devices	SC connector	BFOC connector	SC duplex coupling	BFOC coupling
Design of the electrical connection FastConnect	Yes	Yes	Yes	Yes
Mechanical data				
Material of the enclosure	Metal and plastic	Metal and plastic	Metal and plastic	Metal and plastic
Design, dimensions and weight				
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Width	8 mm	10 mm	9 mm	11 mm
Height	8 mm	10 mm	35 mm	11 mm
Depth	49 mm	22 mm	28 mm	29.5 mm
Net weight	11 g	9 g	18 g	9 g
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Product properties, functions, components general				
Product feature silicon-free	Yes	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Verification of suitability RoHS conformity	Yes	Yes	Yes	Yes

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Ordering data

	Article No.
FC FO standard cable GP 62.5/200/230 FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	**6XV1847-2A**
FC FO trailing cable FC FO trailing cable for use in tow chains and moving applications; sold by the meter	**6XV1847-2C**
FC FO termination kit 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	**6GK1900-1GL00-0AA0**
FC SC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 duplex plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
FC BFOC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC coupler FC SC duplex coupling; (1 pack = 5 units)	**6GK1900-1LP00-0AB0**
FC BFOC coupler FC BFOC coupling; (1 pack = 10 units)	**6GK1900-1GP00-0AB0**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1975-1AA00-3AA0**

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 CI PRM 4
Phone: +49 (911) 750-4465
E-mail: juergen.hertlein@siemens.com

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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

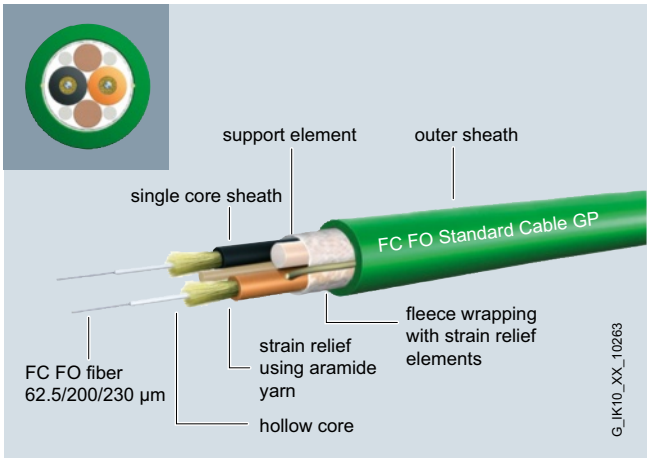
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- Simple installation of the unassembled cable
- Flexible connector assembly possible on site (SC/BFOC connectors)
- Prevention of faults by simply checking the assembled connectors using a microscope
- Simple repair of FC glass fiber-optic cables 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 3 000 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

	Article No.
FC FO termination kit 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	**6GK1900-1GL00-0AA0**

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:

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E-mail: juergen.hertlein@siemens.com

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Overview



- Optical signal transmission
- No radiation along the cable
- Unaffected by external noise fields
- No grounding problems
- Electrical isolation
- Low weight
- Easy routing

Application

The fiber optic (FO) cable is used for transmitting signals with the help of waves in the optical frequency range. 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 fiber optic cable is provided with a protective coating. The term “fiber” is often also used for fiber-optic cables (FOC).

Design

Fiber-optic cables with glass fibers , PCF fibers (**P**olymer **C**ladded **F**iber) and POF fibers (**P**olymer **O**ptical **F**iber) are offered for Industrial Ethernet:

- Glass fiber-optic cable;
  duplex cable for fiber-optic networks indoors and outdoors
- POF fiber-optic cable;
  Duplex cable for POF networks in the indoor area
- PCF fiber-optic cable;
  duplex cable for PCF networks indoors and outdoors

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 cables 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.

Product overview
PROFINET fiber optic, PCF and POF cable

		PROFINET Type B	PROFINET Type C
		fixed or flexible cable depending on cable design	extremely flexible, continuous movement, vibrations or torsion loading, also for special applications
Fiber Optic Cable	**2x 50/125µ**		
FO Standard Cable GP 6XV1 873-2A		–	•
FO FRNC Cable 6XV1 873-2B		•	–
FO Trailing Cable 6XV1 873-2C		–	•
FO TP Trailing Cable GP 6XV1 873-2D		–	•
FO Ground Cable 6XV1873-2G		–	•
FO Robust Cable GP		–	•
FO Robust Cable GP	**4x 9/125/900µ**	–	–
PCF Cable	**2x 200/230µ**		
PCF Standard Cable GP 6XV1 861-2A		•	–
PCF Tailing Cable 6XV1 861-2C		•	–
PCF Tailing Cable GP 6XV1 861-2C		•	–
POF Cable	**2x 980/1 000µ**		
POF Standard Cable GP 6XV1 874-2A		•	–
POF Trailing Cable 6XV1 874-2B		–	•

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Overview



- Used for the optical Industrial Ethernet and PROFIBUS networks
- Rugged design for industrial applications indoors and outdoors
- Halogen-free design for installation inside buildings
- Trailing cable for the special application of forced motion control
- High immunity to noise thanks to insensitivity to electro-magnetic fields
- Available preassembled
- Extensive approvals (UL)

Benefits

get Designed for Industry

- Easy routing with
  - Pre-assembled cables
  - No grounding problems
  - Very light fiber-optic cable
- Tap-proof
  due to lack of radiation from the cable
- Silicon-free;
  therefore suitable for use in the automotive industry
  (e.g. on paint shop conveyors)

Application

Marine duplex FOC SIENOPYR

Halogen-free, non-crush, flame-retardant, marine-approved fiber-optic cable for permanent installation on ships and offshore platforms indoors and on open deck. Sold by the meter

Fiber-optic indoor cable

Halogen-free fiber-optic cable, non-crush, flame-retardant, for installation inside buildings (e.g. in production halls and in building automation). Supplied in fixed lengths, pre-assembled with four BFOC connectors.

Standard FOC/FRNC cable

Fiber-optic cables for the following application areas indoors and outdoors

- For routing above ground
- For installation inside buildings.

Sold by the meter and in fixed lengths, pre-assembled with four BFOC connectors or four SC connectors.

Fiber-optic trailing cable

Fiber-optic cables for the special application of forced motion control, such as in continuously moving machine parts (in trailing cables) indoors and outdoors. Two cable variants are available for this application:

- FO Trailing Cable;
  Cable for high mechanical stress, PUR outer sheath,
  no UL approval
- FO Trailing Cable GP (general purpose);
  Cable for low mechanical stress, PVC outer sheath,
  with UL approval

Sold by the meter and in fixed lengths, pre-assembled with four BFOC connectors or four SC connectors.

Fiber-optic outdoor cable

Waterproof cable (lengthwise and sideways) for use outdoors with non-metallic protection against rodents for laying into the ground.

Sold by the meter and in fixed lengths, pre-assembled with four BFOC connectors or four SC connectors.

Note:

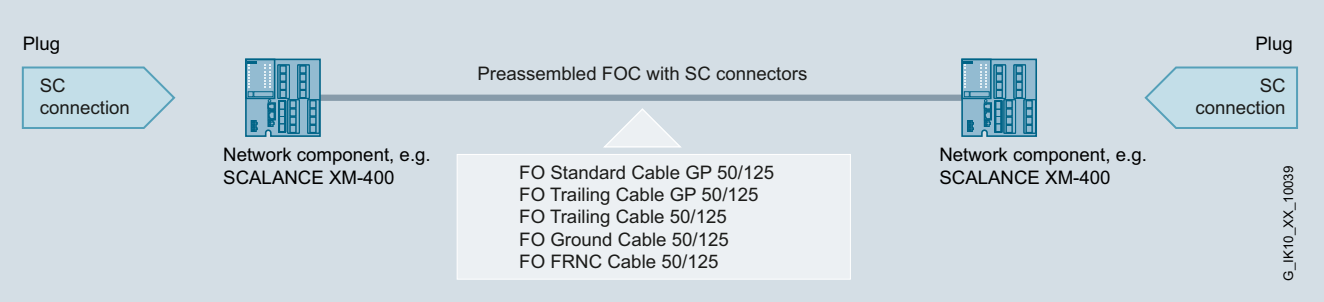
Special tools and specially trained personnel are required for pre-assembling glass fiber-optic cables

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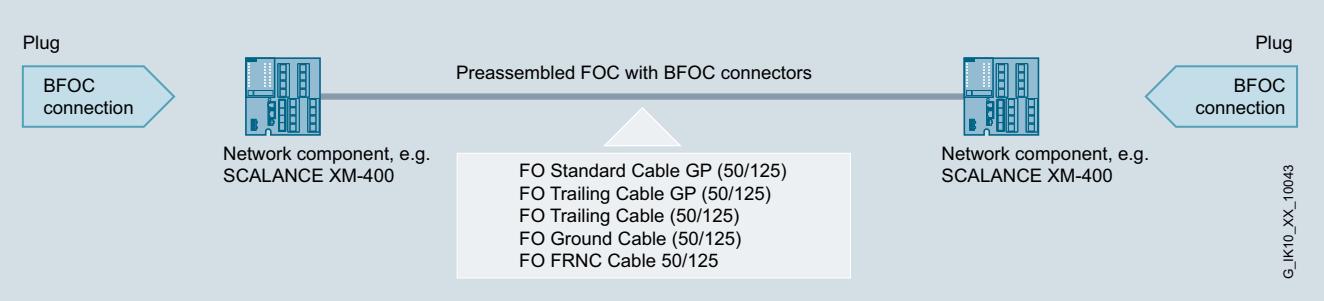
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Application (continued)

Application examples



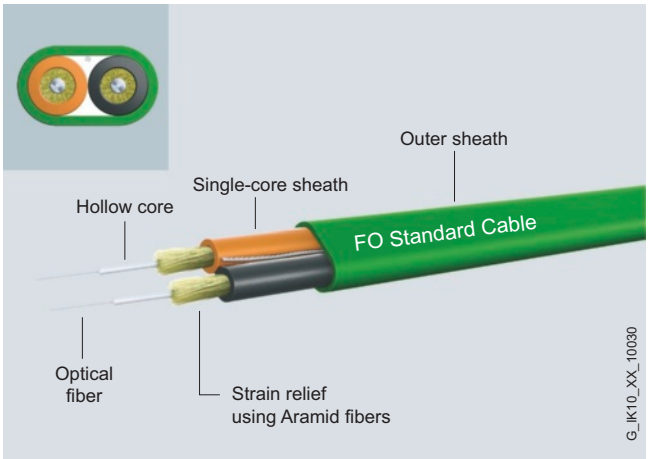
Use of pre-assembled fiber-optic cables with SC connectors (1 000 Mbit/s)



Use of pre-assembled fiber-optic cables with BFOC connectors (100 Mbit/s)

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Design



The following types of cable are available:

- 100Base FX;
  62.5/125 µm fiber, 4 000 m
- 100Base FX;
  50/125 µm fiber, 5 000 m
- 100Base FX;
  9/125 µm fiber, 26 000 m
- 1000Base SX;
  50/125 µm fiber, 750 m
- 1000Base LX;
  50/125 µm fiber, 2 000 m
- 1000Base LX;
  9/125 µm fiber, 10 000 m
- 10GBASE-SR;
  62.5/125 µm fiber, 26 m;
  50/125 µm OM2 fiber 82 m;
  50/125 µm OM3 fiber 300 m
- 10GBASE-LR;
  9/125 µm fiber, 10 000 m;
- 10GBASE-ER;
  9/125 µm fiber, 40 000 m;

The distances that can be spanned by cables depend on the device-specific wavelength.

In the respective applications, the maximum cable lengths must be taken into account. Passive connection of different fiber types is not permissible. The use of 50 µm fiber is recommended for future installations due to the greater range of gigabit Ethernet. Use of the 62.5 µm fiber is only recommended for existing network installations. In order to span very long distances, the use of singlemode cables with a 9 µm fiber is recommended.

Cable types	50/125 µm	62.5/125 µm	9/125 µm
FO standard cable GP (50/125/1 400)	•	–	–
FO FRNC cable (50/125/1 400)	•	–	–
FO trailing cable (50/125/1 400)	•	–	–
FO trailing cable GP (50/125/1 400)	•	–	–
FO ground cable (50/125/1 400)	•	–	–
FO robust cable GP (50/125/900)	•	–	–
Fiber-optic standard cable (62.5/125/900)	–	•	–
INDOOR fiber-optic cable (62.5/125/900)	–	•	–
Flexible fiber-optic trailing cable (62.5/125/1 400)	–	•	–
SIENOPYR marine duplex fiber-optic cable (62.5/125/900)	–	•	–
FO robust cable GP (4E9/125/900)	–	–	•

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Technical specifications

Article No.	6XV1873-2A	6XV1873-2B	6XV1873-2G
Product-type designation	**FO Standard Cable GP**	**FO FRNC Cable GP**	**FO Ground Cable**
Product description	Glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable, sold by the meter, unassembled
Acceptability for application	Cable for indoor and outdoor use, UL approval	Halogen-free cable for indoor and outdoor use, for fixed installation, UL approval	Cable with longitudinal and lateral water tightness with non-metallic protection against rodents for outdoor use and for direct laying in soil.
Version of the assembled FO cable	can be assembled with four BFOC or SC connectors	can be assembled with four BFOC or SC connectors	can be assembled with four BFOC or SC connectors
Cable designation	AT-W(ZN)YY 2x1 G 50/125	AT-W(ZN)HH 2G 50/125 UV	AT-WQ(ZN)Y(ZN)B2Y 2G 50/125
Optical data			
Damping ratio per length			
• at 850 nm maximum	2.7 dB/km	2.7 dB/km	2.7 dB/km
• at 1 300 nm maximum	0.7 dB/km	0.7 dB/km	0.7 dB/km
Bandwidth length product			
• at 850 nm	600 GHz·m	600 GHz·m	600 GHz·m
• at 1 300 nm	1 200 GHz·m	1 200 GHz·m	1 200 GHz·m
Mechanical data			
Number of fibers per FOC core	1	1	1
Number of FOC cores per FOC cable	2	2	2
Version of the FO conductor fiber	Multi-mode gradient fiber 50/125 µm, OM 2	Multi-mode gradient fiber 50/125 µm, OM 2	Multi-mode gradient fiber 50/125 µm, OM 2
Design of the FOC core	Hollow core, filled, diameter 1400 µm	Hollow core, filled, diameter 1400 µm	Hollow core, filled, diameter 1400 µm
Design of the fiber-optic cable	Segmentable	Segmentable	Segmentable
Outer diameter			
• of optical fibers	50 µm	50 µm	50 µm
• of the optical fiber sheath	125 µm	125 µm	125 µm
• of the FOC core sheath	2.9 mm	2.9 mm	2.9 mm
• of the cable	-	9.2 mm	10.5 mm
Symmetrical deviation			
• of the outer diameter of the FOC core sheath	0.1 mm	0.1 mm	0.1 mm
• of the outer diameter of the line	-	0.3 mm	0.5 mm
Width of the cable sheath	7.4 mm	-	-
Thickness of the cable sheath	4.5 mm	-	-
Material			
• of the fiber-optic cable core	Quartz glass	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass	Quartz glass
• of the FOC core sheath	PVC	FRNC	PVC
• of the fiber-optic cable sheath	PVC	FRNC	PE
• of the strain relief	Aramide fibers	Aramide fibers	Aramide fibers
Color			
• of the FOC core sheath	orange / black	orange / black	orange / black
• of the cable sheath	green	green	black
Bending radius			
• with single bend • minimum permissible	45 mm	90 mm	105 mm
• with multiple bends • minimum permissible	65 mm	135 mm	155 mm
Traction stress maximum	500 N	500 N	800 N
Short-term shear force per length	600 N/cm	500 N/cm	500 N/cm
Continuous lateral force per length	400 N/cm	-	300 N/cm
Weight per length	40 kg/km	85 kg/km	90 kg/km

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Technical specifications (continued)

Article No.	6XV1873-2A	6XV1873-2B	6XV1873-2G
Product-type designation	**FO Standard Cable GP**	**FO FRNC Cable GP**	**FO Ground Cable**
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +80 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-25 … +80 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-25 … +80 °C	-40 … +85 °C	-40 … +85 °C
• during installation	-5 … +50 °C	-5 … +50 °C	-5 … +50 °C
Burning behaviour	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 and IEC 60332-3-22 (Cat. A)	Flammable
Chemical resistance			
• to mineral oil	Conditional resistance	Conditional resistance	resistant
• to grease	Conditional resistance	Conditional resistance	resistant
• to water	Conditional resistance	Conditional resistance	resistant
Radiological resistance to UV radiation	resistant	resistant	resistant
Product properties, functions, components general			
Product feature			
• halogen-free	No	Yes	No
• silicon-free	Yes	Yes	Yes
Product component Rodent protection	No	No	Yes
Cable length for glass FOC			
• for 100BaseFX for Industrial Ethernet maximum	5 000 m	5 000 m	5 000 m
• for 1000BaseSX for Industrial Ethernet maximum	750 m	750 m	750 m
• for 1000BaseLX for Industrial Ethernet maximum	2 000 m	2 000 m	2 000 m
• for PROFIBUS maximum	3 000 m	3 000 m	3 000 m
Standards, specifications, approvals			
Verification of suitability	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN 90 Cel, FT1, FT4 (CSA standard C22.2 No232-M1988)	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN (CSA standard C22.2 No232-M1988)	-
• RoHS conformity	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6XV1873-2C	6XV1873-2D
Product-type designation	**FO Trailing Cable**	**FO Trailing Cable GP**
Product description	Glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable, sold by the meter, unassembled
Acceptability for application	Flexible cable for use in trailing cables with high mechanical stress, without UL approval	Flexible cable for use in trailing cables with high mechanical stress, UL approval
Version of the assembled FO cable	can be assembled with four BFOC or SC connectors	can be assembled with four BFOC or SC connectors
Cable designation	AT-W(ZN)Y(ZN)11Y 2G 50/125	AT-W(ZN)Y(ZN)Y 2G 50/125
Optical data		
Damping ratio per length		
• at 850 nm maximum	2.7 dB/km	2.7 dB/km
• at 1 300 nm maximum	0.7 dB/km	0.7 dB/km
Bandwidth length product		
• at 850 nm	600 GHz·m	600 GHz·m
• at 1 300 nm	1 200 GHz·m	1 200 GHz·m
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	2
Version of the FO conductor fiber	Multi-mode gradient fiber 50/125 µm, OM 2	Multi-mode gradient fiber 50/125 µm, OM 2
Design of the FOC core	Hollow core, filled, diameter 1 400 µm	Hollow core, filled, diameter 1 400 µm
Design of the fiber-optic cable	Segmentable	Segmentable
Outer diameter		
• of optical fibers	50 µm	50 µm
• of the optical fiber sheath	125 µm	125 µm
• of the FOC core sheath	2.9 mm	2.9 mm
• of the cable	10.5 mm	10.5 mm
Symmetrical deviation		
• of the outer diameter of the FOC core sheath	0.1 mm	0.1 mm
• of the outer diameter of the line	0.5 mm	0.5 mm
Material		
• of the fiber-optic cable core	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass
• of the FOC core sheath	PVC	PVC
• of the fiber-optic cable sheath	PUR	PVC
• of the strain relief	Aramide fibers	Aramide fibers
Color		
• of the FOC core sheath	orange / black	orange / black
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	150 mm	150 mm
• with multiple bends minimum permissible	200 mm	200 mm
Number of bending cycles	5 000 000	3 500 000
Traction stress maximum	800 N	800 N
Short-term shear force per length	700 N/cm	700 N/cm
Continuous lateral force per length	400 N/cm	400 N/cm
Weight per length	90 kg/km	90 kg/km

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Technical specifications (continued)

Article No.	6XV1873-2C	6XV1873-2D
Product-type designation	**FO Trailing Cable**	**FO Trailing Cable GP**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +80 °C	-25 … +80 °C
• during storage	-40 … +80 °C	-25 … +80 °C
• during transport	-40 … +80 °C	-25 … +80 °C
• during installation	-5 … +50 °C	-5 … +50 °C
Burning behaviour	flammable	flame-retardant in accordance with IEC 60332-1-2 and IEC 60332-3-22 (Cat. A)
Chemical resistance		
• to mineral oil	resistant	Conditional resistance
• to grease	resistant	Conditional resistance
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	resistant	resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Product component Rodent protection	No	No
Cable length for glass FOC		
• for 100BaseFX for Industrial Ethernet maximum	5 000 m	5 000 m
• for 1000BaseSX for Industrial Ethernet maximum	750 m	750 m
• for 1000BaseLX for Industrial Ethernet maximum	2 000 m	2 000 m
• for PROFIBUS maximum	3 000 m	3 000 m
Standards, specifications, approvals		
Verification of suitability	-	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN 90 °C, FT1, FT4 (CSA standard C22.2 No. 232-M1988)
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6XV1820-5AH10	6XV1820-7AH10
Product-type designation	**Fiber optic standard cable**	**INDOOR fiber optic indoor cable**
Product description	Flexible glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable, sold by the meter, unassembled
Acceptability for application	Cable for indoor and outdoor use	Crush-resistant, halogen-free and flame-retardant cable for indoor use
Version of the assembled FO cable	can be assembled with four BFOC connectors	can be assembled with four BFOC connectors
Cable designation	AT-V(ZN)YY 2X1 G 62.5/125	I-V(ZN)HH 2x1 G 62.5/125
Optical data		
Damping ratio per length		
• at 850 nm maximum	3.1 dB/km	3.1 dB/km
• at 1 300 nm maximum	0.8 dB/km	0.8 dB/km
Bandwidth length product		
• at 850 nm	200 GHz·m	200 GHz·m
• at 1 300 nm	600 GHz·m	600 GHz·m
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	2
Version of the FO conductor fiber	Multimode graded-index fiber 62,5/125 µm, OM 1	Multimode graded-index fiber 62,5/125 µm, OM 1
Design of the FOC core	Compact core, diameter 900 µm	Solid core, diameter 900 µm
Design of the fiber-optic cable	Segmentable outer conductor	Segmentable inner conductor
Outer diameter		
• of optical fibers	62.5 µm	62.5 µm
• of the optical fiber sheath	125 µm	125 µm
• of the FOC core sheath	3.5 mm	2.9 mm
Symmetrical deviation		
• of the outer diameter of the FOC core sheath	-	0,1 mm
Width of the cable sheath	9.8 mm	6.8 mm
Thickness of the cable sheath	6.3 mm	3.9 mm
Material		
• of the fiber-optic cable core	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass
• of the FOC core sheath	PVC	FRNC
• of the fiber-optic cable sheath	PVC	FRNC
• of the strain relief	Aramide fibers with additionally integrated compression protection elements	Aramide fibers
Color		
• of the FOC core sheath	Gray	Gray
• of the cable sheath	Black	Orange
Bending radius		
• with single bend minimum permissible	80 mm	30 mm
• with multiple bends minimum permissible	80 mm	50 mm
Traction stress maximum	1 500 N	200 N
Short-term shear force per length	-	300 N/cm
Continuous lateral force per length	200 N/cm	100 N/cm
Weight per length	70 kg/km	30 kg/km

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Technical specifications (continued)

Article No.	6XV1820-5AH10	6XV1820-7AH10
Product-type designation	**Fiber optic standard cable**	**INDOOR fiber optic indoor cable**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +85 °C	-20 … +60 °C
• during storage	-40 … +85 °C	-25 … +70 °C
• during transport	-40 … +85 °C	-25 … +70 °C
• during installation	-5 … +50 °C	-5 … +50 °C
Burning behaviour	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 and IEC 60332-3-22 (Cat. A)
Chemical resistance		
• to mineral oil	not resistant	not resistant
• to grease	not resistant	not resistant
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	resistant	not resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	Yes
• silicon-free	Yes	Yes
Product component Rodent protection	No	No
Cable length for glass FOC		
• for 100BaseFX for Industrial Ethernet maximum	4 000 m	4 000 m
• for 1000BaseSX for Industrial Ethernet maximum	350 m	350 m
• for 1000BaseLX for Industrial Ethernet maximum	550 m	550 m
• for PROFIBUS maximum	3 000 m	3 000 m
Standards, specifications, approvals		
Verification of suitability		
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6XV1820-6AH10	6XV1830-0NH10
Product-type designation	**Flexible fiber optic trailing cable**	**SIENOPYR marine duplex fiber-optic cable**
Product description	Flexible glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable SIENOPYR marine cable, sold by the meter, unassembled
Acceptability for application	Flexible cable for indoor and outdoor use in trailing cables	For fixed installation on ships and offshore units, in all rooms and exposed decks, marine approval assigned
Version of the assembled FO cable	can be assembled with four BFOC connectors	can be assembled with four BFOC connectors
Cable designation	AT-W11Y(ZN)11Y 2 G 62.5/125	MI-VHH 2G 62.5/125 3.1B200 + 0.8F600 + 2x1Cu 300V
Optical data		
Damping ratio per length		
• at 850 nm maximum	3.1 dB/km	3.1 dB/km
• at 1 300 nm maximum	0.8 dB/km	0.8 dB/km
Bandwidth length product		
• at 850 nm	200 GHz·m	200 GHz·m
• at 1 300 nm	600 GHz·m	600 GHz·m
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	2
Version of the FO conductor fiber	Multimode graded-index fiber 62,5/125 µm, OM 1	Multimode graded-index fiber 62.5/125 µm, OM 2
Design of the FOC core	Hollow core, filled, diameter 1 400 µm	Solid core
Design of the fiber-optic cable	Segmentable outer conductor	Segmentable outer conductor
Outer diameter		
• of optical fibers	62.5 µm	62.5 µm
• of the optical fiber sheath	125 µm	125 µm
• of the FOC core sheath	3.5 mm	2.9 mm
• of the cable	12.9 mm	13.3 mm
Symmetrical deviation		
• of the outer diameter of the line	-	0.5 mm
Material		
• of the fiber-optic cable core	Quartz glass	Mineral glass
• of the optical fiber sheath	Quartz glass	-
• of the FOC core sheath	PUR	Polyolefine
• of the fiber-optic cable sheath	PUR	SHF1 mixture
• of the strain relief	Aramide fibers, plus central element made of glass-reinforced plastic	Aramide fibers
Color		
• of the FOC core sheath	Black	-
• of the cable sheath	Black	Black
Bending radius		
• with single bend minimum permissible	150 mm	133 mm
• with multiple bends minimum permissible	150 mm	266 mm
Number of bending cycles	100 000	-
Traction stress maximum	1 000 N	250 N
Weight per length	130 kg/km	220 kg/km

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Technical specifications (continued)

Article No.	6XV1820-6AH10	6XV1830-0NH10
Product-type designation	**Flexible fiber optic trailing cable**	**SIENOPYR marine duplex fiber-optic cable**
Permitted ambient conditions		
Ambient temperature		
• during operating	-30 … +60 °C	-40 … +80 °C
• during storage	-30 … +70 °C	-40 … +80 °C
• during transport	-30 … +70 °C	-40 … +80 °C
• during installation	-30 … +60 °C	-10 … +50 °C
Ambient condition for (standard) operation mode	-	At ambient temperatures below -10 degrees Celsius, the cable must not be subjected to any movements other than the normal vibration levels encountered on board ship
Burning behaviour	Flammable	Flame-retardant in accordance with IEC 60332-3 (Cat. A)
Chemical resistance		
• to mineral oil	resistant	-
• to grease	resistant	-
• to water	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	resistant	resistant
Product properties, functions, components general		
Product feature		
• halogen-free	Yes	Yes
• silicon-free	Yes	Yes
Product component Rodent protection	No	No
Cable length for glass FOC		
• for 100BaseFX for Industrial Ethernet maximum	4 000 m	4 000 m
• for 1000BaseSX for Industrial Ethernet maximum	350 m	350 m
• for 1000BaseLX for Industrial Ethernet maximum	550 m	550 m
• for PROFIBUS maximum	3 000 m	3 000 m
Standards, specifications, approvals		
Verification of suitability	-	-
• RoHS conformity	Yes	Yes
Marine classification association		
• Bureau Veritas (BV)	-	Yes
• Germanische Lloyd (GL)	-	Yes
• Lloyds Register of Shipping (LRS)	-	Yes

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Technical specifications (continued)

Article No.	6XV1873-2R	6XV1843-2R
Product-type designation	**MM FO Robust Cable GP**	**SM FO robust cable GP**
Product description	Glass fiber-optic cable, sold by the meter, unassembled	Glass fiber-optic cable, sold by the meter, unassembled
Acceptability for application	Cable with longitudinal and lateral water tightness with non-metallic protection against rodents for outdoor and indoor use and for direct laying in soil	Cable with longitudinal and lateral water tightness with non-metallic protection against rodents for outdoor and indoor use and for direct laying in soil
Version of the assembled FO cable	can be assembled with tho BFOC, SC and LC duplex plugs	can be assembled with tho BFOC, SC and LC duplex plugs
Cable designation	AT-V(ZN)H(ZN)BH 2G50/125	AT-V(ZN)H(ZN)BH 4E9/125
Optical data		
Damping ratio per length		
• at 850 nm maximum	2.7 dB/km	-
• at 1 300 nm maximum	1 dB/km	0.5 dB/km
• at 1 550 nm maximum	-	0.5 dB/km
Bandwidth length product		
• at 850 nm	600 GHz·m	-
• at 1 300 nm	1 200 GHz·m	-
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	4
Version of the FO conductor fiber	Multi-mode gradient fiber 50/125/245 µm, OM2	Single mode fiber 4E9/125/900, OS1 and OS2
Design of the FOC core	Solid core, diameter 900 µm	Solid core, diameter 900 µm
Design of the fiber-optic cable	Segmentable	Segmentable
Outer diameter		
• of optical fibers	50 µm	9 µm
• of the optical fiber sheath	125 µm	125 µm
• of the FOC core sheath	2.2 mm	2.2 mm
• of the cable	7.5 mm	9 mm
Material		
• of the fiber-optic cable core	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass
• of the FOC core sheath	PE flame retardant	PE flame retardant
• of the fiber-optic cable sheath	PE flame retardant	PE flame retardant
• of the strain relief	Aramide fibers and glass roving	Aramide fibers, plus central support element and glass roving
Color		
• of the FOC core sheath	orange / black, with directional arrow	orange / black, with directional arrow (numbering of the core pairs with 1 and 2)
• of the cable sheath	Black	Black
Bending radius		
• with single bend minimum permissible	25 mm	90 mm
• with multiple bends minimum permissible	40 mm	135 mm
Traction stress maximum	1 000 N	1 000 N
Short-term shear force per length	600 N/cm	600 N/cm
Continuous lateral force per length	200 N/cm	200 N/cm
Weight per length	67 kg/km	87 kg/km

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Technical specifications (continued)

Article No.	6XV1873-2R	6XV1843-2R
Product-type designation	**MM FO Robust Cable GP**	**SM FO robust cable GP**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
• during installation	-20 … +60 °C	-20 … +60 °C
Burning behaviour	Flame-retardant in accordance with IEC 60332-3-24	Flame-retardant in accordance with IEC 60332-3-24
Chemical resistance		
• to mineral oil	Conditional resistance	Conditional resistance
• to grease	Conditional resistance	Conditional resistance
• to water	resistant	resistant
Radiological resistance to UV radiation	resistant	resistant
Product properties, functions, components general		
Product feature		
• halogen-free	Yes	Yes
• silicon-free	Yes	Yes
Product component Rodent protection	Yes	Yes
Cable length for glass FOC		
• for 100BaseFX for Industrial Ethernet maximum	5 000 m	26 000 m
• for 1000BaseSX for Industrial Ethernet maximum	750 m	-
• for 1000BaseLX for Industrial Ethernet maximum	2 000 m	5 000 m
• for PROFIBUS maximum	3 000 m	15 000 m
Standards, specifications, approvals		
Verification of suitability		
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6GK1901-0DA20-0AA0
Product-type designation	**BFOC Connector Set**
Product description	BFOC connector
Acceptability for application	For connection of fiber-optic cables
Transmission rate	
Transfer rate	
• 1 for Industrial Ethernet	10 Mbit/s
• 2 for Industrial Ethernet	100 Mbit/s
• 3 for Industrial Ethernet	1 000 Mbit/s
• with PROFIBUS	9.6 kbit/s … 12 Mbit/s
Interfaces	
Number of optical interfaces for optical waveguide	1
Design of optical connections for network components or terminal devices	BFOC connector
Design of the electrical connection FastConnect	No
Mechanical data	
Material of the enclosure	Metal and plastic
Design, dimensions and weight	
Type of cable outlet	180 degree cable outlet
Width	10 mm
Height	10 mm
Depth	10 mm
Net weight	8 g
Permitted ambient conditions	
Protection class IP	IP20
Product properties, functions, components general	
Product feature silicon-free	Yes
Product component strain relief	Yes
Standards, specifications, approvals	
Verification of suitability RoHS conformity	Yes

Ordering data

	Article No.
FO standard cable GP 50/125/1400 [2]	
Multimode cable, sold by the meter; max. delivery unit 1 000 m; minimum order 20 m;	**6XV1873-2A**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 0.5 m	**6XV1873-3AH05**
• 1 m	**6XV1873-3AH10**
• 2 m	**6XV1873-3AH20**
• 3 m	**6XV1873-3AH30**
• 5 m	**6XV1873-3AH50**
• 10 m	**6XV1873-3AN10**
• 15 m	**6XV1873-3AN15**
• 20 m	**6XV1873-3AN20**
• 30 m	**6XV1873-3AN30**
• 40 m	**6XV1873-3AN40**
• 50 m	**6XV1873-3AN50**
• 80 m	**6XV1873-3AN80**
• 100 m	**6XV1873-3AT10**
• 150 m	**6XV1873-3AT15**
• 200 m	**6XV1873-3AT20**
• 300 m	**6XV1873-3AT30**
Preferred lengths [1] pre-assembled with 4 SC connectors	
• 0.5 m	**6XV1873-6AH05**
• 1 m	**6XV1873-6AH10**
• 2 m	**6XV1873-6AH20**
• 3 m	**6XV1873-6AH30**
• 5 m	**6XV1873-6AH50**
• 10 m	**6XV1873-6AN10**
• 15 m	**6XV1873-6AN15**
• 20 m	**6XV1873-6AN20**
• 30 m	**6XV1873-6AN30**
• 40 m	**6XV1873-6AN40**
• 50 m	**6XV1873-6AN50**
• 80 m	**6XV1873-6AN80**
• 100 m	**6XV1873-6AT10**
• 150 m	**6XV1873-6AT15**
• 200 m	**6XV1873-6AT20**
• 300 m	**6XV1873-6AT30**
FO FRNC cable 50/125/1 400 [2]	
Multimode cable, sold by the meter; max. delivery unit 1 000 m; minimum order 20 m;	**6XV1873-2B**

[1] Special fiber-optic cables, lengths and accessories available on request

[2] Special tools and specially trained personnel are required for pre-assembling glass fiber-optic cables

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Ordering data	Article No.
FO trailing cable 50/125/1 400 [2]	
Multimode cable, sold by the meter; max. delivery unit 1 000 m; minimum order 20 m;	**6XV1873-2C**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 3 m	**6XV1873-3CH30**
• 5 m	**6XV1873-3CH50**
• 10 m	**6XV1873-3CN10**
• 20 m	**6XV1873-3CN20**
• 50 m	**6XV1873-3CN50**
• 100 m	**6XV1873-3CT10**
Preferred lengths [1] pre-assembled with 4 SC connectors	
• 3 m	**6XV1873-6CH30**
• 5 m	**6XV1873-6CH50**
• 10 m	**6XV1873-6CN10**
• 20 m	**6XV1873-6CN20**
• 50 m	**6XV1873-6CN50**
• 100 m	**6XV1873-6CT10**
FO trailing cable GP 50/125/1 400 [2]	
Multimode cable, sold by the meter; max. delivery unit 1 000 m; minimum order 20 m;	**6XV1873-2D**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 3 m	**6XV1873-3DH30**
• 5 m	**6XV1873-3DH50**
• 10 m	**6XV1873-3DN10**
• 20 m	**6XV1873-3DN20**
• 50 m	**6XV1873-3DN50**
• 100 m	**6XV1873-3DT10**
Preferred lengths [1] pre-assembled with 4 SC connectors	
• 3 m	**6XV1873-6DH30**
• 5 m	**6XV1873-6DH50**
• 10 m	**6XV1873-6DN10**
• 20 m	**6XV1873-6DN20**
• 50 m	**6XV1873-6DN50**
• 100 m	**6XV1873-6DT10**
FO ground cable 50/125/1 400 [2]	
Multimode cable, sold by the meter; max. delivery unit 2 000 m; minimum order 20 m;	**6XV1873-2G**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 100 m	**6XV1873-3GT10**
• 200 m	**6XV1873-3GT20**
• 300 m	**6XV1873-3GT30**
Preferred lengths [1] pre-assembled with 4 SC connectors	
• 100 m	**6XV1873-6GT10**
• 200 m	**6XV1873-6GT20**
• 300 m	**6XV1873-6GT30**

	Article No.
FO robust cable GP 50/125/900 [2]	**6XV1873-2R**
Multimode cable, sold by the meter; max. delivery unit 2 000 m; minimum order 20 m;	
Standard FIBER OPTIC CABLE (62.5/125/900), segmentable [2]	
Multimode cable, sold by the meter; max. delivery unit 2 000 m minimum order 20 m	**6XV1820-5AH10**
Preferred lengths [1] pre-assembled with 4 BFOC plugs	
• 1 m	**6XV1820-5BH10**
• 2 m	**6XV1820-5BH20**
• 3 m	**6XV1820-5BH30**
• 4 m	**6XV1820-5BH40**
• 5 m	**6XV1820-5BH50**
• 10 m	**6XV1820-5BN10**
• 15 m	**6XV1820-5BN15**
• 20 m	**6XV1820-5BN20**
• 30 m	**6XV1820-5BN30**
• 40 m	**6XV1820-5BN40**
• 50 m	**6XV1820-5BN50**
• 55 m	**6XV1820-5BN55**
• 60 m	**6XV1820-5BN60**
• 65 m	**6XV1820-5BN65**
• 70 m	**6XV1820-5BN70**
• 75 m	**6XV1820-5BN75**
• 80 m	**6XV1820-5BN80**
• 100 m	**6XV1820-5BT10**
• 120 m	**6XV1820-5BT12**
• 130 m	**6XV1820-5BT13**
• 150 m	**6XV1820-5BT15**
• 200 m	**6XV1820-5BT20**
• 250 m	**6XV1820-5BT25**
• 300 m	**6XV1820-5BT30**
INDOOR FIBER OPTIC CABLE (62.5/125/900), segmentable [2]	
Multimode cable, sold by the meter; max. delivery unit 2 000 m minimum order 20 m	**6XV1820-7AH10**
Preferred lengths; pre-assembled with 4 BFOC connectors	
• 0.5 m	**6XV1820-7BH05**
• 1 m	**6XV1820-7BH10**
• 2 m	**6XV1820-7BH20**
• 3 m	**6XV1820-7BH30**
• 5 m	**6XV1820-7BH50**
• 10 m	**6XV1820-7BN10**
• 15 m	**6XV1820-7BN15**
• 20 m	**6XV1820-7BN20**
• 25 m	**6XV1820-7BN25**
• 50 m	**6XV1820-7BN50**
• 75 m	**6XV1820-7BN75**
• 100 m	**6XV1820-7BT10**

[1] Special fiber-optic cables, lengths and accessories available on request

[2] Special tools and specially trained personnel are required for pre-assembling glass fiber-optic cables

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Ordering data

	Article No.
FLEXIBLE FIBER OPTIC CABLE trailing cable (62.5/125/1 400), segmentable [2]	
Multimode cable, sold by the meter; max. delivery unit 2 000 m minimum order 20 m	**6XV1820-6AH10**
Preferred lengths; pre-assembled with 4 BFOC connectors	
• 1 m	**6XV1820-6BH10**
• 2 m	**6XV1820-6BH20**
• 3 m	**6XV1820-6BH30**
• 5 m	**6XV1820-6BH50**
• 10 m	**6XV1820-6BN10**
• 15 m	**6XV1820-6BN15**
• 20 m	**6XV1820-6BN20**
• 30 m	**6XV1820-6BN30**
• 50 m	**6XV1820-6BN50**
SIENOPYR marine duplex fiber-optic cable; (62.5/125/900)	**6XV1830-0NH10**
Fiber-optic cable for routing on ships and offshore platforms Multimode cable, sold by the meter; max. delivery unit 1 000 m minimum order 20 m	
FO robust cable GP 4E9/125/900 [2]	
Singlemode cable, sold by the meter; max. delivery unit 2 000 m; minimum order 20 m;	**6XV1843-2R**
Accessories	
Multimode FO BFOC connector set	**6GK1901-0DA20-0AA0**
for FO standard cable (50/125/1 400), FO ground cable (50/125/1 400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	
Multimode FO SC Duplex connector set	**6GK1901-0LB10-2AA0**
for FO standard cable (50/125/1400), FO ground cable (50/125/1 400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	
Multimode FO LC duplex plug	**6GK1901-0RB10-2AB0**
LC duplex plug (10 units) for INDOOR FO cable (62.5/125/900), FO robust cable GP (50/125/900), FO standard cable (62.5/125/900)	
Singlemode FO LC duplex plug	**6GK1901-0SB10-2AB0**
LC duplex plug (10 units) for FO robust cable GP (4E9/125/900)	
SIMATIC NET Manual Collection [3]	**6GK1975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

[1] Special fiber-optic cables, lengths and accessories available on request

[2] Special tools and specially trained personnel are required for pre-assembling glass fiber-optic cables

[3] Further language variants and manuals can be found for the respective products at http://www.siemens.com/automation/csi/net

More information

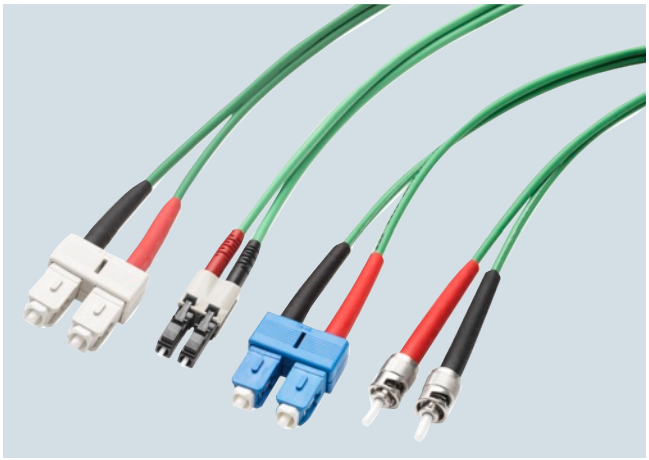
You can order components supplementary to the SIMATIC NET cabling range from your local contact.

Technical advice on this subject is available from:

J. Hertlein
I IA SC CI PRM 4
Phone: +49 (911) 750-4465
E-mail: juergen.hertlein@siemens.com

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Overview



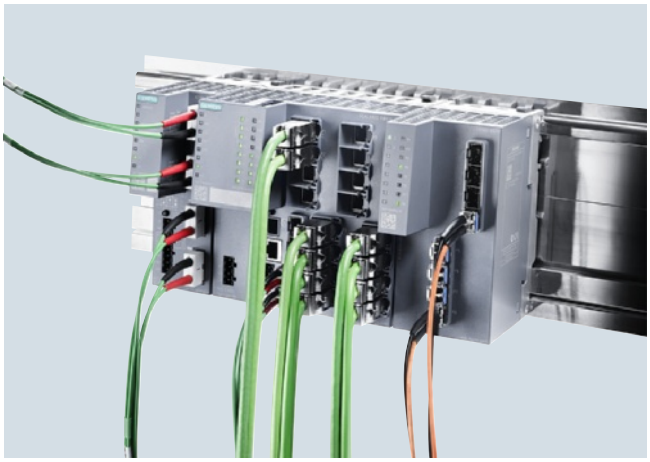
- Patch cables, available as pre-assembled cables (max. length 1 m)
- 2-wire patch cables for directly connecting active network components in the control cabinet
- Small cable diameter for easy laying of cables
- Easy connection of active network components with different fiber-optic interfaces by means of patch cords with two types of connectors

Benefits

get Designed for Industry

- Quick and error-free commissioning thanks to pre-assembled, factory-tested FO patch cables
- Simple cable laying in the control cabinet due to small cable diameter
- Silicone-free, therefore suitable for use in the automotive industry (for example on paint lines)
- Easy connection of active network components with various fiber-optic
  connection methods in the control cabinet

Application



FO Cord SC/SC connecting cable between XC100-4OBR and SCALANCE X320-3LD

Design

- 2 x 2-wire multimode patch cable with fixed cores and integrated aramid strain relief
- 2 x 2-wire singlemode patch cable with fixed cores and integrated aramid strain relief
- Low-emission and halogen-free outer sheath for use in buildings

The FO Cord is available as a pre-assembled cable in the following versions:

- MM FO Cord SC/SC
  Multimode fiber-optic cable pre-assembled with two SC duplex connectors
- MM FO Cord SC/BFOC
  Multimode fiber-optic cable pre-assembled with one SC duplex connector and two BFOC connectors
- MM FO Cord SC/LC
  Multimode fiber-optic cable pre-assembled with one SC duplex connector and one LC duplex connector
- SM FO Cord SC/SC
  Singlemode fiber-optic cable pre-assembled with two SC duplex connectors
- SM FO Cord SC/BFOC
  Singlemode fiber-optic cable pre-assembled with one SC duplex connector and two BFOC connectors
- SM FO Cord SC/LC
  Singlemode fiber-optic cable pre-assembled with one SC duplex connector and one LC duplex connector

Function

The flexibility of the cable ensures easy installation, for example in a control cabinet, or to connect equipment in a control room. The length of an IE FO TP Cord is 1 m.

Cable variants with different fiber-optic connectors are used for the easy connecting of devices to various fiber-optic interfaces.

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Technical specifications

Article No.	6XV1843-5EH10-0CC0	6XV1843-5EH10-0CB0	6XV1843-5EH10-0CA0
Product-type designation	**MM FO CORD SC/SC, 50/125**	**MM FO CORD SC/BFOC, 50/125**	**MM FO CORD SC/LC, 50/125**
Product description	Multimode glass FO cable, pre-assembled	Multimode glass FO cable, pre-assembled	Multimode glass FO cable, pre-assembled
Acceptability for application	Cable for applications in control cabinet	Cable for applications in control cabinet	Cable for applications in control cabinet
Version of the assembled FO cable	pre-assembled with 2X SC DUPLEX connectors	pre-assembled with 1X SC DUPLEX connector and 1XBFOC connector	pre-assembled with 1X SC DUPLEX connector and 1X LC DUPLEX connector
Cable designation	I-V(ZN)H 2x50/125 OM2	I-V(ZN)H 2x50/125 OM2	I-V(ZN)H 2x50/125 OM2
Cable length	1 m	1 m	1 m
Optical data			
Damping ratio per length			
• at 850 nm maximum	3.5 dB/km	3.5 dB/km	3.5 dB/km
• at 1 300 nm maximum	1.5 dB/km	1.5 dB/km	1.5 dB/km
Bandwidth length product			
• at 850 nm	500 kHz·m	500 kHz·m	500 kHz·m
• at 1 300 nm	1 300 kHz·m	1 300 kHz·m	1 300 kHz·m
Mechanical data			
Number of fibers per FOC core	1	1	1
Number of FOC cores per FOC cable	2	2	2
Version of the FO conductor fiber	Multi-mode gradient fiber 50/125 µm, OM 2	Multi-mode gradient fiber 50/125 µm, OM 2	Multi-mode gradient fiber 50/125 µm, OM 2
Design of the FOC core	fixed cores	fixed cores	fixed cores
Outer diameter			
• of optical fibers	5 µm	5 µm	5 µm
• of the optical fiber sheath	125 µm	125 µm	125 µm
• of the FOC core sheath	2.8 mm	2.8 mm	2.8 mm
Width of the cable sheath	5.9 mm	5.9 mm	5.9 mm
Thickness of the cable sheath	2.8 mm	2.8 mm	2.8 mm
Material			
• of the fiber-optic cable core	Quartz glass	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass	Quartz glass
• of the FOC core sheath	FR-LSZH	FR-LSZH	FR-LSZH
• of the fiber-optic cable sheath	LSZH	LSZH	LSZH
• of the strain relief	Aramide fibers	Aramide fibers	Aramide fibers
Color			
• of the FOC core sheath	green/green	green/green	green/green
Bending radius			
• with single bend minimum permissible	42 mm	42 mm	42 mm
Traction stress maximum	500 N	500 N	500 N
Continuous lateral force per length	100 N/cm	100 N/cm	100 N/cm
Weight per length	19 kg/km	19 kg/km	19 kg/km
Permitted ambient conditions			
Ambient temperature			
• during operating	-20 … +70 °C	-20 … +70 °C	-20 … +70 °C
• during storage	-25 … +70 °C	-25 … +70 °C	-25 … +70 °C
• during transport	-25 … +70 °C	-25 … +70 °C	-25 … +70 °C
• during installation	-10 … +70 °C	-10 … +70 °C	-10 … +70 °C
Protection class IP	IP20	IP20	IP20
Burning behaviour	Flame-retardant in accordance with IEC 60332-3-22 (CatA)	Flame-retardant in accordance with IEC 60332-3-22 (CatA)	Flame-retardant in accordance with IEC 60332-3-22 (CatA)

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Technical specifications (continued)

Article No.	6XV1843-5EH10-0CC0	6XV1843-5EH10-0CB0	6XV1843-5EH10-0CA0
Product-type designation	**MM FO CORD SC/SC, 50/125**	**MM FO CORD SC/BFOC, 50/125**	**MM FO CORD SC/LC, 50/125**
Product properties, functions, components general			
Product feature			
• halogen-free	Yes	Yes	Yes
• silicon-free	Yes	Yes	Yes
Product component Rodent protection	No	No	No
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes

Article No.	6XV1843-5FH10-0CC0	6XV1843-5FH10-0CB0	6XV1843-5FH10-0CA0
Product-type designation	**SM FO CORD SC/SC, 9/125**	**SM FO CORD SC/BFOC, 9/125**	**SM FO CORD SC/LC, 9/125**
Product description	Singlemode glass FO cable, pre-assembled	Singlemode glass FO cable, pre-assembled	Singlemode glass FO cable, pre-assembled
Acceptability for application	Cable for applications in control cabinet	Cable for applications in control cabinet	Cable for applications in control cabinet
Version of the assembled FO cable	pre-assembled with 2X2 SC DUPLEX connectors	pre-assembled with1X SC DUPLEX connector and 1X, BFOC connector	pre-assembled with 1X SC DUPLEX connector and 1X LC DUPLEX connector
Cable designation	I-V(ZN)H 2E9/125 G.652D	I-V(ZN)H 2E9/125 G.652D	I-V(ZN)H 2E9/125 G.652D
Cable length	1 m	1 m	1 m
Optical data			
Damping ratio per length			
• at 1300 nm maximum	0.4 dB/km	0.4 dB/km	0.4 dB/km
• at 1550 nm maximum	0.3 dB/km	0.3 dB/km	0.3 dB/km
Mechanical data			
Number of fibers per FOC core	1	1	1
Number of FOC cores per FOC cable	2	2	2
Version of the FO conductor fiber			
Design of the FOC core			
Outer diameter			
• of optical fibers	9 µm	9 µm	9 µm
• of the optical fiber sheath	125 µm	125 µm	125 µm
• of the FOC core sheath	2.8 mm	2.8 mm	2.8 mm
Width of the cable sheath	5.9 mm	5.9 mm	5.9 mm
Thickness of the cable sheath	2.8 mm	2.8 mm	2.8 mm
Material			
• of the fiber-optic cable core	Quartz glass	Quartz glass	Quartz glass
• of the optical fiber sheath	Quartz glass	Quartz glass	Quartz glass
• of the FOC core sheath	FR-LSZH	FR-LSZH	FR-LSZH
• of the fiber-optic cable sheath	LSZH	LSZH	LSZH
• of the strain relief	Aramide fibers	Aramide fibers	Aramide fibers
Color			
• of the FOC core sheath	green/green	green/green	green/green
Bending radius			
• with single bend minimum permissible	42 mm	42 mm	42 mm
Traction stress maximum	500 N	500 N	500 N
Continuous lateral force per length	100 N/cm	100 N/cm	100 N/cm
Weight per length	19 kg/km	19 kg/km	19 kg/km

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Technical specifications (continued)

Article No.	6XV1843-5FH10-0CC0	6XV1843-5FH10-0CB0	6XV1843-5FH10-0CA0
Product-type designation	**SM FO CORD SC/SC, 9/125**	**SM FO CORD SC/BFOC, 9/125**	**SM FO CORD SC/LC, 9/125**
Permitted ambient conditions			
Ambient temperature			
• during operating	-20 … +70 °C	-20 … +70 °C	-20 … +70 °C
• during storage	-25 … +70 °C	-25 … +70 °C	-25 … +70 °C
• during transport	-25 … +70 °C	-25 … +70 °C	-25 … +70 °C
• during installation	-10 … +70 °C	-10 … +70 °C	-10 … +70 °C
Protection class IP	IP20	IP20	IP20
Burning behaviour	Flame-retardant in accordance with IEC 60332-3-22 (CatA)	Flame-retardant in accordance with IEC 60332-3-22 (CatA)	Flame-retardant in accordance with IEC 60332-3-22 (CatA)
Product properties, functions, components general			
Product feature			
• halogen-free	Yes	Yes	Yes
• silicon-free	Yes	Yes	Yes
Product component Rodent protection	No	No	No
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes

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Ordering data	Article No.
Multimode	
MM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**
MM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
Singlemode	
SM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
SM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**

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:

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POF and PCF fiber-optic cables

Overview



- Electrical isolation of PROFINET/Ethernet devices
- Protection of the transmission path against electromagnetic interference
- Up to 50 m cable length with plastic fiber optic cables and up to 100 m with PCF fiber optic cables
- Rugged fiber-optic standard cables, designed for industrial applications
- Extensive approvals (UL)

Benefits

get Designed for Industry

- Plastic and PCF fiber optic cables can be pre-assembled on site
- Easy connector assembly on site
- Time savings on start-up thanks to pre-assembled cables
- Protection of the transmission path against electromagnetic interference
- Tap-proof, because the cable does not radiate

Application

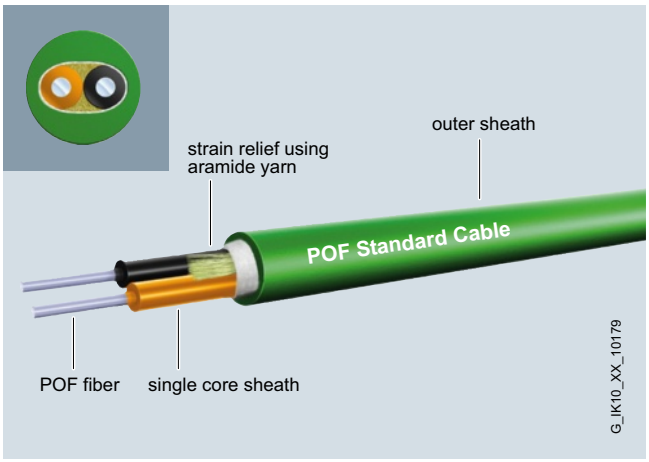
SIMATIC NET POF and PCF fiber optic conductors are used to construct optical indoor PROFINET and Industrial Ethernet networks. Devices with integral optical interface (SC RJ connection system) are, for example, SCALANCE X200-4P IRT, SCALANCE X201-3P IRT, SCALANCE X202-2P IRT, SCALANCE X101-1POF and ET 200S.

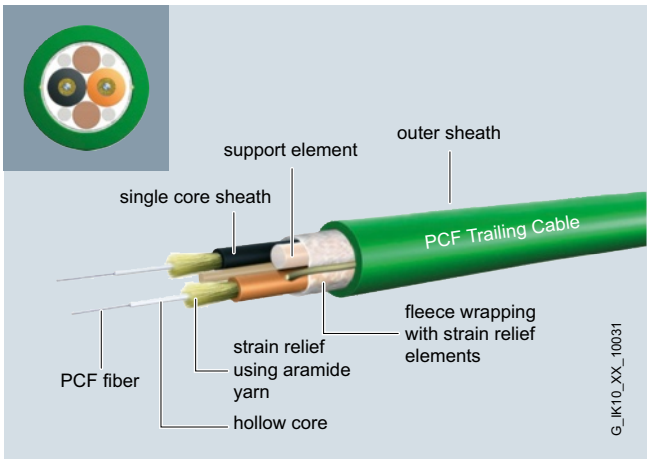
POF and PCF fiber optic cables can be assembled easily on site with SC RJ plugs. The maximum cable length between two devices is 50 m for POF and 100 m for PCF fiber-optic cables.

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Design

Different types of POF and PCF fiber optic cables are offered:





POF fiber optic cables

Rugged round cables with green outer sheath and Kevlar strain relief elements as well as two plastic fibers with rugged Polyamid inner sheath for applications indoors/outdoors with cable lengths **up to 50 m**. The cables are suitable for assembly in the field.

- ***POF Standard Cable GP*** (General Purpose);
  for applications indoor/outdoors
- ***POF Trailing Cable***;
  for trailing cable applications

PCF fiber optic cables

Rugged round cables with green outer sheath and Kevlar strain relief elements for applications indoor/outdoors with cable lengths **up to 100 m**. The cables are suitable for assembly in the field.

- ***PCF Standard Cable GP*** (General Purpose);
  for applications indoor/outdoors with cable lengths up to 100 m.
- ***PCF fiber-optic trailing cable;***
  for trailing cable applications with cable lengths of up to 100 m. The cable is suitable for assembly in the field.
  The following cable versions are available:
  - PCF Trailing Cable;
    cable for high mechanical stress, PUR outer sheath, no UL approval
  - PCF Trailing Cable GP (general purpose);
    cable for low mechanical stress, PVC outer sheath, with UL approval

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2

Technical specifications

Article No.	**6XV1874-2A**	**6XV1874-2B**
Product-type designation	**POF Standard Cable GP**	**POF Trailing Cable**
Product description	Fiber-optic cable with polyoptical fiber, sold by the meter, unassembled	Fiber-optic cable with polyoptical fiber, sold by the meter, unassembled
Acceptability for application	Cable for fixed installation indoors, UL approval	Cable for moving applications (e.g. trailing cables)
Version of the assembled FO cable	can be assembled wit SC RJ or SC RJ Plug PRO connectors	can be assembled wit SC RJ or SC RJ Plug PRO connectors
Cable designation	I-V4Y(ZN)Y 2P 980/1 000	I-V4Y(ZN)11Y 2P 980/1 000 FLEX UL
Optical data		
Damping ratio per length at 650 nm maximum	0.16 dB/m	0.18 dB/m
Bandwidth length product at 650 nm	1 GHz·m	1 GHz·m
Mechanical data		
Number of fibers per FOC core	1	1
Number of FOC cores per FOC cable	2	2
Version of the FO conductor fiber	POF FOC 980/1 000 µm	POF FOC 980/1 000 µm
Outer diameter		
• of optical fibers	980 µm	980 µm
• of the optical fiber sheath	1 000 µm	1 000 µm
• of the FOC core sheath	2.2 mm	2.2 mm
• of the cable	7.8 mm	8 mm
Symmetrical deviation		
• of the outer diameter of the FOC core sheath	0.1 mm	0.1 mm
Material		
• of the fiber-optic cable core	Polymethylmethacrylate (PMMA)	Polymethylmethacrylate (PMMA)
• of the optical fiber sheath	Fluoridated special polymer	Fluoridated special polymer
• of the FOC core sheath	PA	PA
• of the fiber-optic cable sheath	PVC	PUR
• of the strain relief	Kevlar fibers	Kevlar fibers
Color		
• of the FOC core sheath	orange / black	orange / black
• of the cable sheath	green	green
Bending radius		
• with single bend minimum permissible	100 mm	40 mm
• with multiple bends minimum permissible	150 mm	55 mm
• with continuous bending	-	55 mm
Number of bending cycles	-	5 000 000
Number of torsion cycles in the case of torsion by ± 360° on 1 m cable length	-	10 000
Traction stress maximum	100 N	100 N
Short-term shear force per length	100 N/cm	400 N/cm
Continuous lateral force per length	-	20 N/cm
Weight per length	65 kg/km	55 kg/km

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Technical specifications (continued)

Article No.	6XV1874-2A	6XV1874-2B
Product-type designation	**POF Standard Cable GP**	**POF Trailing Cable**
Permitted ambient conditions		
Ambient temperature		
• during operating	-30 … +70 °C	-20 … +70 °C
• during storage	-30 … +70 °C	-40 … +80 °C
• during transport	-30 … +70 °C	-40 … +80 °C
• during installation	0 … 50 °C	5 … 50 °C
Burning behaviour	Flame-retardant in accordance with IEC 60332-1-2	Flame-retardant in accordance with IEC 60332-1-2
Chemical resistance		
• to mineral oil	Conditional resistance	resistant
• to grease	Conditional resistance	resistant
Radiological resistance to UV radiation	not resistant	resistant
Product properties, functions, components general		
Product feature		
• halogen-free	No	No
• silicon-free	Yes	Yes
Product component Rodent protection	No	No
Cable length for POF FOC		
• for Industrial Ethernet maximum	50 m	50 m
Standards, specifications, approvals		
Verification of suitability	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN (CSA standard C22.2 No232-M1988)	UL-758 AWM Style 5422
• RoHS conformity	Yes	Yes

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Technical specifications (continued)

Article No.	6XV1861-2A	6XV1861-2C	6XV1861-2D
Product-type designation	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Product description	PCF fiber-optic cable with plastic cladding, sold by the meter, unassembled	PCF fiber-optic cable with plastic cladding, sold by the meter, unassembled	PCF fiber-optic cable with plastic cladding, sold by the meter, unassembled
Acceptability for application	Cable for fixed installation for indoor and outdoor use, UL approval	Cable for use with high mechanical stress and moving applications (e.g. trailing cables), without UL approval	Cable for use with high mechanical stress and moving applications (e.g. trailing cables), without UL approval
Version of the assembled FO cable	can be assembled with SC RJ, SC RJ Plug PRO, BFOC and Simplex connectors	can be assembled with SC RJ, SC RJ Plug PRO, BFOC and Simplex connectors	can be assembled with SC RJ, SC RJ Plug PRO, BFOC and Simplex connectors
Cable designation	AT-V(ZN)YY 2K 200/230	AT-V(ZN)Y(ZN)11Y 2K 200/230	AT-V(ZN)Y(ZN)Y 2K 200/230
Optical data			
Damping ratio per length at 660 nm maximum	10 dB/km	10 dB/km	10 dB/km
Bandwidth length product at 650 nm	17 GHz·m	17 GHz·m	17 GHz·m
Mechanical data			
Number of fibers per FOC core	1	1	1
Number of FOC cores per FOC cable	2	2	2
Version of the FO conductor fiber	Step index fiber 200/230 µm	Step index fiber 200/230 µm	Step index fiber 200/230 µm
Outer diameter			
• of optical fibers	200 µm	200 µm	200 µm
• of the optical fiber sheath	230 µm	230 µm	230 µm
• of the FOC core sheath	2.2 mm	2.2 mm	2.2 mm
• of the cable	7.2 mm	8.8 mm	8.8 mm
Symmetrical deviation			
• of the outer diameter of the FOC core sheath	0.1 mm	0.1 mm	0.1 mm
• of the outer diameter of the line	0.5 mm	0.5 mm	0.5 mm
Material			
• of the fiber-optic cable core	Quartz glass	Quartz glass	Quartz glass
• of the optical fiber sheath	Special polymer	Special polymer	Special polymer
• of the FOC core sheath	PVC	PVC	PVC
• of the fiber-optic cable sheath	PVC	PUR	PVC
• of the strain relief	Aramide fibers	Aramide fibers	Aramide fibers
Color			
• of the FOC core sheath	orange / black	orange / black	orange / black
• of the cable sheath	green	green	green
Bending radius			
• with single bend minimum permissible	70 mm	130 mm	130 mm
• with multiple bends minimum permissible	105 mm	175 mm	175 mm
Number of bending cycles	-	5 000 000	5 000 000
Traction stress maximum	100 N	800 N	800 N
Short-term shear force per length	500 N/cm	500 N/cm	500 N/cm
Continuous lateral force per length	300 N/cm	300 N/cm	300 N/cm
Weight per length	45 kg/km	85 kg/km	85 kg/km

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Technical specifications (continued)

Article No.	6XV1861-2A	6XV1861-2C	6XV1861-2D
Product-type designation	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +90 °C	-25 … +75 °C	-25 … +75 °C
• during storage	-40 … +90 °C	-30 … +75 °C	-30 … +75 °C
• during transport	-40 … +90 °C	-30 … +75 °C	-30 … +75 °C
• during installation	-5 … +50 °C	-5 … +50 °C	-5 … +50 °C
Burning behaviour	Flame-retardant in accordance with IEC 60332-1-2 and IEC 60332-3-22 (Cat. A)	Flame-retardant	Flame-retardant in accordance with IEC 60332-1-2 and IEC 60332-3-22 (Cat. A)
Chemical resistance			
• to mineral oil	Conditional resistance	resistant	Conditional resistance
• to grease	Conditional resistance	resistant	Conditional resistance
• to water	Conditional resistance	Conditional resistance	Conditional resistance
Radiological resistance to UV radiation	resistant	resistant	resistant
Product properties, functions, components general			
Product feature			
• halogen-free	No	No	No
• silicon-free	Yes	Yes	Yes
Product component Rodent protection	No	No	No
Cable length for PCF FOC			
• for Industrial Ethernet maximum	100 m	100 m	100 m
• for PROFIBUS maximum	400 m	400 m	400 m
Standards, specifications, approvals			
Verification of suitability	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN 90 Cel, FT1, FT4 (CSA standard C22.2 No232-M1988)	-	UL approval: OFN (NEC Article 770, UL 1651) / CSA approval: OFN 90 Cel, FT1, FT4 (CSA standard C22.2 No232-M1988)
• RoHS conformity	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK1900-0MB00-6AA0	6GK1900-0MB00-0AC0	6GK1900-0NB00-0AC0
Product-type designation	**IE SC RJ POF Plug PRO (Push Pull)**	**IE SC RJ POF Plug**	**IE SC RJ PCF Plug**
Product description	SC RJ connector for POF FO cables	SC RJ connector for POF FO cables	SC RJ connector for PCF FO cables
Acceptability for application	Field-assembly connector for push-pull device connection in high degree of protection	For connection of POF fiber-optic cables	For connection of PCF fiber-optic cables
Transmission rate			
Transfer rate			
• 1 for Industrial Ethernet	100 Mbit/s	100 Mbit/s	100 Mbit/s
• 2 for Industrial Ethernet	-	-	-
Interfaces			
Number of electrical connections			
• for Industrial Ethernet FC TP cables	-	-	-
• for network components and terminal equipment	-	-	-
Design of electrical connection			
• for Industrial Ethernet FC TP cables	-	-	-
• for network components and terminal equipment	-	-	-
Number of optical interfaces for optical waveguide	1	1	1
Design of optical connections for network components or terminal devices	SC RJ connector (Push Pull device connection)	SC RJ connector (Push Pull device connection)	SC RJ connector (Push Pull device connection)
Design of the electrical connection FastConnect	No	No	No
Mechanical data			
Material of the enclosure	plastic	plastic	plastic
Design, dimensions and weight			
Type of cable outlet	180 degree cable outlet	180 degree cable outlet	180 degree cable outlet
Width	22 mm	22 mm	22 mm
Height	30 mm	30 mm	30 mm
Depth	62.5 mm	62.5 mm	62.5 mm
Net weight	63.5 g	63.5 g	63.5 g
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °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 maximum	-	-	-
Protection class IP	IP65/67	IP65/67	IP65/67
Chemical resistance to water	resistant	resistant	resistant
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Product component strain relief	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes
• UL-registration	No	No	No

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Ordering data

	Article No.
POF Standard Cable GP 980/1000 POF standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m, minimum order 20 m	**6XV1874-2A**
POF Trailing Cable 980/1000 POF trailing cable for use in cable carriers, with rugged PUR sheath; sold by the meter max. length 1 000 m, minimum order 20 m	**6XV1874-2B**
PCF Standard Cable GP 200/230 Standard cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m;	**6XV1861-2A**
PCF Trailing Cable 200/230 Trailing cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m;	**6XV1861-2C**
PCF Trailing Cable GP 200/230 Trailing cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m;	**6XV1861-2D**
Termination Kit SC RJ POF Plug Assembly case for local assembly of SC RJ connectors, comprising a stripping tool, Kevlar scissors, microscope, grinding paper and grinding base	**6GK1900-0ML00-0AA0**

	Article No.
IE SC RJ POF Plug Screw connector for local assembly on POF FOC (1 pack = 20 items)	**6GK1900-0MB00-0AC0**
IE SC RJ POF Plug PRO Screw connector for local assembly on POF FOC (1 pack = 1 unit)	**6GK1900-0MB00-6AA0**
IE SC RJ POF refill set Refill set for Termination Kit SC RJ POF Plug consisting of grinding paper and grinding base (set of 5)	**6GK1900-0MN00-0AA0**
Termination Kit SC RJ PCF Plug Assembly case for local assembly of SC RJ connectors, comprising a stripping tool, buffer stripping tool, Kevlar scissors, fiber breaking tool, microscope	**6GK1900-0NL00-0AA0**
Industrial Ethernet SC RJ PCF Plug Screw connector for local assembly on POF FOC (1 pack = 10 items)	**6GK1900-0NB00-0AC0**
IE SC RJ PCF Plug PRO Screw connector for local assembly on POF FOC (1 pack = 1 unit)	**6GK1900-0NB00-6AA0**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1975-1AA00-3AA0**

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:

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POF/PCF FOC termination kit

2

Overview



- Compact, rugged assembly case for POF and PCF fiber-optic cables
- Special versions for easy assembly of SC RJ plugs on POF and PCF fiber-optic cables
- The quality of the assembly can be checked using the enclosed microscope

Benefits

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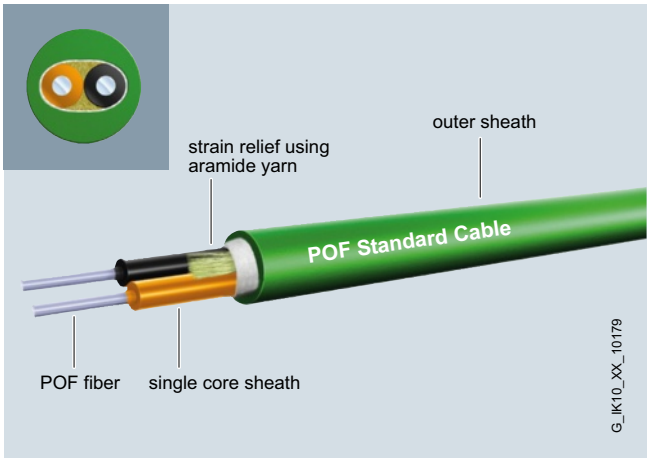
- Easy installation of the unassembled cables in industrial plants
- Flexible assembly of connectors on POF and PCF fiber optic cables on site (SC RJ connectors)
- Mistakes are prevented with easy visual inspection of the assembled connector on site using a microscope
- Simple repair of POF and PCF fiber optic cables in the field

Application

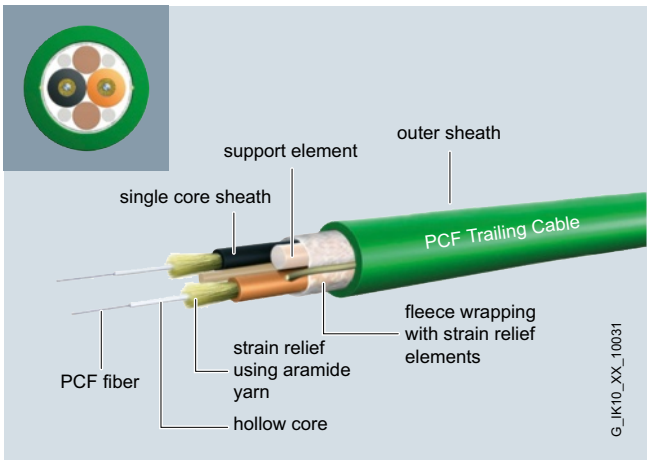
SIMATIC NET POF and PCF fiber-optic cables are used to construct optical indoor and outdoor Industrial Ethernet/PROFINET networks. They are easy to assemble on-site with the Termination Kits and 2 x 2 RJ connectors. The maximum cable length between two Industrial Ethernet/PROFINET devices is 100 m for PCF and 50 m for POF fiber-optic cables.

Industrial Ethernet/PROFINET devices with integral optical interface (SC RJ connection system) are, for example, SCALANCE X-200P IRT and ET200S.

Design



Cable construction POF plastic optical fiber



Cable construction PCF plastic optical fiber

The kit is available in assembly cases for on-site installation of SC RJ connectors on PCF fiber-optic cables.

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

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Ordering data

	Article No.
Termination Kit SC RJ POF Plug Assembly case for on-site installation of SC RJ POF connectors; consisting of stripping tool, Kevlar cutters, SC RJ grinding plate, grinding paper, grinding base and microscope	**6GK1900-0ML00-0AA0**
Termination Kit SC RJ PCF Plug Assembly case for on-site assembly of SC RJ PCF connectors, comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-0NL00-0AA0**
Accessories	
IE SC RJ POF Plug 20 plugs for on-site assembly	**6GK1900-0MB00-0AC0**
IE SC RJ POF Plug PRO 1 plug for on-site assembly	**6GK1900-0MB00-6AA0**
IE SC RJ PCF Plug 10 plugs for on-site assembly	**6GK1900-0NB00-0AC0**
IE SC RJ PCF Plug PRO 1 plug for on-site assembly	**6GK1900-0NB00-6AA0**
IE SC RJ POF refill set Refill set for Termination Kit SC RJ POF Plug consisting of grinding paper and grinding plate (set of 5)	**6GK1900-0MN00-0AA0**

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:

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SCALANCE X-100 unmanaged media converters

2

Overview



The unmanaged Industrial Ethernet media converters of the SCALANCE X-100 product line are ideally suited to the conversion of different transmission media in Industrial Ethernet networks at data transfer rates of 10/100 Mbit/s in line, star and ring topologies.

- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Rugged metal enclosure for space-saving cubicle mounting on standard rails, S7-300 DIN rails, 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
- Connection of existing 10 Mbit/s fiber-optic networks
- Connection of existing 10Base5 networks (e.g. SINEC H1)

Product versions

SCALANCE X101-1, SCALANCE X101-1LD, SCALANCE X101-1POF, SCALANCE X101-1FL and SCALANCE X101-1AUI

- For converting electrical signals into optical signals in Industrial Ethernet line, star and ring topologies
- The Industrial Ethernet media converters have an electrical 10/100 Mbit/s RJ45 port and:
  - SCALANCE X101-1
    1x 100 Mbit/s BFOC port, optical (multimode, glass FOC)
  - SCALANCE X101-1LD
    1x 100 Mbit/s BFOC port, optical (singlemode, glass FOC)
  - SCALANCE X101-1POF
    1x 100 Mbit/s SC-RJ port, optical (plastic optical fiber, POF FOC)
  - SCALANCE X101-1AUI
    1x 10 Mbit/s AUI interface with Sub-D connections
  - SCALANCE X101-1FL
    1x 10 Mbit/s BFOC port, optical (multimode, glass FOC)
- Redundant power supply with 2 x 24 V DC
- 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 electric RJ45 port is industry-standard and features an additional retaining collar for connection of the IE FC RJ45 Plugs

Benefits

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- Ideal solution for converting various transmission media in Industrial Ethernet line, star and ring topologies
- Space-saving installation in the cabinet thanks to the compact design in S7-300 format
- Reliable plug-in connection thanks to industry-standard device connection with PROFINET-compliant FastConnect connectors
- Integration of existing 10Base FL and/or 10Base5 networks
- Cost savings, since installation is possible without a patch field by means of IE FC RJ45 Plug and IE FC Standard Cable
- Uncrossed connecting cables can be used due to the integrated Autocrossover function

Application

The unmanaged media converters of the SCALANCE X-100 product line permit low-cost conversion of various transmission media within Industrial Ethernet line, star and ring topologies. They are designed for installation in the control cabinet.

Single, remote terminal units on network segments can be linked via the optical path of the SCALANCE X-100 media converters. Integration of an optical path into a redundant ring is also possible, as well as installation of the SCALANCE X-100 media converters into a standby link.

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Design

The SCALANCE Industrial Ethernet media converters with a rugged metal housing are optimized for mounting on a standard rail and an S7-300 DIN rail. Direct wall mounting in various positions is also possible. Due to the housing dimensions that correspond to those of the S7-300, the devices are ideally suited for integration into an automation solution using S7-300 components.

The SCALANCE X-100 media converters feature:

- A 4-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC)
- A row of LEDs for displaying status information (power, link status, data communication, signaling contact)
- A 2-pole terminal block for connecting the floating signaling contact
- A SET button for local configuration of the signaling contact and of cascading mode

The following port types are available:

- ***10/100BaseTX, RJ45 port:***
  automatic detection of the data rate (10 or 100 Mbit/s), with autosensing and autocrossover function for connecting IE FC cables via IE FC RJ45 connectors over distances up to 100 m
- ***100BaseFX, BFOC port*** with glass fiber-optic cable:
  for direct connection to Industrial Ethernet glass fiber-optic cables up to 3000 m or 26000 m for configuring line, star or ring topologies
- ***100BaseFX,SC RJ port*** with POF fiber-optic cable:
  for direct connection to Industrial Ethernet POF fiber-optic cables up to 50 m or to Industrial Ethernet PCF fiber-optic cables up to 100 m for configuring line, star or ring topologies
- ***10BaseFL, BFOC port*** with glass fiber-optic cable:
  for direct connection to Industrial Ethernet glass fiber-optic cables up to 3000 m for configuring line, star or ring topologies
- ***AUI, 15-pin Sub-D port:***
  for connecting an Industrial Ethernet AUI cable (connecting cable 727-1/drop cable) of up to 50 m to AUI transceiver (no terminal equipment)

Function

- Configuring electrical and optical Industrial Ethernet line, star or ring topologies
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the TP ports
- Easy configuration and extension of the network; no limits to network extension when switches or media converters of the SCALANCE X-100 family are cascaded.
- Integration of existing 10Base FL and/or 10Base5 networks

	Type and number of ports						Characteristics							
	Twisted Pair		Fiber Optic											
			Fast Ethernet											
	10 / 100 Mbit/s	10 Mbit/s	100 Mbit/s			10 Mbit/s								
	RJ45	AUI	POF / PCF	Multimode BFOC	Singlemode BFOC	Multimode BFOC	Compact enclosure	LED diagnostics	SIMATIC environment	2 x 24 V DC	Signaling contact	On-site display (SET button)	Ring redundancy without RM	
SCALANCE X101-1	1			1			●	●	●	●	●	●	●	
SCALANCE X101-1LD	1				1		●	●	●	●	●	●	●	
SCALANCE X101-1POF	1		1				●	●	●	●	●	●	●	G_IK10_XX_10137
SCALANCE X101-1AUI	1	1					●	●	●	●	●	●	●	
SCALANCE X101-1FL	1					1	●	●	●	●	●	●	●	

Function overview of Industrial Ethernet media converters

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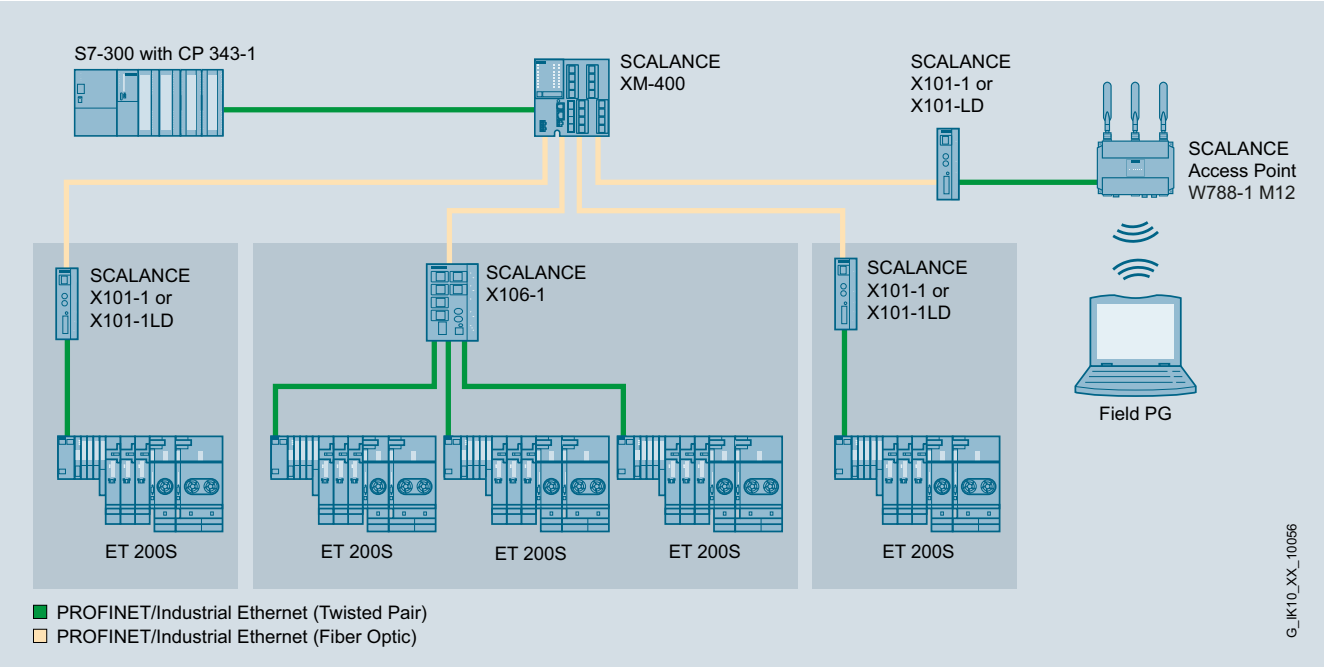
Function (continued)

Network topology and network configuration

The SCALANCE X-100 media converters are typically accommodated in one control cabinet together with the nodes to be connected. They can be installed in line, star and ring topologies.

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

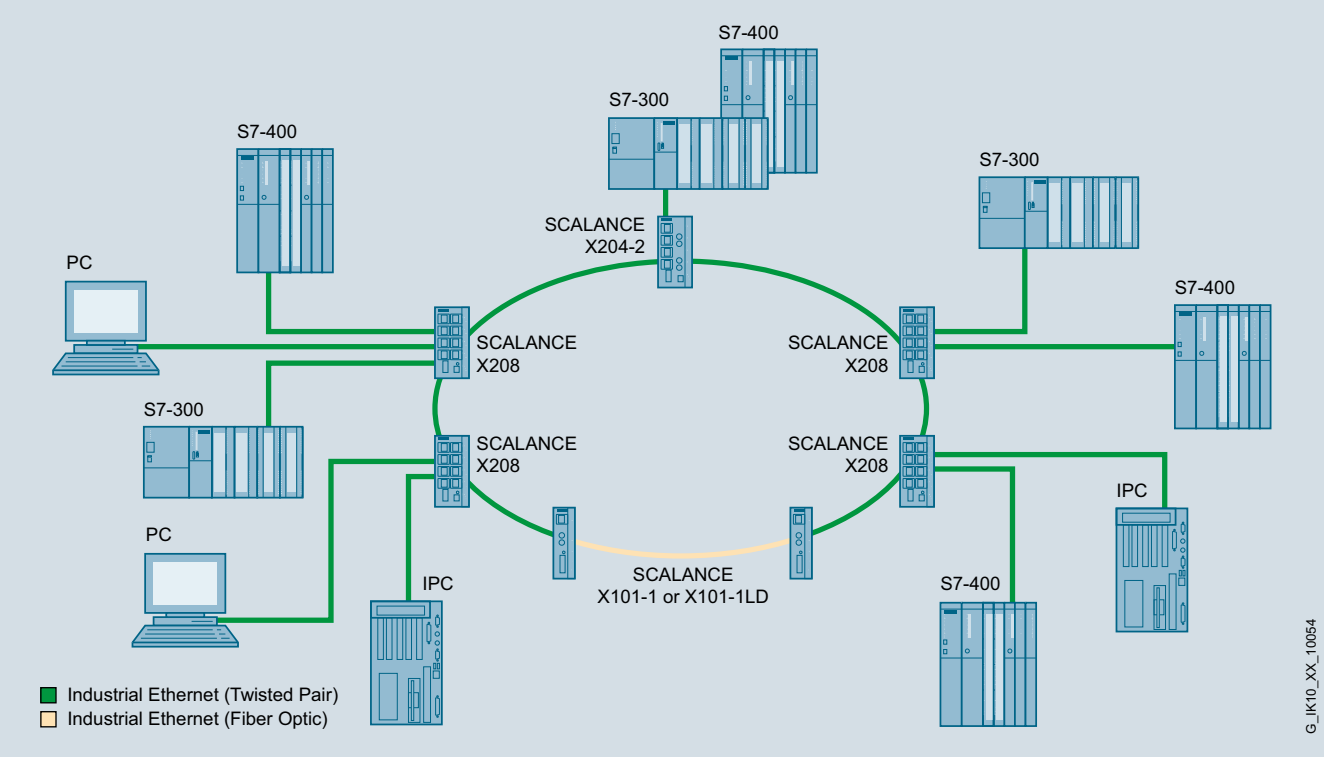
- Length of the TP cable between two SCALANCE X media converters:
  - Max. 100 m with Industrial Ethernet FastConnect products
- Length of the optical cables:
  - Max. 5 km with Industrial Ethernet multimode fiber-optic cables
  - Max. 26 km with Industrial Ethernet singlemode fiber-optic cables
  - Max. 100 m with Industrial Ethernet PCF fiber-optic cables
  - Max. 50 m with Industrial Ethernet POF fiber-optic cables
- Length of the AUI cable:
  - max. 50 m with Industrial Ethernet connecting cable 727-1 (AUI drop cable)



Optical star topology with SCALANCE X101-1/X101-1LD and remote SCALANCE W Access Point

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Function (continued)

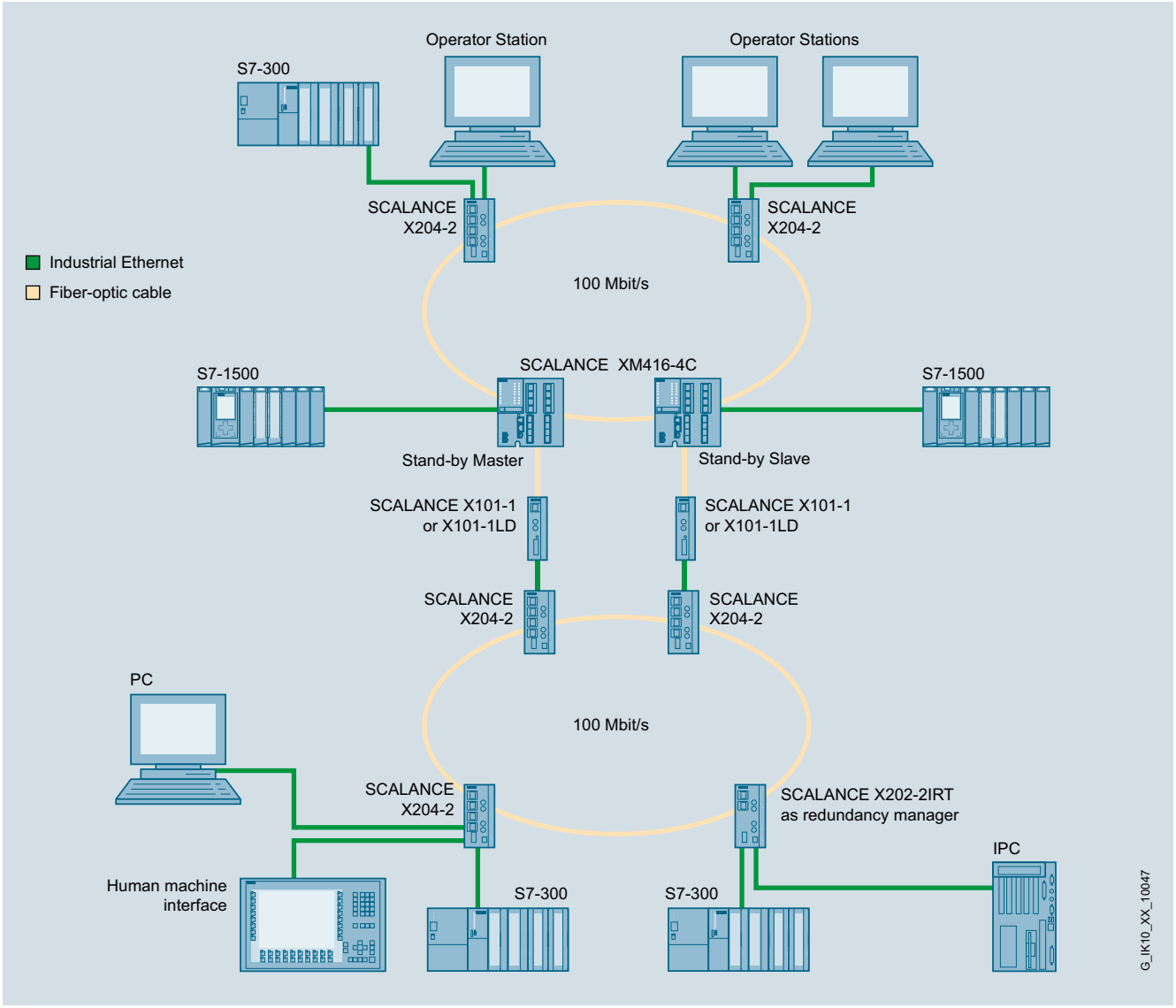


Mixed ring topology with twisted-pair and fiber optic cables

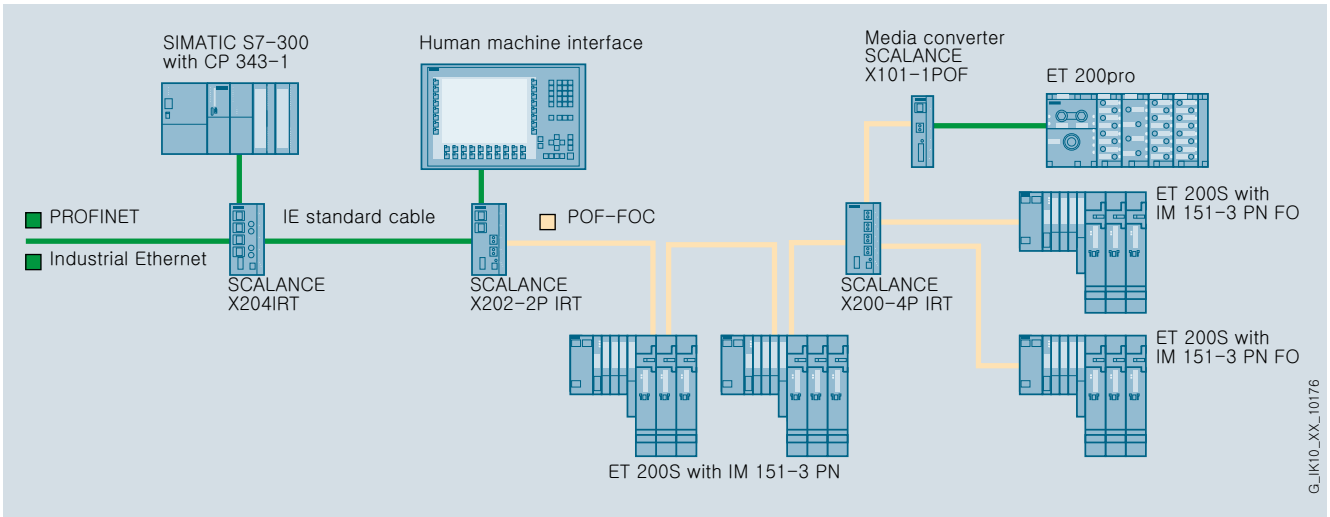
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Function (continued)



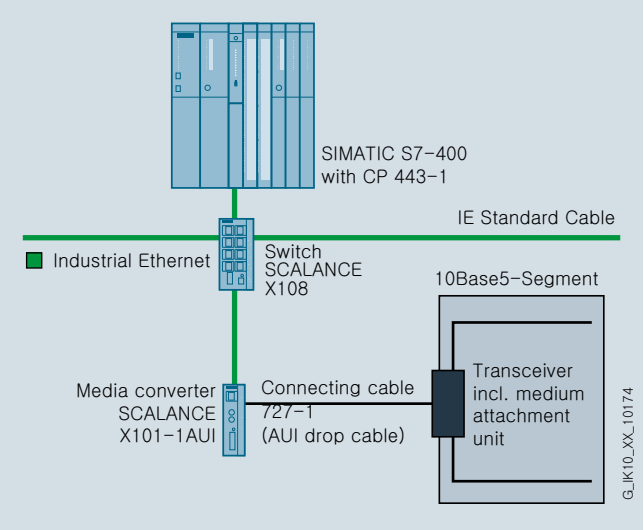
Optical redundant connection of two optical rings with SCALANCE X101-1 or SCALANCE X101-1LD



Network structure with plastic fiber optic cabling

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Function (continued)



Connection of a 10Base5 segment (e.g. SINEC H1) to Industrial Ethernet (10/100 Mbit/s) with SCALANCE X101-1AUI

Diagnostics

The following information is displayed on site by LEDs:

- Power
- Port status
- Data traffic

The Industrial Ethernet media converters of the SCALANCE X-100 product line can also be monitored using the floating signaling contact. Two media converters of the same type can be connected in cascading mode.

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Technical specifications

Article No.	6GK5101-1BB00-2AA3	6GK5101-1BC00-2AA3
Product-type designation	**SCALANCE X101-1**	**SCALANCE X101-1LD**
Transmission rate		
Transfer rate 1	-	-
Transfer rate 2	100 Mbit/s	100 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	2	2
Number of electrical connections		
• for network components and terminal equipment	1	1
• for Power-over-Ethernet for network components or terminal equipment	-	-
• for signaling contact	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port	RJ45 port
• for Power-over-Ethernet for network components or terminal equipment	-	-
• for signaling contact	2-pole terminal block	2-pole terminal block
• for power supply	5-pole terminal block	5-pole terminal block
Number of optical interfaces for optical waveguide		
• at 100 Mbit/s	1	1
Design of optical interface for optical waveguide		
• at 10 Mbit/s	-	-
• at 100 Mbit/s	BFOC-Port (Multimode up to 5 km)	ST/SC-Port
Connectable optical power relative to 1 mW		
• of the receiver input maximum	-14 dB	0 dB
• of the transmitter output	-14 … -19 dB	0 … -5 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-31 dB	-35 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Supply voltage, current consumption, power loss		
Type of supply voltage	DC	DC
Supply voltage external	24 V	24 V
• minimum	18 V	18 V
• maximum	32 V	32 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	0.5 A/60 V	0.5 A/60 V
Consumed current maximum	0.12 A	0.12 A
Active power loss at 24 V for DC	3 W	3 W

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Technical specifications (continued)

Article No.	6GK5101-1BB00-2AA3	6GK5101-1BC00-2AA3
Product-type designation	**SCALANCE X101-1**	**SCALANCE X101-1LD**
Permitted ambient conditions		
Ambient temperature		
• during operating	-10 … +60 °C	-10 … +60 °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 maximum	95 %	95 %
Protection class IP	IP30	IP30
Design, dimensions and weight		
Design	Compact	Compact
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	124 mm	124 mm
Net weight	0.55 kg	0.55 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
• S7-300 rail mounting	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..
• for hazardous zone	EN 600079-15 II 3 G EEx nA II T.. KEMA 06 ATEX 0021 X	EN 600079-15 II 3 G EEx nA II T.. KEMA 06 ATEX 0021 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..
• for emitted interference	EN 61000-6-3	EN 61000-6-4:2001
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• Det Norske Veritas (DNV)	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No

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Technical specifications (continued)

Article No.	6GK5101-1BH00-2AA3	6GK5101-1BY00-2AA3	6GK5101-1BX00-2AA3
Product-type designation	**SCALANCE X101-1POF**	**SCALANCE X101-1FL**	**SCALANCE X101-1AUI**
Transmission rate			
Transfer rate 1	-	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	-	-
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2
Number of electrical connections			
• for network components and terminal equipment	1	1	2
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port, 15-pin D-sub socket
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	5-pole terminal block	5-pole terminal block	5-pole terminal block
Number of optical interfaces for optical waveguide			
• at 10 Mbit/s	-	1	-
• at 100 Mbit/s	1	-	-
Design of optical interface for optical waveguide			
• at 10 Mbit/s	-	BFOC port (multimode up to 5 km)	-
• at 100 Mbit/s	SC-RJ/POF-Port	-	-
Connectable optical power relative to 1 mW			
• of the transmitter output	-6 … -0.5 dB	-16 … -9 dB	-
• of the receiver input maximum	1 dB	-8.2 dB	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-23 dB	-30.6 dB	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-
Range at the optical interface depending on the optical fiber used	0 … 0.05 km	0 … 5 km	-
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.5 A/60 V	0.5 A/60 V	1 A / 33 V
Consumed current maximum	0.12 A	0.12 A	0.16 A
Active power loss at 24 V for DC	3 W	3 W	3 W

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Technical specifications (continued)

Article No.	6GK5101-1BH00-2AA3	6GK5101-1BY00-2AA3	6GK5101-1BX00-2AA3
Product-type designation	**SCALANCE X101-1POF**	**SCALANCE X101-1FL**	**SCALANCE X101-1AUI**
Permitted ambient conditions			
Ambient temperature			
• during operating	-10 … +60 °C	-10 … +60 °C	-10 … +60 °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 maximum	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30
Design, dimensions and weight			
Design	Compact	Compact	Compact
Width	40 mm	40 mm	40 mm
Height	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm
Net weight	0.55 kg	0.55 kg	0.56 kg
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
Mounting type			
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..
• for hazardous zone	EN 600079-15 II 3 G EEx nA II T.. KEMA 06 ATEX 0021 X	EN 600079-15 II 3 G EEx nA II T.. KEMA 06 ATEX 0021 X	EN 600079-15 II 3 G EEx nA II T.. KEMA 06 ATEX 0021 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..
• for emitted interference	EN 61000-6-3 (Class B)	EN 61000-6-3	EN 61000-6-4:2001
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	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)	Yes	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No

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SCALANCE X-100 unmanaged media converters

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Ordering data

	Article No.
SCALANCE X-100 unmanaged media converter Industrial Ethernet media converters, LED diagnostics, fault signaling contact with SET key, redundant power supply, PROFINET-compatible retaining collar; incl. Operating Instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• **SCALANCE X101-1** 1 x 10/100 Mbit/s RJ45 port 1 x 100 Mbit/s multimode FOC BFOC	**6GK5101-1BB00-2AA3**
• **SCALANCE X101-1LD** 1 x 10/100 Mbit/s RJ45 port 1 x 100 Mbit/s singlemode FOC BFOC	**6GK5101-1BC00-2AA3**
• **SCALANCE X101-1POF** 1 x 10/100 Mbit/s RJ45 port 1 x 100 Mbit/s POF SC RJ	**6GK5101-1BH00-2AA3**
• **SCALANCE X101-1AUI** 1 x 10 Mbit/s RJ45 port 1 x 10 Mbit/s AUI segment port	**6GK5101-1BX00-2AA3**
• **SCALANCE X101-1FL** 1 x 10 Mbit/s RJ45 port 1 x 10 Mbit/s multimode FOC	**6GK5101-1BY00-2AA3**
Accessories	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SITOP compact 24 V/0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

Industrial Ethernet switching components comprise

- Compact Switch Modules (CSMs)
- SCALANCE X Industrial Ethernet switches
- Communications processors (CP) with integral switch

Compact Switch Modules (CSMs)

Unmanaged switches for use directly on the SIMATIC for interface expansion and integration of machines into existing plant networks

SCALANCE X-000/XB-000 unmanaged

Unmanaged switches with electrical and/or optical ports for designing small networks for machine or plant islands with 10/100/1000 Mbit/s

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 conversion between two 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 level of plant availability. Devices with a high degree of protection facilitate cabinet-free construction.

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

SCALANCE XF-200 managed

SCALANCE XF-200 Industrial Ethernet switches have the same functions as SCALANCE X-200 switches. The flat design in ET 200S format (IP20 protection) mean they are optimally suitable for space-saving use in small control boxes.

SCALANCE X-300 managed

Networking of subsystem/plant areas, as well as linking to the enterprise network. The SCALANCE X-300 managed product line combines the firmware functionality of the SCALANCE X-400 line with the compact design of the SCALANCE X-200 line. This means the SCALANCE X-300 switches have extended management functions and an extended firmware functionality compared to the SCALANCE X-200 switches.

Electrical and optical Gigabit Ethernet ports are also available.

SCALANCE XR-300 managed

The SCALANCE XR-300 Industrial Ethernet switches correspond functionally to the SCALANCE X-300 switches. Designed as rack switches, they are particularly suitable for use in 19" control cabinets. They are also fully modular, and due to their 2-port media modules (electrical and optical) they can be adapted to the respective task.

For use in power plants and under difficult environmental conditions, ECC (Enhanced Environmental Conditions) versions may be used in compact and rack designs.

SCALANCE X-400 managed (Layer 3)

For flexibly networking and structuring high-performance plant networks. Thanks to the modular design, the switches can be adapted to the respective task. Near Field Communication (NFC) in connection with existing WLAN also enables rapid access to web-based management via a smartphone or tablet connected to an available wireless network.

Optional routing functions on Layer 3 permit communication between different IP subnets.

SCALANCE X-500 managed (Layer 3)

For networking and structuring high-performance industrial networks and for connecting office networks to automation networks. As a Layer 3 switch, SCALANCE X-500 is extremely well suited to use as a central component in backbone networks, e.g. when a high number of ports is required, at extremely high transmission rates (10 Gigabit Ethernet), or for redundant connection to an office infrastructure. The rack switch (19" design) can be used flexibly to suit requirements thanks to its modular design and the plug-in 4-port media modules (electrical and optical).

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

Communications processors for SIMATIC with integral switch

Managed switches for adding Industrial Ethernet/PROFINET interfaces to the SIMATIC and for integrating the controllers into existing line or ring topologies.

Thanks to integral Layer 3 functionality, the Advanced-CPs can also be used as routers between IP subnets.

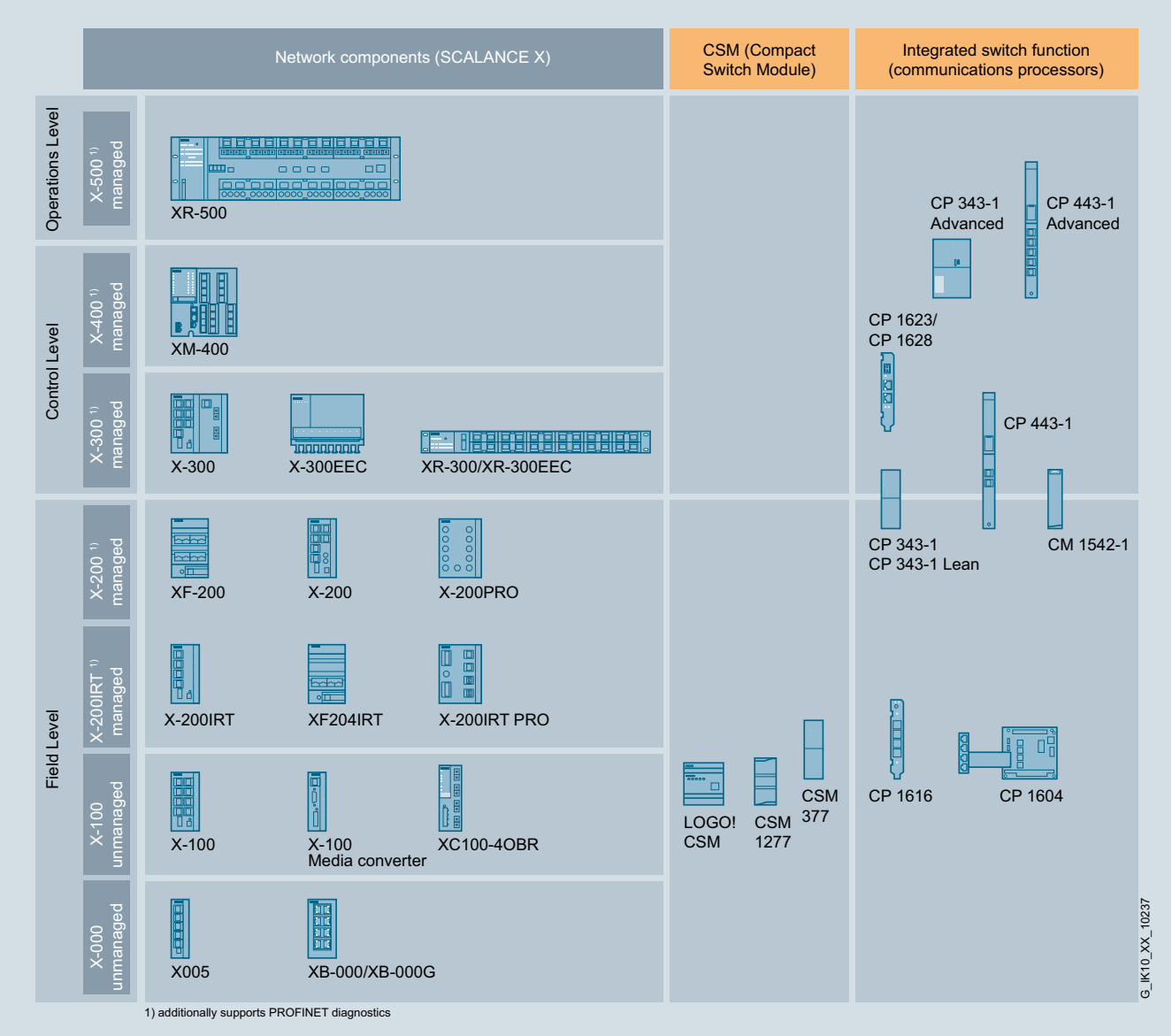
Communications processors for PC with integral switch

Managed switches for adding Industrial Ethernet/PROFINET interfaces to industrial PCs and for integrating PCs into existing line topologies.

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Overview (continued)



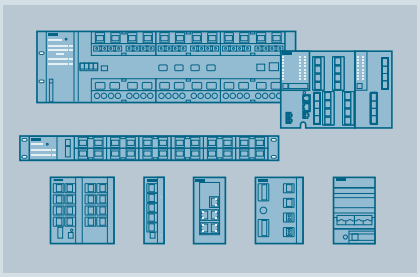
Overview of SCALANCE X Industrial Ethernet switches and components with switch functionality

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Overview (continued)

Network component



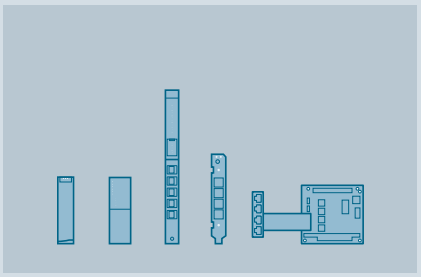
- Basis for integrated networking in industrial automation - from the field to the management level
- Network components optimized for various applications:
  - Small and large-scale structured networks
  - Management functions
  - Connection to IT networks
  - Configuring of redundant networks
  - Use with Industrial Ethernet and PROFINET
- 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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		Application areas / type of network / requirements	Office incorporation	Plant networking	Industry-related applications	Energy generation and distribution	Wind energy plants	Machine building and plant engineering	Plant subnetworking	High-volume machine building	Internal machine networking	Network setup using SIMATIC S7	PC-based applications
X-500		High-performance backbone networks with very high emphasis on functionality / port density / availability and interface to IT network	•	•	•								
X-400		High-performance plant network with high emphasis on functionality and availability	•	•	•								
X-300		Large networks with high emphasis on functionality and availability		•									
	X-300EEC/ XR-300EEC					•	•						
X-200		Networks with higher emphasis on functionality and availability						•	•				
	X204RNA			•					•				
	X204RNA EEC			•		•	•						
X-100		Networks with low emphasis on functionality						•		•			
X-000		Networks with low emphasis on functionality and robustness								•	•		
CSM		Very small networks or interface expansion for SIMATIC S7										•	
CPs		Very small networks through integrated switch in CP										•	•

• applies

G_IK10_XX_10301

Industrial Ethernet Switches SCALANCE X: Areas of application

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Overview (continued)

Features	Modular through media modules	19" design	Support of Gigabit Ethernet	Additional interface for SIMATIC S7	Power-over-Ethernet	Can be used under Enhanced Environmental Conditions (EEC)	Isochronous Real-Time (IRT)	Layer 3	Office features (VLAN)	Diagnosis	PROFINET IO Device	Time synchronization according to IEEE 1588
X-500	•	•	•		•			•	•	•	•	
X-400	•		•					•	•	•	•	
X-300	•	•	•		•				•	•	•	
X-300EEC/ XR-300EEC	•	•	•			•				•	•	•
X-200							•[2]			•	•	
X204RNA										•		
X204RNA EEC						•				•		
X-100					•							
X-000			•[1]									
CSM				•								
CPs [3]				•				•		•	•	

G_IK10_XX_10302

• applies 1) with Gigabit version 2) with IRT version 3) SIMATIC S7 Advanced CPs only

Industrial Ethernet Switches SCALANCE X: Overview of functions

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The module is used to connect a LOGO! and up to three other nodes to an Industrial Ethernet network with 10/100 Mbit/s in an electrical linear, tree or star topology.

The essential features of the LOGO! CSM are:

- Unmanaged 4-port switch, of which one port is on the front for easy diagnostics access
- Two versions for the voltage ranges 12/24 V DC or 230 V AC/DC
- Problem-free connection using four RJ45 standard connectors
- Space-saving, optimized for connection to LOGO!
- Low-cost solution for implementing small, local Ethernet networks
- Stand-alone use for networking any Ethernet devices

Benefits

get Designed for Industry

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

Application

The LOGO! CSM is an Industrial Ethernet switch in compact, modular design for use in devices of the new LOGO! generation with Industrial Ethernet connection. With the LOGO! CSM, the Ethernet interface of the SIMATIC LOGO! can be multiplied to enable simultaneous communication with control and programming devices, other controllers, or the office world.

Problem-free external access (for diagnostics purposes, for example) is possible via the four Ethernet ports.

Product versions

LOGO!CSM 12/24

- For operation with DC power at a voltage of 12 and 24 volts

LOGO!CSM 230

- For operation with alternating voltage of 110 and 230 volts

Design

The design of the LOGO! CSM Compact Switch Modules corresponds to that of the LOGO! components:

- Compact design;
  the rugged plastic enclosure contains:
  - 4 x RJ45 ports for connecting to Industrial Ethernet; of which one port is on the front for easy diagnostics access
  - 3-pin connection for the external supply voltage
  - LEDs for diagnostics and for status display of the Industrial Ethernet ports
- Simple mounting on the standard mounting rail
- Fanless and consequently low-maintenance design

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LOGO! CSM unmanaged

Function

- Multiplication of the Ethernet interfaces for logic modules of the product range LOGO! with Ethernet connection (…-0BA7)
- Design of a small, local Industrial Ethernet network with three further nodes
- Automatic detection of data transfer rate by means of autosensing and autocrossover functions
- LEDs for diagnostics and for status display

Network topology and network configuration

With the LOGO! CSM, different network topologies can be implemented:

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

Configuration

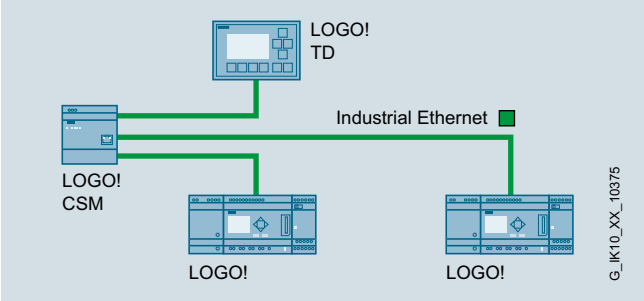
The LOGO! CSM is an unmanaged switch and does not require configuring.

Diagnostics

The following information is displayed on LEDs on the device:

- Power
- Port status
- Data traffic

Integration



Linear structure with LOGO! CSM

Technical specifications

Article No.	**6GK7177-1FA10-0AA0**	**6GK7177-1MA10-0AA0**
Product-type designation	**LOGO! CSM 230**	**LOGO! CSM 12/24**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	4	4
Number of electrical connections		
• for network components • and terminal equipment	4	4
• for power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port / 1 connection on front of module	RJ45 port / 1 connection on front of module
• for power supply	3-pole terminal block	3-pole terminal block
Supply voltage, current consumption, power loss		
Type of supply voltage	AC/DC 115 ... 240 V	DC 12/24 V
Supply voltage external	230 V	24 V
• minimum	100 V	10.2 V
• maximum	240 V	30.2 V
Product component fusing at power supply input	Yes	Yes
Consumed current maximum	0.02 A	0.15 A
Active power loss at 24 V for DC	-	1.5 W

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Technical specifications (continued)

Article No.	6GK7177-1FA10-0AA0	6GK7177-1MA10-0AA0
Product-type designation	**LOGO! CSM 230**	**LOGO! CSM 12/24**
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 55 °C	0 … 55 °C
• during storage	-40 °C 70 °C	-40 °C 70 °C
• during transport	-40 °C	-40 °C
Relative humidity at 25 °C without condensation during operating maximum	90 %	90 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	LOGO! module	LOGO! module
Width	72 mm	72 mm
Height	90 mm	90 mm
Depth	55 mm	55 mm
Net weight	0.155 kg	0.14 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
• S7-300 rail mounting	No	No
Product functions management, configuration		
Product function switch-managed	No	No
Standards, specifications, approvals		
Standard		
• for EMC from FM		
• for safety of CSA and UL		
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	No	No

Ordering data

	Article No.
LOGO! CSM Compact Switch Modules	
Unmanaged switch for connecting a LOGO! (...0BA7) and up to three further nodes on Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; LED diagnostics, LOGO! module	
• **LOGO! CSM 12/24** external 12 V DC or 24 V DC power supply,	**6GK7177-1MA10-0AA0**
• **LOGO! CSM 230** external 115 ... 240 V AC power supply	**6GK7177-1FA10-0AA0**

	Article No.
Accessories	
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE FC Outlet RJ45 For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	**6GK1901-1FC00-0AA0**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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CSM 1277 unmanaged

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

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- 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 for 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 ports 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 consequently 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 autosensing 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

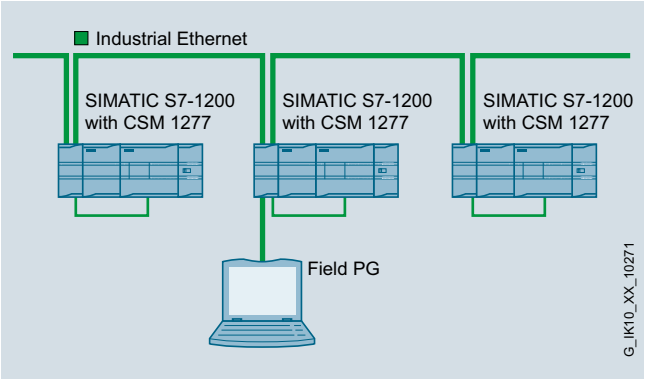
Configuration

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



Linear topology with CSM 1277

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Technical specifications

Article No.	6GK7277-1AA10-0AA0
Product-type designation	**CSM 1277**
Transmission rate	
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Interfaces	
Number of electrical/optical connections for network components or terminal equipment maximum	4
Number of electrical connections	
• for network components and terminal equipment	4
• for power supply	1
Design of electrical connection	
• for network components and terminal equipment	RJ45 port
• for power supply	3-pole terminal block
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage external	24 V
• minimum	19.2 V
• maximum	28.8 V
Product component fusing at power supply input	Yes
Type of fusing at input for supply voltage	0.5 A / 60 V
Consumed current maximum	0.07 A
Active power loss at 24 V for DC	1.6 W
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20

Article No.	6GK7277-1AA10-0AA0
Product-type designation	**CSM 1277**
Design, dimensions and weight	
Design	SIMATIC S7-1200 device design
Width	45 mm
Height	100 mm
Depth	75 mm
Net weight	0.15 kg
Mounting type	
• 35 mm DIN rail mounting	Yes
• wall mounting	Yes
• S7-300 rail mounting	No
Product functions management, configuration	
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 hazardous zone	EN 600079-15:2005, EN 600079-0:2006, II 3 G Ex nA II T4, KEMA 08 ATEX 0003 X
• for safety of CSA and UL	UL 508, CSA C22.2 No. 142
• for emitted interference	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2
Verification of suitability	EN 61000-6-2, EN 61000-6-4
• CE mark	Yes
• C-Tick	Yes
• KC approval	No

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CSM 1277 unmanaged

Ordering data

	Article No.
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	**6GK7277-1AA10-0AA0**
Accessories	
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for use as trailing cable; PROFINET-compatible; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal housing 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Outlet RJ45 For connecting Industrial Ethernet FC cables and TP cords; graduated prices for 10 and 50 units or more	**6GK1901-1FC000AA0**
IE TP Cord RJ45/RJ45	
• TP cord preassembled with 2 RJ45 connectors; length: 0.5 m	**6XV1850-2GE50**
• TP cable 4 x 2 with 2 RJ45 connectors; length: 0.5 m	**6XV1870-3QE50**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



- Unmanaged switch for the connection of a SIMATIC S7-300 with integral PROFINET interface or with an Industrial Ethernet CP or ET 200M to an Industrial Ethernet in an electrical linear, tree or star structure
- As many as three additional nodes can be connected
- As an unmanaged switch, the CSM 377 is used for integrating small machines into existing automation networks or for the standalone operation of the machines
- Simple, space-saving attachment to S7-300 mounting rail due to design as single-width module in S7-300 format
- Low-cost solution for implementing small, local Ethernet networks
- Rugged, industry-standard node connections with PROFINET-compliant RJ45 connectors that latch onto the enclosure to offer additional strain and bending relief

Benefits

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- Quick and easy connection of a SIMATIC S7-300 or ET 200M to electrical Industrial Ethernets in linear, tree or star structures by means of three additional RJ45 ports
- Ideal solution for the implementation of small local Ethernets with a SIMATIC S7-300 station
- 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 enclosure to provide additional strain relief
- Low-maintenance operation thanks to fanless construction
- Quick and easy diagnosis by means of LEDs on the device
- Use of uncrossed connection cables possible by means of integrated autocrossover function

Application

- For the economical construction of small, electrical Industrial Ethernets with star, tree and linear structures using a SIMATIC S7-300 or ET 200M

Design

The compact switch module CSM 377 features all the advantages of the SIMATIC S7-300 design:

- Compact construction;
  the rugged plastic enclosure features the following on the front panel:
  - 4 x RJ45 ports for the connection to Industrial Ethernet (retaining collar)
  - 1 x 2-pin pluggable terminal strip for the connection of the external 24 VDC power supply
  - LEDs for diagnostics and for status display of the Industrial Ethernet ports
- 10/100BaseTX;
  automatic detection of the data rate with autosensing and autocrossover function for the connection of IE FC cables by means of IE FC RJ45 Plug 180 up to 100 m
- Simple mounting;
  the CSM 377 switch module is mounted on the mounting rail of the S7-300. As it has no connection to the backplane bus of the S7-300 or ET 200M, it must either be inserted at the beginning (first module to the left of the CPU) or at the end (last module on far right) of the S7-300 station. The connection to the CPU of the S7-300 is either by means of an Industrial Ethernet cable or an Industrial Ethernet twisted pair cord.
- Three further Industrial Ethernet interfaces (TP ports) are available for the connection of additional Ethernet nodes such as HMI panels or ET 200
- The CSM 377 can be operated without a fan and no backup battery is necessary
- The module can be replaced without a programming device

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Function

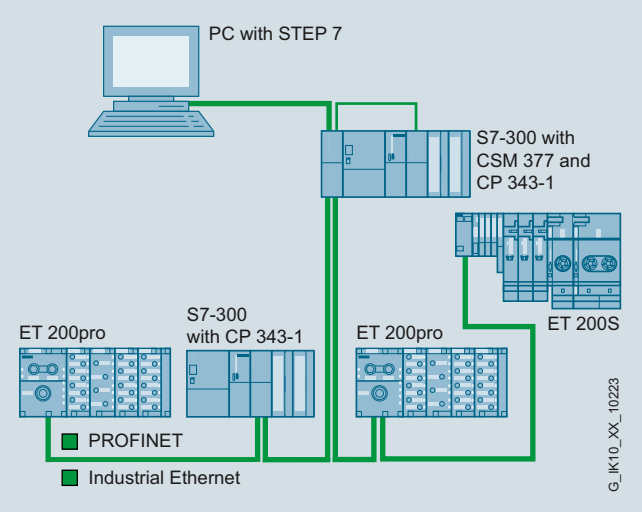
- Connection of a SIMATIC S7-300 to a higher-level electrical network in a linear, tree or point-to-point structure
- Construction of a small local network with one SIMATIC S7-300 and three other Ethernet nodes

Thanks to the switching technology used, the CSM 377 is suitable for use in PROFINET networks, but offers no additional PROFINET functions, i.e. no integration into the PROFINET diagnostics.

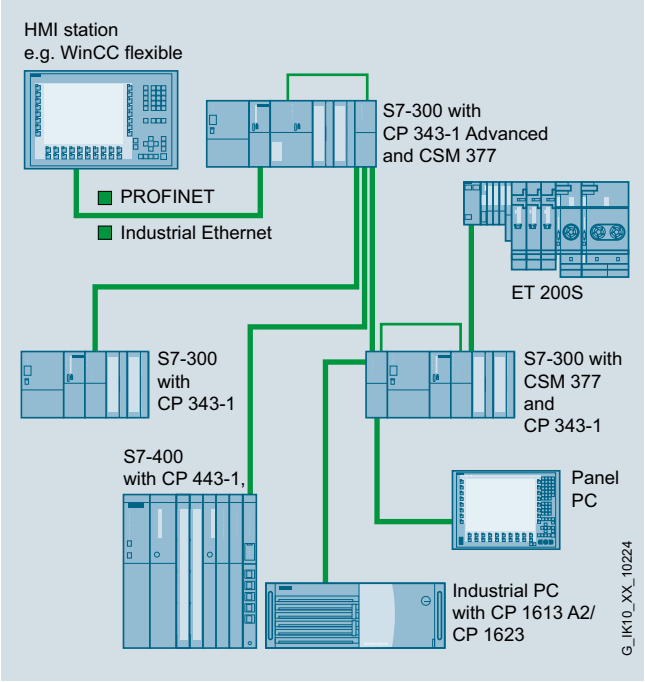
Network topology and network configuration

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

- Length of the TP cable between two nodes:
  - max. 100 m with Industrial Ethernet FastConnect cable and IE FC RJ45 Plug 180;
    of which no more than 10 m by means of patching with TP cord



Connection of SIMATIC S7-300 with CSM 377 to Industrial Ethernet with linear structure



Construction of a local Industrial Ethernet with SIMATIC S7-300 and CSM 377 in a point-to-point structure

Configuration

The Compact Switch Module CSM 377 is an unmanaged switch and requires no configuration.

Diagnostics

The following information is indicated on the device by means of LEDs:

- Power
- Port status
- Data traffic

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Technical specifications

Article No.	6GK7377-1AA00-0AA0
Product-type designation	**CSM 377**
Transmission rate	
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Interfaces	
Number of electrical/optical connections for network components or terminal equipment maximum	4
Number of electrical connections	
• for network components and terminal equipment	4
• for power supply	1
Design of electrical connection	
• for network components and terminal equipment	RJ45 port
• for power supply	2-pole terminal block
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage external	24 V
• minimum	19.2 V
• maximum	28.8 V
Product component fusing at power supply input	Yes
Type of fusing at input for supply voltage	0.5 A / 60 V
Consumed current maximum	0.07 A
Active power loss at 24 V for DC	1.6 W
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20

Article No.	6GK7377-1AA00-0AA0
Product-type designation	**CSM 377**
Design, dimensions and weight	
Design	SIMATIC S7-300 device design
Width	40 mm
Height	125 mm
Depth	118 mm
Net weight	0.2 kg
Mounting type	
• 35 mm DIN rail mounting	No
• wall mounting	No
• S7-300 rail mounting	Yes
Product functions management, configuration	
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 hazardous zone	EN 60079-15, II 3 G Ex nA II T.., KEMA 06 ATEX 0021 X
• for safety of CSA and UL	UL 508, CSA C22.2 No. 142
• for hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location)
• for emitted interference	EN 61000-6-4:2001
• for interference immunity	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes
• C-Tick	Yes
• KC approval	No

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CSM 377 unmanaged

Ordering data	Article No.
Compact Switch Module CSM 377	
Unmanaged switch for connecting a SIMATIC S7-300, ET200 M 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, S7-300 module including electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**
Accessories	
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-compliant; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 2 x 2	
RJ45 plug connector for Industrial Ethernet with a rugged metal housing 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC stripping tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-000		Hardware																	
	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	10 Gigabit Ethernet	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
	X005 / X005TS							•					•	•					
	XB004-1					•							•						
	XB004-1G					•					•		•						
	XB004-1LD					•							•						
	XB004-1LDG					•					•		•						
	XB005					•							•						
	XB005G					•					•		•						
	XB008					•							•						
	XB008G					•					•		•						
	• applies																		

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Function overview SCALANCE X-000 unmanaged

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Overview



The unmanaged Industrial Ethernet Switch SCALANCE X005 is optimized for low-cost installation of small Industrial Ethernet networks with data transfer rates of 10/100 Mbit/s in a line and star topology.

- Five electrical nodes or network connections
- Rugged metal enclosure for space-saving cubicle mounting on standard rails, S7-300 DIN rails, 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
- Diagnostics on the device by means of LEDs (power, link status, data communication)

Product versions

- ***SCALANCE X005***
  for setting up electrical star and linear topologies with five electrical ports
- ***SCALANCE X005TS***
  for setting up electrical star and linear topologies with five electrical ports for use in rail and road transport with extended temperature range

Benefits

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- Ideal solution for configuring small Industrial Ethernet line and star topologies
- Space-saving installation in the cabinet thanks to the compact design in S7-300 format
- Reliable plug-in connection thanks to rugged, industry-standard device connection in conjunction with PROFINET-compliant FastConnect connectors
- Installation is possible without a patch field by means of IE FC RJ45 Plug 180 and IE FC Standard Cable
- Use of uncrossed connection cables possible by means of integrated autocrossover function

Application

- For low-cost configuration of small, electrical Industrial Ethernet star and line topologies with switching functionality, e.g. machine or plant islands
- For use in the control cabinet
- The SCALANCE X005TS (**T**ransportation **S**ystems) is suitable for use in rail and road transport due to its specification according to EN 50155 and e1/E1

Design

The SCALANCE Industrial Ethernet switches with a rugged metal housing (IP30) are optimized for mounting on a standard rail and an S7-300 DIN rail. Direct wall mounting in different positions is also possible. Due to the housing dimensions that correspond to those of the SIMATIC S7-300, the devices are very well suited for integration into an automation solution using S7-300 components.

The SCALANCE X005 switch is equipped with:

- Supply voltage 1 x 24 V DC
- A row of LEDs for displaying status information (power, link status, data communication)
- 5 x 10/100BaseTX, RJ45 ports:
  automatic detection of the data rate (10 or 100 Mbit/s), with autosensing and autocrossover function for connecting IE FC cables via IE FC RJ45 Plug 180 over distances up to 100 m

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Function

- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- Network load disconnection through integral switch functionality

Network topology and network configuration

The SCALANCE X005 is typically accommodated in one control cubicle together with the nodes to be connected. It can be operated in small electrical star and line topologies. Network configuration and expansion are easy to implement; there are no limitations with the cascading of SCALANCE X005.

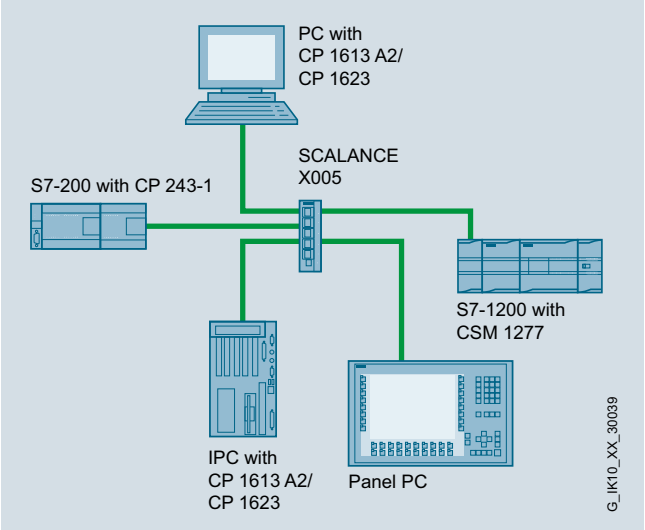
When configuring the network, it is necessary to observe the following boundary conditions:

- Length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with Industrial Ethernet FastConnect products

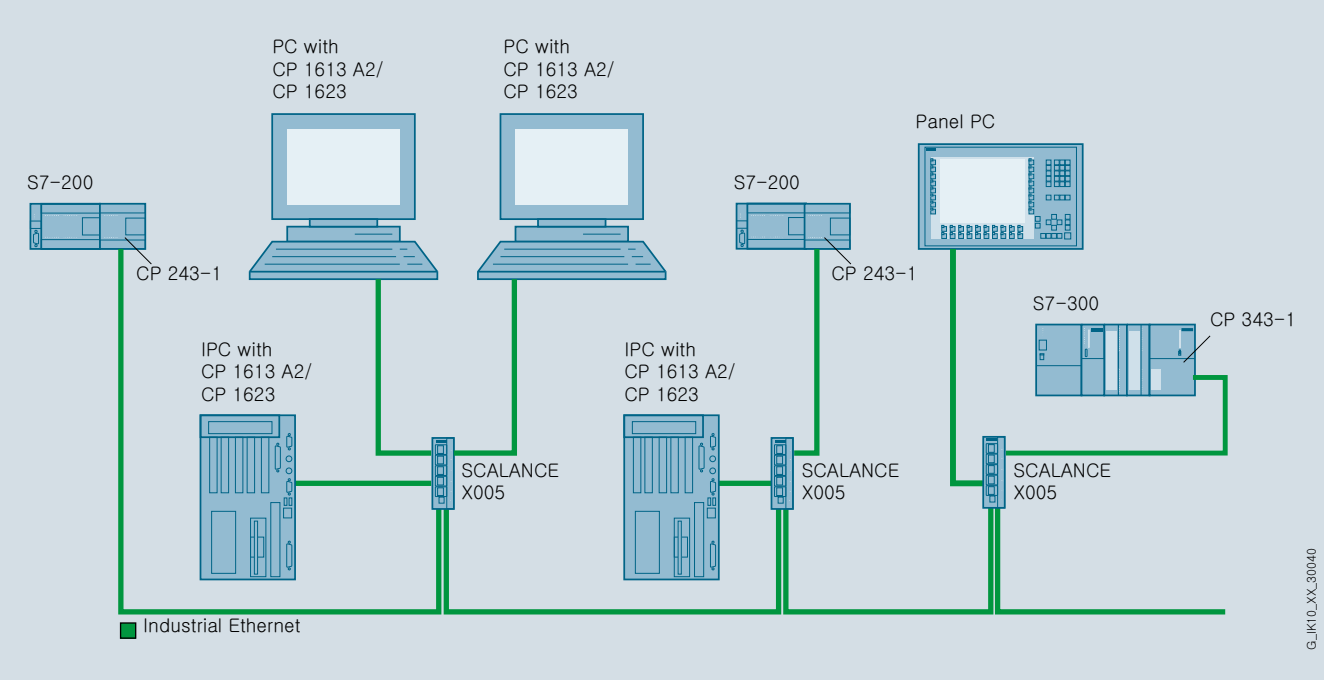
Diagnostics

The following information is displayed on site by LEDs:

- Port status
- Data traffic



Star-shaped network topology with SCALANCE X005



Electrical line topology with SCALANCE X005

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Technical specifications

Article No.	6GK5005-0BA00-1AA3	6GK5005-0BA00-1CA3
Product-type designation	**SCALANCE X005**	**SCALANCE X005TS**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	5	5
Number of electrical connections		
• for network components • and terminal equipment	5	5
• for power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port	RJ45 port
• for power supply	2-pole terminal block	2-pole terminal block
Supply voltage, current consumption, power loss		
Type of supply voltage	DC	DC
Supply voltage external	24 V	24 V
• minimum	18 V	18 V
• maximum	32 V	32 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	0.5 A / 60 V	0.5 A / 60 V
Consumed current maximum	0.08 A	0.08 A
Active power loss at 24 V for DC	2 W	2 W
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 65 °C	-40 … +75 °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 maximum	95 %	95 %
Ambient condition for (standard) operation mode	-	Conformal coating, no
Protection class IP	IP20	IP30
Design, dimensions and weight		
Design	compact	compact
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	124 mm	124 mm
Net weight	0.55 kg	0.55 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
• S7-300 rail mounting	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5005-0BA00-1AA3	6GK5005-0BA00-1CA3
Product-type designation	**SCALANCE X005**	**SCALANCE X005TS**
Standards, specifications, approvals		
Standard		
• for safety of CSA and UL	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)
• for interference immunity	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	Yes	Yes
• E1 approval	No	Yes
• e1 approval	No	Yes
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• Det Norske Veritas (DNV)	No	No
• Germanische Lloyd (GL)	No	No
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes

Ordering data

	Article No.
SCALANCE X005 Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures	**6GK5005-0BA00-1AA3**
SCALANCE X005TS Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures with extended temperature range and approvals for use in rail and road transport	**6GK5005-0BA00-1CA3**

	Article No.
Accessories	
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-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 2 x 2 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 - 264 V AC/110 - 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

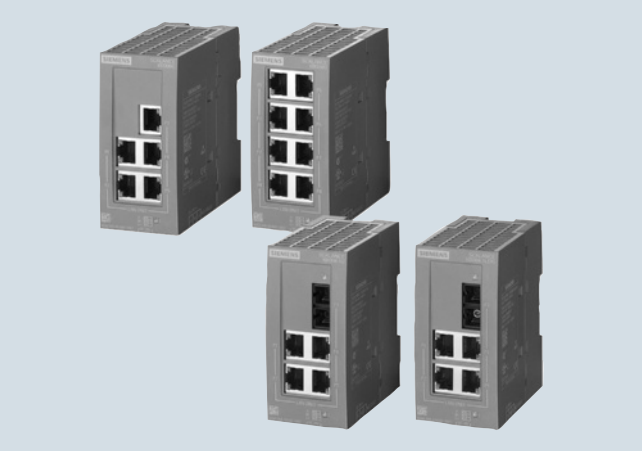
TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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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.

- Enclosure for space-saving installation in control cabinets or boxes on a standard mounting rail

Product versions

SCALANCE XB005 and SCALANCE XB008

- 5 or 8 x 10/100 Mbit/s RJ45 ports, electrical

SCALANCE XB005G and SCALANCE XB008G (Gigabit)

- 5 or 8 x 10/100/1 000 Mbit/s RJ45 ports, electrical

SCALANCE XB004-1

- 4 x 10/100 Mbit/s RJ45 ports, electrical
- 1 x 100 Mbit/s SC port, optical (multi-mode, glass), up to 5 km

SCALANCE XB004-1LD (Long Distance)

- 4 x 10/100 Mbit/s RJ45 ports, electrical
- 1 x 100 Mbit/s SC port, optical (single-mode, glass), up to 26 km

SCALANCE XB004-1G (Gigabit)

- 4 x 10/100/1 000 Mbit/s RJ45 ports, electrical
- 1 x 1000 Mbit/s SC port, optical (multi-mode, glass), up to 750 m

SCALANCE XB004-1LDG (Long Distance)

- 4 x 10/100/1000 Mbit/s RJ45 ports, electrical
- 1 x 1 000 Mbit/s SC port, optical (single-mode, glass), up to 10 km

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
- Uncomplicated use of uncrossed connecting cables possible thanks to the integrated Autocrossover function
- Low-cost connection of especially remote nodes possible

Application

The unmanaged Industrial Ethernet switches of the SCALANCE XB-000 line allow cost-effective solutions for setting up small, electrical/optical 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.

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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 10/100/1 000 BaseTX electrical RJ45 ports:
  automatic data transmission rate detection (10 or 100 Mbit/s), with Autosensing and Autocrossing function for connecting IE TP cables up to 100 m.
- 100 BaseFX, optical SC port:
  for direct connection to Industrial Ethernet FO cables. Multimode fiber-optic cable up to 5 km
- 100 BaseFX, 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:
  for direct connection to Industrial Ethernet FO cables. Multimode fiber-optic cable up to 750 m
- 1000 BaseLX, optical SC port:
  for direct connection to Industrial Ethernet FO cables. Single mode fiber-optic cable up to 10 km

All connections for data cables are located at the front, and the connection for the power supply is at the bottom.

Function

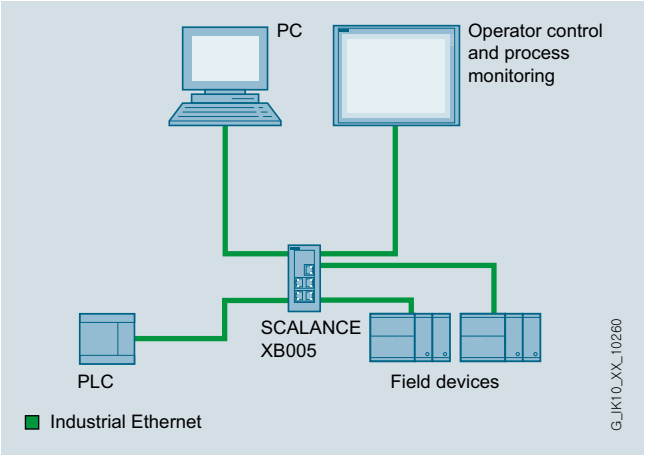
- Construction of electrical Industrial Ethernet line or star topologies
- Automatic data transmission rate detection (10/100/1 000 Mbit/s), with autosensing and autocrossover function
- Easy network configuration and network expansion; no limitation on network expansion with cascading of the switches

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. 5 km with Industrial Ethernet FO cables Multimode
  - max. 26 km with Industrial Ethernet FO cables Single mode

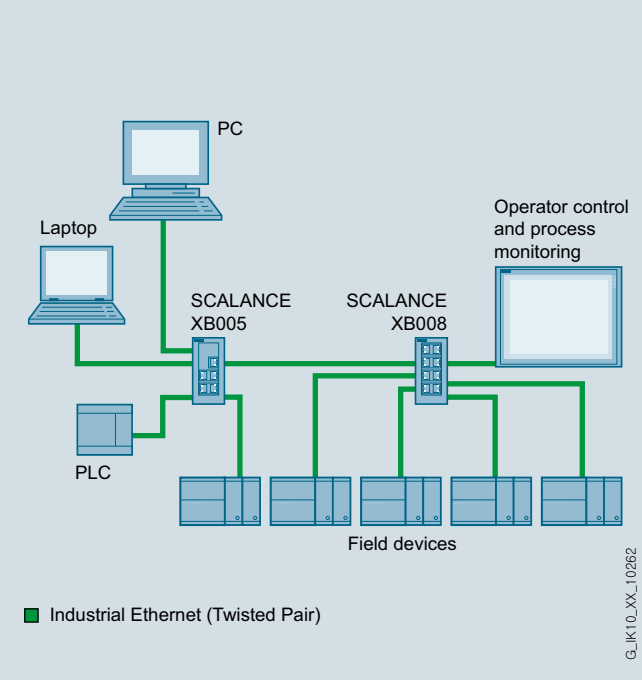


Electrical star topology with SCALANCE XB005 or SCALANCE XB005G

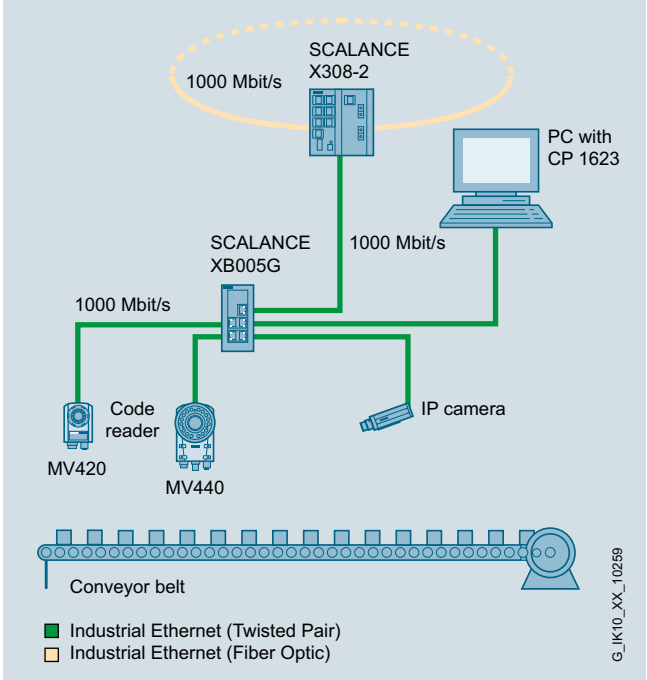
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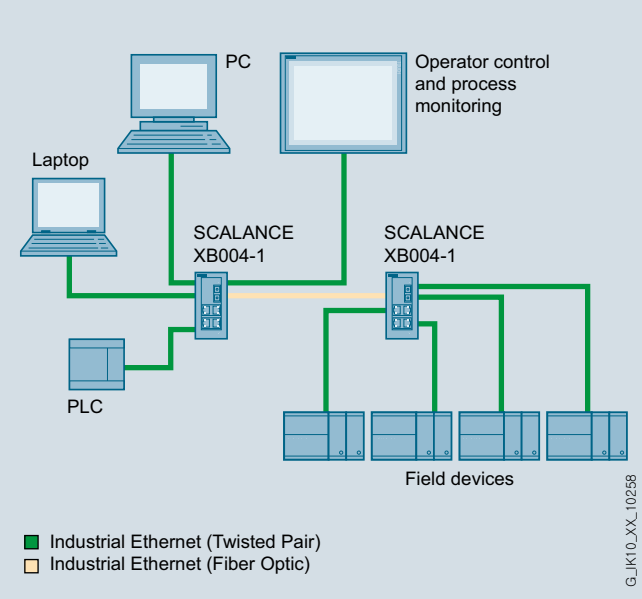
Function (continued)



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



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

Diagnostics

The following information is displayed by LEDs on site:

- Power
- Port status
- Data traffic

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Technical specifications

Article No.	6GK5004-1BD00-1AB2	6GK5004-1BF00-1AB2	6GK5005-0BA00-1AB2	6GK5008-0BA00-1AB2
Product-type designation	**SCALANCE XB004-1**	**SCALANCE XB004-1LD**	**SCALANCE XB005**	**SCALANCE XB008**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	5	5	5	8
Number of electrical connections				
• for network components • and terminal equipment	4	4	5	8
• for power supply	1	1	1	1
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for power supply	3-pole terminal block	3-pole terminal block	3-pole terminal block	3-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	1	1	-	-
Design of optical interface for optical waveguide				
• at 100 Mbit/s	SC port (multimode up to 5 km)	SC port (singlemode up to 26 km)	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-5 … +0 dB	- -	- -
• of the receiver input maximum	-14 dB	0 dB	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	- -	- -
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V
Consumed current maximum	0.11 A	0.1 A	0.07 A	0.12 A
Active power loss at 24 V for DC	2.64 W	2.4 W	1.68 W	2.88 W
Permitted ambient conditions				
Ambient temperature				
• during operating	-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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5004-1BD00-1AB2	6GK5004-1BF00-1AB2	6GK5005-0BA00-1AB2	6GK5008-0BA00-1AB2
Product-type designation	**SCALANCE XB004-1**	**SCALANCE XB004-1LD**	**SCALANCE XB005**	**SCALANCE XB008**
Design, dimensions and weight				
Design	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
Mounting type				
• 35 mm DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for safety of CSA and UL	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 interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	Yes	Yes	Yes	Yes

Article No.	6GK5004-1GL00-1AB2	6GK5004-1GM00-1AB2	6GK5005-0GA00-1AB2	6GK5008-0GA00-1AB2
Product-type designation	**SCALANCE XB004-1G**	**SCALANCE XB004-1LDG**	**SCALANCE XB005G**	**SCALANCE XB008G**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	5	5	5	8
Number of electrical connections				
• for network components and terminal equipment	4	4	5	8
• for power supply	1	1	1	1
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for power supply	3-pole terminal block	3-pole terminal block	3-pole terminal block	3-pole terminal block
Number of optical interfaces for optical waveguide				
• at 1000 Mbit/s	1	1	-	-
Design of optical interface for optical waveguide				
• at 1000 Mbit/s	SC port (multimode up to 0.75 km)	SC port (singlemode up to 10 km)	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-9.5 … -4 dB	-9.5 … -3 dB	-	-
• of the receiver input maximum	-3 dB	-3 dB	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 10 km	-	-

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Technical specifications (continued)

Article No.	6GK5004-1GL00-1AB2	6GK5004-1GM00-1AB2	6GK5005-0GA00-1AB2	6GK5008-0GA00-1AB2
Product-type designation	**SCALANCE XB004-1G**	**SCALANCE XB004-1LDG**	**SCALANCE XB005G**	**SCALANCE XB008G**
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V
Consumed current maximum	0.52 A	0.52 A	0.44 A	0.52 A
Active power loss at 24 V for DC	12.5 W	12.5 W	10.5 W	12.5 W
Permitted ambient conditions				
Ambient temperature				
• during operating	-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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	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
Mounting type				
• 35 mm DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for safety of CSA and UL	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 interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	Yes	Yes	Yes	Yes

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Ordering data

	Article No.
SCALANCE XB-000 Industrial Ethernet switches	
Unmanaged Industrial Ethernet switches for 10/100/1 000 Mbit/s, degree of protection IP20, incl. operating instructions, Industrial Ethernet network manual on CD-ROM	
• **SCALANCE XB005** 5 x 10/100 Mbit/s RJ45 ports electrical	**6GK5005-0BA00-1AB2**
• **SCALANCE XB008** 8 x 10/100 Mbit/s RJ45 ports electrical	**6GK5008-0BA00-1AB2**
• **SCALANCE XB004-1** 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (multimode, glass), up to 5 km	**6GK5004-1BD00-1AB2**
• **SCALANCE XB004-1LD** 4 x 10/100 Mbit/s RJ45 ports electrical 1x 100 Mbit/s SC port optical (singlemode, glass), up to 26 km	**6GK5004-1BF00-1AB2**
• **SCALANCE XB005G** 5 x 10/100/1 000 Mbit/s electrical RJ45 ports	**6GK5005-0GA00-1AB2**
• **SCALANCE XB008G** 8 x 10/100/1 000 Mbit/s electrical RJ45 ports	**6GK5008-0GA00-1AB2**
• **SCALANCE XB004-1G** 4 x 10/100/1 000 Mbit/s RJ45 electrical ports 1x 1 000 Mbit/s optical SC port (multimode, glass), up to 0.75 km	**6GK5004-1GL00-1AB2**
• **SCALANCE XB004-1LDG** 4 x 10/100/1 000 Mbit/s electrical RJ45 ports 1x 1 000 Mbit/s SC optical port (singlemode, glass), up to 10 km	**6GK5004-1GM00-1AB2**
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
FO Standard Cable GP 50/125/1400 [1) 2)]	**6XV1873-2A**
Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m;	
SITOP compact 24 V/0.6 A	**6EP1331-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-100		Hardware																		
	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	10 Gigabit Ethernet	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	
	X104-2							•					•	•	•		•	•		G_IK10_XX_10316
	X106-1							•					•	•	•		•	•		
	X108							•					•	•	•		•	•		
	X108PoE							•				•	•	•	•		•	•		
	X112-2							•					•	•	•		•	•		
	X116							•					•	•	•		•	•		
	X124							•					•	•	•		•	•		
	• applies																			

Function overview SCALANCE X-100 unmanaged

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Overview



The unmanaged Industrial Ethernet switches of the SCALANCE X-100 product line are optimized for installing Industrial Ethernet networks at transmission rates of 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 802.3at Type 1 (corresponds to IEEE 802.3af)
- Rugged metal enclosure for space-saving cubicle mounting on standard rails, S7-300 DIN rails, 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

Product versions

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

- Construction of optical Industrial Ethernet line or star topologies:
  - SCALANCE X104-2;
    with 4 electrical ports and 2 optical ports
  - SCALANCE X106-1;
    with 6 electrical ports and 1 optical port
  - SCALANCE X112-2;
    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 RJ45 ports are suitable for industrial use and have additional retaining collars: optimized for connecting 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 ports are suitable for industrial use and have additional retaining collars: optimized for connecting the IE FC RJ45 Plug 180

Benefits

get Designed for Industry

- 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) direct at the switch (SCALANCE X108PoE only)
- Space-saving installation in the cabinet thanks to the compact design in S7-300 format
- Reliable plug-in connection thanks to industry-standard device connection in conjunction with PROFINET-compliant FastConnect connectors
- Installation is possible without a patch field by means of IE FC RJ45 Plug 180 and IE FC Standard Cable
- Use of uncrossed connection cables possible by means of integrated autocrossover function

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 installation in the control cabinet.

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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 for displaying status information (power, link status, data communication, signaling contact)
- A 2-pole terminal block for connecting the floating signaling contact
- A SET button for on-site configuration of the signaling contact

The following port types are available:

- ***10/100BaseTX, RJ45 port;***
  automatic detection of the transmission 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 ports and Power-over-Ethernet functionality;***
  automatic detection of the transmission 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 802.3at Type 1
- ***100BaseFX, BFOC port;***
  for direct connection to the Industrial Ethernet glass FOC up to 5 km

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

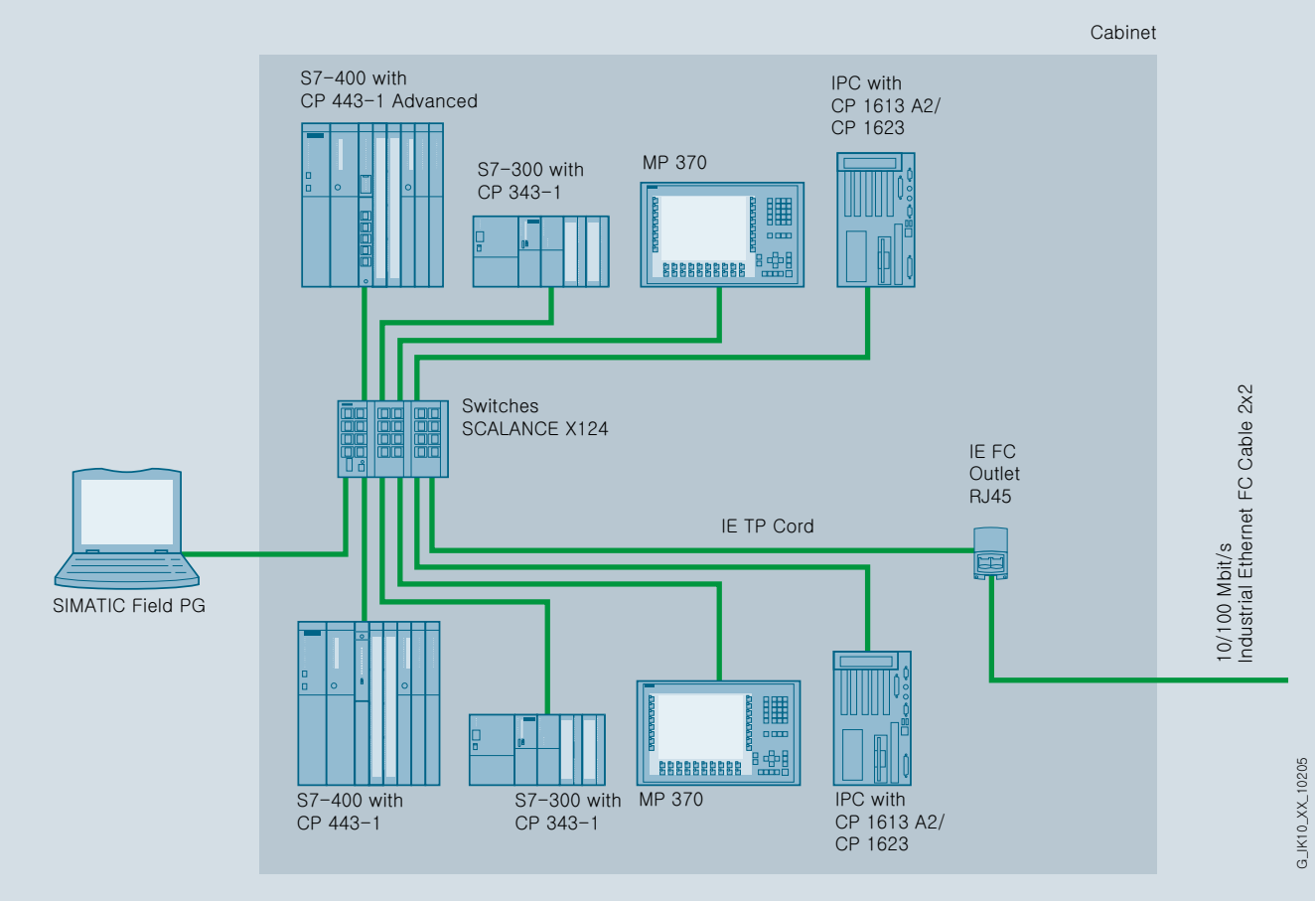
The SCALANCE X-100 switches are typically installed with the stations to be connected in a control cabinet. They can be mixed electrically and optically in star and line topologies.

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

- Length of the TP cable between 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. 5 km with Industrial Ethernet glass fiber-optic cables

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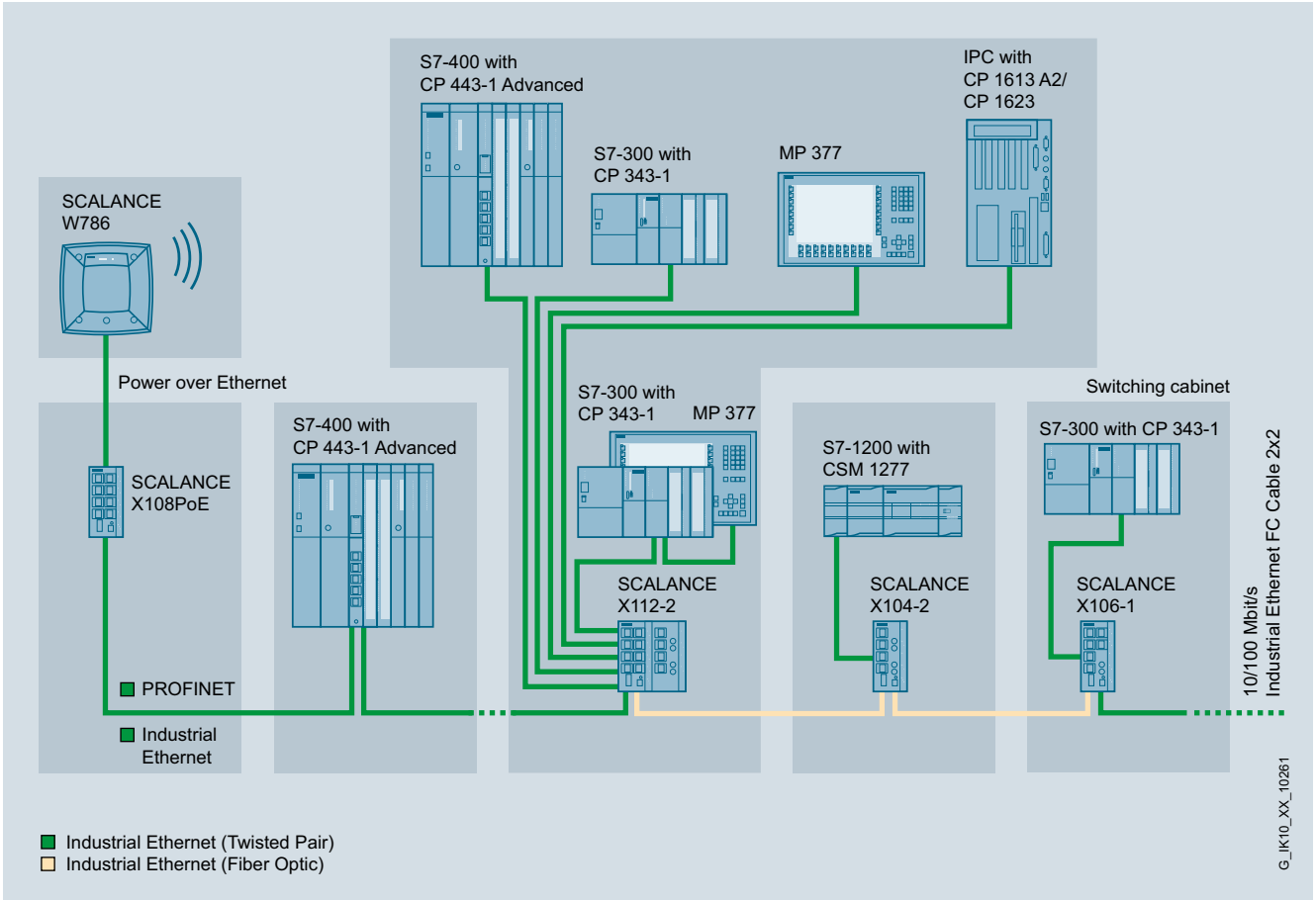
Function (continued)



Star-shaped network topology with SCALANCE X124

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Function (continued)

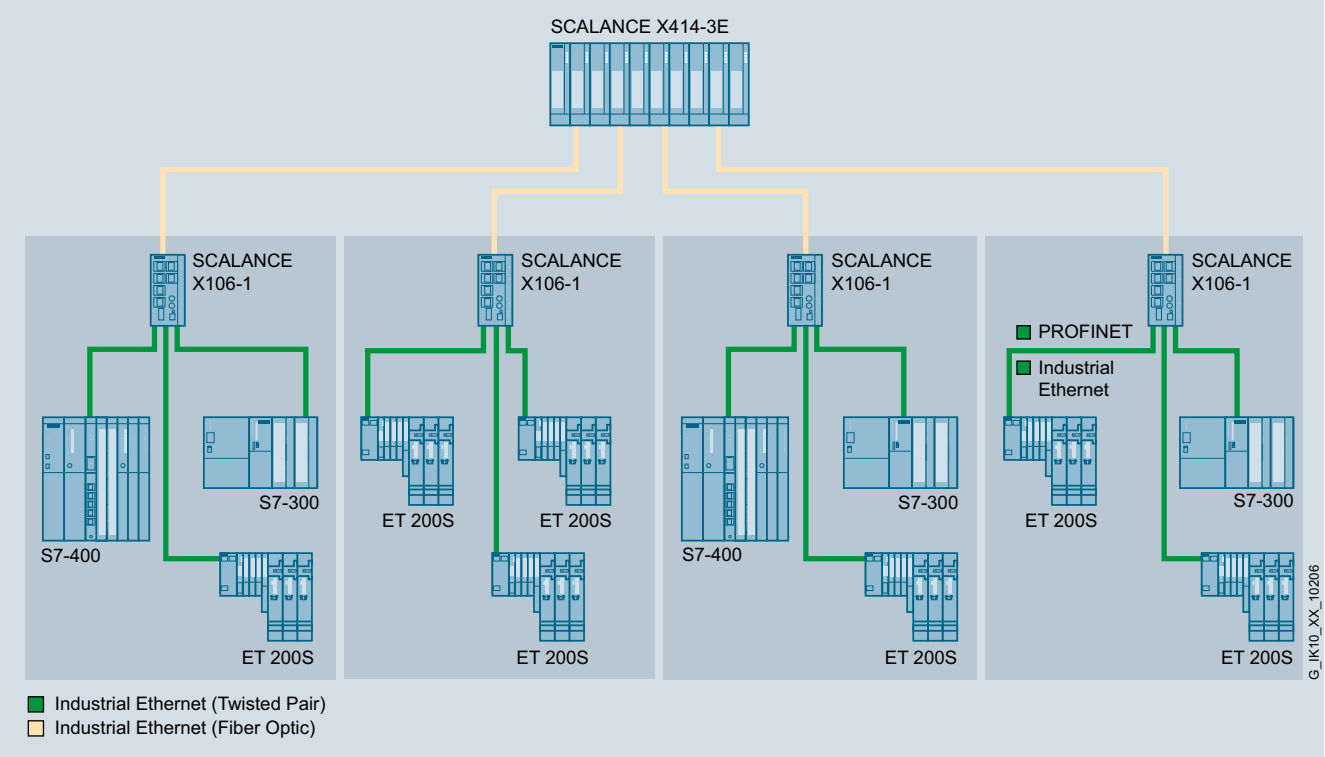


Electrical and optical line topology with SCALANCE X112-2, X104-2 and X106-1 as well as connection and supply of data terminals with Power-over-Ethernet (PoE) by SCALANCE X108PoE

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2

Function (continued)



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.

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Technical specifications

Article No.	6GK5104-2BB00-2AA3	6GK5106-1BB00-2AA3	6GK5108-0BA00-2AA3	6GK5108-0PA00-2AA3
Product-type designation	**SCALANCE X104-2**	**SCALANCE X106-1**	**SCALANCE X108**	**SCALANCE X108PoE**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	6	7	8	8
Number of electrical connections				
• for network components and terminal equipment	4	6	8	6
• for Power-over-Ethernet for network components or terminal equipment	-	-	-	2
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for Power-over-Ethernet for network components or terminal equipment	-	-	-	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	2	1	-	-
Design of optical interface for optical waveguide				
• at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	BFOC sockets (multimode up to 5 km)	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-19 … -14 dB	-	-
• of the receiver input maximum	-14 dB	-14 dB	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-32 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 5 km	-	-
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V	4 A / 125 V
Consumed current maximum	0.16 A	0.15 A	0.14 A	1.7 A
Active power loss at 24 V for DC	3.8 W	3.6 W	3.36 W	10 W

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2

Technical specifications (continued)

Article No.	6GK5104-2BB00-2AA3	6GK5106-1BB00-2AA3	6GK5108-0BA00-2AA3	6GK5108-0PA00-2AA3
Product-type designation	**SCALANCE X104-2**	**SCALANCE X106-1**	**SCALANCE X108**	**SCALANCE X108PoE**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	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	0.78 kg	0.78 kg	0.78 kg	0.9 kg
Mounting type				
• 35 mm DIN rail mounting	Yes	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes	Yes
Mounting type	-	-	-	-
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..
• for hazardous 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 safety of CSA and UL	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 hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4:2001
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2:2001
Verification 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 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	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
• Germanische 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

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Technical specifications (continued)

Article No.	6GK5112-2BB00-2AA3	6GK5116-0BA00-2AA3	6GK5124-0BA00-2AA3
Product-type designation	**SCALANCE X112-2**	**SCALANCE X116**	**SCALANCE X124**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	14	16	24
Number of electrical connections			
• for network components and terminal equipment	12	16	24
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide			
• at 100 Mbit/s	2	-	-
Design of optical interface for optical waveguide			
• at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	-	-
Connectable optical power relative to 1 mW			
• of the transmitter output	-19 … -14 dB	-	-
• of the receiver input maximum	-14 dB	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 5 km	-	-
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	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
Product component fusing at power supply input	No	No	No
Consumed current maximum	0.45 A	0.3 A	0.45 A
Active power loss at 24 V for DC	5.16 W	4.4 W	4.8 W
Permitted ambient conditions			
Ambient temperature			
• during operating	-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 maximum	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30

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Technical specifications (continued)

Article No.	6GK5112-2BB00-2AA3	6GK5116-0BA00-2AA3	6GK5124-0BA00-2AA3
Product-type designation	**SCALANCE X112-2**	**SCALANCE X116**	**SCALANCE X124**
Design, dimensions and weight			
Design	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
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	Yes	Yes
• S7-300 rail mounting	Yes	Yes	Yes
Mounting type	-	-	-
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..	FM3611: Class 1, Division 2, Group A, B, C, D / T.., Class 1, Zone 2, Group IIC, T..
• for hazardous zone	EN 60079-0:2006, EN 60079-15:2005, II 3 G Ex nA II T.. KEMA 08 ATEX 0003 X	EN 60079-0:2006, EN 60079-15:2005, II 3 G Ex nA II T.. KEMA 08 ATEX 0003 X	EN 60079-0:2006, EN 600EN 60079-15:2005, II 3 G Ex nA II T.. KEMA 08 ATEX 0003 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..	UL 1604 and UL 2279-15 (Hazardous Location), Class 1 / Division 2 / Group A, B, C, D / T.., Class 1 / Zone 2 / Group IIC / T..
• for emitted interference	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	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
• Germanische 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

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Ordering data

	Article No.
SCALANCE X-100 Industrial Ethernet switches	
Industrial Ethernet switches for 10/100 Mbit/s, incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• **SCALANCE X104-2** 4 x 10/100 Mbit/s RJ45 ports, electrical 2 x BFOC ports, optical (multimode, glass) up to 5 km	**6GK5104-2BB00-2AA3**
• **SCALANCE X106-1** 6 x 10/100 Mbit/s RJ45 ports, electrical 1 x BFOC port, optical (multi-mode, glass) up to 5 km	**6GK5106-1BB00-2AA3**
• **SCALANCE X112-2** 12 x 10/100 Mbit/s RJ45 ports, electrical 2 x BFOC ports, optical (multi-mode, glass) up to 5 km	**6GK5112-2BB00-2AA3**
• **SCALANCE X108** 8 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5108-0BA00-2AA3**
• **SCALANCE X108PoE** 6 x 10/100 Mbit/s RJ45 ports, electrical 2 x 10/100 Mbit/s RJ45 PoE ports, electrical	**6GK5108-0PA00-2AA3**
• **SCALANCE X116** 16 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5116-0BA00-2AA3**
• **SCALANCE X124** 24 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5124-0BA00-2AA3**
Accessories	
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-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
FO Standard Cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1873-2A**
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m, minimum order 20 m	**6XV1847-2A**
IE FC RJ45 Plug 180 2 x 2 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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
FC FO termination kit 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	**6GK1900-1GL00-0AA0**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The SCALANCE XC100-4OBR optical bypass relays are ideally suitable as ballast in Industrial Ethernet networks in linear and ring topologies with data transfer rates of 100/1 000 Mbit/s. They are used for uninterruptible connection and disconnection of SCALANCE X switches.

- Uninterruptible connection and disconnection of network nodes by means of integrated optical relays for multi-mode and single-mode fiber-optic networks
- Suitable for use in extended networks (e.g. in wind farms, pipelines, or large chemical plants) thanks to low optical attenuation
- Rugged plastic enclosure in SIMATIC S7-1500 format, with installation options on standard mounting rail, and SIMATIC S7-300/S7-1500 mounting rail in different installation positions
- Rugged, industry-standard node/network connections using SC FO interfaces
- Redundant voltage infeed and monitoring of large voltage range (12 V DC, 24 V DC, 48 V DC)
- Diagnostics on the device by means of LEDs (bypass function, configuration, power supply)
- Fault signaling contact for signaling switching operations
- Digital input contact for remote function check of the bypass relay

Product versions

SCALANCE XC100-4OBR with multimode fiber optic ports

- For establishing optical multimode fiber optic line or ring topologies with four optical SC ports and TAP function for quickly establishing links

SCALANCE XC100-4OBR with singlemode fiber optic ports

- For establishing optical singlemode fiber optic line topologies with four optical SC ports and low throughput attenuation in the optical relay
- For establishing optical singlemode fiber optic line or ring topologies with four optical SC ports and TAP function for quickly establishing links

SCALANCE XC100-4OBR, SM, line topology

- For establishing optical singlemode fiber optic line topologies with four optical SC ports and low throughput attenuation in the optical relay without TAP function

Benefits

get Designed for Industry

- Ideal solution for uninterruptible connection and disconnection of network nodes, e.g. for maintenance work in MRP or HRP (high speed redundancy) rings
- Simple integration into existing Industrial Ethernet line, star and ring topologies for increasing the availability of the network
- Use in harsh industrial environments thanks to wide temperature range and coated PCBs (conformal coating)
- Integration into extended multi-mode and single-mode networks thanks to low throughput attenuation of the integrated optical relay
- Combination with different network components thanks to configurable reset delay by means of SET pushbutton on the device
- Low installation width (50 mm) enables simple retrofitting in existing control cabinets
- High device availability thanks to redundant voltage infeed and large voltage range (12 V DC, 24 V DC, 48 V DC)

Application

The SCALANCE XC100-4OBR optical bypass relays increase network availability in Industrial Ethernet line, star and ring topologies, especially in the case of networks in pipelines or wind farms, for example, that are difficult to access.

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Design

The SCALANCE XC100-4OBRs with rugged enclosures are optimized for mounting on a standard rail and the S7-300 or S7-1500 rail in different installation positions. Thanks to the S7-1500 housing dimensions, the devices are suitable for integration into an automation solution with S7-1500 components. The SCALANCE XC100-4OBRs with degree of protection IP20 are designed for operation in the control cabinet. The coated PCBs (conformal coating) protect against condensation.

The SCALANCE XC100-4OBR features:

- An enclosure in SIMATIC S7-1500 design with recessed fiber-optic interfaces
- A row of LEDs for displaying status information (bypass, display mode, power supply)
- A 4-pole terminal block for connecting the redundant supply voltage (2 x 12 V DC ... 48 V DC)
- A 2-pole terminal block for connecting the floating signaling contact
- A 2-pole terminal block for connecting the digital input signal (switching signal)
- A SET pushbutton for on-site configuration of the monitored voltage range and the reset delay;
  optimal adaptation of the reset delay:
  - short reset delay for unmanaged network components
  - long reset delay for managed network components
- Four FO SC interfaces for integration into the FO network and connection of network components;
  simple connection to active network components thanks to extensive range of fiber-optic patch cords with different fiber-optic connectors

Function

- Integration into optical Industrial Ethernet line, star and ring topologies
- Fast bridging of network nodes using optical relays within 10 ms in the event of a fault (e.g. power failure)
- Maintenance of network communication thanks to bridging of the failed network components
- No activation of the redundancy manager when resetting a network component in MRP and HRP ring topologies thanks to previous establishment of link;
  this avoids a message burst in the network in the case of planned maintenance work. Thanks to the configurable connection delay, network components are not switched back into the network until they have been fully powered up and the link has been established (only on versions with TAP function).
- Simple integration of the SCALANCE XC100-4OBR into existing 100/1000 Mbit/s networks thanks to extensive portfolio of FO adapter cables
- Simple diagnostics via signaling contact and LED on-site

Network topology and network configuration

The Industrial Ethernet SCALANCE XC100-4OBRs with IP20 degree of protection are usually installed in a control cabinet together with the network components to be connected.

When configuring the network, the following parameters have to be taken into account for calculating the cable length between two devices:

- The line attenuation of the fiber-optic cables used
- The attenuation of the optical relay
- The maximum number of SCALANCE XC100-4OBR bypass relays that can be activated simultaneously

Commissioning and diagnostics

Before commissioning the SCALANCE XC100-4OBR, the reset delay and the voltage range to be monitored must be selected using the SET pushbutton on the device.

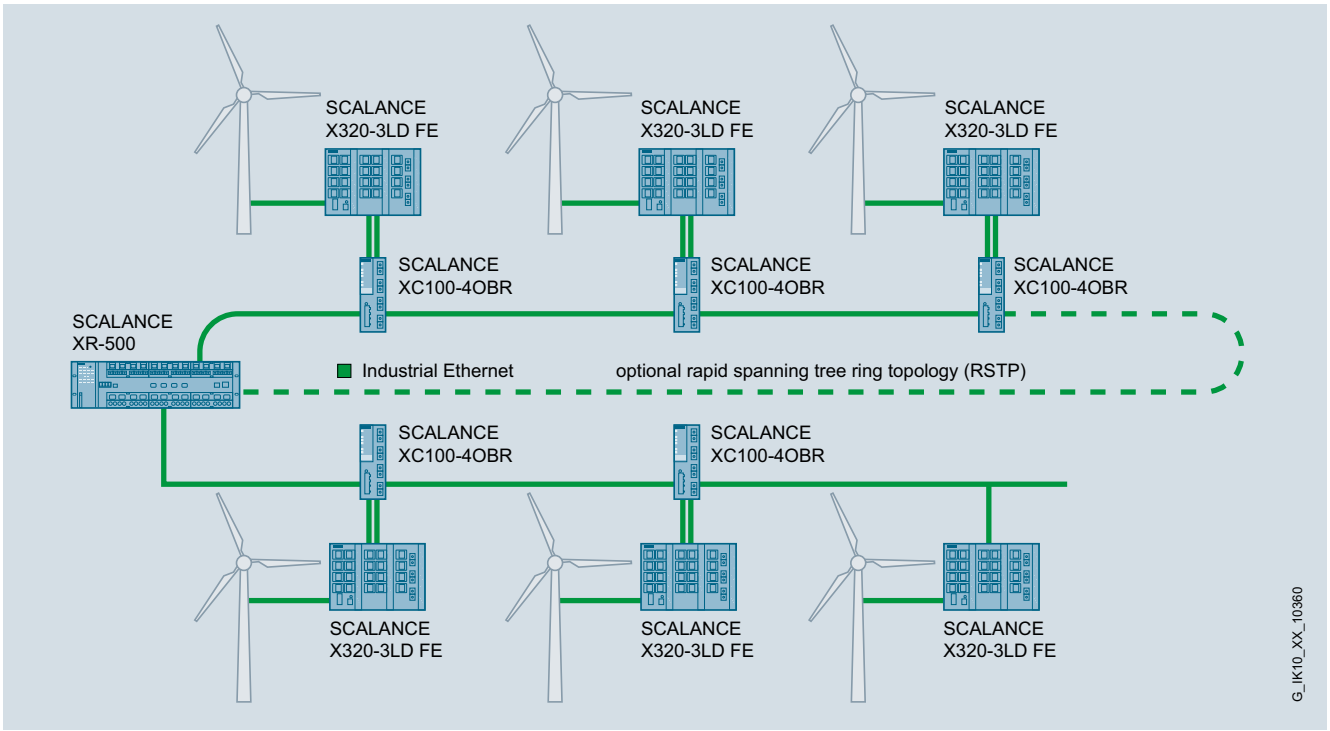
The following information is displayed by LEDs on site:

- Bypass
- Display mode
- Power supply

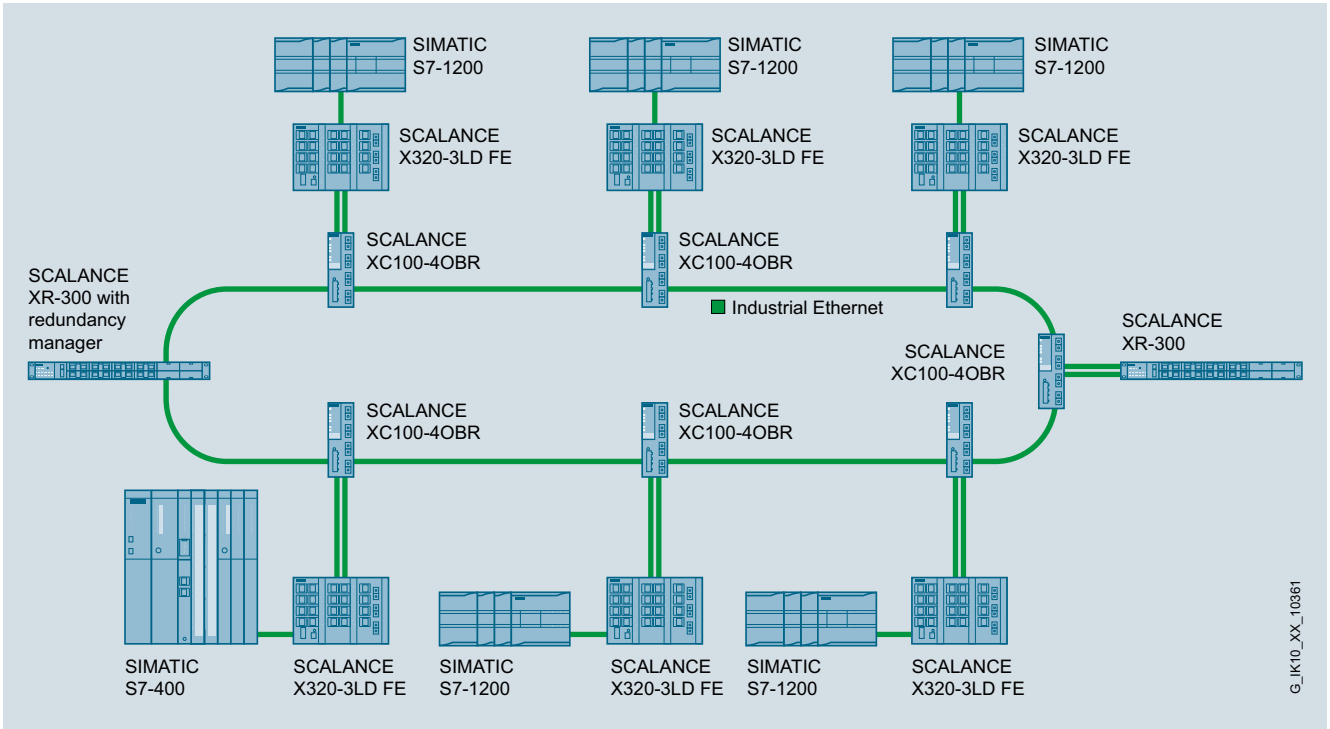
The SCALANCE XC100-4OBR can also be monitored using the floating signaling contact. A digital input contact enables remote function checking of the relay.

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Integration



Redundant network with SCALANCE XC100-4OBR



Redundant MRP network with SCALANCE XC100-4OBR in ring topology

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Technical specifications

Article No.	**6GK5100-4AV00-2DA2**	**6GK5100-4AV00-2FA2**	**6GK5100-4AW00-2FA2**
Product-type designation	**SCALANCE XC100-4OBR, SM, LINE STRUCTURE**	**SCALANCE XC100-4OBR, SM**	**SCALANCE XC100-4OBR, MM**
Product description	Optical bypass relay for single-mode fiber-optic networks without Tap function	Optical bypass relay for single-mode fiber-optic networks with Tap function	Optical bypass relay for multi-mode fiber-optic networks with Tap function
Electrical data			
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	-
Interfaces			
Transmission loss			
• at Rx-In P1 and Tx-Out P2	1.2 dB	4.1 dB	4.5 dB
• at Rx-In P2 and Tx-Out P1	1.2 dB	4.1 dB	4.5 dB
• at Rx-In P1 and Tx-Out P1'	1.2 dB	5.7 dB	6 dB
• at Rx-In P2 and Tx-Out P2'	1.2 dB	5.7 dB	6 dB
• at Rx-In P1' and Tx-Out P1	1.2 dB	1.2 dB	1.5 dB
• at Rx-In P2' and Tx-Out P2	1.2 dB	1.2 dB	1.5 dB
Supply voltage			
Type of voltage supply	DC	DC	DC
Supply voltage external			
• minimum	12 V	12 V	12 V
• maximum	48 V	48 V	48 V
Mechanical data			
Material of the enclosure	Metal/plastic	Metal/plastic	Metal/plastic
Design, dimensions and weight			
Width	50 mm	50 mm	50 mm
Height	140 mm	140 mm	140 mm
Depth	125 mm	125 mm	125 mm
Net weight	550 g	550 g	550 g
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	No	No	No
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Protection class IP	IP20	IP20	IP20
Standards, specifications, approvals			
Verification of suitability			
• RoHS conformity	Yes	Yes	Yes
• UL-registration	Yes	Yes	Yes
Standard for hazardous zone			

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Ordering data

	Article No.
SCALANCE XC100-4OBR optical bypass relay	
for integration into 100/1 000 Mbit/s Industrial Ethernet networks with redundant voltage infeed, signaling contact and digital input contact	
with **four optical SC ports and TAP function** for fast link establishment; for integration into optical line or ring topologies	
• Multi-mode FO	**6GK5100-4AV00-2DA2**
• Single-mode FO	**6GK5100-4AV00-2FA2**
with **four optical SC ports and reduced throughput attenuation in the optical relay**; for integration into optical line topologies	
• Single-mode FO	**6GK5100-4AW00-2FA2**
Accessories	
FO Standard Cable GP 50/125/1400 [1) 2)] Multi-mode cable for use indoors and outdoors, sold by the meter; max. length 1 000 m; minimum order length 20 m	**6XV1873-2A**
FO ground cable 50/125/1400 [1) 2)] Multi-mode cable for use in the outdoor area, as well as for direct routing underground; longitudinally and laterally water-tight cable with non-metallic rodent protection; sold by the meter max. length 2 000 m, minimum order 20 m	**6XV1873-2G**
FO Robust Cable GP 50/125/900 [1) 2)] Multi-mode cable for outdoor and indoor use, as well as for direct routing underground; longitudinally and laterally water-tight cable with non-metallic rodent protection; sold by the meter max. length 2 000 m, minimum order 20 m	**6XV1873-2R**
FO Robust Cable GP 4E9/125/900 [1) 2)] Single-mode cable for outdoor and indoor use, as well as for direct routing underground; longitudinally and laterally water-tight cable with non-metallic rodent protection; sold by the meter max. length 2 000 m, minimum order 20 m	**6XV1843-2R**
Multi-mode FO BFOC connector set for FO standard cable (50/125/1 400), FO ground cable (50/125/1 400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 20 units	**6GK1901-0DA20-0AA0**
Multi-mode FO SC duplex connector set for FO standard cable (50/125/1 400), FO ground cable (50/125/1 400), flexible FO trailing cable, INDOOR FO cable (62.5/125/900), 10 units	**6GK1901-0LB10-2AA0**
Multi-mode FO LC duplex plug LC duplex plug (10 units) for INDOOR FO cable (62.5/125/900), FO robust cable GP (50/125/900), FO standard cable (62.5/125/900)	**6GK1901-0RB10-2AB0**
Single-mode FO LC duplex plug LC duplex plug (10 units) for FO robust cable GP (4E9/125/900)	**6GK1901-0SB10-2AB0**
Pre-assembled FO patch cables	
Multi-mode	
MM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5EH10-0CC0**
MM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5EH10-0CB0**
MM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5EH10-0CA0**
Single-mode	
SM FO Cord SC/SC With two SC duplex connectors, 1 m	**6XV1843-5FH10-0CC0**
SM FO Cord SC/BFOC With one SC duplex connector and two BFOC connectors, 1 m	**6XV1843-5FH10-0CB0**
SM FO Cord SC/LC With one SC duplex connector and one LC duplex connector, 1 m	**6XV1843-5FH10-0CA0**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-200	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	10 Gigabit Ethernet	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)	PLUG slot	
	X204-2							•					•	•	•		•	•	•	
	X204-2TS							•					•	•	•		•	•	•	
	X204-2LD							•					•	•	•		•	•	•	
	X206-1							•					•	•	•		•	•	•	
	X206-1LD							•					•	•	•		•	•	•	
	X208							•					•	•	•		•	•	•	
	X208PRO							•					•	•	•		•	•	•	
	X212-2							•					•	•	•		•	•	•	
	X212-2LD							•					•	•	•		•	•	•	
	X216							•					•	•	•		•	•	•	
	X224							•					•	•	•		•	•	•	
	XF204				•								•	•	•		•	•	•	
	XF204-2				•								•	•	•		•	•	•	
	XF206-1				•								•	•	•		•	•	•	
	XF208				•								•	•	•		•	•	•	
	X204RNA PRP					•							•	•	•		•	•	•	
	X204RNA EEC PRP							•					•				•	•	•	
	X204RNA HSR					•							•	•	•		•	•	•	
	X204RNA EEC HSR							•					•				•	•	•	
	X204RNA EEC PRP+HSR							•					•				•	•	•	

• applies

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Function overview SCALANCE X-200 managed: Hardware

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Overview (continued)

	Type of device	Software																													
		Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	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)	Access Control List (IP)	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)	PRP communication	HSR communication	
SCALANCE X-200	X204-2		•	•	•	•	•	•	•						•							•								
	X204-2TS		•	•	•	•	•	•	•						•							•								
	X204-2LD		•	•	•	•	•	•	•						•							•								
	X206-1		•	•	•	•	•	•	•						•							•								
	X206-1LD		•	•	•	•	•	•	•						•							•								
	X208		•	•	•	•	•	•	•						•							•								
	X208PRO		•	•	•	•	•	•														•								
	X212-2		•	•	•	•	•	•	•						•							•								
	X212-2LD		•	•	•	•	•	•	•						•							•								
	X216		•	•	•	•	•	•	•						•							•								
	X224		•	•	•	•	•	•	•						•							•								
	XF204		•	•	•	•	•	•	•						•							•								
	XF204-2		•	•	•	•	•	•	•						•							•								
	XF206-1		•	•	•	•	•	•	•						•							•								
	XF208		•	•	•	•	•	•	•						•							•								
	X204RNA PRP				•	•		•														•						•		
	X204RNA EEC PRP				•	•		•														•						•		
	X204RNA HSR				•	•		•														•							•	
	X204RNA EEC HSR				•	•		•														•							•	
	X204RNA EEC PRP+HSR				•	•		•														•						•	•	

• applies

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Function overview SCALANCE X-200 managed: Software

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Overview



The managed Industrial Ethernet switches of the SCALANCE X-200 line are optimized for setting up Industrial Ethernet networks at data transfer rates of 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
- Rugged metal housing in S7-300 format for mounting on standard rail, S7-300 standard mounting rail or for direct wall mounting in various positions
- 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
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product versions

- Switches with electrical and optical ports for glass multi-mode FOC up to 5 km:
  - ***SCALANCE X204-2;***
    for constructing optical line or ring topologies with four electrical ports and two optical ports
  - ***SCALANCE X204-2TS (degree of protection IP20);***
    for setting up optical line or ring topologies with four electrical ports and two optical ports especially for railway applications (EN 50155) with extended temperature range
  - ***SCALANCE X206-1;***
    for setting up star topologies with 6 electrical ports and 1 optical port, line or ring topologies with electrical and optical transmission paths
  - ***SCALANCE X212-2;***
    for constructing optical line or ring topologies with 12 electrical ports and two optical ports
- Switches with electrical and optical ports for glass single mode FOC up to 26 km:
  - ***SCALANCE X204-2LD;***
    for constructing optical line or ring topologies with four electrical ports and two optical ports
  - ***SCALANCE X206-1LD;***
    for constructing star topologies with 6 electrical ports and 1 optical port, line or ring topologies with electrical and optical transmission paths
  - ***SCALANCE X212-2LD;***
    for constructing optical line or ring topologies with 12 electrical ports and 2 optical ports
- Switches with electrical ports for configuring electrical Industrial Ethernet line, star or ring topologies:
  - ***SCALANCE X208;***
    with 8 electrical ports for mounting in the control cabinet
  - ***SCALANCE X208PRO (IP65/67 degree of protection);***
    with 8 electrical ports especially for use outside the control cabinet (M12 connection system)
  - ***SCALANCE X216;***
    with 16 electrical ports for mounting in the control cabinet
  - ***SCALANCE X224;***
    with 24 electrical ports for mounting in the control cabinet

Benefits

get Designed for Industry

- Ideal solution for configuring Industrial Ethernet line, star and ring topologies
- Reliable plug-in connection thanks to rugged, industry-standard device connection in conjunction with PROFINET-compliant FastConnect connectors
- High network availability through design of redundant ring structures (redundancy manager integrated)
- Integration of the SCALANCE X-200 switches in the existing network management infrastructure through SNMP access point
- Easy integration in the process diagnosis and system diagnosis with PROFINET
- Configuration and diagnostics integrated into STEP 7 provide significant benefits during engineering, commissioning, and the operating phase of a plant
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data

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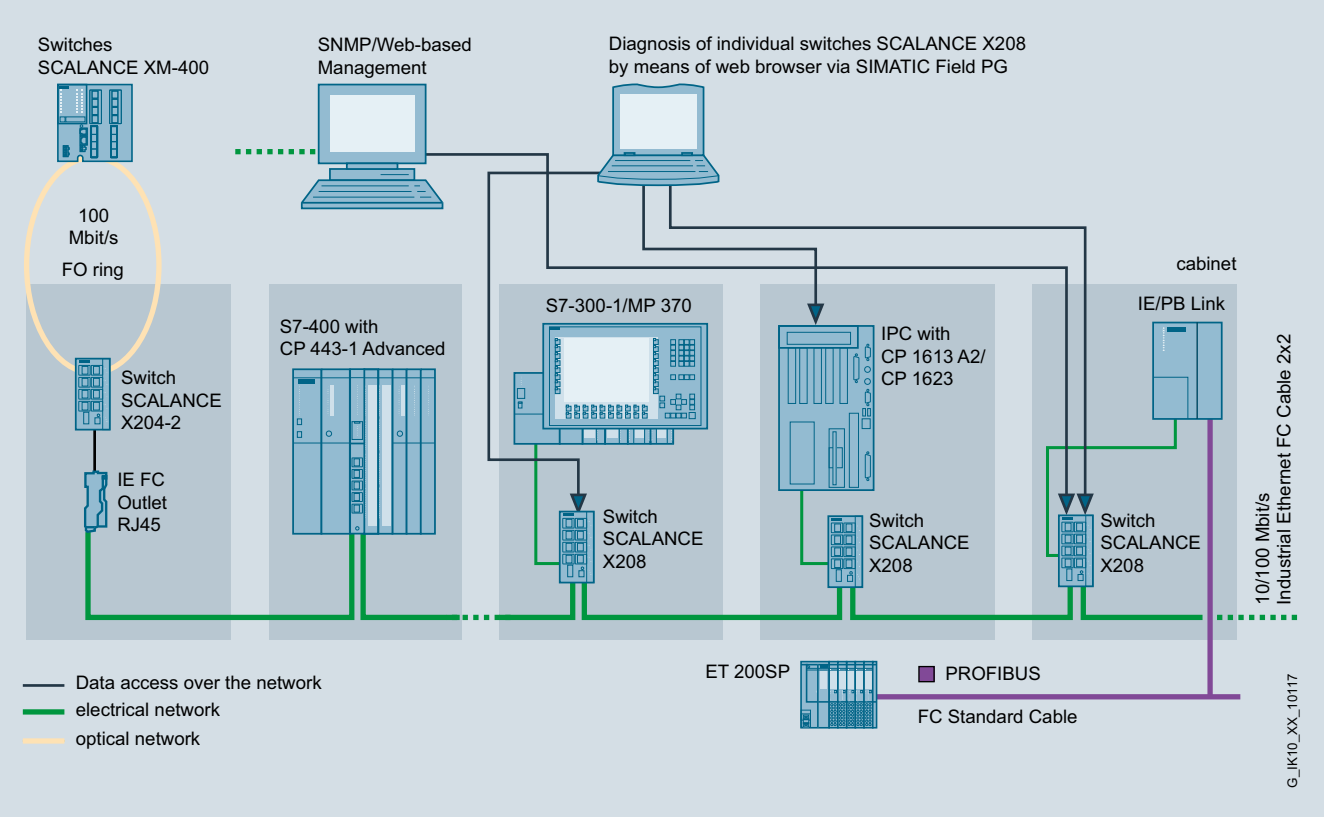
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Application

The SCALANCE X-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 IP30 degree of protection have been designed for use in the control cabinet. The SCALANCE X208PRO is designed to the IP65/67 degree of protection for installation outside the control cabinet. The SCALANCE X204-2TS (TS = Transportation Systems) is suitable for use in railway applications due to its specification according to EN 50155.

Features:

- The RJ45 ports are industry-standard and feature additional retaining collars (except for SCALANCE X208PRO), for connection to the IE FC RJ45 Plug 180
- The eight PROFINET-compliant M12 ports (d-coded) of the SCALANCE X208PRO are designed with IP65/67 degree of protection for connection to the IE FC M12 Plug PRO 2x2 or the pre-assembled IE M12 connecting cable
- The SCALANCE X208PRO can be mounted on a DIN rail or S7-300 rail or direct on the equipment or machine; the status information can be read off regardless of the mounting position thanks to the angled LED strip.
- Power can also be supplied to the SCALANCE X208PRO from outside the control cabinet from the PS791-1PRO power supply module at 230 V AC.



Diagnostics access over SNMP and Web browser with SCALANCE X208

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Design

The SCALANCE X-200 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. Thanks to the S7-300 housing dimensions, the devices are suitable for integration into an automation solution with S7-300 components.

The switches with IP20/IP30 degree of protection 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 exchange, power supply, signaling contact)
- A 2-pole terminal block for connecting the floating signaling contact
- A SET button for on-site configuration of the signaling contact

The SCALANCE X208PRO with IP65/67 degree of protection features:

- 2 x M12 interfaces for connecting the redundant supply voltage (2 x 24 V DC)
- A row of LEDs to indicate the status information (power, link status, data exchange, power supply, signaling contact)
- An M12 interface for connecting the isolated signaling contact

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

- ***10/100BaseTX, RJ45 or M12 connection;***
  RJ45 or M12 port, 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 or IE FC M12 Plug PRO up to 100 m.
- ***100BaseFX, BFOC connection technique;***
  BFOC ports for direct connection to Industrial Ethernet glass fiber-optic cables up to 5 km (multimode FOC) or up to 26 km (singlemode FOC) for configuring line, ring and star topologies.

Function

- Configuring electrical and optical Industrial Ethernet line, star and ring topologies
- Fast redundancy in the ring with
  - High Speed Redundancy Protocol (HRP); up to 0.3 seconds for reconfiguration of the ring with 50 switches in the ring
  - PROFINET MRP (Media Redundancy Protocol); up to 0.2 seconds 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 X-200 and activates the substitute path within 0.3 seconds or 0.2 seconds with MRP
- Use in ring topologies (100 Mbit/s) together with SCALANCE X-300, SCALANCE X-400 and SCALANCE X-500
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- 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
- Optimized support of PROFINET real-time communication (RT) through prioritizing
- 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

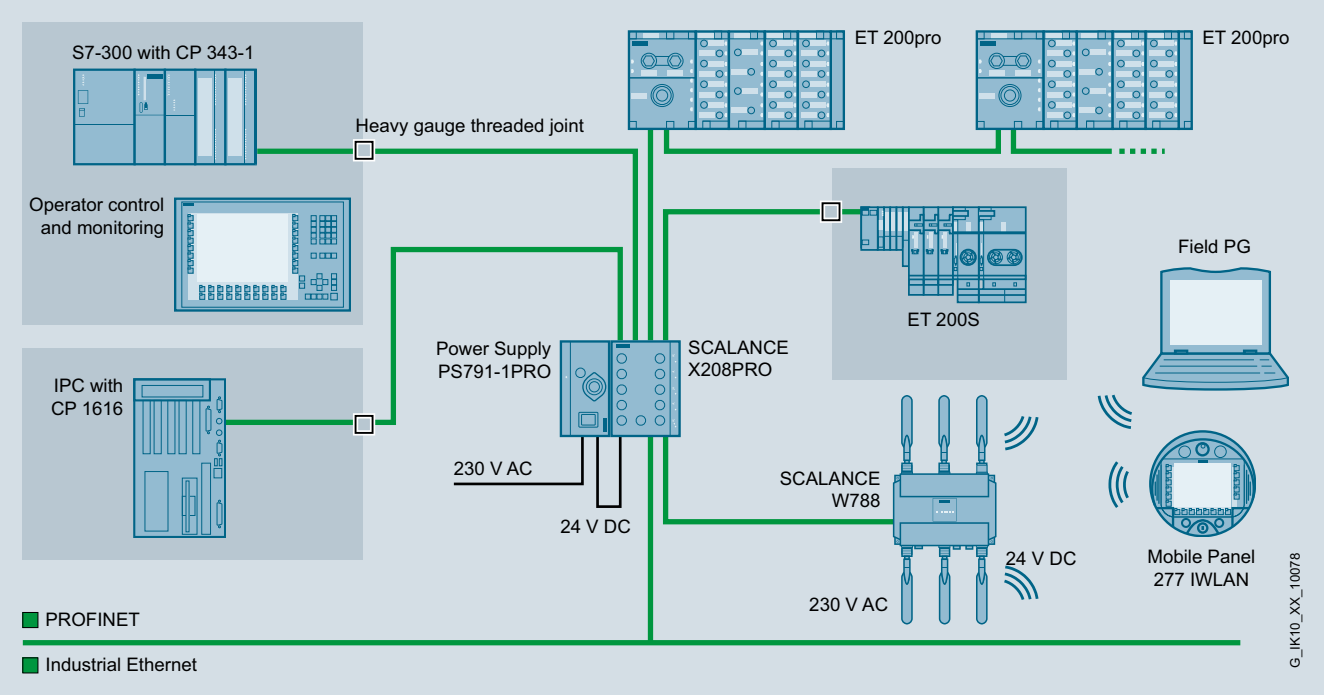
The Industrial Ethernet SCALANCE X-200 switches with IP30 degree of protection are usually installed in a control cabinet together with the stations to be connected. Electrical and optical versions can be installed together in star, line and ring topologies. The SCALANCE X208PRO is designed for installation outside the control cabinet.

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

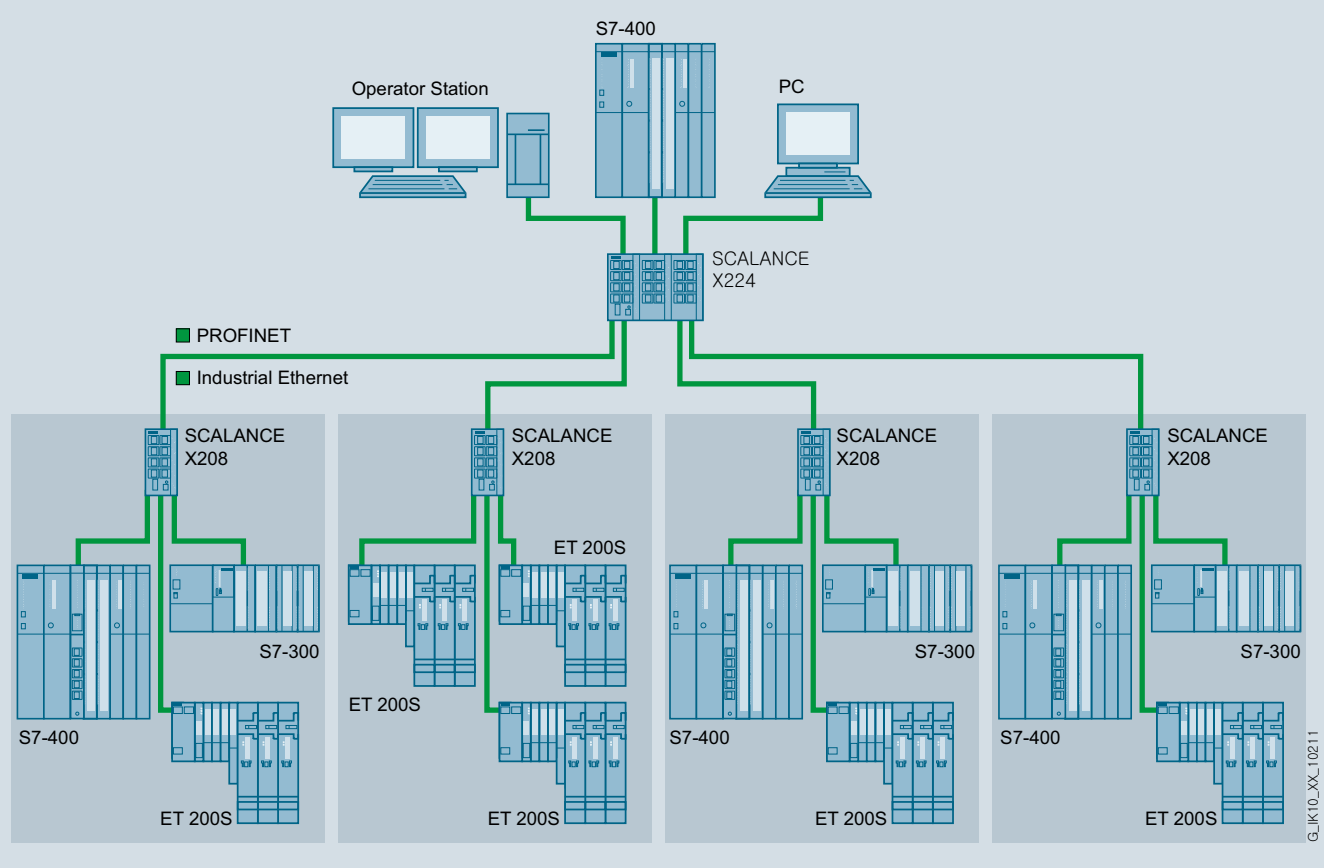
- Length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC cable and IE FC RJ45 Plug 180 or IE FC M12 Plug PRO
  - Max. 10 m using patches with TP cord
- Length of the optical cables
  - Max. 5 000 m with Industrial Ethernet glass fiber-optic cables (multimode)
  - Max. 26 000 m with Industrial Ethernet glass fiber-optic cables (singlemode)
- IP Address:
  The IP address is assigned by means of the DHCP (Dynamic Host Configuration Protocol). 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.

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Function (continued)



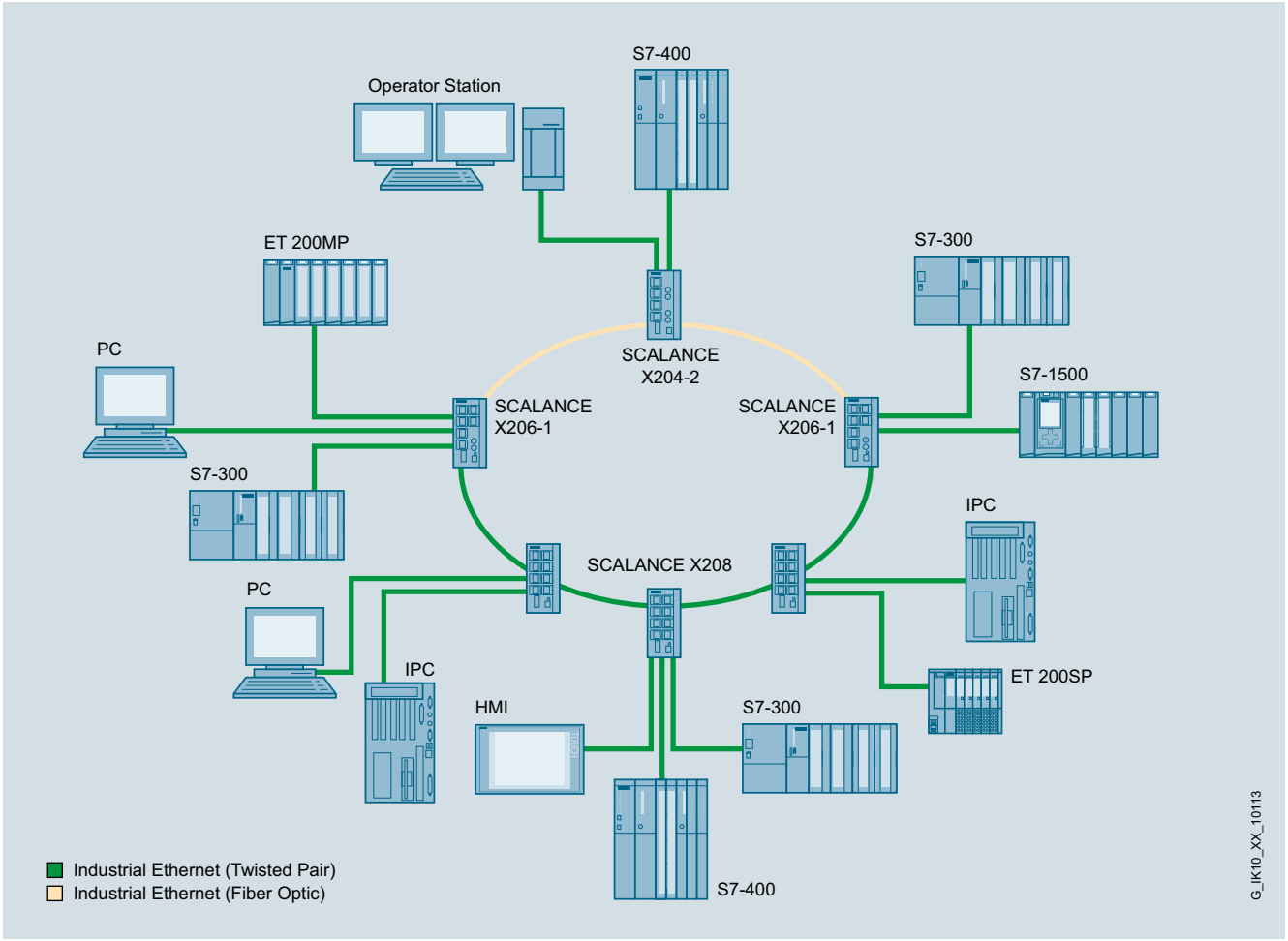
Star network topology with SCALANCE X208PRO outside the control cabinet and 230 V AC power supply



Star topology with SCALANCE X224

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Function (continued)



High-speed redundancy in mixed ring with fiber-optic and twisted-pair cables

Commissioning and diagnostics

PROFINET diagnostic interrupts from SCALANCE X 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 X-200 Industrial Ethernet switches can also be integrated into a network management system such as SINEMA Server through the standardized Simple Network Management Protocol (SNMP). If faults occur on the device, error messages (SNMP traps) can be sent to a network management 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 on site by LEDs:

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

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

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Technical specifications

Article No.	6GK5204-2BB10-2AA3	6GK5204-2BC10-2AA3	6GK5204-2BB10-2CA2
Product-type designation	**SCALANCE X204-2**	**SCALANCE X204-2LD**	**SCALANCE X204-2TS**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections			
• for network components or terminal equipment maximum	6	6	6
Number of electrical connections			
• for network components and terminal equipment	4	4	4
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	2	2	2
Design of optical interface for optical waveguide at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	BFOC port (singlemode up to 26 km)	BFOC sockets (multimode up to 5 km)
Connectable optical power relative to 1 mW			
• of the transmitter output	-19 … -14 dB	-15 … -7 dB	-19 … -14 dB
• of the receiver input maximum	-	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-34 dB	-34 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	0 … 5 km
Design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.05 A
Supply voltage, current consumption, power loss			
Type of supply voltage	DC	DC	DC
Supply voltage external	24 V	24 V	12 V
• minimum	18 V	18 V	10 V
• maximum	32 V	32 V	30 V
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V	3 A / 32 V
Consumed current maximum	0.265 A	0.265 A	0.6 A
Active power loss at 24 V for DC	6.36 W	6.36 W	6.6 W

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Technical specifications (continued)

Article No.	6GK5204-2BB10-2AA3	6GK5204-2BC10-2AA3	6GK5204-2BB10-2CA2
Product-type designation	**SCALANCE X204-2**	**SCALANCE X204-2LD**	**SCALANCE X204-2TS**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +60 °C	-40 … +60 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• Comment	-	-	If the IE switch X-204-2TS is installed horizontally, a maximum ambient temperature of +40 °C is permitted
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	Conformal coating, yes
Protection class IP	IP30	IP30	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	60 mm	60 mm
Height	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm
Net weight	0.78 kg	0.78 kg	0.78 kg
Mounting type			
• 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			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• SMTP server	-	-	-
• Port mirroring	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• FTP	Yes	Yes	Yes
• BOOTP	No	No	No
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5204-2BB10-2AA3	6GK5204-2BC10-2AA3	6GK5204-2BB10-2CA2
Product-type designation	**SCALANCE X204-2**	**SCALANCE X204-2LD**	**SCALANCE X204-2TS**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
Product functions DHCP			
Product function DHCP client	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes
• Standby redundancy	No	No	No
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes
Product functions Security			
Protocol is supported SSH	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, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	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 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-2	EN 61000-6-2
Verification of suitability	EN 61000-6-4:2001	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
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	Yes
• Railway application in accordance with EN 50124-1	No	No	No
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	No
• Bureau Veritas (BV)	Yes	Yes	No
• Det Norske Veritas (DNV)	Yes	Yes	No
• Germanische Lloyd (GL)	Yes	Yes	No
• Lloyds Register of Shipping (LRS)	Yes	Yes	No
• Nippon Kaiji Kyokai (NK)	Yes	Yes	No
• Polski Rejestr Statkow (PRS)	Yes	Yes	No

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Technical specifications (continued)

Article No.	6GK5206-1BB10-2AA3	6GK5206-1BC10-2AA3	6GK5208-0BA10-2AA3	6GK5208-0HA10-2AA6
Product-type designation	**SCALANCE X206-1**	**SCALANCE X206-1LD**	**SCALANCE X208**	**SCALANCE X208PRO**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces				
Number of electrical/optical connections				
• for network components or terminal equipment maximum	7	7	8	8
Number of electrical connections				
• for network components and terminal equipment	6	6	8	8
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	M12 port, 4-pin, D-coded
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	5-pin M12 socket (b-coded)
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pin M12 interface (A-coded)
Number of optical interfaces for optical waveguide at 100 Mbit/s	1	1	-	-
Design of optical interface for optical waveguide at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	BFOC port (singlemode up to 26 km)	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-15 … -7 dB	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-	-34 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	-	-
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V	0.6 A / 60 V
Consumed current maximum	0.22 A	0.2 A	0.185 A	0.185 A
Active power loss at 24 V for DC	5.28 W	5.28 W	3.84 W	4.4 W

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Technical specifications (continued)

Article No.	6GK5206-1BB10-2AA3	6GK5206-1BC10-2AA3	6GK5208-0BA10-2AA3	6GK5208-0HA10-2AA6
Product-type designation	**SCALANCE X206-1**	**SCALANCE X206-1LD**	**SCALANCE X208**	**SCALANCE X208PRO**
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 °C … + 60 °C	-40 °C … + 60 °C	-40 °C … + 60 °C	-40 °C … + 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
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP65/67
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	60 mm	60 mm	60 mm	90 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm	124 mm
Net weight	0.78 kg	0.78 kg	0.78 kg	1 kg
Mounting type				
• 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				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5206-1BB10-2AA3	6GK5206-1BC10-2AA3	6GK5208-0BA10-2AA3	6GK5208-0HA10-2AA6
Product-type designation	**SCALANCE X206-1**	**SCALANCE X206-1LD**	**SCALANCE X208**	**SCALANCE X208PRO**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No	No
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes	Yes
Product functions Security				
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
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	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 safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	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
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
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
• Germanische 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

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Technical specifications (continued)

Article No.	6GK5212-2BB00-2AA3	6GK5212-2BC00-2AA3	6GK5216-0BA00-2AA3	6GK5224-0BA00-2AA3
Product-type designation	**SCALANCE X212-2**	**SCALANCE X212-2LD**	**SCALANCE X216**	**SCALANCE X224**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces				
Number of electrical/optical connections				
• for network components or terminal equipment maximum	14	14	16	24
Number of electrical connections				
• for network components and terminal equipment	12	12	16	24
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	2	2	-	-
Design of optical interface for optical waveguide at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	BFOC port (singlemode up to 26 km)	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-15 … -7 dB	-	-
• of the receiver input maximum	-	-	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-34 dB	-34 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-	-
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	-	-
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	1.1 A / 33 V	1.1 A / 33 V	1.1 A / 33 V	1.1 A / 33 V
Consumed current maximum	0.33 A	0.33 A	0.24 A	0.35 A
Active power loss at 24 V for DC	7.92 W	7.92 W	5.76 W	8.4 W

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Technical specifications (continued)

Article No.	6GK5212-2BB00-2AA3	6GK5212-2BC00-2AA3	6GK5216-0BA00-2AA3	6GK5224-0BA00-2AA3
Product-type designation	**SCALANCE X212-2**	**SCALANCE X212-2LD**	**SCALANCE X216**	**SCALANCE X224**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	120 mm	120 mm	120 mm	180 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm	124 mm
Net weight	1.2 kg	1.2 kg	1.2 kg	1.6 kg
Mounting type				
• 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				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5212-2BB00-2AA3	6GK5212-2BC00-2AA3	6GK5216-0BA00-2AA3	6GK5224-0BA00-2AA3
Product-type designation	**SCALANCE X212-2**	**SCALANCE X212-2LD**	**SCALANCE X216**	**SCALANCE X224**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No	No
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes	Yes
Product functions Security				
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
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	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 safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
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
• Germanische Lloyd (GL)	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No	No	No

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Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE X-200	
Industrial Ethernet switches with integral SNMP access, online diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (exception: SCALANCE X208PRO); incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• With electrical and optical ports for glass multimode FOC up to max. 5 km	
- **SCALANCE X204-2** with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports	**6GK5204-2BB10-2AA3**
- **SCALANCE X204-2TS** with four 10/100 Mbit/s RJ45 ports and two fiber-optic ports with extended temperature range and EN 50155 approval for railway applications	**6GK5204-2BB10-2CA2**
- **SCALANCE X206-1** with six 10/100 Mbit/s RJ45 ports and one fiber-optic port	**6GK5206-1BB10-2AA3**
- **SCALANCE X212-2** with twelve 10/100 Mbit/s RJ45 ports and two fiber-optic ports	**6GK5212-2BB00-2AA3**
• With electrical and optical ports for glass single mode FOC up to max. 26 km	
- **SCALANCE X204-2LD** with four 10/100 Mbit/s RJ45 ports and two long-distance fiber-optic ports	**6GK5204-2BC10-2AA3**
- **SCALANCE X206-1LD** with six 10/100 Mbit/s RJ45 ports and one long-distance fiber-optic port	**6GK5206-1BC10-2AA3**
- **SCALANCE X212-2LD** with twelve 10/100 Mbit/s RJ45 ports and two long-distance fiber-optic ports	**6GK5212-2BC00-2AA3**
• With electrical ports	
- **SCALANCE X208;** with eight 10/100 Mbit/s RJ45 ports	**6GK5208-0BA10-2AA3**
- **SCALANCE X208PRO** with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust protection caps, IP65 degree of protection	**6GK5208-0HA10-2AA6**
- **SCALANCE X216** with sixteen 10/100 Mbit/s RJ45 ports	**6GK5216-0BA00-2AA3**
- **SCALANCE X224** with twenty-four 10/100 Mbit/s RJ45 ports	**6GK5224-0BA00-2AA3**

	Article No.
Accessories	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
FO Standard Cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m;	**6XV1873-2A**
FO Robust Cable GP 4E9/125/90 Singlemode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	**6XV1843-2R**
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	**6XV1847-2A**
IE FC RJ45 Plug 180 2 x 2 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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
IE FC M12 Plug PRO 2 x 2 M12 plug connector for connection of Industrial Ethernet FC installation cables; 4-pole, D-coded, metal enclosure, IP65 degree of protection, pin insert; 180° cable outlet; for network components and Industrial Ethernet stations with IP65/IP67 degree of protection	
• 1 pack = 1 unit	**6GK1901-0DB20-6AA0**
• 1 pack = 8 units	**6GK1901-0DB20-6AA8**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

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Ordering data

	Article No.
IE connecting cable M12-180/M12-180	
Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two 4-pole M12 plugs, 4-pole, D-coded, IP65/IP67 degree of protection; Length:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1.0 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2.0 m	**6XV1870-8AH20**
• 3.0 m	**6XV1870-8AH30**
• 5.0 m	**6XV1870-8AH50**
• 10 m	**6XV1870-8AN10**
• 15 m	**6XV1870-8AN15**
IE M12 Panel Feedthrough	
Control cabinet feedthrough for transition from 4-pole, D-coded M12 interface (IP65IP67) to RJ45 socket (IP20)	
• 1 pack = 5 units	**6GK1901-0DM20-2AA5**
IE Power M12 Cable Connector PRO	**6GK1907-0DC10-6AA3**
Socket for connecting SCALANCE W-700/ SCALANCE X208PRO for 24 V DC supply; 4-pole, A-coded, with installation instructions	
Signaling Contact M12 Cable Connector PRO	**6GK1908-0DC10-6AA3**
Socket for connecting SCALANCE X208PRO for signaling contact; 5-pole, B-coded, with installation instructions	

	Article No.
SITOP compact 24 V/0.6 A	**6EP1331-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	
PS791-1PRO Power Supply	**6GK5791-1PS00-0AA6**
AC/DC power supply, 10 W, IP65 (-20 to +60 °C) for SCALANCE X208PRO, input: AC 85 V – 265 V, output: 24 V DC, metal enclosure, scope of delivery: AC power 3+PE cable connector, DC power cord M12, installation materials, manuals German/English	
C-PLUG	**6GK1900-0AB00**
Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	
IE Connecting Cable IE FC RJ45 Plug-180/IE FC RJ45 Plug-180	
Preassembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two IE FC RJ45 plug-180, IP20 degree of protection; length:	
• 1.0 m	**6XV1871-5BH10**
• 2.0 m	**6XV1871-5BH20**
• 3.0 m	**6XV1871-5BH30**
• 5.0 m	**6XV1871-5BH50**
• 10.0 m	**6XV1871-5BN10**
• 15.0 m	**6XV1871-5BN15**
• 20.0 m	**6XV1871-5BN20**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

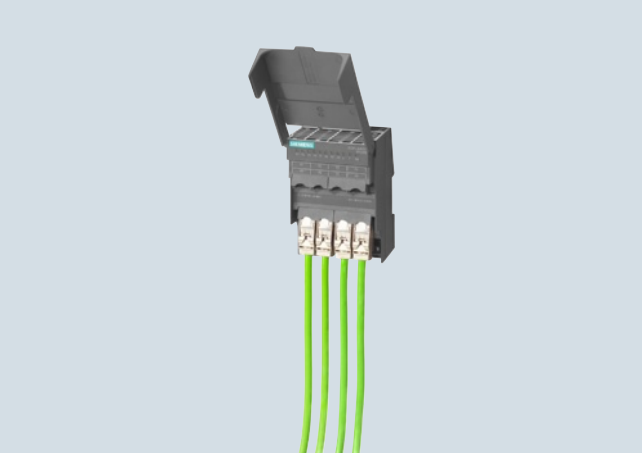
- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The managed Industrial Ethernet switches of the SCALANCE XF-200 line are optimized for setting up Industrial Ethernet networks at data transfer rates of 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 station connections with PROFINET-compatible RJ45 connectors that offer additional strain relief and bending strain relief thanks to latching on the housing
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product versions

- Switches with electrical and optical ports for glass multi-mode FOC up to 5 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

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

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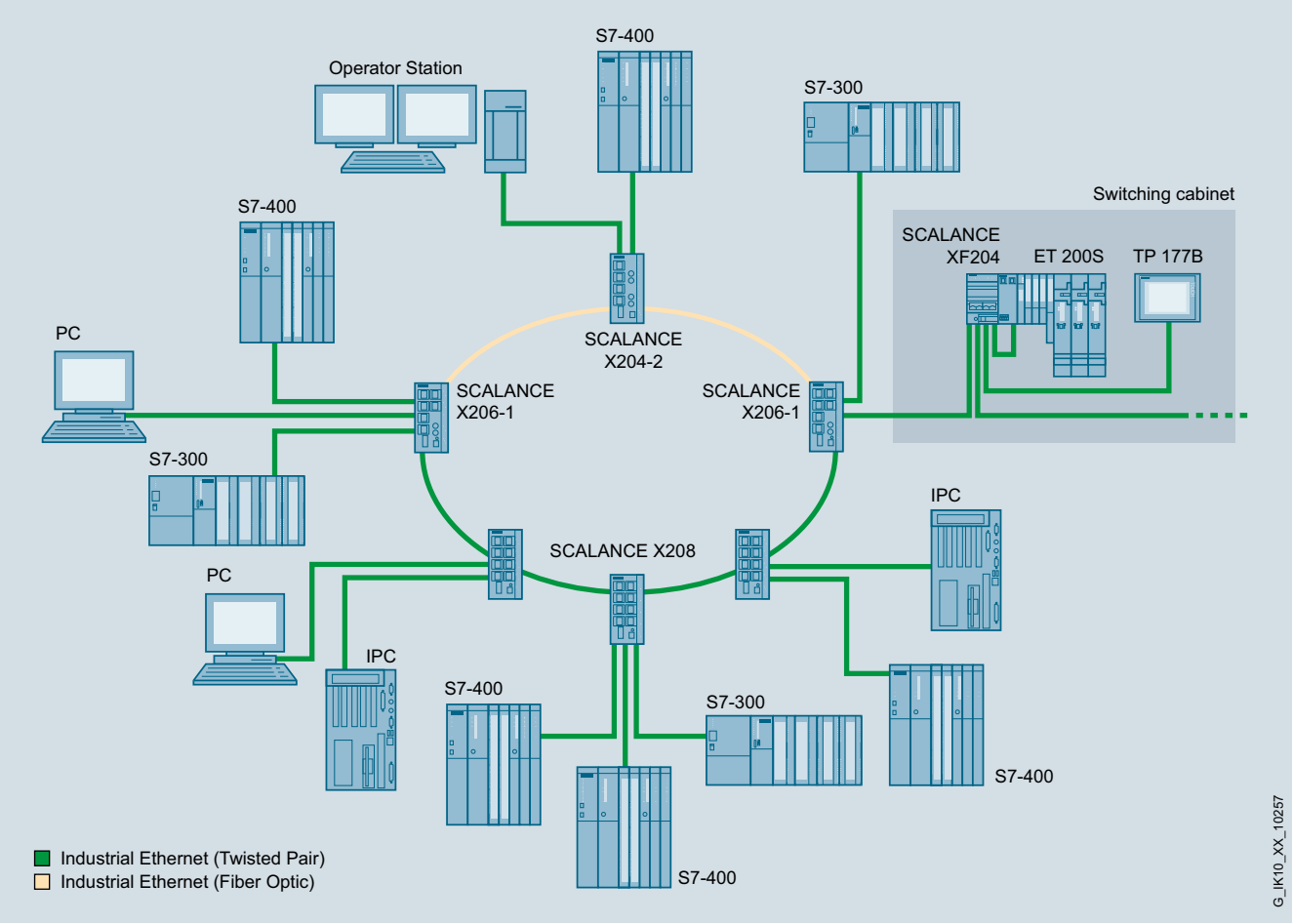
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Application

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.

Features:

- Device diagnostics with LEDs (power, link status, data communication)
- 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 XF-200

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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 IP20 degree of protection 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 5 km (multimode 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. 5 000 m with Industrial Ethernet glass fiber-optic cables (multimode)
- IP address:
  The IP address is assigned by means of the DHCP (Dynamic Host Configuration Protocol). 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 on site by LEDs:

- 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.

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Technical specifications

Article No.	6GK5204-0BA00-2AF2	6GK5204-2BC00-2AF2	6GK5206-1BC00-2AF2	6GK5208-0BA00-2AF2
Product-type designation	**SCALANCE XF204**	**SCALANCE XF204-2**	**SCALANCE XF206-1**	**SCALANCE XF208**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces				
Number of electrical/optical connections				
• for network components or terminal equipment maximum	4	6	7	8
Number of electrical connections				
• for network components and terminal equipment	4	4	6	8
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	-	2	1	-
Design of optical interface for optical waveguide at 100 Mbit/s	-	BFOC sockets (multimode up to 5 km)	BFOC sockets (multimode up to 5 km)	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-	-19 … -14 dB	-19 … -14 dB	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-	-34 dB	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	-	0 dB	0 dB	-
Range at the optical interface depending on the optical fiber used	-	0 … 5 km	0 … 5 km	-
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	1.1 A / 33 V	1.1 A / 33 V	1.1 A / 33 V	1.1 A / 33 V
Consumed current maximum	0.11 A	0.22 A	0.17 A	0.13 A
Active power loss at 24 V for DC	2.64 W	5.28 W	4.08 W	3.12 W

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2AF2	6GK5204-2BC00-2AF2	6GK5206-1BC00-2AF2	6GK5208-0BA00-2AF2
Product-type designation	**SCALANCE XF204**	**SCALANCE XF204-2**	**SCALANCE XF206-1**	**SCALANCE XF208**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
• Comment	If the IE switch XF 200 is installed horizontally a maximum ambient temperature of +40 °C is permitted	If the IE switch XF 200 is installed horizontally a maximum ambient temperature of +40 °C is permitted	If the IE switch XF 200 is installed horizontally a maximum ambient temperature of +40 °C is permitted	If the IE switch XF 200 is installed horizontally a maximum ambient temperature of +40 °C is permitted
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	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
Mounting type				
• 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 in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2AF2	6GK5204-2BC00-2AF2	6GK5206-1BC00-2AF2	6GK5208-0BA00-2AF2
Product-type designation	**SCALANCE XF204**	**SCALANCE XF204-2**	**SCALANCE XF206-1**	**SCALANCE XF208**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No	No
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes	Yes
Product functions Security				
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
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 600EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No	No
• Bureau Veritas (BV)	Yes	No	No	No
• Det Norske Veritas (DNV)	No	No	No	No
• Germanische Lloyd (GL)	No	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No	No
• Nippon Kaiji Kyokai (NK)	No	No	No	No
• Polski Rejestr Statkow (PRS)	No	No	No	No

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Ordering data

	Article No.
SCALANCE XF-200 Industrial Ethernet switches	
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	
• **SCALANCE XF204-2** 4 x 10/100 Mbit/s RJ45 ports, electrical; 2 x 100 Mbit/s BFOC ports, optical (multimode, glass), up to 5 km	**6GK5204-2BC00-2AF2**
• **SCALANCE XF206-1** 6 x 10/100 Mbit/s RJ45 ports, electrical; 1 x 100 Mbit/s BFOC ports, optical (multimode, glass), up to 5 km	**6GK5206-1BC00-2AF2**
• **SCALANCE XF204** 4 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5204-0BA00-2AF2**
• **SCALANCE XF208** 8 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5208-0BA00-2AF2**
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A) 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. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
FO Standard Cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m;	**6XV1873-2A**
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	**6XV1847-2A**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

	Article No.
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
FC BFOC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
FC FO termination kit 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	**6GK1900-1GL00-0AA0**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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SCALANCE X204RNA PRP

Overview



The SCALANCE X-200RNA (**R**edundant **N**etwork **A**ccess) managed Industrial Ethernet network access points with PRP functionality (**P**arallel **R**edundancy **P**rotocol in accordance with IEC 62439-3) are used to connect up to two non-PRP-enabled terminal devices or network segments to parallel networks.

- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Media redundancy thanks to duplicate transmission of frames in two parallel, separate networks
- High system availability since frames are sent simultaneously over two separate networks
- Reconfiguration times in a subnetwork do not affect the propagation time because the frames are transmitted via two separate networks (bumpless redundancy)
- Redundant 24 V DC voltage infeed or wide-range power supply unit, depending on device version
- SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product versions

- Network access point in plastic enclosure with electrical ports
  - ***SCALANCE X204RNA for PRP networks;***
    for connecting up to two non-PRP-enabled terminal devices to redundant networks with four electrical ports
- Network access point in metal enclosure with electrical and optical ports, as well as a wide-range power supply unit for use under extended ambient conditions
  - ***SCALANCE X204RNA EEC for PRP networks;***
    for connecting up to two non-PRP-enabled terminal devices to redundant networks with two electrical terminal device ports and two optical/electrical combo ports for network connection
  - ***SCALANCE X204RNA EEC for PRP or HSR networks;***
    for connecting up to two non-PRP-enabled or non-HSR-enabled terminal devices to redundant networks with two electrical terminal device ports and two optical/electrical combo ports for network connection. PRP or HSR function can be defined by the user when starting the device (for description of HSR function, see Section on X204RNA with HSR function).

Benefits

get Designed for Industry

- Ideal solution for establishing Industrial Ethernet networks with high network availability (bumpless media redundancy through parallel data transfer in parallel network topologies)
- The reconfiguration time of a subnetwork does not influence frame transmission
- Fast and easy diagnosis with LEDs on the device, through the integral Web server and through signaling contacts
- Integration of the SCALANCE X-200RNA network access points into the existing network management infrastructure through SNMP access
- Simple commissioning without mandatory configuring
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data

Application

The SCALANCE X-200RNA Industrial Ethernet network access points enable low-cost connection of non-PRP-enabled terminal equipment to parallel, separate networks in which high availability is demanded. The devices with degree of protection IP20 are designed for operation in the control cabinet.

Features:

- Device diagnostics with LEDs (power, link status, data communication)
- Remote diagnostics possible via signaling contact (signal screen can be set locally using buttons), SNMP, and Web browser
- With its extended ambient conditions, the SCALANCE X204RNA EEC is suitable for use in power switching and distribution systems (IEC 61850-3, IEEE 1613) in tough industrial environments

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Design

The SCALANCE X204RNA and X204RNA EEC network access points with rugged plastic or metal enclosure have been optimized for installation on a standard mounting rail and for direct wall mounting in different mounting positions.

The network access points with IP20 degree of protection feature:

- A 4-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC), or a 3-pole terminal block in the case of the wide-range power supply unit
- A row of LEDs to indicate the status information (power, link status, data exchange, power supply, signaling contact)
- A 2-pole or 3-pole terminal block for connecting the floating signaling contact in the corresponding voltage range
- A SET button for on-site configuration of the signaling contact

The SCALANCE X200RNA devices are available with the following port types:

- ***100BaseTX, RJ45 connection;***
  RJ45 port with a data rate of 100 Mbit/s, with autosensing and autocrossover function for the connection of IE FC cables via IE FC RJ45 Plug 180 up to 100 m
- ***100BaseTX, combo port (RJ45, SFP slot);***
  100 Mbit/s combo ports for direct connection to Industrial Ethernet copper cables or glass fiber-optic cables (multimode/singlemode fiber-optic cable);
  if the RJ45 interface of the combo port is used, the SFP slot is deactivated, and vice versa.

Function

- Connection of non-PRP-enabled terminal equipment to parallel, separate networks
- Parallel data transfer over two parallel, separate networks
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- Easy diagnostics using signaling contact, SNMP and Web browser
- 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 X-200RNA switches with IP30 degree of protection are usually installed in a control cabinet together with the stations to be connected. 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 the network and SCALANCE X-200RNA:
  - 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 between the network and SCALANCE X-200RNA
  - Max. 5 000 m with Industrial Ethernet glass fiber-optic cables (multimode)
  - Max. 26 000 m with Industrial Ethernet glass fiber-optic cables (singlemode)
- IP address:
  The IP address is assigned by means of the DHCP (Dynamic Host Configuration Protocol). If there is no corresponding server in the network, the IP address can be assigned using the supplied software tool PST (Primary Setup Tool).

Commissioning and diagnosis

The SCALANCE X-200RNA Industrial Ethernet network access points can be integrated into a network management system via the standardized protocol SNMP (**S**imple **N**etwork **M**anagement **P**rotocol). 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.

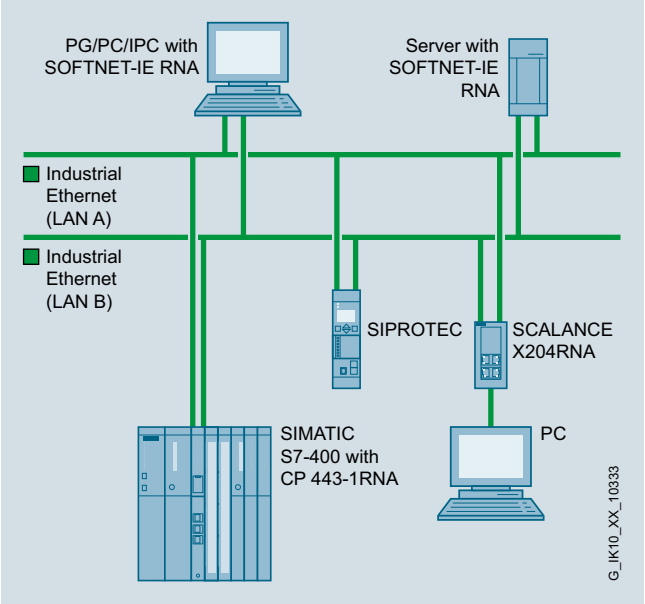
The integral Web server enables configuration and diagnostics settings to be made using a standard browser (e.g. port configuration). Statistical information can also be read out over the Web server (e.g. port capacity utilization).

The following information is displayed on site by LEDs:

- Power
- Port status
- Data traffic
- Signaling contact
- PRP activity

The SCALANCE X-200RNA Industrial Ethernet network access points can also be monitored using the floating signaling contact.

Integration



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Technical specifications

Article No.	6GK5204-0BA00-2KB2	6GK5204-0BS00-3LA3	6GK5204-0BS00-3PA3
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Transmission rate			
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections			
• for network components or terminal equipment maximum	4	4	4
• as combo port for network components or terminal equipment	-	2	2
Number of electrical connections			
• for network components • and terminal equipment	4	2	2
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	2	1	1
Design of electrical/optical connections for network components or terminal equipment	-	SFP	SFP
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	3-pole terminal block	
• for power supply	4-pole terminal block	3-pole terminal block	3-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	-	2	2
Design of optical interface for optical waveguide at 100 Mbit/s	-	SFF port	SFF port
Design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating current of signaling contacts at AC maximum	-	0.1 A	0.1 A
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	DC	-	-
Supply voltage external	24 V	-	-
Supply voltage external			
• minimum	19.2 V	-	-
• maximum	28.8 V	-	-
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage			
Consumed current maximum	0.15 A	0.25 A	0.25 A
Active power loss at 24 V for DC	3.5 W	6 W	6 W

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2KB2	6GK5204-0BS00-3LA3	6GK5204-0BS00-3PA3
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +60 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• Comment	-	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
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	45 mm	70 mm	70 mm
Height	100 mm	147 mm	147 mm
Depth	87 mm	123 mm	123 mm
Net weight	0.23 kg	0.78 kg	0.78 kg
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	No	No
• S7-300 rail mounting	No	No	No
Mounting type	-	-	-
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	-	-	-
Cascading in cases of star structuring	-	-	-
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	No	No	No
• Port mirroring	No	No	No
• for IRT PROFINET IO switch	No	No	No
• PROFINET IO diagnosis	No	No	No
• switch-managed	No	No	No
Protocol is supported			
• Telnet	No	No	No
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	No	No	No
• FTP	No	No	No
• BOOTP	No	No	No
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	No	No	No
• LLDP	No	No	No
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2KB2	6GK5204-0BS00-3LA3	6GK5204-0BS00-3PA3
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
Product functions DHCP			
Product function DHCP client	-	-	-
Product functions Redundancy			
Product function			
• Ring redundancy	No	No	No
• Redundancy manager	No	No	No
• Standby redundancy	No	No	No
• High Speed Redundancy Protocol (HRP)	No	No	No
• Media Redundancy Protocol (MRP)	No	No	No
• Parallel Redundancy Protocol (PRP)	Yes	Yes	Yes
• High availability Seamless Redundancy (HSR)	No	No	Yes
• Passive listening	No	No	No
Protocol is supported PRP	Yes	Yes	Yes
Product functions Security			
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
Product function			
• SICLOCK support	No	No	No
Protocol is supported			
• NTP	No	No	No
• SNTP	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for EMC	-	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613
- from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL			
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No
• IEC 61850-3	No	Yes	Yes
Certificate of suitability IEEE 1613	-	Yes	Yes
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No
• Bureau Veritas (BV)	No	No	No
• Det Norske Veritas (DNV)	No	No	No
• Germanische Lloyd (GL)	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No
• Nippon Kaiji Kyokai (NK)	No	No	No
• Polski Rejestr Statkow (PRS)	No	No	No

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Ordering data

	Article No.
SCALANCE X-200RNA Industrial Ethernet network access points	
Industrial Ethernet network access points with integrated SNMP access, web diagnostics and PROFINET diagnostics, for connecting non-PRP-enabled terminal equipment to PRP networks; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; with electrical and optical ports for glass multimode fiber optic cables up to 5 km	
• **SCALANCE X204RNA** with four 100 Mbit/s RJ45 ports	**6GK5204-0BA00-2KB2**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-3LA3**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports with PRP or HSR support	**6GK5204-0BS00-3PA3**
SIMATIC NET communications processor CP 443-1 RNA S7 integration into bumpless, redundant network structures on the basis of the Parallel Redundancy Protocol (PRP)	**6GK7443-1RX00-0XE0**
SOFTNET-IE RNA	
Software for connecting PCs to PRP-enabled networks with integrated SNMP, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
SOFTNET-IE RNA V12 for 32/64-bit Windows 7 Professional/Ultimate; for Windows 2008 Server R2; for 32/64-bit Windows 8 Professional/Enterprise; for Windows Server 2012 German/English	
• Single License for one installation	**6GK1711-1EW12-0AA0**
SOFTNET-IE RNA V8.1 for 32-bit Windows XP; German/English	
• Single License for one installation	**6GK1711-1EW08-1AA0**
Software Update Service for 1 year with automatic extension; requirement: Current software version	**6GK1711-1EW00-3AL0**

[1] Special fiber-optic cables, lengths and accessories available on request

[2] Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

	Article No.
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-wire, shielded TP installation cable for connecting to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 2 x 2 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 interfaces	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
SFP plug-in transceiver	
• SFP991-1 (multimode, glass, up to 3 km)	**6GK5991-1AD00-8AA0**
• SFP991-1LH+ (singlemode, glass, up to 70 km, LH+)	**6GK5991-1AE00-8AA0**
• SFP991-1LD (singlemode, glass, up to 26 km)	**6GK5991-1AF00-8AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
LC Plug SM[2]	**6GK1901-0SB10-2AB0**
FO Robust Cable GP 50/125/900[1]	**6XV1873-2R**
FO Robust Cable GP 4x9/125/900[1]	**6XV1843-2R**
SITOP compact 24 V/0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slots	**6GK1900-0AB00**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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SCALANCE X204RNA HSR

Overview



The SCALANCE X-200RNA (**R**edundant **N**etwork **A**ccess) managed Industrial Ethernet network access points with HSR functionality (**H**igh-availability **S**eamless **R**edundancy Protocol in accordance with IEC 62439-3) are used to connect up to two non-HSR-enabled terminal devices or network segments to a ring-shaped HSR network structure. They can also be used for simple and redundant transition from HSR to PRP (Parallel Redundancy Protocol) network structures.

- Electrical or optical connection to stations or network in accordance with the port type of the devices
- Media redundancy thanks to duplicate transmission of frames in ring-shaped networks
- High system availability since frames are sent simultaneously via two routes in the ring
- No reconfiguration times of the ring-shaped network are required in the event of an error due to duplicate transmission of frames in the ring
- Simple and redundant connection of HSR and PRP network structures
- Redundant 24 V DC voltage infeed or wide-range power supply unit, depending on device version
- SNMP access, integrated Web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product versions

- Network access point in plastic enclosure with electrical ports
  - ***SCALANCE X204RNA for HSR networks;***
    for connecting up to two non-HSR-enabled terminal devices to ring-topology networks with four electrical ports
- Network access point in metal enclosure with electrical and optical ports, as well as a wide-range power supply unit for use under extended ambient conditions
  - ***SCALANCE X204RNA EEC for HSR networks;***
    for connecting up to two non-HSR-enabled terminal devices to ring-shaped networks with two electrical terminal device ports and two optical/electrical combo ports for network connection
  - ***SCALANCE X204RNA EEC for PRP or HSR networks;***
    for connecting up to two non-PRP-enabled or non-HSR-enabled terminal devices to redundant networks with two electrical terminal device ports and two optical/electrical combo ports for network connection. PRP or HSR function can be defined by the user when starting the device (for description of PRP function, see Section on X204RNA with PRP function).

Benefits

get Designed for Industry

- Ideal solution for establishing Industrial Ethernet networks with high network availability (bumpless media redundancy through parallel data transfer in parallel network topologies)
- Bumpless data transmission in ring-shaped network structures for high availability systems (e.g. process automation)
- Fast and easy diagnosis with LEDs on the device, through the integral Web server and through signaling contacts
- Integration of the SCALANCE X-200RNA network access points into the existing network management infrastructure through SNMP access
- Simple commissioning without mandatory configuring
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data

Application

The SCALANCE X-200RNA Industrial Ethernet network access points with HSR functionality enable low-cost connection of non-HSR-enabled terminal devices to ring-shaped networks in which high availability is demanded. The devices with degree of protection IP20 are designed for operation in the control cabinet.

Features:

- Device diagnostics with LEDs (power, link status, data communication)
- Remote diagnostics possible via signaling contact (signal screen can be set locally using buttons), SNMP, and Web browser
- With its extended ambient conditions, the SCALANCE X204RNA EEC is suitable for use in power switching and distribution systems (IEC 61850-3, IEEE 1613) in tough industrial environments

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Design

The SCALANCE X204RNA and X204RNA EEC network access points with rugged plastic or metal enclosure have been optimized for installation on a standard mounting rail and for direct wall mounting in different mounting positions.

The network access points with IP20 degree of protection feature:

- A 4-pole terminal block for connecting the redundant supply voltage (2 x 24 V DC), or a 3-pole terminal block in the case of the wide-range power supply unit
- A row of LEDs to indicate the status information (power, link status, data exchange, power supply, signaling contact)
- A 2-pole or 3-pole terminal block for connecting the floating signaling contact in the corresponding voltage range
- A SET button for on-site configuration of the signaling contact

The SCALANCE X200RNA devices are available with the following port types:

- ***100BaseTX, RJ45 connection;***
  RJ45 port with a data rate of 100 Mbit/s, with autosensing and autocrossover function for the connection of IE FC cables via IE FC RJ45 Plug 180 up to 100 m
- ***100BaseTX, combo port (RJ45, SFP slot);***
  100 Mbit/s combo ports for direct connection to Industrial Ethernet copper cables or glass fiber-optic cables (multimode/singlemode fiber-optic cable);
  if the RJ45 interface of the combo port is used, the SFP slot is deactivated, and vice versa.

Function

- Connection of non-HSR-enabled terminal devices to ring-shaped networks
- Transition from ring-shaped HSR networks to parallel PRP network structures
- Parallel data transmission by means of duplicate transmission in the ring network
- Uncrossed connecting cables can be used due to Autocrossover function integrated in the ports
- Easy diagnostics using signaling contact, SNMP and Web browser
- 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 X-200RNA switches with IP20 degree of protection are usually installed in a control cabinet together with the stations to be connected. 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 the network and SCALANCE X-200RNA:
  - 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 between the network and SCALANCE X-200RNA
  - Max. 5 000 m with Industrial Ethernet glass fiber-optic cables (multimode)
  - Max. 26 000 m with Industrial Ethernet glass fiber-optic cables (singlemode)
- IP address:
  The IP address is assigned by means of the DHCP (Dynamic Host Configuration Protocol). If there is no corresponding server in the network, the IP address can be assigned using the supplied software tool PST (Primary Setup Tool).

Commissioning and diagnostics

The SCALANCE X-200RNA Industrial Ethernet network access points can be integrated into a network management system via the standardized protocol SNMP (**S**imple **N**etwork **M**anagement **P**rotocol). 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 on site by LEDs:

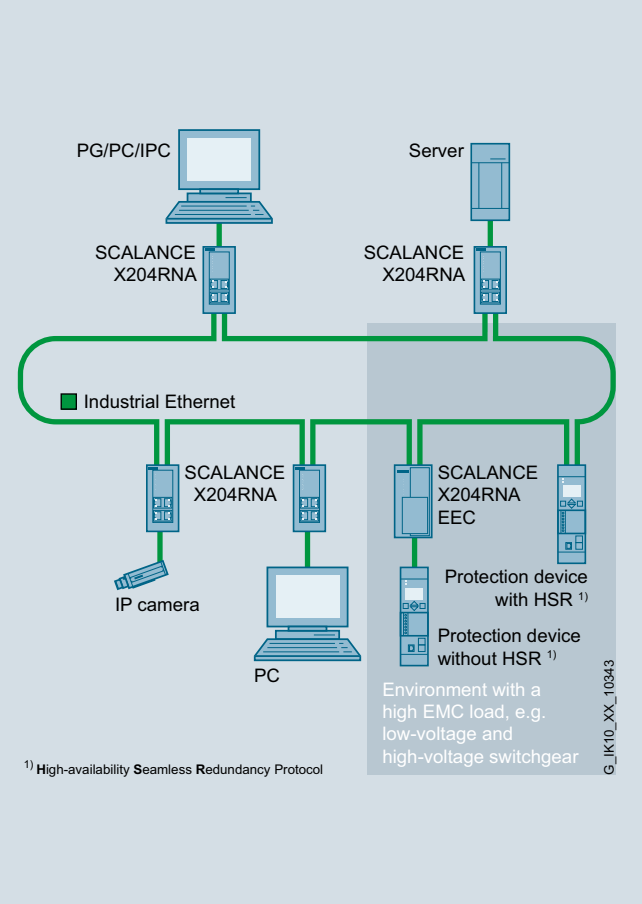
- Power
- Port status
- Data traffic
- Signaling contact
- HSR activity

The SCALANCE X-200RNA Industrial Ethernet network access points can also be monitored using the floating signaling contact.

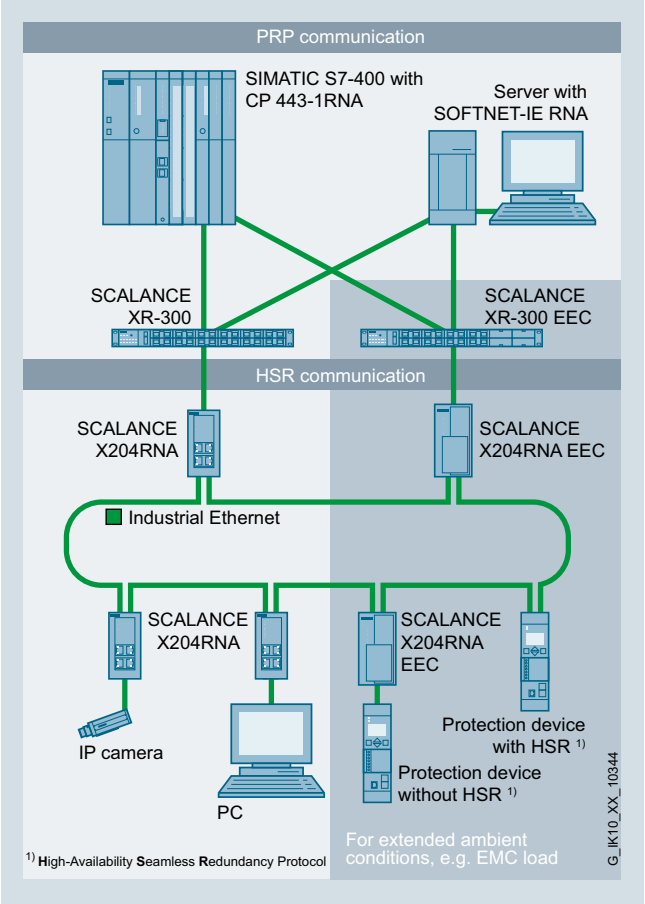
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Integration



Ring-shaped HSR network structure with SCALANCE X-204RNA



Redundant transition from ring-shaped HSR network structure to parallel PRP network structure by means of SCALANCE X204RNA

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Technical specifications

Article No.	**6GK5204-0BA00-2MB2**	**6GK5204-0BS00-2NA3**	**6GK5204-0BS00-3PA3**
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Transmission rate			
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections			
• for network components or terminal equipment maximum	4	4	4
• as combo port for network components or terminal equipment	-	2	2
Number of electrical connections			
• for network components and terminal equipment	4	2	2
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	2	1	1
Design of electrical/optical connections for network components or terminal equipment	-	SFP	SFP
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	3-pole terminal block	
• for power supply	4-pole terminal block	3-pole terminal block	3-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	-	2	2
Design of optical interface for optical waveguide at 100 Mbit/s	-	SFF port	SFF port
Design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating current of signaling contacts at AC maximum	-	0.1 A	0.1 A
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	DC	-	-
Supply voltage external	24 V	-	-
• minimum	19.2 V	-	-
• maximum	28.8 V	-	-
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage			
Consumed current maximum	0.15 A	0.25 A	0.25 A
Active power loss at 24 V for DC	3.5 W	6 W	6 W

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2MB2	6GK5204-0BS00-2NA3	6GK5204-0BS00-3PA3
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +60 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• Comment	-	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
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	compact	compact	compact
Width	45 mm	70 mm	70 mm
Height	100 mm	147 mm	147 mm
Depth	87 mm	123 mm	123 mm
Net weight	0.23 kg	0.78 kg	0.78 kg
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	Yes	No	No
• S7-300 rail mounting	No	No	No
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	No	No	No
• SMTP server	-	-	-
• Port mirroring	No	No	No
• for IRT PROFINET IO switch	No	No	No
• PROFINET IO diagnosis	No	No	No
• switch-managed	No	No	No
Protocol is supported			
• Telnet	No	No	No
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	No	No	No
• FTP	No	No	No
• BOOTP	No	No	No
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	No	No	No
• LLDP	No	No	No
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2MB2	6GK5204-0BS00-2NA3	6GK5204-0BS00-3PA3
Product-type designation	**SCALANCE X204RNA**	**SCALANCE X204RNA EEC**	**SCALANCE X204RNA EEC**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	No
• Redundancy manager	No	No	No
• Standby redundancy	No	No	No
• High Speed Redundancy Protocol (HRP)	No	No	No
• Media Redundancy Protocol (MRP)	No	No	No
• Parallel Redundancy Protocol (PRP)	No	No	Yes
• High availability Seamless Redundancy (HSR)	Yes	Yes	Yes
• Passive listening	No	No	No
Protocol is supported PRP	Yes	Yes	Yes
Product functions Security			
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
Product function			
• SICLOCK support	No	No	No
Protocol is supported			
• NTP	No	No	No
• SNTP	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for EMC	-	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613
- from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 600EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL			
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No
• IEC 61850-3	No	Yes	Yes
Certificate of suitability IEEE 1613	-	Yes	Yes
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No
• Bureau Veritas (BV)	No	No	No
• Det Norske Veritas (DNV)	No	No	No
• Germanische Lloyd (GL)	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No
• Nippon Kaiji Kyokai (NK)	No	No	No
• Polski Rejestr Statkow (PRS)	No	No	No

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Ordering data

	Article No.
SCALANCE X-200RNA HSR Industrial Ethernet network access points	
Industrial Ethernet network access points with integrated SNMP access, web diagnostics and PROFINET diagnostics, for connecting non-HSR-enabled terminal devices to ring-shaped HSR networks; incl. operating instructions, Industrial Ethernet network manual, and configuration software on CD-ROM; with electrical and optical ports for glass multimode fiber optic cables up to 5 km	
• **SCALANCE X204RNA** with four 100 Mbit/s RJ45 ports	**6GK5204-0BA00-2MB2**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-2NA3**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports with PRP or HSR support	**6GK5204-0BS00-3PA3**
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
4-wire, shielded TP installation cable for connecting to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC RJ45 Plug 180 2 x 2	
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 interfaces	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**

	Article No.
SFP plug-in transceiver	
• SFP991-1 (multimode, glass, up to 3 km)	**6GK5991-1AD00-8AA0**
• SFP991-1LH+ (singlemode, glass, up to 70 km, LH+)	**6GK5991-1AE00-8AA0**
• SFP991-1LD (singlemode, glass, up to 26 km)	**6GK5991-1AF00-8AA0**
LC Plug MM[2]	**6GK1901-0RB10-2AB0**
LC Plug SM[2]	**6GK1901-0SB10-2AB0**
FO Robust Cable GP 50/125/900[1]	**6XV1873-2R**
FO Robust Cable GP 4x9/125/900[1]	**6XV1843-2R**
SITOP compact 24 V/0.6 A	**6EP1331-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	
C-PLUG	**6GK1900-0AB00**
Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slots	

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-200IRT	Hardware																		
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	10 Gigabit Ethernet	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	
X200-4P IRT							•					•	•	•		•	•	•	
X201-3P IRT							•					•	•	•		•	•	•	
X201-3P IRT PRO							•					•	•	•		•	•	•	
X202-2IRT							•					•	•	•		•	•	•	
X202-2P IRT							•					•	•	•		•	•	•	
X202-2P IRT PRO							•					•	•	•		•	•	•	
X204IRT							•					•	•	•		•	•	•	
X204IRT PRO							•					•	•	•		•	•	•	
XF204IRT				•								•	•	•		•	•	•	G_IK10_XX_10314

• applies

Function overview SCALANCE X-200IRT managed: Hardware

SCALANCE X-200IRT	Software																											
Type of device	Security Integrated (Firewall/VPN)	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)	
X200-4P IRT		•	•	•	•	•	•	•	•	•				•														
X201-3P IRT		•	•	•	•	•	•	•	•	•				•														
X201-3P IRT PRO		•	•	•	•	•	•	•	•	•				•														
X202-2IRT		•	•	•	•	•	•	•	•	•				•														
X202-2P IRT		•	•	•	•	•	•	•	•	•				•														
X202-2P IRT PRO		•	•	•	•	•	•	•	•	•				•														
X204IRT		•	•	•	•	•	•	•	•	•				•														
X204IRT PRO		•	•	•	•	•	•	•	•	•				•														
XF204IRT		•	•	•	•	•	•	•	•	•				•														G_IK10_XX_10315

• applies

Function overview SCALANCE X-200IRT managed: Software

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Overview



SCALANCE X-200IRT switches are especially designed for constructing isochronous real-time (IRT) Industrial Ethernet networks in line, star and ring topologies at transmission rates of 10/100 Mbit/s (Redundancy Manager integrated); construction of redundant ring connections possible.

- Optimized performance due to combination of the switching mechanisms "Cut Through" and "Store and Forward"
- Fast media redundancy due to the integrated redundancy manager for Fast Ethernet
- Rugged, industry-standard station connections with PROFINET-compatible plug-in connectors that offer additional strain relief and bending strain relief thanks to latching on the enclosure
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network
- Different device versions with copper and fiber-optic interfaces (BFOC, SC RJ)
- Implementation of cabinet-free plant concepts with PROFINET-compliant push pull connection systems with device variants with IP65/67 protection

Product versions

SCALANCE X204IRT

- For configuring electrical Industrial Ethernet linear bus, star or ring topologies with 4 electrical ports

SCALANCE X202-2IRT

- For configuring electrical/optical Industrial Ethernet linear bus, star or ring topologies with two electrical ports and two glass fiber optic ports

SCALANCE X202-2P IRT

- For configuring electrical/optical Industrial Ethernet linear bus, star or ring topologies with two electrical ports and two optical POF fiber optic ports

SCALANCE X201-3P IRT

- For configuring electrical/optical Industrial Ethernet linear bus, star or ring topologies with one electrical port and three optical POF fiber optic ports

SCALANCE X200-4P IRT

- For configuring optical Industrial Ethernet linear bus, star or ring topologies with 4 optical POF fiber-optic ports

SCALANCE X204 IRT PRO

- For the construction of electrical Industrial Ethernet linear, star or ring topologies with four electrical ports in degree of protection IP65/67 with PROFINET-compliant push-pull connection technology

SCALANCE X202-2P IRT PRO

- For the construction of electrical/optical Industrial Ethernet linear bus, star or ring structures with two electrical and two optical POF/PCF fiber optic ports in degree of protection IP65/67 with PROFINET-compliant push-pull connection technology

SCALANCE X201-3P IRT PRO

- For the construction of electrical/optical Industrial Ethernet linear bus, star or ring topologies with one electrical and three optical POF/PCF fiber optic ports in degree of protection IP65/67 with PROFINET-compliant push-pull connection technology

Applicable to all versions:

- Integral redundancy manager (RM)
- Device diagnostics with LEDs (power, link status, data communication)
- Remote diagnosis is possible through signaling contact (signal mask can be set locally using buttons), PROFINET, SNMP and Web browser
- Automatic e-mail send function
- 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

The SCALANCE X-200IRT switches, based on PROFINET, satisfy the real-time requirements of the field level up to high-performance motion control applications.

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Benefits

get Designed for Industry

- The ideal solution for constructing isochronous real-time (IRT) Industrial Ethernet segments especially in line, star and ring topologies with copper and fiber-optic cabling (glass FOC, PCF FOC, POF FOC)
- Reliable data communication thanks to rugged, industry-standard device connection using PROFINET-compatible connectors (IE FC RJ45 Plug 2x2) that offer additional strain relief and bending strain relief thanks to latching on the enclosure
- High network availability in ring topologies, without reconfiguration times, when using the PROFINET-compliant MRPD process (**M**edia **R**edundancy for **P**lanned **D**uplication according to IEC 61158)
- Fast and easy diagnosis with LEDs on the device, through the integral Web server and through signaling contacts
- Easy integration in the process diagnosis and system diagnosis with PROFINET
- Configuration and diagnostics integrated into STEP 7 provide significant benefits during the engineering, start-up and operating phases of a plant
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data

Application

The SCALANCE X-200IRT Industrial Ethernet switches permit the construction of isochronous real-time (IRT) Industrial Ethernet line and star topologies. Ring structures can also be designed using the integral redundancy manager (RM). Redundant ring connections are also possible. 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 have been satisfied for the first time within a single technology based on the PROFINET standard.

The switches with IP30 degree of protection have been designed for use in the control cabinet. The switches with IP65/67 protection are designed for cabinet-free mounting (PROFINET-compliant push pull connection technology).

Real-time Ethernet

- Interfacing of the PROFINET IO Devices to the PROFINET IO Controller through high-performance, optimized data transmission
- 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 isochronous 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.

Design

- The SCALANCE X-200IRT switches in a rugged metal housing with IP30 and IP65/67 degree of protection are optimized for mounting on a standard rail and an S7-300 rail. Direct wall mounting in various 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 supply voltage (2 x 24 V DC). The variants with IP65/67 protection have two 5-pin push-pull connectors via which the supply voltage is fed and forwarded. In addition, the load voltage circuit is also looped through for the ET200pro devices further along the line. The devices with IP65/67 protection thus have no redundant voltage feed, but permit optimal integration into cabinet-free plant concepts with ET200pro modules.
  The status information (power, link status, data traffic, voltage supply, signaling contact) is indicated by means of a row of LEDs.

The SCALANCE X-200IRT modules are available with the following port types:

- ***10/100BaseTX, RJ45 connection***
  RJ45 port, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover function for connecting IE FC cables over IE FC RJ45 Plug 180 over distances up to 100 m.
- ***10/100BaseTX, push-pull RJ45 connection***
  RJ45 port, automatic detection of the data rate (10 or 100 Mbit/s), with Autosensing and Autocrossover function for connecting IE FC cables via IE FC RJ45 Plug PRO over distances up to 100 m
- ***100BaseFX, BFOC connection technique***
  BFOC ports for direct connection to Industrial Ethernet glass fiber-optic cables up to 5000 m for configuring line and star topologies.
- ***100BaseFX, SC RJ connections***
  SC RJ ports for connection to Industrial Ethernet POF (50 m) and PCF FOC (100 m) using SC RJ plug connectors
- ***100BaseFX, push-pull SC RJ connections***
  SC RJ ports for connection to Industrial Ethernet POF (50 m) and PCF FOC (100 m) using SC RJ plug PRO connectors

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Function

- 4-port switch for configuring electrical and optical Industrial Ethernet line, star and ring topologies
- Integral redundancy manager for design of 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
- Bumpless ring redundancy by sending message frames twice in the ring, by means of PROFINET-compliant MRPD procedure (**M**edia **R**edundancy for **P**lanned **D**uplication according to IEC 61158)
- System-wide clock accuracy (less than 1 ms)
- 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
- Automatic e-mail function
- Integration into the diagnostics of a PROFINET IO-Controllers for a consistent diagnostics concept, including network infrastructure
- 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 X-200IRT Industrial Ethernet Switches are usually installed in the control cabinet together with the stations to be connected (e.g. ET 200S) or, in the case of cabinet-free designs, mounted directly onto the machine. 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 IE FC cable and IE FC RJ45 Plug 180 or IE FC RJ45 Plug PRO
  - Max. 10 m with TP Cord
- Length of the optical cables
  - Max. 4 000 m with Industrial Ethernet glass fiber-optic cables (62.5/125 µm)
  - Max. 5 000 m with Industrial Ethernet glass fiber-optic cables (50/125 µm)
  - Max. 100 m with Industrial Ethernet PCF fiber-optic cables.
  - Max. 50 m with Industrial Ethernet POF fiber-optic cables.
- IP Address:
  The IP address is assigned by means of the DHCP (Dynamic Host Configuration Protocol). 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 X-200IRT switches and their real-time functions are configured with STEP 7.

Commissioning and diagnostics

PROFINET diagnostic alarms from SCALANCE X-200IRT Switches can be displayed with the appropriate SIMATIC Engineering Tools and processed in the control unit. 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.

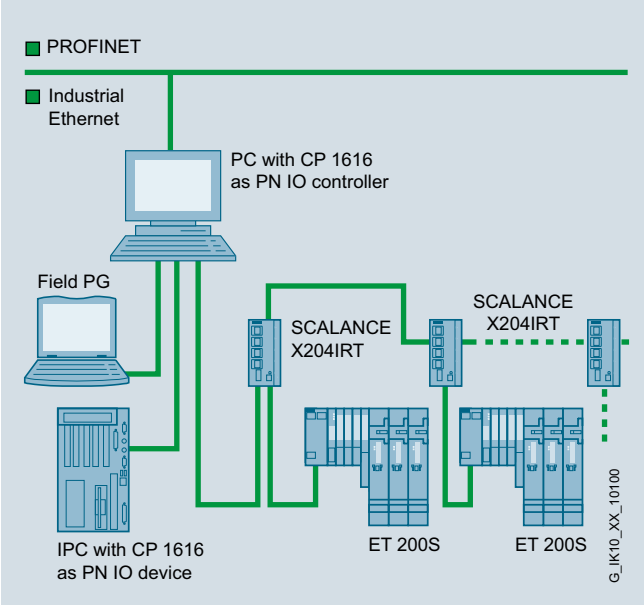
The SCALANCE X-200IRT Industrial Ethernet switches can also be integrated into a network management system through the standardized protocol SNMP (Simple Network Management Protocol). In the event of a device fault, error messages (SNMP traps) can be sent to a network system or as e-mail to a specified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

The integral Web server enables configuration and diagnosis settings to be made using a standard browser. Statistical information can also be read out over the Web server. Warning thresholds, and alarms generated by them, permit early recognition of critical fiber states (only with POF). Cable failures (fiber breakage) can thus be avoided, and plant downtimes reduced, since maintenance work can be carried out at an early point in time and outside production periods.

The following information is displayed on site by LEDs:

- Power
- Port status
- Data traffic
- RM activated
- POF cable diagnostics (for POF versions only)

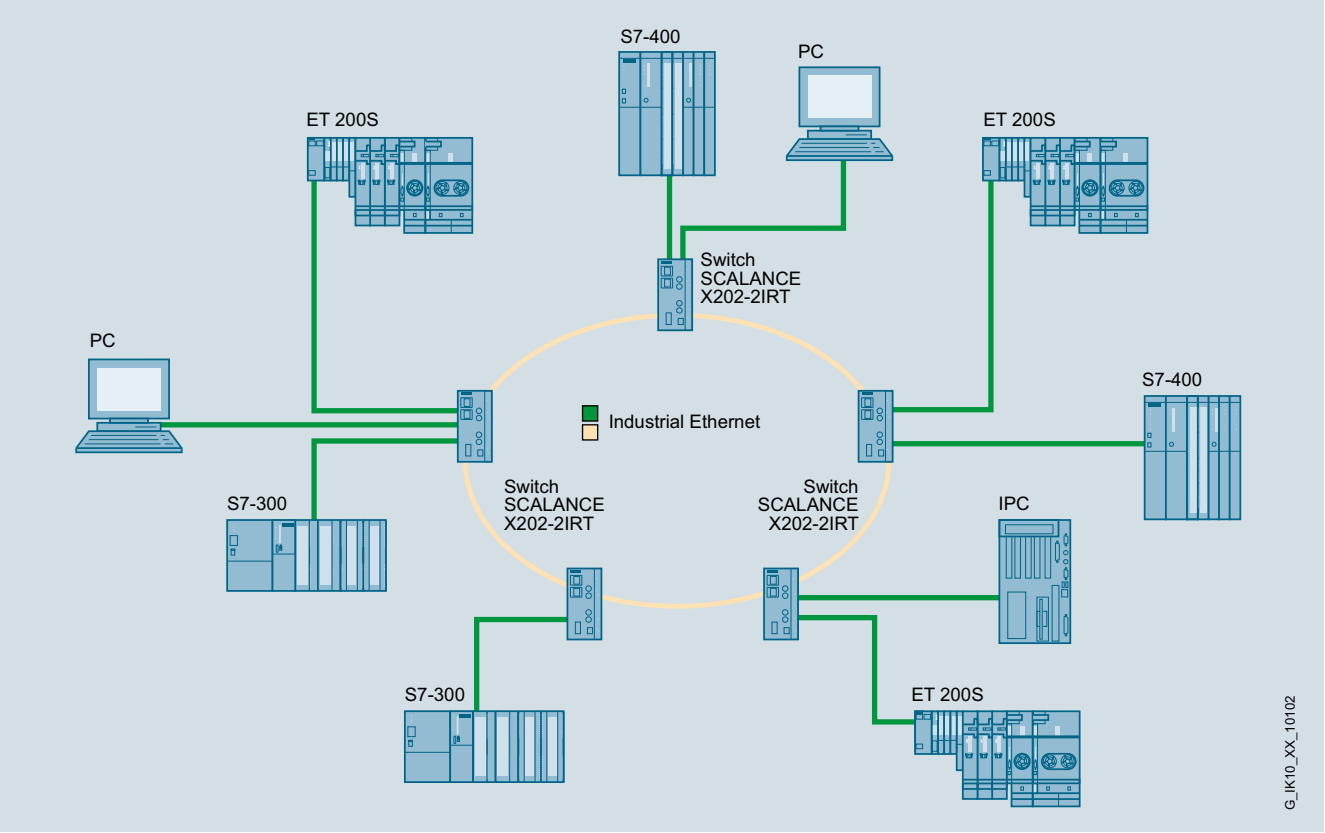
The Industrial Ethernet switches of the SCALANCE X-200IRT line can also be monitored using the floating signaling contact.



Configuration example for SCALANCE X204IRT

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Function (continued)

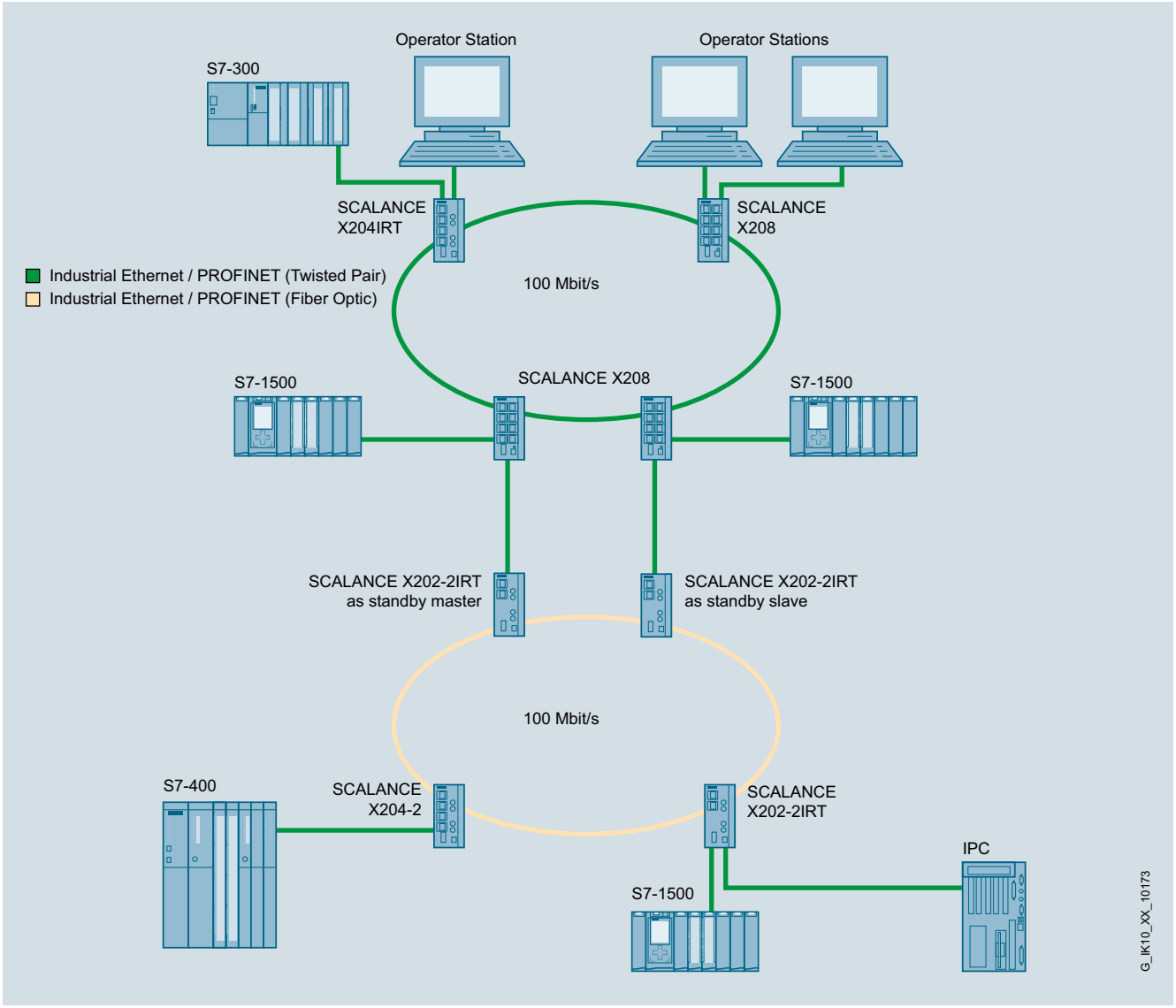


Configuration with high-speed redundancy in the optical ring

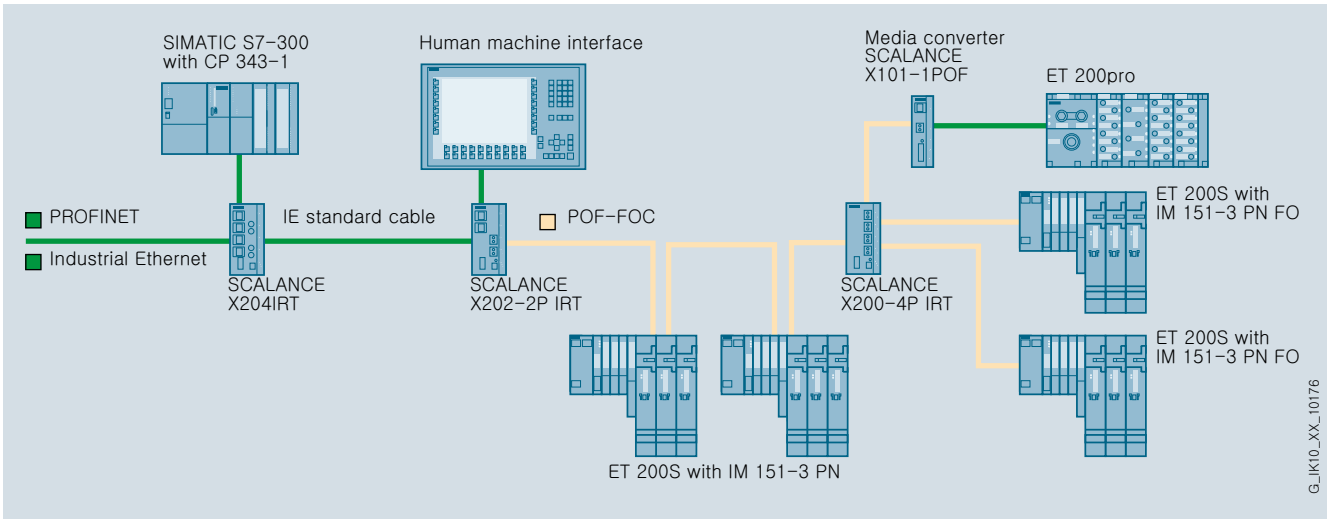
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Function (continued)



Redundant coupling of two subnetworks with SCALANCE X-200IRT



Mixed network topology with plastic fiber-optic cables and twisted-pair cables

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Technical specifications

Article No.	6GK5200-4AH00-2BA3	6GK5201-3BH00-2BA3	6GK5202-2BH00-2BA3
Product-type designation	**SCALANCE X200-4P IRT**	**SCALANCE X201-3P IRT**	**SCALANCE X202-2P IRT**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections			
• for network components or terminal equipment maximum	4	4	4
Number of electrical connections			
• for network components and terminal equipment	-	1	2
• for signaling contact	1	1	1
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical/optical connections for network components or terminal equipment	SC RJ	SC RJ	SC RJ
Design of electrical connection			
• for network components and terminal equipment	-	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	4	3	2
Design of optical interface for optical waveguide at 100 Mbit/s	SC-RJ/POF port	SC-RJ/POF port	SC-RJ/POF port
Connectable optical power relative to 1 mW			
• of the transmitter output	-8 ... -2 dB	-8 ... -2 dB	-8 ... -2 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-25 dB	-25 dB	-25 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 0.05 km	0 … 0.05 km	0 … 0.05 km
Design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	1.1 A / 33 V	1.1 A / 33 V	1.1 A / 33 V
Consumed current maximum	0.4 A	0.35 A	0.3 A
Active power loss at 24 V for DC	9.6 W	8.4 W	7.2 W

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Technical specifications (continued)

Article No.	6GK5200-4AH00-2BA3	6GK5201-3BH00-2BA3	6GK5202-2BH00-2BA3
Product-type designation	**SCALANCE X200-4P IRT**	**SCALANCE X201-3P IRT**	**SCALANCE X202-2P IRT**
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +40 °C	-25 … +50 °C	-25 … +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 maximum	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30
Design, dimensions and weight			
Design	compact	compact	compact
Width	60 mm	60 mm	60 mm
Height	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm
Net weight	0.78 kg	0.78 kg	0.78 kg
Mounting type			
• 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			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• SMTP server	-	-	-
• Port mirroring	No	No	No
• for IRT PROFINET IO switch	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• FTP	Yes	Yes	Yes
• BOOTP	No	No	No
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5200-4AH00-2BA3	6GK5201-3BH00-2BA3	6GK5202-2BH00-2BA3
Product-type designation	**SCALANCE X200-4P IRT**	**SCALANCE X201-3P IRT**	**SCALANCE X202-2P IRT**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error statistics	Yes	Yes	Yes
Product functions DHCP			
Product function DHCP client	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes
Product functions Security			
Protocol is supported SSH	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, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001	EN 61000-6-4 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2, EN 61000-6-4	EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No
• Bureau Veritas (BV)	No	No	No
• Det Norske Veritas (DNV)	No	No	No
• Germanische Lloyd (GL)	No	No	No
• Lloyds Register of Shipping (LRS)	No	No	No
• Nippon Kaiji Kyokai (NK)	No	No	No
• Polski Rejestr Statkow (PRS)	No	No	No

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Technical specifications (continued)

Article No.	6GK5202-2BB00-2BA3	6GK5204-0BA00-2BA3
Product-type designation	**SCALANCE X202-2IRT**	**SCALANCE X204IRT**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Interfaces		
Number of electrical/optical connections		
• for network components or terminal equipment maximum	4	4
Number of electrical connections		
• for network components and terminal equipment	2	4
• for signaling contact	1	1
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide at 100 Mbit/s	2	-
Design of optical interface for optical waveguide at 100 Mbit/s	BFOC sockets (multimode up to 5 km)	-
Connectable optical power relative to 1 mW		
• of the transmitter output	-19 ... -14 dB	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-34 dB	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	-
Range at the optical interface depending on the optical fiber used	0 … 0.05 km	-
Design of the removable storage C-PLUG	Yes	Yes
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Supply voltage, current consumption, power loss		
Type of supply voltage	DC	DC
Supply voltage external	24 V	24 V
• minimum	18 V	18 V
• maximum	32 V	32 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	0.6 A / 60 V
Consumed current maximum	0.3 A	0.2 A
Active power loss at 24 V for DC	6 W	4.8 W

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Technical specifications (continued)

Article No.	6GK5202-2BB00-2BA3	6GK5204-0BA00-2BA3
Product-type designation	**SCALANCE X202-2IRT**	**SCALANCE X204IRT**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +60 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
• Comment	-	-
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Protection class IP	IP30	IP30
Design, dimensions and weight		
Design	compact	compact
Width	60 mm	60 mm
Height	125 mm	125 mm
Depth	124 mm	124 mm
Net weight	0.78 kg	0.78 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
• S7-300 rail mounting	Yes	Yes
Product properties, functions, components general		
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• SMTP server	-	-
• Port mirroring	No	No
• for IRT PROFINET IO switch	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes
• switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• FTP	Yes	Yes
• BOOTP	No	No
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5202-2BB00-2BA3	6GK5204-0BA00-2BA3
Product-type designation	**SCALANCE X202-2IRT**	**SCALANCE X204IRT**
Product functions Diagnosis		
Product function		
• Port diagnostics	Yes	Yes
• Statistics packet size	Yes	Yes
• Statistics packet type	Yes	Yes
• Error statistics	Yes	Yes
Product functions DHCP		
Product function DHCP client	Yes	Yes
Product functions Redundancy		
Product function		
• Ring redundancy	Yes	Yes
• Redundancy manager	Yes	Yes
• Standby redundancy	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No
• Passive listening	Yes	Yes
Protocol is supported PRP	Yes	Yes
Product functions Security		
Protocol is supported SSH	Yes	Yes
Product functions Time		
Product function SICLOCK support	Yes	Yes
Protocol is supported		
• NTP	No	No
• SNTP	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 (2) G Ex nA [op is] IIC T4, KEMA 07 ATEX 0145 X	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-4:2001	EN 61000-6-4:2001
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
• Railway application in accordance with EN 50155	No	No
• Railway application in accordance with EN 50124-1	No	No
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	No	Yes
• Det Norske Veritas (DNV)	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes
• Polski Rejestr Statkow (PRS)	No	No

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Technical specifications (continued)

Article No.	6GK5204-0JA00-2BA6	6GK5202-2JR00-2BA6	6GK5201-3JR00-2BA6
Product-type designation	**SCALANCE X204IRT PRO**	**SCALANCE X202-2P IRT PRO**	**SCALANCE X201-3P IRT PRO**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Interfaces			
Number of electrical/optical connections			
• for network components or terminal equipment maximum	4	4	4
Number of electrical connections			
• for network components and terminal equipment	4	2	1
• for signaling contact	1	1	1
• for power supply	1	1	1
Design of electrical/optical connections for network components or terminal equipment	-	SC RJ push-pull	SC RJ push-pull
Design of electrical connection			
• for network components and terminal equipment	RJ45 push-pull plug PRO	RJ45 push-pull plug PRO	RJ45 push-pull plug PRO
• for signaling contact	5-pin M12 socket	5-pin M12 socket	5-pin M12 socket
• for power supply	5-pin push-pull plug PRO socket	5-pin push-pull plug PRO socket	5-pin push-pull plug PRO socket
Number of optical interfaces for optical waveguide at 100 Mbit/s	-	2	3
Design of optical interface for optical waveguide at 100 Mbit/s	-	SC-RJ/POF push-pull plug PRO port	SC-RJ/POF push-pull plug PRO port
Connectable optical power relative to 1 mW			
• of the transmitter output	- -	-8 … -2 dB	-8 … -2 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-	-25 dB	-25 dB
Attenuation of fiber-optic cable transmission link minimum necessary	-	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	- -	0 … 0.05 km	0 … 0.05 km
Design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	0.6 A / 60 V	1.1 A / 33 V	1.1 A / 33 V
Consumed current maximum	0.2 A	0.3 A	0.33 A
Active power loss at 24 V for DC	4.8 W	7.2 W	7.92 W

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Technical specifications (continued)

Article No.	6GK5204-0JA00-2BA6	6GK5202-2JR00-2BA6	6GK5201-3JR00-2BA6
Product-type designation	**SCALANCE X204IRT PRO**	**SCALANCE X202-2P IRT PRO**	**SCALANCE X201-3P IRT PRO**
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +70 °C	-25 … +60 °C	-25 … +60 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• Comment	-	-	-
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP67	IP67	IP67
Design, dimensions and weight			
Design	compact	compact	compact
Width	90 mm	90 mm	90 mm
Height	125 mm	125 mm	125 mm
Depth	124 mm	124 mm	124 mm
Net weight	1 kg	1 kg	1 kg
Mounting type			
• 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			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based Management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• Port mirroring	No	No	No
• for IRT PROFINET IO switch	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
Protocol is supported			
• Telnet	Yes	Yes	Yes
• HTTP	Yes	Yes	Yes
• HTTPS	Yes	Yes	Yes
• TFTP	Yes	Yes	Yes
• FTP	Yes	Yes	Yes
• BOOTP	No	No	No
• SNMP v1	Yes	Yes	Yes
• SNMP v2	Yes	Yes	Yes
• SNMP v3	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
Identification & maintenance function			
• I&M0 - device specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5204-0JA00-2BA6	6GK5202-2JR00-2BA6	6GK5201-3JR00-2BA6
Product-type designation	**SCALANCE X204IRT PRO**	**SCALANCE X202-2P IRT PRO**	**SCALANCE X201-3P IRT PRO**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	Yes	Yes	Yes
• Error Statistics	Yes	Yes	Yes
Product functions DHCP			
Product function DHCP client	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• Parallel Redundancy Protocol (PRP)	No	No	No
• Passive listening	Yes	Yes	Yes
Protocol is supported PRP	Yes	Yes	Yes
Product functions Security			
Protocol is supported SSH	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, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 12.12.01, 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 12.12.01, 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 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-4:2001	EN 61000-6-4:2001	EN 61000-6-4:2001
• CE-mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	No	No	No
• Bureau Veritas (BV)	Yes	No	No
• Det Norske Veritas (DNV)	Yes	No	No
• Germanische Lloyd (GL)	Yes	No	No
• Lloyds Register of Shipping (LRS)	Yes	No	No
• Nippon Kaiji Kyokai (NK)	Yes	No	No
• Polski Rejestr Statkow (PRS)	No	No	No

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Ordering data	Article No.
Industrial Ethernet Switches SCALANCE X-200IRT	
Managed Industrial Ethernet switches; 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 X204IRT;** 4 x 10/100 Mbit/s RJ45 ports	**6GK5204-0BA00-2BA3**
• **SCALANCE X204IRT PRO;** 4 x 10/100 Mbit/s RJ45 push-pull ports	**6GK5204-0JA00-2BA6**
• **SCALANCE X202-2IRT;** 2 x 10/100 Mbit/s RJ45 ports, 2 x 100 Mbit/s • Multimode BFOC ports	**6GK5202-2BB00-2BA3**
• **SCALANCE X202-2P IRT;** 2 x 10/100 Mbit/s RJ45 ports, 2 x 100 Mbit/s POF/PCF SC RJ ports	**6GK5202-2BH00-2BA3**
• **SCALANCE X202-2P IRT PRO;** 2 x 10/100 Mbit/s • RJ45 push-pull ports, 2 x 100 Mbit/s POF/PCF SC RJ push-pull ports	**6GK5202-2JR00-2BA6**
• **SCALANCE X201-3P IRT;** 1 x 10/100 Mbit/s RJ45 port, 3 x 100 Mbit/s POF/PCF SC RJ ports	**6GK5201-3BH00-2BA3**
• **SCALANCE X201-3P IRT;** 1 x 10/100 Mbit/s RJ45 port, 3 x 100 Mbit/s POF/PCF SC RJ ports	**6GK5201-3JR00-2BA6**
• **SCALANCE X200-4P IRT;** 4 x 100 Mbit/s POF/PCF SC RJ	**6GK5200-4AH00-2BA3**
Accessories	
Industrial Ethernet media converter SCALANCE X-100 Industrial Ethernet media converters, LED diagnostics, fault signaling contact with SET key, redundant power supply, PROFINET-compatible securing collars	
• **SCALANCE X101-1POF;** 1 X 10/100 Mbit/s RJ45 port, 1 X 100 Mbit/s POF SC RJ port	**6GK5101-1BH00-2AA3**
IE FC TP Standard Cable GP 2 x 2 (Type A) 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. length 1 000 m, minimum order 20 m	**6XV1840-2AH10**
FO Standard Cable GP 50/125/1400 [1) 2)] Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m;	**6XV1873-2A**

Ordering data	Article No.
POF Standard Cable GP 980/1000 POF standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	**6XV1874-2A**
PCF Standard Cable GP 200/230 Standard cable, segmentable, sold by the meter; max. length 2 000 m; minimum order 20 m;	**6XV1861-2A**
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug PRO FastConnect RJ45 plug-in connector; plastic housing, insulation displacement technology, for SCALANCE X-200IRT PRO switches and SIMATIC ET 200pro; 1 connector (IP65/67) suitable for on-site assembly	**6GK1901-1BB20-6AA0**
SC RJ POF Plug 20 plugs for on-site assembly	**6GK1900-0MB00-0AC0**
SC RJ POF Plug PRO 1 plug (IP65/67) for on-site assembly	**6GK1900-0MB00-6AA0**
SC RJ PCF Plug 10 plugs for on-site assembly	**6GK1900-0NB00-0AC0**
SC RJ PCF Plug PRO 1 plug (IP65/67) for on-site assembly	**6GK1900-0NB00-6AA0**
Termination Kit SC RJ POF Plug Assembly case for on-site installation of SC RJ POF connectors; consisting of stripping tool, Kevlar cutters, SC RJ grinding plate, grinding paper, grinding base and microscope	**6GK1900-0ML00-0AA0**
Termination Kit SC RJ PCF Plug Assembly case for local assembly of SC RJ PCF connectors, comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-0NL00-0AA0**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

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Ordering data	Article No.
Accessories *(continued)*	
Power Plug PRO 1 plug (IP65/67) for on-site assembly (5-core)	**6GK1907-0AB10-6AA0**
SIMATIC RF600 connecting cable Preassembled connecting cable (10 m) with RJ45 Plug PRO and RJ45 Plug	**6GT2891-1HN10**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

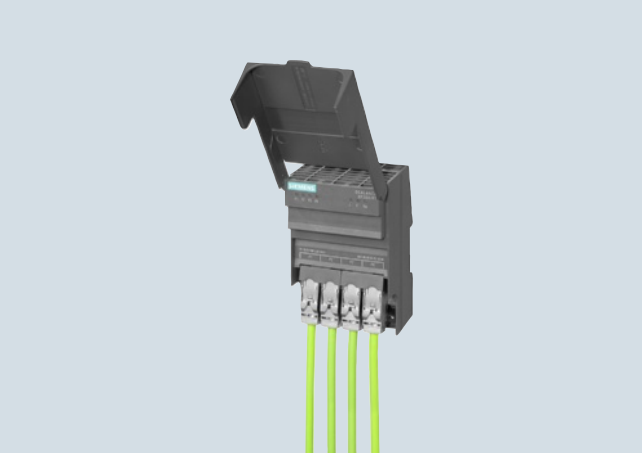
- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The SCALANCE XF204IRT Industrial Ethernet switch is suitable for the construction of deterministic and isochronous real-time Industrial Ethernet networks, at data transfer rates of 10/100 Mbit/s, 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
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product versions

SCALANCE XF204IRT

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

Benefits

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- 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 in ring topologies, without reconfiguration times, when using the PROFINET-compliant MRPD process (**M**edia **R**edundancy for **P**lanned **D**uplication according to IEC 61158)
- Protection of investment through integration into existing network management systems, such as SINEMA Server, 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.

Features:

- Device diagnostics with LEDs (power, link status, data communication)
- Remote diagnostics is possible through signaling contact (signal mask can be set locally using buttons), PROFINET, SNMP, and web browser
- Automatic e-mail send 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
- 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 isochronous and deterministic response.
  For example, with a cycle time of 1 ms, axes can be controlled in isochronous mode while 50% of the bandwidth is available at the same time for IT communication without restriction.

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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 ET200S.

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

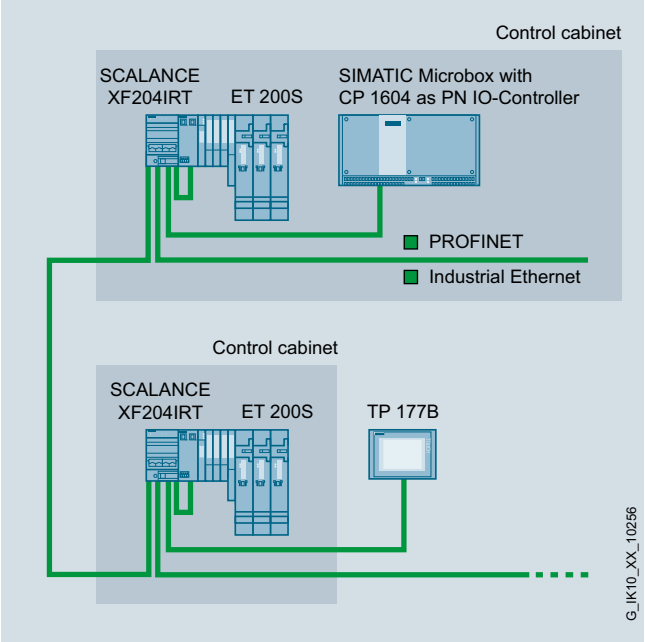
- Configuration of electrical Industrial Ethernet line, star and ring topologies
- Integral redundancy manager for setting up ring topologies
- Integral standby function for redundant coupling of two rings
- Extremely short cycle times with highly accurate clock-pulse rates thanks to integrated real-time functions
- Bumpless ring redundancy by sending message frames twice in the ring, by means of PROFINET-compliant MRPD procedure (**M**edia **R**edundancy for **P**lanned **D**uplication according to IEC 61158)
- 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 IP30 degree of protection 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, e.g. SINEMA Server, 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

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Technical specifications

Article No.	6GK5204-0BA00-2BF2
Product-type designation	**SCALANCE XF204IRT**
Transmission rate	
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Interfaces	
Number of electrical/optical connections	
• for network components or terminal equipment maximum	4
Number of electrical connections	
• for network components and terminal equipment	4
• for signaling contact	1
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components and terminal equipment	RJ45 port
• for signaling contact	2-pole terminal block
• for power supply	4-pole terminal block
Design of the removable storage C-PLUG	Yes
Signal-Inputs/outputs	
Operating voltage of signaling contacts at DC rated value	24 V
Operating current of signaling contacts at DC maximum	0.1 A
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage external	24 V
• minimum	18 V
• maximum	32 V
Product component fusing at power supply input	Yes
Type of fusing at input for supply voltage	0,6 A / 60 V
Consumed current maximum	0.2 A
Active power loss at 24 V for DC	4.8 W

Article No.	6GK5204-0BA00-2BF2
Product-type designation	**SCALANCE XF204IRT**
Permitted ambient conditions	
Ambient temperature	
• during operating	-40 … +60 °C
• during storage	-40 … +60 °C
• during transport	-40 … +60 °C
• Comment	If the IE switch XF 200 is installed horizontally a maximum ambient temperature of +40 °C is permitted
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Design	Flat
Width	75 mm
Height	125 mm
Depth	73 mm
Net weight	0.25 kg
Mounting type	
• 35 mm DIN rail mounting	Yes
• wall mounting	No
• S7-300 rail mounting	No
Product properties, functions, components general	
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)

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Technical specifications (continued)

Article No.	6GK5204-0BA00-2BF2
Product-type designation	**SCALANCE XF204IRT**
Product functions management, configuration	
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• Port mirroring	No
• for IRT PROFINET IO switch	Yes
• PROFINET IO diagnosis	Yes
• switch-managed	Yes
Protocol is supported	
• Telnet	Yes
• HTTP	Yes
• HTTPS	Yes
• TFTP	Yes
• FTP	Yes
• BOOTP	No
• SNMP v1	Yes
• SNMP v2	Yes
• SNMP v3	Yes
• DCP	Yes
• LLDP	Yes
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Diagnosis	
Product function	
• Port diagnostics	Yes
• Statistics packet size	Yes
• Statistics packet type	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
• High Speed Redundancy Protocol (HRP)	Yes
• Media Redundancy Protocol (MRP)	Yes
• Parallel Redundancy Protocol (PRP)	No
• Passive listening	Yes
Protocol is supported PRP	Yes

Article No.	6GK5204-0BA00-2BF2
Product-type designation	**SCALANCE XF204IRT**
Product functions Security	
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 from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, CL.1, Zone 2, GP. IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area of CSA and UL	ANSI / ISA 12.12.01, 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 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-4:2001
Verification of suitability	EN 61000-6-4:2001
• CE mark	Yes
• C-Tick	Yes
• KC approval	No
• Railway application in accordance with EN 50155	No
• Railway application in accordance with EN 50124-1	No
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	No
• Bureau Veritas (BV)	No
• Det Norske Veritas (DNV)	No
• Germanische Lloyd (GL)	No
• Lloyds Register of Shipping (LRS)	No
• Nippon Kaiji Kyokai (NK)	No
• Polski Rejestr Statkow (PRS)	No

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Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE XF-200IRT	
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;	**6GK5204-0BA00-2BF2**
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A) 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 1 000 m, minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

	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	10 Gigabit Ethernet	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)	PLUG slot	
SCALANCE X-300	X302-7EEC							•			•		•	•	•		•	•	•	
	X304-2FE							•					•	•	•		•	•	•	
	X306-1LD FE							•					•	•	•		•	•	•	
	X307-2EEC							•			•		•	•	•		•	•	•	
	X307-3							•			•		•	•	•		•	•	•	
	X307-3LD							•			•		•	•	•		•	•	•	
	X308-2							•			•		•	•	•		•	•	•	
	X308-2LD							•			•		•	•	•		•	•	•	
	X308-2LH							•			•		•	•	•		•	•	•	
	X308-2LH+							•			•		•	•	•		•	•	•	
	X308-2M							•	•		•		•	•	•		•	•	•	
	X308-2M PoE							•	•		•	•	•	•	•		•	•	•	
	X308-2M TS							•	•		•		•	•	•		•	•	•	
	X310							•			•		•	•	•		•	•	•	
	X310FE							•					•	•	•		•	•	•	
	X320-1FE							•					•	•	•		•	•	•	
	X320-3LD FE							•					•	•	•		•	•	•	
	XR324-12M						•		•		•		•	•	•		•	•	•	
	XR324-4M PoE						•		•		•	•	•	•	•		•	•	•	
	XR324-4M EEC						•		•		•		•	•	•		•	•	•	
	XR324-4M PoE TS						•		•		•	•	•	•	•		•	•	•	
	XR324-12M TS						•		•		•		•	•	•		•	•	•	

• applies

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Function overview SCALANCE X-300 managed: Hardware

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Overview (continued)

	Type of device	Software																											
		Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	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)	Access Control List (IP)	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-300	X302-7EEC		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X304-2FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X306-1LD FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X307-2EEC		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X307-3		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X307-3LD		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2LD		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2LH		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2LH+		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2M		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2M PoE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X308-2M TS		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X310		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X310FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X320-1FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	X320-3LD FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	XR324-12M		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	XR324-4M PoE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	XR324-4M EEC		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	XR324-4M PoE TS		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
	XR324-12M TS		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					

• applies

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Function overview SCALANCE X-300 managed: Software

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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 data transfer rates of 10/100/1 000 Mbit/s.

- SCALANCE X-300 is available
  - with integrated electrical and optical Ethernet ports
  - as a partially modular version with four integrated electrical Ethernet ports and two modular slots for 2-port media modules
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet (SCALANCE X-300, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards: Establishment of virtual networks (VLANs)
- Redundant integration into higher-level networks thanks to support for standardized redundancy procedures (Rapid Spanning Tree Protocol)
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Benefits

get Designed for Industry

- 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
- Simple adaptation to different network topologies, and reduction in stock keeping costs through flexibility of the partially modular versions

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Application

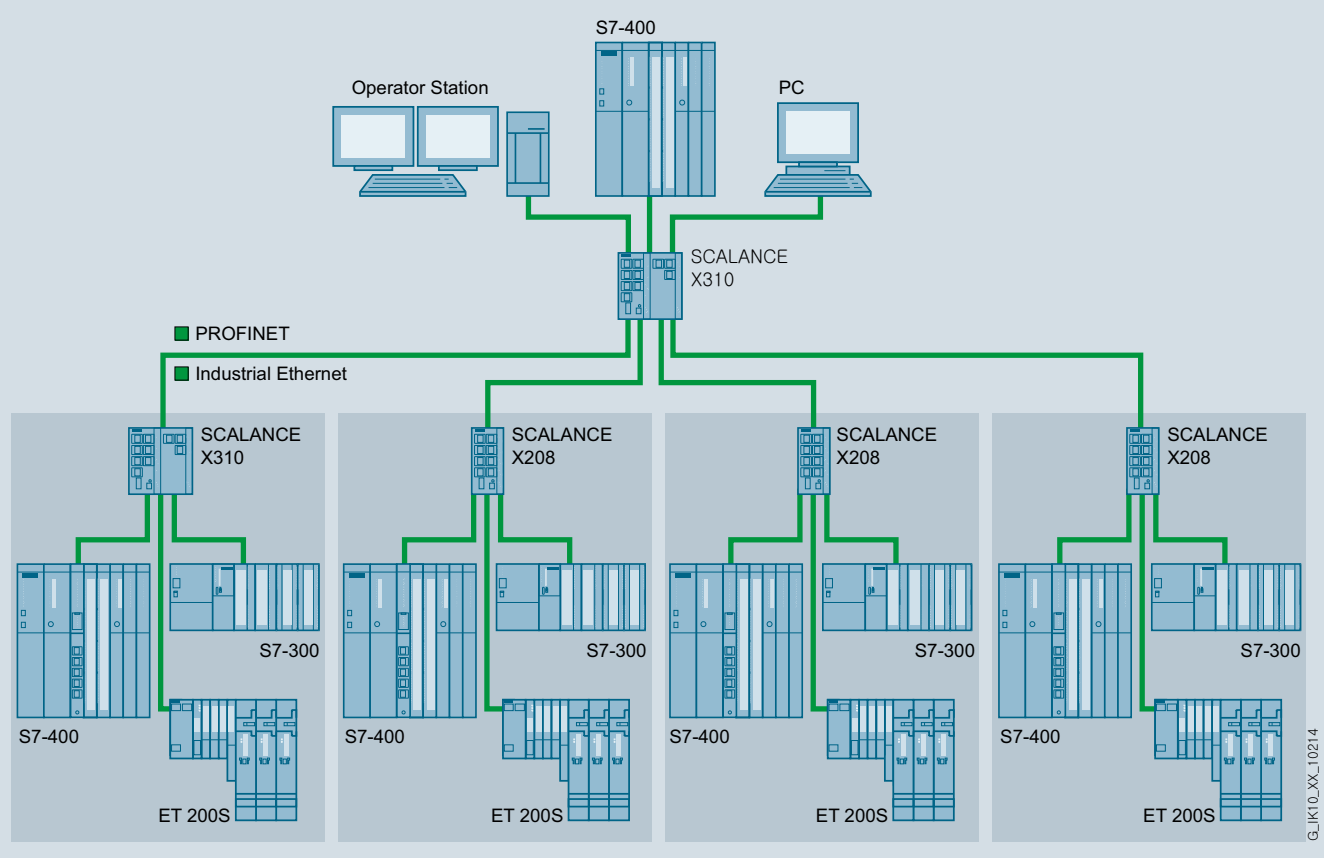
SCALANCE X-300 products enable the establishment of switched networks both at the field level and at the control level where high data transfer rates are required in addition to high network availability and extensive diagnostics facilities.
The switches are designed in degree of protection IP30 for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

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

The X308-2M TS is suitable for use in railway applications due to its specification according to EN 50155.

Product versions

Switches with Fast Ethernet and Gigabit Ethernet ports



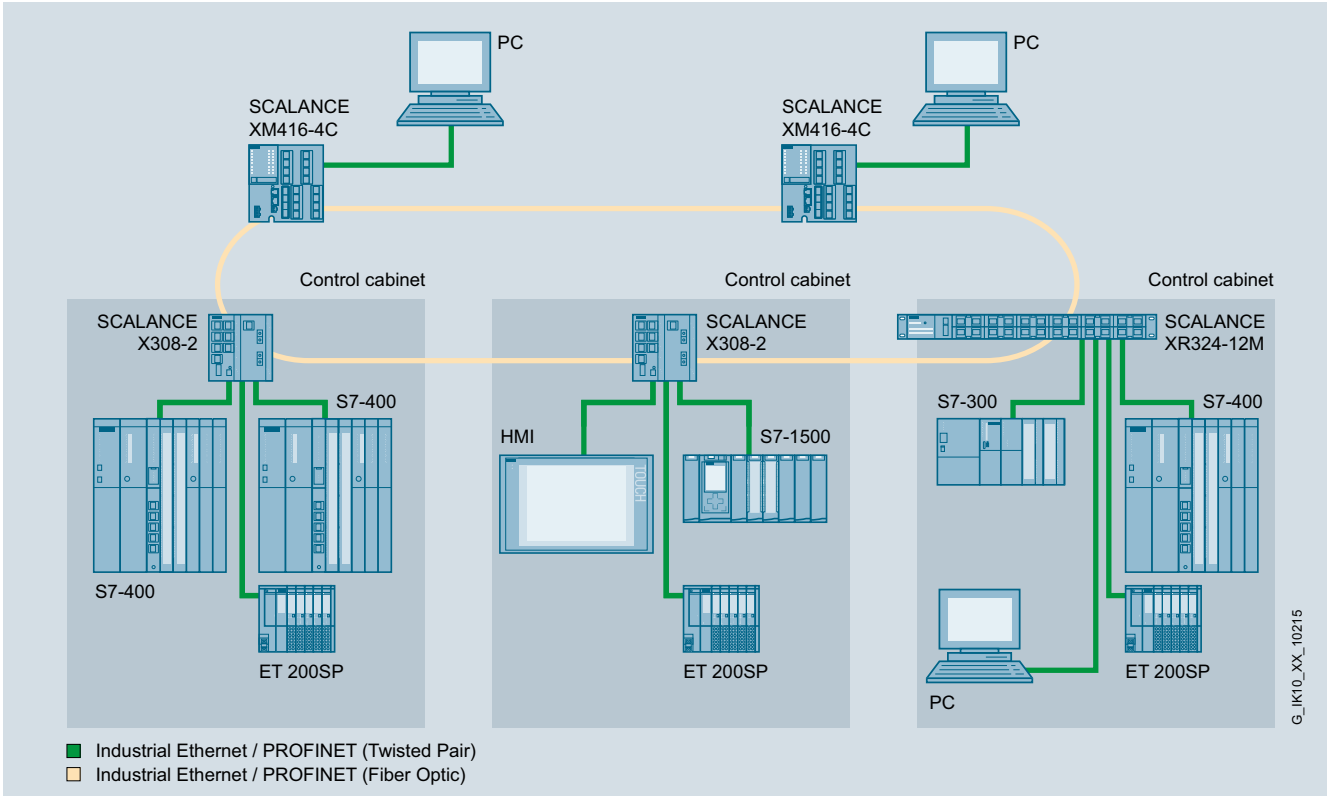
Electrical star topology with SCALANCE X310

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;
    3 x 10/100/1 000 Mbit/s RJ45 ports, electrical
    7 x 10/100 Mbit/s RJ45 ports, electrical
  - SCALANCE X308-2;
    1 x 10/100/1 000 Mbit/s RJ45 ports, electrical
    7 x 10/100 Mbit/s RJ45 ports, electrical
    2 x 1 000 Mbit/s SC ports, optical, for glass FOC (multimode) up to 750 m
  - SCALANCE X307-3;
    7 x 10/100 Mbit/s RJ45 ports, electrical
    3 x 1 000 Mbit/s SC ports, optical, for glass FOC (multimode) up to 750 m
  - SCALANCE X308-2LD;
    1 x 10/100/1 000 Mbit/s RJ45 ports, electrical
    7 x 10/100 Mbit/s RJ45 ports, electrical
    2 x 1 000 Mbit/s SC ports, optical, for glass FOC (singlemode) up to 10 km
  - SCALANCE X307-3LD;
    7 x 10/100 Mbit/s RJ45 ports, electrical
    3 x 1 000 Mbit/s SC ports, optical, for glass FOC (singlemode) up to 10 km
  - SCALANCE X308-2LH;
    1 x 10/100/1 000 Mbit/s RJ45 ports, electrical
    7 x 10/100 Mbit/s RJ45 ports, electrical
    2 x 1 000 Mbit/s SC ports, optical, for glass FOC (singlemode) up to 40 km
  - SCALANCE X308-2LH+;
    1 x 10/100/1 000 Mbit/s RJ45 ports, electrical
    7 x 10/100 Mbit/s RJ45 ports, electrical
    2 x 1 000 Mbit/s SC ports, optical, for glass FOC (singlemode) up to 70 km
- The RJ45 ports are designed to be industry-standard with additional holding collars for connection of the IE FC RJ45 Plug 180

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Application (continued)



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

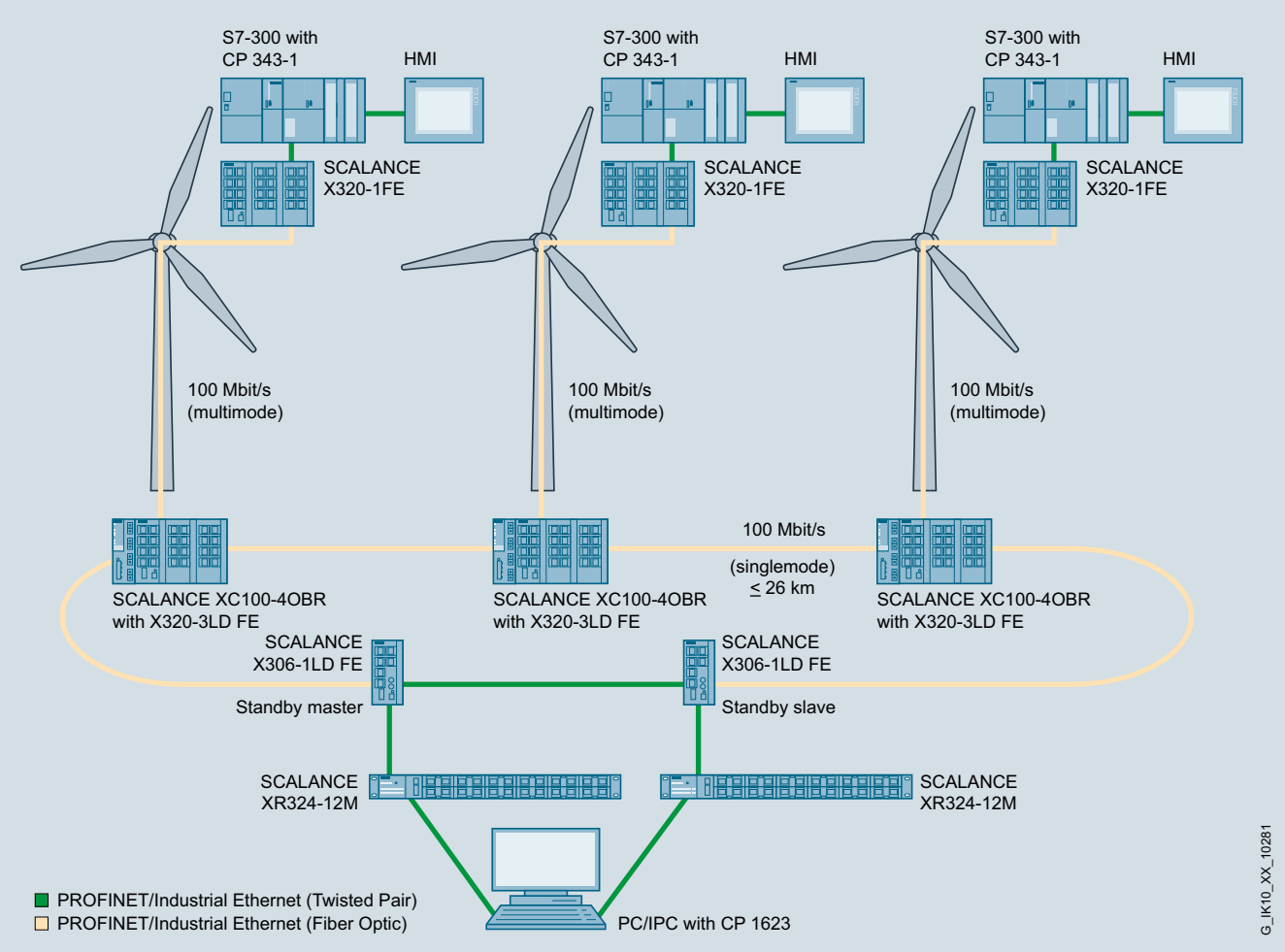
Fast Ethernet switches

SCALANCE X310FE
SCALANCE X304-2FE
SCALANCE X306-1LD FE
SCALANCE X320-1FE
SCALANCE X320-3 LD FE

- For configuring electrical and/or optical Industrial Ethernet line, star or ring structures
  - SCALANCE X310FE;
    10 x 10/100 Mbit/s RJ45 ports, electrical
  - SCALANCE X304-2FE;
    4 x 10/100 Mbit/s RJ45 ports, electrical
    2 x 100 Mbit/s SC ports, optical, for glass FOC (multimode) up to 5 km
  - SCALANCE X306-1LD FE;
    6 x 10/100 Mbit/s RJ45 ports, electrical
    1 x 100 Mbit/s SC port, optical, for glass FOC (singlemode) up to 26 km
  - SCALANCE X320-1FE;
    20 x 10/100 Mbit/s RJ45 ports, electrical
    1 x 100 Mbit/s SC port, optical, for glass FOC (multimode) up to 5 km
  - SCALANCE X320-3LD FE;
    20 x 10/100 Mbit/s RJ45 ports, electrical
    1 x 100 Mbit/s SC port, optical, for glass FOC (multimode) up to 5 km
    2 x 100 Mbit/s SC ports, optical, for glass FOC (singlemode), up to 26 km
- The RJ45 ports are designed to be industry-standard with additional holding collars for connection of the IE FC RJ45 Plug 180

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Application (continued)



Redundant ring topology with SCALANCE X for wind farms

Full Gigabit switches

SCALANCE X308-2M
SCALANCE X308-2M TS

- 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 2-port media modules (see "Media modules for SCALANCE X-300")
- Star hubs in the plant bus (redundant connection possible)
- SCALANCE X308-2M;
  4 x 10/100/1 000 Mbit/s RJ45 ports, electrical
  2 x free module slots for 4 x 10/100/1 000 Mbit/s media modules (electrical or optical)
- SCALANCE X308-2M TS (TS = Transportation Systems);
  4 x 10/100/1 000 Mbit/s RJ45 ports, electrical
  2 x free module slots for 4 x 10/100/1 000 Mbit/s media modules (electrical or optical)
  is suitable for use in railway applications due to its specification according to EN 50155

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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 various 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

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 1 000 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 1 000 Mbit/s via TP Cord and IE FC RJ45 Modular Outlet up to 100 m
  - IE FC cables 4x2 for 1 000 Mbit/s via IE FC RJ45 Plug 4x2 up to 100 m
- 1000BaseSX, SC connections;
  SC ports for direct connection to the Industrial Ethernet glass fiber-optic cable up to 750 m (multimode)
- ***1000BaseSX, SC connections;***
  SC ports for direct connection to the Industrial Ethernet glass fiber-optic cable up to 10 km (singlemode)
- ***1000BaseLX, SC connections;***
  SC ports for direct connection to the Industrial Ethernet glass fiber-optic cable up to 40 km (singlemode)
- ***1000BaseLX, SC connections;***
  SC ports for direct connection to the Industrial Ethernet glass fiber-optic cable up to 70 km (singlemode)

Function

- Increase of the network performance;
  by filtering the data traffic on the basis of the Ethernet (MAC) address of the data terminals, data traffic remains local; only data intended for users of another subnetwork is forwarded by the switch.
- Simple network configuration and network expansion;
  the switch saves the data received at the ports and forwards it automatically to the destination address. Collision detection (CSMA/CD method) does not restrict the expansion of the network beyond the port.
- Limitation of the error propagation to the affected subnetwork;
  the SCALANCE X-300 switches only forward 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 1 000 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 Gigabit Ethernet ports for connecting the switches to each other or with other Gigabit-Ethernet-enabled components (e.g. SCALANCE X-400, X-500)
- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy.
- High-speed standby redundancy;
  several network segments such as rings can be interconnected redundantly with SCALANCE X-300 by means of the integrated standby function. Two X-300 switches are configured in a ring as a master and slave and are connected via two links to the other ring. The redundant connection can be made at 1 000 Mbit/s.
- Redundant interfacing to higher-level 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 network with reduced requirements for the reconfiguration time (in the order of seconds). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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 with IEEE 802.1x. Authentication is by means of a RADIUS server that must be configured appropriately and must be accessible 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.

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Function (continued)

- 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 compliant with RFC 3164 is used in the IP network for transmitting short, unencrypted text messages via UDP. This requires the use of a Syslog server that must be configured appropriately and must be accessible 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 time transmitter, SNTP or NTP server or via IEEE1588, thereby simplifying the assignment of diagnostic messages of several devices.
- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

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. Electrical and optical versions can be installed together 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, X-400 or X-500 switches can be cascaded in line can be connected into a ring
- Several rings can be redundantly linked through the standby function
- At the same time, SCALANCE X-300 supports redundant connection of the ring structure to the corporate network with Rapid Spanning Tree.
- Star topology with SCALANCE X-300 switches:
  The SCALANCE X-300 switch represents a star point which can interconnect several nodes or subnets 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
  - 5 km at 100 Mbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 10 to 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 diagnostics

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 (10/100/1 000 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 system, e.g. SINEMA Server
  - 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.

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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
- 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 of new firmware versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a 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

Article No.	**6GK5304-2BD00-2AA3**	**6GK5306-1BF00-2AA3**	**6GK5307-3BL00-2AA3**	**6GK5307-3BM00-2AA3**
Product-type designation	**SCALANCE X304-2FE**	**SCALANCE X306-1LD FE**	**SCALANCE X307-3**	**SCALANCE X307-3LD**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	-	-	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	6	7	10	10
Number of electrical connections				
• for network components and terminal equipment	4	6	7	7
• for operator console	-	-	-	-
• for signaling contact	1	1	1	1
• for media module	-	-	-	-
• for power supply	1	1	1	1
• for redundant power supply	2	2	2	2
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for operator console	-	-	-	-
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	2	1	-	-
• at 1 000 Mbit/s	-	-	3	3

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Technical specifications (continued)

Article No.	6GK5304-2BD00-2AA3	6GK5306-1BF00-2AA3	6GK5307-3BL00-2AA3	6GK5307-3BM00-2AA3
Product-type designation	**SCALANCE X304-2FE**	**SCALANCE X306-1LD FE**	**SCALANCE X307-3**	**SCALANCE X307-3LD**
Design of optical interface for optical waveguide				
• at 100 Mbit/s	SC port (multimode up to 5 km)	SC port (singlemode up to 26 km)	-	-
• at 1 000 Mbit/s	-	-	SC port (multimode up to 0.75 km)	SC port (singlemode up to 10 km)
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-15 … -8 dB	-9.5 … -4 dB	-9.5 … -3 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB	-17 dB	-21 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	0 … 0.75 km	0 … 10 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0,1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	No	No
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V
Consumed current maximum	0.26 A	0.2 A	0.4 A	0.4 A
Active power loss				
• at 24 V for DC	6.2 W	4.8 W	9.6 W	9.6 W
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +60 °C	-40 … +60 °C	-10 … +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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	60 mm	60 mm	120 mm	120 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	123 mm	123 mm	123 mm	123 mm
Net weight	0.7 kg	0.7 kg	1.4 kg	1.4 kg
Mounting type				
• 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
Mounting type	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.

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Technical specifications (continued)

Article No.	6GK5304-2BD00-2AA3	6GK5306-1BF00-2AA3	6GK5307-3BL00-2AA3	6GK5307-3BM00-2AA3
Product-type designation	**SCALANCE X304-2FE**	**SCALANCE X306-1LD FE**	**SCALANCE X307-3**	**SCALANCE X307-3LD**
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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

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Technical specifications (continued)

Article No.	6GK5304-2BD00-2AA3	6GK5306-1BF00-2AA3	6GK5307-3BL00-2AA3	6GK5307-3BM00-2AA3
Product-type designation	**SCALANCE X304-2FE**	**SCALANCE X306-1LD FE**	**SCALANCE X307-3**	**SCALANCE X307-3LD**
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• MSTP	No	No	No	No
• IEEE 1588 profile default	No	No	No	No
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	Yes	Yes
• Bureau Veritas (BV)	-	-	Yes	Yes
• Det Norske Veritas (DNV)	-	-	Yes	Yes
• Germanische Lloyd (GL)	-	-	Yes	Yes
• Lloyds Register of Shipping (LRS)	-	-	Yes	Yes
• Nippon Kaiji Kyokai (NK)	-	-	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5308-2FL00-2AA3	6GK5308-2FM00-2AA3	6GK5308-2FN00-2AA3	6GK5308-2FP00-2AA3
Product-type designation	**SCALANCE X308-2**	**SCALANCE X308-2LD**	**SCALANCE X308-2LH**	**SCALANCE X308-2LH+**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	10	10	10	10
Number of electrical connections				
• for network components and terminal equipment	8	8	8	8
• for signaling contact	1	1	1	1
• for power supply	1	1	1	1
• for redundant power supply	2	2	2	2
Design of electrical connection				
• for network components and 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 signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 1 000 Mbit/s	2	2	2	2
Design of optical interface for optical waveguide				
• at 1 000 Mbit/s	SC port (multimode up to 0.75 km)	SC port (singlemode up to 10 km)	SC port (singlemode up to 40 km)	SC port (singlemode up to 70 km)
Connectable optical power relative to 1 mW				
• of the transmitter output	-9.5 … -4 dB	-9.5 … -3 dB	-6 … +0 dB	0 … 5 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-23 dB	-23 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB	8 dB
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 10 km	8 … 40 km	30 … 70 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	No	No
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V
Consumed current maximum	0.4 A	0.4 A	0.4 A	0.4 A
Active power loss				
• at 24 V for DC	9.6 W	9.6 W	9.6 W	9.6 W

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Technical specifications (continued)

Article No.	6GK5308-2FL00-2AA3	6GK5308-2FM00-2AA3	6GK5308-2FN00-2AA3	6GK5308-2FP00-2AA3
Product-type designation	**SCALANCE X308-2**	**SCALANCE X308-2LD**	**SCALANCE X308-2LH**	**SCALANCE X308-2LH+**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	120 mm	120 mm	120 mm	120 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	123 mm	123 mm	123 mm	123 mm
Net weight	1.4 kg	1.4 kg	1.4 kg	1.4 kg
Mounting type				
• 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
Mounting type	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	-	-	-	-
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5308-2FL00-2AA3	6GK5308-2FM00-2AA3	6GK5308-2FN00-2AA3	6GK5308-2FP00-2AA3
Product-type designation	**SCALANCE X308-2**	**SCALANCE X308-2LD**	**SCALANCE X308-2LH**	**SCALANCE X308-2LH+**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	No	No	No	No

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Technical specifications (continued)

Article No.	6GK5308-2FL00-2AA3	6GK5308-2FM00-2AA3	6GK5308-2FN00-2AA3	6GK5308-2FP00-2AA3
Product-type designation	**SCALANCE X308-2**	**SCALANCE X308-2LD**	**SCALANCE X308-2LH**	**SCALANCE X308-2LH+**
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
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
• Germanische 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)

Article No.	6GK5310-0BA00-2AA3	6GK5310-0FA00-2AA3	6GK5320-1BD00-2AA3	6GK5320-3BF00-2AA3
Product type designation	**SCALANCE X310FE**	**SCALANCE X310**	**SCALANCE X320-1FE**	**SCALANCE X320-3LD FE**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	-	1 000 Mbit/s	-	-
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	10	10	21	23
Number of electrical connections				
• for network components and terminal equipment	10	10	20	20
• for signaling contact	1	1	1	1
• for media module	-	-	-	-
• for power supply	1	1	1	1
• for redundant power supply	2	2	2	2
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port (3 x 1GE, 7 x FE)	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	-	-	1	3
Design of optical interface for optical waveguide				
• at 100 Mbit/s	-	-	SC port (multimode up to 5 km)	SC port (1 x multimode up to 5 km, 2 x singlemode up to 26 km)
Connectable optical power relative to 1 mW				
• of the transmitter output	-	-	-19 … -14 dB	-15 … -8 dB
• of the receiver input maximum	-	-	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-	-	-32 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	-	-	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	-	-	0 … 5 km	0 … 26 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	No	No
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V	F 3 A / 32 V
Consumed current maximum	0.4 A	0.4 A	0.4 A	0.5 A
Active power loss				
• at 24 V for DC	9.6 W	9.6 W	9.6 W	12 W

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Technical specifications (continued)

Article No.	6GK5310-0BA00-2AA3	6GK5310-0FA00-2AA3	6GK5320-1BD00-2AA3	6GK5320-3BF00-2AA3
Product type designation	**SCALANCE X310FE**	**SCALANCE X310**	**SCALANCE X320-1FE**	**SCALANCE X320-3LD FE**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	Compact	Compact	Compact	Compact
Width	120 mm	120 mm	180 mm	180 mm
Height	125 mm	125 mm	125 mm	125 mm
Depth	123 mm	123 mm	123 mm	123 mm
Net weight	1.4 kg	1.4 kg	1.65 kg	1.65 kg
Mounting type				
• 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
Mounting type	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5310-0BA00-2AA3	6GK5310-0FA00-2AA3	6GK5320-1BD00-2AA3	6GK5320-3BF00-2AA3
Product type designation	**SCALANCE X310FE**	**SCALANCE X310**	**SCALANCE X320-1FE**	**SCALANCE X320-3LD FE**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• 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
• MSTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	No	No	No	No

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Technical specifications (continued)

Article No.	6GK5310-0BA00-2AA3	6GK5310-0FA00-2AA3	6GK5320-1BD00-2AA3	6GK5320-3BF00-2AA3
Product type designation	**SCALANCE X310FE**	**SCALANCE X310**	**SCALANCE X320-1FE**	**SCALANCE X320-3LD FE**
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	-	-
• Bureau Veritas (BV)	Yes	Yes	-	-
• Det Norske Veritas (DNV)	Yes	Yes	-	-
• Germanische Lloyd (GL)	Yes	Yes	-	-
• Lloyds Register of Shipping (LRS)	Yes	Yes	-	-
• Nippon Kaiji Kyokai (NK)	Yes	Yes	-	-

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Technical specifications (continued)

Article No.	6GK5308-2GG00-2AA2	6GK5308-2GG00-2CA2
Product-type designation	**SCALANCE X308-2M**	**SCALANCE X308-2M TS**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	8	8
Number of electrical connections		
• for network components and terminal equipment	4	4
• for signaling contact	1	1
• for media module	2	2
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block
Design of optical interface for optical waveguide		
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
Design of the removable storage C-PLUG	Yes	Yes
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Supply voltage, current consumption, power loss		
Type of supply voltage redundant power supply unit	No	No
Type of supply voltage	DC	DC
Supply voltage external	24 V	12 V
• minimum	18 V	20 V
• maximum	32 V	30 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V	F 3 A / 32 V
Consumed current maximum	0.7 A	0.7 A
Active power loss		
• at 24 V for DC	16.6 W	16.6 W
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
• Comment	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Ambient condition for (standard) operation mode	-	Conformal coating, no
Protection class IP	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5308-2GG00-2AA2	6GK5308-2GG00-2CA2
Product-type designation	**SCALANCE X308-2M**	**SCALANCE X308-2M TS**
Design, dimensions and weight		
Design	compact	compact
Width	120 mm	120 mm
Height	125 mm	125 mm
Depth	124 mm	124 mm
Net weight	1.4 kg	1.4 kg
Mounting type		
• 19-inch installation	No	No
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	Yes	Yes
• S7-300 rail mounting	Yes	Yes
Mounting type	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.	When used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted.
Product properties, functions, components general		
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• RMON	Yes	Yes
• SMTP server	-	-
• Port mirroring	Yes	Yes
• CoS	Yes	Yes
• for IRT PROFINET IO switch	-	-
• PROFINET IO diagnosis	Yes	Yes
• switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• FTP	Yes	Yes
• BOOTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
• GMRP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 -higher level designation/location designation	Yes	Yes
Product functions Diagnosis		
Product function		
• Port diagnostics	Yes	Yes
• Statistics packet size	Yes	Yes
• Statistics packet type	Yes	Yes
• Error statistics	Yes	Yes
• SysLog	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5308-2GG00-2AA2	6GK5308-2GG00-2CA2
Product-type designation	**SCALANCE X308-2M**	**SCALANCE X308-2M TS**
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
• VLAN dynamic	Yes	Yes
Number of VLANs maximum	255	255
Number of VLANs - dynamic maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	Yes	Yes
• DHCP Option 67	Yes	Yes
Product functions Redundancy		
Product function		
• Ring redundancy	Yes	Yes
• Redundancy manager	Yes	Yes
• Standby redundancy	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes
• redundancy procedure STP	Yes	Yes
• RSTP redundancy protocol	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• Passive listening	Yes	Yes
Protocol is supported		
• STP/RSTP	Yes	Yes
• STP	Yes	Yes
• RSTP	Yes	Yes
• RSTP big network support	Yes	Yes
• LACP	Yes	Yes
Product functions Security		
Product function		
• ACL - port/MAC-based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes
• broadcast blocking	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
Product function SICLOCK support	Yes	Yes
Protocol is supported		
• NTP	No	No
• SNTP	Yes	Yes
• MSTP	Yes	Yes
• IEEE 1588 profile default	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2, EN 61000-6-4
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
• Railway application in accordance with EN 50155	No	Yes

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Ordering data

	Article No.
SCALANCE X-300 Industrial 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 delivery	
• **SCALANCE X310**; 3 x 10/100/1 000 Mbit/s RJ45 ports, electrical 7 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5310-0FA00-2AA3**
• **SCALANCE X308-2**; 2 x 1 000 Mbit/s SC ports, optical (multimode, glass), up to 750 m 1 x 10/100/1 000 Mbit/s RJ45 port, electrical 7 x 10/100 Mbit/s RJ45 ports, electrical;	**6GK5308-2FL00-2AA3**
• **SCALANCE X308-2LD**; 2 x 1 000 Mbit/s SC ports, optical (single-mode, glass), up to 10 km 1 x 10/100/1 000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical;	**6GK5308-2FM00-2AA3**
• **SCALANCE X308-2LH**; 2 x 1 000 Mbit/s SC ports, optical (single-mode, glass), up to 40 km 1 x 10/100/1 000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5308-2FN00-2AA3**
• **SCALANCE X308-2LH+**; 2 x 1 000 Mbit/s SC ports, optical (single-mode, glass), up to 70 km 1 x 10/100/1 000 Mbit/s RJ45 port, electrical, 7 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5308-2FP00-2AA3**
• **SCALANCE X307-3**; 3 x 1 000 Mbit/s SC ports, optical (multi-mode, glass), up to 750 m 7 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5307-3BL00-2AA3**
• **SCALANCE X307-3LD**; 3 x 1 000 Mbit/s SC ports, optical (single-mode, glass), up to 10 km 7 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5307-3BM00-2AA3**

	Article No.
Fast Ethernet switches	
• **SCALANCE X310FE**; 10 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5310-0BA00-2AA3**
• **SCALANCE X304-2FE;** 2 x 100 Mbit/s SC port, optical (multimode, glass), up to 5 km 4 x 10/100 Mbit/s RJ45 ports, electrical	**6GK5304-2BD00-2AA3**
• **SCALANCE X306-1LD FE;** 1 x 100 Mbps SC port, optical (single-mode, glass), up to 5 km 6 x 10/100 Mbps RJ45 ports, electrical	**6GK5306-1BF00-2AA3**
• **SCALANCE X320-1FE**; 1 x 100 Mbps SC port, optical (multi-mode, glass), up to 5 km 20 x 10/100 Mbps RJ45 ports, electrical	**6GK5320-1BD00-2AA3**
• **SCALANCE X320-3LD FE**; 1 x 100 Mbps SC port, optical (multi-mode, glass), up to 5 km 2 x 100 Mbps SC port, optical (single-mode, glass), up to 26 km 20 x 10/100 Mbps RJ45 ports, electrical	**6GK5320-3BF00-2AA3**
Full Gigabit Ethernet switches	
• **SCALANCE X308-2M**; 4 x 10/100/1 000 Mbps RJ45 ports, electrical 2 x 10/100/1 000 Mbps slots for 2-port media modules, electrical or optical	**6GK5308-2GG00-2AA2**
• **SCALANCE X308-2M TS**; 4 x 10/100/1 000 Mbps RJ45 ports, electrical 2 x 10/100/1 000 Mbps slots for 2-port media modules, electrical or optical, with extended temperature range and EN 50155 approval for railway applications	**6GK5308-2GG00-2CA2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A) 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 1 000 m, minimum order 20 m	**6XV1840-2AH10**
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 application; with UL approval; sold by the meter; max quantity 1 000 m, minimum order 20 m	**6XV1870-2E**
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with two RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

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Ordering data

	Article No.
FO Standard Cable GP 50/125/1400 [2]	**6XV1873-2A**
Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	
FO Robust Cable GP 4E9/125/90	**6XV1843-2R**
Singlemode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	
Glass fiber-optic cable, pre-assembled with 4 SC connectors [1]	
• 80 m	**6XV1873-6AN80**
• 100 m	**6XV1873-6AT10**
• 150 m	**6XV1873-6AT15**
• 200 m	**6XV1873-6AT20**
• 300 m	**6XV1873-6AT30**
FC FO Standard Cable GP 62.5/200/230	**6XV1847-2A**
FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	
IE FC RJ45 Plug 180 2 x 2	
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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**

	Article No.
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbps) 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
FC SC Plug	**6GK1900-1LB00-0AC0**
Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 Duplex Plugs + cleaning cloths)	
IE FC stripping tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
FC FO termination kit	**6GK1900-1GL00-0AA0**
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	
SITOP compact 24 V/ 0.6 A	**6EP1331-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	
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	**6GK1901-1BE00-0AA1**
• **With insert 1GE**; replaceable insert for 1 x 1 000 Mbps interfaces	**6GK1901-1BE00-0AA2**

[1] Special fiber-optic cables, lengths and accessories available on request

[2] Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The SCALANCE XR-300 Industrial Ethernet switches are fully modular, high-performance, industry-standard switches for the construction of electrical and optical line, ring and star topologies with data transfer rates of 10/100/1 000 Mbit/s, designed for installation in 19" control cabinets.

- As many as 24 electrical and/or optical interfaces (10/100/1 000 Mbit/s);
  up to12 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, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standard functions (VLANs, IGMP-Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service)
- Redundant integration into higher-level networks thanks to support for standardized redundancy procedures (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP)
- Remote diagnostics by means of PROFINET diagnostics, Web browser, CLI, or SNMP

Benefits

get Designed for Industry

- Unlimited flexibility during network expansions (e.g. more terminals) or conversion (e.g. switching from copper to fiber-optic cable) and reduction of the storage costs due to the modular construction using 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
- Space savings in control cabinet due to flexible cable outlet on the front or rear of the device

Application

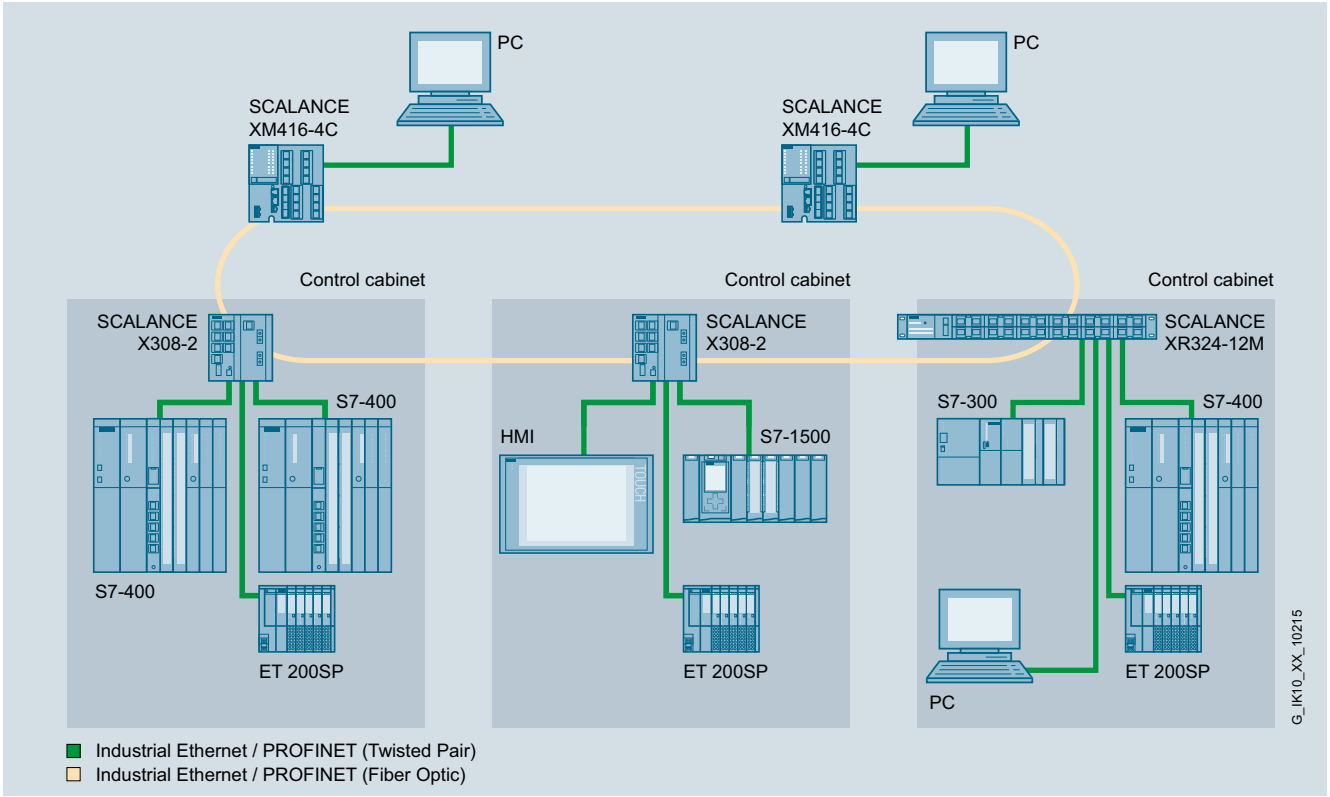
The SCALANCE XR-300 is ideal for use in plant networks and for integrating the industrial network into an existing corporate network. Both at the field level and the control level, the switch performs the network with the distributed field devices and ensures high plant availability with extensive diagnostics 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 electrical and optical Industrial Ethernet line, star or ring 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).

The SCALANCE XR324-12M TS (TS = Transportation Systems) is suitable for use in railway applications due to its specification according to EN 50155.

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Design (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 multimode to single-mode FOC

Design

The SCALANCE XR-300 Industrial Ethernet switches with rugged metal enclosure with IP30 degree of protection 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
- Row of LEDs for indicating status information (power, link status, data transfer, power supply, signaling contact)
- SELECT/SET pushbutton for easy setting 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
- Console port (serial interface) for on-site parameterization/ diagnostics (RJ11 cable to RS232 (9-pin) included in scope of delivery)

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 10/100/1 000 Mbit/s, all optical Ethernet interfaces support 100 or 1 000 Mbit/s
- The SCALANCE XR-300 switches support Gigabit Ethernet (1 000 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.

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Design (continued)

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 on the front, 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 unit
- 1 x 230 V AC power supply

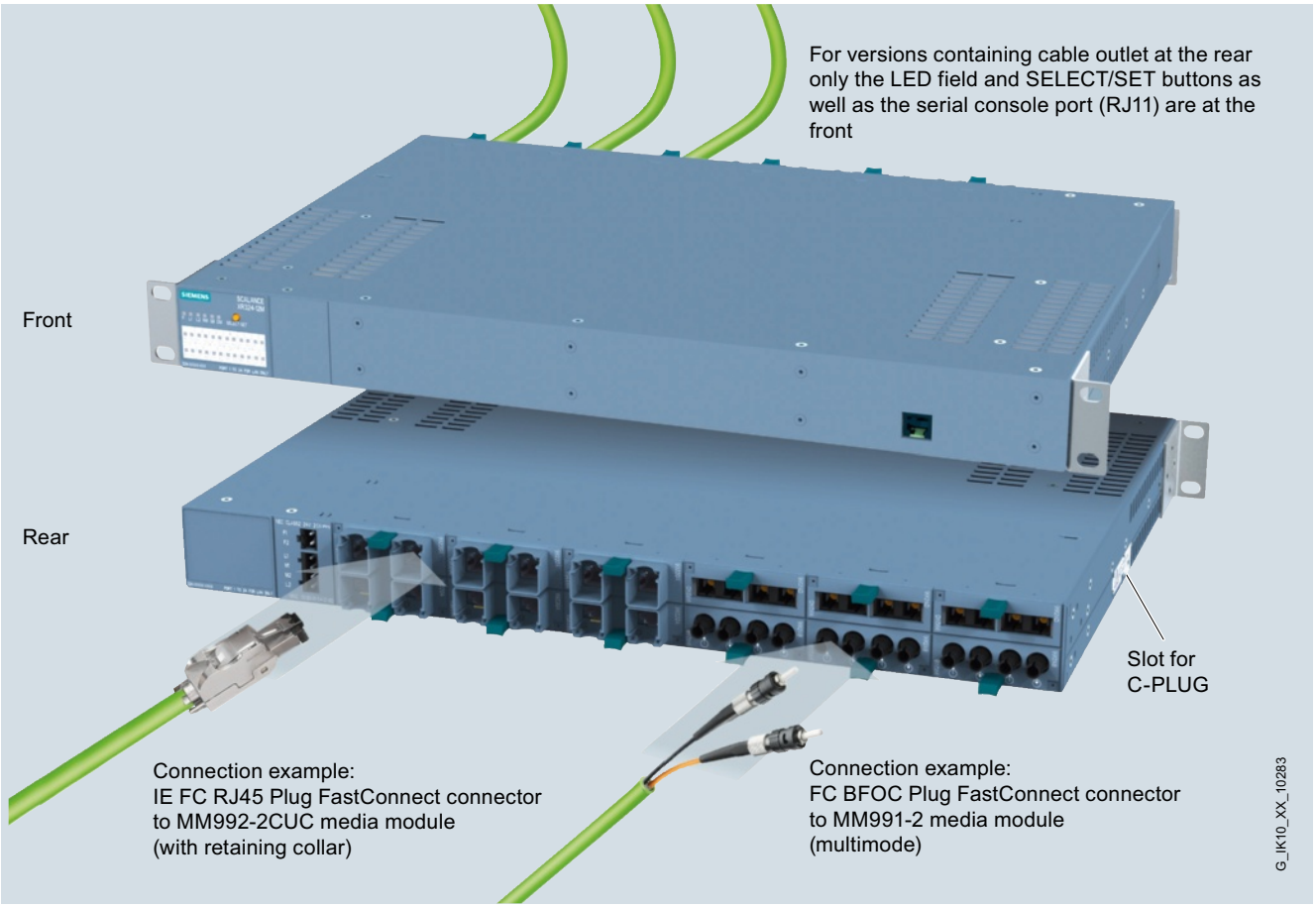
SCALANCE XR324-12M TS (12 media module slots)

A variant is available with

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

The SCALANCE XR324-12M TS has twelve media module slots and

- 1 x 24 V DC power supply unit



SCALANCE XR-300 with cable outlet at rear

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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.
- 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). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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, SNTP or NTP server or via IEEE1588, thereby simplifying the assignment of diagnostic messages of 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, X-400 or X-500 switches cascaded in line can be connected into a ring.
- 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:
  - 5 km at 100 Mbit/s
  - 750 m at 1 Gbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26 km to 70 km at 100 Mbps
  - 10 to 120 km 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

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Function (continued)

Commissioning and diagnostics

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 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 (10/100/1 000 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 into a network management system, e.g. SINEMA Server
  - 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 versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a Web browser
- 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.

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Technical specifications

Article No.	**6GK5324-0GG00-1AR2**	**6GK5324-0GG00-1HR2**	**6GK5324-0GG00-1CR2**
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**	**SCALANCE XR324-12M TS**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24
Number of electrical connections			
• for operator console	1	1	1
• for signaling contact	1	1	1
• for media module	12	12	12
• for power supply	1	1	1
• for redundant power supply	1	1	1
Design of electrical connection			
• for network components and terminal equipment	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• for operator console	RJ11 port	RJ11 port	RJ11 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Design of optical interface for optical waveguide			
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage redundant power supply unit	No	No	No
Type of supply voltage	DC	DC	DC
Supply voltage external	24 V	24 V	24 V
• minimum	19.2 V	19.2 V	19.2 V
• maximum	28.8 V	28.8 V	28.8 V
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 5 A / 125 V	F 5 A / 125 V	F 5 A / 125 V
Consumed current maximum	1.8 A	1.8 A	1.8 A
Active power loss			
• at 24 V for DC	44 W	44 W	44 W

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Technical specifications (continued)

Article No.	6GK5324-0GG00-1AR2	6GK5324-0GG00-1HR2	6GK5324-0GG00-1CR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**	**SCALANCE XR324-12M TS**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• Comment	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, no	Conformal coating, yes
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	19" rack	19" rack	19" rack
Width	483 mm	483 mm	483 mm
Height	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm
Net weight	5.5 kg	5.5 kg	5.5 kg
Mounting type			
• 19-inch installation	Yes	Yes	Yes
• 35 mm DIN rail mounting	No	No	No
• wall mounting	No	No	No
• S7-300 rail mounting	No	No	No
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• SMTP server	-	-	-
• Port mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-0GG00-1AR2	6GK5324-0GG00-1HR2	6GK5324-0GG00-1CR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**	**SCALANCE XR324-12M TS**
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
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255
Number of VLANs - dynamic maximum	255	255	255
Protocol is supported GVRP	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• STP/RSTP	Yes	Yes	Yes
• STP	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes
• LACP	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-0GG00-1AR2	6GK5324-0GG00-1HR2	6GK5324-0GG00-1CR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**	**SCALANCE XR324-12M TS**
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
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
Product function SICLOCK support	Yes	Yes	Yes
Protocol is supported			
• NTP	No	No	No
• SNTP	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	Yes

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Technical specifications (continued)

Article No.	6GK5324-0GG00-3AR2	6GK5324-0GG00-3HR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	24	24
Number of electrical connections		
• for operator console	1	1
• for signaling contact	1	1
• for media module	12	12
• for power supply	1	1
• for redundant power supply	0	0
Design of electrical connection		
• for network components and terminal equipment	Dependent on selected media modules	Dependent on selected media modules
• for operator console	RJ11 port	RJ11 port
• for signaling contact	2-pole terminal block	2-pole terminal block
• for power supply	2-pole terminal block	2-pole terminal block
Design of optical interface for optical waveguide		
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
Design of the removable storage C-PLUG	Yes	Yes
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Supply voltage, current consumption, power loss		
Type of supply voltage redundant power supply unit	No	No
Type of supply voltage	AC	AC
Supply voltage external	230 V	230 V
• minimum	85 V	85 V
• maximum	264 V	264 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	3.15 A / 250 V	3.15 A / 250 V
Consumed current maximum	0.8 A	0.8 A
Active power loss		
• at 230 V AC	50 W	50 W

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Technical specifications (continued)

Article No.	6GK5324-0GG00-3AR2	6GK5324-0GG00-3HR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C
• Comment	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.	Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C). If the device is installed in the vertical position, the maximum operating temperature is reduced to +50 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, no
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	19" rack	19" rack
Width	483 mm	483 mm
Height	44 mm	44 mm
Depth	305 mm	305 mm
Net weight	5.9 kg	5.9 kg
Mounting type		
• 19-inch installation	Yes	Yes
• 35 mm DIN rail mounting	No	No
• wall mounting	No	No
• S7-300 rail mounting	No	No
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
Product properties, functions, components general		
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• RMON	Yes	Yes
• SMTP server	-	-
• Port mirroring	Yes	Yes
• CoS	Yes	Yes
• for IRT PROFINET IO switch	-	-
• PROFINET IO diagnosis	Yes	Yes
• switch-managed	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-0GG00-3AR2	6GK5324-0GG00-3HR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• FTP	Yes	Yes
• BOOTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
• GMRP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes
Product functions Diagnosis		
Product function		
• Port diagnostics	Yes	Yes
• Statistics packet size	Yes	Yes
• Statistics packet type	Yes	Yes
• Error statistics	Yes	Yes
• SysLog	Yes	Yes
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
• VLAN dynamic	Yes	Yes
Number of VLANs maximum	255	255
Number of VLANs - dynamic maximum	255	255
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	Yes	Yes
• DHCP Option 67	Yes	Yes
Product functions Redundancy		
Product function		
• Ring redundancy	Yes	Yes
• Redundancy manager	Yes	Yes
• Standby redundancy	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes
• redundancy procedure STP	Yes	Yes
• RSTP redundancy protocol	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• Passive listening	Yes	Yes
Protocol is supported		
• STP/RSTP	Yes	Yes
• STP	Yes	Yes
• RSTP	Yes	Yes
• RSTP big network support	Yes	Yes
• LACP	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-0GG00-3AR2	6GK5324-0GG00-3HR2
Product-type designation	**SCALANCE XR324-12M**	**SCALANCE XR324-12M**
Product functions Security		
Product function		
• ACL - port/MAC-based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes
• broadcast blocking	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
Product function SICLOCK support	Yes	Yes
Protocol is supported		
• NTP	No	No
• SNTP	Yes	Yes
• MSTP	Yes	Yes
• IEEE 1588 profile default	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	No	No
• for hazardous zone	No	No
• for safety of CSA and UL	UL 508, CSA C22.2 No. 142-M1987	UL 508, CSA C22.2 No. 142-M1987
• for hazardous area of CSA and UL	No	No
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
• Railway application in accordance with EN 50155	No	No

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Ordering data

	Article No.
SCALANCE XR324 Industrial Ethernet switches	
Fully modular 19" Industrial Ethernet switches for setting up electrical and/or optical 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 10/100/1 000 Mbit/s slots for 2-port media modules, electrical or optical	
SCALANCE XR324-12M	
24 V DC power supply	
• Data cable outlet at front	**6GK5324-0GG00-1AR2**
• Data cable outlet at rear	**6GK5324-0GG00-1HR2**
110 … 230 V AC power supply	
• Data cable outlet at front	**6GK5324-0GG00-3AR2**
• Data cable outlet at rear	**6GK5324-0GG00-3HR2**
SCALANCE XR324-12M TS	
for railway applications (approval in accordance with EN 50155); 24 V DC power supply	
• Data cable outlet at front	**6GK5324-0GG00-1CR2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"
SITOP compact, 2.5 A	**6EP1332-5BA00**
1-phase power supply with wide-range input 85 – 264 V AC, regulated output voltage 24 V, output current rated value 2.5 A	

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The SCALANCE X-300PoE product line comprises compact Industrial Ethernet switches for constructing electrical and/or optical line, star and ring topologies operating at data transfer rates of 10/100/1 000 Mbit/s.

- Partially modular version with four integrated electrical, PoE-enabled Ethernet ports and two slots for 2-port media modules
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet (SCALANCE X-300, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards: Establishment of virtual networks (VLANs)
- Redundant integration into higher-level networks thanks to support for standardized redundancy procedures (Rapid Spanning Tree Protocol)
- PROFINET diagnostics, SNMP access, integrated web server and automatic e-mail transmission function for remote diagnostics and signaling via the network

Product version

Full Gigabit switches

SCALANCE X308-2M PoE (Power over Ethernet)

- For the construction of electrical and/or optical line, ring and star topologies with
  - four integrated electrical, PoE-compatible Gigabit Ethernet Ports and two slots for any 2-port media modules (see "Media modules for SCALANCE X-300")
- Star coupler in the plant bus (redundant connection is possible)

Benefits

get Designed for Industry

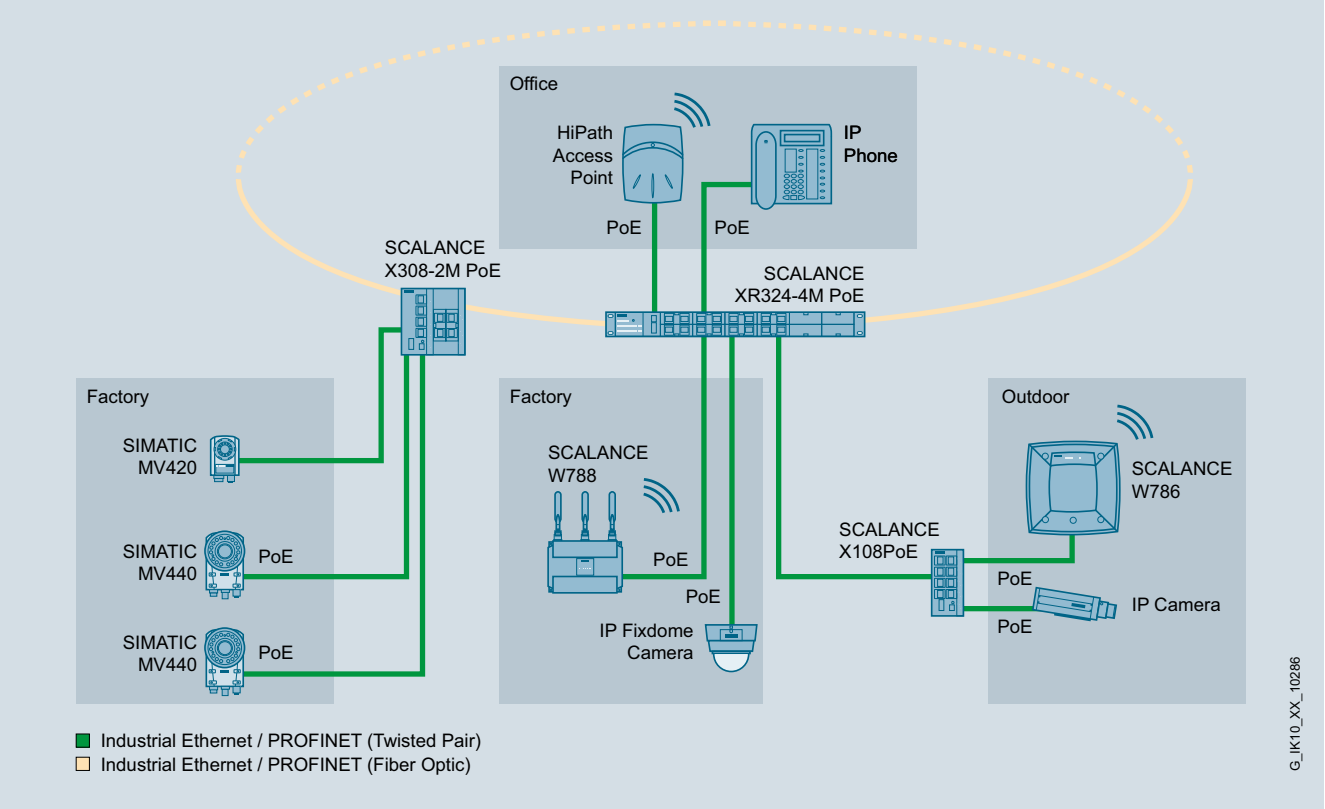
- Unlimited flexibility during network expansions (e.g. more terminals) or conversion (e.g. switching from copper to fiber-optic cable) and reduction of the storage costs due to the modular construction using port modules
- Saving of additional power supply units and cabling for terminals by means of PoE voltage supply
- High availability of the network due to
  - redundant voltage feed
  - 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 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 through 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 due to the use of configuration and diagnostics integrated in STEP 7

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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 rates are required in addition to high network availability and extensive diagnostics facilities.
The SCALANCE X308-2M PoE switch supplies PoE-compatible devices, such as IWLAN access points SCALANCE W, IP cameras and IP telephones, with energy over the data cable. The switch is designed with IP20 degree of protection for installation in control cabinets.

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



Supply of terminal devices with PoE by means of PoE-compatible switches

Design

The SCALANCE X-300 Industrial Ethernet switches with their robust metal enclosure are optimized for mounting on a standard DIN rail and the S7-300 mounting rail. Direct wall mounting in different positions is also possible. Due to the S7-300 enclosure dimensions, the devices are ideally suited for integration in an automation system using S7-300 components.

The switches have:

- 4-pin terminal block for connection of the redundant power supply (2 x 24 V DC)
- Row of LEDs for indicating status information (power, link status, data transfer, error indication, redundancy manager, standby manager)
- 2-pin terminal block for connecting the isolated signaling contact
- SELECT/SET pushbutton for on-site configuration of the signaling contact
- Slot for optional C-PLUG swap medium on the rear of the device for the easy replacement of the device in the event of a fault
- SCALANCE X308-2M PoE has four integrated electrical, PoE-compatible Ethernet ports and two slots for accommodating 2-port media modules

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Function

- Support of Power over Ethernet (PoE) according to IEEE 802.3at Type 1 (corresponds to IEEE 802.3af)
- Increase of the network performance;
  by filtering the data traffic on the basis of the Ethernet (MAC) address of the data terminals, data traffic remains local; only data intended for users of another subnetwork is forwarded by the switch.
- Simple network configuration and network expansion;
  the switch saves the data received at the ports and forwards it automatically to the destination address. The limitation of the network expansion by collision detection (CSMA/CD procedure) terminates at the port.
- Limitation of the error propagation to the affected subnetwork;
  the SCALANCE X-300 switches only forward 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 switches automatically recognize the conductor pairs for transmission and reception (autocrossover), the data transfer rate of 10 or 100 or 1 000 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 PoE switches have up to eight Gigabit Ethernet ports for connecting the switches to each other or with other Gigabit-Ethernet-enabled components (e.g. SCALANCE X-400, X-500)
- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy.
- High-speed standby redundancy;
  several network segments such as rings can be interconnected redundantly with SCALANCE X-300 by means of the integrated standby function. Two X-300 switches are configured in a ring as a master and slave and are connected via two links to the other ring. The redundant link can be implemented at 1 000 Mbit/s.
- Redundant interfacing to higher-level 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 network with reduced requirements for the reconfiguration time (in the order of seconds). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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 with IEEE 802.1x.
  Authentication is by means of a RADIUS server that must be configured appropriately and must be accessible 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 of Access Control List (ACL);
  if this function is activated for a port, the switch only forwards message frames received at this port if their source address is listed in the address table. All connected nodes can be automatically entered in the ACL.
- Syslog;
  Syslog compliant with RFC 3164 is used in the IP network for transmitting short, unencrypted text messages via UDP. This requires the use of a Syslog server that must be configured appropriately and must be accessible 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 time transmitter, SNTP or NTP server or via IEEE1588, thereby simplifying the assignment of diagnostic messages of several devices.

Network topology and network configuration

The SCALANCE X-300 Industrial Ethernet switches are typically accommodated together with the nodes to be connected in one control cabinet. Electrical and optical versions can be installed together 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, X-400 or X-500 switches can be cascaded in line can be connected into a ring.
- Several rings can be redundantly linked through the standby function.
- At the same time, SCALANCE X-300 supports redundant connection of the ring structure to the corporate network with Rapid Spanning Tree.
- Star topology with SCALANCE X300PoE switches:
  The SCALANCE X-308-2M PoE switch represents a neutral point that can connect up to eight 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
  - 5 km at 100 Mbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 10 to 120 km at 1 Gbit/s
  - 26 to 70 km at 100 Mbps
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m at 10/100 Mbit/s 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

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Function (continued)

Commissioning and diagnostics

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 (10/100/1 000 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 system, e.g. SINEMA Server
  - 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 of 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 of new firmware versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a 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 switches 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

Article No.	6GK5308-2QG00-2AA2
Product-type designation	**SCALANCE X308-2M POE**
Transmission rate	
Transfer rate 1	10 Mbit/s
Transfer rate 2	100 Mbit/s
Transfer rate 3	1 000 Mbit/s
Interfaces	
Number of electrical/optical connections for network components or terminal equipment maximum	8
Number of electrical connections	
• for network components and terminal equipment	4
• for Power-over-Ethernet for network components or terminal equipment	4
• for operator console	-
• for signaling contact	1
• for media module	2
• for power supply	1
• for redundant power supply	1
Design of electrical connection	
• for network components and terminal equipment	RJ45 port
• for Power-over-Ethernet for network components or terminal equipment	RJ45 port
• for signaling contact	2-pole terminal block
• for power supply	4-pole terminal block
Design of optical interface for optical waveguide	
• at 100 Mbit/s	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules
Design of the removable storage C-PLUG	Yes
Signal-Inputs/outputs	
Operating voltage of signaling contacts at DC rated value	24 V
Operating current of signaling contacts at DC maximum	0.1 A
Supply voltage, current consumption, power loss	
Type of supply voltage redundant power supply unit	No
Type of supply voltage	DC
Supply voltage external	24 V
• minimum	19.2 V
• maximum	28.8 V
Product component fusing at power supply input	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V
Consumed current maximum	2 A
Active power loss	
• at 24 V for DC	17 W

Article No.	6GK5308-2QG00-2AA2
Product-type designation	**SCALANCE X308-2M POE**
Permitted ambient conditions	
Ambient temperature	
• during operating	-40 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
• Comment	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %
Ambient condition for (standard) operation mode	-
Protection class IP	IP20
Design, dimensions and weight	
Design	compact
Width	120 mm
Height	125 mm
Depth	124 mm
Net weight	1.15 kg
Mounting type	
• 19-inch installation	No
• 35 mm DIN rail mounting	Yes
• wall mounting	Yes
• S7-300 rail mounting	Yes
Mounting type	When using SFP plug transceivers, only horizontal mounting is permitted; when used in shipbuilding, installation on a 35 mm standard mounting rail is not permitted
Product properties, functions, components general	
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)
Product functions management, configuration	
Product function	
• CLI	Yes
• web-based management	Yes
• MIB support	Yes
• TRAPs via email	Yes
• Configuration with STEP 7	Yes
• RMON	Yes
• SMTP server	-
• Port mirroring	Yes
• CoS	Yes
• for IRT PROFINET IO switch	-
• PROFINET IO diagnosis	Yes
• switch-managed	Yes

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Technical specifications (continued)

Article No.	6GK5308-2QG00-2AA2
Product-type designation	**SCALANCE X308-2M POE**
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
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Diagnosis	
Product function	
• Port diagnostics	Yes
• Statistics packet size	Yes
• Statistics packet type	Yes
• Error statistics	Yes
• SysLog	Yes
Product functions VLAN	
Product function	
• VLAN - port based	Yes
• VLAN dynamic	Yes
Number of VLANs maximum	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes
• Media Redundancy Protocol (MRP)	Yes
• redundancy procedure STP	Yes
• RSTP redundancy protocol	Yes
• redundancy procedure MSTP	Yes
• Passive listening	Yes
Protocol is supported	
• STP/RSTP	Yes
• STP	Yes
• RSTP	Yes
• RSTP big network support	Yes
• LACP	Yes

Article No.	6GK5308-2QG00-2AA2
Product-type designation	**SCALANCE X308-2M POE**
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	Yes
• SNTP	Yes
• IEEE 1588 profile default	Yes
Standards, specifications, approvals	
Standard	
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0 : 2006, EN 60079-15: 2005, II 3 G Ex nA II T4 KEMA 07 ATEX 0145X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area 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
• for emitted interference	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes
• C-Tick	Yes
• KC approval	No
• Railway application in accordance with EN 50155	No
• Railway application in accordance with EN 50124-1	-
Marine classification association	
• American Bureau of Shipping Europe Ltd. (ABS)	-
• Bureau Veritas (BV)	-
• Det Norske Veritas (DNV)	-
• Germanische Lloyd (GL)	-
• Lloyds Register of Shipping (LRS)	-
• Nippon Kaiji Kyokai (NK)	-

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Ordering data	Article No.
SCALANCE X-300PoE Industrial Ethernet switches	
PoE-compatible Industrial Ethernet Switches for setting up electrical and/or optical Industrial Ethernet networks; integrated redundancy manager, IT functions (RSTP, VLAN, ...), network management via SNMP and web server; incl. operating instructions, Industrial Ethernet manual and configuration software on CD-ROM; C-PLUG included in scope of supply	
Full Gigabit Ethernet switches	
• **SCALANCE X308-2M PoE**; 4 x 10/100/1 000 Mbit/s RJ45 ports with PoE, electrical; 2 x 10/100/1 000 Mbit/s slots for 2-port media modules, electrical or optical	**6GK5308-2QG00-2AA2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
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. quantity 1 000 m, minimum order 20 m	
IE FC TP Standard Cable GP 4 x 2	**6XV1870-2E**
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 1 000 m, minimum order 20 m	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with two RJ45 plugs	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE FC RJ45 Plug 180 2 x 2	
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 package = 1 unit	**6GK1901-1BB10-2AA0**
• 1 package = 10 units	**6GK1901-1BB10-2AB0**
• 1 package = 50 units	**6GK1901-1BB10-2AE0**

	Article No.
Accessories	
IE FC RJ45 Plug 4 x 2	
RJ45 plug-in connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
FC SC Plug	**6GK1900-1LB00-0AC0**
Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 Duplex Plugs + cleaning cloths)	
IE FC Stripping Tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	
FC FO termination kit	**6GK1900-1GL00-0AA0**
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	
IE FC RJ45 Modular Outlet	
FastConnect RJ45 outlet for Industrial Ethernet with interface for insertion of a replacement insert;	
• **with insert 2FE** ; replacement insert for 2 x 100 Mbit/s interface	**6GK1901-1BE00-0AA1**
• **with insert 1GE** ; replacement insert for 1 x 1 000 Mbit/s interface	**6GK1901-1BE00-0AA2**
SITOP compact PSU100C 24 V/1.3 A	**6EP1331-5BA10**
1-phase power supply with wide-range input 85 … 264 VAC/110 … 300 V DC, stabilized output voltage 24 V, rated output current value 1.3 A, slim design	

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More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The SCALANCE XR-300PoE Industrial Ethernet switches are partly modular, high-performance, industry-standard switches for the construction of electrical and/or optical line, ring and star topologies at data transfer rates of 10/100/1 000 Mbit/s, designed for installation in 19" control cabinets

- As many as 24 electrical and/or optical interfaces (10/100/1 000 Mbit/s), of which 16 are integrated RJ45 ports, eight of which are PoE-compatible;
  up to four electrical and/or optical 2-port media modules can additionally be inserted in the media module slots of the basic unit
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet (with SCALANCE X-300, X-400) and Fast Ethernet (e.g. in combination with SCALANCE X-200 switches)
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standard functions (VLANs, IGMP-Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service)
- Redundant integration into higher-level networks thanks to support for standardized redundancy procedures (Spanning Tree Protocol/Rapid Reconfiguration Spanning Tree Protocol/MRP)
- Remote diagnostics by means of PROFINET diagnostics, Web browser, CLI, or SNMP

Benefits

get Designed for Industry

- Unlimited flexibility during network expansions (e.g. more terminals) or conversion (e.g. switching from copper to fiber-optic cable) and reduction of the storage costs due to the modular construction using port modules
- Saving of additional power supply units and cabling for terminals by means of PoE voltage supply
- High availability of the network due to
  - redundant voltage feed
  - redundant network structures based on FOC or Twisted Pair (redundancy manager, standby function and STP/RSTP integrated)
  - easy device replacement by means of plug-in C-PLUG swap medium
  - very fast reconfiguration of the network in event of a fault
- lower susceptibility to faults and higher availability of the plant networking by latching the RJ45 FastConnect plug in the retaining collar of the RJ45 port modules
- Protection of investment through 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 due to integrated configuration and diagnostics in STEP 7, without additional software
- Space savings in control cabinet due to flexible cable outlet on the front or rear of the device

Application

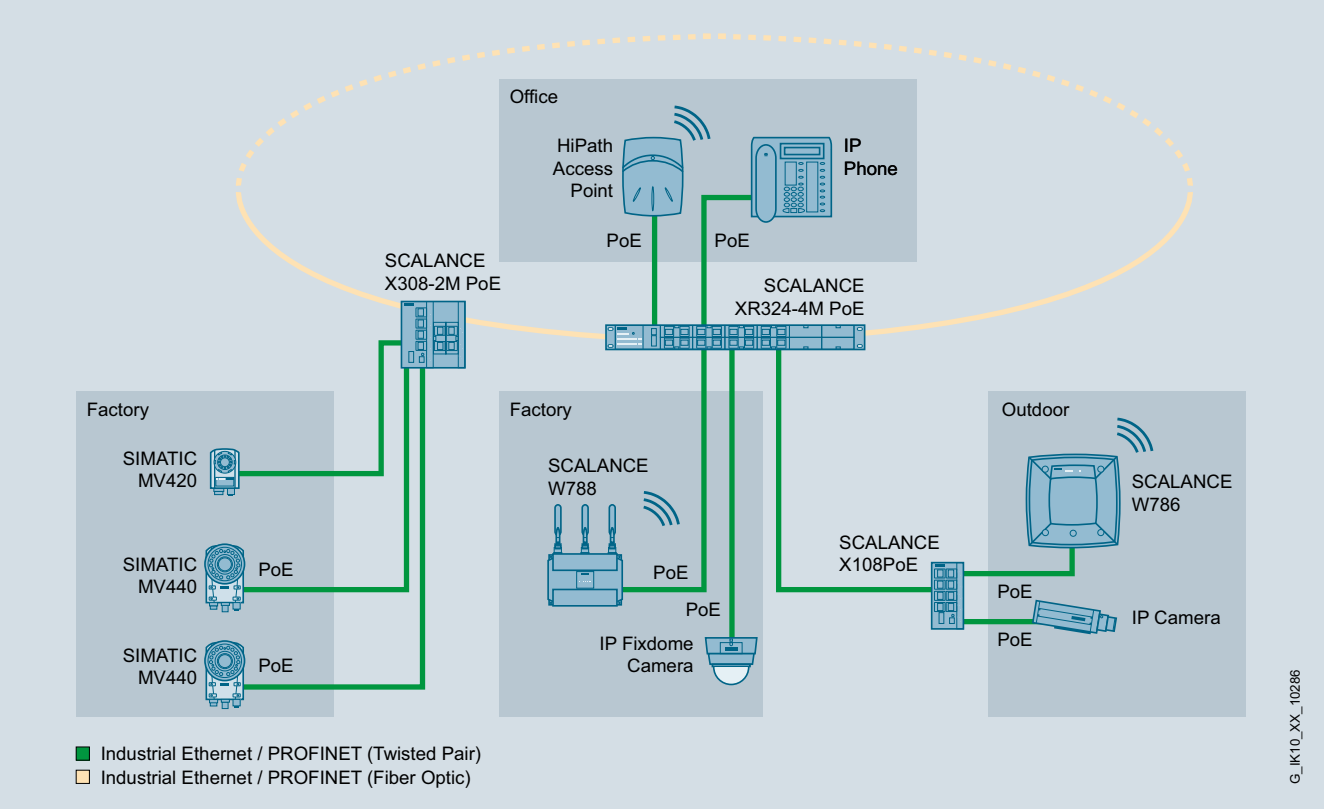
The SCALANCE XR-300PoE is ideal for use in plant networks and for integrating the industrial network into an existing corporate network. Both at the field level and the control level, the switch performs the network with the distributed field devices and ensures high plant availability with extensive 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-300PoE supplies PoE-compatible devices, such as IWLAN access points SCALANCE W, IP cameras and IP telephones, with energy over the data cable and is suitable for constructing electrical and/or optical Industrial Ethernet linear, star or ring structures with up to 24 ports, of which 16 RJ45 ports are pre-assigned. Eight of these support PoE. The switch can be optionally equipped with four electrical and/or optical 2-port media modules. It can also be used as a hub in the plant bus (redundant connection is possible).

The SCALANCE XR324-4M PoE TS (**T**ransportation **S**ystems) is suitable for use in railway applications due to its EN 50155 specification. Media modules that have been approved for train applications must be used.

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Application (continued)



Supply of terminal devices with PoE by means of PoE-compatible switches

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 multimode to single-mode FOC

Design

The SCALANCE XR-300PoE Industrial Ethernet switches with rugged metal enclosure with IP20 degree of protection are optimized for installation in the 19" control cabinet. Versions are available with either 24 V DC or 100 - 240 V AC connections. 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 to protected against power failure at 24 V DC
- 2-pin terminal block for voltage feed at 100 - 240 V AC
- 2-pin terminal block for connecting the isolated signaling contact for simple display of faults
- Row of LEDs for indicating status information (power, link status, data transfer, power supply, signal contact)
- SELECT/SET pushbutton for easy setting of the fault signal contact on the device
- Slot for optional C-PLUG swap medium on the side of the device for easy replacement of the device in the event of a fault
- Console port (serial interface) for on-site parameterization/ diagnostics (RJ11 cable to RS232 (9-pin) included in scope of delivery)

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

- 16 integrated RJ45 ports, eight RJ45 ports supporting PoE;
- The RJ45 sockets are designed to industry standards with additional retaining collars for the connection of the Industrial Ethernet FC RJ45 Plug 180
- All electrical Ethernet interfaces support 10/100/1 000 Mbit/s, all optical Ethernet interfaces support 100 or 1 000 Mbit/s
- The SCALANCE XR-300 switches support Gigabit Ethernet (1 000 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.

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Design (continued)

Product versions

SCALANCE XR324-4M PoE (4 media module slots)

Versions are available with

- LEDs, power supply connection and data cable outlet at the front
- LEDs at the front, 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 unit
- 1 x 100 - 240 V AC power supply unit

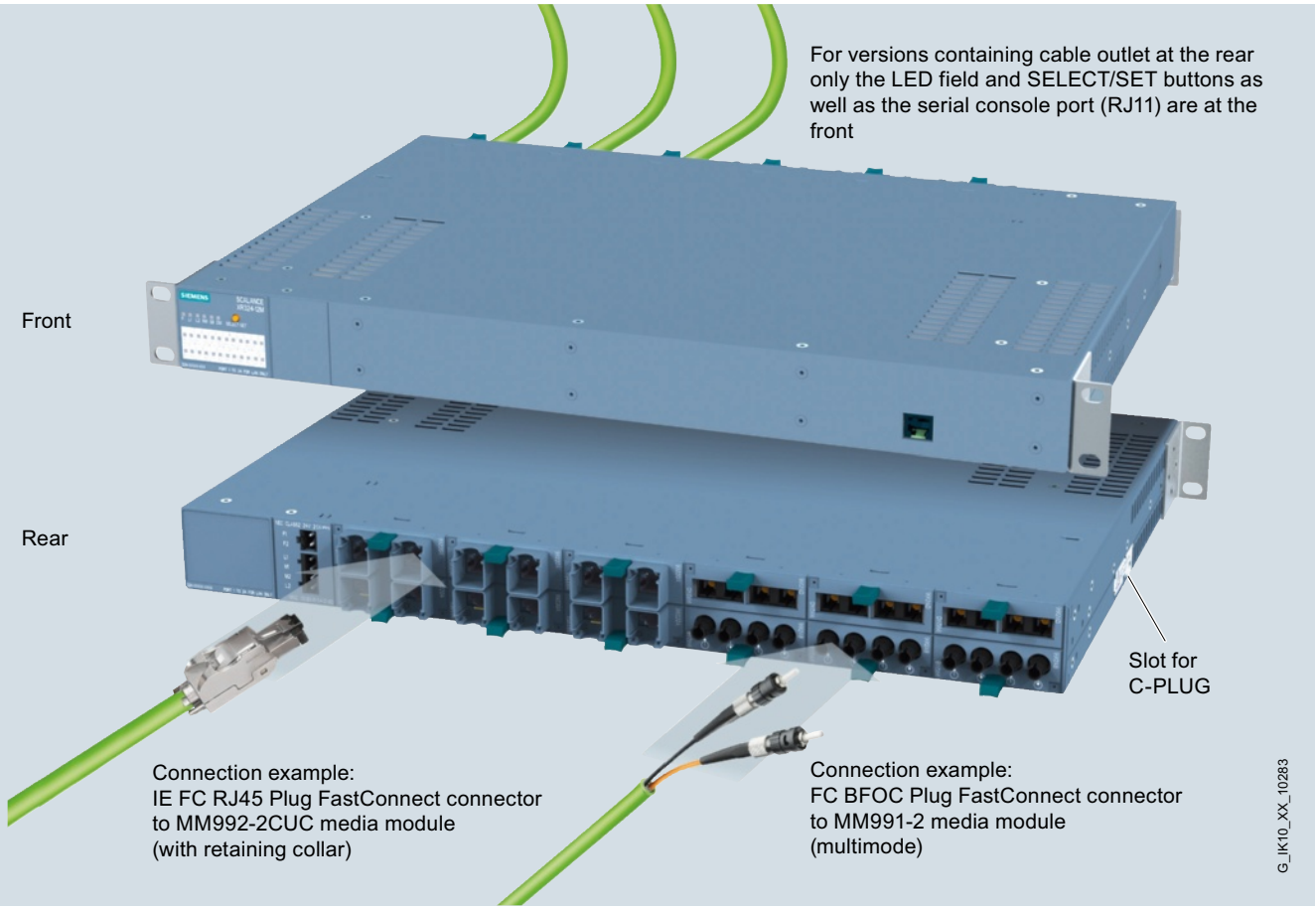
SCALANCE XR324-4M PoE TS(4 media module slots)

A version is available with

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

All versions have four media module slots and

- 1 x 24 V DC power supply unit



SCALANCE XR-300 with cable outlet at rear

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Function

- Support of Power over Ethernet (PoE) to IEEE 802.3at Type1 (corresponds to IEEE 802.3af)
- 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.
- 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). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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, or SNTP / NTP time transmitter or via IEEE1588, thereby simplifying the assignment of diagnostic messages of multiple devices.
- 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, X-400 or X-500 switches cascaded in line can be connected into a ring.
- 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:
  - 5 km at 100 Mbit/s
  - 750 m at 1 Gbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26 to 70 km at 100 Mbps
  - 10 to 120 km at 1 Gbit/s
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m at 10/100 Mbit/s 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

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Function (continued)

Commissioning and diagnostics

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 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 (10/100/1 000 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 into a network management system, e.g. SINEMA Server
  - 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 versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a Web browser
- 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.

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Technical specifications

Article No.	**6GK5324-4QG00-1AR2**	**6GK5324-4QG00-1HR2**	**6GK5324-4QG00-1CR2**
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE TS**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24
Number of electrical connections			
• for network components and terminal equipment	16	16	16
• for Power-over-Ethernet for network components or terminal equipment	8	8	8
• for operator console	1	1	1
• for signaling contact	1	1	1
• for media module	4	4	4
• for power supply	1	1	1
• for redundant power supply	1	1	0
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for Power-over-Ethernet for network components or terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port	RJ11 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Design of optical interface for optical waveguide			
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
design of the removable storage C-PLUG	Yes	Yes	Yes
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage redundant power supply unit	No	No	No
Type of supply voltage	DC	DC	DC
Supply voltage external	24 V	24 V	24 V
• minimum	19.2 V	19.2 V	19.2 V
• maximum	28.8 V	28.8 V	28.8 V
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 5 A / 250 V	F 5 A / 250 V	F 5 A / 250 V
Consumed current maximum	4.2 A	4.2 A	4.2 A
Active power loss			
• at 24 V for DC	46 W	46 W	46 W

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Technical specifications (continued)

Article No.	6GK5324-4QG00-1AR2	6GK5324-4QG00-1HR2	6GK5324-4QG00-1CR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE TS**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +60 °C	-40 … +60 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• Comment	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	Conformal coating, yes
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	19" rack	19" rack	19" rack
Width	449 mm	449 mm	449 mm
Height	43.6 mm	43.6 mm	43.6 mm
Depth	305 mm	305 mm	305 mm
Net weight	6.8 kg	6.8 kg	6.8 kg
Mounting type			
• 19-inch installation	Yes	Yes	Yes
• 35 mm DIN rail mounting	No	No	No
• wall mounting	No	No	No
• S7-300 rail mounting	No	No	No
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4QG00-1AR2	6GK5324-4QG00-1HR2	6GK5324-4QG00-1CR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE TS**
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
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255
Number of VLANs - dynamic maximum	255	255	255
Protocol is supported GVRP	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• STP/RSTP	Yes	Yes	Yes
• STP	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes
• LACP	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4QG00-1AR2	6GK5324-4QG00-1HR2	6GK5324-4QG00-1CR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE TS**
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
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
Product function SICLOCK support	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2006	EN 61000-6-2:2006	EN 61000-6-2:2006
Verification of suitability	EN 61000-6-2:2006, EN 61000-6-4:2007	EN 61000-6-2:2006, EN 61000-6-4:2007	EN 61000-6-2:2006, EN 61000-6-4:2007
Verification of suitability			
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	No	No	No
• Railway application in accordance with EN 50155	-	-	Yes

Article No.	6GK5324-4QG00-3AR2	6GK5324-4QG00-3HR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	24	24
Number of electrical connections		
• for network components and terminal equipment	16	16
• for Power-over-Ethernet for network components or terminal equipment	8	8
• for operator console	1	1
• for signaling contact	1	1
• for media module	4	4
• for power supply	1	1
• for redundant power supply	0	0

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Technical specifications (continued)

Article No.	6GK5324-4QG00-3AR2	6GK5324-4QG00-3HR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**
Design of electrical connection		
• for network components and terminal equipment	RJ45 port	RJ45 port
• for Power-over-Ethernet for network components or terminal equipment	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port
• for signaling contact	2-pole terminal block	2-pole terminal block
• for power supply	2-pole terminal block	2-pole terminal block
Design of optical interface for optical waveguide		
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules
Design of the removable storage C-PLUG	Yes	Yes
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Supply voltage, current consumption, power loss		
Type of supply voltage redundant power supply unit	No	No
Type of supply voltage	AC	AC
Supply voltage external	230 V	230 V
• minimum	85 V	85 V
• maximum	264 V	264 V
Product component fusing at power supply input	Yes	Yes
Consumed current maximum	1 A	1 A
Active power loss		
• at 230 V AC	46 W	46 W
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C
• Comment	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.	If the device is installed in the vertical position, the maximum operating temperature is reduced to 60 °C.
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	19" rack	19" rack
Width	449 mm	449 mm
Height	43.6 mm	43.6 mm
Depth	305 mm	305 mm
Net weight	6.8 kg	6.8 kg
Mounting type		
• 19-inch installation	Yes	Yes
• 35 mm DIN rail mounting	No	No
• wall mounting	No	No
• S7-300 rail mounting	No	No
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points

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Technical specifications (continued)

Article No.	6GK5324-4QG00-3AR2	6GK5324-4QG00-3HR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**
Product properties, functions, components general		
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• RMON	Yes	Yes
• Port mirroring	Yes	Yes
• CoS	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes
• switch-managed	Yes	Yes
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• FTP	Yes	Yes
• BOOTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
• GMRP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes
Product functions Diagnosis		
Product function		
• Port diagnostics	Yes	Yes
• Statistics packet size	Yes	Yes
• Statistics packet type	Yes	Yes
• Error statistics	Yes	Yes
• SysLog	Yes	Yes
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
• VLAN dynamic	Yes	Yes
Number of VLANs maximum	255	255
Number of VLANs - dynamic maximum	255	255
Protocol is supported GVRP	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4QG00-3AR2	6GK5324-4QG00-3HR2
Product-type designation	**SCALANCE XR324-4M POE**	**SCALANCE XR324-4M POE**
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	Yes	Yes
• DHCP Option 67	Yes	Yes
Product functions Redundancy		
Product function		
• Ring redundancy	Yes	Yes
• Redundancy manager	Yes	Yes
• Standby redundancy	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes
• redundancy procedure STP	Yes	Yes
• RSTP redundancy protocol	Yes	Yes
• redundancy procedure MSTP	Yes	Yes
• Passive listening	Yes	Yes
Protocol is supported		
• STP/RSTP	Yes	Yes
• STP	Yes	Yes
• RSTP	Yes	Yes
• RSTP big network support	Yes	Yes
• LACP	Yes	Yes
Product functions Security		
Product function		
• ACL - port/MAC-based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes
• broadcast blocking	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
Product function SICLOCK support	Yes	Yes
Protocol is supported		
• NTP	Yes	Yes
• SNTP	Yes	Yes
• IEEE 1588 profile default	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	No	No
• for hazardous zone	No	No
• for safety of CSA and UL	UL 508, CSA C22.2 No. 142-M1987	UL 508, CSA C22.2 No. 142-M1987
• for hazardous area of CSA and UL	No	No
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2006	EN 61000-6-2:2006
Verification of suitability	EN 61000-6-2:2006, EN 61000-6-4:2007	EN 61000-6-2:2006, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	No	No

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Ordering data

	Article No.
SCALANCE XR324-4M PoE Industrial Ethernet switches	
Partly modular 19" Industrial Ethernet switches for setting up electrical and optical Industrial Ethernet networks; eight PoE-compatible 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 16 x 10/100/1 000 Mbit/s RJ45 ports, eight of which support PoE; 4 x 10/100/1 000 Mbit/s slots for 2-port media modules, electrical or optical	
SCALANCE XR324-4M PoE	
24 V DC power supply	
• Data cable outlet at front	**6GK5324-4QG00-1AR2**
• Data cable outlet at rear	**6GK5324-4QG00-1HR2**
100 … 240 V AC power supply	
• Data cable outlet at front	**6GK5324-4QG00-3AR2**
• Data cable outlet at rear	**6GK5324-4QG00-3HR2**
SCALANCE XR324-4M PoE TS	
for railway applications (approval in accordance with EN 50155); 24 V DC power supply	
• Data cable outlet at front	**6GK5324-4QG00-1CR2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"
SITOP modular, 5 A	**6EP1333-3BA00**
Single-phase and 2-phase power supply with wide-range input 85 ... 264 V / 176 V … 550 V AC, regulated output voltage 24 V, output current rated value 5 A	

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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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 at data transfer rates of 10/100/1 000 Mbit/s.

- Suitable for use in extremely harsh industrial environments and in low-voltage and high-voltage switchgear thanks to:
  - Extended temperature range (-40 to +70 °C, briefly to +85 °C)
  - Special coating on PCBs (conformal coating)
  - Support for special protocols and standards (IEEE 1613 and IEC 61850-3)
  - Wide-range power supplies (60 to 250 V AC/DC)
- As many as nine integrated electrical and/or optical Ethernet interfaces (10/100/1 000 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
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standard functions (VLANs, IGMP-Snooping/Querier, STP/RSTP)
- PROFINET diagnostics, SNMP access, integrated web server and CLI for remote diagnostics and signaling via the network

Product versions

SCALANCE X307-2EEC

- 5 x 10/100 Mbit/s RJ45 port, electrical
- 2 x 10/100/1 000 Mbit/s RJ45 port, electrical
- 2 x 100 Mbit/s LC Port optical (multi-mode, glass), up to 5 km

SCALANCE X302-7EEC

- 2 x 10/100/1 000 Mbit/s RJ45 port, electrical
- 7 x 100 Mbit/s LC Port optical (multi-mode, glass), up to 5 km

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

- 24 V DC (single or redundant) and
- with wide-range power supplies for 60 to 250 V DC / 100-240 V AC (single or redundant) as well as
- with or without PCB coating (conformal coating)

Benefits

get Designed for Industry

- 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

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.

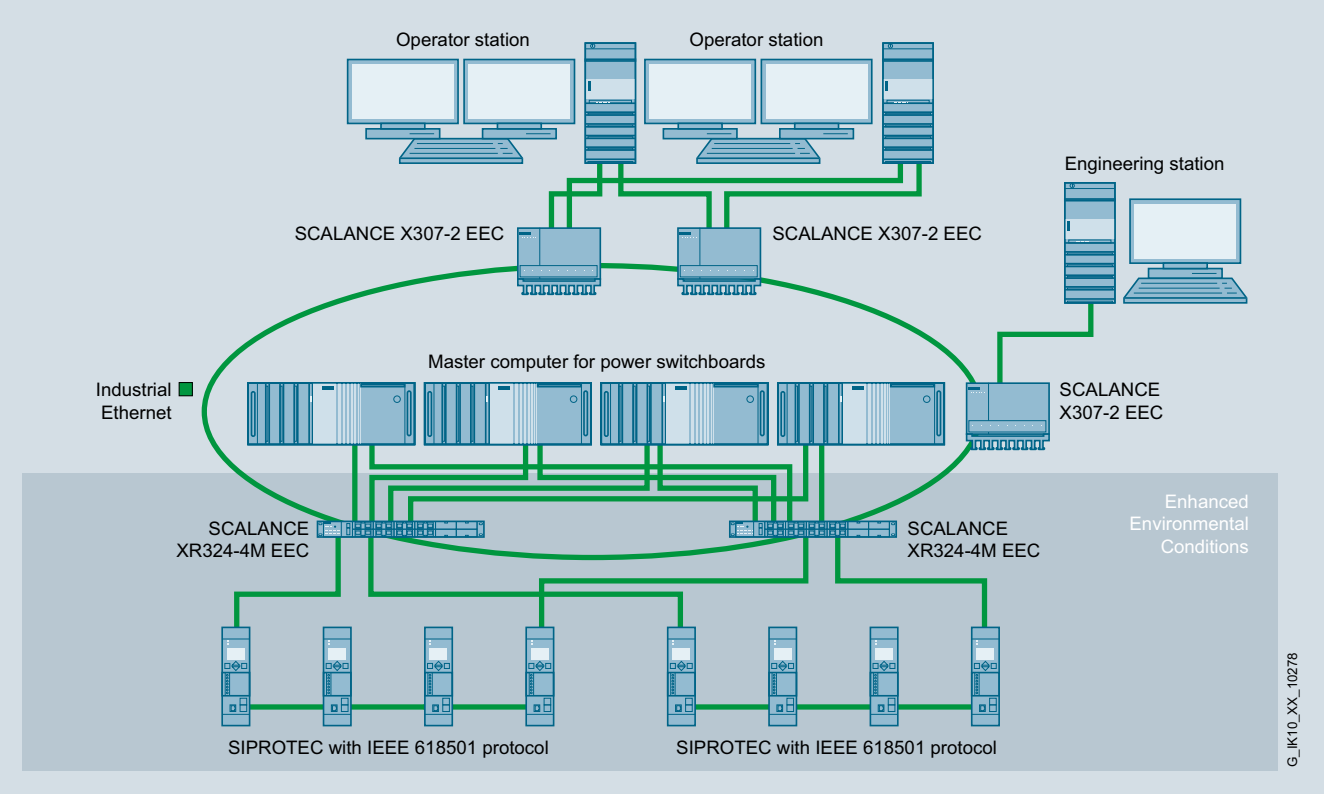
The main area of application is found in high-performance plant networks with interfaces to the corporate network. Thanks to the immunity to electromagnetic interference of the SCALANCE X-300EEC switches, the devices can also be used in medium/high voltage substations under harsh industrial conditions.

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.

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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 (multimode). The Fast Ethernet fiber optic ports are designed using LC connection technology.
- Up to 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.

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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 1 000 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). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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 time transmitter, SNTP or NTP server or via IEEE1588, thereby simplifying the assignment of diagnostic messages of multiple devices.
- 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 boundary conditions:

- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 5 000 m at 100 Mbit/s
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - max. 100 m

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Function (continued)

Commissioning and diagnostics

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.

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

Article No.	6GK5302-7GD00-1EA3	6GK5302-7GD00-1GA3	6GK5302-7GD00-2EA3	6GK5302-7GD00-2GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	9	9	9	9
Number of electrical connections				
• for network components and terminal equipment	2	2	2	2
• for operator console	-	-	-	-
• for signaling contact	1	1	2	2
• for media module	-	-	-	-
• for power supply	1	1	2	2
• for redundant power supply	1	1	2	2
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	2 x 4-pole terminal block	2 x 4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	7	7	7	7
Design of optical interface for optical waveguide				
• at 100 Mbit/s	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-32 dB	-32 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 5 km	0 … 5 km	0 … 5 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	DC	DC	DC	DC
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	24 V	24 V	24 V	24 V
• rated value	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	T 4 A / 125 V	T 4 A / 125 V	T 4 A / 125 V	T 4 A / 125 V
Consumed current maximum	0.75 A	0.75 A	0.75 A	0.75 A
Active power loss				
• at 24 V for DC	17 W	17 W	17 W	17 W

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Technical specifications (continued)

Article No.	6GK5302-7GD00-1EA3	6GK5302-7GD00-1GA3	6GK5302-7GD00-2EA3	6GK5302-7GD00-2GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
• Comment	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 for a duration of 16 hours
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, yes	Conformal coating, no	Conformal coating, yes
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	216 mm	216 mm	216 mm	216 mm
Height	143 mm	143 mm	143 mm	143 mm
Depth	110 mm	110 mm	110 mm	110 mm
Net weight	1.8 kg	1.8 kg	2.03 kg	1.8 kg
Mounting type				
• 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	Yes	Yes	Yes	Yes
Mounting type	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5302-7GD00-1EA3	6GK5302-7GD00-1GA3	6GK5302-7GD00-2EA3	6GK5302-7GD00-2GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5302-7GD00-1EA3	6GK5302-7GD00-1GA3	6GK5302-7GD00-2EA3	6GK5302-7GD00-2GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
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, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	UL 508	UL 508	UL 508	UL 508
• for hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
• IEC 61850-3	Yes	Yes	Yes	Yes
Certificate of suitability IEEE 1613	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5302-7GD00-3EA3	6GK5302-7GD00-3GA3	6GK5302-7GD00-4EA3	6GK5302-7GD00-4GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	9	9	9	9
Number of electrical connections				
• for network components and terminal equipment	2	2	2	2
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	3-pole terminal block	3-pole terminal block	3-pole terminal block	3-pole terminal block
• for power supply	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	7	7	7	7
Design of optical interface for optical waveguide				
• at 100 Mbit/s	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-32 dB	-32 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 5 km	0 … 5 km	0 … 5 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at AC rated value	276 V	276 V	276 V	276 V
Operating current of signaling contacts at AC maximum	5 A	5 A	5 A	5 A
Operating voltage of signaling contacts at DC rated value	230 V	230 V	230 V	230 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A

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Technical specifications (continued)

Article No.	6GK5302-7GD00-3EA3	6GK5302-7GD00-3GA3	6GK5302-7GD00-4EA3	6GK5302-7GD00-4GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	AC	AC	AC	AC
Supply voltage at AC	230 V	230 V	230 V	230 V
• rated value	80 … 276 V	80 … 276 V	80 … 276 V	80 … 276 V
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	220 V	220 V	220 V	220 V
• rated value	46.25 … 300 V	46.25 … 300 V	46.25 … 300 V	46.25 … 300 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	T 2 A / 250 V	T 2 A / 250 V	T 2 A / 250 V	T 2 A / 250 V
Consumed current maximum	0.08 A	0.08 A	0.08 A	0.08 A
Active power loss				
• at 230 V AC	18 W	18 W	18 W	18 W
• at 250 V with DC	18 W	18 W	18 W	18 W
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
• Comment	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 for a duration of 16 hours
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, yes	Conformal coating, no	Conformal coating, yes
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	216 mm	216 mm	216 mm	216 mm
Height	143 mm	143 mm	143 mm	143 mm
Depth	110 mm	110 mm	110 mm	110 mm
Net weight	1.85 kg	1.85 kg	2.12 kg	2.12 kg
Mounting type				
• 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	Yes	Yes	Yes	Yes
Mounting type	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)

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Technical specifications (continued)

Article No.	6GK5302-7GD00-3EA3	6GK5302-7GD00-3GA3	6GK5302-7GD00-4EA3	6GK5302-7GD00-4GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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

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Technical specifications (continued)

Article No.	6GK5302-7GD00-3EA3	6GK5302-7GD00-3GA3	6GK5302-7GD00-4EA3	6GK5302-7GD00-4GA3
Product-type designation	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**	**SCALANCE X302-7EEC**
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613
• for safety of CSA and UL	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 emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
• IEC 61850-3	Yes	Yes	Yes	Yes
certificate of suitability IEEE 1613	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5307-2FD00-1EA3	6GK5307-2FD00-1GA3	6GK5307-2FD00-2EA3	6GK5307-2FD00-2GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	9	9	9	9
Number of electrical connections				
• for network components and terminal equipment	7	7	7	7
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	2 x 4-pole terminal block	2 x 4-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	2	2	2	2
Design of optical interface for optical waveguide				
• at 100 Mbit/s	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-32 dB	-32 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 5 km	0 … 5 km	0 … 5 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	DC	DC	DC	DC
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	24 V	24 V	24 V	24 V
• rated value	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	T 4 A / 125 V	T 4 A / 125 V	T 4 A / 125 V	T 4 A / 125 V
Consumed current maximum	0.75 A	0.75 A	0.75 A	0.75 A
Active power loss				
• at 24 V for DC	12 W	12 W	12 W	12 W

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Technical specifications (continued)

Article No.	6GK5307-2FD00-1EA3	6GK5307-2FD00-1GA3	6GK5307-2FD00-2EA3	6GK5307-2FD00-2GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
• Comment	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 for a duration of 16 hours
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, yes	Conformal coating, no	Conformal coating, yes
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	216 mm	216 mm	216 mm	216 mm
Height	143 mm	143 mm	143 mm	143 mm
Depth	110 mm	110 mm	110 mm	110 mm
Net weight	1.8 kg	1.8 kg	2.03 kg	2.03 kg
Mounting type				
• 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	Yes	Yes	Yes	Yes
Mounting type	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5307-2FD00-1EA3	6GK5307-2FD00-1GA3	6GK5307-2FD00-2EA3	6GK5307-2FD00-2GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5307-2FD00-1EA3	6GK5307-2FD00-1GA3	6GK5307-2FD00-2EA3	6GK5307-2FD00-2GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
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, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	UL 508	UL 508	UL 508	UL 508
• for hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
• IEC 61850-3	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5307-2FD00-3EA3	6GK5307-2FD00-3GA3	6GK5307-2FD00-4EA3	6GK5307-2FD00-4GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	9	9	9	9
Number of electrical connections				
• for network components and terminal equipment	7	7	7	7
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	3-pole terminal block	3-pole terminal block	3-pole terminal block	3-pole terminal block
• for power supply	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
Number of optical interfaces for optical waveguide				
• at 100 Mbit/s	2	2	2	2
Design of optical interface for optical waveguide				
• at 100 Mbit/s	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)	LC port (multimode up to 5 km)
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-32 dB	-32 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 5 km	0 … 5 km	0 … 5 km
Design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at AC rated value	276 V	276 V	276 V	276 V
Operating current of signali-ng contacts at AC maximum	5 A	5 A	5 A	5 A
Operating voltage of signaling contacts at DC rated value	230 V	230 V	230 V	230 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A

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Technical specifications (continued)

Article No.	6GK5307-2FD00-3EA3	6GK5307-2FD00-3GA3	6GK5307-2FD00-4EA3	6GK5307-2FD00-4GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	AC	AC	AC	AC
Supply voltage at AC	230 V	230 V	230 V	230 V
• rated value	80 … 276 V	80 … 276 V	80 … 276 V	80 … 276 V
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	220 V	220 V	220 V	220 V
• rated value	46.25 … 300 V	46.25 … 300 V	46.25 … 300 V	46.25 … 300 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	T 2 A / 250 V	T 2 A / 250 V	T 2 A / 250 V	T 2 A / 250 V
Consumed current maximum	0.08 A	0.08 A	0.08 A	0.08 A
Active power loss				
• at 230 V AC	18 W	18 W	18 W	18 W
• at 250 V with DC	18 W	18 W	18 W	18 W
Permitted ambient conditions				
Ambient temperature				
• during operating	-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
• Comment	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 for a duration of 16 hours
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, no	Conformal coating, yes	Conformal coating, no	Conformal coating, yes
Protection class IP	IP30	IP30	IP30	IP30
Design, dimensions and weight				
Design	compact	compact	compact	compact
Width	216 mm	216 mm	216 mm	216 mm
Height	143 mm	143 mm	143 mm	143 mm
Depth	110 mm	110 mm	110 mm	110 mm
Net weight	1.85 kg	1.85 kg	2.12 kg	2.12 kg
Mounting type				
• 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	Yes	Yes	Yes	Yes
Mounting type	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate	Wall mounting is possible only with an additional wall bracket; 19" mounting only with installation of two X-300EEC switches in pairs using a mounting plate
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)

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Technical specifications (continued)

Article No.	6GK5307-2FD00-3EA3	6GK5307-2FD00-3GA3	6GK5307-2FD00-4EA3	6GK5307-2FD00-4GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	No	No	No	No
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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

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Technical specifications (continued)

Article No.	6GK5307-2FD00-3EA3	6GK5307-2FD00-3GA3	6GK5307-2FD00-4EA3	6GK5307-2FD00-4GA3
Product-type designation	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**	**SCALANCE X307-2EEC**
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
Standards, specifications, approvals				
Standard				
• for EMC	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613	IEC 61850, IEEE 1613
• for safety of CSA and UL	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 emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	No	No	No	No
• Railway application in accordance with EN 50124-1	No	No	No	No
• IEC 61850-3	Yes	Yes	Yes	Yes
Certificate of suitability IEEE 1613	Yes	Yes	Yes	Yes

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Ordering data

	Article 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 10/100/1 000 Mbit/s RJ45 ports, electrical; 7 x 100 Mbit/s LC ports, optical (multimode, glass) up to 5 km	
24 V DC power supply	
• 1 power supply	**6GK5302-7GD00-1EA3**
• 2 power supplies	**6GK5302-7GD00-2EA3**
• 1 power supply with conformal coating	**6GK5302-7GD00-1GA3**
• 2 power supplies with conformal coating	**6GK5302-7GD00-2GA3**
100-240 AC / 60-250 V DC power supply	
• 1 power supply	**6GK5302-7GD00-3EA3**
• 2 power supplies	**6GK5302-7GD00-4EA3**
• 1 power supply with conformal coating	**6GK5302-7GD00-3GA3**
• 2 power supplies with conformal coating	**6GK5302-7GD00-4GA3**
SCALANCE X307-2EEC; 5 x 10/100 Mbit/s RJ45 ports, electrical; 2 x 10/100/1 000 Mbit/s RJ45 ports, electrical 2 x 100 Mbit/s LC ports, optical (multimode, glass) up to 5 km	
24 V DC power supply	
• 1 power supply	**6GK5307-2FD00-1EA3**
• 2 power supplies	**6GK5307-2FD00-2EA3**
• 1 power supply with conformal coating	**6GK5307-2FD00-1GA3**
• 2 power supplies with conformal coating	**6GK5307-2FD00-2GA3**
100-240 AC/60-250 V DC power supply	
• 1 power supply	**6GK5307-2FD00-3EA3**
• 2 power supplies	**6GK5307-2FD00-4EA3**
• 1 power supply with conformal coating	**6GK5307-2FD00-3GA3**
• 2 power supplies with conformal coating	**6GK5307-2FD00-4GA3**

	Article No.
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
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 1 000 m, minimum order length 20 m	
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 application; with UL approval; sold by the meter; max length 1 000 m, minimum order 20 m	
• AWG 22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG 24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC TP Flexible Cable GP 4 x 2	
8-core, shielded TP installation cable for occasional moving; with UL approval; sold by the meter; max. delivery unit 1 000 m, minimum order 20 m	
• AWG 24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2B**
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with two RJ45 plugs	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

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Ordering data	Article No.
Accessories (continued)	
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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
IE FC Stripping Tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
SIPLUS PS modular 5 A	**6AG1933-3BA00-2AA0**
Single-phase and 2-phase power supply with wide-range input 85 ... 264 V / 176 V ... 550 V AC, regulated output voltage 24 V, output current rated value 5 A, coating of the PCB and electronic components (conformal coating)	
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	**6GK1901-1BE00-0AA1**
• with 1GE insert; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

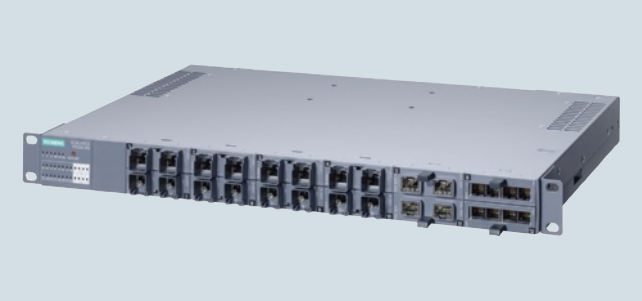
- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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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 at data transfer rates of 10/100/1 000 Mbit/s, designed for installation in 19" control cabinets.

- As many as 24 electrical and/or optical interfaces (10/100/1 000 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
- Suitable for use in extremely harsh industrial environments and in low-voltage and high-voltage switchgear thanks to:
  - Extended temperature range (-40 to +70 °C, briefly to +85 °C)
  - Support for special protocols and standards (IEEE 1613 and IEC 61850-3)
  - Wide-range power supplies (60 to 250 V AC/DC)
- High-speed media redundancy through integral redundancy manager both for Gigabit Ethernet and Fast Ethernet
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards (VLANs, IGMP-Snooping/Querier, STP/RSTP, Link Aggregation, Quality of Service)
- Remote diagnostics by means of PROFINET diagnostics, Web browser, CLI, or SNMP

Product versions

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

Versions are available with

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

Benefits

get Designed for Industry

- 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 during network expansions (e.g. more terminals) or conversion (e.g. switching from copper to fiber-optic cable) and reduction of the storage costs due to the modular construction using 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

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).

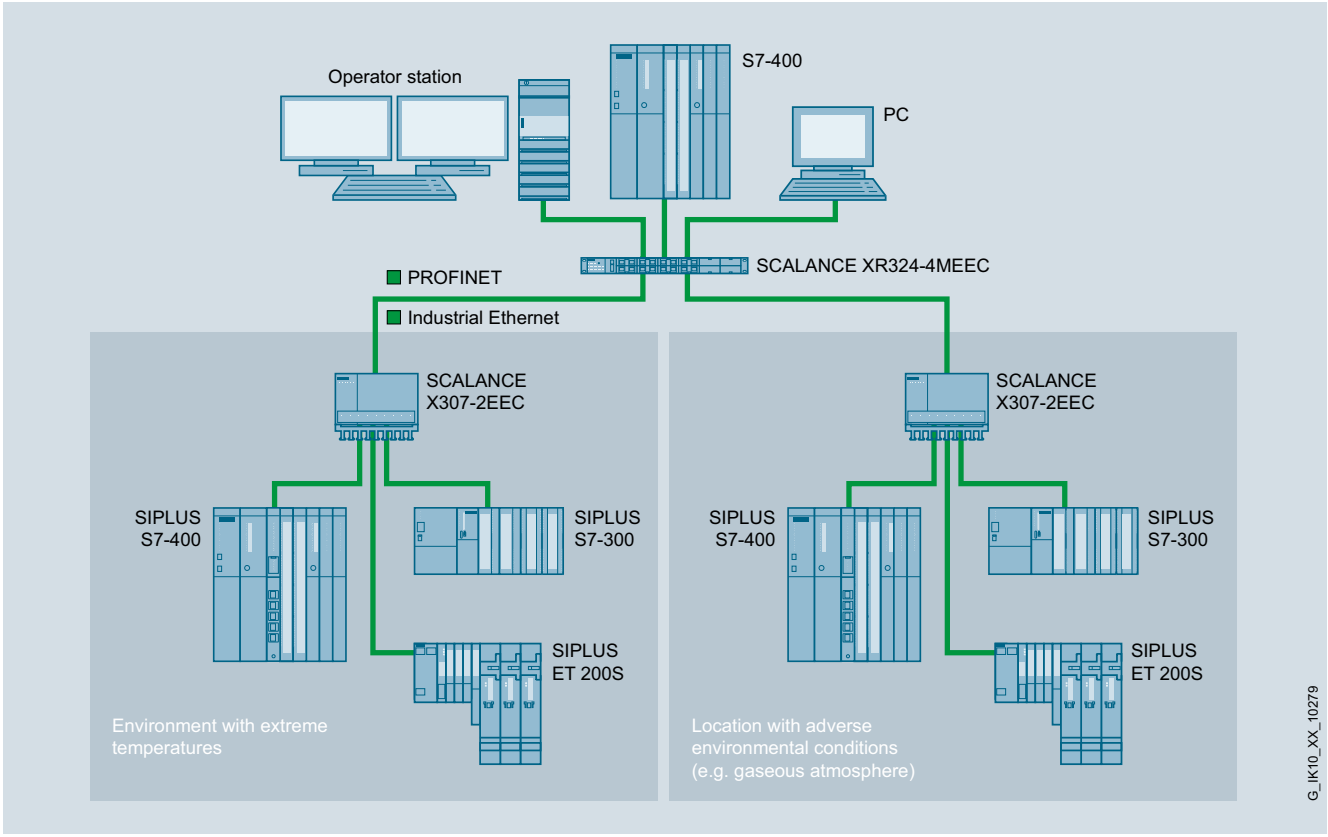
The use of media modules in partly and fully modular versions of the SCALANCE X-300 switches supports:

- 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 multimode to single-mode FOC

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Application (continued)



Star structure in switchgear under extreme ambient conditions with SCALANCE XR324-4M EEC and X-300EEC

Design

The SCALANCE XR-300EEC Industrial Ethernet switches with rugged metal enclosure with IP20 degree of protection 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
- Console port (serial interface) for on-site parameterization/ diagnostics (RJ11 cable to RS232 (9-pin) included in scope of delivery)

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 multimode or single-mode connections; the optical media modules are available in various connection technologies
- All electrical Ethernet interfaces support 10/100/1 000 Mbit/s, all optical Ethernet interfaces support 100 or 1 000 Mbit/s
- The SCALANCE XR-300EEC switches support Gigabit Ethernet (1 000 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.

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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.
- 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). By supporting the Multiple Spanning Tree Protocol (MSTP), a network can also be split into multiple sub-segments.
- 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, SNTP or NTP server or via IEEE1588, thereby simplifying the assignment of diagnostic messages of multiple 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, X-400 or X-500 switches cascaded in line can be connected into a ring.
- 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:
  - 5 km at 100 Mbit/s
  - 750 m at 1 000 Mbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26 to 70 km at 100 Mbit/s
  - 10 to 120 km at 1 000 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 1 000 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

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Function (continued)

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 (10/100/1 000 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 a network management system, e.g. SINEMA Server
  - 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.

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 versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a Web browser
- 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.

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Technical specifications

Article No.	6GK5324-4GG00-1ER2	6GK5324-4GG00-1JR2	6GK5324-4GG00-2ER2	6GK5324-4GG00-2JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24	24
Number of electrical connections				
• for network components and terminal equipment	16	16	16	16
• for operator console	1	1	1	1
• for signaling contact	1	1	1	1
• for media module	4	4	4	4
• for power supply	1	1	2	2
• for redundant power supply	1	1	1	1
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port	RJ11 port	RJ11 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2 x 2-pole terminal block	2 x 2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	2 x 4-pole terminal block	2 x 4-pole terminal block
Design of optical interface for optical waveguide				
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	DC	DC	DC	DC
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	24 V	24 V	24 V	24 V
• rated value	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V	19.2 … 57.6 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	T2H / 250 V	T2H / 250 V	T2H / 250 V	T2H / 250 V
Consumed current maximum	1.6 A	1.6 A	1.6 A	1.6 A
Active power loss				
• at 24 V for DC	40 W	40 W	40 W	40 W

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Technical specifications (continued)

Article No.	6GK5324-4GG00-1ER2	6GK5324-4GG00-1JR2	6GK5324-4GG00-2ER2	6GK5324-4GG00-2JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• Comment	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Width	483 mm	483 mm	483 mm	483 mm
Height	44 mm	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	6.5 kg	6.5 kg	6.8 kg	6.8 kg
Mounting type				
• 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
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	-	-	-	-
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4GG00-1ER2	6GK5324-4GG00-1JR2	6GK5324-4GG00-2ER2	6GK5324-4GG00-2JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M 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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4GG00-1ER2	6GK5324-4GG00-1JR2	6GK5324-4GG00-2ER2	6GK5324-4GG00-2JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M 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
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
Product function SICLOCK support	Yes	Yes	Yes	Yes
Protocol is supported				
• NTP	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
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, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous 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 safety of CSA and UL	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 hazardous area of CSA and UL	ANSI / ISA 12.12.01, CSA C22.2 No. 142-M1987, 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. 142-M1987, 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. 142-M1987, 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. 142-M1987, CL. 1 / Div. 2 / GP. A, B, C, D T4, CL. 1 / Zone 2 / GP. IIC, T4
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• IEC 61850-3	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4GG00-3ER2	6GK5324-4GG00-3JR2	6GK5324-4GG00-4ER2	6GK5324-4GG00-4JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24	24
Number of electrical connections				
• for network components and terminal equipment	16	16	16	16
• for operator console	1	1	1	1
• for signaling contact	1	1	1	1
• for media module	4	4	4	4
• for power supply	1	1	2	2
• for redundant power supply	0	0	0	0
Design of electrical connection				
• for network components and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port	RJ11 port	RJ11 port
• for signaling contact	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
• for power supply	3-pole terminal block	3-pole terminal block	2 x 3-pole terminal block	2 x 3-pole terminal block
Design of optical interface for optical waveguide				
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
design of the removable storage C-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at AC rated value	276 V	276 V	276 V	276 V
Operating current of signaling contacts at AC maximum	5 A	5 A	5 A	5 A
Operating voltage of signaling contacts at DC rated value	230 V	230 V	230 V	230 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage redundant power supply unit	No	No	Yes	Yes
Type of supply voltage	AC	AC	AC	AC
Supply voltage at AC	230 V	230 V	230 V	230 V
• rated value	80 … 276 V	80 … 276 V	80 … 276 V	80 … 276 V
Type 2 of supply voltage	DC	DC	DC	DC
Supply voltage for DC	220 V	220 V	220 V	220 V
• rated value	48 … 300 V	48 … 300 V	48 … 300 V	48 … 300 V
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage				
Consumed current maximum	0.7 A	0.7 A	0.7 A	0.7 A
Active power loss				
• at 230 V AC	42 W	42 W	42 W	42 W
• at 250 V with DC	42 W	42 W	42 W	42 W

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Technical specifications (continued)

Article No.	6GK5324-4GG00-3ER2	6GK5324-4GG00-3JR2	6GK5324-4GG00-4ER2	6GK5324-4GG00-4JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• Comment	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)	Extended temperature upper limit of +85° C permitted for 16 hours. Reduced operating temperature through the use of media modules (-40 °C to +70 °C) or SFP plug-in transceivers (-40 °C to +60 °C)
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Width	483 mm	483 mm	483 mm	483 mm
Height	44 mm	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	6.6 kg	6.6 kg	7 kg	7 kg
Mounting type				
• 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
Mounting type	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points	When used in shipbuilding, the device must be secured in the 19" rack at four points
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• SMTP server	-	-	-	-
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• for IRT PROFINET IO switch	-	-	-	-
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4GG00-3ER2	6GK5324-4GG00-3JR2	6GK5324-4GG00-4ER2	6GK5324-4GG00-4JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M 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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP/RSTP	Yes	Yes	Yes	Yes
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5324-4GG00-3ER2	6GK5324-4GG00-3JR2	6GK5324-4GG00-4ER2	6GK5324-4GG00-4JR2
Product-type designation	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M EEC**	**SCALANCE XR324-4M 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
Protocol is supported SSH	Yes	Yes	Yes	Yes
Product functions Time				
Product function SICLOCK support	Yes	Yes	Yes	Yes
Protocol is supported				
• NTP	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes	Yes
• IEEE 1588 profile default	Yes	Yes	Yes	Yes
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	No	No	No	No
• for hazardous zone	No	No	No	No
• for safety of CSA and UL	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 hazardous area of CSA and UL	No	No	No	No
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes
• IEC 61850-3	Yes	Yes	Yes	Yes

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Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE XR324-4M EEC	
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 10/100/1 000 Mbit/s RJ45 ports, electrical 4 x 10/100/1 000 Mbit/s slots for 2-port media modules, electrical or optical	
SCALANCE XR324-4M EEC	
Power supply 1 x 24 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-1ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-1JR2**
Power supply 1 x 100-240 AC / 60-250 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-3ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-3JR2**
Power supply 2 x 24 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-2ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-2JR2**
Power supply 2 x 100-240 AC / 60-250 V DC	
• Front data cable outlet, rear power supply	**6GK5324-4GG00-4ER2**
• Rear data cable outlet, front power supply	**6GK5324-4GG00-4JR2**
Media modules	See "Media modules for modular SCALANCE X-300 managed"
SIPLUS PS modular 5 A	**6EP1933-3BA00**
1-phase and 2-phase power supply with wide-range input 85 ... 264 V / 176 V ... 550 V AC, regulated output voltage 24 V, output current rated value 5 A, coating of the PCB and electronic components (conformal coating)	

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

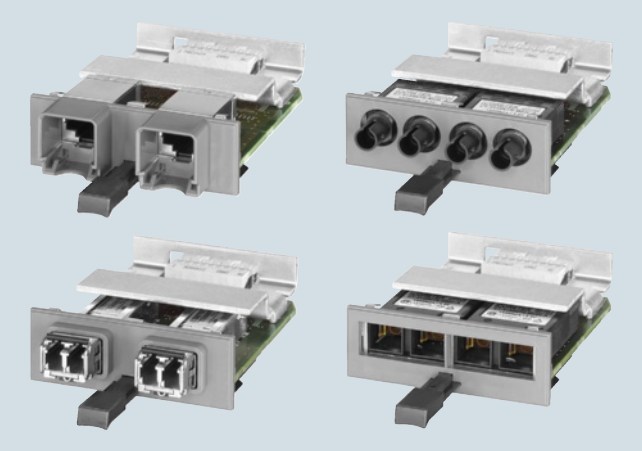
TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Media modules for modular SCALANCE X-300 managed

Overview



- 2-port media modules for flexible, 2-port-granular equipping of partly and fully modular versions of SCALANCE X-300 switches (e.g. SCALANCE X308-2M, SCALANCE XR324-12M) as well as the SCALANCE S627-2M
- Electrical versions with RJ45 ports are available as well as optical versions with BFOC and SC ports for the use of multimode and singlemode fiber-optic cables
- A 2-port SFP media module permits the optional use of fiber-optic SFP plug-in transceivers (**S**mall **F**orm-Factor **P**luggable) with LC connection technology. Versions with coated PCBs (conformal coating) for railway applications are also available.

Benefits

get Designed for Industry

- 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

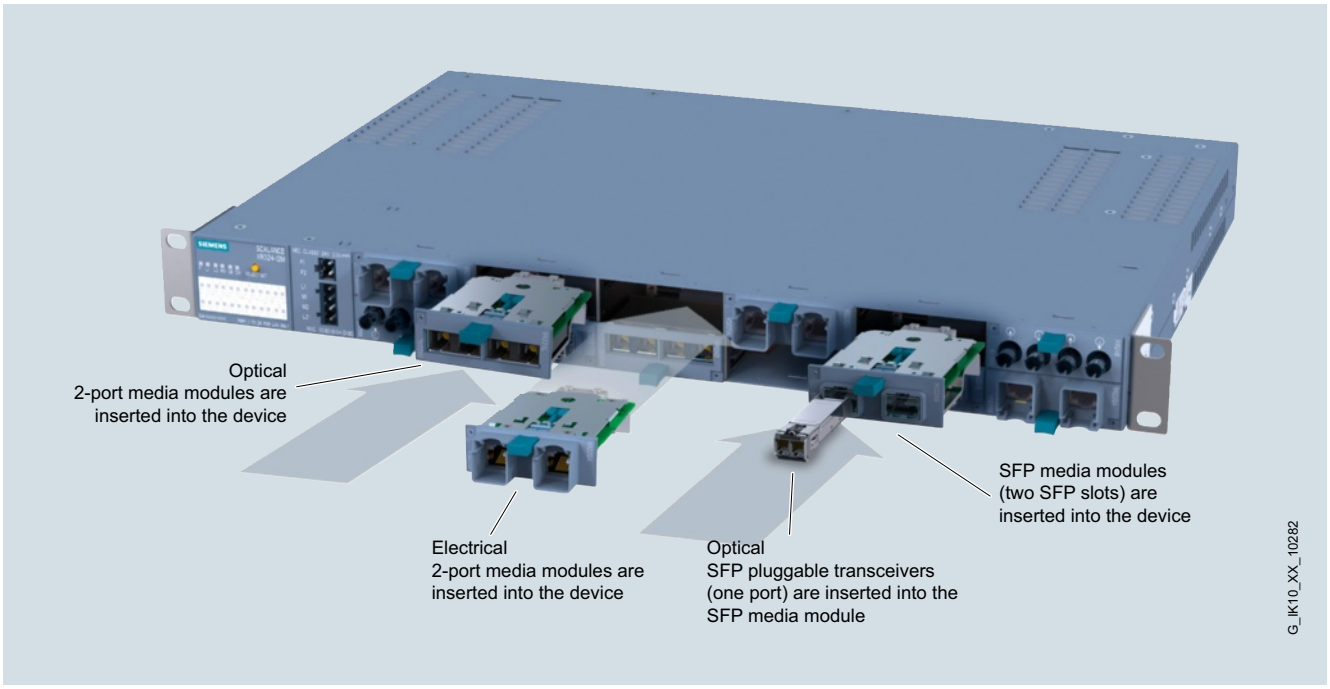
The use of media modules in partly and fully modular versions of the SCALANCE X-300 switches or selected SCALANCE S devices supports:

- Extension of networks by subsequent insertion of additional media modules in unused media module slots
- Changing of the cabling technology (e.g. conversion from copper to fiber-optic cables, or from multi-mode to single-mode FOC)
- Bridging of longer cable runs or use of existing 2-wire cables (variable distance)

Media module MM992-2VD (in VD mode)	IE FC TP Standard Cable GP 4x2 (AWG24) with IE FC RJ45 plug 4x2	0 ... 500 m at 100 Mbit/s
	Standard IE FC TP cable GP 2x2 (AWG22/1) with IE FC RJ45 plug 2x2	0 ... 300 m at 100 Mbit/s
	IE FC TP Standard Cable 2x2 (AWG22/1) with IE FC RJ45 plug 2x2	300 ... 500 m at 10 Mbit/s
	PROFIBUS FC Standard Cable GP with IE FC RJ45 plug 4x2	100 ... 1 000 m at 10 Mbit/s
	PROFIBUS FC Standard Cable GP with IE FC RJ45 plug 4x2	0 ... 100 m at 100 Mbit/s

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Design



Insertion of 2-port media modules in media module slot

Product versions of media modules

Electrical media modules with 2 x 10/100/1 000 Mbit/s RJ45 ports

- MM992-2CUC with retaining sleeve
- MM992-2CUC with retaining sleeve and coated PCBs (conformal coating)
- MM992-2CU without retaining sleeve

Electrical media modules with 2 x 1/10/100/1 000 Mbit/s RJ45 ports

- MM992-2VD with retaining collar and additional two-wire transmission function (variable distance) for establishing Ethernet connections via non-Ethernet conformant cables as well. Bridgeable distance, depending on the quality of the cable

Electrical media modules with 2 x 10/100/ 1 000 Mbit/s M12 ports

- MM992-2 with M12 interface (x-coded) and coated PCBs

Optical media modules with 2 x 100 Mbit/s BFOC ports

- MM991-2
  multimode, glass, up to 5 km
- MM991-2LD
  singlemode, glass, up to 26 km

Optical media modules with 2 x 100 Mbit/s SC ports

- MM991-2
  multimode, glass, up to 5 km
- MM991-2LD
  singlemode, glass, up to 26 km
- MM991-2LH+
  singlemode, glass, up to 70 km

Optical media modules with 2 x 1 000 Mbit/s SC ports

- MM992-2
  multimode, glass, up to 750 m
- MM992-2
  multimode, glass, up to 750 m, coated PCBs (conformal coating)
- MM992-2LD
  singlemode, glass, up to 10 km
- MM992-2LH
  singlemode, glass, up to 40 km
- MM992-2LH+
  singlemode, glass, up to 70 km
- MM992-2ELH
  singlemode, glass, up to 120 km

Optical media modules with 2 x 100/1 000 Mbit/s for SFP pluggable transceiver

- MM992-2SFP
  for SFP plug-in transceivers with 1 x 100 Mbit/s or 1 x 1 000 Mbit/s multi-mode or single-mode, glass

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Design (continued)

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
  multimode, glass, up to 5 km
- SFP991-1LD
  singlemode, glass, up to 26 km
- SFP991-1LH+
  singlemode, glass, up to 70 km
- SFP991-1ELH200
  singlemode, glass, up to 200 km

Optical SFP pluggable transceivers with 1 x 1 000 Mbit/s LC port

- SFP992-1
  multimode, glass, up to 750 m
- SFP992-1LD
  singlemode, glass, up to 10 km
- SFP992-1LH
  singlemode, glass, up to 40 km
- SFP992-1LH+
  singlemode, glass, up to 70 km
- SFP992-1ELH
  singlemode, glass, up to 120 km

	Type and quantity of ports					
	Gigabit Ethernet			Fast Ethernet		Max. distance
	10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s		
	Electrical	Optical		Optical		
Type of module	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	
Media modules						
MM992-2CUC	2x RJ45 1)					100 m
MM992-2CUC (C)	2x RJ45 1)					100 m
MM992-2CU	2x RJ45					100 m
MM992-2M12 (C)	2x M12 4)					100 m
MM992-2VD	2x RJ45					depending on cable *
MM991-2				2x BFOC		5 km
MM991-2LD					2x BFOC	26 km
MM991-2				2x SC		5 km
MM991-2LD					2x SC	26 km
MM991-2LH+					2x SC	70 km
MM992-2		2x SC				750 m
MM992-2 (C)		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 LC2)	2x LC 2)	2x LC 2)	2x LC 2)	
SFP modules 3)						
SFP991-1				1x LC		5 km
SFP991-1LD					1x LC	26 km
SFP991-1LH+					1x LC	70 km
SFP991-1ELH200					1x LC	200 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

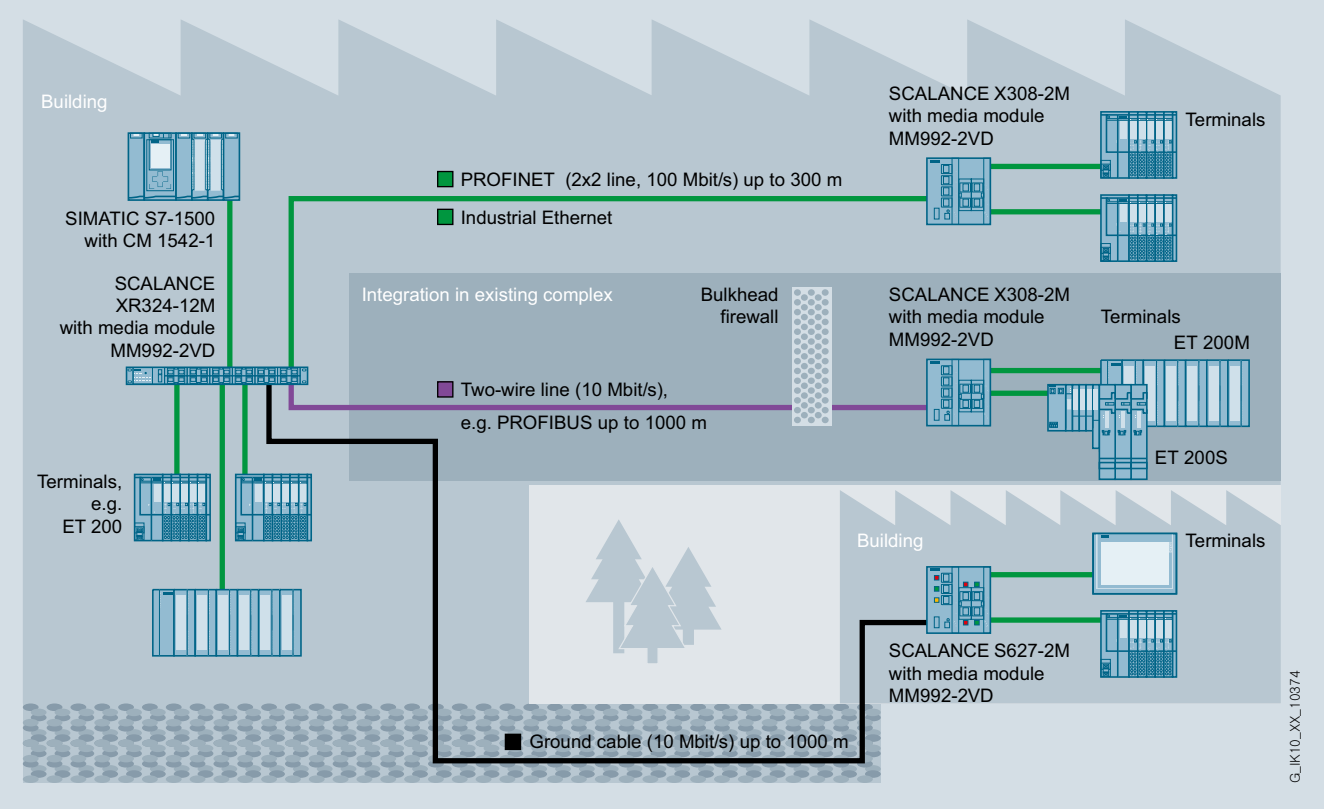
G_IK10_XX_10277

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
4) M12 X-coded
(C) Conformal Coating
* see media modules manual

Overview of media modules for SCALANCE X-300

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Integration



Ethernet communication with MM992-2VD media module

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Technical specifications

Article No.	6GK5992-2GA00-8AA0	6GK5992-2GA00-8FA0	6GK5992-2SA00-8AA0
Product-type designation	**MM992-2CUC**	**MM992-2CUC**	**MM992-2CU**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2
Number of 10/100/1 000 Mbit/s RJ45 ports	2	2	2
Design of electrical connection			
• for network components and terminal equipment	RJ45	RJ45	RJ45
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °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 maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	Conformal coating, yes	-
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	Media module with retaining collar	Media module with retaining collar	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
Mounting type Installation in media module slot	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5992-2HA00-0AA0	6GK5992-2VA00-8AA0
Product-type designation	**MM992-2 M12 GIGA**	**MM992-2VD (RJ45)**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	2	2
Number of 10/100/1 000 Mbit/s M12 ports	2	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	2
Design of electrical connection		
• for network components and terminal equipment	M12	RJ45
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Ambient condition for (standard) operation mode	Conformal coating, yes	-
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	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
Mounting type Installation in media module slot	Yes	Yes
Mounting type	Latched	Latched
Standards, specifications, approvals		
Standard		
• for EMC from FM	-	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	-	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	-	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area 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
• for emitted interference	-	EN 61000-6-4:2007 (Class A)
• for interference immunity	-	EN 61000-6-2:2005
Verification of suitability	-	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
• Railway application in accordance with EN 50155	Yes	-

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Technical specifications (continued)

Article No.	6GK5991-2AB00-8AA0	6GK5991-2AC00-8AA0
Product-type designation	**MM991-2 (BFOC)**	**MM991-2LD (BFOC)**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	2	2
Number of 100 Mbit/s ST(BFOC) ports	2	2
Design of optical connections for network components or terminal devices	BFOC	BFOC
Connectable optical power relative to 1 mW		
• of the transmitter output	-19 … -14 dB	-15 … -8 dB
• of the receiver input maximum	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	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
Mounting type Installation in media module slot	Yes	Yes
Mounting type	Latched	Latched
Standards, specifications, approvals		
Standard		
• for EMC	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3(2) G Ex nA [op is] IIC T4 DEKRA 11 ATEX 0060 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5991-2AD00-8AA0	6GK5991-2AF00-8AA0	6GK5991-2AE00-8AA0
Product-type designation	**MM991-2 (SC)**	**MM991-2LD (SC)**	**MM991-2LH+**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2
Number of 100 Mbit/s SC ports	2	2	2
Design of optical connections for network components or terminal devices	SC	SC	SC
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-34 dB	-32 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	12 … 70 km
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °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 maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	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
Mounting type Installation in media module slot	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC	-	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5992-2AL00-8AA0	6GK5992-2AL00-8FA0	6GK5992-2AM00-8AA0	6GK5992-2AN00-8AA0
Product-type designation	**MM992-2**	**MM992-2**	**MM992-2LD**	**MM992-2LH**
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2	2
Number of 1 000 Mbit/s SC ports (LX)	-	-	2	2
Number of 1 000 Mbit/s SC ports (SX)	2	2	-	-
Design of optical connections for network components or terminal devices	SC	SC	SC	SC
Connectable optical power relative to 1 mW				
• of the transmitter output	-9.5 … -4 dB	-9.5 … -4 dB	-9.5 … -3 dB	-6 … +0 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-17 dB	-21 dB	-23 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	0 dB	3 dB
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 0.75 km	0 … 10 km	8 … 40 km
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °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 maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	Conformal coating, yes	-	-
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	Media module	Media module	Media module	Media module
Width	60 mm	60 mm	60 mm	60 mm
Height	22 mm	22 mm	22 mm	22 mm
Depth	100 mm	100 mm	100 mm	100 mm
Net weight	0.08 kg	0.08 kg	0.08 kg	0.08 kg
Mounting type Installation in media module slot	Yes	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched	Latched
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5992-2AP00-8AA0	6GK5992-2AQ00-8AA0	6GK5992-2AS00-8AA0
Product-type designation	**MM992-2LH+**	**MM992-2ELH**	**MM992-2SFP**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2
Number of electrical connections			
• for SFP+/SFP	-	-	2
Number of 1 000 Mbit/s SC ports (LX)	2	2	-
Design of optical connections for network components or terminal devices	SC	SC	-
Connectable optical power relative to 1 mW			
• of the transmitter output	0 … 5 dB	0 … 5 dB	-
• of the receiver input maximum	-3 dB	-3 dB	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-23 dB	-30 dB	-
Attenuation of fiber-optic cable transmission link minimum necessary	8 dB	8 dB	-
Range at the optical interface depending on the optical fiber used	30 … 70 km	37 … 120 km	-
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +60 °C	-40 … +60 °C	-40 … +70 °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 maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	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
Mounting type Installation in media module slot	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area 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 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5991-1AD00-8AA0	6GK5991-1AF00-8AA0	6GK5991-1AE00-8AA0	6GK5991-1AE30-8AA0
Product-type designation	**SFP991-1**	**SFP991-1LD**	**SFP991-1LH+**	**SFP991-1ELH200**
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	1	1	1	1
Number of 100 Mbit/s LC ports	1	1	1	1
Design of optical connections for network components or terminal devices	LC	LC	LC	LC
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-15 … -8 dB	-5 … +0 dB	1 … 5 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-9 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB	-34 dB	-42 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB	14 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	12 … 70 km	61 … 200 km
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	SFP Module	SFP Module	SFP Module	SFP Module
Width	13.7 mm	13.7 mm	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg	0.01 kg	0.01 kg
Mounting type	Latched	Latched	Latched	Latched
Standards, specifications, approvals				
Standard				
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	-	-	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	No	No	No	No

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Technical specifications (continued)

Article No.	6GK5992-1AL00-8AA0	6GK5992-1AM00-8AA0	6GK5992-1AN00-8AA0
Product-type designation	**SFP992-1**	**SFP992-1LD**	**SFP992-1LH**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	1	1	1
Number of 1 000 Mbit/s LC ports (LX)	-	1	1
Number of 1 000 Mbit/s LC ports (SX)	1	-	-
Design of optical connections for network components or terminal devices	LC	LC	LC
Connectable optical power relative to 1 mW			
• of the transmitter output	-9.5 … -4 dB	-9.5 … -3 dB	-6 … +0 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-23 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 10 km	8 … 40 km
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	SFP Module	SFP Module	SFP Module
Width	13.7 mm	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg	0.01 kg
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	-	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	No	No	No

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Technical specifications (continued)

Article No.	6GK5992-1AP00-8AA0	6GK5992-1AQ00-8AA0
Product-type designation	**SFP992-1LH+**	**SFP992-1ELH**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	1	1
Number of 1 000 Mbit/s LC ports (LX)	1	1
Design of optical connections for network components or terminal devices	LC	LC
Connectable optical power relative to 1 mW		
• of the transmitter output	0 … 5 dB	0 … 5 dB
• of the receiver input maximum	-3 dB	-8 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-23 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	8 dB	8 dB
Range at the optical interface depending on the optical fiber used	30 … 70 km	37 … 120 km
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	SFP Module	SFP Module
Width	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg
Mounting type	Latched	Latched
Standards, specifications, approvals		
Standard		
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous area of CSA and UL	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	No	No

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Ordering data	Article No.
Electrical media modules	
with 2 x 10/100/1 000 Mbit/s RJ45 ports, electrical	
• MM992-2CUC with retaining sleeve	**6GK5992-2GA00-8AA0**
• MM992-2CUC with retaining sleeve and coated PCBs (conformal coating)	**6GK5992-2GA00-8FA0**
• MM992-2CU without retaining sleeve	**6GK5992-2SA00-8AA0**
with 2 x 10/100/1 000 Mbit/s M12 ports, electrical	
• MM992-2 M12 interface (x-coded) and coated PCBs (conformal coating)	**6GK5992-2HA00-0AA0**
with 2 x 1/10/100/1 000 Mbit/s RJ45 ports, electrical	
• MM992-2VD	**6GK5992-2VA00-8AA0**
Fiber optic modules	
with 2 x 100 Mbit/s BFOC ports, optical	
• MM991-2 multimode, glass, up to 5 km	**6GK5991-2AB00-8AA0**
• MM991-2LD singlemode, glass, up to 26 km	**6GK5991-2AC00-8AA0**
with 2 x 100 Mbit/s SC ports, optical	
• MM991-2 multimode, glass, up to 5 km	**6GK5991-2AD00-8AA0**
• MM991-2LD singlemode, glass, up to 26 km	**6GK5991-2AF00-8AA0**
• MM991-2LH+ singlemode, glass, up to 70 km	**6GK5991-2AE00-8AA0**
with 2 x 1 000 Mbit/s SC ports, optical	
• MM992-2 multimode, glass, up to 750 m	**6GK5992-2AL00-8AA0**
• MM992-2 multimode, glass, up to 750 m, coated PCBs (conformal coating)	**6GK5992-2AL00-8FA0**
• MM992-2LD singlemode, glass, up to 10 km	**6GK5992-2AM00-8AA0**
• MM992-2LH singlemode, glass, up to 40 km	**6GK5992-2AN00-8AA0**
• MM992-2LH+ singlemode, glass, up to 70 km	**6GK5992-2AP00-8AA0**
• MM992-2ELH singlemode, glass, up to 120 km	**6GK5992-2AQ00-8AA0**
with 2 x 100/1 000 Mbit/s for SFP pluggable transceiver, optical	
• MM992-2SFP for SFP pluggable transceivers with 1 x 100 or 1 x 1 000 Mbit/s multimode or singlemode, glass	**6GK5992-2AS00-8AA0**

Ordering data	Article No.
SFP pluggable transceiver, optical	
with 1 x 100 Mbit/s LC port, optical	
• SFP991-1 multimode, glass, up to 5 km	**6GK5991-1AD00-8AA0**
• SFP991-1LD singlemode, glass, up to 26 km	**6GK5991-1AF00-8AA0**
• SFP991-1LH+ singlemode, glass, up to 70 km	**6GK5991-1AE00-8AA0**
• SFP991-1ELH200 singlemode, glass, up to 200 km	**6GK5991-1AE30-8AA0**
with 1 x 1 000 Mbit/s LC port, optical	
• SFP992-1 multimode, glass, up to 750 m	**6GK5992-1AL00-8AA0**
• SFP992-1LD singlemode, glass, up to 10 km	**6GK5992-1AM00-8AA0**
• SFP992-1LH singlemode, glass, up to 40 km	**6GK5992-1AN00-8AA0**
• SFP992-1LH+ singlemode, glass, up to 70 km	**6GK5992-1AP00-8AA0**
• SFP992-1ELH singlemode, glass, up to 120 km	**6GK5992-1AQ00-8AA0**
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	**6GK1901-1BE00-0AA1**
• with 1GE insert; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
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 1 000 m, minimum order quantity 20 m	
IE FC TP Standard Cable GP 4 x 2	**6XV1870-2E**
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 length 1 000 m, minimum order 20 m	

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Ordering data	Article No.
Accessories *(continued)*	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with two RJ45 plugs	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE FC RJ45 Plug 180	
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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-400

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	10 Gigabit Ethernet	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)	PLUG slot	
X408-2								•		•		•	•	•		•	•	•	
X414-3E								•		•		•	•	•		•	•	•	
XM416-4C		•						•		•		•	•	•		•	•	•	
XM408-8C		•						•		•		•	•	•		•	•	•	
XM408-4C		•						•		•		•	•	•		•	•	•	
PE408		•						•		•		•	•				•		
PE400-8SFP		•						•		•		•	•				•		
PE408 PoE		•						•		•	•	•	•				•		

Type of device	Software																											
	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	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)	Access Control List (IP)	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)	
X408-2		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•					
X414-3E		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	
XM416-4C		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
XM408-8C		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
XM408-4C		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	G_IK10_XX_10309

• applies

Functional overview of SCALANCE X-400 managed and XM-400 managed

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Overview



The SCALANCE X-400 product range comprises modular Industrial Ethernet switches expandable with various media modules and, in some cases, with extenders. It supports 10/100/1 000 Mbit technology for various transmission media (twisted pair, fiber optic) and increased port requirements. The main applications are high-performance plant networks (control level). Thanks to its partly modular design, the X-400 product line is also designed for future requirements and can be adapted to the relevant task.

- Two to four integral Gigabit Ethernet twisted pair interfaces (10/100/1 000 Mbit/s) for connecting several switches to each other; node connection via the Fast Ethernet twisted pair ports (10/100 Mbit/s) integrated into the basic unit
- ***SCALANCE X414-3E;***
  another eight nodes can be connected to the basic unit via extender modules;
  the following extender modules are available:
  - Extenders with eight Fast Ethernet twisted-pair ports
  - Extenders with four media module slots for up to eight Fast Ethernet fiber optic ports
- High-speed media redundancy through integral redundancy manager even for large networks, for both Gigabit Ethernet and Fast Ethernet
- For the construction of optical Gigabit Ethernet rings, the integrated Gigabit Ethernet ports can be converted to fiber optic via a 2-port Gigabit Ethernet media module (MM).
- By means of pluggable 2-port Fast Ethernet media modules for multimode or alternatively single-mode fiber-optic cable, SCALANCE X-400 switches can also be integrated into 100 Mbit/s rings, e.g. with SCALANCE X204-2. In this way, even remote nodes can be connected optically.
- Remote diagnostics by means of PROFINET diagnostics, CLI, Web browser, or SNMP
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards: Establishment of virtual networks (VLANs)
- Integration into higher-level enterprise networks thanks to support for standardized redundancy procedures (Rapid Spanning Tree Protocol)
- By learning the Multicast sources and targets (IGMP: **I**nternet **G**roup **M**anagement **P**rotocol snooping), SCALANCE X-400 switches can also filter Multicast data traffic and therefore limit the load in the network.
- Creation of IP subnets and IP router communication by means of Layer 3 switching (IP routing) on SCALANCE X414-3E
  - Static routing
  - Dynamic routing OSPF (Open Shortest Path First) and RIPv2 (Routing Information Protocol)
  - Redundant routing VRRP (Virtual Router Redundancy Protocol)

SCALANCE X408-2/SCALANCE X414-3

Communication connections

- Integral Gigabit Ethernet twisted pair ports (10/100/1 000 Mbit/s, RJ45 sockets) for interconnecting the SCALANCE X-400 switches:
  - ***SCALANCE X408-2:*** 4 Gigabit Ethernet twisted pair ports
  - ***SCALANCE X414-3E:*** 2 Gigabit Ethernet twisted pair ports
- Integral Fast Ethernet twisted pair ports (10/100 Mbit/s, RJ45 sockets with retaining collars) for node connection
  - ***SCALANCE X408-2:*** 4 Fast Ethernet twisted pair ports
  - ***SCALANCE X414-3E:*** 12 Fast Ethernet twisted pair ports
- The Gigabit Ethernet ports can be converted to fiber-optic connections with optical Gigabit Ethernet media modules

Only for ***SCALANCE X408-2***

- Two universal slots either for optical Fast Ethernet or Gigabit Ethernet media modules with two ports

Only for ***SCALANCE X414-3E***

- Two slots for optical Fast Ethernet media modules with two ports
- One extender interface for expansion by 8 Fast Ethernet ports (twisted pair or fiber optic, depending on extender version). In this way, a maximum configuration of two Gigabit Ethernet Ports (electrical or optical) and up to 24 Fast Ethernet ports (of which between 2 and 12 can be optical) is possible. The maximum installation width including extender is 19".

Interfaces:

- Console port (serial interface) for on-site parameterization/ diagnostics, for firmware update
- Slot for C-PLUG swap media for easy device replacement (included in scope of supply)
- Redundant 24 V DC supply; two feeds are available for protection against voltage failure
- One floating message output for simple display of faults

Only for ***SCALANCE X414-3E***

- Additional out-band Ethernet port for on-site parameterization/ diagnostics
- Eight floating inputs for recording digital status information such as signal contacts of PROFIBUS OLM or door contacts and forwarding via SCALANCE X-400 diagnostic paths (LED indicator, log table, trap or Email)

Extensive operating mode and status information is displayed via LEDs and selection buttons.

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Benefits

get Designed for Industry

- Flexible construction of electrical or optical Industrial Ethernets;
  the network topology, type and number of ports can be adapted easily to the structure of the plant
- 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, RSTP and VRRP are integrated)
  - Replacement and extension of media and expansion modules during operation
  - Easy device replacement by means of plug-in C-PLUG swap medium
- Reliable communication thanks to very fast reconfiguration of the network in the event of a fault
- Simple fiber optic connection technology by means of SC sockets (Gigabit Ethernet), BFOC sockets (Fast Ethernet) and prefabricated fiber optic cables
- Twisted pair ports are readily accessible from the front, 10/100/1 000 Mbit/s;
  ports with sleeve for rugged, industry-compatible station connection for direct connections up to 100 m in conjunction with the PROFINET-compatible IE FC RJ45 Plug 180 or IE FC RJ45 Plug 145 connector
- Easy network configuration without runtime calculation also for extremely large networks
- Simple monitoring and diagnosis by means of signaling contact, digital inputs, SNMP, Syslog and e-mail; PROFINET IO diagnostics
- Reduced engineering expenditure for PLC/HMI due to integration into the SIMATIC system fault message concept SFM
- Thanks to the integrated Layer 3 function (IP routing) – static, dynamic and redundant – of SCALANCE X414-3E, networks can be divided into different subnets
- Investment protection for existing networks due to
  - Effortless connection of existing 10 bit/s data terminals or network segments to Fast Ethernet networks with 100 Mbit/s
  - Increase in performance through load decoupling and data transfer rates of 100 Mbit/s and 1 000 Mbit/s
  - Easy integration into existing network management infrastructures by means of SNMP
- Support of VLAN permits integration into Enterprise Security Policies
- Load limiting with use of Multicast protocols (e.g. video transmission) by means of IGMP (Internet Group Management Protocol) snooping or GMRP (GARP Multicast Registration Protocol)
- Protection of network against overload by setting of port thresholds
- Operating temperature range
  - ***SCALANCE X414-3E:*** -40 °C to + 70 °C
  - ***SCALANCE X408-2:*** 0 °C to + 60 °C
- Low-maintenance operation thanks to fanless construction

Application

SCALANCE X-400 products permit the configuration of switched networks at the control level, which not only demands high availability of the network and extensive diagnostic options, but also a high number of ports, high transfer rate and the support of fiber optic and twisted-pair transmission media. SCALANCE X-400 products are designed with IP20 degree of protection for installation in control cabinets.

SCALANCE X408-2

- Control stations with a low concentration of devices
- Star hub in plant bus for applications with low concentration of devices
- High-speed backbone including high-speed media redundancy for process control systems
- In the high-speed backbone for coupling Gigabit network topologies

SCALANCE X414-3E

- Control stations with a high concentration of devices
- Star hub in plant bus for applications with high concentration of devices
- High-speed backbone including high-speed media redundancy for process control systems
- SCALANCE X414-3E equipped with Layer 3 for IP routing (static, dynamic, redundant)

Design

SCALANCE X-400 media modules (MM)

SCALANCE X-400 switches can be equipped with 2-port media modules. Media modules are available for both multi-mode and single-mode optical fibers. They can be added or replaced during network operation. The operating temperature range is -40 to +70 °C. The SCALANCE X414-3E basic unit supports two optical Gigabit Ethernet ports and up to four additional optical Fast Ethernet ports.

On two media-module slots, SCALANCE X408-2 supports as many as four optical ports which can optionally be equipped with optical Gigabit Ethernet or Fast Ethernet media modules.

The following media modules are available:

- MM491-2;
  two fiber optic ports (BFOC sockets) 100 Mbit/s for distances up to 5 km with multi-mode fiber-optic conductors
- MM491-2LD;
  two fiber optic ports (BFOC sockets) 100 Mbit/s for distances up to 26 km with single-mode fiber-optic conductors
- MM491-2LH+;
  two fiber optic ports (SC sockets) 100 Mbit/s for distances up to 70 km with single-mode fiber-optic conductors
- MM492-2;
  two fiber optic ports (SC sockets) 1 Gbit/s for distances up to 750 m with multi-mode fiber-optic conductors (when using SIMATIC NET FO cable 50/125 µm)
- MM492-2LD;
  two fiber optic ports (SC sockets) 1 Gbit/s for distances up to 10 km with single-mode fiber-optic conductors
- MM492-2LH; two fiber optic ports (SC sockets) 1 Gbit/s for distances up to 40 km with single-mode fiber-optic conductors
- MM492-2LH+; two fiber optic ports (SC sockets) 1 Gbit/s for distances up to 70 km with single-mode fiber-optic conductors
- MM492-2ELH; two fiber-optic ports (SC sockets) 1 Gbit/s for distances up to 120 km with single-mode fiber-optic conductors

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Design (continued)

Plug-in media modules for Gigabit Ethernet convert the Gigabit Ethernet twisted pair-ports included in the switch to optical mode. The Gigabit ports can then be used as either twisted-pair or fiber-optic ports. In the case of the SCALANCE X414-3E basic device, optical media modules for Fast Ethernet each generate two additional ports per slot.

SCALANCE X-400 extender modules (EM)
(For SCALANCE X414-3E only)

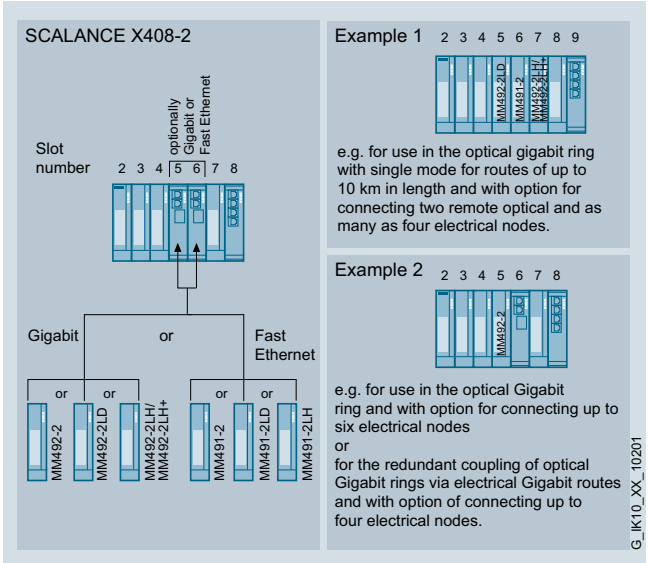
An optional extender module with up to eight further Fast Ethernet ports can be mounted next to the expansion interface of the SCALANCE X414-3E. The operating temperature range is -40 to +70 °C.

Versions

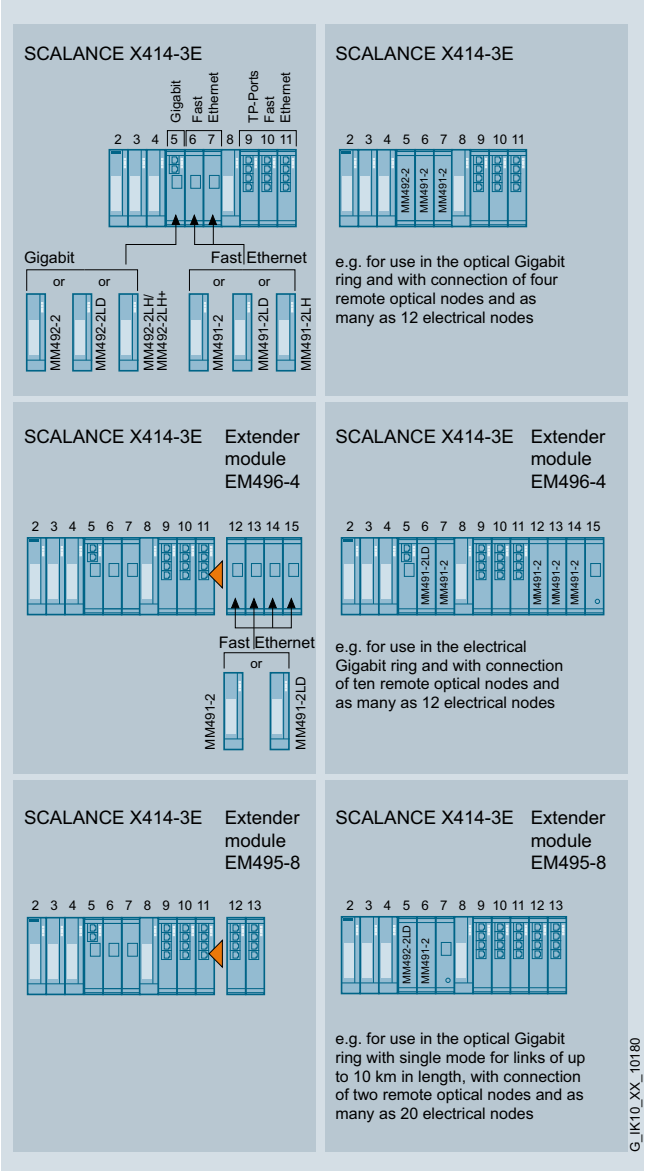
- EM495-8;
  with 8 twisted pair ports (RJ45 sockets with sleeves) 10/100 Mbit/s; this enables the 12 onboard Fast Ethernet twisted pair ports of the SCALANCE X414-3E to be expanded to a total of 20 ports.
- EM496-4;
  with a further four media module slots for Fast Ethernet media modules for up to 8 optical Fast Ethernet ports

The structure of the SCALANCE X-400 product line offers the following advantages

- Simple user connection via twisted pair
- Gigabit Ethernet transfer rate between SCALANCE X-400 switches
- Fiber optic connection via fiber-optic media modules
- Reduced costs for spare parts inventories
  Electrical and optical variants are covered by a basic unit and fiber-optic media modules



Possible applications of the media modules with SCALANCE X408-2



Possible applications of the media and extender modules with SCALANCE X414-3E

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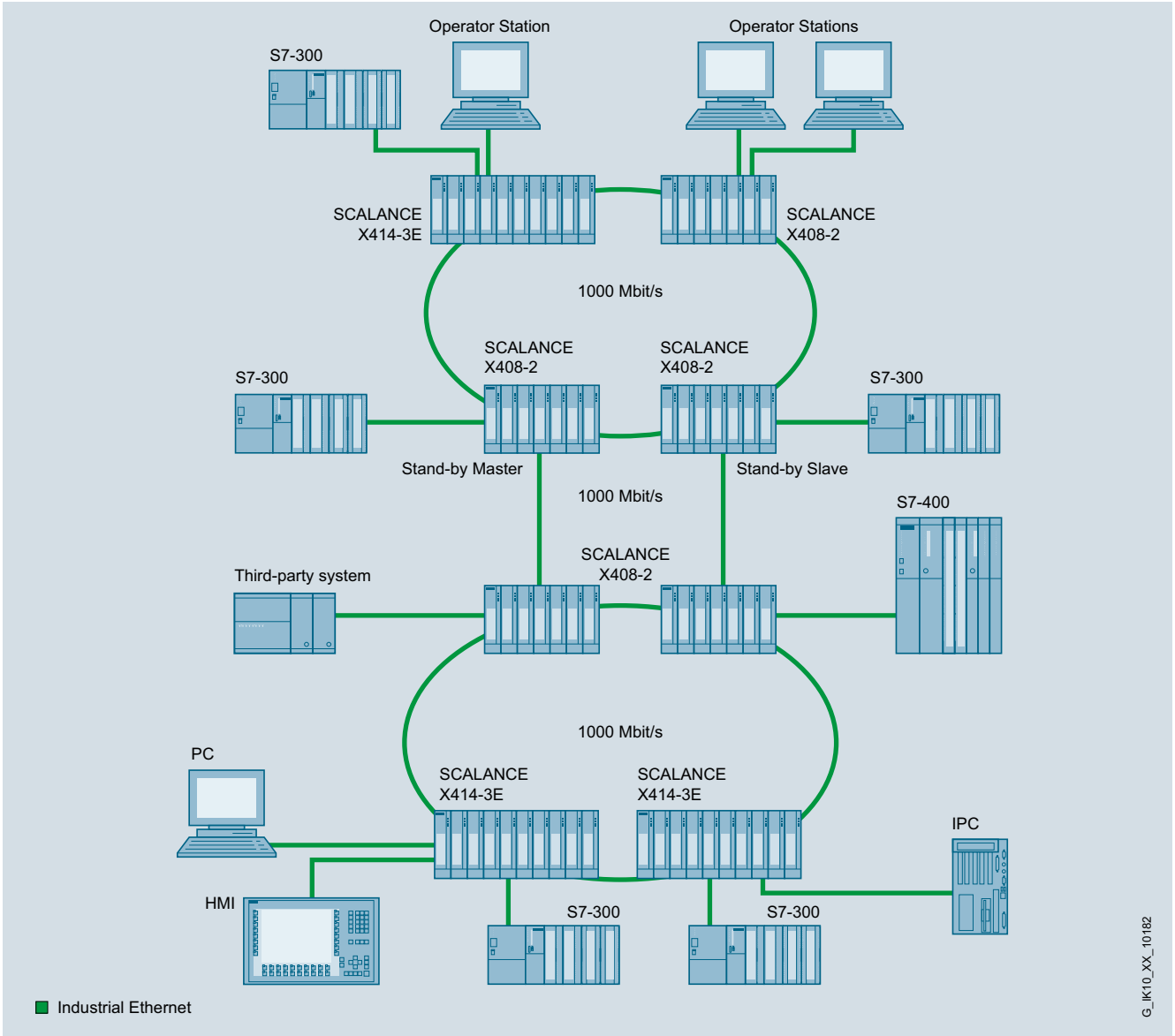
Function

- Increasing 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 network expansion;
  the switch saves the data received at the ports and forwards it automatically to the destination address. The limitation of the network expansion by collision detection (CSMA/CD procedure) terminates at the port.
- Limitation of the error propagation to the affected subnetwork;
  the SCALANCE X-400 switches only forward 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-400 switch automatically recognizes the conductor pairs for transmission and reception (autocrossover), the data transfer rate of 10 or 100 Mbit/s, as well as full-duplex and half-duplex operation (autonegotiation).
- High-performance connection of SCALANCE X-400 switches with 1 Gbit/s;
  SCALANCE X-400 switches have two (X414-3E) or four (X408-2) Gigabit Ethernet ports for connecting the switches to each other.
- Integrated redundancy manager for constructing Fast Ethernet and Gigabit Ethernet ring topologies with high-speed media redundancy.
- High-speed standby redundancy;
  several network segments such as rings can be interconnected redundantly with SCALANCE X-400 by means of the integrated standby function. Two X-400 switches are configured in a ring as a master and slave and are connected via two links to the other ring. In the case of SCALANCE X408-2 or SCALANCE X-300, a high-performance redundant coupling at 1 000 Mbit/s is possible.
- Redundant interfacing to company networks;
  SCALANCE X-400 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.
- Integrated hardware Layer 3 Switching function
  (IP routing, only SCALANCE X414-3E);
  IP subnetworks can be created and interconnected, e.g. automation network with office network, enabling a structuring of the networks.
- Load limiting with use of Multicast protocols
  (e.g. video transmission);
  through learning the Multicast sources and targets (IGMP snooping), SCALANCE X-400 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.
- Fast replacement of devices in event of failure, by means of the C-PLUG switching medium

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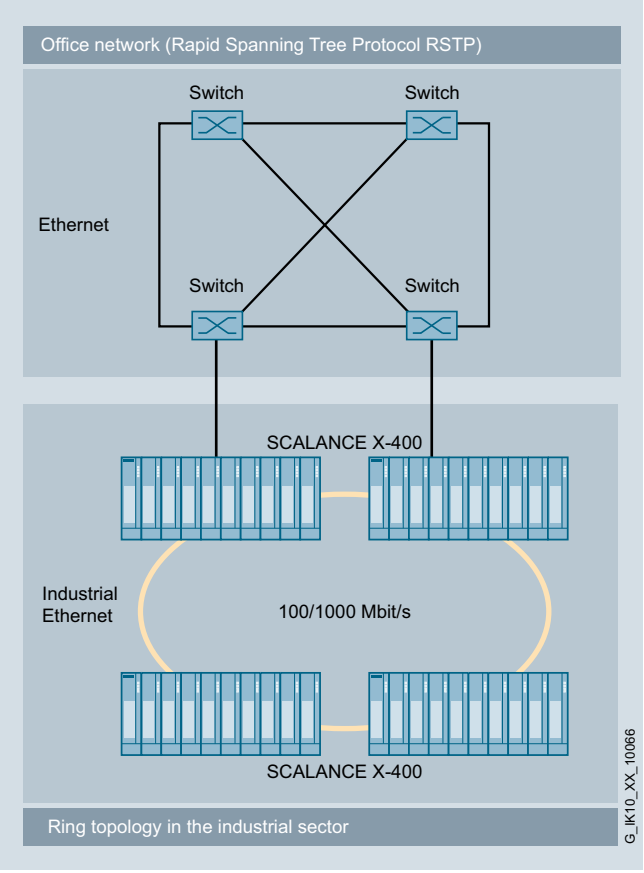
Function (continued)



Optical redundant connection of two optical Gigabit subnets with SCALANCE X408-2 on Layer 2 and Layer 3

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Function (continued)



Redundant coupling with an Office network and industrial network on Layer 2 and Layer 3

Network topology and network configuration

The network topology can easily be adapted to the structure of the plant with SCALANCE X-400 Industrial Ethernet switches. The following network structures and combinations of structures can be implemented:

- Fast Ethernet and Gigabit rings with fast media redundancy: To protect against failure of a transmission link or a switch, as many as 50 X-400 switches cascaded in line can be connected into a ring with a total length of up to 150 km using multi-mode or 6,000 km using single mode. On the failure of a transmission link or a SCALANCE X-400 switch in the ring, the transmission path is quickly reconfigured due to the media redundancy.
- Several rings can be redundantly linked through the standby function.
- At the same time, SCALANCE X-400 supports redundant connection of the ring structure to the corporate network with Rapid Spanning Tree.
- Star topology with SCALANCE X-400 switches:
  The SCALANCE X-414-3E switch represents a star point which can interconnect as many as 26 nodes or subnetworks electrically or optically;
  SCALANCE X408-2 can connect up to 8 nodes or subnetworks.

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:
  - 3 000 m at 100 Mbit/s
  - 750 m at 1 Gbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 70 km at 100 Mbit/s
  - 12 km at 1 Gbit/s
- Maximum length of installation cable:
  - 100 m at 100 Mbit/s with IE FC TP Cable 2 x 2 and IE FC Plug 180
  - Max. 90 m at 1 Gbit/s with IE FC TP cable 4 x 2, IE FC RJ45 modular outlet and patch cable (10 m)
  - 100 m at 1 000 Mbit/s with IE FC TP Cable 4 x 2 and IE FC Plug 4 x 2

Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM;
  to establish a ring, a SCALANCE X-400 is switched to RM mode. The Gigabit ports (electrical or – with media module – optical) are preferably used as ring ports. When using in optical rings with 100 Mbit/s, the ring ports can be configured on one media module or on two media modules.
- Signal mask;
  the signal mask is set to the current status of the SCALANCE X-400 (setpoint) by pushbutton operation. It defines which ports and which voltage feeds are to be monitored. The signal 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 (10/100/1 000 Mbit/s, full/half-duplex)
  - Status of the two voltage feeders
  - Signal contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode
- The status of the signal 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.
- A PC or a programming device can be directly connected via a serial interface or, with the X414-3E, also via an Ethernet interface (out-band port). Operation is by means of commands (Command Line Interface (CLI)).
- Monitoring via the Industrial Ethernet network;
  the following possibilities are available:
  - Remote via standard browser (Web-based management): Selection of SCALANCE X-400 switches via the network from a PC with browser
  - Remote via SNMP V1, V2c, V3:
    Secure integration of SCALANCE X-400 switches via the network into a network management station
  - Remote via PROFINET IO diagnostics
  - Standard diagnostic alarms can be configured in an easy, familiar manner in STEP 7 and processed in SIMATIC.
    The engineering outlay is drastically reduced for the PLC and HMI through complete integration in the SIMATIC system error message concept SFM.

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Function (continued)

Network management

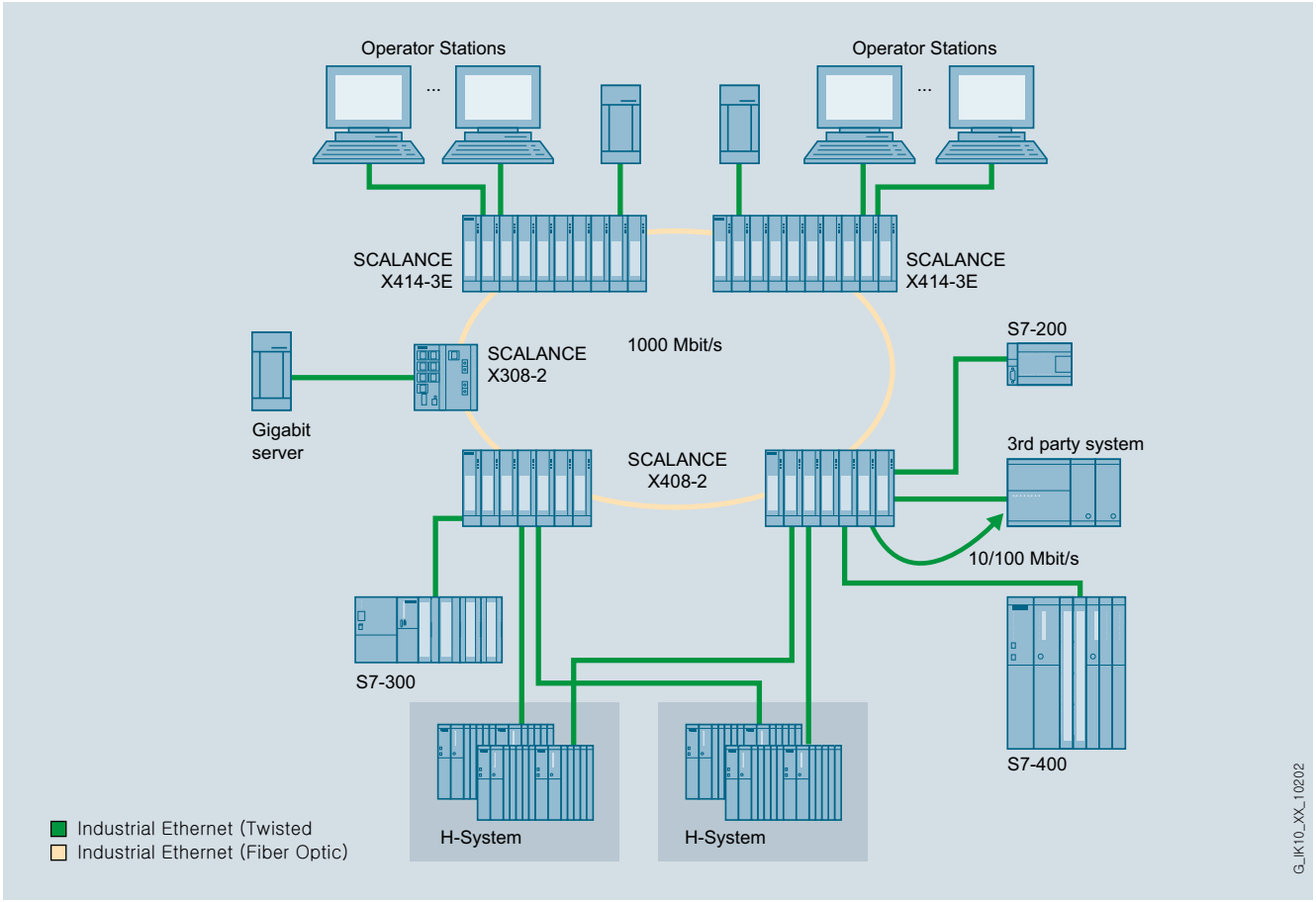
The network management provides the following functions:

- 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
- 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 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 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
- Only for SCALANCE X414-3E:
  Configuration of the IP routing function (static routing, dynamic routing, (OSPF, RIP v1/2) and redundant routing (VRRP))

If faults occur in the network, the SCALANCE X-400 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 XM-400 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.

Integration



Fault-tolerant system with SCALANCE X-400

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Technical specifications

Article No.	**6GK5408-2FD00-2AA2**	**6GK5414-3FC00-2AA2**
Product-type designation	**SCALANCE X408-2**	**SCALANCE X414-3E**
Transmission rate		
Transfer rate 1	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	12	26
Number of electrical connections for operator console	1	1
Design of electrical connection for operator console	RS232 port	RS232 port
Number of electrical connections		
• for network components and terminal equipment	8	14
• for network components and terminal equipment with extender modules	-	8
• for signaling contact	1	1
• for media module	2	3
• for power supply	1	1
• for redundant power supply	1	1
Design of electrical connection		
• for network components and terminal equipment	RJ45 port (4 x 1GE, 4 x FE)	RJ45 port (2 x 1GE, 12 x FE)
• for network components and terminal equipment with extender modules	-	RJ45 port via EM495-8
• for signaling contact	4-pole terminal block	4-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide		
• at 100 Mbit/s	4	4
• at 1 000 Mbit/s	4	2
• with extender modules	-	8
Design of optical interface for optical waveguide		
• at 100 Mbit/s	BFOC or SC ports via media modules MM491-2, MM491-2LD, MM491-2LH+	BFOC or SC ports via media modules MM491-2, MM491-2LD, MM491-2LH+
• at 1 000 Mbit/s	SC ports via media modules MM492-2, MM492-2LD, MM492-2LH, MM492-2LH+	SC ports via media modules MM492-2, MM492-2LD, MM492-2LH, MM492-2LH+
• with extender modules	-	BFOC or SC ports via media modules MM491-2, MM491-2LD, MM491-2LH+, MM492-2, MM492-2LD, MM492-2LH, MM492-2LH+
Number of extender expansion interfaces	-	1
Design of the extender extension interface	-	EM495-8 or EM496-4
Design of the removable storage C-PLUG	Yes	Yes
Signal-Inputs/outputs		
Operating voltage of signaling contacts at DC rated value	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A
Number of digital inputs	-	2
Number of electrical connections for digital input signals	-	2
Design of electrical connection for digital input signals	-	5-pole terminal block

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Technical specifications (continued)

Article No.	6GK5408-2FD00-2AA2	6GK5414-3FC00-2AA2
Product-type designation	**SCALANCE X408-2**	**SCALANCE X414-3E**
Supply voltage, current consumption, power loss		
Type of supply voltage	DC	DC
Supply voltage external	24 V	24 V
• minimum	20.4 V	20.4 V
• maximum	28.8 V	28.8 V
Product component fusing at power supply input	Yes	Yes
Type of fusing at input for supply voltage	F 3 A / 32 V	F 3,15 A / 250 V
Consumed current maximum	0.7 A	2 A
Active power loss		
• at 24 V for DC	8 W	15 W
• maximum	48 W	48 W
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 60 °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 maximum	95 %	95 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	Modular	Modular
Width	242 mm	344 mm
Height	145 mm	145 mm
Depth	117 mm	117 mm
Net weight	1.9 kg	3.07 kg
Mounting type		
• 35 mm DIN rail mounting	Yes	Yes
• wall mounting	No	No
• S7-300 rail mounting	Yes	Yes
Mounting type	-	-
Product properties, functions, components general		
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s	50	50
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration		
Product function		
• CLI	Yes	Yes
• web-based management	Yes	Yes
• MIB support	Yes	Yes
• TRAPs via email	Yes	Yes
• Configuration with STEP 7	Yes	Yes
• RMON	Yes	Yes
• Port mirroring	Yes	Yes
• CoS	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes
• switch-managed	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5408-2FD00-2AA2	6GK5414-3FC00-2AA2
Product-type designation	**SCALANCE X408-2**	**SCALANCE X414-3E**
Protocol is supported		
• Telnet	Yes	Yes
• HTTP	Yes	Yes
• HTTPS	Yes	Yes
• TFTP	Yes	Yes
• FTP	Yes	Yes
• BOOTP	Yes	Yes
• SNMP v1	Yes	Yes
• SNMP v2	Yes	Yes
• SNMP v3	Yes	Yes
• IGMP (snooping/querier)	Yes	Yes
• GMRP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
Identification & maintenance function		
• I&M0 - device-specific information	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes
Product functions Diagnosis		
Product function		
• Port diagnostics	Yes	Yes
• Statistics packet size	Yes	Yes
• Statistics packet type	Yes	Yes
• Error statistics	Yes	Yes
• SysLog	Yes	Yes
Product functions VLAN		
Product function		
• VLAN - port based	Yes	Yes
• VLAN dynamic	Yes	Yes
Number of VLANs maximum	64	64
Number of VLANs - dynamic maximum	64	64
Protocol is supported GVRP	Yes	Yes
Product functions DHCP		
Product function		
• DHCP client	Yes	Yes
• DHCP Option 82	Yes	Yes
• DHCP Option 66	Yes	Yes
• DHCP Option 67	Yes	Yes
Product functions Routing		
Product function		
• static IP routing	No	Yes
• dynamic IP routing	No	Yes
Protocol is supported		
• RIPv2	No	Yes
• OSPFv2	No	Yes
• VRRP	No	Yes

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Technical specifications (continued)

Article No.	6GK5408-2FD00-2AA2	6GK5414-3FC00-2AA2
Product-type designation	**SCALANCE X408-2**	**SCALANCE X414-3E**
Product functions Redundancy		
Product function		
• Ring redundancy	Yes	Yes
• Redundancy manager	Yes	Yes
• Standby redundancy	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes
• Redundancy procedure STP	Yes	Yes
• RSTP redundancy protocol	Yes	Yes
• Redundancy procedure MSTP	Yes	No
• Passive listening	Yes	Yes
Protocol is supported		
• STP/RSTP	Yes	Yes
• STP	Yes	Yes
• RSTP	Yes	Yes
• RSTP big network support	Yes	Yes
• LACP	Yes	Yes
Product functions Security		
Product function		
• ACL - MAC-based	Yes	Yes
• ACL - port/MAC-based	Yes	Yes
• IEEE 802.1x (radius)	Yes	Yes
• Broadcast/Multicast/Unicast Limiter	Yes	Yes
• broadcast blocking	Yes	Yes
Protocol is supported SSH	Yes	Yes
Product functions Time		
Product function SICLOCK support	Yes	Yes
Protocol is supported		
• NTP	No	No
• SNTP	Yes	Yes
Standards, specifications, approvals		
Standard		
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4 A, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4 A, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA IIT4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), 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), Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• Det Norske Veritas (DNV)	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5492-2AL00-8AA2	6GK5492-2AM00-8AA2	6GK5492-2AN00-8AA2	6GK5492-2AP00-8AA2	6GK5492-2AQ00-8AA2
Product-type designation	**MM492-2**	**MM492-2LD**	**MM492-2LH**	**MM492-2LH+**	**MM492-2ELH**
Interfaces					
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2	2	2
Number of 1 000 Mbit/s SC ports (LX)	-	2	2	2	2
Number of 1 000 Mbit/s SC ports (SX)	2	-	-	-	-
Design of optical connections for network components or terminal devices	SC	SC	SC	SC	SC
Connectable optical power relative to 1 mW					
• of the transmitter output	-9.5 … -4 dB	-9.5 … -3 dB	-6 … +0 dB	0 … 5 dB	0 … 5 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-23 dB	-23 dB	-30 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB	8 dB	8 dB
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 10 km	8 … 40 km	30 … 70 km	37 … 120 km
Permitted ambient conditions					
Ambient temperature					
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +80 °C	-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	-40 … +80 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20	IP20
Design, dimensions and weight					
Design	Media module	Media module	Media module	Media module	Media module
Width	35 mm	35 mm	35 mm	35 mm	35 mm
Height	145 mm	145 mm	145 mm	145 mm	145 mm
Depth	90 mm	90 mm	90 mm	90 mm	90 mm
Net weight	0.25 kg	0.25 kg	0.25 kg	0.25 kg	0.25 kg
Mounting type Installation in media module slot	Yes	Yes	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched	Latched	Latched
Standards, specifications, approvals					
Standard					
• for EMC	-	-	-	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), 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), 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), 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), 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), Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001

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Technical specifications (continued)

Article No.	6GK5492-2AL00-8AA2	6GK5492-2AM00-8AA2	6GK5492-2AN00-8AA2	6GK5492-2AP00-8AA2	6GK5492-2AQ00-8AA2
Product-type designation	**MM492-2**	**MM492-2LD**	**MM492-2LH**	**MM492-2LH+**	**MM492-2ELH**
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes	Yes	-
• C-Tick	Yes	Yes	Yes	Yes	-
• KC approval	Yes	Yes	Yes	Yes	Yes
• Railway application in accordance with EN 50155	-	-	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-	-	-
• IEC 61850-3	-	-	-	-	-
Marine classification association					
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes	Yes	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes	Yes	Yes	Yes
• Det Norske Veritas (DNV)	Yes	Yes	Yes	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes	Yes	Yes

Article No.	6GK5491-2AB00-8AA2	6GK5491-2AC00-8AA2	6GK5491-2AE00-8AA2
Product-type designation	**MM491-2**	**MM491-2LD**	**MM491-2LH+**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	2	2	2
Number of 100 Mbit/s ST(BFOC) ports	2	2	-
Number of 100 Mbit/s SC ports	-	-	2
Design of optical connections for network components or terminal devices	BFOC	BFOC	SC
Connectable optical power relative 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
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	12 … 70 km
Permitted ambient conditions			
Ambient temperature			
• during operating	-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 maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5491-2AB00-8AA2	6GK5491-2AC00-8AA2	6GK5491-2AE00-8AA2
Product-type designation	**MM491-2**	**MM491-2LD**	**MM491-2LH+**
Design, dimensions and weight			
Design	Media module	Media module	Media module
Width	35 mm	35 mm	35 mm
Height	145 mm	145 mm	145 mm
Depth	90 mm	90 mm	90 mm
Net weight	0.26 kg	0.26 kg	0.26 kg
Mounting type Installation in media module slot	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC	-	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), 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), 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), Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	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)	Yes	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5495-8BA00-8AA2	6GK5496-4MA00-8AA2
Product-type designation	**EM495-8**	**EM496-4**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	8	8
Number of electrical connections		
• for network components or terminal equipment maximum	8	-
• for media module	-	4
Number of 10/100 Mbit/s RJ45 ports	8	-
Design of electrical connection for network components and terminal equipment	RJ45	-
Permitted ambient conditions		
Ambient temperature		
• during operating	-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 maximum	95 %	95 %
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	Extender-Module	Extender-Module
Width	112.4 mm	112.4 mm
Height	86 mm	154 mm
Depth	145 mm	145 mm
Net weight	0.56 kg	0.98 kg
Mounting type	Latched	Latched
Standards, specifications, approvals		
Standard		
• for EMC	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous area of CSA and UL	UL 1604 and UL 2279-15 (Hazardous Location), 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), Class 1 / Division 2 / Group A, B, C, D / T4, Class 1 / Zone 2 / Group IIC / T4
• for emitted interference	EN 61000-6-4:2001 (Class A)	EN 61000-6-4:2001 (Class A)
• for interference immunity	EN 61000-6-2:2001	EN 61000-6-2:2001
Verification of suitability	EN 61000-6-2:2001, EN 61000-6-4:2001	EN 61000-6-2:2001, EN 61000-6-4:2001
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	Yes	Yes
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	Yes	Yes
• Bureau Veritas (BV)	Yes	Yes
• Det Norske Veritas (DNV)	Yes	Yes
• Germanische Lloyd (GL)	Yes	Yes
• Lloyds Register of Shipping (LRS)	Yes	Yes
• Nippon Kaiji Kyokai (NK)	Yes	Yes

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Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE X-400	
Modular Industrial Ethernet switches with integrated RJ45 ports for setting up electrical and/or optical Industrial Ethernet networks; integrated redundancy manager, IT functions (RSTP, VLAN, ...), PROFINET IO device, 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 delivery	
• **SCALANCE X408-2**; 4 x 10/100/1 000 Mbit/s and 4 x 10/100 Mbit/s RJ45 ports; 2 x Gigabit/Fast Ethernet media module slots	**6GK5408-2FD00-2AA2**
• **SCALANCE X414-3E**; 8 x 10/100/1 000 Mbit/s, of which 8 x RJ45/SFP combo ports; 8 x 1 000 Mbit/s can be maximally used in the basic device 24 x 1 000 Mbit/s maximum overall configuration by using port extenders	**6GK5414-3FC00-2AA2**
MM491/MM492 media modules	
Media modules with 2 ports; 1 Gbit/s	
MM492-2; 1000BaseSX, SC connection, multimode FOC up to 750 m	**6GK5492-2AL00-8AA2**
MM492-2LD; 1000BaseLX, SC connection, single-mode FOC up to 10 km	**6GK5492-2AM00-8AA2**
MM492-2LH; 1000BaseLX, SC connection, single-mode FOC up to 40 km	**6GK5492-2AN00-8AA2**
MM492-2LH+; 1000BaseLX, SC connection, single-mode FOC up to 70 km	**6GK5492-2AP00-8AA2**
MM492-2ELH; 1000BaseLX, SC connection, single-mode FOC up to 120 km	**6GK5492-2AQ00-8AA2**
Media modules with 2 ports; 100 Mbit/s	
MM491-2; 100BaseLX, BFOC interface, multimode FOC up to 5 km	**6GK5491-2AB00-8AA2**
MM491-2LD; 100BaseFX, BFOC interface, singlemode FOC up to 26 km	**6GK5491-2AC00-8AA2**
MM491-2LH+; 100BaseFX, SC connection, single-mode FOC up to 70 km	**6GK5491-2AE00-8AA2**

	Article No.
EM495/EM496 extender modules	
Extender modules for SCALANCE X414-3E	
EM495-8; with 8 x 10/100 Mbit/s TP ports	**6GK5495-8BA00-8AA2**
EM496-4; with 4 slots for 100 Mbit/s media modules MM	**6GK5496-4MA00-8AA2**
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
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 1 000 m, minimum order quantity 20 m	
IE FC TP Standard Cable GP 4 x 2	**6XV1870-2E**
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 length 1 000 m, minimum order 20 m	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with two RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
FO standard cable GP 50/125/1400 [1) 2)]	**6XV1873-2A**
Multimode cable, sold by the meter; max. length 1 000 m; minimum order 20 m;	
FO robust cable GP 4E9/125/90	**6XV1843-2R**
Single-mode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	
FC FO standard cable GP 62.5/200/230	**6XV1847-2A**
FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter max. length 1 000 m; minimum order 20 m	
IE FC RJ45 Plug 180 2 x 2	
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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**

1) Special fiber-optic cables, lengths and accessories available on request

2) Special tools and trained personnel are required for pre-assembling glass fiber-optic cables

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Ordering data	Article No.
Accessories (continued)	
IE FC RJ45 plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
FC SC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 Duplex Plugs + cleaning cloths)	**6GK1900-1LB00-0AC0**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
FC FO termination kit 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	**6GK1900-1GL00-0AA0**
IE FC RJ45 modular outlet FastConnect RJ45 outlet for Industrial Ethernet with interface for a replaceable insert;	
• **With insert 2FE**; replaceable insert for 2 x 100 Mbit/s interfaces	**6GK1901-1BE00-0AA1**
• **With insert 1GE**; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
SITOP compact, 2.5 A 1-phase power supply with wide-range input 85 – 264 V AC, regulated output voltage 24 V, output current rated value 2.5 A	**6EP1332-5BA00**
Spare parts	
CV490 cover set consisting of covers for: 1 x Gbit submodule slot, 2 x 100 Mbit/s submodule slot, 3 x 10/100 Mbit/s TP slot, 1x cover	**6GK5490-0AA00-0AA2**
Labeling sheet 10 DIN A4 sheets, petrol blue, with 10 strips each, perforated, for printing using a standard laser printer	**6GK5498-0AA00-0AA0**
4-pole and 5-pole terminal set 20-part, comprising 10x 4-pole and 10 x 5-pole terminals, straight, with latch	**6GK5498-1AA00-0AA0**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



The new SCALANCE XM-400 product range comprises modular Industrial Ethernet switches, expandable by various port extenders and plug-in transceivers for a maximum configuration with up to 24 ports. It supports 10/100/1 000 Mbit technology for various transmission media (twisted pair, fiber optic) and increased port requirements. The main applications are high-performance plant networks (control level). Thanks to the flexible, modular design, the XM-400 product line is also designed for future requirements and can be adapted to the relevant task.

The new XM-400 range replaces the previous X-400 range (X414-3E and X408-2).

- Combo ports for the flexible use of interfaces: A combo port consists of an electric port and an SFP slot. Only one of the two ports can ever be active. If an SFP plug-in transceiver is inserted, the electric port is deactivated
- Fast mobile diagnosis with smartphone/tablet thanks to WLAN and NFC: Fast access to the web-based management of the SCALANCE XM-400 via mobile websites. The function can be started using existing WLAN and NFC (Near Field Communication)
- High-speed media redundancy through integral redundancy manager even for large networks, for both Gigabit Ethernet and Fast Ethernet
- Remote diagnostics by means of PROFINET diagnostics, CLI, Web browser, or SNMP
- Integration into the TIA Portal including up/downloading of the configuration
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standards: Establishment of virtual networks (VLANs)
- Integration into higher-level enterprise networks thanks to support for standardized redundancy procedures (Rapid Spanning Tree Protocol, Link Aggregation)
- By learning the multicast sources and destinations (Internet Group Management Protocol (IGMP) Snooping), SCALANCE XM-400 switches can also filter multicast data traffic and thus limit the load on the network.
- Optional activation of the Layer 3 functions for IPv4 (IPv6 available soon) in connection with the KEY-PLUG XM-400. For a detailed description, see "Accessories for Layer 3 switches/routers"
- Creation of IP subnets and IP router communication by means of Layer 3 switching (IP routing)
  - Static routing
  - Dynamic routing OSPF (Open Shortest Path First) and RIPv2 (Routing Information Protocol)
  - Redundant routing VRRP (Virtual Router Redundancy Protocol)

Product versions – basic devices

Basic devices with eight to 16 integrated Gigabit Ethernet twisted pair interfaces (10/100/1 000 Mbit/s)

XM416-4C

- 16 ports available in total, of which
  - up to 16 x 10/100/1 000 Mbit/s are RJ45 ports with retaining collars
  - up to 4 x SFP slots (combo ports), 100 or 1 000 Mbit/s
- A port extender with 8 ports can be connected to implement a maximum of 24 ports in one switch

XM408-8C

- 8 ports available in total, of which
  - up to 8 x 10/100/1 000 Mbit/s are RJ45 ports with retaining collars
  - up to 8 x SFP slots (combo ports), 100 or 1 000 Mbit/s
- Two port extenders with 8 ports each can be connected to implement a maximum of 24 ports in one switch

XM408-4C

- 8 ports available in total, of which
  - up to 8 x 10/100/1 000 Mbit/s are RJ45 ports with retaining collars
  - up to 4 x pluggable slots (combo ports) for SC connection method (1 000 Mbit/s) or BFOC connection method (100 Mbit/s)
- Two port extenders with 8 ports each can be connected to implement a maximum of 24 ports in one switch

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Product versions – port extender

Port extender for flexible expansion to up to 24 ports can be connected to the basic device.

PE408

- 8 x 10/100/1 000 Mbit/s RJ45 ports with retaining collars for expanding an XM-400 basic device to a maximum of 24 ports

PE400-8SFP

- 8 x SFP slots for expanding an XM-400 basic device to a maximum of 24 ports, 100 or 1 000 Mbit/s

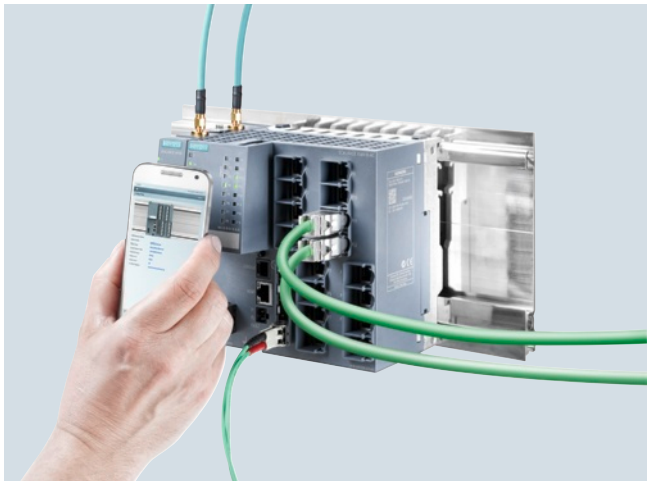
PE408PoE

- 8 x 10/100/1 000 Mbit/s RJ45 ports with retaining collars with PoE according to IEEE 802.3at Type 2 for expanding an XM-400 basic device to a maximum of 24 ports
- Separate power supply required

Benefits

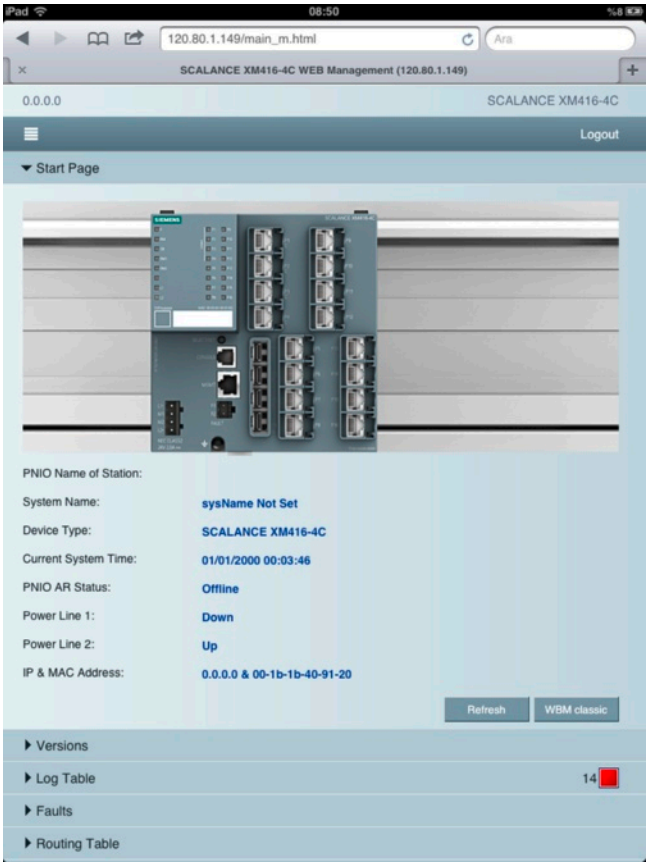
get Designed for Industry

- Modular system offers cost savings. The modular system allows the setup of electrical and optical Industrial Ethernet networks and the network topology and port type to easily be adapted to the plant structure and expanded at any time
- Integrated industrial network for data, speech, and video
- High performance due to up to 24 Gigabit ports
- Operational reliability in industrial environments, e.g. due to robust enclosure, redundancy, temperature range from - 40 °C to +70 °C
- Increased plant availability thanks to:
  - Redundant power supply
  - Redundant network structures based on fast media redundancy
  - Standby redundancy between ring topologies
  - Redundant switching through standard mechanisms STP, RSTP, MSTP
  - Redundant router operation through VRRP
  - Media modules can be replaced or expanded during operation
  - Easy device replacement due to plug-in KEY-PLUG/C-PLUG swap media
- Virtual LANs (VLAN) allow simple subdivision of large networks into smaller subnets with their own address space. Reasons for subdivision into subnets include separation of the Ethernet networks to reduce the broadcast load, separation of sensitive areas from the main network, and subdivision of the network into logical working groups. Communication between the VLANs can, however, be achieved with Layer-3-Switching (IP routing)
- Integrated and optional security functions offer protection against unauthorized network access and configuration
- Simple monitoring and diagnosis by means of signaling contact, SNMP traps, PROFINET diagnosis, and email function
- Reduced engineering expenditure for PLC/HMI due to integration into the SIMATIC system fault message concept
- Integrated configuration and diagnostics in the TIA Portal
- Fast mobile diagnostics with smartphone/tablet thanks to WLAN and NFC (Near Field Communication): Fast access to the web-based management of the SCALANCE XM-400 via mobile websites. The function can be started using existing WLAN and NFC.



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Benefits (continued)



Application

SCALANCE XM-400 products permit the configuration of switched networks at the control level, which not only demands high availability of the network and extensive diagnostic options, but also a high number of ports, high transfer rate, and the support of fiber-optic and copper cables and Power over Ethernet transmission.

Thanks to the scalability of the basic unit and the optionally available Layer 3 switching function, the network can be established specially for the relevant application or expanded at any time.

Design

SCALANCE XM-400

SCALANCE XM-400 with up to 24 Gigabit ports is an Industrial Ethernet switch with robust, industry-standard enclosure, for mounting onto standard rails, and designed IP20 protection.

SCALANCE XM-400 basic devices offer the following additional interfaces

- Console port (serial interface RJ11) and management port (100 Mbit/s, RJ45) for on-site parameterization/diagnostics and firmware update
- Slot for optional C-PLUG swap medium for simple device replacement (included in scope of delivery) or KEY-PLUG for optional software expansion to Layer-3 Switching
- Floating signaling contact can be freely configured to indicate fault events, for example
- Extensive operating mode and status information is displayed via LEDs and selection pushbuttons
- Grounding bolts for defined ground connection
- Two infeeds are available for protection against voltage failure
- Connection for a port extender on the right (tool-free installation)

Product versions of SFP pluggable transceivers

The SFP (Small Formfactor Pluggable) plug-in transceivers can be used in the SFP slots.

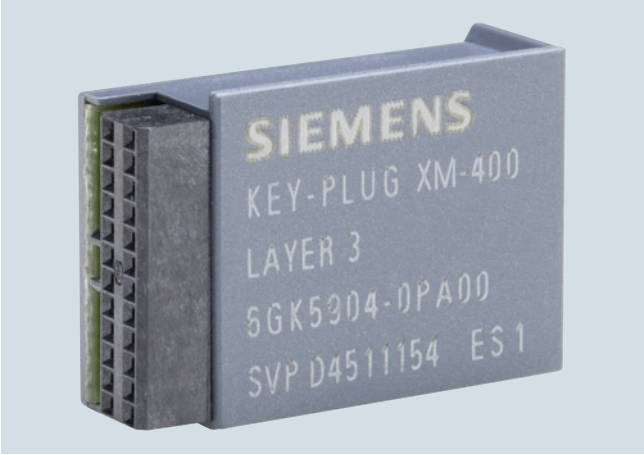
Optical SFP pluggable transceivers with 1 x 100 Mbit/s LC port.

- SFP991-1 multimode, glass, up to 5 km
- SFP991-1LD singlemode, glass, up to 26 km
- SFP991-1LH+ singlemode, glass, up to 70 km
- SFP991-1ELH200 singlemode, glass, up to 200 km max.

Optical SFP pluggable transceivers with 1 x 1 000 Mbit/s LC port

- SFP992-1 multimode, glass, up to 750 m
- SFP992-1LD singlemode, glass, up to 10 km
- SFP992-1LH singlemode, glass, up to 40 km
- SFP992-1LH+ singlemode, glass, up to 70 km
- SFP992-1ELH singlemode, glass, up to 120 km

KEY-PLUG XM-400



- For activation of the Layer 3 function
- Integrated C-PLUG functionality (configuration memory)

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Function

- Fast redundancy in the ring;
  A redundant network structure is created by interconnecting the ends of an optical line to form a ring.
  The SCALANCE XM-400 switches have an integral redundancy manager (RM) which monitors the function of the network continuously. It recognizes the failure of a transmission path or the failure of a SCALANCE XM-400 switch in the ring and then activates the substitute path. In rings with SCALANCE X-200 or OSM/ESM, it is possible to integrate XM-400 switches at 100 Mbit/s. In rings with SCALANCE X-300 and SCALANCE XR-500, it is possible to integrate XM-400 switches with Gigabit.
- Fast standby redundancy;
  The integrated standby function permits a reliable interconnection of several rings. Two transmission links are used to connect two XM-400 switches of a ring to the other ring
- Time synchronization;
  diagnostic messages (log table entries, e-mails) are time-stamped. The local time is standardized throughout the network by means of time synchronization with a time server, thereby simplifying the assignment of diagnostic messages of several devices.
- Load limiting when using multicast protocols
  (e.g. Voice over IP, Video)
- By learning the multicast receivers, XM-400 switches can also filter multicast data traffic and thus limit the load in the network.
- Redundant interfacing to company networks;
  XM-400 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 for 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 subnets, e.g. to divide the network into logical areas. In this way, very large Ethernet networks can be subdivided into smaller subnets with their own IP address space.
- Support for Quality of Service (QoS) through IP Type of Service (ToS) and prioritizing according to 802.1Q
- Link Aggregation (IEEE 802.3ad) for parallel use of ports to increase the transmission rate and fail-safety.
- Support for port prioritization
- Support for bandwidth limiting (Broadcast Limiter, Multicast Limiter, Unicast Limiter)
- Flow control
- Simple device replacement;
  All settings are automatically backed up on the C-PLUG plug-in swap medium (included in scope of delivery). If a switch of the SCALANCE XM-400 series has to be replaced, then these settings are simply transferred to the replacement device by plugging in the C-PLUG.

Additional function through Layer 3 KEY PLUG

- Layer 3 switching support
  - Static routing
  - Dynamic routing
  - Router redundancy
    The integrated dynamic routing protocols OSPF (Open Shortest Path First) and RIPv2 (Routing Information Protocol) govern the communication to other IP routers in the network.
- Redundant Layer-3 switching (routing) is achieved with the integrated VRRP function (Virtual Router Redundancy Protocol).
- IPv6 support (available soon), support of dual-stack routing (IPv4 / IPv6)

Integrated security

- Port security
- Access Control to Agent
- Authentication 802.1X
- SSH
- HTTPS
- SNMPv3
- RADIUS

Network topology and network configuration

The network topology can easily be adapted to the structure of the plant with SCALANCE XM-400 Industrial Ethernet switches. The following network structures and combinations of structures can be implemented:

- Gigabit and Fast Ethernet rings with fast media redundancy:
  To protect against the failure of a transmission link or a switch, up to 50 linearly cascaded switches can be interconnected to form a ring. On the failure of a transmission link or of a switch in the ring, the transmission path is reconfigured within 300 milliseconds.
- Several rings can be redundantly linked through the standby function.
- In addition, SCALANCE XM-400 supports redundant connection of the ring structure to the corporate network with a rapid spanning tree.
- Star topology with SCALANCE XM-400 switches:
  The switch represents a neutral star point that can interconnect up to 24 nodes or subnets electrically or optically

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

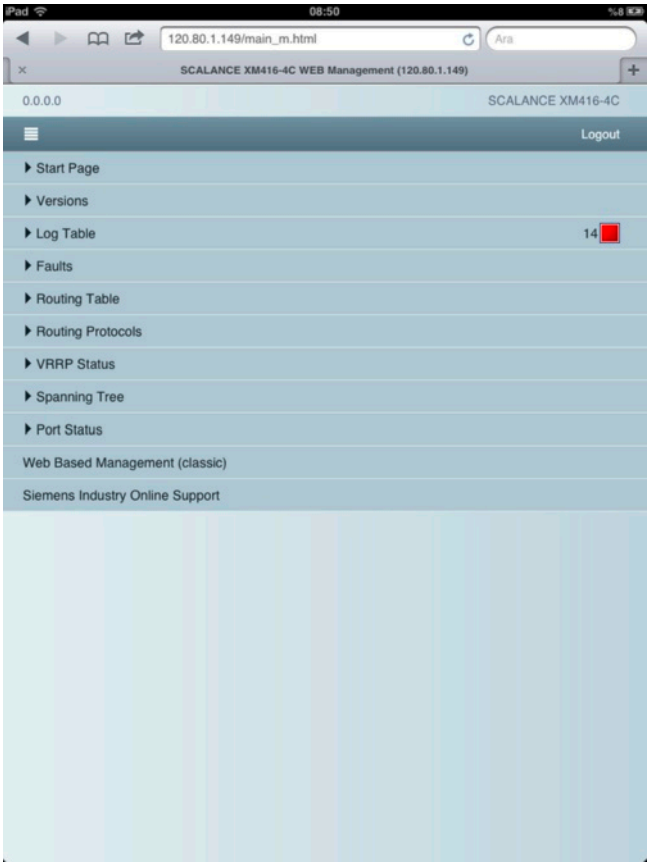
- Maximum line length between two modules for multi-mode fiber-optic conductors:
  - 5 000 m at 100 Mbit/s
  - 750 m at 1 Gbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 200 km at 100 Mbit/s
  - 120 km at 1 Gbit/s
- Maximum length of installation cable:
  - 100 m at 100 Mbit/s with IE FC TP Cable 2 x 2 and IE FC Plug 180
  - Max. 90 m at 1 Gbit/s with IE FC TP cable 4 x 2, IE FC RJ45 modular outlet and patch cable (10 m)
  - 100 m at 1 000 Mbit/s with IE FC TP Cable 4 x 2 and IE FC Plug 4 x 2

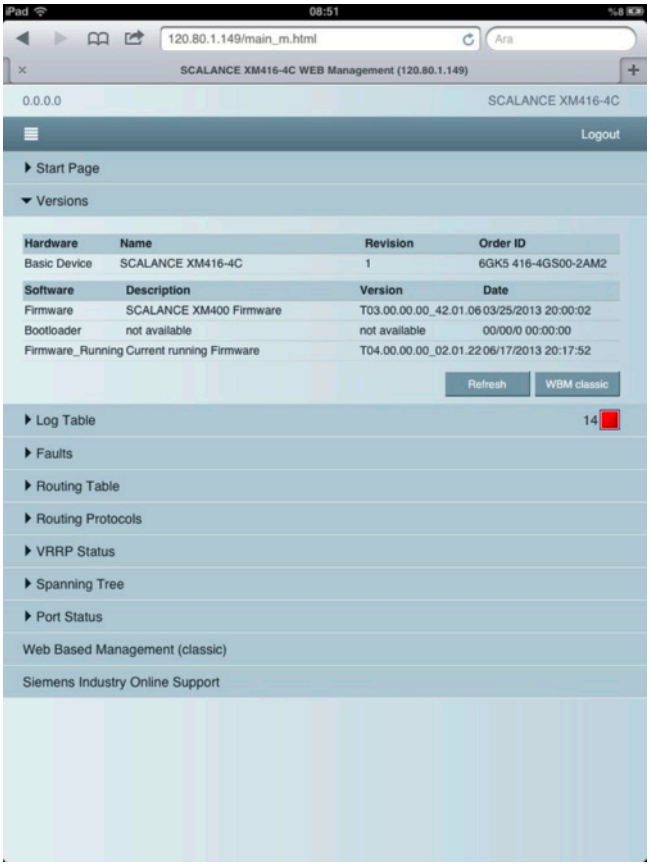
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Function (continued)

Commissioning and diagnosis

- Signal mask;
  The signal mask is set to the current status of the SCALANCE XM-400 (setpoint state) by pushbutton operation. The signal mask defines which ports and which power supplies are to be monitored. The signal contact only reports an error when a monitored port or a monitored feeder fails (deviation of setpoint/actual status).
- Using a serial interface (RJ11), a PC or a programming device can be connected directly; operation is carried out using commands (Command Line Interface - CLI)
- 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 or via the serial console interface (CLI).
- The following status information is displayed by LEDs on site:
  - Port status
  - Port mode (10/100/1 000 Mbit/s, full/half-duplex)
  - Status of the two voltage feeders
  - Signal contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode
- The status of the signal 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.
- Redundancy manager RM;
  To establish a ring, a SCALANCE XM-400 is switched to the 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.
- Monitoring via the Industrial Ethernet network;
  the following possibilities are available:
  - via standard browser (Web-based management):
    Selection of SCALANCE XM-400 switches via the network from a PC with browser
  - via the browser of a mobile device (Smartphone, Tablet)
  - Reading out the address of the mobile website of the XM-400 by means of NFC:
    - mobile terminal starts browser with this address
    - powerful diagnosis by means of an existing WLAN
  - via SNMP V1, V2c, V3:
    Secure integration of SCALANCE X-400 switches via the network into a network management system, e.g. SINEMA Server
  - via PROFINET IO diagnostics:
    Standard diagnostic alarms can be configured in an easy, familiar manner in STEP 7 and processed in SIMATIC. The engineering outlay is drastically reduced for the PLC and HMI through complete integration in the SIMATIC system error message concept SFM.

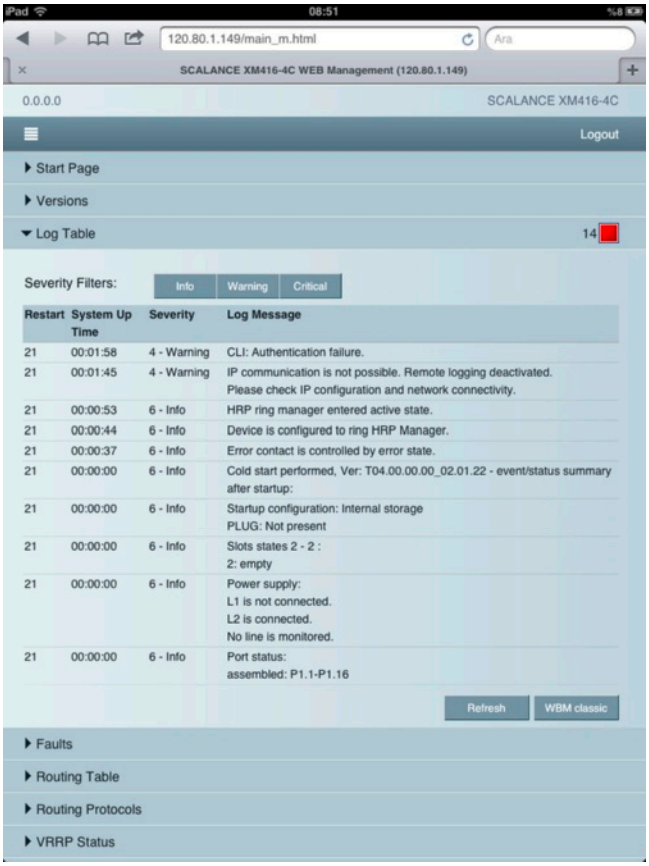




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Function (continued)



Network management

The network management provides the following functions:

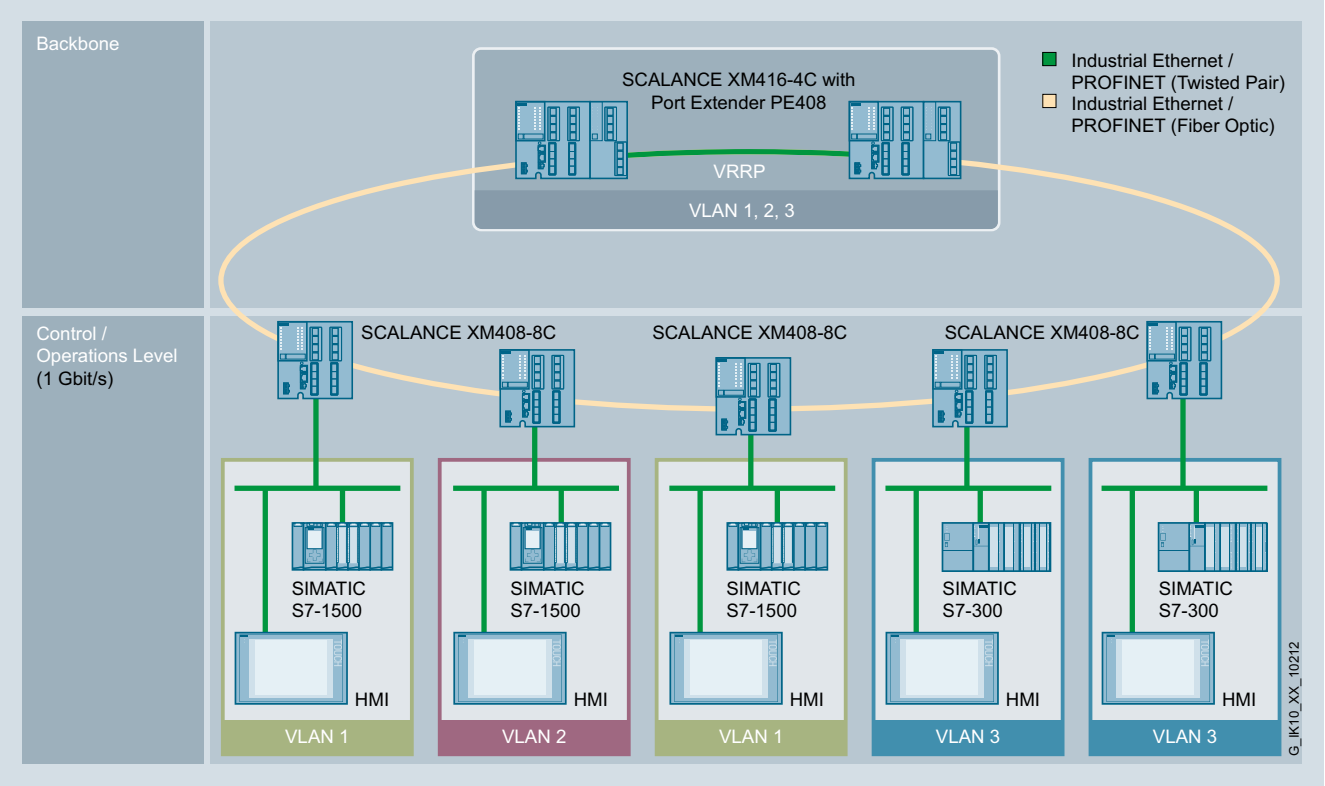
- Password-protected dial-up for "Administrator" (read and write authorization) and "User" (read only)
- Access protection by means of access control list
- Encrypted HTTPS access
- Read-out of version and status information
- Setting the signal and standby mask and address information
- Fixed parameterization 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
- Defining a maximum load per port for load limiting (port thresholds)
- 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
- Configuration of the IP routing function after activation with KEY-PLUG (static routing, dynamic routing (OSPF, RIP v1/2), and redundant routing (VRRP))

If faults occur in the network, the SCALANCE XM-400 switch can independently send error messages (traps) to a network management system (e.g. SINEMA Server) or also e-mails to a predefined network administrator.

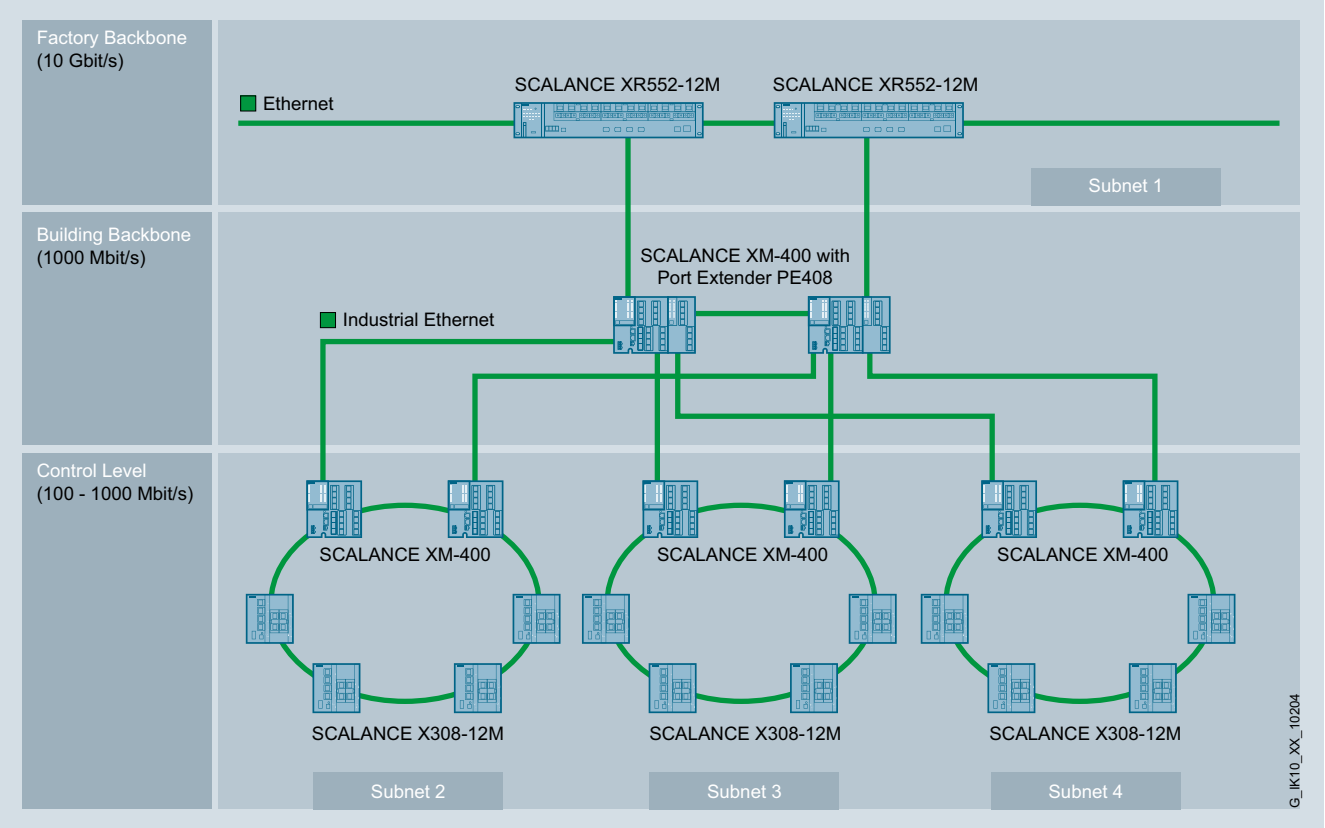
Remote monitoring (RMON) provides the following functions: The SCALANCE XM-400 switch can collect statistics information according to the RMON groups 1 through 4. These include, for example, fault statistics that are kept for each port. This information can be read out through Web-based management in the statistics sub-area.

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Integration



Network structuring through the routing of virtual LANs (a VLAN corresponds to an IP subnetwork)

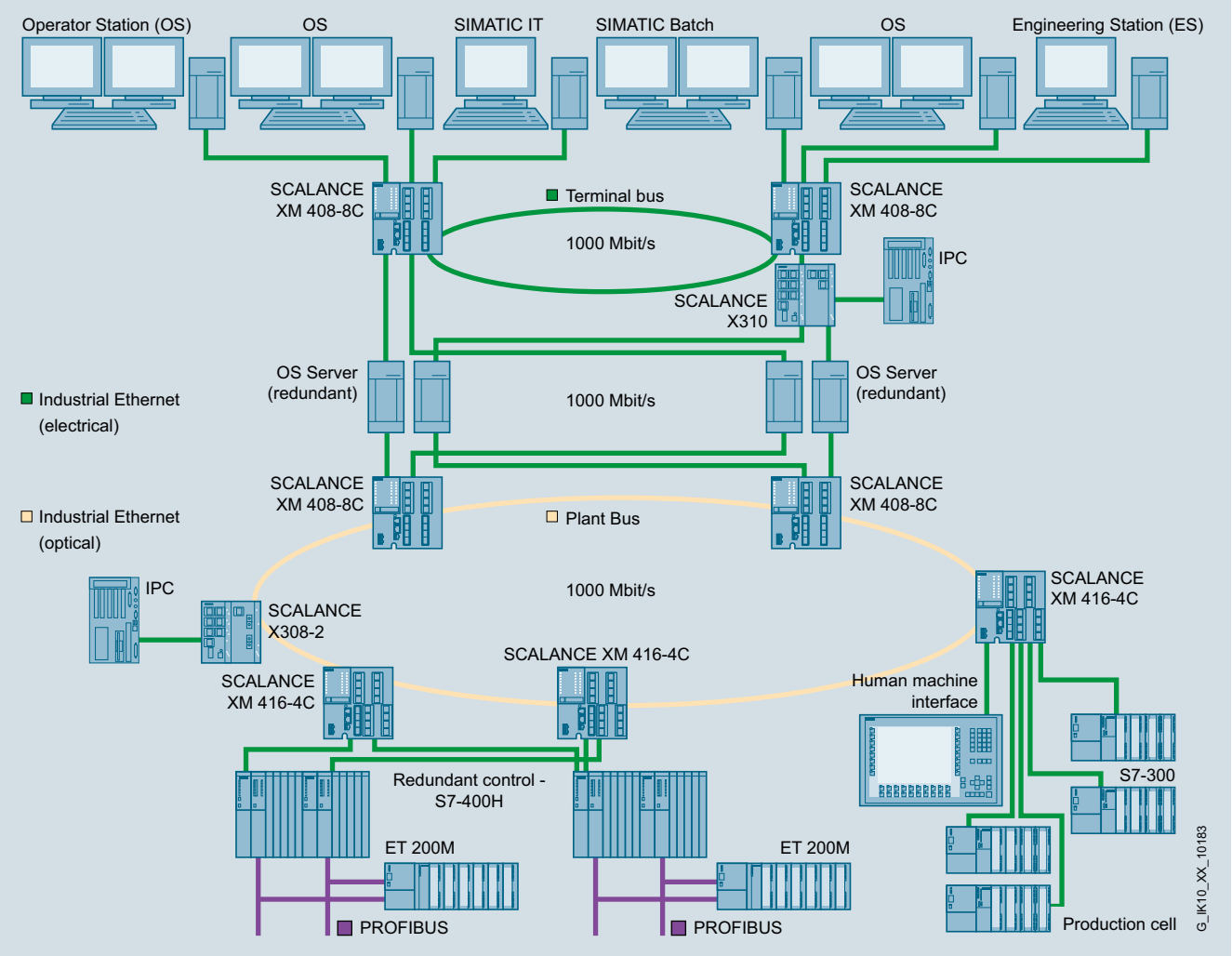


Subnetworks with SCALANCE X308-12M and SCALANCE XM-400 for increasing network availability

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Integration (continued)



Use of the SCALANCE XM-400 switches in a process control system, e.g. PCS 7

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Technical specifications

Article No.	6GK5416-4GS00-2AM2	6GK5408-8GS00-2AM2	6GK5408-4GP00-2AM2
Product-type designation	**SCALANCE XM416-4C**	**SCALANCE XM408-8C**	**SCALANCE XM408-4C**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24
Number of electrical connections for operator console	1	1	1
Design of electrical connection for operator console	RJ11 port	RJ11 port	RJ11 port
Number of electrical connections			
• for network components and terminal equipment	16	8	8
• for network components and terminal equipment with extender modules	8	16	16
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for network components and terminal equipment with extender modules	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide			
• at 100 Mbit/s	4	8	4
• at 1 000 Mbit/s	4	8	4
• with extender modules	8	16	16
Design of optical interface for optical waveguide			
• at 100 Mbit/s	SFP slot	SFP slot	SFP slot
• at 1 000 Mbit/s	SFP slot	SFP slot	SFP slot
• with extender modules	SFP slot	SFP slot	SFP slot
Number of extender expansion interfaces	2	2	2
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	DC	DC	DC
Supply voltage external	24 V	24 V	24 V
• minimum	19.2 V	19.2 V	19.2 V
• maximum	28.8 V	28.8 V	28.8 V
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 15 A / 125 V	F 15 A / 125 V	F 15 A / 125 V
Consumed current maximum	2 A	2 A	2 A
Active power loss			
• at 24 V for DC	48 W	48 W	48 W

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Technical specifications (continued)

Article No.	6GK5416-4GS00-2AM2	6GK5408-8GS00-2AM2	6GK5408-4GP00-2AM2
Product-type designation	**SCALANCE XM416-4C**	**SCALANCE XM408-8C**	**SCALANCE XM408-4C**
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design
Width	140 mm	140 mm	140 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	1.25 kg	1.15 kg	1.15 kg
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	No	No	No
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s			
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes
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
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/ location designation	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5416-4GS00-2AM2	6GK5408-8GS00-2AM2	6GK5408-4GP00-2AM2
Product-type designation	**SCALANCE XM416-4C**	**SCALANCE XM408-8C**	**SCALANCE XM408-4C**
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255
Number of VLANs - dynamic maximum	255	255	255
Protocol is supported GVRP	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 Routing			
Service Routing Note	IP-Routing connection with KEY-PLUG XM-400	IP-Routing connection with KEY-PLUG XM-400	IP-Routing connection with KEY-PLUG XM-400
Product function			
• static IP routing	Yes	Yes	Yes
• dynamic IP routing	Yes	Yes	Yes
Protocol is supported			
• RIPv2	Yes	Yes	Yes
• OSPFv2	Yes	Yes	Yes
• VRRP	Yes	Yes	Yes
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• STP	-	-	-
• RSTP	-	-	-
• RSTP big network support	-	-	-
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• ACL - MAC-based	Yes	Yes	Yes
• 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
Protocol is supported SSH	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5416-4GS00-2AM2	6GK5408-8GS00-2AM2	6GK5408-4GP00-2AM2
Product-type designation	**SCALANCE XM416-4C**	**SCALANCE XM408-8C**	**SCALANCE XM408-4C**
Product functions Time			
Product function SICLOCK support	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for hazardous area of CSA and UL	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)
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	Yes	Yes	Yes

Article No.	6GK5416-4GR00-2AM2	6GK5408-8GR00-2AM2	6GK5408-4GQ00-2AM2
Product-type designation	**SCALANCE XM416-4C IP Routing integrated**	**SCALANCE XM408-8C IP Routing integrated**	**SCALANCE XM408-4C IP Routing integrated**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24
Number of electrical connections for operator console	1	1	1
Design of electrical connection for operator console	RJ11 port	RJ11 port	RJ11 port
Number of electrical connections			
• for network components and terminal equipment	16	8	8
• for network components and terminal equipment with extender modules	8	16	16
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port
• for network components and terminal equipment with extender modules	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block
Number of optical interfaces for optical waveguide			
• at 100 Mbit/s	4	8	4
• at 1 000 Mbit/s	4	8	4
• with extender modules	8	16	16
Design of optical interface for optical waveguide			
• at 100 Mbit/s	SFP slot	SFP slot	SFP slot
• at 1 000 Mbit/s	SFP slot	SFP slot	SFP slot
• with extender modules	SFP slot	SFP slot	SFP slot
Number of extender expansion interfaces	2	2	2

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Technical specifications (continued)

Article No.	6GK5416-4GR00-2AM2	6GK5408-8GR00-2AM2	6GK5408-4GQ00-2AM2
Product-type designation	**SCALANCE XM416-4C IP Routing integrated**	**SCALANCE XM408-8C IP Routing integrated**	**SCALANCE XM408-4C IP Routing integrated**
Signal-Inputs/outputs			
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss			
Type of supply voltage	DC	DC	DC
Supply voltage external	24 V	24 V	24 V
• minimum	19.2 V	19.2 V	19.2 V
• maximum	28.8 V	28.8 V	28.8 V
Product component fusing at power supply input	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 15 A / 125 V	F 15 A / 125 V	F 15 A / 125 V
Consumed current maximum	2 A	2 A	2 A
Active power loss			
• at 24 V for DC	48 W	48 W	48 W
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design
Width	140 mm	140 mm	140 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	1.25 kg	1.15 kg	1.15 kg
Mounting type			
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	No	No	No
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
Product properties, functions, components general			
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s			
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration			
Product function			
• CLI	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes
• RMON	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes
• CoS	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5416-4GR00-2AM2	6GK5408-8GR00-2AM2	6GK5408-4GQ00-2AM2
Product-type designation	**SCALANCE XM416-4C IP Routing integrated**	**SCALANCE XM408-8C IP Routing integrated**	**SCALANCE XM408-4C IP Routing integrated**
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
Identification & maintenance function			
• I&M0 - device-specific information	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes
Product functions Diagnosis			
Product function			
• Port diagnostics	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes
• Statistics packet type	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
Number of VLANs maximum	255	255	255
Number of VLANs - dynamic maximum	255	255	255
Protocol is supported GVRP	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 Routing			
Service Routing Note	IP-Routing integrated	IP-Routing integrated	IP-Routing integrated
Product function			
• static IP routing	Yes	Yes	Yes
• dynamic IP routing	Yes	Yes	Yes
Protocol is supported			
• RIPv2	Yes	Yes	Yes
• OSPFv2	Yes	Yes	Yes
• VRRP	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5416-4GR00-2AM2	6GK5408-8GR00-2AM2	6GK5408-4GQ00-2AM2
Product-type designation	**SCALANCE XM416-4C IP Routing integrated**	**SCALANCE XM408-8C IP Routing integrated**	**SCALANCE XM408-4C IP Routing integrated**
Product functions Redundancy			
Product function			
• Ring redundancy	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes
Protocol is supported			
• STP	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes
• LACP	Yes	Yes	Yes
Product functions Security			
Product function			
• ACL - MAC-based	Yes	Yes	Yes
• 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
Protocol is supported SSH	Yes	Yes	Yes
Product functions Time			
Product function SICLOCK support	Yes	Yes	Yes
Protocol is supported			
• NTP	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes
Standards, specifications, approvals			
Standard			
• for safety of CSA and UL	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 hazardous area of CSA and UL	-	-	-
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5408-0GA00-8AP2	6GK5408-0PA00-8AP2	6GK5400-8AS00-8AP2
Product-type designation	**SCALANCE PE408**	**SCALANCE PE408PoE**	**SCALANCE PE400-8SFP**
Transmission rate			
Transfer rate 1	10 Mbit/s	10 Mbit/s	-
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	8	8	8
Number of electrical connections			
• for network components and terminal equipment	8	8	-
• for Power-over-Ethernet for network components or terminal equipment	-	8	-
• for SFP+/SFP	-	-	8
Design of electrical/optical connections for network components or terminal equipment	-	-	SFP
Design of electrical connection			
• for network components and terminal equipment	RJ45 port	RJ45 port	-
• for Power-over-Ethernet for network components or terminal equipment	-	RJ45 port	-
• for power supply	-	2-pole terminal block	-
Number of optical connections			
• for optical waveguide			
- at 100 Mbit/s	-	-	8
- at 1 000 Mbit/s	-	-	8
Design of optical interface for optical waveguide			
• at 100 Mbit/s	-	-	SFP slot
• at 1 000 Mbit/s	-	-	SFP slot
Number of extender expansion interfaces	2	2	2
Supply voltage, current consumption, power loss			
Type of supply voltage	-	DC	-
Supply voltage external	-	54 V	-
• minimum	-	51.3 V	-
• maximum	-	56.7 V	-
Product component fusing at power supply input	-	Yes	-
Type of fusing at input for supply voltage	-		-
Consumed current maximum	0.2 A	0.2 A	0.07 A
Active power loss at 24 V for DC	4.8 W	4.8 W	1.7 W
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +70 °C	-40 … +60 °C	-40 … +60 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5408-0GA00-8AP2	6GK5408-0PA00-8AP2	6GK5400-8AS00-8AP2
Product-type designation	**SCALANCE PE408**	**SCALANCE PE408PoE**	**SCALANCE PE400-8SFP**
Design, dimensions and weight			
Design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design	SIMATIC S7-1500 device design
Width	70 mm	70 mm	70 mm
Height	147 mm	147 mm	147 mm
Depth	125 mm	125 mm	125 mm
Net weight	0.6 kg	0.7 kg	0.6 kg
Mounting type			
• 19-inch installation	No	No	No
• 35 mm DIN rail mounting	Yes	Yes	Yes
• wall mounting	No	No	No
• S7-300 rail mounting	Yes	Yes	Yes
• S7-1500 rail mounting	Yes	Yes	Yes
• fixed-mounted	-	-	-
Standards, specifications, approvals			
Standard			
• for EMC from FM	available soon	available soon	available soon
• for hazardous zone	available soon	available soon	available soon
• for safety of CSA and UL	available soon	available soon	available soon
• for hazardous area of CSA and UL	available soon	available soon	available soon
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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
• KC approval	No	No	No
• E1 approval	No	No	No
• e1 approval	No	No	No

Ordering data

SCALANCE XM-400 Industrial Ethernet switches

	Article No.
With eight to 16 integrated Gigabit Ethernet twisted-pair interfaces (10/100/1 000 Mbit/s); 24 x 1 000 Mbit/s maximum overall configuration by means of port extenders; integrated redundancy manager, IT functions (RSTP, VLAN, etc.), PROFINET IO Device, network management via SNMP and web server; incl. operating instructions, Industrial Ethernet network manual and configuration software on DVD-ROM; C-PLUG included in the scope of delivery	
SCALANCE XM416-4C; 16 x 10/100/1 000 Mbit/s, of which 4 x RJ45/SFP combo ports; 16 x 1 000 Mbit/s maximum basic device configuration	
• IP routing in combination with KEY PLUG XM-400	**6GK5416-4GS00-2AM2**
• IP routing integrated	**6GK5416-4GR00-2AM2**
SCALANCE XM408-8C; 8 x 10/100/1 000 Mbit/s, of which 8 x RJ45/SFP combo ports; 8 x 1 000 Mbit/s maximum basic device configuration	
• IP routing in combination with KEY PLUG XM-400	**6GK5408-8GS00-2AM2**
• IP routing integrated	**6GK5408-8GR00-2AM2**
SCALANCE XM408-4C; 8 x 10/100/1 000 Mbit/s, of which 4 x RJ45/ST pluggable/SC pluggable combo ports; 8 x 1 000 Mbit/s maximum basic device configuration	
• IP routing in combination with KEY PLUG XM-400	**6GK5408-4GP00-2AM2**
• IP routing integrated	**6GK5408-4GQ00-2AM2**

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Ordering data

	Article No.
Port extender	
Port extender for SCALANCE XM-400 basic devices	
• **PE408**; with 8 x 10/100/1 000 Mbit/s TP ports	**6GK5408-0GA00-8AP2**
• **PE400-8SFP**; with 8 slots for 100/1 000 Mbit/s SFP plug-in transceivers	**6GK5400-8AS00-8AP2**
• **PE408PoE**; with 8 x 10/100/1 000 Mbit/s TP ports Power over Ethernet according to 802.3at Type 1 and 2	**6GK5408-0PA00-8AP2**
Plug-in transceiver	
ST and SC plug-in transceivers for XM-400 basic device XM408-4C	
STP991-1 100 Mbit/s, ST/BFOC connection, multi-mode FOC up to 5 km	**6GK5991-1AB00-8AA0**
STP991-1LD 100 Mbit/s, ST/BFOC connection, single-mode FOC up to 26 km	**6GK5991-1AC00-8AA0**
SCP992-1 1 000 Mbit/s, SC connection, multi-mode FOC up to 750 m	**6GK5992-1AJ00-8AA0**
SCP992-1LD 1 000 Mbit/s, SC connection, single-mode FOC up to 10 km	**6GK5992-1AK00-8AA0**
SFP plug-in transceivers for XM-400	see "Plug-in transceivers for SCALANCE XR-500"/ "Media modules for modular SCALANCE X-500 managed"

	Article No.
Accessories	
KEY-PLUG XM-400 Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and for easy replacement of SCALANCE XM-400 in the event of a fault	**6GK5904-0PA00**
C-PLUG 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	**6GK1900-0AB00**
Power supplies	
SIMATIC PM 1507 24 V stabilized power supply for SIMATIC S7-1500	
• Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/3 A stabilized power supply for SIMATIC S7-1500 Input: 120/230 V AC Output: 24 V DC/3 A	**6EP1332-4BA00**
• Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/8 A stabilized power supply for SIMATIC S7-1500 Input: 120/230 V AC Output: 24 V DC/8 A	**6EP1333-4BA00**
Miscellaneous accessories	
4-pole spring-loaded terminal block Spring-type 4-pole terminal for power supply (24 V DC) for SCALANCE X/W/S/M; 1 pack = 5 items	**6GK5980-1DB10-0AA5**
2-pole spring-loaded terminal block Spring-type 2-pole terminal for signaling contact (24 V DC) for SCALANCE X/W/S/M; 1 pack = 5 items	**6GK5980-0BB10-0AA5**
Screw for fixing to S7-1500 and S7-300 rails Mounting screw for SCALANCE X/W/S/M; 1 pack = 5 items	**6GK5980-4AA00-0AA5**
Connection cable (RJ11/RS232) pre-assembled serial cable with RJ11 and RS323 connector, length: 5 m; 1 item per pack	**6GK5980-3BB00-0AA5**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version: http://www.siemens.com/snst
- Offline version: http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview

SCALANCE X-500

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	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 x 24 V DC)	External supply	Signal contact	Local display (SET pushbutton)	PLUG slot	
XR552-12M/ XR528-6M						•		•	•	•	•	•	•	•	•	•	•	•	
XR524-8C						•		•		•	•	•	•	•		•	•	•	

Type of device	Software																										
	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	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)	Access Control List (IP)	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)	
XR552-12M/ XR528-6M		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	
XR524-8C		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	G_IK10_XX_10308

• applies

Function overview SCALANCE X-500 managed

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Overview



The Layer 3-enabled SCALANCE XR-500 Industrial Ethernet switches are fully modular, high-performance, industry-standard switches for the construction of electrical and optical line, ring and star topologies with data transfer rates of up to 10 Gbit/s, designed for installation in 19" control cabinets.

- Four optical interfaces (10 Gbit/s) and up to 48 electrical and/or optical interfaces (10/100/1 000 Mbit/s), of which up to 12 electrical PoE interfaces;
  up to twelve electrical and/or optical 4-port media modules can be plugged into the basic unit at any point.
- Fast media redundancy due to the integrated redundancy manager:
  Redundant connection of rings by means of high-speed media redundancy is also possible with SCALANCE XR-500.
- Seamless integration of automation networks into existing corporate networks thanks to support for a host of IT standard functions (VLANs, IGMP-Snooping/Querier, STP/RSTP/MSTP, Link Aggregation, Quality of Service, 802.1X and optional static routing, RIP, OSPF, VRRP for IPv4 and IPv6)
- PROFINET diagnostics, Web browser, CLI and SNMP
- Redundant integration into higher-level networks through support for standardized redundancy procedures (Multiple Spanning Tree Protocol, Spanning Tree Protocol, Rapid Reconfiguration Spanning Tree Protocol, Media Redundancy Protocol) and standardized IP routing protocols or procedures (Routing Information Protocol, Open Shortest Path First, Virtual Router Redundancy Protocol)
- KEY-PLUG as the swap medium with which Layer 3 routing functions can be enabled.
  - For the automatic backup of configuration data. If a fault occurs, it allows fast and simple device replacement of SCALANCE X-500 components without a Field PG (contains the function of the C-PLUG)
  - Can be used in all Layer 2 variants of the SCALANCE XR552 and XR528
  - For a detailed description, see "SCALANCE Accessories for Layer 3 Switches / Routers"

Product versions

SCALANCE XR552-12M

- LEDs and ports on the front
- Alternatively: LEDs on the front and ports at the rear
- Connection of power supply unit at rear or above/below the switch
- Four SFP+ slots for equipping with 10 Gigabit Ethernet SFP+ plug-in transceivers or Gigabit SFP plug-in transceivers
- 12x 4-port media module slots
- Available with integrated IP routing functions or for the optional extension of the IP routing functions by means of KEY-PLUG

SCALANCE XR528-6M

- LEDs and ports on the front
- Alternatively: LEDs on the front and ports at the rear
- Connection of power supply unit at rear or above/below the switch
- Four SFP+ slots for equipping with 10 Gigabit Ethernet SFP+ plug-in transceivers or Gigabit SFP plug-in transceivers
- 6x 4-port media module slots
- Available with integrated IP routing functions or for the optional extension of the IP routing functions by means of KEY-PLUG

SCALANCE XR524-8C

- Eight combo-ports for optional use of optical or electrical interfaces with 10/100/1 000 Mbit/s optically or electrically via SFP plug-in transceiver
- 16 electrical ports operating at 10/100/1 000 Mbit/s
- In total, 24 ports can be used
- Power supply versions 24 V and 230 V (integrated)
- Available with integrated IP routing functions or for the optional extension of the IP routing functions by means of KEY-PLUG

Benefits

get Designed for Industry

- Unlimited flexibility during network expansions (e.g. more terminals, higher data transfer rates, PoE ports) or conversion (e.g. switching from copper to fiber-optic cable) and reduction of the storage costs due to the fully modular construction using SFPplus/SFP and media modules
- Retrofitting the Layer 3 switching functions (IP routing) by means of a license on KEY-PLUG without replacing the existing hardware
- Changing the media modules during operation
- High availability of the network thanks to
  - redundant power supply
  - redundant network structures based on FOC or Twisted Pair (redundancy manager, standby function and STP/RSTP/MSTP integrated)
  - easy device replacement by means of plug-in C-PLUG/KEY-PLUG swap medium
  - very fast reconfiguration of the network in event of a fault
- Thanks to the support of the Dual Stack Routing function, IPv4 networks and IPv6 networks can overlap and be operated in parallel
- High flexibility thanks to variable mounting options of the power supply unit and device variants with ports on either the front or rear of the device.

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Application

The SCALANCE XR-500 switches are ideal for use in industrial networks and for integrating the industrial network into an existing corporate network. From the control level to the management level, the switch handles the networking of plant sections as well as distributed field devices and ensures high plant availability with extensive diagnostics options and high transmission speeds. Thanks to the scalability of the basic unit and the optionally available Layer 3 switching function, the network can be established specially for the relevant application, or adapted and expanded at any time.

The SCALANCE XR-500 switches are suitable for establishing electrical and optical Industrial Ethernet line, star or ring topologies with four integral SFP+ slots that can be optionally equipped with SFP+ plug-in transceivers (10 Gbit/s) or SFP plug-in transceivers (1 000 Mbit/s), and up to 12 media module slots that can be optionally equipped with electrical and/or optical 4-port media modules. Thanks to data transfer rates of up to 10 Gbit/s, the switches can be used as an Industrial Ethernet backbone switch and as a hub in the plant bus (redundant connection possible).

The use of media modules or SFP+/SFP enables the following:

- Extension of networks by subsequent insertion of additional media modules in unused media module slots
- Changing of cabling technology, e.g. conversion from copper to fiber-optic cables, or from multimode to singlemode FOC
- Changing of the data transfer rate, e.g. from 1 000 Mbit/s to 10 Gbit/s

Design

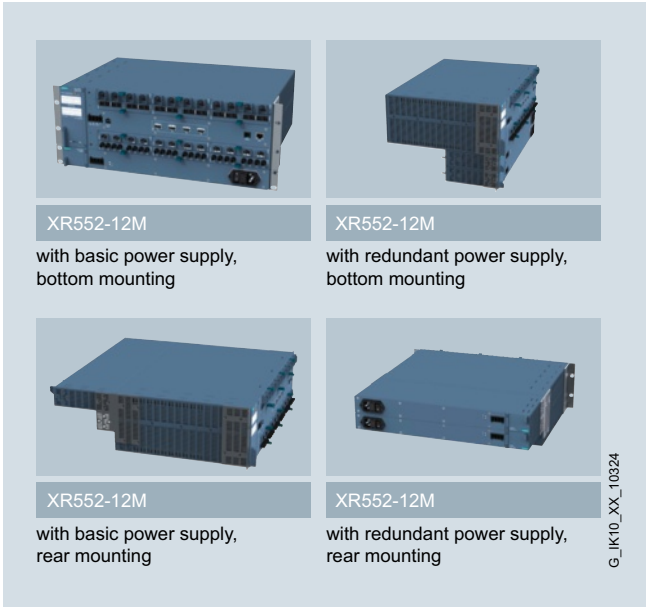
The SCALANCE XR-500 Industrial Ethernet switches with robust metal enclosure with IP20 degree of protection are optimized for installation in the 19" control cabinet. The power supply unit (85 to 264 V AC) for power supply to the SCALANCE XR-500, which is also optimized for the 19" cabinet , can either be installed directly at the rear of the SCALANCE XR-500 or connected using connecting cables (installation of the power supply unit in a 19" rack). The data ports of the SCALANCE XR-500 are located optionally either at the front or rear of the device (depending on the device variant).

The switches have:

- 4-pole terminal block on the front for connecting the optionally available power supply unit (85 V to 264 V AC)
- 6-pole connector for assembly of the optionally available power supply unit (85 V to 264 V AC) on the rear
- 2-pole terminal block for connecting the isolated signaling contact for simple display of faults
- Row of LEDs for indicating status information (power, link status, data transfer, power supply, signaling contact)
- SELECT/SET pushbutton for easy setting of the fault signaling contact on the device
- Slot on the side of the device for the C-PLUG swap medium for simple device replacement in the event of a fault, or for the KEY-PLUG for adding IP routing to the device functionality
- Console port (RS 232 serial interface, RJ11 cable to Sub-D (9-pole) included in scope of delivery) and management port (Ethernet interface) for on-site parameter assignment/ diagnostics

The SCALANCE XR-500 switches are available with the following port types:

- Four SFP+ slots for optical SFP+ or SFP plug-in transceivers (multimode and singlemode connections)
  - The SFP+ plug-in transceivers support 10 Gbps
  - The SFP plug-in transceivers support 1 000 Mbps
- Up to 12 slots for electrical 4-port media modules and electrical PoE 4-port media modules or optical 4-port media modules for multimode or singlemode connections; the optical media modules are available in various connection technologies
  - The RJ45 sockets are also available in industry-standard design with additional retaining collars for connection of the Industrial Ethernet FC RJ45 Plug 180
  - All electrical Ethernet interfaces support 10/100/1 000 Mbps,
    all optical Ethernet interfaces support 100 or 1 000 Mbps



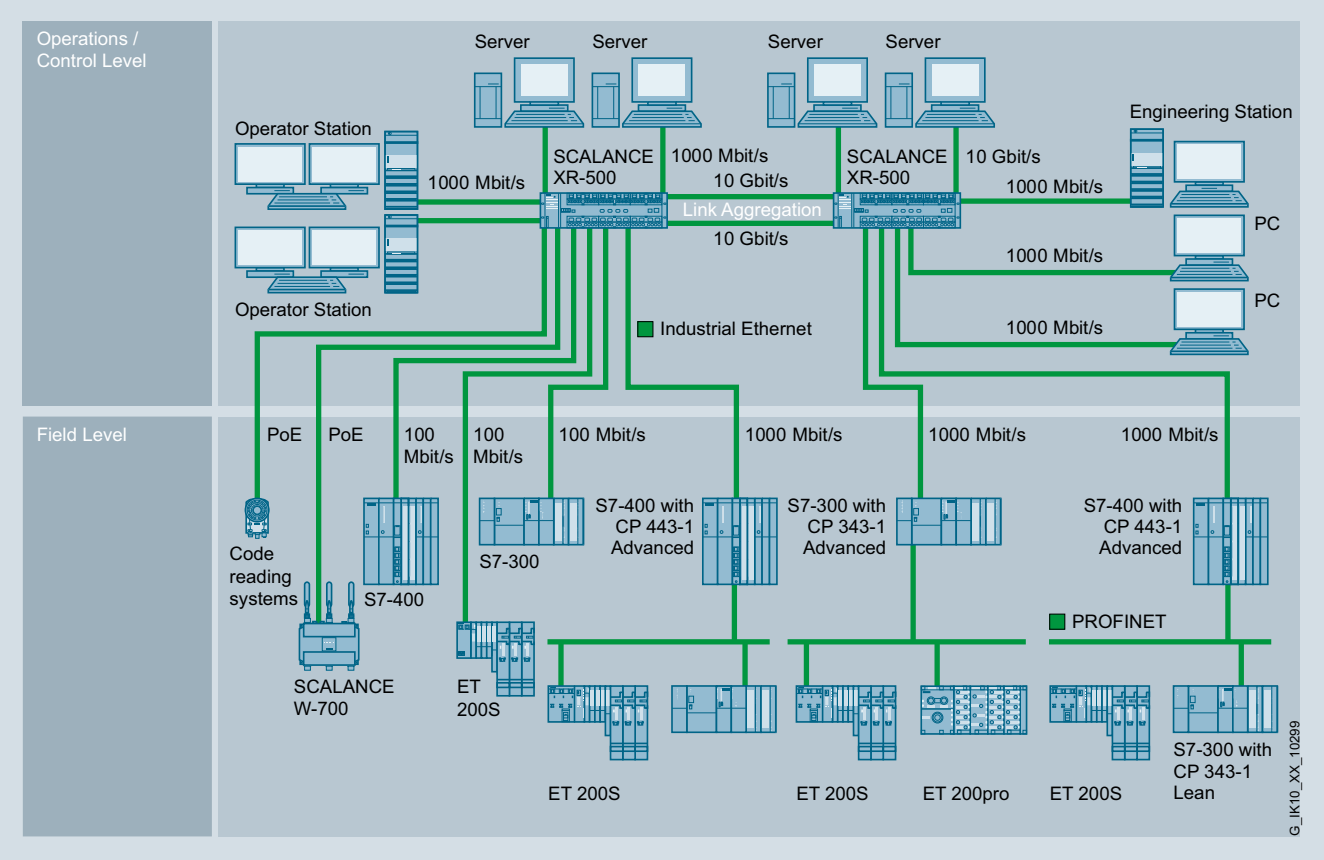
Options for mounting a single/redundant power supply unit to SCALANCE XR552-12M

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Function

- Integrated redundancy manager for constructing ring topologies with up to 10 Gbps and high-speed media redundancy. By interconnecting the ends of an optical or electrical line to form a ring, reliable communication can be achieved. The redundancy manager (RM) integrated in the SCALANCE XR-500 switch monitors the function of the network. It recognizes the failure of a transmission link or of a SCALANCE X switch in the ring and activates the substitute path within a maximum of 200 milliseconds.
- Redundant Layer 2 interfacing to company networks; SCALANCE XR-500 switches support the standardized redundancy procedures Multiple Spanning Tree Protocol (MSTP), Rapid Spanning Tree Protocol (RSTP), and Spanning Tree Protocol (STP). This enables a subnet to be connected redundantly to a higher-level corporate network with reduced requirements for the reconfiguration time (in the order of seconds).
- The Layer 3 switching functions (optional) enable simple subdivision of large networks into smaller subnets with their own address space. Reasons for subdivision into subnets include separation of the Ethernet network to reduce the broadcast load, separation of sensitive areas from the main network, and subdivision of the network into logical working groups.
- Redundant Layer 3 connection to corporate networks; SCALANCE XR-500 switches support the standardized routing protocols Open Shortest Path First (OSPF) and Routing Information Protocol (RIP), and the standardized routing procedure Virtual Router Redundancy Protocol (VRRP). This means industrial, routed subnets can also be connected redundantly to a higher-level corporate network.
- Thanks to support for the Dual Stack Routing function, both IPv4 addressing and IPv6 addressing can be operated in one network.
- 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. Port-based, protocol-based and IP-based VLANs are available for selection.
- Load limiting when multicast protocols (e.g. video transmission) are used; through learning the multicast receivers (IGMP Snooping, IGMP Querier), SCALANCE XR-500 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 or SNTP/NTP server, thereby simplifying the assignment of diagnostic messages of several devices.
- Link Aggregation (IEEE 802.3ad) for bundling data streams
- Quality of Service (IEEE 802.1Q) for prioritization of network traffic



Increasing the transmission bandwidth by means of link aggregation

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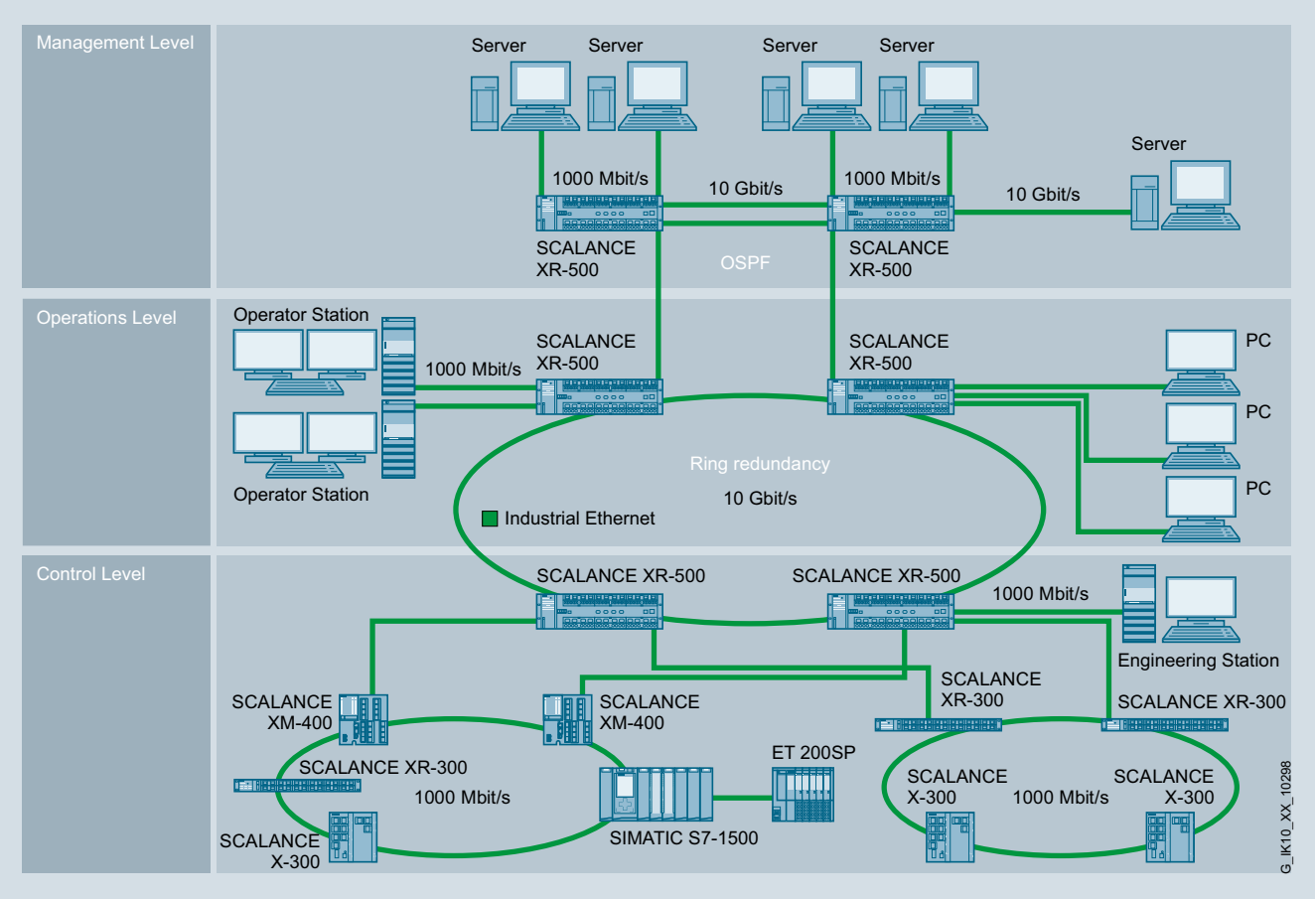
Function (continued)

Network topology and network configuration

The network topology can easily be adapted to the structure of the plant using SCALANCE XR-500 Industrial Ethernet switches .

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

- Ethernet with fast media redundancy;
  to increase network availability, as many as 50 X-200, X-300, X-400 or X-500 switches cascaded in line can be connected into a ring.
- Several rings can be redundantly linked through the standby function
- Star topology with SCALANCE XR-500 switches:
  Each SCALANCE XR-500 switch represents a neutral point that can connect up to 52 nodes or subnets with each other electrically.



Use of SCALANCE XR-500 in redundant network topologies, e.g. with Rapid Spanning Tree Protocol (RSTP) and ring redundancy

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:
  - 5 km at 100 Mbit/s
  - 750 m at 1 000 Mbit/s
  - 300 m at 10 Gbit/s
- Maximum line length between two modules for single-mode fiber-optic conductors:
  - 26 to 200 km at 100 Mbit/s
  - 10 to 120 km at 1 000 Mbit/s
  - 10 to 40 km at 10 Gbit/s
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC Cable 2 x 2 and IE FC RJ45 Plug 180
  - Max. 100 m at 1 Gbps with IE FC Standard Cable 4 x 2 (90 m), IE FC RJ45 Modular Outlet and patch cable (10 m)
  - Max. 10 m using patches with TP cord

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Function (continued)

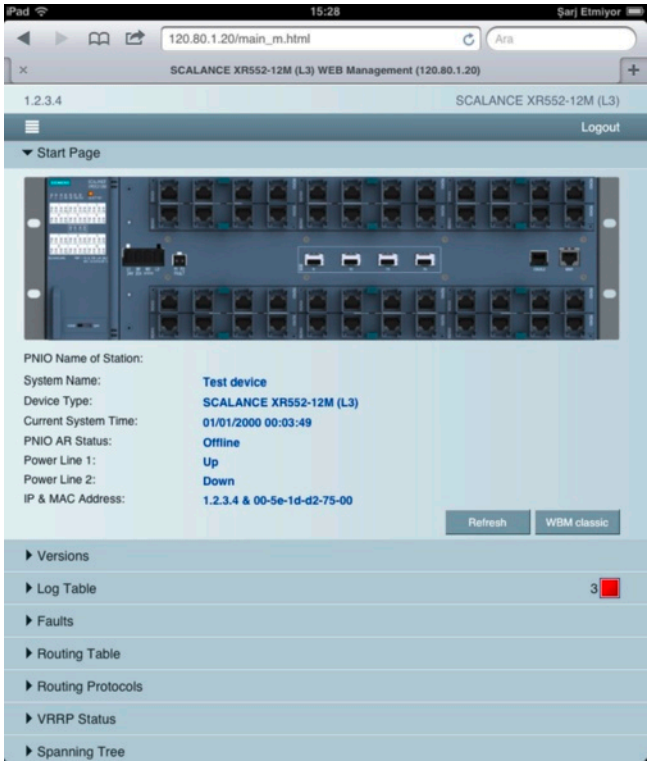
Commissioning and diagnosis

Setting options on the device itself:

- Redundancy manager RM;
  to establish a ring, a SCALANCE XR-500 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 XR-500 (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 by means of dynamic host configuration protocol (DHCP). 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 (Mbps, full/half-duplex)
  - Status of the two power supplies
  - Signaling contact status
  - Signal mask (setpoint status)
  - RM mode
  - Standby mode
  - Via the browser of a mobile device (smartphone, tablet)



- 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:
  - Via standard browser (Web-based management):
    Selection of SCALANCE XR-500 switches via the network from a PC with browser
  - Via SNMP V1, V2c, V3:
    Secure integration of SCALANCE XR-500 switches via the network into a network management system, e.g. SINEMA Server
  - Via PROFINET IO diagnostics:
    PROFINET diagnostic alarms from SCALANCE XR-500 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.
- Via the browser of a mobile device (smartphone, tablet)

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/Multiple 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
  - Support of Access Control List (ACL)
- 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 versions or of the configuration data via the network by a TFTP server or directly via HTTP/HTTPS using a Web browser
- Saving the configuration data or log table via the network on a TFTP server

If faults occur in the network, the SCALANCE XR-500 switch can independently send error messages (traps) to a network management system, such as SINEMA Server, or also e-mails to a predefined network administrator.

Remote monitoring (RMON) provides the following functions: The SCALANCE XR-500 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

Article No.	**6GK5552-0AA00-2AR2 6GK5552-0AA00-2HR2**	**6GK5552-0AR00-2AR2 6GK5552-0AR00-2HR2**	**6GK5528-0AA00-2AR2 6GK5528-0AA00-2HR2**	**6GK5528-0AR00-2AR2 6GK5528-0AR00-2HR2**
Product-type designation	**SCALANCE XR552-12M**	**SCALANCE XR552-12M**	**SCALANCE XR528-6M**	**SCALANCE XR528-6M**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Transfer rate 4	10 Gbit/s	10 Gbit/s	10 Gbit/s	10 Gbit/s
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	52	52	28	28
Number of electrical connections				
• for SFP+/SFP	4	4	4	4
• for operator console	1	1	1	1
• for management purposes	1	1	1	1
• for signaling contact	1	1	1	1
• for media module	12	12	6	6
• for power supply	1	1	1	1
• for redundant power supply	1	1	1	1
Design of electrical connection				
• for network components and terminal equipment	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• for Power-over-Ethernet for network components or terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port	RJ11 port	RJ11 port
• for management purposes	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Design of optical interface for optical waveguide				
• at 100 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
• at 1 000 Mbit/s	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules	Dependent on selected media modules
Design of the removable storage C-PLUG/KEY-PLUG	Yes	Yes	Yes	Yes
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	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
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	F 15 A / 125 V	F 15 A / 125 V	F 15 A / 125 V	F 15 A / 125 V

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Technical specifications (continued)

Article No.	6GK5552-0AA00-2AR2 6GK5552-0AA00-2HR2	6GK5552-0AR00-2AR2 6GK5552-0AR00-2HR2	6GK5528-0AA00-2AR2 6GK5528-0AA00-2HR2	6GK5528-0AR00-2AR2 6GK5528-0AR00-2HR2
Product-type designation	**SCALANCE XR552-12M**	**SCALANCE XR552-12M**	**SCALANCE XR528-6M**	**SCALANCE XR528-6M**
Permitted ambient conditions				
Ambient temperature				
• during operating	0 … 60 °C	0 … 60 °C	0 … 60 °C	0 … 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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Width	449 mm	449 mm	449 mm	449 mm
Height	130.8 mm	130.8 mm	87.2 mm	87.2 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	10 kg	10 kg	10 kg	10 kg
Mounting type 19-inch installation	Yes	Yes	Yes	Yes
Type of cable outlet	Cable outlet at front	Cable outlet at front	Cable outlet at front	Cable outlet at front
Product properties, functions, components general				
Cascading in the case of a redundant ring at reconfiguration time of < 0.3 s				
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5552-0AA00-2AR2 6GK5552-0AA00-2HR2	6GK5552-0AR00-2AR2 6GK5552-0AR00-2HR2	6GK5528-0AA00-2AR2 6GK5528-0AA00-2HR2	6GK5528-0AR00-2AR2 6GK5528-0AR00-2HR2
Product-type designation	**SCALANCE XR552-12M**	**SCALANCE XR552-12M**	**SCALANCE XR528-6M**	**SCALANCE XR528-6M**
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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 - protocol-based	Yes	Yes	Yes	Yes
• VLAN - IP-based	Yes	Yes	Yes	Yes
• VLAN dynamic	Yes	Yes	Yes	Yes
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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 Routing				
Service Routing Note	IP routing in connection with KEY-PLUG, IPv6 available soon	IP routing integrated, IPv6 available soon	IP routing in connection with KEY-PLUG, IPv6 available soon	IP routing integrated, IPv6 available soon
Product function				
• static IP routing	-	Yes	-	Yes
• static IP routing IPv6	-	No	-	No
• dynamic IP routing	-	Yes	-	Yes
• dynamic IP routing IPv6	-	No	-	No
Protocol is supported				
• RIPv2	-	Yes	-	Yes
• RIPnG for IPv6	-	No	-	No
• OSPFv2	-	Yes	-	Yes
• OSPFv3 for IPv6	-	No	-	No
• VRRP	-	Yes	-	Yes
• VRRP for IPv6	-	No	-	No
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• STP	Yes	Yes	Yes	Yes
• RSTP	Yes	Yes	Yes	Yes
• MSTP	Yes	Yes	Yes	Yes
• RSTP big network support	Yes	Yes	Yes	Yes
• LACP	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5552-0AA00-2AR2 6GK5552-0AA00-2HR2	6GK5552-0AR00-2AR2 6GK5552-0AR00-2HR2	6GK5528-0AA00-2AR2 6GK5528-0AA00-2HR2	6GK5528-0AR00-2AR2 6GK5528-0AR00-2HR2
Product-type designation	**SCALANCE XR552-12M**	**SCALANCE XR552-12M**	**SCALANCE XR528-6M**	**SCALANCE XR528-6M**
Product functions Security				
Product function				
• ACL - MAC-based	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
Type of time synchronization	IEEE 1588 available soon	IEEE 1588 available soon	IEEE 1588 available soon	IEEE 1588 available soon
Standards, specifications, approvals				
Standard				
• for safety of CSA and UL	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 interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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

Article No.	6GK5524-8GS00-2AR2	6GK5524-8GS00-4AR2 6GK5524-8GS00-3AR2	6GK5524-8GR00-2AR2	6GK5524-8GR00-4AR2 6GK5524-8GR00-3AR2
Product-type designation	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**
Transmission rate				
Transfer rate 1	10 Mbit/s	10 Mbit/s	10 Mbit/s	10 Mbit/s
Transfer rate 2	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Transfer rate 3	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
Transfer rate 4	-	-	-	-
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	24	24	24	24
Number of electrical connections				
• for SFP+/SFP	8	8	8	8
• for operator console	1	1	1	1
• for management purposes	1	1	1	1
• for signaling 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 and terminal equipment	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for operator console	RJ11 port	RJ11 port	RJ11 port	RJ11 port
• for management purposes	RJ45 port	RJ45 port	RJ45 port	RJ45 port
• for signaling contact	2-pole terminal block	2-pole terminal block	2-pole terminal block	2-pole terminal block
• for power supply	4-pole terminal block	4-pole terminal block	4-pole terminal block	4-pole terminal block
Design of optical interface for fibre optic cable				
• at 100 Mbit/s	SFP slot	SFP slot	SFP slot	SFP slot
• at 1 000 Mbit/s	SFP slot	SFP slot	SFP slot	SFP slot
Design of the removable storage C-PLUG/KEY-PLUG	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5524-8GS00-2AR2	6GK5524-8GS00-4AR2 6GK5524-8GS00-3AR2	6GK5524-8GR00-2AR2	6GK5524-8GR00-4AR2 6GK5524-8GR00-3AR2
Product-type designation	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**
Signal-Inputs/outputs				
Operating voltage of signaling contacts at DC rated value	24 V	24 V	24 V	24 V
Operating current of signaling contacts at DC maximum	0.1 A	0.1 A	0.1 A	0.1 A
Supply voltage, current consumption, power loss				
Type of supply voltage	DC	AC	DC	AC
Supply voltage external	24 V	-	24 V	-
• minimum	19.2 V	-	19.2 V	-
• maximum	28.8 V	-	28.8 V	-
Product component fusing at power supply input	Yes	Yes	Yes	Yes
Type of fusing at input for supply voltage	3.15 A / 125 V	3.15 A / 250 V	3.15 A / 125 V	3.15 A / 250 V
Permitted ambient conditions				
Ambient temperature				
• during operating	0 … 60 °C	0 … 60 °C	0 … 60 °C	0 … 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 maximum	95 %	95 %	95 %	95 %
Protection class IP	IP20	IP20	IP20	IP20
Design, dimensions and weight				
Design	19" rack	19" rack	19" rack	19" rack
Width	449 mm	449 mm	449 mm	449 mm
Height	44 mm	44 mm	44 mm	44 mm
Depth	305 mm	305 mm	305 mm	305 mm
Net weight	5 kg	5.5 kg	5 kg	5.5 kg
Mounting type 19-inch installation	Yes	Yes	Yes	Yes
Type of cable outlet	Cable outlet at front	Cable outlet at front	Cable outlet at front	Cable outlet at front
Product properties, functions, components general				
Cascading in cases of star structuring	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)	Any (depending only on signal propagation time)
Product functions management, configuration				
Product function				
• CLI	Yes	Yes	Yes	Yes
• web-based management	Yes	Yes	Yes	Yes
• MIB support	Yes	Yes	Yes	Yes
• TRAPs via email	Yes	Yes	Yes	Yes
• Configuration with STEP 7	Yes	Yes	Yes	Yes
• RMON	Yes	Yes	Yes	Yes
• Port mirroring	Yes	Yes	Yes	Yes
• CoS	Yes	Yes	Yes	Yes
• PROFINET IO diagnosis	Yes	Yes	Yes	Yes
• switch-managed	Yes	Yes	Yes	Yes

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Technical specifications (continued)

Article No.	6GK5524-8GS00-2AR2	6GK5524-8GS00-4AR2 6GK5524-8GS00-3AR2	6GK5524-8GR00-2AR2	6GK5524-8GR00-4AR2 6GK5524-8GR00-3AR2
Product-type designation	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**
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
Identification & maintenance function				
• I&M0 - device-specific information	Yes	Yes	Yes	Yes
• I&M1 - higher level designation/location designation	Yes	Yes	Yes	Yes
Product functions Diagnosis				
Product function				
• Port diagnostics	Yes	Yes	Yes	Yes
• Statistics packet size	Yes	Yes	Yes	Yes
• Statistics packet type	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 - protocol-based	Yes	Yes	Yes	Yes
• VLAN - IP-based	Yes	Yes	Yes	Yes
• VLAN dynamic	Yes	Yes	Yes	Yes
Number of VLANs maximum	255	255	255	255
Number of VLANs - dynamic maximum	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 Routing				
Service Routing Note	IP routing in connection with KEY-PLUG	IP routing in connection with KEY-PLUG	IP routing in connection with KEY-PLUG	IP routing in connection with KEY-PLUG
Product function				
• static IP routing	-	-	Yes	Yes
• static IP routing IPv6	-	-	No	No
• dynamic IP routing	-	-	Yes	Yes
• dynamic IP routing IPv6	-	-	No	No
Protocol is supported				
• RIPv2	-	-	Yes	Yes
• RIPnG for IPv6	-	-	No	No
• OSPFv2	-	-	Yes	Yes
• OSPFv3 for IPv6	-	-	No	No
• VRRP	-	-	Yes	Yes
• VRRP for IPv6	-	-	No	No

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Technical specifications (continued)

Article No.	6GK5524-8GS00-2AR2	6GK5524-8GS00-4AR2 6GK5524-8GS00-3AR2	6GK5524-8GR00-2AR2	6GK5524-8GR00-4AR2 6GK5524-8GR00-3AR2
Product-type designation	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**	**SCALANCE XR524-8C**
Product functions Redundancy				
Product function				
• Ring redundancy	Yes	Yes	Yes	Yes
• Redundancy manager	Yes	Yes	Yes	Yes
• Standby redundancy	Yes	Yes	Yes	Yes
• High Speed Redundancy Protocol (HRP)	Yes	Yes	Yes	Yes
• Media Redundancy Protocol (MRP)	Yes	Yes	Yes	Yes
• Redundancy procedure STP	Yes	Yes	Yes	Yes
• RSTP redundancy protocol	Yes	Yes	Yes	Yes
• Redundancy procedure MSTP	Yes	Yes	Yes	Yes
• Passive listening	Yes	Yes	Yes	Yes
Protocol is supported				
• LACP	Yes	Yes	Yes	Yes
Product functions Security				
Product function				
• ACL - MAC-based	Yes	Yes	Yes	Yes
• 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	Yes	Yes	Yes	Yes
• SNTP	Yes	Yes	Yes	Yes
Type of time synchronization	IEEE 1588 available soon	IEEE 1588 available soon	IEEE 1588 available soon	IEEE 1588 available soon
Standards, specifications, approvals				
Standard				
• for hazardous area of CSA and UL	available soon	available soon	available soon	available soon
• 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 interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification 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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Ordering data

	Article No.
SCALANCE XR-500 Industrial Ethernet switches	
Layer 3-enabled Industrial Ethernet switches for establishing electrical and/or optical Industrial Ethernet networks; with data transfer rates up to 10 Gbit/s, designed for installation in 19" control cabinets	
SCALANCE XR552-12M	
4 x integral 1/10 Gbps SFP+ slots for SFP or SFP+ plug-in transceivers 12 x 10/100/1 000 Mbps slots for 4-port media modules, electrical or optical	
Layer 2, upgrade to Layer 3 possible	
• Ports at front	**6GK5552-0AA00-2AR2**
• Ports at rear	**6GK5552-0AA00-2HR2**
Layer 3	
• Ports at front	**6GK5552-0AR00-2AR2**
• Ports at rear	**6GK5552-0AR00-2HR2**
SCALANCE XR528-6M	
4 x integral 1/10 Gbps SFP+ slots for SFP or SFP+ plug-in transceivers 6 x 10/100/1 000 Mbps slots for 4-port media modules, electrical or optical	
Layer 2, upgrade to Layer 3 possible	
• Ports at front	**6GK5528-0AA00-2AR2**
• Ports at rear	**6GK5528-0AA00-2HR2**
Layer 3	
• Ports at front	**6GK5528-0AR00-2AR2**
• Ports at rear	**6GK5528-0AR00-2HR2**
SCALANCE XR524-8C	
24 x 10/100/1 000 Mbit/s, of which 8 x RJ45/SFP combo ports; 24 x 1 000 Mbit/s maximum usable	
Layer 2, upgrade to Layer 3 possible	
• Redundant 24 V DC voltage supply	**6GK5524-8GA00-2AR2**
• Redundant 230 V AC voltage supply	**6GK5524-8GA00-4AR2**
Layer 3	
• Redundant 24 V DC voltage supply	**6GK5524-8GR00-2AR2**
• Redundant 230 V AC voltage supply	**6GK5524-8GR00-4AR2**

	Article No.
Accessories	
FAN597-1 Replacement fan slide-in unit for SCALANCE XR552-12M	**6GK5597-1AA00-8AA0**
FAN597-2 Replacement fan slide-in unit for SCALANCE XR528-6M	**6GK5597-2AA00-8AA0**
KEY-PLUG X-500 Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and for easy replacement of SCALANCE X-500 in the event of a fault	**6GK5905-0PA00**
Media modules	See "Media modules for modular SCALANCE X-500 managed"
Power supply	See "Power supply for modular SCALANCE X-500 managed"

More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

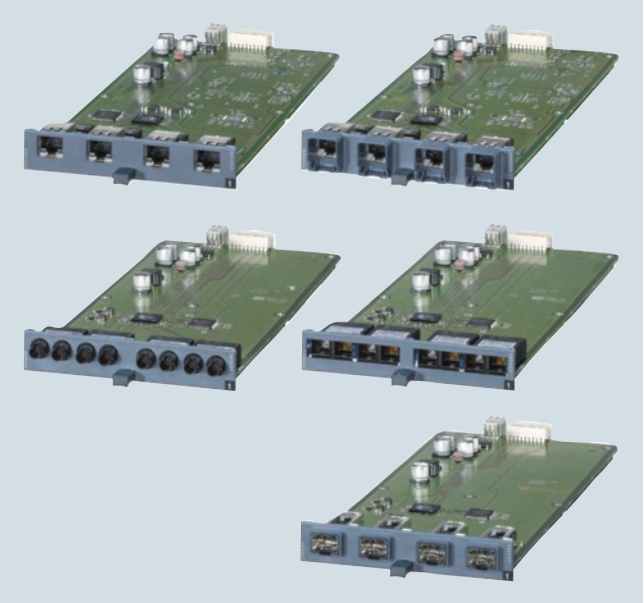
- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Overview



- 4-port media modules for flexible, 4-port-granular equipping of SCALANCE X-500 Industrial Ethernet switches
- Electrical versions with RJ45 ports are available as well as optical versions with BFOC and SC ports for the use of multimode and single-mode fiber-optic cables
- Using a 4-port SFP media module, the optional use of fiber-optic SFP plug-in transceivers (small form-factor pluggable) with LC connection technology is possible
- SFP+ and SFP plug-in transceivers for flexible equipping of the four integral SFP+ slots in SCALANCE X-500

Benefits

get Designed for Industry

- Unlimited flexibility during network expansions (e.g. more terminal devices), conversion (e.g. switching from copper to fiber-optic cables), or performance enhancement (e.g. from Gigabit to 10 Gigabit) through modular construction using media modules and SFP+ or SFP plug-in transceivers
- Reduction of storage costs and maintenance overhead by focusing on a few basic device versions

Application

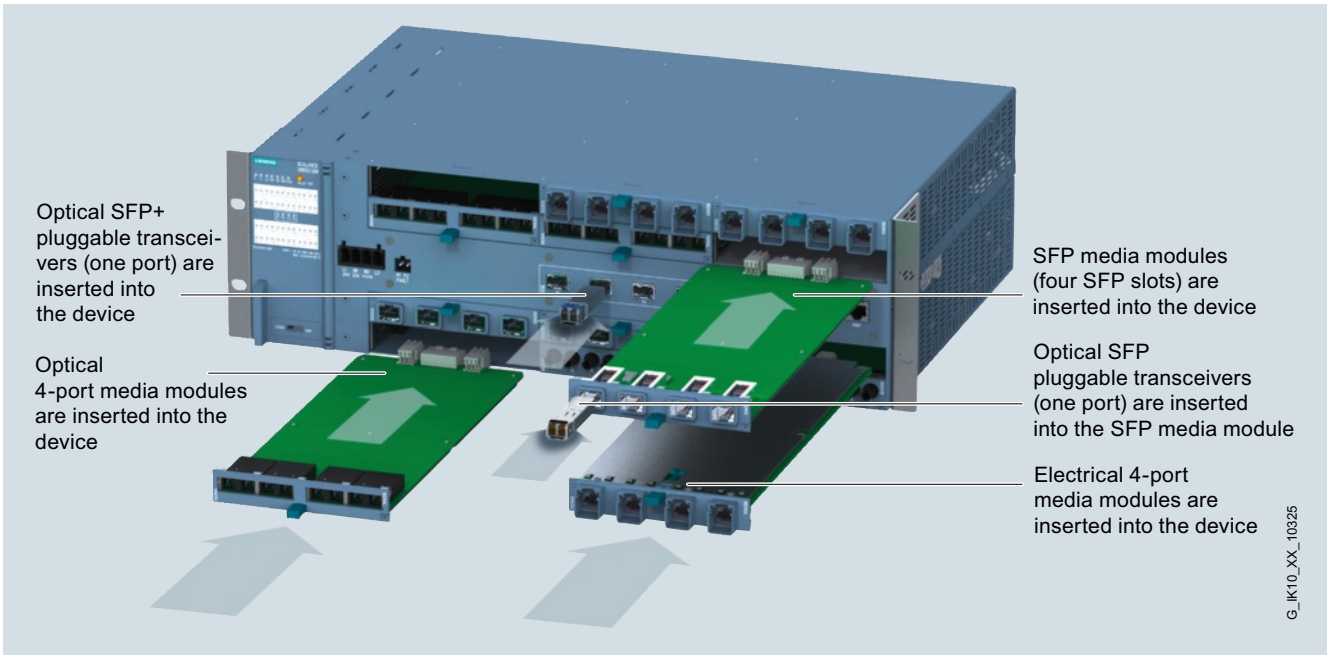
Use of media modules in the SCALANCE X-500 switches enables:

- Extension of networks by subsequent insertion of additional media modules in unused media module slots (possible during operation)
- Extension of networks by subsequent insertion of additional SFP+ or SFP plug-in transceivers in unused SFP+ slots (possible during operation)
- Changing of cabling technology (e.g. conversion from copper to fiber-optic cables, or from multimode to singlemode FOC)
- Change of the data transfer rate (e.g. conversion from SFP plug-in transceivers (1 000 Mbit/s) to SFP+ plug-in transceivers (10 Gbit/s)

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Design



4-port media modules plugged into media module slot and SFP/SFP+ plug-in transceivers in SFP+ slots

Product versions of media modules

Electrical media modules with 4 x 10/100/1 000 Mbit/s RJ45 ports

- MM992-4CUC with retaining collar
- MM992-4CU without retaining collar

Electrical media modules with 4 x 10/100/1 000 Mbit/s RJ45 ports and PoE

- MM992-4PoEC with retaining collar
- MM992-4PoE without retaining collar

Optical media modules with 4 x 100 Mbit/s BFOC ports

- MM991-4
  multimode, glass, up to 5 km
- MM991-4LD
  singlemode, glass, up to max. 26 km

Optical media modules with 4 x 1 000 Mbit/s SC ports

- MM992-4
  multimode, glass, up to 750 m
- MM992-4LD
  single-mode, glass, up to 10 km

Optical media modules with 4 x 100/1 000 Mbit/s for SFP pluggable transceiver

- MM992-4SFP
  for SFP plug-in transceivers with 1 x 100 Mbit/s or 1 x 1 000 Mbit/s multimode or singlemode, glass

Product versions of SFP pluggable transceivers

The SFP plug-in transceivers (small form-factor pluggable) can be used together with the SFP media module MM992-4SFP, and in the integral SFP+ slots of the SCALANCE X-500.

Optical SFP pluggable transceivers with 1x 100 Mbit/s LC port

- SFP991-1
  multimode, glass, up to 5 km
- SFP991-1LD
  singlemode, glass, up to 26 km
- SFP991-1LH+
  singlemode, glass, up to 70 km
- •SFP991-1ELH200
  singlemode, glass, up to 200 km

Optical SFP pluggable transceivers with 1 x 1 000 Mbit/s LC port

- SFP992-1
  multimode, glass, up to 750 m
- SFP992-1LD
  singlemode, glass, up to 10 km
- SFP992-1LH
  singlemode, glass, up to 40 km
- SFP992-1LH+
  singlemode, glass, up to 70 km
- SFP992-1ELH
  singlemode, glass, up to 120 km

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Design (continued)

Product versions of SFP+ pluggable transceivers

The SFP+ pluggable transceivers (small form-factor pluggable) can only be used in the integral SFP+ slots of the SCALANCE X-500.

Optical SFP+ pluggable transceivers with 1 x 10 Gbit/s LC ports

- SFP993-1
  multimode, glass, up to max 300 m
- SFP993-1LD
  single-mode, glass, up to 10 km
- SFP993-1LH
  singlemode, glass, up to max 40 km

Electrically preassembled SFP+/SFP+

Connecting cable with 10 Gbit/s

The IE connecting cable SFP+/SFP+ is preassembled at both ends and suitable for the transmission of 10 Gbit/s Ethernet. The cables have SFP+ connectors for use in the SFP+ slots of the SCALANCE X-500 series and therefore offer the possibility of connecting SCALANCE X-500 switches cost-effectively over short distances with a bandwidth of 10 Gbit/s. The SFP+/SFP+ connecting cables can only be used in the integrated SFP+ slots of the SCALANCE X-500.

- IE connecting cable SFP+/SFP+ 1 m;
  Twinax copper cable with a length of 1 m
- IE connecting cable SFP+/SFP+ 2 m;
  Twinax copper cable with a length of 2 m
- IE connecting cable SFP+/SFP+ 7 m;
  Twinax copper cable with a length of 7 m

	Type and quantity of ports							
	10 Gigabit Ethernet		Gigabit Ethernet			Fast Ethernet		Max. distance
	10000 Mbit/s		10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s		
	Optical		Electrical	Optical		Optical		
Type of module	Multimode	Singlemode	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	
Media modules								
MM992-4CUC			4x RJ45[1)]					100 m
MM992-4CU			4x RJ45					100 m
MM992-4PoEC			4x RJ45[1)]					100 km
MM992-4PoE			4x RJ45					100 km
MM991-4						4x BFOC		5 km
MM991-4LD							4x BFOC	26 km
MM992-4				4x SC				5 km
MM992-4LD					4x SC			10 km
MM992-4SFP				4x LC[2)]	4x LC[2)]	4x LC[2)]	4x LC[2)]	
SFP-Module								
SFP991-1[3)]						1x LC		5 km
SFP991-1LD[3)]							1x LC	26 km
SFP991-1LH+[3)]							1x LC	70 km
SFP991-1ELH200[3)]							1x LC	200 km
SFP992-1[3) 4)]				1x LC				750 m
SFP992-1LD[3) 4)]					1x LC			10 km
SFP992-1LH[3) 4)]					1x LC			40 km
SFP992-1LH+[3) 4)]					1x LC			70 km
SFP992-1ELH[3) 4)]					1x LC			120 km
SFPplus-Module[4)]								
SFP993-1	1x LC							300 m
SFP993-1LD		1x LC						10 km
SFP993-1LH		1x LC						40 km

G_IK10_XX_10293

[1)] With retaining collars
[2)] The MM992-4SFP SFP slot module can accommodate up to four 1-port SFP modules
[3)] Can only be plugged into an MM992-4SFP slot module
[4)] Puggable in XR-500 SFPplus slots only

Overview of media modules for SCALANCE X-500

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Technical specifications

Article No.	6GK5992-4GA00-8AA0	6GK5992-4SA00-8AA0	6GK5992-4RA00-8AA0	6GK5992-4QA00-8AA0
Product-type designation	**MM992-4CUC**	**MM992-4CU**	**MM992-4POEC**	**MM992-4POE**
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	4	4	4	4
Number of 10/100/1 000 Mbit/s M12 ports	-	-	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	4	4	2	2
Number of electrical connections				
• for Power-over-Ethernet for network components or terminal equipment	-	-	4	4
• for SFP+/SFP	-	-	-	-
Design of electrical connection				
• for network components and terminal equipment	RJ45	RJ45	RJ45	RJ45
• for Power-over-Ethernet for network components or terminal equipment	-	-	-	-
Number of 100 Mbit/s ST(BFOC) ports	-	-	-	-
Number of 100 Mbit/s SC ports	-	-	-	-
Number of 100 Mbit/s LC ports	-	-	-	-
Number of 1 000 Mbit/s LC ports (LX)	-	-	-	-
Number of 1 000 Mbit/s LC ports (SX)	-	-	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-	-	-
Number of 10 Gbit/s LC ports (LX)	-	-	-	-
Number of 10 Gbit/s LC ports (SX)	-	-	-	-
Design of optical connections for network components or terminal devices	-	-	-	-
Connectable optical power relative to 1 mW				
• of the transmitter output	-	-	-	-
• of the receiver input maximum	-	-	-	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-	-	-	-
Attenuation of fiber-optic cable transmission link minimum necessary	-	-	-	-
Range at the optical interface depending on the optical fiber used	-	-	-	-
Permitted ambient conditions				
Ambient temperature				
• during operating	0 … 60 °C	0 … 60 °C	0 … 60 °C	0 … 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 maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-	-
Protection class IP	IP20	IP20	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5992-4GA00-8AA0	6GK5992-4SA00-8AA0	6GK5992-4RA00-8AA0	6GK5992-4QA00-8AA0
Product-type designation	**MM992-4CUC**	**MM992-4CU**	**MM992-4POEC**	**MM992-4POE**
Design, dimensions and weight				
Design	Media module	Media module	Media module	Media module
Width	120.3 mm	120.3 mm	120.3 mm	120.3 mm
Height	22.3 mm	22.3 mm	22.3 mm	22.3 mm
Depth	275.5 mm	275.5 mm	275.5 mm	275.5 mm
Net weight	0.3 kg	0.3 kg	0.3 kg	0.3 kg
Mounting type Installation in media module slot	Yes	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched	Latched
Standards, specifications, approvals				
Standard				
• for EMC	-	-	-	-
• for EMC from FM	-	-	-	-
• for hazardous zone	-	-	-	-
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-4	UL 60950-1, CSA C22.2 No. 60950-7	UL 60950-1, CSA C22.2 No. 60950-6	UL 60950-1, CSA C22.2 No. 60950-5
• for hazardous area of CSA and UL	-	-	-	-
• 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 interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification of suitability	EN 61000-6-2, EN 61000-6-7	EN 61000-6-2, EN 61000-6-10	EN 61000-6-2, EN 61000-6-9	EN 61000-6-2, EN 61000-6-8
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	Yes	Yes	No	No
• Railway application in accordance with EN 50155	-	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-	-
• IEC 61850-3	-	-	-	-
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	-	-
• Bureau Veritas (BV)	-	-	-	-
• Det Norske Veritas (DNV)	-	-	-	-
• Germanische Lloyd (GL)	-	-	-	-
• Lloyds Register of Shipping (LRS)	-	-	-	-
• Nippon Kaiji Kyokai (NK)	-	-	-	-

Article No.	6GK5991-4AB00-8AA0	6GK5991-4AC00-8AA0
Product-type designation	**MM991-4**	**MM991-4LD**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	4	4
Number of 10/100/1 000 Mbit/s M12 ports	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-
Number of electrical connections		
• for Power-over-Ethernet for network components or terminal equipment	-	-
• for SFP+/SFP	-	-
Design of electrical connection		
• for network components and terminal equipment	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-

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Technical specifications (continued)

Article No.	6GK5991-4AB00-8AA0	6GK5991-4AC00-8AA0
Product-type designation	**MM991-4**	**MM991-4LD**
Number of 100 Mbit/s ST(BFOC) ports	4	4
Number of 100 Mbit/s SC ports	-	-
Number of 100 Mbit/s LC ports	-	-
Number of 1 000 Mbit/s LC ports (LX)	-	-
Number of 1 000 Mbit/s LC ports (SX)	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-
Number of 10 Gbit/s LC ports (LX)	-	-
Number of 10 Gbit/s LC ports (SX)	-	-
Design of optical connections for network components or terminal devices	BFOC	BFOC
Connectable optical power relative to 1 mW		
• of the transmitter output	-19 … -14 dB	-15 … -8 dB
• of the receiver input	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 ... 5 km	0 ... 26 km
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 60 °C	0 … 60 °C
• during storage	-40 ... +70 °C	-40 ... +70 °C
• during transport	-40 ... +70 °C	-40 ... +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Ambient condition for (standard) operation mode	-	-
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	Media module	Media module
Width	120.3 mm	120.3 mm
Height	22.3 mm	22.3 mm
Depth	275.5 mm	275.5 mm
Net weight	0.3 kg	0.3 kg
Mounting type Installation in media module slot	Yes	Yes
Mounting type	Latched	Latched
Standards, specifications, approvals		
Standard		
• for EMC	-	-
• for EMC from FM	-	-
• for hazardous zone	-	-
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-1
• for hazardous area of CSA and UL	-	-
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2	EN 61000-6-2

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Technical specifications (continued)

Article No.	6GK5991-4AB00-8AA0	6GK5991-4AC00-8AA0
Product-type designation	**MM991-4**	**MM991-4LD**
Verification 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
• KC approval	Yes	Yes
• Railway application in accordance with EN 50155	-	-
• Railway application in accordance with EN 50124-1	-	-
• IEC 61850-3	-	-
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	-	-
• Bureau Veritas (BV)	-	-
• Det Norske Veritas (DNV)	-	-
• Germanische Lloyd (GL)	-	-
• Lloyds Register of Shipping (LRS)	-	-
• Nippon Kaiji Kyokai (NK)	-	-

Article No.	6GK5992-4AL00-8AA0	6GK5992-4AM00-8AA0	6GK5992-4AS00-8AA0
Product-type designation	**MM992-4**	**MM992-4LD**	**MM992-4SFP**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	4	4	4
Number of 10/100/1 000 Mbit/s M12 ports	-	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-	-
Number of electrical connections			
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
• for SFP+/SFP	-	-	4
Design of electrical connection			
• for network components and terminal equipment	-	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
Number of 100 Mbit/s ST(BFOC) ports	-	-	-
Number of 100 Mbit/s SC ports	-	-	-
Number of 100 Mbit/s LC ports	-	-	-
Number of 1 000 Mbit/s LC ports (LX)	-	-	-
Number of 1 000 Mbit/s LC ports (SX)	-	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	4	-
Number of 1 000 Mbit/s SC ports (SX)	4	-	-
Number of 10 Gbit/s LC ports (LX)	-	-	-
Number of 10 Gbit/s LC ports (SX)	-	-	-
Design of optical connections for network components or terminal devices	SC	SC	-
Connectable optical power relative to 1 mW			
• of the transmitter output	-9.5 ... -4 dB	-9.5 ... -3 dB	- -
• of the receiver input maximum	-3 dB	-3 dB	-
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	-
Range at the optical interface depending on the optical fiber used	0 ... 0.75 km	0 ... 10 km	- -

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Technical specifications (continued)

Article No.	6GK5992-4AL00-8AA0	6GK5992-4AM00-8AA0	6GK5992-4AS00-8AA0
Product-type designation	**MM992-4**	**MM992-4LD**	**MM992-4SFP**
Permitted ambient conditions			
Ambient temperature			
• during operating	0 … 60 °C	0 … 60 °C	0 … 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 maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	Media module	Media module	Media module
Width	120.3 mm	120.3 mm	120.3 mm
Height	22.3 mm	22.3 mm	22.3 mm
Depth	275.5 mm	275.5 mm	275.5 mm
Net weight	0.3 kg	0.3 kg	0.3 kg
Mounting type Installation in media module slot	Yes	Yes	Yes
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC	-	-	-
• for EMC from FM	-	-	-
• for hazardous zone	-	-	-
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1	UL 60950-1, CSA C22.2 No. 60950-2	UL 60950-1, CSA C22.2 No. 60950-3
• for hazardous area of CSA and UL	-	-	-
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification of suitability	EN 61000-6-2, EN 61000-6-4	EN 61000-6-2, EN 61000-6-5	EN 61000-6-2, EN 61000-6-6
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	Yes	Yes	Yes
• Railway application in accordance with EN 50155	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-
• IEC 61850-3	-	-	-
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	-
• Bureau Veritas (BV)	-	-	-
• Det Norske Veritas (DNV)	-	-	-
• Germanische Lloyd (GL)	-	-	-
• Lloyds Register of Shipping (LRS)	-	-	-
• Nippon Kaiji Kyokai (NK)	-	-	-

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Technical specifications (continued)

Article No.	6GK5991-1AD00-8AA0	6GK5991-1AF00-8AA0	6GK5991-1AE00-8AA0	6GK5991-1AE30-8AA0
Product-type designation	**SFP991-1**	**SFP991-1LD**	**SFP991-1LH+**	**SFP991-1ELH200**
Interfaces				
Number of electrical/optical connections for network components or terminal equipment maximum	1	1	1	1
Number of 10/100/1 000 Mbit/s M12 ports	-	-	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-	-	-
Number of electrical connections				
• for Power-over-Ethernet for network components or terminal equipment	-	-	-	-
• for SFP+/SFP	-	-	-	-
Design of electrical connection				
• for network components and terminal equipment	-	-	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-	-	-
Number of 100 Mbit/s ST(BFOC) ports	-	-	-	-
Number of 100 Mbit/s SC ports	-	-	-	-
Number of 100 Mbit/s LC ports	1	1	1	1
Number of 1 000 Mbit/s LC ports (LX)	-	-	-	-
Number of 1 000 Mbit/s LC ports (SX)	-	-	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-	-	-
Number of 10 Gbit/s LC ports (LX)	-	-	-	-
Number of 10 Gbit/s LC ports (SX)	-	-	-	-
Design of optical connections for network components or terminal devices	LC	LC	LC	LC
Connectable optical power relative to 1 mW				
• of the transmitter output	-19 … -14 dB	-15 … -8 dB	-5 … +0 dB	1 … 5 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB	-9 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-32 dB	-34 dB	-34 dB	-42 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB	14 dB
Range at the optical interface depending on the optical fiber used	0 … 5 km	0 … 26 km	12 … 70 km	61 … 200 km
Permitted ambient conditions				
Ambient temperature				
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-	-
Protection class IP	IP20	IP20	IP20	IP20

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Technical specifications (continued)

Article No.	6GK5991-1AD00-8AA0	6GK5991-1AF00-8AA0	6GK5991-1AE00-8AA0	6GK5991-1AE30-8AA0
Product-type designation	**SFP991-1**	**SFP991-1LD**	**SFP991-1LH+**	**SFP991-1ELH200**
Design, dimensions and weight				
Design	SFP Module	SFP Module	SFP Module	SFP Module
Width	13.7 mm	13.7 mm	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg	0.01 kg	0.01 kg
Mounting type Installation in media module slot	-	-	-	-
Mounting type	Latched	Latched	Latched	Latched
Standards, specifications, approvals				
Standard				
• for EMC	-	-	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	-	-	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes	Yes
• KC approval	No	No	No	No
• Railway application in accordance with EN 50155	-	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-	-
• IEC 61850-3	-	-	-	-
Marine classification association				
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	-	-
• Bureau Veritas (BV)	-	-	-	-
• Det Norske Veritas (DNV)	-	-	-	-
• Germanische Lloyd (GL)	-	-	-	-
• Lloyds Register of Shipping (LRS)	-	-	-	-
• Nippon Kaiji Kyokai (NK)	-	-	-	-

Article No.	6GK5992-1AL00-8AA0	6GK5992-1AM00-8AA0	6GK5992-1AN00-8AA0
Product-type designation	**SFP992-1**	**SFP992-1LD**	**SFP992-1LH**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	1	1	1
Number of 10/100/1 000 Mbit/s M12 ports	-	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-	-
Number of electrical connections			
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
• for SFP+/SFP	-	-	-

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Technical specifications (continued)

Article No.	6GK5992-1AL00-8AA0	6GK5992-1AM00-8AA0	6GK5992-1AN00-8AA0
Product-type designation	**SFP992-1**	**SFP992-1LD**	**SFP992-1LH**
Design of electrical connection			
• for network components and terminal equipment	-	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
Number of 100 Mbit/s ST(BFOC) ports	-	-	-
Number of 100 Mbit/s SC ports	-	-	-
Number of 100 Mbit/s LC ports	-	-	-
Number of 1 000 Mbit/s LC ports (LX)	-	1	1
Number of 1 000 Mbit/s LC ports (SX)	1	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-	-
Number of 10 Gbit/s LC ports (LX)	-	-	-
Number of 10 Gbit/s LC ports (SX)	-	-	-
Design of optical connections for network components or terminal devices	LC	LC	LC
Connectable optical power relative to 1 mW			
• of the transmitter output	-9.5 … -4 dB	-9.5 … -3 dB	-6 … +0 dB
• of the receiver input maximum	-3 dB	-3 dB	-3 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-17 dB	-21 dB	-23 dB
Attenuation of fiber-optic cable transmission link minimum necessary	0 dB	0 dB	3 dB
Range at the optical interface depending on the optical fiber used	0 … 0.75 km	0 … 10 km	8 … 40 km
Permitted ambient conditions			
Ambient temperature			
• during operating	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	SFP Module	SFP Module	SFP Module
Width	13.7 mm	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg	0.01 kg
Mounting type Installation in media module slot	-	-	-
Mounting type	Latched	Latched	Latched

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Technical specifications (continued)

Article No.	6GK5992-1AL00-8AA0	6GK5992-1AM00-8AA0	6GK5992-1AN00-8AA0
Product-type designation	**SFP992-1**	**SFP992-1LD**	**SFP992-1LH**
Standards, specifications, approvals			
Standard			
• for EMC	-	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	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 hazardous area of CSA and UL	-	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	No	No	No
• Railway application in accordance with EN 50155	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-
• IEC 61850-3	-	-	-
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	-
• Bureau Veritas (BV)	-	-	-
• Det Norske Veritas (DNV)	-	-	-
• Germanische Lloyd (GL)	-	-	-
• Lloyds Register of Shipping (LRS)	-	-	-
• Nippon Kaiji Kyokai (NK)	-	-	-

Article No.	6GK5992-1AP00-8AA0	6GK5992-1AQ00-8AA0
Product-type designation	**SFP992-1LH+**	**SFP992-1ELH**
Interfaces		
Number of electrical/optical connections for network components or terminal equipment maximum	1	1
Number of 10/100/1 000 Mbit/s M12 ports	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-
Number of electrical connections		
• for Power-over-Ethernet for network components or terminal equipment	-	-
• for SFP+/SFP	-	-
Design of electrical connection		
• for network components and terminal equipment	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-

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Technical specifications (continued)

Article No.	6GK5992-1AP00-8AA0	6GK5992-1AQ00-8AA0
Product-type designation	**SFP992-1LH+**	**SFP992-1ELH**
Number of 100 Mbit/s ST(BFOC) ports	-	-
Number of 100 Mbit/s SC ports	-	-
Number of 100 Mbit/s LC ports	-	-
Number of 1 000 Mbit/s LC ports (LX)	1	1
Number of 1 000 Mbit/s LC ports (SX)	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-
Number of 10 Gbit/s LC ports (LX)	-	-
Number of 10 Gbit/s LC ports (SX)	-	-
Design of optical connections for network components or terminal devices	LC	LC
Connectable optical power relative to 1 mW		
• of the transmitter output	0 … 5 dB	0 … 5 dB
• of the receiver input maximum	-3 dB	-8 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-23 dB	-32 dB
Attenuation of fiber-optic cable transmission link minimum necessary	8 dB	8 dB
Range at the optical interface depending on the optical fiber used	30 … 70 km	37 … 120 km
Permitted ambient conditions		
Ambient temperature		
• during operating	-40 … +85 °C	-40 … +85 °C
• during storage	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Ambient condition for (standard) operation mode	-	-
Protection class IP	IP20	IP20
Design, dimensions and weight		
Design	SFP Module	SFP Module
Width	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg
Mounting type Installation in media module slot	-	-
Mounting type	Latched	Latched

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Technical specifications (continued)

Article No.	6GK5992-1AP00-8AA0	6GK5992-1AQ00-8AA0
Product-type designation	**SFP992-1LH+**	**SFP992-1ELH**
Standards, specifications, approvals		
Standard		
• for EMC	-	-
• for EMC from FM	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4	FM3611: Class 1, Division 2, Group A, B, C, D / T4, Class 1, Zone 2, Group IIC, T4
• for hazardous zone	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X	EN 60079-0: 2006, EN 60079-15: 2005, II 3 G Ex nA II T4, KEMA 07 ATEX 0145 X
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-1-03	UL 60950-1, CSA C22.2 No. 60950-1-03
• for hazardous area of CSA and UL	-	-
• for emitted interference	EN 61000-6-4:2007 (Class A)	EN 61000-6-4:2007 (Class A)
• for interference immunity	EN 61000-6-2:2005	EN 61000-6-2:2005
Verification of suitability	EN 61000-6-2:2005, EN 61000-6-4:2007	EN 61000-6-2:2005, EN 61000-6-4:2007
• CE mark	Yes	Yes
• C-Tick	Yes	Yes
• KC approval	No	No
• Railway application in accordance with EN 50155	-	-
• Railway application in accordance with EN 50124-1	-	-
• IEC 61850-3	-	-
Marine classification association		
• American Bureau of Shipping Europe Ltd. (ABS)	-	-
• Bureau Veritas (BV)	-	-
• Det Norske Veritas (DNV)	-	-
• Germanische Lloyd (GL)	-	-
• Lloyds Register of Shipping (LRS)	-	-
• Nippon Kaiji Kyokai (NK)	-	-

Article No.	6GK5993-1AV00-8AA0	6GK5993-1AU00-8AA0	6GK5993-1AT00-8AA0
Product-type designation	**SFP993-1LH**	**SFP993-1LD**	**SFP993-1**
Interfaces			
Number of electrical/optical connections for network components or terminal equipment maximum	1	1	1
Number of 10/100/1 000 Mbit/s M12 ports	-	-	-
Number of 10/100/1 000 Mbit/s RJ45 ports	-	-	-
Number of electrical connections			
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
• for SFP+/SFP	-	-	-
Design of electrical connection			
• for network components and terminal equipment	-	-	-
• for Power-over-Ethernet for network components or terminal equipment	-	-	-
Number of 100 Mbit/s ST(BFOC) ports	-	-	-
Number of 100 Mbit/s SC ports	-	-	-
Number of 100 Mbit/s LC ports	-	-	-
Number of 1 000 Mbit/s LC ports (LX)	-	-	-
Number of 1 000 Mbit/s LC ports (SX)	-	-	-
Number of 1 000 Mbit/s SC ports (LX)	-	-	-
Number of 1 000 Mbit/s SC ports (SX)	-	-	-
Number of 10 Gbit/s LC ports (LX)	1	1	-
Number of 10 Gbit/s LC ports (SX)	-	-	1

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Technical specifications (continued)

Article No.	6GK5993-1AV00-8AA0	6GK5993-1AU00-8AA0	6GK5993-1AT00-8AA0
Product-type designation	**SFP993-1LH**	**SFP993-1LD**	**SFP993-1**
Design of optical connections for network components or terminal devices	LC	LC	LC
Connectable optical power relative to 1 mW			
• of the transmitter output	0 ... 5 dB	-8.2 ... +0.5 dB	-5 ... -1 dB
• of the receiver input maximum	0.5 dB	0.5 dB	-1 dB
Optical sensitivity relative to 1 mW of the receiver input minimum	-15 dB	-12.6 dB	-11.1 dB
Attenuation of fiber-optic cable transmission link minimum necessary	4.5 dB	0 dB	0 dB
Range at the optical interface depending on the optical fiber used	0 ... 40 km	0 ... 10 km	0 ... 0.3 km
Permitted ambient conditions			
Ambient temperature			
• during operating	0 … 60 °C	0 … 60 °C	0 … 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 maximum	95 %	95 %	95 %
Ambient condition for (standard) operation mode	-	-	-
Protection class IP	IP20	IP20	IP20
Design, dimensions and weight			
Design	SFP Module	SFP Module	SFP Module
Width	13.7 mm	13.7 mm	13.7 mm
Height	11.9 mm	11.9 mm	11.9 mm
Depth	56.5 mm	56.5 mm	56.5 mm
Net weight	0.01 kg	0.01 kg	0.01 kg
Mounting type Installation in media module slot	-	-	-
Mounting type	Latched	Latched	Latched
Standards, specifications, approvals			
Standard			
• for EMC	-	-	-
• for EMC from FM	-	-	-
• for hazardous zone	-	-	-
• for safety of CSA and UL	UL 60950-1, CSA C22.2 No. 60950-10	UL 60950-1, CSA C22.2 No. 60950-9	UL 60950-1, CSA C22.2 No. 60950-8
• for hazardous area of CSA and UL	-	-	-
• for emitted interference	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)	EN 61000-6-4 (Class A)
• for interference immunity	EN 61000-6-2	EN 61000-6-2	EN 61000-6-2
Verification of suitability	EN 61000-6-2, EN 61000-6-13	EN 61000-6-2, EN 61000-6-12	EN 61000-6-2, EN 61000-6-11
• CE mark	Yes	Yes	Yes
• C-Tick	Yes	Yes	Yes
• KC approval	No	No	No
• Railway application in accordance with EN 50155	-	-	-
• Railway application in accordance with EN 50124-1	-	-	-
• IEC 61850-3	-	-	-
Marine classification association			
• American Bureau of Shipping Europe Ltd. (ABS)	-	-	-
• Bureau Veritas (BV)	-	-	-
• Det Norske Veritas (DNV)	-	-	-
• Germanische Lloyd (GL)	-	-	-
• Lloyds Register of Shipping (LRS)	-	-	-
• Nippon Kaiji Kyokai (NK)	-	-	-

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Media modules for modular SCALANCE XR-500 managed

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Ordering data	Article No.
Electrical media modules	
with 4 x 10/100/1 000 Mbit/s RJ45 ports, electrical	
• MM992-4CuC	**6GK5992-4GA00-8AA0**
• MM992-4CU	**6GK5992-4SA00-8AA0**
with power over Ethernet	
• MM992-4PoEC	**6GK5992-4RA00-8AA0**
• MM992-4PoE	**6GK5992-4QA00-8AA0**
Optical media modules	
with 4 x 100 Mbit/s BFOC ports, optical	
• MM991-4 multi-mode, glass, up to 5 km	**6GK5991-4AB00-8AA0**
• MM991-4LD single-mode, glass, up to max. 26 km	**6GK5991-4AC00-8AA0**
with 4 x 1 000 Mbit/s SC ports, optical	
• MM992-4 multi-mode, glass, up to max. 750 m	**6GK5992-4AL00-8AA0**
• MM992-4LD single-mode, glass, up to max. 10 km	**6GK5992-4AM00-8AA0**
with 4 x 100/1 000 Mbit/s for SFP pluggable transceiver, optical	
• MM992-4SFP for SFP plug-in transceivers with 1 x 100 or 1 x 1 000 Mbit/s multi-mode or single-mode, glass	**6GK5992-4AS00-8AA0**
SFP pluggable transceiver, optical	
with 1 x 100 Mbit/s LC port, optical	
• SFP991-1 multi-mode, glass, up to max. 5 km	**6GK5991-1AD00-8AA0**
• SFP991-1LD single-mode, glass, up to max. 26 km	**6GK5991-1AF00-8AA0**
• SFP991-1LH+ single-mode, glass, up to max. 70 km	**6GK5991-1AE00-8AA0**
• SFP991-1ELH200 single-mode, glass, up to max. 200 km	**6GK5991-1AE30-8AA0**
with 1 x 1 000 Mbit/s LC port, optical	
• SFP992-1 multi-mode, glass, up to max. 750 m	**6GK5992-1AL00-8AA0**
• SFP992-1LD single-mode, glass, up to max. 10 km	**6GK5992-1AM00-8AA0**
• SFP992-1LH single-mode, glass, up to max. 40 km	**6GK5992-1AN00-8AA0**
• SFP992-1LH+ single-mode, glass, up to max. 70 km	**6GK5992-1AP00-8AA0**
• SFP992-1ELH single-mode, glass, up to max. 120 km	**6GK5992-1AQ00-8AA0**
with 1 x 10 Gbit/s LC port, optical	
• SFP993-1 multi-mode, glass, up to max. 300 m	**6GK5993-1AT00-8AA0**
• SFP993-1LD single-mode, glass, up to max. 10 km	**6GK5993-1AU00-8AA0**
• SFP993-1LH single-mode, glass, up to max. 40 km	**6GK5993-1AV00-8AA0**
IE connecting cable SFP+/SFP+, electrical, 10 Gbit/s	
Twinax copper cables, length	
• 1 m	**6GK5980-3CB00-0AA1**
• 2 m	**6GK5980-3CB00-0AA2**
• 7 m	**6GK5980-3CB00-0AA7**

	Article No.
Accessories	
IE FC RJ45 Modular Outlet	
FastConnect RJ45 Outlet for Industrial Ethernet with interface for replaceable insert	
• with 2FE insert; replaceable insert for 2 x 100 Mbit/s interfaces	**6GK1901-1BE00-0AA1**
• with 1GE insert; replaceable insert for 1 x 1 000 Mbit/s interfaces	**6GK1901-1BE00-0AA2**
IE FC TP Standard Cable GP 2 x 2 (Type A)	**6XV1840-2AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	
IE FC TP Standard Cable GP 4 x 2	**6XV1870-2E**
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 1 000 m, minimum order 20 m	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with two RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
IE FC RJ45 plug 180	
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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2	
RJ45 plug connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

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More information

Selection tool:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

TIA Selection Tool:

http://www.siemens.com/tia-selection-tool

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Power supplies for SCALANCE X-500

Overview



- The 24 V PS598 power supply is designed for installation in 19" control cabinets or for direct mounting on SCALANCE XR-500 Industrial Ethernet switches; it has degree of protection IP20.
- 300 W output power at an input voltage range of 85 V to 264 V AC and an operating temperature of 0 °C to +60 °C

Product versions

PS598-1 24 V power supply

- 300 W output power
- Input voltage range from 85 V to 264 V AC
- Output voltage 24 V DC
- Operating temperature from 0 °C to +60 °C
- Degree of protection IP20

Benefits

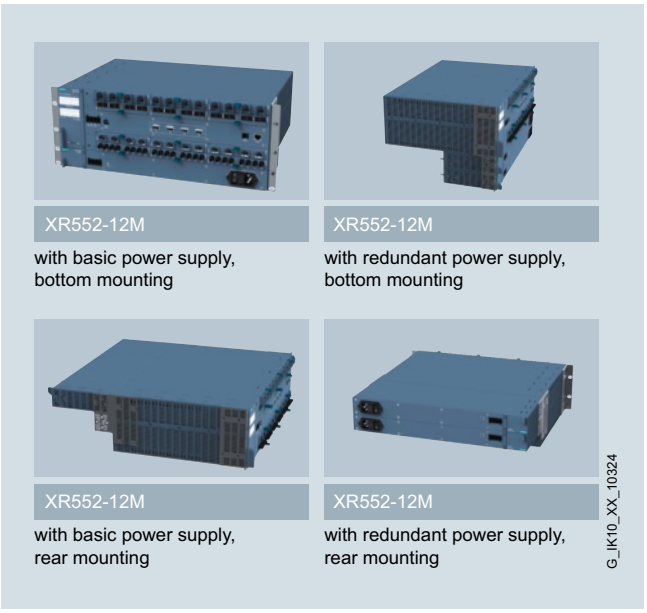
get Designed for Industry

- Global use thanks to wide-range input (85 to 264 V AC)
- High reliability reliability since it is short-circuit proof, secure against no-load operation, and able to bridge short breaks in the mains power

Design

- Non-heating apparatus socket for connecting to the AC network of 85 to 264 V AC (non-heating apparatus cable not included in the scope of delivery; can be ordered optionally on country-specific basis)
- Terminal block for universal supply of products with 24 V DC input
- Plug-in contact for direct connection on the rear of the SCALANCE XR-500 Industrial Ethernet switches (mounting kit included in scope of delivery of SCALANCE XR-500)
- Operating temperatures from 0°C to +60°C
- IP20 degree of protection
- Optimized for installation in 19" control cabinet or for direct mounting on SCALANCE XR-500 (SCALANCE XR-500 and power supply unit are mounted in the 19" control cabinet as a single unit)
- LEDs for indicating the status information (power, operating state)

Integration



Options for mounting a single/redundant power supply unit to SCALANCE XR552-12M

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Technical specifications

Article No.	6GK5598-1AA00-3AA0
Product-type designation	**POWER SUPPLY PS598-1**
Type of current supply	**300 W, input: 85 - 264 V, output: DC 24 V**
Electrical data	
Electrical data Input	
Form of voltage at the input	1-phase AC
Supply voltage	
• for AC	85 … 264 V
• 1 at AC nominal value	230 V
Type of input wide range input	Yes
Overvoltage class	Category II (20 A rated branch circuit)
Stored energy time on nominal level of the output current: at mains power cut minimum	16 ms
Line frequency	
• 1 nominal value	50 Hz
• 2 nominal value	60 Hz
• initial value	47 Hz
• ultimate value	63 Hz
Input current at nominal level of the input voltage 230 V nominal value	1.8 A
Current limiting of input current at 25 °C maximum	40 A
Type of protection at input	replaceable
Electrical data Output	
Form of voltage secondary side	Controlled, isolated DC voltage
Output voltage for DC nominal value	24 V
Relative overall tolerance of the voltage	2 %
Relative regulation accuracy of the output voltage	
• On slow fluctuation of the input voltage	0.2 %
• on slow fluctuation of the ohm loading	0.4 %
Residual ripple maximum	0.36 V
Voltage peak maximum	240 V
Type of display for normal operation	Green LED for 24 V OK and fault LED
Behaviour of the output voltage on switching on	Overshoot of Ua < 5 %
Startup delay time maximum	1.5 s
Voltage increase time of the output voltage maximum	15 ms
Output current	
• nominal value	12.5 A
• nominal range	0 … 12.5 A
delivered active power typ.	300 W
Product feature Bridging of channels	Yes
Number of parallel-switched pieces of equipment for increasing the power	2
Efficiency in percentage	87 %
Resistive loss	39 W

Article No.	6GK5598-1AA00-3AA0
Product-type designation	**POWER SUPPLY PS598-1**
Electrical data Closed-loop control	
Relative regulation accuracy of the output voltage	
• with rapid fluctuation of the input voltage by +/- 15% typical	0.8 %
• load step of ohmic load 50/100/50 % typical	3.25 %
Setting time	
• load step 50 to 100% typical	2 ms
• load step 100 to 50% typical	2 ms
Electrical data Protection and monitoring	
Design of overvoltage protection at output	< 37 V
Pick-up level current limitation typical	1.15 A
Characteristic feature of the output short-circuit protected	Yes
Design of the short-circuit protection	Electronic shutdown, automatic restart
Enduring short circuit current Effective level maximum	-
Electrical data Safety	
Galvanic isolation between entrance and outlet	Yes
Potential separation	Safety extra-low output voltage U_{out} acc. to EN 60950-1 and EN 50178
Operating resource protection class	Class I
stray current	
• maximum	3 mA
• typical	0.858 mA
Mechanical data	
Design of the electrical connection	
• at the input	IEC plug
• secondary side	for plugging into basic device or screw terminal in accordance with specification
Width	446 mm
Height	44 mm
Depth	140 mm
Net weight	1.7 kg
Product feature of the housing housing for side-by-side mounting	No
Type of mounting	
• 19-inch installation	Yes
• wall mounting	No
• standard rail mounting	No
• S7-300 rail mounting	No
Mounting type	Plugged into the basic unit or rack mounted

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Technical specifications (continued)

Article No.	6GK5598-1AA00-3AA0
Product-type designation	**POWER SUPPLY PS598-1**
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-25 … +70 °C
• during transport	-25 … +70 °C
• Comment	Operation with integral fan, non-replaceable
Climatic class according to EN 60721	Climate class 3K3, without condensation
Protection class IP	IP20
Standards, specifications, approvals	
Standard	
• for EMC	-
• for EMC from FM	-
• for hazardous zone	-
• for safety of CSA and UL	UL 60950-1, CSA C22.2 Nr. 60950-1
• for hazardous area of CSA and UL	-
• for emitted interference	EN 55022 (Class B)
• for interference immunity	EN 61000-6-2
Verification of suitability	EN 55022, EN 61000-6-4
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
Power supplies for SCALANCE X-500	
24 V power supplies are designed for installation in 19" control cabinets or for direct mounting on SCALANCE X-500 Industrial Ethernet switches; degree of protection IP20	
PS598-1 300 W output power, input voltage range of 85 V to 264 V AC, operating temperature of 0 °C to +60 °C	**6GK5598-1AA00-3AA0**
Accessories	
Appliance cable	
• Grounded Continental European plug, region: D/F/NL/ESP/B/A/S/FIN	**6ES7900-0AA00-0XA0**
• Grounded British plug; region: UK	**6ES7900-0BA00-0XA0**
• Grounded Swiss plug; region: CH	**6ES7900-0CA00-0XA0**
• Grounded North American and Japanese plug; region: USA	**6ES7900-0DA00-0XA0**
• Grounded Italian plug; region: Italy	**6ES7900-0EA00-0XA0**
• Grounded Chinese plug; region: China	**6ES7900-0FA00-0XA0**

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Overview



- Swap medium with which Layer 3 Routing functions can be enabled
- For the automatic backup of configuration data. If a fault occurs, it allows fast and simple device replacement without a Field PG (contains the function of the C-PLUG)
- Can be used in all Layer 2 variants of the SCALANCE XR500 and in all variants of the SCALANCE XM-400 basic devices

Benefits

- Fast and simple replacement of SCALANCE X-500 or SCALANCE XM-400 components without reconfiguration of the spare part
- The device can be replaced without the need for specially trained personnel or a programming device or PC
- The downtimes of network segments and connected Industrial Ethernet nodes can therefore be minimized if a fault occurs

Application

The KEY-PLUG stores the configuration data of a SCALANCE X-500 or SCALANCE XM-400 component. Additional Layer 3 Routing functions can be enabled by inserting a KEY-PLUG.

In addition to this, if there is a fault on a module, the module can be replaced simply and quickly without needing to reconfigure the replacement device and without specially trained personnel. If a device needs to be replaced, the KEY-PLUG is simply removed from the failed component and plugged into the replacement device. The replacement device now starts up automatically with the device configuration of the failed device.

Design

The KEY-PLUG has degree of protection IP20. Power is supplied by the terminal device.

The KEY-PLUG is plugged into the slot of the SCALANCE X-500 or SCALANCE XM-400 basic device provided for this purpose.

Mode of operation

The device automatically backs up the configuration data on a KEY-PLUG (as delivered) upon start-up. Changes to the configuration during operation are also saved on the KEY-PLUG without any additional operator intervention being necessary.

During start-up, an unconfigured device automatically loads the configuration data from an inserted KEY-PLUG that has been written to provided the data was written by a compatible device type.

Diagnostics

Incorrect use of the KEY-PLUG such as inserting a KEY-PLUG containing the configuration of a non-compatible device or general malfunctions of the KEY-PLUG are indicated by diagnostics mechanisms of the terminal device (LEDs, SNMP, Web based Management, etc.).

Integration

Supported products

SCALANCE X-500

SCALANCE XM-400

Technical specifications

KEY-PLUG	
Supply voltage	via terminal device
Power loss	0.015 mW
Installation	Can be plugged into C-PLUG compartment
Construction	
• Dimensions (W x H x D) in mm	24.3 x 17 x 8.1
• Approx. weight	5 g
Memory capacity	256 MB
Degree of protection	IP20

Ordering data

	Article No.
KEY-PLUG X-500 Layer 3 Routing KEY-PLUG XR-500, swap medium for enabling Layer 3 Routing Features for SCALANCE XR-500 and for easily replacing a device in the event of a failure as well as for recording configuration data.	
• For SCALANCE XR552, SCALANCE XR528 and XR524	**6GK5905-0PA00**
KEY-PLUG XM-400 Layer 3 Routing KEY-PLUG XM-400, swap medium for enabling Layer 3 Routing Features for SCALANCE XM-400 and for easily replacing a device in the event of a failure as well as for recording configuration data.	**6GK5904-0PA00**

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Overview

The SINAMICS range



- Totally integrated range of drives for any application and every industry
- Wide range of power ratings from 0.12 kW to 120 MW
- Broad functional scope from simple U/f control through to highly dynamic servo control
- Designed for problem-free interaction with other Siemens automation components
- Shared platform concept with uniform functionality, engineering, commissioning, operation as well as a uniform diagnostics concept and communication mechanisms

	SINAMICS G							SINAMICS S		
	G120C	G120P/ G120	G120		G110M	G120D		S110	S120	
	Compact inverters	CU230P-2 Control Unit	CU240E-2 Control Unit	CU250S-2 Control Unit	CU240M Control Unit	CU240D-2 Control Unit	CU250D-2 Control Unit	CU305 Control Unit	CU310-2 Control Unit	CU320-2 Control Unit
Protocol										
PROFINET										
- PROFINET RT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET IRT (not isochronous)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET IRT isochronous	–	–	–	–	–	–	–	✓	✓	✓
- PROFINET Shared Device	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET media redundancy MRP (surge prone)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
- PROFINET media redundancy MRPD (surge free)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
• **Profile**										
- PROFIsafe	✓	–	✓	✓	✓	✓	✓	✓	✓	✓
- PROFIenergy	✓	✓	✓	✓	✓	✓	✓	–	✓	✓
- PROFIdrive	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

SINAMICS G120P – the specialist for pumps, fans, and compressors



- Automatic switchover to mains-fed operation at rated speed
- Numerous functions for pumps, fans and compressors, e. g. energy-saving mode, auto ramping, Pt1000/LG-Ni1000 temperature sensor interface, cascade connection, real time clock, bypass, multi-zone control
- Communication: RS485, USS, Modbus RTU, BACnet MS/TP, PROFINET, EtherNet/IP, PROFIBUS DP, CANopen
- Integrated in the TIA Portal with SINAMICS Startdrive
- Energy efficient through minimal apparent power losses, automatic adaptation of the motor current to the actual load conditions with ECO mode

More information

- Catalog D 35
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-g120p
  www.siemens.com/industrymall

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Overview (continued)

SINAMICS G120D – the distributed single-motor drive for high-performance solutions



- Positioning capability
- Power range from 0.75 kW to 7.5 kW
- Energy efficient thanks to regenerative feedback and low line harmonic distortion
- Safety Integrated: STO, SS1, SDI, SSM and SLS encoderless
- Thanks to the modular design, electronics stocks are minimal
- Interchangeable memory card
- Communication via PROFIBUS DP, PROFINET, EtherNet/IP
- Integrated in the TIA Portal with SINAMICS Startdrive

More information

- Catalog D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-g120d
  www.siemens.com/industrymall

SINAMICS G120C – the compact and versatile inverter with optimum functionality



- Compact unit
- Highest power density in its class
- Power range from 0.55 kW to 18.5 kW
- Easy commissioning and maintenance
- With BOP-2 or IOP operator panel
- Safety Integrated: STO
- Available communication: PROFIBUS DP, CANopen, USS, Modbus RTU, PROFINET, EtherNet/IP
- Integrated in the TIA Portal with SINAMICS Startdrive

More information

- Catalog D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-g120c
  www.siemens.com/industrymall

SINAMICS G120 – the modular single-motor drive for low to medium power ratings



- Power range from 0.37 kW to 250 kW
- Safety Integrated: STO, SS1, SBC, SLS, SDI and SSM encoderless
- Communication via PROFIBUS, PROFINET, EtherNet/IP, RS485, USS, Modbus RTU, CANopen, BACnet MS/TP
- Energy efficient thanks to regenerative feedback and low line harmonic distortion
- Parameter copy function for standard commissioning
- Integrated in the TIA Portal with SINAMICS Startdrive

More information

- Catalog D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-g120
  www.siemens.com/industrymall

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Overview (continued)

SINAMICS G110M – the distributed inverter integrated in the motor

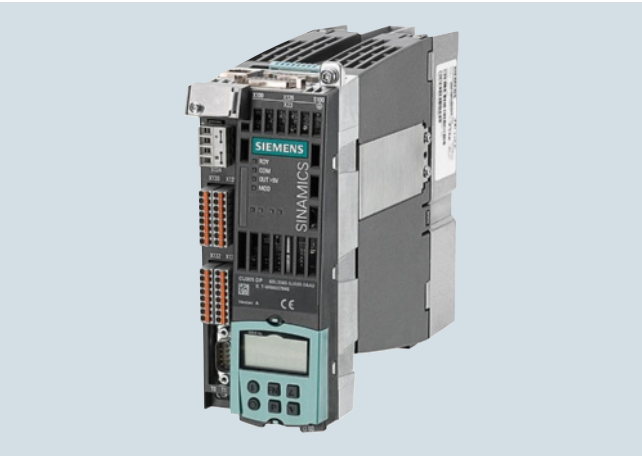


- Power range from 0.37 kW to 4 kW
- Integrated safety functions (STO locally via F-DI or via PROFIsafe)
- Integrated communication: USS, Modbus RTU, PROFIBUS, PROFINET, EtherNet/IP
- Basic PLC functions and additional conveyor technology functions
- Local commissioning via DIP switch and potentiometer, memory card, USB interface or Intelligent Operator Panel (IOP)
- Integrated in the TIA Portal with SINAMICS Startdrive

More information

- Catalog D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-g110m
  www.siemens.com/industrymall

SINAMICS S110 – the specialist for simple positioning tasks



- Servo control
- Power range from 0.12 kW to 90 kW
- Safety Integrated
- Integrated positioning functions
- Straightforward system interface with higher-level controllers (e.g. PLC) with PROFIBUS DP, PROFINET, CANopen

More information

- Catalog D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-s110
  www.siemens.com/industrymall

SINAMICS S120 – the flexible, modular drive system for demanding single-axis and multi-axis applications from the low-end to the high-end performance range



- Specially for motion control and vector control in single-axis and multi-axis applications in all areas of machine and plant manufacturing
- Servo/vector control, U/f control
- Power range from 0.12 kW to 1 200 kW, as Cabinet Modules up to 4 500 kW
- Various types of construction for different application areas
- Highly flexible due to, for example, modular system architecture, different cooling methods, support for a wide range of motors/encoders, easy expansion
- High degree of scalability with regard to performance, number of axes, functionality
- Integrated safety functions
- Comprehensive motion control functionality
- High availability and efficiency, even in unstable networks
- Automatic parameterization and easy drive commissioning/ optimization.

More information

- Catalog PM 21, NC 61, NC 62, D 21.3
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinamics-s120
  www.siemens.com/industrymall

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Overview



- Measuring systems are encoders for recording distances, angles of rotation, and velocities.
- Can be used on machines in various sectors, e.g. production machines, manipulators, machine tools, and special machines.
- Can be connected to SIMATIC, SINAMICS, SINUMERIK and SIMOTION.
- Accessories available for measuring systems: couplings, mounting material, connectors, and completely preassembled signal cables.
- External encoders are available as incremental or absolute-value encoders.
- Incremental encoders:
  - Interfaces RS422 (TTL), 1 V_{pp} and HTL.
  - Operating voltage 5 V DC or 10 V to 30 V DC.
- Absolute-value encoders:
  - All absolute-value encoders are available in singleturn and multiturn versions.
  - Interface SSI (synchronous serial interface) or connection for EnDat, PROFIBUS DP, PROFINET IO with RT/IRT and DRIVE-CLiQ.
  - Encoders with PROFIBUS DP support Class 1 ... 3 profiles as well as isochronous mode, internode communication, and application-specific supplementary functions. They are parameterizable.
  - Encoders with PROFINET IO support Class 1 ... 4 profiles.
- All measuring systems are available in synchro flange and supported flange joint versions. The absolute encoders are available in a hollow shaft version.

More information

- Catalogs NC 62, NC 82, PM 21, D 31
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sensor-systems
  www.siemens.com/industrymall

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CPU 1211C

Overview



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

Technical specifications

	6ES7211-1BE40-0XB0 CPU 1211C AC/DC/Relay	6ES7211-1AE40-0XB0 CPU 1211C DC/DC/DC	6ES7211-1HE40-0XB0 CPU 1211C DC/DC/Relay
General information			
Engineering with • Programming package	STEP 7 V13 or higher	STEP 7 V13 or higher	STEP 7 V13 or higher
Supply voltage 24 V DC		Yes	Yes
120 V AC	Yes		
230 V AC	Yes		
Power losses Power loss, typ.	10 W	8 W	8 W
Memory Work memory • integrated	30 kbyte	30 kbyte	30 kbyte
Load memory • integrated • plug-in (SIMATIC Memory Card), max.	1 Mbyte 2 Gbyte; with SIMATIC Memory Card	1 Mbyte 2 Gbyte; with SIMATIC Memory Card	1 Mbyte 2 Gbyte; with SIMATIC Memory Card
Backup • without battery	Yes	Yes	Yes
CPU processing times for bit operations, typ.	0.085 µs; / Operation	0.085 µs; / Operation	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation	1.7 µs; / Operation	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation
Data areas and their retentivity 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 Process image • Inputs, adjustable • Outputs, adjustable	 1 kbyte 1 kbyte	 1 kbyte 1 kbyte	 1 kbyte 1 kbyte
Time of day Clock • Hardware clock (real-time clock)	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7211-1BE40-0XB0 CPU 1211C AC/DC/Relay	6ES7211-1AE40-0XB0 CPU 1211C DC/DC/DC	6ES7211-1HE40-0XB0 CPU 1211C DC/DC/Relay
Digital inputs			
Number of digital inputs	6; integrated	6; integrated	6; integrated
• of which, inputs usable for technological functions	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)
Digital outputs			
Number of digital outputs	4; Relays	4	4; Relays
• of which high-speed outputs		4; 100 kHz Pulse Train Output	
Analog inputs			
Integrated channels (AI)	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V
Input ranges			
• Voltage	Yes	Yes	Yes
1st interface			
Interface type	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Functionality			
• PROFINET IO Device	Yes	Yes	Yes
• PROFINET IO Controller	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	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		4	
Limit frequency (pulse)		100 kHz	
Ambient conditions			
Operating temperature			
• min.	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	90 mm	90 mm	90 mm
Height	100 mm	100 mm	100 mm
Depth	75 mm	75 mm	75 mm
Weights			
Weight, approx.	420 g	370 g	380 g

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CPU 1211C

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Ordering data	Article No.
CPU 1211C	
Compact CPU, AC/DC/relay; Integrated program/data memory 25 KB, load memory 1 MB; Wide-range AC 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 with up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7211-1BE40-0XB0**
Compact CPU, DC/DC/DC; Integrated program/data memory 25 KB, load memory 1 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs, 2 analog inputs; Expandable with up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or as outputs with pulse width modulation (PWM) at 100 kHz	**6ES7211-1AE40-0XB0**
Compact CPU, DC/DC/relay; Integrated program/data memory 25 KB, load memory 1 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 6 digital inputs, 4 digital outputs (relays), 2 analog inputs; Expandable with up to 3 communication modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7211-1HE40-0XB0**
SB 1221 signal board	
4 inputs, 5 V DC, 200 kHz	**6ES7221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	**6ES7221-3BD30-0XB0**
SB 1222 signal board	
4 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7222-1BD30-0XB0**

	Article No.
SB 1223 signal board	
2 inputs, 24 V DC, IEC Type 1 sink input; 2 transistor outputs 24 V DC, 0.5 A, 5 W; Can be used as HSC at up to 30 kHz	**6ES7223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7223-3BD30-0XB0**
SB 1231 signal board 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits	**6ES7231-4HA30-0XB0**
Thermocouple signal board SB 1231 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K	**6ES7231-5QA30-0XB0**
RTD signal board SB 1231 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign	**6ES7231-5PA30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits	**6ES7232-4HA30-0XB0**
Communication board CB 1241 RS485 for point-to-point connection, with 1 RS485 interface	**6ES7241-1CH30-1XB0**
Simulator (optional) 8 input switches, for CPU 1211C / CPU 1212C	**6ES7274-1XF30-0XA0**
SIMATIC Memory Card (optional)	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
Terminal block (spare part) for CPU 1211C/1212C	
For DI, with 14 screws, tin-plated; 4 units	**6ES7292-1AH30-0XA0**
For DO, with 8 screws, tin-plated; 4 units	**6ES7292-1AP30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	**6ES7292-1BC30-0XA0**
RJ45 cable grip 4 units per pack Single port	**6ES7290-3AA30-0XA0**
Front flap set (spare part) for CPU 1211C/1212C	**6ES7291-1AA30-0XA0**

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Ordering data	Article No.
S7-1200 automation system, System Manual	
For SIMATIC S7-1200 and STEP 7 Basic	
German	**6ES7298-8FA30-8AH0**
English	**6ES7298-8FA30-8BH0**
French	**6ES7298-8FA30-8CH0**
Spanish	**6ES7298-8FA30-8DH0**
Italian	**6ES7298-8FA30-8EH0**
Chinese	**6ES7298-8FA30-8KH0**
S7-1200 automation system, Easy Book	
Brief instructions	
German	**6ES7298-8FA30-8AQ0**
English	**6ES7298-8FA30-8BQ0**
French	**6ES7298-8FA30-8CQ0**
Spanish	**6ES7298-8FA30-8DQ0**
Italian	**6ES7298-8FA30-8EQ0**
Chinese	**6ES7298-8FA30-8KQ0**
STEP 7 Professional / Basic V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key[1]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License Software download incl. License Key[1]	**6ES7822-0AE03-0YA5**
E-mail address required for delivery	

	Article No.
Accessories	
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	**6GK7277-1AA10-0AA0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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CPU 1212C

Overview



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

Technical specifications

	6ES7212-1BE40-0XB0 CPU 1212C AC/DC/Relay	6ES7212-1AE40-0XB0 CPU 1212C DC/DC/DC	6ES7212-1HE40-0XB0 CPU 1212C DC/DC/Relay
General information			
Engineering with • Programming package	STEP 7 V13 or higher	STEP 7 V13 or higher	STEP 7 V13 or higher
Supply voltage 24 V DC		Yes	Yes
120 V AC	Yes		
230 V AC	Yes		
Power losses Power loss, typ.	11 W	9 W	9 W
Memory Work memory • integrated	50 kbyte	50 kbyte	50 kbyte
Load memory • integrated • plug-in (SIMATIC Memory Card), max.	1 Mbyte 2 Gbyte; with SIMATIC memory card	1 Mbyte 2 Gbyte; with SIMATIC memory card	1 Mbyte 2 Gbyte; with SIMATIC memory card
Backup • without battery	Yes	Yes	Yes
CPU processing times for bit operations, typ.	0.085 µs; / Operation	0.085 µs; / Operation	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation	1.7 µs; / Operation	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation
Data areas and their retentivity 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 Process image • Inputs, adjustable • Outputs, adjustable	 1 kbyte 1 kbyte	 1 kbyte 1 kbyte	 1 kbyte 1 kbyte
Time of day Clock • Hardware clock (real-time clock)	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7212-1BE40-0XB0 CPU 1212C AC/DC/Relay	6ES7212-1AE40-0XB0 CPU 1212C DC/DC/DC	6ES7212-1HE40-0XB0 CPU 1212C DC/DC/Relay
Digital inputs			
Number of digital inputs	8; integrated	8; integrated	8; integrated
• of which, inputs usable for technological functions	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)	6; HSC (High Speed Counting)
Digital outputs			
Number of digital outputs	6; Relays	6	6; Relays
• of which high-speed outputs		4; 100 kHz Pulse Train Output	
Analog inputs			
Integrated channels (AI)	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V
Input ranges			
• Voltage	Yes	Yes	Yes
1st interface			
Interface type	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Functionality			
• PROFINET IO Device	Yes	Yes	Yes
• PROFINET IO Controller	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	Yes	Yes	Yes
Integrated Functions			
Number of counters	4	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	4	4	
Limit frequency (pulse)		100 kHz	
Ambient conditions			
Operating temperature			
• min.	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	90 mm	90 mm	90 mm
Height	100 mm	100 mm	100 mm
Depth	75 mm	75 mm	75 mm
Weights			
Weight, approx.	425 g	370 g	385 g

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CPU 1212C

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Ordering data	Article No.
CPU 1212C	
Compact CPU, AC/DC/relay; Integrated program/data memory 25 KB, load memory 1 MB; Wide-range AC 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 with up to 3 communication modules, 2 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7212-1BE40-0XB0**
Compact CPU, DC/DC/DC; Integrated program/data memory 25 KB, load memory 1 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs, 2 analog inputs; Expandable with up to 3 communication modules, 2 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or as outputs with pulse width modulation (PWM) at 100 kHz	**6ES7212-1AE40-0XB0**
Compact CPU, DC/DC/relay; Integrated program/data memory 25 KB, load memory 1 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 8 digital inputs, 6 digital outputs (relays), 2 analog inputs; Expandable with up to 3 communication modules, 2 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7212-1HE40-0XB0**
SB 1221 signal board	
4 inputs, 5 V DC, 200 kHz	**6ES7221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	**6ES7221-3BD30-0XB0**
SB 1222 signal board	
4 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7222-1BD30-0XB0**

	Article No.
SB 1223 signal board	
2 inputs, 24 V DC, IEC Type 1 sink input; 2 transistor outputs 24 V DC, 0.5 A, 5 W; Can be used as HSC at up to 30 kHz	**6ES7223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7223-3BD30-0XB0**
SB 1231 signal board	**6ES7231-4HA30-0XB0**
1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits	
Thermocouple signal board SB 1231	**6ES7231-5QA30-0XB0**
1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K	
RTD signal board SB 1231	**6ES7231-5PA30-0XB0**
1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign	
SB 1232 signal board	**6ES7232-4HA30-0XB0**
1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits	
Communication board CB 1241 RS485	**6ES7241-1CH30-1XB0**
for point-to-point connection, with 1 RS485 interface	
Simulator (optional)	**6ES7274-1XF30-0XA0**
8 input switches, for CPU 1211C / CPU 1212C	
SIMATIC Memory Card (optional)	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
Extension cable for two-tier configuration	**6ES7290-6AA30-0XA0**
For connecting digital/analog signal modules; 2 m long	
Starter box CPU 1212C AC/DC/relay	**6ES7212-1BD33-4YB0**
Complete offer SIMATIC S7-1200, starter box, comprising: CPU 1212C AC/DC/relay, simulator, STEP 7 BASIC CD, manual CD, info material, in Systainer	
Terminal block (spare part)	
for CPU 1211C/1212C	
For DI, with 14 screws, tin-plated; 4 units	**6ES7292-1AH30-0XA0**
For DO, with 8 screws, tin-plated; 4 units	**6ES7292-1AP30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	**6ES7292-1BC30-0XA0**

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Ordering data	Article No.
RJ45 cable grip	**6ES7290-3AA30-0XA0**
4 units per pack	
Single port	
Front flap set (spare part)	**6ES7291-1AA30-0XA0**
for CPU 1211C/1212C	
S7-1200 automation system, System Manual	
For SIMATIC S7-1200 and STEP 7 Basic	
German	**6ES7298-8FA30-8AH0**
English	**6ES7298-8FA30-8BH0**
French	**6ES7298-8FA30-8CH0**
Spanish	**6ES7298-8FA30-8DH0**
Italian	**6ES7298-8FA30-8EH0**
Chinese	**6ES7298-8FA30-8KH0**
S7-1200 automation system, Easy Book	
Brief instructions	
German	**6ES7298-8FA30-8AQ0**
English	**6ES7298-8FA30-8BQ0**
French	**6ES7298-8FA30-8CQ0**
Spanish	**6ES7298-8FA30-8DQ0**
Italian	**6ES7298-8FA30-8EQ0**
Chinese	**6ES7298-8FA30-8KQ0**
STEP 7 Professional / Basic V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirements:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key[1]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License Software download incl. License Key[1]	**6ES7822-0AE03-0YA5**
E-mail address required for delivery	

	Article No.
Accessories	
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	**6GK7277-1AA10-0AA0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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CPU 1214C

Overview



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

Technical specifications

	6ES7214-1BG40-0XB0 CPU 1214C AC/DC/Relay	6ES7214-1AG40-0XB0 CPU 1214C DC/DC/DC	6ES7214-1HG40-0XB0 CPU 1214C DC/DC/Relay
General information			
Engineering with • Programming package	STEP 7 V13 or higher	STEP 7 V13 or higher	STEP 7 V13 or higher
Supply voltage 24 V DC		Yes	Yes
120 V AC	Yes		
230 V AC	Yes		
Power losses Power loss, typ.	14 W	12 W	12 W
Memory Work memory • integrated	75 kbyte	75 kbyte	75 kbyte
Load memory • integrated • plug-in (SIMATIC Memory Card), max.	4 Mbyte 2 Gbyte; with SIMATIC memory card	4 Mbyte 2 Gbyte; with SIMATIC memory card	4 Mbyte 2 Gbyte; with SIMATIC memory card
Backup • without battery	Yes	Yes	Yes
CPU processing times for bit operations, typ.	0.085 µs; / Operation	0.085 µs; / Operation	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation	1.7 µs; / Operation	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation
Data areas and their retentivity Flag • Number, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area Process image • Inputs, adjustable • Outputs, adjustable	1 kbyte 1 kbyte	1 kbyte 1 kbyte	1 kbyte 1 kbyte
Time of day Clock • Hardware clock (real-time clock)	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7214-1BG40-0XB0 CPU 1214C AC/DC/Relay	6ES7214-1AG40-0XB0 CPU 1214C DC/DC/DC	6ES7214-1HG40-0XB0 CPU 1214C DC/DC/Relay
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)
Digital outputs			
Number of digital outputs	10; Relays	10	10; Relays
• of which high-speed outputs		4; 100 kHz Pulse Train Output	
Analog inputs			
Integrated channels (AI)	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V
Input ranges			
• Voltage	Yes	Yes	Yes
1st interface			
Interface type	PROFINET	PROFINET	PROFINET
Physics	Ethernet	Ethernet	Ethernet
Functionality			
• PROFINET IO Device	Yes	Yes	Yes
• PROFINET IO Controller	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	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	4	4	4
Limit frequency (pulse)		100 kHz	
Ambient conditions			
Operating temperature			
• min.	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	110 mm	110 mm	110 mm
Height	100 mm	100 mm	100 mm
Depth	75 mm	75 mm	75 mm
Weights			
Weight, approx.	475 g	415 g	435 g

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CPU 1214C

2

Ordering data	Article No.
CPU 1214C	
Compact CPU, AC/DC/relay; Integrated program/data memory 50 KB, load memory 2 MB; Wide-range AC 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 with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7214-1BG40-0XB0**
Compact CPU, DC/DC/DC; Integrated program/data memory 50 KB, load memory 2 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or as outputs with pulse-width modulation (PWM) at 100 kHz	**6ES7214-1AG40-0XB0**
Compact CPU, DC/DC/relay; Integrated program/data memory 50 KB, load memory 2 MB; Supply voltage 24 V DC; Boolean execution times 0.1 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7214-1HG40-0XB0**
SB 1221 signal board	
4 inputs, 5 V DC, 200 kHz	**6ES7221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	**6ES7221-3BD30-0XB0**
SB 1222 signal board	
4 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7222-1BD30-0XB0**

	Article No.
SB 1223 signal board	
2 inputs, 24 V DC, IEC Type 1 sink input; 2 transistor outputs 24 V DC, 0.5 A, 5 W; Can be used as HSC at up to 30 kHz	**6ES7223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7223-3BD30-0XB0**
SB 1231 signal board	**6ES7231-4HA30-0XB0**
1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits	
Thermocouple signal board SB 1231	**6ES7231-5QA30-0XB0**
1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K	
RTD signal board SB 1231	**6ES7231-5PA30-0XB0**
1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign	
SB 1232 signal board	**6ES7232-4HA30-0XB0**
1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits	
Communication board CB 1241 RS485	**6ES7241-1CH30-1XB0**
for point-to-point connection, with 1 RS485 interface	
Simulator (optional)	**6ES7274-1XH30-0XA0**
14 input switches, for CPU 1214C	
SIMATIC Memory Card (optional)	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
Extension cable for two-tier configuration	**6ES7290-6AA30-0XA0**
For connecting digital/analog signal modules; 2 m long	
Terminal block (spare part)	
for CPU 1214C	
For DI, with 20 screws, tin-plated; 4 units	**6ES7292-1AV30-0XA0**
For DO, with 12 screws, tin-plated; 4 units	**6ES7292-1AM30-0XA0**
For AI, with 3 screws, tin-plated; 4 units	**6ES7292-1BC30-0XA0**
RJ45 cable grip	**6ES7290-3AA30-0XA0**
4 items per pack	
Single port	
Front flap set (spare part)	**6ES7291-1AB30-0XA0**
for CPU 1214C	

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Ordering data	Article No.
S7-1200 automation system, System Manual	
For SIMATIC S7-1200 and STEP 7 Basic	
German	**6ES7298-8FA30-8AH0**
English	**6ES7298-8FA30-8BH0**
French	**6ES7298-8FA30-8CH0**
Spanish	**6ES7298-8FA30-8DH0**
Italian	**6ES7298-8FA30-8EH0**
Chinese	**6ES7298-8FA30-8KH0**
S7-1200 automation system, Easy Book	
Brief instructions	
German	**6ES7298-8FA30-8AQ0**
English	**6ES7298-8FA30-8BQ0**
French	**6ES7298-8FA30-8CQ0**
Spanish	**6ES7298-8FA30-8DQ0**
Italian	**6ES7298-8FA30-8EQ0**
Chinese	**6ES7298-8FA30-8KQ0**
STEP 7 Professional / Basic V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key[1)]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License Software download incl. License Key[1)]	**6ES7822-0AE03-0YA5**
E-mail address required for delivery	

	Article No.
Accessories	
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	**6GK7277-1AA10-0AA0**

[1)] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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CPU 1215C

Overview



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

Technical specifications

	6ES7215-1BG40-0XB0 CPU 1215C AC/DC/Relay	6ES7215-1AG40-0XB0 CPU 1215C DC/DC/DC	6ES7215-1HG40-0XB0 CPU 1215C DC/DC/Relay
General information			
Engineering with • Programming package	STEP 7 V13 or higher	STEP 7 V13 or higher	STEP 7 V13 or higher
Supply voltage 24 V DC		Yes	Yes
120 V AC	Yes		
230 V AC	Yes		
Power losses Power loss, typ.	14 W	12 W	12 W
Memory Work memory • integrated	100 kbyte	100 kbyte	100 kbyte
Load memory • integrated • plug-in (SIMATIC Memory Card), max.	4 Mbyte 2 Gbyte; with SIMATIC memory card	4 Mbyte 2 Gbyte; with SIMATIC memory card	4 Mbyte 2 Gbyte; with SIMATIC memory card
Backup • without battery	Yes	Yes	Yes
CPU processing times for bit operations, typ.	0.085 µs; / Operation	0.085 µs; / Operation	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation	1.7 µs; / Operation	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation	2.3 µs; / Operation	2.3 µs; / Operation
Data areas and their retentivity Flag • Number, max.	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area
Address area Process image • Inputs, adjustable • Outputs, adjustable	1 kbyte 1 kbyte	1 kbyte 1 kbyte	1 kbyte 1 kbyte
Time of day Clock • Hardware clock (real-time clock)	Yes	Yes	Yes
Digital inputs Number of digital inputs • of which, inputs usable for technological functions	14; integrated 6; HSC (High Speed Counting)	14; integrated 6; HSC (High Speed Counting)	14; integrated 6; HSC (High Speed Counting)

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Technical specifications (continued)

	6ES7215-1BG40-0XB0 CPU 1215C AC/DC/Relay	6ES7215-1AG40-0XB0 CPU 1215C DC/DC/DC	6ES7215-1HG40-0XB0 CPU 1215C DC/DC/Relay
Digital outputs			
Number of digital outputs	10; Relays	10	10; Relays
• of which high-speed outputs		4; 100 kHz Pulse Train Output	
Analog inputs			
Integrated channels (AI)	2; 0 to 10 V	2; 0 to 10 V	2; 0 to 10 V
Input ranges			
• Voltage	Yes	Yes	Yes
Analog outputs			
Integrated channels (AO)	2; 0 to 20 mA	2; 0 to 20 mA	2; 0 to 20 mA
1st interface			
Interface type	PROFINET	PROFINET	PROFINET
Functionality			
• PROFINET IO Device	Yes	Yes	Yes
• PROFINET IO Controller	Yes	Yes	Yes
Communication functions			
S7 communication			
• supported	Yes	Yes	Yes
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• ISO-on-TCP (RFC1006)	Yes	Yes	Yes
• UDP	Yes	Yes	Yes
Web server			
• supported	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	4	4	4
Limit frequency (pulse)		100 kHz	
Ambient conditions			
Operating temperature			
• min.	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
Dimensions			
Width	130 mm	130 mm	130 mm
Height	100 mm	100 mm	100 mm
Depth	75 mm	75 mm	75 mm
Weights			
Weight, approx.	585 g	520 g	550 g

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CPU 1215C

2

Ordering data	Article No.
CPU 1215C	
Compact CPU, AC/DC/relay; Integrated program/data memory 100 KB, load memory 4 MB; Wide-range AC power supply 85 ... 264 V AC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs, 2 analog outputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7215-1BG40-0XB0**
Compact CPU, DC/DC/DC; Integrated program/data memory 100 KB, load memory 4 MB; Supply voltage 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs, 2 analog inputs, 2 analog outputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or as outputs with pulse width modulation (PWM) at 100 kHz	**6ES7215-1AG40-0XB0**
Compact CPU, DC/DC/relay; Integrated program/data memory 100 KB, load memory 4 MB; Supply voltage 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs, 10 digital outputs (relays), 2 analog inputs, 2 analog outputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 100 kHz	**6ES7215-1HG40-0XB0**
SB 1221 signal board	
4 inputs, 5 V DC, 200 kHz	**6ES7221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	**6ES7221-3BD30-0XB0**
SB 1222 signal board	
4 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7222-1BD30-0XB0**

	Article No.
SB 1223 signal board	
2 inputs, 24 V DC, IEC Type 1 sink input; 2 transistor outputs 24 V DC, 0.5 A, 5 W; Can be used as HSC at up to 30 kHz	**6ES7223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7223-3BD30-0XB0**
SB 1231 signal board 1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits	**6ES7231-4HA30-0XB0**
Thermocouple signal board SB 1231 1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K	**6ES7231-5QA30-0XB0**
RTD signal board SB 1231 1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign	**6ES7231-5PA30-0XB0**
SB 1232 signal board 1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits	**6ES7232-4HA30-0XB0**
Communication board CB 1241 RS485 for point-to-point connection, with 1 RS485 interface	**6ES7241-1CH30-1XB0**
BB 1297 battery board for long-term backup of real time clock; can be plugged into the signal board slot of an S7-1200 CPU in FW version 3.0 or higher; Battery (CR 1025) not included	**6ES7297-0AX30-0XA0**
Simulator (optional) 14 input switches, for CPU 1214C	**6ES7274-1XH30-0XA0**
SIMATIC Memory Card (optional)	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
Extension cable for two-tier configuration For connecting digital/analog signal modules; 2 m long	**6ES7290-6AA30-0XA0**
Terminal block (spare part) for CPU 1215C	
For DI, with 20 screws, tin-plated; 4 units	**6ES7292-1AV30-0XA0**
For DO, with 12 screws, tin-plated; 4 units	**6ES7292-1AM30-0XA0**
For analog units, with 6 screws, gold-plated; 4 units	**6ES7292-1BF30-0XB0**

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Ordering data	Article No.
Front flap set (spare part)	**6ES7291-1AC30-0XA0**
for CPU 1215C	
RJ45 cable grip	
4 items per pack	
Single port	**6ES7290-3AA30-0XA0**
Dual port	**6ES7290-3AB30-0XA0**
S7-1200 automation system, System Manual	
For SIMATIC S7-1200 and STEP 7 Basic	
German	**6ES7298-8FA30-8AH0**
English	**6ES7298-8FA30-8BH0**
French	**6ES7298-8FA30-8CH0**
Spanish	**6ES7298-8FA30-8DH0**
Italian	**6ES7298-8FA30-8EH0**
Chinese	**6ES7298-8FA30-8KH0**
S7-1200 automation system, Easy Book	
Brief instructions	
German	**6ES7298-8FA30-8AQ0**
English	**6ES7298-8FA30-8BQ0**
French	**6ES7298-8FA30-8CQ0**
Spanish	**6ES7298-8FA30-8DQ0**
Italian	**6ES7298-8FA30-8EQ0**
Chinese	**6ES7298-8FA30-8KQ0**
STEP 7 Professional / Basic V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) Type of delivery: German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key[1]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License Software download incl. License Key[1]	**6ES7822-0AE03-0YA5**
E-mail address required for delivery	

	Article No.
Accessories	
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	**6GK7277-1AA10-0AA0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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CPU 1217C

Overview

- The compact high-performance CPU
- With 24 integrated I/Os
- Expandable by:
  - 1 Signal Board (SB) or Communication Board (CB)
  - 8 signal modules (SM)
  - Max. 3 communication modules (CM)

Technical specifications

	6ES7217-1AG40-0XB0 CPU 1217C DC/DC/DC
General information	
Engineering with	
• Programming package	STEP 7 V13 or higher
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	12 W
Memory	
Work memory	
• integrated	125 kbyte
Load memory	
• integrated	4 Mbyte
• plug-in (SIMATIC Memory Card), max.	2 Gbyte; with SIMATIC memory card
Backup	
• without battery	Yes
CPU processing times	
for bit operations, typ.	0.085 µs; / Operation
for word operations, typ.	1.7 µs; / Operation
for floating point arithmetic, typ.	2.3 µs; / Operation
Data areas and their retentivity	
Flag	
• Number, max.	8 kbyte; Size of bit memory address area
Address area	
Process image	
• Inputs, adjustable	1 kbyte
• Outputs, adjustable	1 kbyte
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Digital inputs	
Number of digital inputs	14; integrated
• of which, inputs usable for technological functions	6; HSC (High Speed Counting)
Digital outputs	
Number of digital outputs	10
• of which high-speed outputs	4; 1 MHz Pulse Train Output

	6ES7217-1AG40-0XB0 CPU 1217C DC/DC/DC
Analog inputs	
Integrated channels (AI)	2; 0 to 10 V
Input ranges	
• Voltage	Yes
Analog outputs	
Integrated channels (AO)	2; 0 to 20 mA
1st interface	
Interface type	PROFINET
Functionality	
• PROFINET IO Device	Yes
• PROFINET IO Controller	Yes
Communication functions	
S7 communication	
• supported	Yes
Open IE communication	
• TCP/IP	Yes
• ISO-on-TCP (RFC1006)	Yes
• UDP	Yes
Web server	
• supported	Yes
Integrated Functions	
Number of counters	6
Counter frequency (counter) max.	1 MHz
Frequency meter	Yes
Controlled positioning	Yes
PID controller	Yes
Number of alarm inputs	4
Number of pulse outputs	4
Limit frequency (pulse)	1 MHz
Ambient conditions	
Operating temperature	
• min.	-20 °C
• max.	60 °C
Configuration	
programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- SCL	Yes
Dimensions	
Width	150 mm
Height	100 mm
Depth	75 mm
Weights	
Weight, approx.	530 g

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Ordering data

	Article No.
CPU 1217C	
Compact CPU, DC/DC/DC; Integrated program and data memory of 125 KB, load memory of 4 MB; Supply voltage 24 V DC; Boolean execution times 0.085 µs per operation; 14 digital inputs (10 digital 24 V DC inputs, 4 digital 1.5 V DC differential inputs), 10 digital outputs (6 digital 24 V DC outputs, 4 digital 1.5 V DC differential outputs), 2 analog inputs, 2 analog outputs; Expandable with up to 3 communication modules, 8 signal modules and 1 signal board/communication board; Digital inputs can be used as HSC at 1 MHz, 24 V DC digital outputs can be used as pulse outputs (PTO) or outputs with pulse width modulation (PWM) at 100 kHz	**6ES7217-1AG40-0XB0**
SB 1221 signal board	
4 inputs, 5 V DC, 200 kHz	**6ES7221-3AD30-0XB0**
4 inputs, 24 V DC, 200 kHz	**6ES7221-3BD30-0XB0**
SB 1222 signal board	
4 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7222-1AD30-0XB0**
4 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7222-1BD30-0XB0**
SB 1223 signal board	
2 inputs, 24 V DC, IEC Type 1 sink input; 2 transistor outputs 24 V DC, 0.5 A, 5 W; Can be used as HSC at up to 30 kHz	**6ES7223-0BD30-0XB0**
2 inputs, 5 V DC, 200 kHz 2 outputs, 5 V DC, 0.1 A, 200 kHz	**6ES7223-3AD30-0XB0**
2 inputs, 24 V DC, 200 kHz 2 outputs, 24 V DC, 0.1 A, 200 kHz	**6ES7223-3BD30-0XB0**
SB 1231 signal board	**6ES7231-4HA30-0XB0**
1 analog input, ±10 V with 12 bits or 0 ... 20 mA with 11 bits	
Thermocouple signal board SB 1231	**6ES7231-5QA30-0XB0**
1 input +/- 80 mV, resolution 15 bits + sign, thermocouples type J, K	
RTD signal board SB 1231	**6ES7231-5PA30-0XB0**
1 input for resistance temperature sensors Pt 100, Pt 200, Pt 500, Pt 1000, resolution 15 bits + sign	

	Article No.
SB 1232 signal board	**6ES7232-4HA30-0XB0**
1 analog output, ±10 V with 12 bits or 0 to 20 mA with 11 bits	
Communication board CB 1241 RS485	**6ES7241-1CH30-1XB0**
for point-to-point connection, with 1 RS485 interface	
BB 1297 battery board	**6ES7297-0AX30-0XA0**
for long-term backup of real time clock; can be plugged into the signal board slot of an S7-1200 CPU in FW version 3.0 or higher; Battery (CR 1025) not included	
Simulator (optional)	
digital, 14 input switches, for CPU 1217C	**6ES7274-1XK30-0XA0**
analog, 2 potentiometer inputs	**6ES7274-1XA30-0XA0**
SIMATIC Memory Card (optional)	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
Extension cable for two-tier configuration	**6ES7290-6AA30-0XA0**
For connecting digital/analog signal modules; 2 m long	
Terminal block (spare part)	
for CPU 1217C	
for DI, with 10 screws, tin-plated; 4 units	**6ES7292-1AK30-0XA0**
for DI, with 10 screws, tin-plated; 4 units	**6ES7292-1AR30-0XA0**
for DO, with 18 screws, tin-plated; 4 units	**6ES7292-1AT30-0XA0**
For analog units, with 6 screws, gold-plated; 4 units	**6ES7292-1BF30-0XB0**
RJ45 cable grip	**6ES7290-3AB30-0XA0**
4 items per pack	
Dual port	

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Ordering data	Article No.
S7-1200 automation system, System Manual	
For SIMATIC S7-1200 and STEP 7 Basic	
German	**6ES7298-8FA30-8AH0**
English	**6ES7298-8FA30-8BH0**
French	**6ES7298-8FA30-8CH0**
Spanish	**6ES7298-8FA30-8DH0**
Italian	**6ES7298-8FA30-8EH0**
Chinese	**6ES7298-8FA30-8KH0**
S7-1200 automation system, Easy Book	
Brief instructions	
German	**6ES7298-8FA30-8AQ0**
English	**6ES7298-8FA30-8BQ0**
French	**6ES7298-8FA30-8CQ0**
Spanish	**6ES7298-8FA30-8DQ0**
Italian	**6ES7298-8FA30-8EQ0**
Chinese	**6ES7298-8FA30-8KQ0**
STEP 7 Professional / Basic V13	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key[1]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License Software download incl. License Key[1]	**6ES7822-0AE03-0YA5**
E-mail address required for delivery	

	Article No.
Accessories	
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	**6GK7277-1AA10-0AA0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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Overview CPU 1511-1 PN



- Entry-level CPU in the S7-1500 controller product range
- Suitable for applications with medium requirements for program scope and processing speed
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- Isochronous mode
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages
- SIMATIC memory card required for operation of the CPU

Overview CPU 1513-1 PN



- The CPU for applications with medium requirements for program/data storage in the S7-1500 controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- Isochronous mode
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages
- SIMATIC memory card required for operation of the CPU

Overview CPU 1515-2 PN

- The CPU for applications with medium to high requirements for program/data storage in the S7-1500 controller product range
- Medium to high processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- Isochronous mode
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages
- SIMATIC memory card required for operation of the CPU

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Overview CPU 1516-3 PN/DP



- The CPU with a large program and data memory in the S7-1500 controller product range for applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Additional PROFINET interface with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages
- SIMATIC memory card required for operation of the CPU

Overview CPU 1518-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 controller product range for demanding applications with extremely high requirements regarding program scope, performance and networking
- Extremely high processing speed for binary and floating-point arithmetic
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- PROFINET IO IRT interface with 2-port switch
- Two additional PROFINET interfaces with separate IP address
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface
- Isochronous mode on PROFIBUS and PROFINET
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated web server with the option of creating user-defined web pages
- SIMATIC memory card required for operation of the CPU

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Technical specifications

	6ES7511-1AK00-0AB0 CPU 1511-1 PN	6ES7513-1AL00-0AB0 CPU 1513-1 PN	6ES7515-2AM00-0AB0 CPU 1515-2 PN
General information			
Engineering with			
• STEP 7 TIA Portal can be configured/integrated as of version	V13	V13	V13
Display			
Screen diagonal (cm)	3.45 cm	3.45 cm	6.1 cm
Supply voltage			
Type of supply voltage	24 V DC	24 V DC	24 V DC
Power losses			
Power loss, typ.	5.7 W	5.7 W	6.3 W
Memory			
Work memory			
• integrated (for program)	150 kbyte	300 kbyte	500 kbyte
• integrated (for data)	1 Mbyte	1.5 Mbyte	3 Mbyte
Load memory			
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte	32 Gbyte
CPU processing times			
for bit operations, typ.	60 ns	40 ns	30 ns
for word operations, typ.	72 ns	48 ns	36 ns
for fixed point arithmetic, typ.	96 ns	64 ns	48 ns
for floating point arithmetic, typ.	384 ns	256 ns	192 ns
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
IEC counter			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times			
• Number	2 048	2 048	2 048
IEC timer			
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity			
Flag			
• Number, max.	16 kbyte	16 kbyte	16 kbyte
Address area			
I/O address area			
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day			
Clock			
• Type	Hardware clock	Hardware clock	Hardware clock

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Technical specifications (continued)

	6ES7511-1AK00-0AB0 CPU 1511-1 PN	6ES7513-1AL00-0AB0 CPU 1513-1 PN	6ES7515-2AM00-0AB0 CPU 1515-2 PN
Interfaces			
1st interface			
• Interface types			
- Number of ports	2	2	2
- Integrated switch	Yes	Yes	Yes
- RJ 45 (Ethernet)	Yes	Yes	Yes
• Protocols			
- PROFINET IO Controller	Yes	Yes	Yes
- PROFINET IO Device	Yes	Yes	Yes
- SIMATIC communication	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes
- Web server	Yes	Yes	Yes
- Media redundancy	Yes	Yes	Yes
2nd interface			
• Interface types			
- Number of ports			1
- Integrated switch			No
- RJ 45 (Ethernet)			Yes
• Protocols			
- PROFINET IO Controller			No
- PROFINET IO Device			No
- SIMATIC communication			Yes
- Open IE communication			Yes
- Web server			Yes
Protocols			
Number of connections			
• Number of connections, max.	96	128	192; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller			
• Services			
- Max. number of connectable IO devices for RT	128	128	256
- Number of IO Devices with IRT and the option "high performance", max.	64	64	64
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes	Yes	Yes
Supported technology objects			
Motion	Yes	Yes	Yes
• Speed-controlled axis			
- Number of speed-controlled axes, max.	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
• Positioning axis			
- Number of positioning axes, max.	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
• External encoders			
- Number of external encoders, max.	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	6; Up to 6 axes in total (speed-controlled, positioning axis, external encoders) are supported	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported
Controller			
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
Counting and measuring			
• High-speed counter	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7511-1AK00-0AB0 CPU 1511-1 PN	6ES7513-1AL00-0AB0 CPU 1513-1 PN	6ES7515-2AM00-0AB0 CPU 1515-2 PN
Ambient conditions			
Operating temperature			
• horizontal installation, min.	0 °C	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- GRAPH	Yes; from STEP 7 V12 SP1	Yes; from STEP 7 V12 SP1	Yes
Know-how protection			
• User program protection	Yes	Yes	Yes
• Copy protection	Yes	Yes	Yes
• Block protection	Yes	Yes	Yes
Access protection			
• Password for display	Yes	Yes	Yes
• Protection level: Write protection	Yes	Yes	Yes
• Protection level: Read/write protection	Yes	Yes	Yes
• Protection level: Complete protection	Yes	Yes	Yes
Dimensions			
Width	35 mm	35 mm	70 mm
Height	147 mm	147 mm	147 mm
Depth	129 mm	129 mm	129 mm
Weights			
Weight, approx.	430 g	430 g	830 g

	6ES7516-3AN00-0AB0 CPU 1516-3 PN/DP	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP
General information		
Engineering with		
• STEP 7 TIA Portal can be configured/integrated as of version	V13	V13
Display		
Screen diagonal (cm)	6.1 cm	6.1 cm
Supply voltage		
Type of supply voltage	24 V DC	24 V DC
Power losses		
Power loss, typ.	7 W	24 W
Memory		
Work memory		
• integrated (for program)	1 Mbyte	3 Mbyte
• integrated (for data)	5 Mbyte	10 Mbyte
Load memory		
• Plug-in (SIMATIC Memory Card), max.	32 Gbyte	32 Gbyte
CPU processing times		
for bit operations, typ.	10 ns	1 ns
for word operations, typ.	12 ns	2 ns
for fixed point arithmetic, typ.	16 ns	2 ns
for floating point arithmetic, typ.	64 ns	6 ns

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Technical specifications (continued)

	6ES7516-3AN00-0AB0 CPU 1516-3 PN/DP	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times		
• Number	2 048	2 048
IEC timer		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte	16 kbyte
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
Interfaces		
1st interface		
• Interface types		
- Number of ports	2	2
- Integrated switch	Yes	Yes
- RJ 45 (Ethernet)	Yes	Yes
• Protocols		
- PROFINET IO Controller	Yes	Yes
- PROFINET IO Device	Yes	Yes
- SIMATIC communication	Yes	Yes
- Open IE communication	Yes	Yes
- Web server	Yes	Yes
- Media redundancy	Yes	Yes
2nd interface		
• Interface types		
- Number of ports	1	1
- Integrated switch	No	No
- RJ 45 (Ethernet)	Yes	Yes
• Protocols		
- PROFINET IO Controller	No	No
- PROFINET IO Device	No	No
- SIMATIC communication	Yes	Yes
- Open IE communication	Yes	Yes
- Web server	Yes	Yes
3rd interface		
• Interface types		
- Number of ports	1	1
- Integrated switch		No
- RJ 45 (Ethernet)		Yes
- RS 485	Yes	
• Protocols		
- PROFINET IO Controller		No
- PROFINET IO Device		No
- SIMATIC communication	Yes	Yes
- Open IE communication		Yes
- Web server		Yes
- PROFIBUS DP master	Yes	
- PROFIBUS DP slave	No	
4th interface		
• Interface types		
- Number of ports		1
- RS 485		Yes
• Protocols		
- SIMATIC communication		Yes
- PROFIBUS DP master		Yes
- PROFIBUS DP slave		No

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Technical specifications (continued)

	6ES7516-3AN00-0AB0 CPU 1516-3 PN/DP	6ES7518-4AP00-0AB0 CPU 1518-4 PN/DP
Protocols		
Number of connections		
• Number of connections, max.	256	384; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller		
• Services		
- Max. number of connectable IO devices for RT	256	512
- Number of IO Devices with IRT and the option "high performance", max.	64	64
PROFIBUS		
• Services		
- Number of DP slaves	125; In total, up to 768 distributed I/O devices can be connected via PROFIBUS or PROFINET	125; In total, up to 768 distributed I/O devices can be connected via PROFIBUS or PROFINET
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes	Yes
Supported technology objects		
Motion	Yes	Yes
• Speed-controlled axis		
- Number of speed-controlled axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• Positioning axis		
- Number of positioning axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• External encoders		
- Number of external encoders, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
Counting and measuring		
• High-speed counter	Yes	Yes
Ambient conditions		
Operating temperature		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration		
programming		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes; STEP 7 V12 SP1 or higher	Yes
Know-how protection		
• User program protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• Password for display	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	70 mm	175 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	845 g	1 988 g

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Standard CPUs

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Ordering data	Article No.
CPU 1511-1 PN Work memory 150 KB for program, 1 MB for data, PROFINET IO IRT interface, SIMATIC memory card required	**6ES7511-1AK00-0AB0**
CPU 1513-1 PN Work memory 300 KB for program, 1.5 MB for data, PROFINET IO IRT interface, SIMATIC memory card required	**6ES7513-1AL00-0AB0**
CPU 1515-2 PN Work memory 500 KB for program, 3 MB for data, PROFINET IO IRT interface, PROFINET interface; SIMATIC memory card required	**6ES7515-2AM00-0AB0**
CPU 1516-3 PN/DP 1 MB RAM for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC memory card required	**6ES7516-3AN00-0AB0**
CPU 1518-4 PN/DP Work memory 3 MB for program, 10 MB for data, PROFINET IO IRT interface, 2 PROFINET/PROFIBUS interfaces; SIMATIC memory card required	**6ES7518-4AP00-0AB0**
Accessories	
SIMATIC memory card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
SIMATIC S7-1500 mounting rail Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2 000 mm	**6ES7590-1BC00-0AA0**
PE connection element for mounting rail 2 000 mm 20 units	**6ES7590-5AA00-0AA0**
Power supply For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector With coding element for power supply module; spare part, 10 units	**6ES7590-8AA00-0AA0**

	Article No.
Load power supply	
24 V DC/3A	**6EP1332-4BA00**
24 V DC/8A	**6EP1333-4BA00**
Power supply connector Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180 180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2 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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for cable carrier use; PROFINET-compatible; with UL approval; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 marine certified, Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	**6XV1840-4AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Displays	**6ES7591-1AA00-0AA0**
• for CPU 1511-1 PN and CPU 1513-1 PN; spare part	
• for CPU 1515-2 PN, CPU 1516-3 PN/DP and CPU 1518-4 PN/DP; spare part	**6ES7591-1BA00-0AA0**

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Ordering data

	Article No.
SIMATIC S7-1500 Starter Kit Consisting of: CPU 1511-1 PN, SIMATIC memory card 4 MB, digital input DI 16 x 24 V DC HF, digital output DO 16 x 24 V DC/ 0.5 A ST, 160 mm mounting rail, front connector, STEP 7 Professional V12, 365-day license, power supply 60 W AC 120/230 V, Standard Ethernet CAT 5 cable (2 m), screwdriver, documentation	**6ES7511-1AK01-4YB5**
STEP 7 Professional V13 *Target system:* SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key [1] E-mail address required for delivery	**6ES7822-1AE03-0YA5**

[1] For up-to-date information and download availability, see:
http://www.siemens.com/tia-online-software-delivery

More information

Further information and downloads

Manuals

The SIMATIC S7-1500 manuals can be downloaded free of charge from the Internet (SIMATIC Customer Support).

http://support.automation.siemens.com/WW/view/en/86140384

SIMATIC S7-1500 Display Simulator

Using the Display Simulator of the S7-1500, you can become familiar in advance with the different setting options and functions on the display.

http://www.automation.siemens.com/salesmaterial-as/interactive-manuals/getting-started_simatic-s7-1500/disp_tool/start_en.html

General information

http://www.siemens.com/S7-1500

SIMATIC Selection Tool

http://www.siemens.com/tia-selection-tool

Brochures

Information material for downloading can be found on the Internet:

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

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Overview CPU 1516F-3 PN/DP

- The CPU with a large program and data memory in the S7-1500 controller product range for fail-safe applications with high requirements regarding program scope and networking.
- High processing speed for binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Additional PROFINET interface with separate IP address.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders.
- Integrated Web server with the option of creating user-defined Web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

Overview CPU 1518F-4 PN/DP

- The CPU with a very large program and data memory in the S7-1500 controller product range for fail-safe applications with highest requirements regarding program scope and networking.
- Extremely high processing speed for binary and floating-point arithmetic.
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O.
- Supports PROFIsafe in centralized and distributed configuration.
- PROFINET IO IRT interface with 2-port switch.
- Two additional PROFINET interfaces with separate IP addresses.
- PROFINET IO controller for operating distributed I/O on PROFINET.
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller.
- PROFIBUS DP master interface.
- Isochronous mode on PROFIBUS and PROFINET.
- Integrated Motion Control functionalities for controlling speed-controlled and positioning axes, support for external encoders
- Integrated Web server with the option of creating user-defined Web pages.

Note:

SIMATIC Memory Card required for operation of the CPU.

Technical specifications

	6ES7516-3FN00-0AB0 **CPU 1516F-3 PN/DP**	**6ES7518-4FP00-0AB0** **CPU 1518F-4PN/DP**
General information		
Engineering with • STEP 7 TIA Portal can be configured/integrated as of version	V13	V13
Display		
Screen diagonal (cm)	6.1 cm	6.1 cm
Supply voltage		
Type of supply voltage	24 V DC	24 V DC
Power losses		
Power loss, typ.	7 W	24 W
Memory		
Work memory • integrated (for program) • integrated (for data)	 1.5 Mbyte 5 Mbyte	 4.5 Mbyte 10 Mbyte
Load memory • Plug-in (SIMATIC Memory Card), max.	 32 Gbyte	 32 Gbyte
CPU processing times		
for bit operations, typ.	10 ns	1 ns
for word operations, typ.	12 ns	2 ns
for fixed point arithmetic, typ.	16 ns	2 ns
for floating point arithmetic, typ.	64 ns	6 ns

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Technical specifications (continued)

	6ES7516-3FN00-0AB0 CPU 1516F-3 PN/DP	6ES7518-4FP00-0AB0 CPU 1518F-4PN/DP
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
S7 times		
• Number	2 048	2 048
IEC timer		
• Number	Any (only limited by the main memory)	Any (only limited by the main memory)
Data areas and their retentivity		
Flag		
• Number, max.	16 kbyte	16 kbyte
Address area		
I/O address area		
• Inputs	32 kbyte; All inputs are in the process image	32 kbyte; All inputs are in the process image
• Outputs	32 kbyte; All outputs are in the process image	32 kbyte; All outputs are in the process image
Time of day		
Clock		
• Type	Hardware clock	Hardware clock
Interfaces		
1st interface		
• Interface types		
- Number of ports	2	2
- Integrated switch	Yes	Yes
- RJ 45 (Ethernet)	Yes	Yes
• Protocols		
- PROFINET IO Controller	Yes	Yes
- PROFINET IO Device	Yes	Yes
- SIMATIC communication	Yes	Yes
- Open IE communication	Yes	Yes
- Web server	Yes	Yes
- Media redundancy	Yes	Yes
2nd interface		
• Interface types		
- Number of ports	1	1
- Integrated switch	No	No
- RJ 45 (Ethernet)	Yes	Yes
• Protocols		
- PROFINET IO Controller	No	No
- PROFINET IO Device	No	No
- SIMATIC communication	Yes	Yes
- Open IE communication	Yes	Yes
- Web server	Yes	Yes
3rd interface		
• Interface types		
- Number of ports	1	1
- Integrated switch		No
- RJ 45 (Ethernet)		Yes
- RS 485	Yes	
• Protocols		
- PROFINET IO Controller		No
- PROFINET IO Device		No
- SIMATIC communication	Yes	Yes
- Open IE communication		Yes
- Web server		Yes
- PROFIBUS DP master	Yes	
- PROFIBUS DP slave	No	
4th interface		
• Interface types		
- Number of ports		1
- RS 485		Yes
• Protocols		
- SIMATIC communication		Yes
- PROFIBUS DP master		Yes
- PROFIBUS DP slave		No

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Technical specifications (continued)

	6ES7516-3FN00-0AB0 CPU 1516F-3 PN/DP	6ES7518-4FP00-0AB0 CPU 1518F-4PN/DP
Protocols		
Number of connections		
• Number of connections, max.	256; via integrated interfaces of the CPU and connected CPs / CMs	384; via integrated interfaces of the CPU and connected CPs / CMs
PROFINET IO Controller		
• Services		
- Max. number of connectable IO devices for RT	256	512
- Number of IO Devices with IRT and the option "high performance", max.	64	64
PROFIBUS		
• Services		
- Number of DP slaves	125; In total, up to 768 distributed I/O devices can be connected via CPs/CMs via PROFIBUS or PROFINET	125; In total, up to 768 distributed I/O devices can be connected via CPs/CMs via PROFIBUS or PROFINET
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes	Yes
supported technology objects		
Motion	Yes	Yes
• Speed-controlled axis		
- Number of speed-controlled axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• Positioning axis		
- Number of positioning axes, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
• External encoders		
- Number of external encoders, max.	20; Up to 20 axes in total (speed-controlled, positioning axis, external encoders) are supported	128; Up to 128 axes in total (speed-controlled, positioning axis, external encoders) are supported
Controller		
• PID_Compact	Yes; Universal PID controller with integrated optimization	Yes; Universal PID controller with integrated optimization
• PID_3Step	Yes; PID controller with integrated optimization for valves	Yes; PID controller with integrated optimization for valves
Counting and measuring		
• High-speed counter	Yes	Yes
Ambient conditions		
Operating temperature		
• horizontal installation, min.	0 °C	0 °C
• horizontal installation, max.	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off	60 °C; Display: 50 °C, at an operating temperature of typically 50 °C, the display is switched off
• vertical installation, min.	0 °C	0 °C
• vertical installation, max.	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off	40 °C; Display: 40 °C, at an operating temperature of typically 40 °C, the display is switched off
Configuration		
programming		
• Programming language		
- LAD	Yes; incl. Failsafe	Yes; incl. Failsafe
- FBD	Yes; incl. Failsafe	Yes; incl. Failsafe
- STL	Yes	Yes
- SCL	Yes	Yes
- GRAPH	Yes	Yes
Know-how protection		
• User program protection	Yes	Yes
• Copy protection	Yes	Yes
• Block protection	Yes	Yes
Access protection		
• Password for display	Yes	Yes
• Protection level: Write protection	Yes	Yes
• Protection level: Read/write protection	Yes	Yes
• Protection level: Complete protection	Yes	Yes
Dimensions		
Width	70 mm	175 mm
Height	147 mm	147 mm
Depth	129 mm	129 mm
Weights		
Weight, approx.	845 g	1 988 g

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Ordering data	Article No.
CPU 1516F-3 PN/DP	**6ES7516-3FN00-0AB0**
Fail-safe CPU, 1.5 MB RAM for program, 5 MB for data, PROFINET IO IRT interface, PROFINET/PROFIBUS interface; SIMATIC memory card required	
CPU 1518F-4 PN/DP	**6ES7518-4FP00-0AB0**
Fail-safe CPU, 4.5 MB RAM for program, 10 MB for data, PROFINET IO IRT interface, 2 PROFINET interfaces, PROFIBUS interface; SIMATIC Memory Card required	
Accessories	
SIMATIC memory card	
4 MB	**6ES7954-8LC02-0AA0**
12 MB	**6ES7954-8LE02-0AA0**
24 MB	**6ES7954-8LF02-0AA0**
256 MB	**6ES7954-8LL02-0AA0**
2 GB	**6ES7954-8LP01-0AA0**
SIMATIC S7-1500 mounting rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2 000 mm	**6ES7590-1BC00-0AA0**
PE connection element for mounting rail 2 000 mm	**6ES7590-5AA00-0AA0**
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	
Load current supply	
24 V DC/3 A	**6EP1332-4BA00**
24 V DC/8 A	**6EP1333-4BA00**
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
PROFIBUS FastConnect bus connector RS485 with 90° cable outlet	
with insulation displacement, max. transmission rate 12 Mbps	
without programming device interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BA70-0XA0**
with programming device interface, grounding via control cabinet contact surface; 1 unit	**6ES7972-0BB70-0XA0**

	Article No.
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Flexible Cable	**6XV1831-2K**
2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	
2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
Sheath color: Petrol	**6XV1830-3EH10**
Sheath color: Violet	**6XV1831-2L**
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FC Ground Cable	**6XV1830-3FH10**
2-wire, shielded; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FC FRNC Cable GP	**6XV1830-0LH10**
2-wire, shielded, flame-retardant, with copolymer outer sheath FRNC; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	
PROFIBUS FastConnect Stripping Tool	**6GK1905-6AA00**
Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
IE FC TP Standard Cable GP 2x2	**6XV1840-2AH10**
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 1 000 m, minimum order quantity 20 m	

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Ordering data	Article No.
IE FC TP Trailing Cable 2 x 2 (Type C) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for cable carrier use; PROFINET-compatible; with UL approval; Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	**6XV1840-3AH10**
IE FC TP Marine Cable 2 x 2 (Type B) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 marine certified, Sold by the meter, max. length 1 000 m, minimum order quantity 20 m	**6XV1840-4AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
Display for CPU 1516-3 PN/DP; spare part	**6ES7591-1BA00-0AA0**

	Article No.
STEP 7 Professional V13 *Target system:* SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64-bit), Windows 7 Enterprise SP1 (64-bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64-bit), Windows 8.1 Professional (64-bit), Windows 8.1 Enterprise (64-bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Type of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, Software download incl. License Key [1]	**6ES7822-1AE03-0YA5**
E-mail address required for delivery	
STEP 7 Safety Advanced V13 *Task:* Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 Professional V13	
Floating License for 1 user	**6ES7833-1FA13-0YA5**
Floating License for 1 user, License Key download without software and documentation[1]; E-mail address required for delivery	**6ES7833-1FA13-0YH5**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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Overview CPU 315-2 PN/DP



- The CPU with mid-range program memory and quantity frameworks
- High processing power in binary and floating-point arithmetic
- Used as central controller in production lines with central and distributed I/O
- PROFINET interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O Controller
- Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 317-2 PN/DP



- The CPU with a large program memory and quantity framework for demanding applications
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O
- High processing power in binary and floating-point arithmetic
- PROFINET interface with 2-port switch
- PROFINET I/O Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O Controller
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Integrated web server with the option of creating user-defined web pages
- Combined MPI/PROFIBUS DP master/slave interface
- Isochronous mode on PROFIBUS and PROFINET
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of CPU.

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Standard CPUs

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Overview CPU 319-3 PN/DP



- The CPU with high command processing performance, large program memory and quantity framework for demanding applications
- For cross-industry automation tasks in series machine, special machine and plant construction
- Used as central controller in production lines with central and distributed I/O on PROFIBUS and PROFINET
- PROFINET I/O controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET I/O controller
- PROFINET interface with 2-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integrated web server with the option of creating user-defined web pages
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- Optionally supports the use of SIMATIC engineering tools

SIMATIC Micro Memory Card required for operation of the CPU.

Technical specifications

	6ES7315-2EH14-0AB0 CPU 315-2 PN/DP	6ES7317-2EK14-0AB0 CPU 317-2 PN/DP	6ES7318-3EL01-0AB0 CPU 319-3 PN/DP
General information			
Engineering with			
• Programming package	STEP7 V 5.5 or higher	STEP7 V 5.5 or higher	STEP7 V 5.5 or higher
Supply voltage			
24 V DC	Yes	Yes	Yes
Power losses			
Power loss, typ.	4.65 W	4.65 W	14 W
Memory			
Work memory			
• integrated	384 kbyte	1 024 kbyte	2 048 kbyte
• Size of retentive memory for retentive data blocks	128 kbyte	256 kbyte	700 kbyte
Load memory			
• pluggable (MMC), max.	8 Mbyte	8 Mbyte	8 Mbyte
CPU processing times			
for bit operations, typ.	0.05 µs	0.025 µs	0.004 µs
for word operations, typ.	0.09 µs	0.03 µs	0.01 µs
for fixed point arithmetic, typ.	0.12 µs	0.04 µs	0.01 µs
for floating point arithmetic, typ.	0.45 µs	0.16 µs	0.04 µs
Counters, timers and their retentivity			
S7 counter			
• Number	256	512	2 048
IEC counter			
• present	Yes	Yes	Yes
S7 times			
• Number	256	512	2 048
IEC timer			
• present	Yes	Yes	Yes
Data areas and their retentivity			
Flag			
• Number, max.	2 048 byte	4 096 byte	8 192 byte

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Technical specifications (continued)

	6ES7315-2EH14-0AB0 CPU 315-2 PN/DP	6ES7317-2EK14-0AB0 CPU 317-2 PN/DP	6ES7318-3EL01-0AB0 CPU 319-3 PN/DP
Address area			
I/O address area			
• Inputs	2 048 byte	8 192 byte	8 192 byte
• Outputs	2 048 byte	8 192 byte	8 192 byte
Process image			
• Inputs, adjustable	2 048 byte	8 192 byte	8 192 byte
• Outputs, adjustable	2 048 byte	8 192 byte	8 192 byte
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	1	4	4
1st interface			
Interface type	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485	RS 485	RS 485
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes; A DP slave at both interfaces simultaneously is not possible
• Point-to-point connection	No	No	No
DP master			
• Number of DP slaves, max.	124	124	124
2nd interface			
Interface type	PROFINET	PROFINET	Integrated RS 485 interface
Physics	Ethernet RJ45	Ethernet RJ45	RS 485
Number of ports	2	2	
Functionality			
• MPI	No	No	No
• DP master	No	No	Yes
• DP slave	No	No	Yes; A DP slave at both interfaces simultaneously is not possible
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality	Yes; Also simultaneously with IO-Device functionality	No
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality	Yes; Also simultaneously with IO Controller functionality	No
• PROFINET CBA	Yes	Yes	No
DP master			
• Number of DP slaves, max.			124
PROFINET IO Controller			
• Max. number of connectable IO devices for RT	128	128	
• Number of IO devices with IRT and the option "high flexibility"	128	128	
• Number of IO Devices with IRT and the option "high performance", max.	64	64	
3rd interface			
Interface type			PROFINET
Physics			Ethernet RJ45
Number of ports			2
Functionality			
• MPI			No
• DP master			No
• DP slave			No
• PROFINET IO Controller			Yes; Also simultaneously with I-Device functionality
• PROFINET IO Device			Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA			Yes

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Technical specifications (continued)

	6ES7315-2EH14-0AB0 CPU 315-2 PN/DP	6ES7317-2EK14-0AB0 CPU 317-2 PN/DP	6ES7318-3EL01-0AB0 CPU 319-3 PN/DP
PROFINET IO Controller			
• Max. number of connectable IO devices for RT			256
• Number of IO devices with IRT and the option "high flexibility"			256
• Number of IO Devices with IRT and the option • "high performance", max.			64
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via 2nd PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
S7 basic communication			
• supported	Yes	Yes	Yes
S7 communication			
• supported	Yes	Yes	Yes
S5-compatible communication			
• supported	Yes; Via CP and loadable FC	Yes; Via CP and loadable FC	Yes; Via CP and loadable FC
Open IE communication			
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
• UDP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
Web server			
• supported	Yes	Yes	Yes
Number of connections			
• overall	16	32	32
Ambient conditions			
Operating temperature			
• min.	0 °C	0 °C	0 °C
• max.	60 °C	60 °C	60 °C
Configuration			
Programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			
Width	40 mm	40 mm	120 mm
Height	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm
Weights			
Weight, approx.	340 g	340 g	1 250 g

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Ordering data	Article No.
CPU 315-2 PN/DP 384 KB main memory, 24 V DC power supply, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required	**6ES7315-2EH14-0AB0**
CPU 317-2 PN/DP 1 MB main memory, 24 V DC power supply, combined MPI/PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required	**6ES7317-2EK14-0AB0**
CPU 319-3 PN/DP Main memory 2 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, PROFIBUS DP master/slave interface, Ethernet/PROFINET interface with 2-port switch; MMC required	**6ES7318-3EL01-0AB0**
SIMATIC Micro Memory Card	
64 KB	**6ES7953-8LF30-0AA0**
128 KB	**6ES7953-8LG30-0AA0**
512 KB	**6ES7953-8LJ30-0AA0**
2 MB	**6ES7953-8LL31-0AA0**
4 MB	**6ES7953-8LM31-0AA0**
8 MB	**6ES7953-8LP31-0AA0**
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
Slot number plates	**6ES7912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7398-8FA10-8AA0**
English	**6ES7398-8FA10-8BA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**

	Article No.
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**
Power supply connector 10 units, spare part	**6ES7391-1AA00-0AA0**
SIMATIC S7 training case With mounting components for mounting S7-200 and S7-300	**6ES7910-3AA00-0XA0**
USB A2 PC adapter for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery	**6GK1571-0BA00-0AA0**
PROFIBUS bus components	
PROFIBUS DP bus connector RS 485	
• with 90° cable outlet, max. transfer rate 12 Mbit/s	
- without PG interface	**6ES7972-0BA12-0XA0**
- with PG interface	**6ES7972-0BB12-0XA0**
• with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	
- without PG interface, 1 unit	**6ES7972-0BA52-0XA0**
- without PG interface, 100 units	**6ES7972-0BA52-0XB0**
- with PG interface, 1 unit	**6ES7972-0BB52-0XA0**
- with PG interface, 100 units	**6ES7972-0BB52-0XB0**
• with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1500-0EA02**
PROFIBUS FastConnect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	**6ES7972-0AA02-0XA0**

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Standard CPUs

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Ordering data	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2 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	**6XV1840-2AH10**
FO Standard Cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1873-2A**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Compact Switch Module CSM 377 Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**

	Article No.
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 145 145° cable outlet	
1 unit	**6GK1901-1BB30-0AA0**
10 units	**6GK1901-1BB30-0AB0**
50 units	**6GK1901-1BB30-0AE0**
IE FC RJ45 plug 180 180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

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Overview CPU 314C-2 PN/DP



- The compact CPU with integral digital and analog inputs/ outputs and technological functions
- High processing performance in binary and floating-point arithmetic
- For connecting distributed I/O via PROFIBUS and PROFINET
- Combined MPI/PROFIBUS DP master/slave interface
- PROFINET interface with 2-port switch
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET I-Device for connecting the CPU as intelligent PROFINET device under a SIMATIC or third-party PROFINET I/O controller
- Component based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component based Automation (CBA)
- Integrated Web server with the option of creating user-defined web pages
- Isochronous mode on PROFINET

SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

CPU 314C-2 PN/DP	6ES7314-6EH04-0AB0
General information	
Hardware product version	01
Firmware version	V3.3
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	14 W
Memory	
Work memory	
• integrated	192 kbyte
• expandable	No
• Size of retentive memory for retentive data blocks	64 kbyte
Load memory	
• pluggable (MMC), max.	8 Mbyte
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
IEC counter	
• present	Yes
S7 times	
• Number	256
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	256 byte
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte

CPU 314C-2 PN/DP	6ES7314-6EH04-0AB0
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	1
Digital inputs	
integrated channels (DI)	24
Digital outputs	
integrated channels (DO)	16
Analog inputs	
Integrated channels (AI)	5; 4 x current/voltage, 1 x resistance
Input ranges	
• Voltage	Yes; ±10 V / 100 kΩ; 0 V to 10 V / 100 kΩ
• Current	Yes; ±20 mA / 100 Ω; 0 mA to 20 mA / 100 Ω; 4 mA to 20 mA / 100 Ω
• Resistance thermometer	Yes; Pt 100 / 10 MΩ
• Resistance	Yes; 0 Ω to 600 Ω / 10 MΩ
Analog outputs	
Integrated channels (AO)	2
Output ranges, voltage	
• 0 to 10 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
1st interface	
Interface type	Integrated RS 485 interface
Physics	RS 485
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
• Point-to-point connection	No
DP master	
• Number of DP slaves, max.	124

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Technical specifications (continued)

CPU 314C-2 PN/DP	6ES7314-6EH04-0AB0
2nd interface	
Interface type	PROFINET
Physics	Ethernet RJ45
Number of ports	2
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA	Yes
PROFINET IO Controller	
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
• Number of IO devices with IRT and the option "high flexibility"	128
• Number of IO Devices with IRT and the option "high performance", max.	64
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; For PROFINET only
Communication functions	
PG/OP communication	Yes
Data record routing	Yes
Global data communication	
• supported	Yes
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
S5-compatible communication	
• supported	Yes; Via CP and loadable FC
Open IE communication	
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• UDP	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
Web server	
• supported	Yes
Number of connections	
• overall	12

CPU 314C-2 PN/DP	6ES7314-6EH04-0AB0
Integrated Functions	
Number of counters	4; See "Technological Functions" manual
Counter frequency (counter) max.	60 kHz
Frequency measurement	Yes
Number of frequency meters	4; up to 60 kHz (see "Technological Functions" manual)
Controlled positioning	Yes
Integrated function blocks (closed-loop control)	Yes; PID controller (see "Technological Functions" manual)
PID controller	Yes
Number of pulse outputs	4; Pulse width modulation up to 2.5 kHz (see "Technological Functions" Manual)
Limit frequency (pulse)	2.5 kHz
Ambient conditions	
Operating temperature	
• Min.	0 °C
• max.	60 °C
Configuration	
Configuration software	
• STEP 7	Yes; V5.5 or higher
programming	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	120 mm
Height	125 mm
Depth	130 mm
Weights	
Weight, approx.	730 g

Ordering data

	Article No.
CPU 314C-2 PN/DP	**6ES7314-6EH04-0AB0**
Compact CPU, 192 KB main memory, 24 V DC power supply, 24 DI/16 DO/4 AI/2 AO integrated, integrated functions, MPI; PROFIBUS DP master/slave interface; PROFINET IO Controller/I-Device interface, MMC is required	

	Article No.
SIMATIC Micro Memory Card	
64 KB	**6ES7953-8LF30-0AA0**
128 KB	**6ES7953-8LG30-0AA0**
512 KB	**6ES7953-8LJ30-0AA0**
2 MB	**6ES7953-8LL31-0AA0**
4 MB	**6ES7953-8LM31-0AA0**
8 MB	**6ES7953-8LP31-0AA0**
MPI cable	**6ES7901-0BF00-0AA0**
for connection of SIMATIC S7 and PG via MPI; 5 m in length	

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Ordering data

	Article No.
Front connector (1 unit)	
For compact CPUs	
40-pin, with screw contacts	
• 1 unit	**6ES7392-1AM00-0AA0**
• 100 units	**6ES7392-1AM00-1AB0**
40-pin, with spring-loaded contacts	
• 1 unit	**6ES7392-1BM01-0AA0**
• 100 units	**6ES7392-1BM01-1AB0**
SIMATIC TOP connect	see page ; for information about which components can be used for the respective module, see A&D Mall or Catalog KT 10.2
Front door, elevated design	**6ES7328-7AA20-0AA0**
For compact CPUs; for connecting 1.3 mm^2/16 AWG wires; wiring diagram and labels in petrol	
Slot number plates	**6ES7912-0AA00-0AA0**
S7-300 manual	
Design, CPU data, module data, instruction list	
German	**6ES7398-8FA10-8AA0**
English	**6ES7398-8FA10-8BA0**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
Power supply connector	**6ES7391-1AA00-0AA0**
10 units, spare part	
Labeling strips	**6ES7392-2XX00-0AA0**
10 units, spare part	
Label cover	**6ES7392-2XY00-0AA0**
10 units, spare part	
Labeling sheets for machine inscription	
for modules with 40-pin front connector, DIN A4, for printing with laser printer; 10 units	
Petrol	**6ES7392-2AX10-0AA0**
Light-beige	**6ES7392-2BX10-0AA0**
Yellow	**6ES7392-2CX10-0AA0**
Red	**6ES7392-2DX10-0AA0**
USB A2 PC adapter	**6GK1571-0BA00-0AA0**
for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery	

	Article No.
PROFIBUS DP bus connector RS 485	
• with 90° cable outlet, max. transfer rate 12 Mbit/s	
- without PG interface	**6ES7972-0BA12-0XA0**
- with PG interface	**6ES7972-0BB12-0XA0**
• with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	
- without PG interface, 1 unit	**6ES7972-0BA52-0XA0**
- without PG interface, 100 units	**6ES7972-0BA52-0XB0**
- with PG interface, 1 unit	**6ES7972-0BB52-0XA0**
- with PG interface, 100 units	**6ES7972-0BB52-0XB0**
• with axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1500-0EA02**
PROFIBUS Fast Connect bus cable	**6XV1830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7972-0AA02-0XA0**
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	
PROFINET bus components	
IE FC TP Standard Cable GP 2x2	**6XV1840-2AH10**
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	
FO standard cable GP (50/125)	**6XV1873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
Compact Switch Module CSM 377	**6GK7377-1AA00-0AA0**
Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM	
IE FC RJ45 Plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

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Fail-safe CPUs

Overview CPU 315F-2 PN/DP



- Based on CPU 315-2 PN/DP
- The CPU with medium-sized program memory and quantity structures for setting up a fail-safe automation system in plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component based Automation (CBA) on PROFINET
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 317F-2 PN/DP



- Based on CPU 317-2 PN/DP
- The fail-safe CPU with a large program memory and quantity framework for demanding applications; for setting up a fail-safe automation system in plants with increased safety requirements.
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Fail-safe I/O modules in distributed stations can be connected through the integrated PROFINET interface (PROFIsafe) and/or through the integrated PROFIBUS DP interface (PROFIsafe)
- Fail-safe I/O modules of the ET 200M range can also be centrally connected
- Central and distributed use of standard modules for non safety-relevant applications
- Component based Automation (CBA) on PROFINET
- PROFINET IO Controller for operating distributed I/O on PROFINET
- PROFINET interface with 2-port switch
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

Overview CPU 319F-3 PN/DP



- The fail-safe CPU with high-performance command processing, large program memory and large quantity structure for demanding applications
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to 13849.1
- Fail-safe I/O modules can be connected decentralized over the integrated PROFINET interface (PROFIsafe) and/or over the integrated PROFIBUS DP interface (PROFIsafe);
- Fail-safe I/O modules of ET 200M can also be connected centrally
- Standard modules for non-safety-related applications can be operated centrally and decentralized
- Distributed intelligence in Component Based Automation (CBA) on PROFINET
- Isochronous mode on PROFIBUS
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component based Automation (CBA)

SIMATIC Micro Memory Card required for operation of CPU.

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Technical specifications

	6ES7315-2FJ14-0AB0 CPU 315F-2 PN/DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU 319F-3 PN/DP
General information			
Engineering with			
• Programming package	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4
Supply voltage			
24 V DC	Yes	Yes	Yes
Power losses			
Power loss, typ.	4.65 W	4.65 W	14 W
Memory			
Work memory			
• integrated	512 kbyte	1 536 kbyte	2 560 kbyte
• Size of retentive memory for retentive data blocks	128 kbyte	256 kbyte	700 kbyte
Load memory			
• pluggable (MMC), max.	8 Mbyte	8 Mbyte	8 Mbyte
CPU processing times			
for bit operations, typ.	0.05 µs	0.025 µs	0.004 µs
for word operations, typ.	0.09 µs	0.03 µs	0.01 µs
for fixed point arithmetic, typ.	0.12 µs	0.04 µs	0.01 µs
for floating point arithmetic, typ.	0.45 µs	0.16 µs	0.04 µs
Counters, timers and their retentivity			
S7 counter			
• Number	256	512	2 048
IEC counter			
• present	Yes	Yes	Yes
S7 times			
• Number	256	512	2 048
IEC timer			
• present	Yes	Yes	Yes
Data areas and their retentivity			
Flag			
• Number, max.	2 048 byte	4 096 byte	8 192 byte
Address area			
I/O address area			
• Inputs	2 048 byte	8 192 byte	8 192 byte
• Outputs	2 048 byte	8 192 byte	8 192 byte
Process image			
• Inputs, adjustable	2 048 byte	8 192 byte	8 192 byte
• Outputs, adjustable	2 048 byte	8 192 byte	8 192 byte
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	1	4	4
1st interface			
Interface type	Integrated RS 485 interface	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485	RS 485	RS 485
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes; A DP slave at both interfaces simultaneously is not possible
• Point-to-point connection	No	No	No
DP master			
• Number of DP slaves, max.	124	124	124

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Technical specifications (continued)

	6ES7315-2FJ14-0AB0 CPU 315F-2 PN/DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU 319F-3 PN/DP
2nd interface			
Interface type	PROFINET	PROFINET	Integrated RS 485 interface
Physics	Ethernet RJ45	Ethernet RJ45	RS 485
Number of ports	2	2	
Functionality			
• MPI	No	No	No
• DP master	No	No	Yes
• DP slave	No	No	Yes; A DP slave at both interfaces simultaneously is not possible
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality	Yes; Also simultaneously with IO-Device functionality	No
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality	Yes; Also simultaneously with IO Controller functionality	No
• PROFINET CBA	Yes	Yes	No
DP master			
• Number of DP slaves, max.			124
PROFINET IO Controller			
• Max. number of connectable IO devices for RT	128	128	
• Number of IO devices with IRT and the option "high flexibility"	128	128	
• Number of IO Devices with IRT and the option "high performance", max.	64	64	
3rd interface			
Interface type			PROFINET
Physics			Ethernet RJ45
Number of ports			2
Functionality			
• MPI			No
• DP master			No
• DP slave			No
• PROFINET IO Controller			Yes; Also simultaneously with I-Device functionality
• PROFINET IO Device			Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA			Yes
PROFINET IO Controller			
• Max. number of connectable IO devices for RT			256
• Number of IO devices with IRT and the option "high flexibility"			256
• Number of IO Devices with IRT and the option "high performance", max.			64
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via 2nd PROFIBUS DP or PROFINET interface

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Technical specifications (continued)

	6ES7315-2FJ14-0AB0 CPU 315F-2 PN/DP	6ES7317-2FK14-0AB0 CPU 317F-2 PN/DP	6ES7318-3FL01-0AB0 CPU 319F-3 PN/DP
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
S7 basic communication			
• supported	Yes	Yes	Yes
S7 communication			
• supported	Yes	Yes	Yes
S5-compatible communication			
• supported	Yes; Via CP and loadable FC	Yes; Via CP and loadable FC	Yes; Via CP and loadable FC
Open IE communication			
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
• UDP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	16	32
Web server			
• supported	Yes; only read function	Yes	Yes
Number of connections			
• overall	16	32	32
Ambient conditions			
Operating temperature			
• min.	0 °C	0 °C	0 °C
• max.	60 °C	60 °C	60 °C
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			
Width	40 mm	40 mm	120 mm
Height	125 mm	125 mm	125 mm
Depth	130 mm	130 mm	130 mm
Weights			
Weight, approx.	340 g	340 g	1 250 g

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Fail-safe CPUs

Ordering data	Article No.
CPU 315F-2 PN/DP CPU for SIMATIC S7-300F; 512 KB main memory, 24 V DC power supply, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/ PROFINET interface; incl. slot number labels; MMC required	**6ES7315-2FJ14-0AB0**
CPU 317F-2 PN/DP Main memory 1.5 MB, 24 V DC power supply, MPI/PROFIBUS DP master/slave interface, Industrial Ethernet/ PROFINET interface; MMC required	**6ES7317-2FK14-0AB0**
CPU 319F-3 PN/DP Main memory 2.5 MB, power supply 24 V DC, combined MPI/PROFIBUS DP master/slave interface, PROFIBUS DP master/slave interface, Ethernet/PROFINET interface MMC required	**6ES7318-3FL01-0AB0**
S7 Distributed Safety V5.4 programming tool *Task:* Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**
S7 Distributed Safety upgrade From V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**
STEP 7 Safety Advanced V13 *Task:* Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 Professional V13	
Floating license for 1 user	**6ES7833-1FA13-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FA13-0YH5**

	Article No.
SIMATIC Micro Memory Card	
64 KB	**6ES7953-8LF30-0AA0**
128 KB	**6ES7953-8LG30-0AA0**
512 KB	**6ES7953-8LJ30-0AA0**
2 MB	**6ES7953-8LL31-0AA0**
4 MB	**6ES7953-8LM31-0AA0**
8 MB	**6ES7953-8LP31-0AA0**
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
Slot number plates	**6ES7912-0AA00-0AA0**
S7-300 manual Design, CPU data, module data, instruction list	
German	**6ES7398-8FA10-8AA0**
English	**6ES7398-8FA10-8BA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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Ordering data	Article No.
Power supply connector 10 units, spare part	**6ES7391-1AA00-0AA0**
USB A2 PC adapter for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery	**6GK1571-0BA00-0AA0**
PROFIBUS DP bus connector RS 485	
• With 90° cable outlet, max. transfer rate 12 Mbit/s	
- Without PG interface	**6ES7972-0BA12-0XA0**
- With PG interface	**6ES7972-0BB12-0XA0**
• With 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	
- Without PG interface, 1 unit	**6ES7972-0BA52-0XA0**
- Without PG interface, 100 units	**6ES7972-0BA52-0XB0**
- With PG interface, 1 unit	**6ES7972-0BB52-0XA0**
- With PG interface, 100 units	**6ES7972-0BB52-0XB0**
• With axial cable outlet for SIMATIC OP, for connecting to PPI, MPI, PROFIBUS	**6GK1500-0EA02**
PROFIBUS FastConnect bus cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	**6ES7972-0AA02-0XA0**

	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2 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	**6XV1840-2AH10**
FO standard cable GP (50/125) Standard cable, splittable, UL approval, sold by the meter	**6XV1873-2A**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Compact Switch Module CSM 377 Unmanaged switch for connecting a SIMATIC S7-300, ET 200M and up to three other stations to Industrial Ethernet with 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module incl. electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**
IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 145	
145° cable outlet	
1 unit	**6GK1901-1BB30-0AA0**
10 units	**6GK1901-1BB30-0AB0**
50 units	**6GK1901-1BB30-0AE0**
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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Standard CPUs

Overview CPU 412-2PN



- The low-cost starter solution for the medium performance range
- Can be used in small and medium-sized systems with requirements of the medium performance range

Overview CPU 416-3 PN/DP



- High-performance CPUs in the high-end performance range
- Applicable for plants with high requirements in the high-end performance range
- Integrated PROFINET functions in CPU 416-3 PN/DP

Overview CPU 416-3 PN/DP



- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Integrated PROFINET functions in CPU 414-3 PN/DP

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Technical specifications

	6ES7412-2EK06-0AB0 CPU 412-2 PN	6ES7414-3EM06-0AB0 CPU 414-3 PN/DP	6ES7416-3ES06-0AB0 CPU 416-3 PN/DP
General information			
Engineering with			
• Programming package	STEP 7 V 5.5 or higher / IMap V3.0 or higher + iMap-STEP 7 Addon V3.0 SP5	STEP 7 V 5.5 or higher / IMap V3.0 or higher + iMap-STEP 7 Addon V3.0 SP5	STEP 7 V 5.5 or higher / IMap V3.0 or higher + iMap-STEP 7 Addon V3.0 SP5
Supply voltage			
24 V DC	No; Power supply via system power supply	No; Power supply via system power supply	No; Power supply via system power supply
Power losses			
Power loss, typ.	5.5 W	6.5 W	6.5 W
Memory			
Work memory			
• integrated	1 Mbyte	4 Mbyte	16 Mbyte
• integrated (for program)	0.5 Mbyte	2 Mbyte	8 Mbyte
• integrated (for data)	0.5 Mbyte	2 Mbyte	8 Mbyte
Load memory			
• expandable FEPROM, max.	64 Mbyte	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 kbyte	512 kbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times			
for bit operations, typ.	75 ns	45 ns	30 ns
for word operations, typ.	75 ns	45 ns	30 ns
for fixed point arithmetic, typ.	75 ns	45 ns	30 ns
for floating point arithmetic, typ.	225 ns	135 ns	90 ns
Counters, timers and their retentivity			
S7 counter			
• Number	2 048	2 048	2 048
IEC counter			
• present	Yes	Yes	Yes
S7 times			
• Number	2 048	2 048	2 048
IEC timer			
• present	Yes	Yes	Yes
Data areas and their retentivity			
Flag			
• Number, max.	4 kbyte; Size of bit memory address area	8 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area			
I/O address area			
• Inputs	4 kbyte	8 kbyte	16 kbyte
• Outputs	4 kbyte	8 kbyte	16 kbyte
Process image			
• Inputs, adjustable	4 kbyte	8 kbyte	16 kbyte
• Outputs, adjustable	4 kbyte	8 kbyte	16 kbyte
Hardware configuration			
Slots			
• Required slots	1	2	2
Time of day			
Clock			
• Hardware clock (real-time clock)	Yes	Yes	Yes
Operating hours counter			
• Number	16	16	16
1st interface			
Interface type	integrated	integrated	integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality			
• MPI	Yes	Yes	Yes
• DP master	Yes	Yes	Yes
• DP slave	Yes	Yes	Yes
DP master			
• Number of DP slaves, max.	32	32	32

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Technical specifications (continued)

	6ES7412-2EK06-0AB0 CPU 412-2 PN	6ES7414-3EM06-0AB0 CPU 414-3 PN/DP	6ES7416-3ES06-0AB0 CPU 416-3 PN/DP
2nd interface			
Interface type	PROFINET	PROFINET	PROFINET
Physics	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Number of ports	2	2	2
Functionality			
• DP master	No	No	No
• DP slave	No	No	No
• PROFINET IO Controller	Yes	Yes	Yes
• PROFINET IO Device	Yes	Yes	Yes
• PROFINET CBA	Yes	Yes	Yes
DP master			
• Number of DP slaves, max.			
PROFINET IO Controller			
• Max. number of connectable IO devices for RT	256	256	256
• Number of IO devices with IRT and the option "high flexibility"	256	256	256
• Number of IO Devices with IRT and the option "high performance", max.	64	64	64
3rd interface			
Interface type		Pluggable interface module (IF)	Pluggable interface module (IF)
Plug-in interface modules		IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics		RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality			
• MPI		No	No
• DP master		Yes	Yes
• DP slave		Yes	Yes
DP master			
• Number of DP slaves, max.		96	125
Isochronous mode			
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions			
PG/OP communication	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes
Global data communication			
• supported	Yes	Yes	Yes
S7 basic communication			
• supported	Yes	Yes	Yes
S7 communication			
• supported	Yes	Yes	Yes
S5-compatible communication			
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)			
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication			
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.	46	62	94
• UDP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94
Web server			
• supported	Yes	Yes	Yes
Number of connections			
• overall	48	64	96

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Technical specifications (continued)

	6ES7412-2EK06-0AB0 CPU 412-2 PN	6ES7414-3EM06-0AB0 CPU 414-3 PN/DP	6ES7416-3ES06-0AB0 CPU 416-3 PN/DP
Configuration			
programming			
• Programming language			
- LAD	Yes	Yes	Yes
- FBD	Yes	Yes	Yes
- STL	Yes	Yes	Yes
- SCL	Yes	Yes	Yes
- CFC	Yes	Yes	Yes
- GRAPH	Yes	Yes	Yes
- HiGraph®	Yes	Yes	Yes
Know-how protection			
• User program protection/password protection	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions			
Width	25 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm
Weights			
Weight, approx.	750 g	900 g	900 g

Ordering data

	Article No.
CPU 412-2 PN Main memory 1 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, incl. slot number labels	**6ES7412-2EK06-0AB0**
CPU 414-3 PN/DP Main memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	**6ES7414-3EM06-0AB0**
CPU 416-3 PN/DP Main memory 16 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, module slot for 1 IF submodule, slot for memory card, incl. slot number labels	**6ES7416-3ES06-0AB0**
Memory card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**

	Article No.
FEPROM memory card	
64 KB	**6ES7952-0KF00-0AA0**
256 KB	**6ES7952-0KH00-0AA0**
1 MB	**6ES7952-1KK00-0AA0**
2 MB	**6ES7952-1KL00-0AA0**
4 MB	**6ES7952-1KM00-0AA0**
8 MB	**6ES7952-1KP00-0AA0**
16 MB	**6ES7952-1KS00-0AA0**
32 MB	**6ES7952-1KT00-0AA0**
64 MB	**6ES7952-1KY00-0AA0**
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module To connect an additional DP line; for CPU 414-3, CPU 414-3 PN/DP, CPU 416-3, CPU 416-3 PN/DP, CPU 417-4	**6ES7964-2AA04-0AB0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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Ordering data	Article No.
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA12-0XA0**
With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA42-0XA0**
With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect connection system	
Max. transfer rate 12 Mbit/s	
Without PG interface	
• 1 unit	**6ES7972-0BA52-0XA0**
• 100 units	**6ES7972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7972-0BB52-0XA0**
• 100 units	**6ES7972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	**6GK1500-0EA02**
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	
PROFIBUS FastConnect bus cable	**6XV1830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum ordering quantity 20 m	
RS 485 repeater for PROFIBUS	**6ES7972-0AA02-0XA0**
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1840-2AH10**
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	
FO Standard Cable GP (50/125)	**6XV1873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet switch	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

More information

Brochures

Information material for downloading can be found in the Internet:

http://www.automation.siemens.com/infocenter

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Overview CPU 414F-3 PN/DP



- For constructing a fail-safe automation system for plants with increased safety requirements
- CPUs for high demands in the mid-level performance range
- Applicable for plants with additional demands on programming scope and processing speed
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Standard and safety-related tasks can be performed with a single CPU
- Integrated PROFINET functions in CPU 414F-3 PN/DP
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP or PROFINET IO with PROFIsafe profile
- Fail-safe I/O modules can be connected in a distributed manner via the integrated interfaces (DP and PN with CPU 416F-3 PN/DP) and/or through communication modules (CP 443-5 Extended and CP 443-1 Adv.)
- Central and distributed use of standard modules for non-safety-oriented applications

Overview CPU 416F-3 PN/DP



- For constructing a fail-safe automation system for plants with increased safety requirements
- High-performance CPU in the top-end performance range
- Complies with safety requirements to SIL 3 acc. to IEC 61508 and PL e acc. to ISO 13849.1
- Standard and safety-related tasks can be performed with a single CPU
- Multi-processor mode is possible
- Safety-related communication with distributed I/O devices over PROFIBUS DP with the *PROFI*safe profile
- Fail-safe I/O modules can be connected decentralized over the integrated interfaces (DP and PN with CPU416F-3 PN/DP) and/or through communication modules (CP443-5 Ext. and CP443-1 Adv.)
- Standard modules for non-safety-related applications can be operated centrally and decentralized

Technical specifications

	6ES7414-3FM06-0AB0 **CPU 414F-3 PN/DP**	**6ES7416-3FS06-0AB0** **CPU 416F-3 PN/DP**
General information		
Engineering with		
• Programming package	STEP 7 V 5.5 or higher / IMap V3.0 or higher + iMap- STEP 7 Addon V3.0 SP5	STEP 7 V 5.5 or higher / IMap V3.0 or higher + iMap- STEP 7 Addon V3.0 SP5
Supply voltage		
24 V DC	No; Power supply via system power supply	No; Power supply via system power supply
Power losses		
Power loss, typ.	6.5 W	6.5 W
Memory		
Work memory		
• integrated	4 Mbyte	16 Mbyte
• integrated (for program)	2 Mbyte	8 Mbyte
• integrated (for data)	2 Mbyte	8 Mbyte
Load memory		
• expandable FEPROM, max.	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 kbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte

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Technical specifications (continued)

	6ES7414-3FM06-0AB0 CPU 414F-3 PN/DP	6ES7416-3FS06-0AB0 CPU 416F-3 PN/DP
CPU processing times		
for bit operations, typ.	45 ns	30 ns
for word operations, typ.	45 ns	30 ns
for fixed point arithmetic, typ.	45 ns	30 ns
for floating point arithmetic, typ.	135 ns	90 ns
Counters, timers and their retentivity		
S7 counter		
• Number	2 048	2 048
IEC counter		
• present	Yes	Yes
S7 times		
• Number	2 048	2 048
IEC timer		
• present	Yes	Yes
Data areas and their retentivity		
Flag		
• Number, max.	8 kbyte; Size of bit memory address area	16 kbyte; Size of bit memory address area
Address area		
I/O address area		
• Inputs	8 kbyte	16 kbyte
• Outputs	8 kbyte	16 kbyte
Process image		
• Inputs, adjustable	8 kbyte	16 kbyte
• Outputs, adjustable	8 kbyte	16 kbyte
Hardware configuration		
Slots		
• Required slots	2	2
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	16	16
1st interface		
Interface type	integrated	integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of DP slaves, max.	32	32
2nd interface		
Interface type	PROFINET	PROFINET
Physics	Ethernet RJ45	Ethernet RJ45
Number of ports	2	2
Functionality		
• DP master	No	No
• DP slave	No	No
• PROFINET IO Controller	Yes	Yes
• PROFINET IO Device	Yes	Yes
• PROFINET CBA	Yes	Yes
DP master		
• Number of DP slaves, max.		
PROFINET IO Controller		
• Max. number of connectable IO devices for RT	256	256
• Number of IO devices with IRT and the option "high flexibility"	256	256
• Number of IO Devices with IRT and the option "high performance", max.	64	64

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Technical specifications (continued)

	6ES7414-3FM06-0AB0 CPU 414F-3 PN/DP	6ES7416-3FS06-0AB0 CPU 416F-3 PN/DP
3rd interface		
Interface type	Pluggable interface module (IF)	Pluggable interface module (IF)
Plug-in interface modules	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)	IF 964-DP (MLFB: 6ES7964-2AA04-0AB0)
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality		
• MPI	No	No
• DP master	Yes	Yes
• DP slave	Yes	Yes
DP master		
• Number of DP slaves, max.	96	125
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Data record routing	Yes	Yes
Global data communication		
• supported	Yes	Yes
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes
S5-compatible communication		
• supported	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5	Yes; Via FC AG_SEND and AG_RECV, max. via 10 CP 443-1 or 443-5
Standard communication (FMS)		
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB
Open IE communication		
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62	94
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 Adv. and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.	62	94
• UDP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	62	94
Web server		
• supported	Yes	Yes
Number of connections		
• overall	64	96
Configuration		
programming		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	50 mm	50 mm
Height	290 mm	290 mm
Depth	219 mm	219 mm
Weights		
Weight, approx.	900 g	900 g

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Fail-safe CPUs

Ordering data	Article No.
CPU 414F-3 PN/DP for setting up safety-related automation system Main memory 4 MB, power supply 24 V DC, MPI/PROFIBUS DP master interface, PROFINET interface, slot for memory card, module slot for 1 IF module, incl. slot number labels	**6ES7414-3FM06-0AB0**
CPU 416F-3 PN/DP for configuring safety-related automation systems Main memory 16 MB, 24 V DC power supply, MPI/PROFIBUS DP master interface, PROFINET interface, PROFIBUS DP master interface, receptacle for 1 IF submodule, slot for memory card, incl. slot number labels	**6ES7416-3FS06-0AB0**
Distributed Safety V5.4 programming tool *Task:* Configuration software for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FC02-0YH5**
Distributed Safety Upgrade from V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**
STEP 7 Safety Advanced V13 *Task:* Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 Professional V13	
Floating license for 1 user	**6ES7833-1FA13-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FA13-0YH5**

	Article No.
Memory Card RAM	
64 KB	**6ES7952-0AF00-0AA0**
256 KB	**6ES7952-1AH00-0AA0**
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
FEPROM memory card	
64 KB	**6ES7952-0KF00-0AA0**
256 KB	**6ES7952-0KH00-0AA0**
1 MB	**6ES7952-1KK00-0AA0**
2 MB	**6ES7952-1KL00-0AA0**
4 MB	**6ES7952-1KM00-0AA0**
8 MB	**6ES7952-1KP00-0AA0**
16 MB	**6ES7952-1KS00-0AA0**
32 MB	**6ES7952-1KT00-0AA0**
64 MB	**6ES7952-1KY00-0AA0**
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
IF 964-DP interface module for connecting an additional DP line	**6ES7964-2AA04-0AB0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
SIMATIC Manual Collection Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7998-8XC01-8YE2**

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Ordering data

	Article No.
PROFIBUS bus components	
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA12-0XA0**
With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA42-0XA0**
With PG interface	**6ES7972-0BB42-0XA0**
RS 485 bus connector with 90° cable outlet for FastConnect system	
Max. transfer rate 12 Mbit/s	
Without PG interface	
• 1 unit	**6ES7972-0BA52-0XA0**
• 100 units	**6ES7972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7972-0BB52-0XA0**
• 100 units	**6ES7972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	**6GK1500-0EA02**
PROFIBUS FastConnect bus cable	
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**
RS 485 repeater for PROFIBUS	**6ES7972-0AA02-0XA0**
Transmission rate up to 12 Mbit/s; 24 V DC; IP20 enclosure	

	Article No.
PROFINET bus components	
IE FC TP standard cable GP 2x2	**6XV1840-2AH10**
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	
FO Standard Cable GP (50/125)	**6XV1873-2A**
Standard cable, splittable, UL approval, sold by the meter	
SCALANCE X204-2 Industrial Ethernet Switch	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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High-availability CPUs

Overview CPU 412-5H



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

Overview CPU 416-5H



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

Overview CPU 414-5H



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

Overview CPU 417-5H



- CPU for SIMATIC S7-400H and S7-400F/FH
- Can be used in S7-400H high-availability systems
- Can be used with F runtime license as F-capable CPU in S7-400F/FH safety-related systems
- With integrated PROFIBUS DP master interface and combined MPI/PROFIBUS DP master interface
- With integrated PROFINET interface (2-port switch)
- Features 2 slots for sync modules

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Technical specifications

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
General information				
Engineering with				
• Programming package	STEP 7 V 5.5 SP2 or higher with HF1	STEP 7 V 5.5 SP2 or higher with HF1	STEP 7 V 5.5 SP2 or higher with HF1	STEP 7 V 5.5 SP2 or higher with HF1
Supply voltage				
24 V DC	No; Power supply Via system power supply	No; Power supply Via system power supply	No; Power supply Via system power supply	No; Power supply Via system power supply
Power losses				
Power loss, typ.	7.5 W	7.5 W	7.5 W	7.5 W
Memory				
Work memory				
• integrated	1 Mbyte	4 Mbyte	16 Mbyte	32 Mbyte
• integrated (for program)	512 kbyte	2 Mbyte	6 Mbyte	16 Mbyte
• integrated (for data)	512 kbyte	2 Mbyte	10 Mbyte	16 Mbyte
Load memory				
• expandable FEPROM, max.	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
• integrated RAM, max.	512 kbyte	512 kbyte	1 Mbyte	1 Mbyte
• expandable RAM, max.	64 Mbyte	64 Mbyte	64 Mbyte	64 Mbyte
CPU processing times				
for bit operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for word operations, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for fixed point arithmetic, typ.	31.25 ns	18.75 ns	12.5 ns	7.5 ns
for floating point arithmetic, typ.	62.5 ns	37.5 ns	25 ns	15 ns
Counters, timers and their retentivity				
S7 counter				
• Number	2 048	2 048	2 048	2 048
IEC counter				
• present	Yes	Yes	Yes	Yes
S7 times				
• Number	2 048	2 048	2 048	2 048
IEC timer				
• present	Yes	Yes	Yes	Yes
Data areas and their retentivity				
Flag				
• Number, max.	8 192 byte	8 192 byte	16 384 byte	16 384 byte
Address area				
I/O address area				
• Inputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
• Outputs	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Process image				
• Inputs, adjustable	8 kbyte	8 kbyte	16 kbyte	16 kbyte
• Outputs, adjustable	8 kbyte	8 kbyte	16 kbyte	16 kbyte
Hardware configuration				
Slots				
• Required slots	2	2	2	2
Time of day				
Clock				
• Hardware clock (real-time clock)	Yes	Yes	Yes	Yes
Operating hours counter				
• Number	16	16	16	16
1st interface				
Interface type	integrated	integrated	integrated	integrated
Physics	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI	RS 485 / PROFIBUS + MPI
Functionality				
• MPI	Yes	Yes	Yes	Yes
• DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
DP master				
• Number of DP slaves, max.	32	32	32	32

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Technical specifications (continued)

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
2nd interface				
Interface type	PROFINET	PROFINET	PROFINET	PROFINET
Physics	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Number of ports	2	2	2	2
Functionality				
• DP master	No	No	No	No
• DP slave	No	No	No	No
• PROFINET IO Controller	Yes	Yes	Yes	Yes
• PROFINET IO Device	No	No	No	No
• PROFINET CBA	No	No	No	No
PROFINET IO Controller				
• Max. number of connectable IO devices for RT	256	256	256	256
3rd interface				
Interface type	integrated	integrated	integrated	integrated
Physics	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS	RS 485 / PROFIBUS
Functionality				
• DP master	Yes	Yes	Yes	Yes
• DP slave	No	No	No	No
DP master				
• Number of DP slaves, max.	64	96	125	125
4th interface				
Interface type	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
5. Interface				
Interface type	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)	Pluggable synchronization submodule (FO)
Plug-in interface modules	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0	Synchronization modules 6ES7960-1AA06-0XA0 or 6ES7960-1AB06-0XA0
Isochronous mode				
Isochronous operation (application synchronized up to terminal)	No	No	No	No
Communication functions				
PG/OP communication	Yes	Yes	Yes	Yes
Data record routing	Yes	Yes	Yes	Yes
S7 routing	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
S5-compatible communication				
• supported	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)	Yes; (via CP max. 10 and FC AG_SEND and FC AG_RECV)
Standard communication (FMS)				
• supported	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB	Yes; Via CP and loadable FB

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Technical specifications (continued)

	6ES7412-5HK06-0AB0 CPU 412-5H PN/DP	6ES7414-5HM06-0AB0 CPU 414-5H PN/DP	6ES7416-5HS06-0AB0 CPU 416-5H PN/DP	6ES7417-5HT06-0AB0 CPU 417-5H PN/DP
Open IE communication				
• TCP/IP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
• ISO-on-TCP (RFC1006)	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs	Yes; Via integrated PROFINET interface or CP 443-1 and loadable FBs
- Number of connections, max.	46	62	94	118
• UDP	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface and loadable FBs
- Number of connections, max.	46	62	94	118
Web server				
• supported	No	No	No	No
Number of connections				
• overall	48	64	96	120
Configuration				
programming				
• Programming language				
- LAD	Yes	Yes	Yes	Yes
- FBD	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
Know-how protection				
• User program protection/password protection	Yes	Yes	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions				
Width	50 mm	50 mm	50 mm	50 mm
Height	290 mm	290 mm	290 mm	290 mm
Depth	219 mm	219 mm	219 mm	219 mm
Weights				
Weight, approx.	995 g	995 g	995 g	995 g

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High-availability CPUs

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Ordering data	Article No.
CPU 412-5H For S7-400H and S7-400F/FH; 1 MB RAM, 1 combined MPI/PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7412-5HK06-0AB0**
CPU 412-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 412-5H, 4 x Sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; additional two memory cards required (to be ordered separately)	
CPU 412-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR01-4AB0**
CPU 412-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR51-4AB0**
CPU 414-5H For S7-400H and S7-400F/FH; 4 MB RAM, 1 combined MPI/PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7414-5HM06-0AB0**
CPU 414-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 414-5H, 4 x Sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; additional two memory cards required (to be ordered separately)	
CPU 414-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR02-4AB0**
CPU 414-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR52-4AB0**
CPU 416-5H For S7-400H and S7-400F/FH; 16 MB RAM, 1 combined MPI/PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7416-5HS06-0AB0**
CPU 416-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 416-5H, 4 x Sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; additional two memory cards required (to be ordered separately)	
CPU 416-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR03-4AB0**
CPU 416-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR53-4AB0**

	Article No.
CPU 417-5H For S7-400H and S7-400F/FH; 32 MB RAM, 1 combined MPI/PROFIBUS DP master interface, 1 PROFIBUS DP interface, 2 PROFINET interfaces (switches), 2 slots for sync modules, slot for memory card, incl. slot number labels	**6ES7417-5HT06-0AB0**
CPU 417-5H system bundle Not assembled, consisting of: UR2-H rack, 2 x PS 405/407 power supply units, 2 x CPU 417-5H, 4 x Sync modules (for max. 10 m), 2 x fiber optic cables for sync modules (1 m), 4 x backup batteries; additional two memory cards required (to be ordered separately)	
CPU 417-5H system bundle, 120/230 V AC, 10 A	**6ES7400-0HR04-4AB0**
CPU 417-5H system bundle, 24/48/60 V DC, 10 A	**6ES7400-0HR54-4AB0**
Memory card RAM	
1 MB	**6ES7952-1AK00-0AA0**
2 MB	**6ES7952-1AL00-0AA0**
4 MB	**6ES7952-1AM00-0AA0**
8 MB	**6ES7952-1AP00-0AA0**
16 MB	**6ES7952-1AS00-0AA0**
64 MB	**6ES7952-1AY00-0AA0**
FEPROM memory card	
1 MB	**6ES7952-1KK00-0AA0**
2 MB	**6ES7952-1KL00-0AA0**
4 MB	**6ES7952-1KM00-0AA0**
8 MB	**6ES7952-1KP00-0AA0**
16 MB	**6ES7952-1KS00-0AA0**
32 MB	**6ES7952-1KT00-0AA0**
64 MB	**6ES7952-1KY00-0AA0**
MPI cable for connection of SIMATIC S7 and PG via MPI; 5 m in length	**6ES7901-0BF00-0AA0**
Slot number plates 1 set (spare part)	**6ES7912-0AA00-0AA0**
S7 F Systems RT License For processing safety-related user programs, for one S7-400H-based system each with CPU 412-5H, CPU 414-5H, CPU 416-5H or CPU 417-5H	**6ES7833-1CC00-6YX0**
S7 F Systems V6.1 Programming and configuring environment for creating and operating safety-related STEP 7 programs for an S7-400H-based target system, floating license for 1 user, runs under Windows XP Prof SP2, Windows XP Prof SP2/SP3, Windows Server 2003 SP2 2 languages (English, German) Type of delivery: Certificate of License as well as software and electronic documentation on CD	**6ES7833-1CC02-0YA5**

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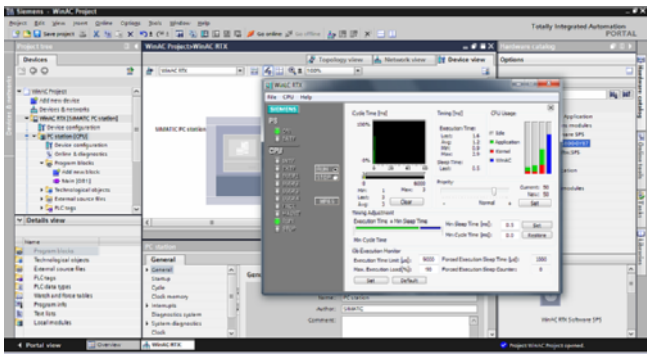
Ordering data

	Article No.
S7 F systems upgrade from V5.x/V6.0 to V6.1	**6ES7833-1CC02-0YE5**
2 languages (English, German), floating license for 1 user *Type of delivery:* Certificate of License as well as software and electronic documentation on CD	
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
RS 485 bus connector with 90° cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA12-0XA0**
With PG interface	**6ES7972-0BB12-0XA0**
RS 485 bus connector with angled cable outlet	
Max. transfer rate 12 Mbit/s	
Without PG interface	**6ES7972-0BA42-0XA0**
With PG interface	**6ES7972-0BB42-0XA0**
Max. transfer rate 1.5 Mbit/s	
Without PG interface	**6ES7972-0BA30-0XA0**
Bus connector RS 485 with 90° cable outlet for FastConnect connection technology	
Max. transfer rate 12 Mbit/s	
Without PG interface	
• 1 unit	**6ES7972-0BA52-0XA0**
• 100 units	**6ES7972-0BA52-0XB0**
With PG interface	
• 1 unit	**6ES7972-0BB52-0XA0**
• 100 units	**6ES7972-0BB52-0XB0**
RS 485 bus connector with axial cable outlet	**6GK1500-0EA02**
For SIMATIC OP, for connection to PPI, MPI, PROFIBUS	
PROFIBUS FastConnect bus cable	**6XV1830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	

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SIMATIC WinAC RTX

Overview



- SIMATIC WinAC RTX:
  Optimized for applications that require a high degree of flexibility and integration capability.
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.

New with WinAC RTX 2010 SP1:

- SIMATIC IPC427D and IPC477D are fully supported
  - Communication via onboard CP 5622
  - Retentive memory
  - LED display of the operating status
- Support for the new PROFIBUS CP 5612 (PCI) and CP 5622 (PCIe)

Benefits

- Hard real time and maximum performance
- Implementation of fast, S7-compatible control solutions with low processor loading.
  Alongside the control task, sufficient processor capability is available for processing complex, demanding PC applications in parallel.

Technical specifications

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
General information	
Firmware version	V4.6
Memory	
Type of memory	RAM
Work memory	
• integrated (for program)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
• integrated (for data)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
Load memory	
• integrated RAM, max.	8 Mbyte; Adjustable; depends on Non Paged Memory Pool
CPU processing times	
for bit operations, typ.	0.004 µs
for fixed point arithmetic, typ.	0.003 µs
for floating point arithmetic, typ.	0.004 µs
Reference platform	Pentium IV, 2.4 GHz
CPU-blocks	
DB	
• Number, max.	65 535
• Size, max.	64 kbyte
FB	
• Number, max.	65 536
• Size, max.	64 kbyte
FC	
• Number, max.	65 536; Limited only by RAM set for code
OB	
• Size, max.	64 kbyte
• Number of free cycle OBs	1
• Number of time alarm OBs	1
• Number of delay alarm OBs	1
• Number of time interrupt OBs	9
• Number of process alarm OBs	1
• Number of ODK OBs	3; OB 52-54
• Number of DPV1 alarm OBs	3; OB 55-57
• Number isochronous mode OBs	2; OB 61-62
• Number of startup OBs	2
• Number of asynchronous error OBs	7
• Number of synchronous error OBs	2

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Nesting depth	
• per priority class	24
• additional within an error OB	24
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	8
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)

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Technical specifications (continued)

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Data areas and their retentivity	
Retentivity without UPS and PS Extension Board	128 KB with SIMATIC IPC227D, IPC427C, IPC427D, HMI IPC277D, IPC477C, IPC477D; further SIMATIC IPCs on request
Retentivity with UPS	all data
Flag	
• Number, max.	16 kbyte
• of which retentive	MB 0 to MB 16383
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8
Data blocks	
• Number, max.	Limited only by available retentive memory (NVRAM, or file storage)
• Size, max.	64 kbyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• adjustable, max.	64 kbyte
• preset	32 kbyte
• per priority class, max.	61 440 byte
Address area	
I/O address area	
• Inputs	16 kbyte
• Outputs	16 kbyte
• of which, distributed	
- DP interface, inputs	16 kbyte
- DP interface, outputs	16 kbyte
- PN interface, inputs	16 kbyte
- PN interface, outputs	16 kbyte
Process image	
• Inputs, adjustable	8 kbyte; 16 KB with STEP 7 V5.5 SP3 or higher
• Outputs, adjustable	8 kbyte; 16 KB with STEP 7 V5.5 SP3 or higher
• Inputs, default	512 byte
• Outputs, default	512 byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	128 000
• Outputs	128 000
Analog channels	
• Inputs	8 000
• Outputs	8 000
Hardware configuration	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; Supported interfaces: see 1st and 2nd interface
• of which Industrial Ethernet, max.	1; Supported interfaces: see 3rd and 4th interface
Number of operable FMs and CPs (recommended)	
• FM	FM distributed: FM 350-1 / 350-2, FM 351, FM 352, FM 353, FM 355 / 355-2
• CP, point-to-point	CP 340, CP 341 distributed
• CP, LAN	Over PC CP

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
Operating hours counter	
• Number	8
Clock synchronization	
• supported	Yes
• to PC-CP, slave	Yes
• on Ethernet via NTP	Yes
Interfaces	
Number of USB interfaces	0
1st interface	
Interface type	CP 5611, CP 5611-A2, CP 5612, CP 5621, CP 5622, integrated PROFIBUS interface of the SIMATIC PC
Max. no. of simultaneously operable CPs	1
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	does not exist
Number of connection resources	8
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	8
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte

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Technical specifications (continued)

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
2nd interface	
Interface type	CP 5613, CP 5613-A2, CP 5603, CP 5623
Max. no. of simultaneously operable CPs	4
Physics	RS 485 / PROFIBUS
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	50
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
3rd interface	
Interface type	PROFINET
Max. no. of simultaneously operable CPs	1; Intel Pro/1000 (82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C, IPC2x7D, IPC4x7D
Physics	Ethernet
Isolated	Yes
Integrated switch	No
Number of ports	1
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	No
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• Open IE communication	Yes

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
PROFINET IO Controller	
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• IRT, supported	No
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	1 ms
• Updating time	1 - 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data)
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	254 byte
PROFINET CBA	
• acyclic transmission	Yes
• Cyclic transmission	Yes
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	16
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 443, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes
4th interface	
Interface type	PROFINET
Max. no. of simultaneously operable CPs	1
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Number of connection resources	32

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Technical specifications (continued)

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO devices for RT	256
- of which in line, max.	256
• Number of IO devices with IRT and the option "high flexibility"	64
- of which in line, max.	32
• Number of IO Devices with IRT and the option "high performance", max.	64
- of which in line, max.	32
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	250 µs, 500 µs, 1 ms
• Updating time	0.25...512 depending on the send cycle
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	Yes
- Open IE communication	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	254 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	32
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	128 byte
equidistance	Yes
shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; Only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• As client	Yes
• User data per job, max.	64 kbyte; When using BSEND/USEND
Open IE communication	
• TCP/IP	Yes
- Number of connections, max.	32
- Data length for connection type 01H, max.	Not supported
- Data length for connection type 11H, max.	65 534 byte
- Data length, max.	65 534 byte
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	32
- Data length, max.	65 534 byte
• UDP	Yes
- Number of connections, max.	32
- Data length, max.	1 472 byte
Web server	
• supported	Yes
• Number of HTTP clients	2
• User-defined websites	No
PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	20 %
• Number of remote interconnection partners	64
• Number of functions, master/slave	30
• Total of all Master/Slave connections	1 000
• Data length of all incoming connections master/slave, max.	6 800 byte
• Data length of all outgoing connections master/slave, max.	6 800 byte
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal and PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, min.	500 ms
- Number of incoming interconnections	100
- Number of outgoing interconnections	100
- Data length of all incoming interconnections, max.	2 000 byte
- Data length of all outgoing interconnections, max.	2 000 byte
- Data length per connection, max.	1 400 byte

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Technical specifications (continued)

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
• Remote interconnections with cyclic transmission	
- Transmission frequency: Transmission interval, min.	10 ms
- Number of incoming interconnections	200
- Number of outgoing interconnections	200
- Data length of all incoming interconnections, max.	4 800 byte
- Data length of all outgoing interconnections, max.	4 800 byte
- Data length per connection, max.	250 byte
• HMI variables via PROFINET (acyclic)	
- Number of stations that can log on for HMI variables (PN OPC/iMap)	3
- HMI variable updating	500 ms
- Number of HMI variables	200
- Data length of all HMI variables, max.	2 000 byte
• PROFIBUS proxy functionality	
- supported	Yes
- Number of linked PROFIBUS devices	16
- Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
• overall	96
• usable for PG communication	
- reserved for PG communication	1
• usable for OP communication	
- reserved for OP communication	1
S7 message functions	
Number of login stations for message functions, max.	62
SCAN procedure	No
Process diagnostic messages	Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	20; of a total of 20 for all SFCs
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	4 000
Process control messages	No
Number of archives that can log on simultaneously (SFB 37 AR_SEND)	32
Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	20
Status/control	
• Status/control variable	Yes
Forcing	
• Forcing	No
Diagnostic buffer	
• present	Yes
• Number of entries, max.	
- adjustable	Yes
- preset	120
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Main memory, min.	1 Gbyte; WES7: 2 GB
Required memory on hard disk, min.	100 Mbyte
Processor	Intel Celeron M, 900 MHz or compatible
• Multi-processor system	Yes; Dual Pentium, CoreDuo, Core2Duo or compatible
• Hyper-threading	Yes

	6ES7671-0RC08-0YA0 SIMATIC WinAC RTX 2010
Operating systems	
Windows CE	No
Windows NT 4.0	No
Windows 2000	No
Windows XP	Yes; Professional, SP2 and SP3
Windows XP embedded	Yes; With the delivery image of the SIMATIC PC
• Supported HAL types under Windows XP	ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC
Windows Vista	No
Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bits)
Windows embedded Standard 7	Yes; With the delivery image of the SIMATIC PC
Configuration	
Configuration software	
• STEP 7	Yes; V5.5 and higher, Engineering Tools (optional)
programming	
• Nesting levels	8
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
• Software libraries	
- Easy Motion Control	Yes
- Software redundancy	Yes; As of V1.2, only operation of WinAC RTX with WinAC RTX
• Number of simultaneously active SFCs	
- DPSYC_FR	20; of a total of 20 for all SFCs
- D_ACT_DP	20; of a total of 20 for all SFCs
- RD_REC	20; of a total of 20 for all SFCs
- WR_REC	20; of a total of 20 for all SFCs
- WR_PARM	20; of a total of 20 for all SFCs
- PARM_MOD	20; of a total of 20 for all SFCs
- WR_DPARM	20; of a total of 20 for all SFCs
- DPNRM_DG	20; of a total of 20 for all SFCs
- RDSYSST	20; of a total of 20 for all SFCs
• Number of simultaneously active SFBs	
- RD_REC	20; of a total of 20 for all SFBs
- WR_REC	20; of a total of 20 for all SFBs
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	No
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC ODK V4.2 or higher
• CMI (Controller Management Interface)	Yes; WinAC ODK V4.2 or higher
• SMX (Shared Memory Extension)	Yes; WinAC ODK V4.2 or higher
- Inputs	4 kbyte
- Outputs	4 kbyte
I/O/Options	
I/O devices	none
• Printer	No
Weights	
Weight, approx.	100 g; Weight incl. packaging

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Ordering data

	Article No.
SIMATIC WinAC RTX 2010 Software PLC for PC-based automation tasks with stringent deterministic requirements; PROFIBUS and PROFINET; CD-ROM with electronic documentation d, e, f; single license, executable under Windows XP SP2 and SP3 as well as Windows 7 (32 bit)	**6ES7671-0RC08-0YA0**
SIMATIC WinAC RTX 2010 Upgrade For upgrading from basic/RTX V3.x, V4.0, V4.1 2005, 2008 and 2009; single license, executable under Windows XP SP2 and SP3 and Windows 7 (32 bit)	**6ES7671-0RC08-0YE0**
CP 5612 communications processor PCI card (32 bit) for connection of a programming device or PC to PROFIBUS	**6GK1561-2AA00**
CP 5622 communications processor PCI Express x1 card (32 bit) for connection of a programming device or PC to PROFIBUS	**6GK1562-2AA00**
CP 5603 Microbox Package Comprising CP 5603 module and Microbox expansion rack	**6GK1560-3AU00**
CP 5613 A2 communications processor PCI card (32 bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows 2000 Professional/Server, Windows XP Professional, German/English	**6GK1561-3AA01**
CP 5623 communications processor PCI Express x1 card (32 bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	**6GK1562-3AA00**
CP 1616 communications processor PCI Card (32 bit; 3.3/5 V universal key) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO controller (RT operation) and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows XP Professional; German/English	**6GK1161-6AA02**

More information

Add-ons for SIMATIC WinAC

PC-based Competence Center Cologne

Our add-ons supplement the WinAC RTX soft PLC by useful functions which have arisen in the context of projects. You can thus fully utilize the advantages of PC-based automation.

The applications are available in the form of function blocks and are easy to use without special programming knowledge.

Detailed information and prices can be obtained from your Siemens contact or from:

Contact:

Siemens AG
Competence Center Cologne
E-mail: CCCologne@siemens.com

Application	Function
WinAC serial driver	Communication over serial interfaces
WinAC PC IO driver	Access to central I/O expansion PC IO including interrupt handling
WinAC SQL	Access to SQL databases
WinAC TCP/IP driver	Data exchange between WinAC and other communication partners over Windows interface using TCP/IP, UDP, or ISO-on-TCP
WinAC OPC Client	Access to various OPC servers
WinAC Shutdown	Controlled shutdown of WinAC and PC system
WinAC File-I/O	Reading and writing of DBs as file on the PC system
WinAC Command	Calling of batch commands from WinAC
WinAC Access-DB	High-performance access to DBs, bit memories or I/O image
WinAC SMX Cover	Provision of SMX functions, e.g. for Delphi or VB
WinAC CMI Wrapper	Simple program-based operation of WinAC

Brochures

Information material for downloading can be found in the Internet:

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

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SIMATIC WinAC RTX F

Overview



- SIMATIC WinAC RTX F:
  Optimized for applications that demand a high degree of flexibility and integration capability and that must also satisfy safety requirements up to SIL 3 (IEC 61508).
- The software solution for tasks that require hard deterministic behavior and high performance.
- With real-time expansion for assuring deterministic behavior for the control section.
- Distributed I/O can be connected over PROFIBUS and/or PROFINET, also safety-related over PROFIsafe.

New:

- SIMATIC IPC427D and IPC477D are fully supported
  - Communication via onboard CP 5622
  - Retentive memory
  - LED display of the operating status
- Support for the new PROFIBUS CP 5612 (PCI) and CP 5622 (PCIe)

Benefits

- Hard real-time and maximum performance up to SIL 3 according to IEC 61508/62061 or according to EN ISO 13849-1 up to PL e
- Implementation of fast, S7-compatible control solutions with low processor loading.
  Alongside the control task, sufficient processor capability is available for processing complex, demanding PC applications in parallel.

Technical specifications

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
General information	
Hardware product version	-
Firmware version	V4.6
Engineering with	
• Programming package	STEP 7 V5.5 or higher + hardware update / iMap V3.0 SP1 / option package S7 Distributed Safety V5.4 + SP5 / S7 F Configuration Pack V5.5 + SP6 + HF1
Memory	
Type of memory	RAM
Work memory	
• integrated (for program)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
• integrated (for data)	4 Mbyte; Adjustable; depends on Non Paged Memory Pool
Load memory	
• integrated RAM, max.	Adjustable; depends on Non Paged Memory Pool
CPU processing times	
for bit operations, typ.	0.004 µs
for fixed point arithmetic, typ.	0.003 µs
for floating point arithmetic, typ.	0.004 µs
Reference platform	Pentium IV, 2.4 GHz
CPU-blocks	
DB	
• Number, max.	65 535; Limited only by RAM set for code
• Size, max.	64 kbyte

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
FB	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 kbyte
FC	
• Number, max.	65 536; Limited only by RAM set for code
• Size, max.	64 kbyte
OB	
• Size, max.	64 kbyte
• Number of free cycle OBs	1
• Number of time alarm OBs	1
• Number of delay alarm OBs	1
• Number of time interrupt OBs	9
• Number of process alarm OBs	1
• Number of ODK OBs	3; OB 52-54
• Number of DPV1 alarm OBs	3; OB 55-57
• Number isochronous mode OBs	2; OB 61-62
• Number of startup OBs	2
• Number of asynchronous error OBs	7
• Number of synchronous error OBs	2
Nesting depth	
• per priority class	24
• additional within an error OB	24

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Technical specifications (continued)

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Counters, timers and their retentivity	
S7 counter	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	8
• Counting range	
- adjustable	Yes
- lower limit	0
- upper limit	999
IEC counter	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
S7 times	
• Number	2 048
• Retentivity	
- adjustable	Yes
- lower limit	0
- upper limit	2 047
- preset	0
• Time range	
- lower limit	10 ms
- upper limit	9 990 s
IEC timer	
• present	Yes
• Type	SFB
• Number	Unlimited (limited only by RAM capacity)
Data areas and their retentivity	
Retentivity without UPS and PS Extension Board	128 kbyte with SIMATIC IPC427C and HMI IPC477C; further SIMATIC PCs on request
Retentivity with UPS	all data
Flag	
• Number, max.	16 kbyte
• of which retentive	MB 0 to MB 16383
• Retentivity preset	MB 0 to MB 15
• Number of clock memories	8
Data blocks	
• Number, max.	Limited only by available retentive memory (NVRAM, or file storage)
• Size, max.	64 kbyte
• Retentivity adjustable	Yes; via non-retain property on DB
• Retentivity preset	Yes
Local data	
• adjustable, max.	64 kbyte
• preset	32 kbyte
• per priority class, max.	61 440 byte

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Address area	
I/O address area	
• Inputs	16 kbyte
• Outputs	16 kbyte
• of which, distributed	
- DP interface, inputs	16 kbyte
- DP interface, outputs	16 kbyte
- PN interface, inputs	16 kbyte
- PN interface, outputs	16 kbyte
Process image	
• Inputs, adjustable	8 kbyte
• Outputs, adjustable	8 kbyte
• Inputs, default	512 byte
• Outputs, default	512 byte
Subprocess images	
• Number of subprocess images, max.	15
Digital channels	
• Inputs	128 000
• Outputs	128 000
Analog channels	
• Inputs	8 000
• Outputs	8 000
Hardware configuration	
Submodules	
• Number of submodules, max	4
• of which PROFIBUS, max.	4; Supported interfaces: see 1st and 2nd interface
• of which Industrial Ethernet, max.	1; Supported interfaces: see 3rd and 4th interface
Number of operable FMs and CPs (recommended)	
• FM	4; FM distributed: FM 350-1, FM 350-2, FM 351, FM 352 / FM 352-5, FM 353, FM 354, FM 355, FM 355-2
• CP, point-to-point	2; CP 340, CP 341 distributed
• CP, LAN	Over PC CP
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
• battery-backed and synchronizable	Yes
Operating hours counter	
• Number	8
Clock synchronization	
• supported	Yes
• to PC-CP, slave	Yes
• on Ethernet via NTP	Yes

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Technical specifications (continued)

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Interfaces	
With optical interface	No
1st interface	
Interface type	CP 5611-A2, CP 5621, integrated PB interface of the SIMATIC PC
Max. no. of simultaneously operable CPs	1
Physics	RS 485 / PROFIBUS
Isolated	Yes
Power supply to interface (15 to 30 V DC), max.	does not exist
Number of connection resources	8
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	8
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	64
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
2nd interface	
Interface type	CP 5613, CP 5613-A2, CP 5603, CP 5623
Max. no. of simultaneously operable CPs	4
Physics	RS 485 / PROFIBUS
Isolated	Yes
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
DP master	
• Number of connections, max.	50
• Transmission rate, max.	12 Mbit/s
• Number of DP slaves, max.	125
• Services	
- PG/OP communication	Yes
- Routing	Yes
- Global data communication	No
- S7 basic communication	No
- S7 communication	Yes
- S7 communication, as client	Yes
- S7 communication, as server	Yes
- Equidistance mode support	Yes; Only in conjunction with isochronous mode
- Isochronous mode	Yes
- SYNC/FREEZE	Yes
- Activation/deactivation of DP slaves	Yes
- Direct data exchange (slave-to-slave communication)	Yes
- DPV0	Yes
- DPV1	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
• User data per DP slave	
- Inputs, max.	244 byte
- Outputs, max.	244 byte
3rd interface	
Interface type	PROFINET
Max. no. of simultaneously operable CPs	1; Intel Pro/1000 (Intel 82571EB, 82573L, 82574L, 82541PI; non-shared IRQ required); integrated IE interface SIMATIC PC 4x7B, 6x7B, 8x7B, IPC4x7C, IPC6x7C, IPC8x7C
Physics	Ethernet
Isolated	Yes
Integrated switch	No
Number of ports	1
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Media redundancy	
• supported	No

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Technical specifications (continued)

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
PROFINET IO Controller	
• Transmission rate, min.	100 Mbit/s
• Transmission rate, max.	100 Mbit/s
• Number of connectable IO devices, max.	128
• Max. number of connectable IO devices for RT	128
- of which in line, max.	128
• IRT, supported	No
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	1 ms
• Updating time	1 - 512 ms (minimum value depends on communication share set for PROFINET I/O, on the number of I/O devices, and on the volume of configured user data)
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	No
- Open IE communication	Yes
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	254 byte
PROFINET CBA	
• acyclic transmission	Yes
• Cyclic transmission	Yes
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	16
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 23, 25, 80, 102, 135, 161, 8080, 34962, 34963, 34964, 65532, 65533, 65534, 65535
• Keep-alive function, supported	Yes

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
4th interface	
Interface type	PROFINET
Max. no. of simultaneously operable CPs	1
Physics	Ethernet
Isolated	Yes
Integrated switch	Yes
Number of ports	3
Automatic detection of transmission speed	Yes; 10/100 Mbit/s
Autonegotiation	Yes
Autocrossing	Yes
Change of IP address at runtime, supported	Yes
Number of connection resources	32
Media redundancy	
• supported	Yes
• Switchover time on line break, typically	200 ms
• Number of stations in the ring, max.	50
Functionality	
• PROFINET IO Controller	Yes
• PROFINET IO Device	No
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
PROFINET IO Controller	
• Transmission rate, max.	100 Mbit/s
• Max. number of connectable IO devices for RT	256
- of which in line, max.	256
• Number of IO devices with IRT and the option "high flexibility"	64
- of which in line, max.	32
• Number of IO Devices with IRT and the option "high performance", max.	64
- of which in line, max.	64
• IRT, supported	Yes
• Prioritized startup supported	Yes
- Number of IO Devices, max.	32
• Activation/deactivation of IO Devices	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.	8
• IO Devices changing during operation (partner ports), supported	Yes
• Device replacement without swap medium	Yes
• Send cycles	250 µs, 500 µs, 1 ms
• Updating time	0.25...512 depending on the send cycle
• Services	
- PG/OP communication	Yes
- Routing	Yes; S7 routing
- S7 communication	Yes
- Isochronous mode	Yes
- Open IE communication	Yes

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Technical specifications (continued)

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
• Address area	
- Inputs, max.	16 kbyte
- Outputs, max.	16 kbyte
- User data per address area, max.	2 kbyte
- User data consistency, max.	254 byte
SIMATIC communication	
• PG/OP communication	Yes
• S7 routing	Yes
• S7 communication	Yes
• Number of connections, max.	32
Open IE communication	
• Open IE communication, supported	Yes
• Number of connections, max.	32
• Local port numbers used at the system end	0, 20, 21, 25, 80, 102, 135, 161, 34962, 34963, 34964, 65532, 65533, 65534, 65535
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes
Number of DP masters with isochronous mode	2
User data per isochronous slave, max.	128 byte
Equidistance	Yes
Shortest clock pulse	2.2 ms; 2.2 ms without partial process image; 2.2 ms with partial process image
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; Only with CP 5611 or integrated PROFIBUS interface of the SIMATIC PC
Global data communication	
• supported	No
S7 basic communication	
• supported	No
S7 communication	
• supported	Yes
• as server	Yes
• As client	Yes
• User data per job, max.	64 kbyte; Depends on which block is used: BSEND/USEND or PUT/GET
Open IE communication	
• TCP/IP	Yes
- Number of connections, max.	32
- Data length for connection type 01H, max.	Not supported
- Data length for connection type 11H, max.	65 534 byte
- Data length, max.	65 534 byte
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	32
- Data length, max.	65 534 byte
• UDP	Yes
- Number of connections, max.	32
- Data length, max.	1 472 byte
Web server	
• Supported	Yes
• Number of HTTP clients	2
• User-defined websites	No

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
PROFINET CBA (at set setpoint communication load)	
• Setpoint for the CPU communication load	20 %
• Number of remote interconnection partners	64
• Number of functions, master/slave	30
• Total of all Master/Slave connections	1 000
• Data length of all incoming connections master/slave, max.	6 800 byte
• Data length of all outgoing connections master/slave, max.	6 800 byte
• Number of device-internal and PROFIBUS interconnections	500
• Data length of device-internal and PROFIBUS interconnections, max.	4 000 byte
• Data length per connection, max.	1 400 byte
• Remote interconnections with acyclic transmission	
- Sampling frequency: Sampling time, min.	500 ms
- Number of incoming interconnections	100
- Number of outgoing interconnections	100
- Data length of all incoming - interconnections, max.	2 000 byte
- Data length of all outgoing - interconnections, max.	2 000 byte
- Data length per connection, max.	1 400 byte
• Remote interconnections with cyclic transmission	
- Transmission frequency: Transmission interval, min.	10 ms
- Number of incoming interconnections	200
- Number of outgoing interconnections	200
- Data length of all incoming interconnections, max.	4 800 byte
- Data length of all outgoing interconnections, max.	4 800 byte
- Data length per connection, max.	250 byte
• HMI variables via PROFINET (acyclic)	
- Number of stations that can log on for HMI variables (PN OPC/iMap)	3
- HMI variable updating	500 ms
- Number of HMI variables	200
- Data length of all HMI variables, max.	2 000 byte
• PROFIBUS proxy functionality	
- supported	Yes
- Number of linked PROFIBUS devices	16
- Data length per connection, max.	240 byte; Slave-dependent
Number of connections	
• overall	96
• usable for PG communication	
- reserved for PG communication	1
• usable for OP communication	
- reserved for OP communication	1

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Technical specifications (continued)

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
S7 message functions	
Number of login stations for message functions, max.	62
SCAN procedure	No
Process diagnostic messages	Yes; ALARM_S, ALARM_SQ, ALARM_D, ALARM_DQ
simultaneously active Alarm-S blocks, max.	20; of a total of 20 for all SFCs
Alarm 8-blocks	Yes
• Number of instances for alarm 8 and S7 communication blocks, max.	4 000
Process control messages	No
Test commissioning functions	
Status block	Yes
Single step	Yes
Number of breakpoints	20
Status/control	
• Status/control variable	Yes
Forcing	
• Forcing	No
Diagnostic buffer	
• present	Yes
• Number of entries, max.	
- adjustable	Yes
- preset	120
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Main memory, min.	1 Gbyte
Required memory on hard disk, min.	100 Mbyte
Processor	Intel Celeron M 900 MHz or compatible (older PC systems with Programmable Interrupt Controllers (PIC) are not suitable for WinAC RTX F 2010.)
• Multi-processor system	No
• Hyper-threading	Yes
Operating systems	
Windows NT 4.0	No
Windows 2000	No
Windows XP	Yes; Professional, SP2 and SP3
Windows XP embedded	Yes; With the delivery image of the SIMATIC PC
• Supported HAL types under Windows XP	ACPI uniprocessor PC, ACPI multiprocessor PC, MPS multiprocessor PC
Windows Vista	No
Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bits)
Windows embedded Standard 7	No

	6ES7671-1RC08-0YA0 SIMATIC WinAC RTX F 2010
Configuration	
Configuration software	
• STEP 7	Yes; As of V5.5 + HW update/S7 F Configuration Pack V5.5 + SP6 + HF1/option package S7 Distributed Safety V5.4 + SP5 or later
programming	
• Nesting levels	8
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
• Software libraries	
- Easy Motion Control	Yes
- Software redundancy	Yes; As of V1.2, only for operation of WinAC RTX (F) with WinAC RTX (F)
• Number of simultaneously active SFCs	
- DPSYC_FR	20; of a total of 20 for all SFCs
- D_ACT_DP	20; of a total of 20 for all SFCs
- RD_REC	20; of a total of 20 for all SFCs
- WR_REC	20; of a total of 20 for all SFCs
- WR_PARM	20; of a total of 20 for all SFCs
- PARM_MOD	20; of a total of 20 for all SFCs
- WR_DPARM	20; of a total of 20 for all SFCs
- DPNRM_DG	20; of a total of 20 for all SFCs
- RDSYSST	20; of a total of 20 for all SFCs
• Number of simultaneously active SFBs	
- RD_REC	20; of a total of 20 for all SFBs
- WR_REC	20; of a total of 20 for all SFBs
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	No
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; WinAC ODK V4.2 or higher
• CMI (Controller Management Interface)	Yes; WinAC ODK V4.2 or higher
• SMX (Shared Memory Extension)	Yes; WinAC ODK V4.2 or higher
- Inputs	4 kbyte
- Outputs	4 kbyte
I/O/Options	
I/O devices	none
• Printer	No
Weights	
Weight, approx.	100 g; Weight incl. packaging

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SIMATIC WinAC RTX F

Ordering data

Ordering data	Article No.
SIMATIC WinAC RTX F 2010	**6ES7671-1RC08-0YA0**
SIMATIC WinAC RTX F 2010 upgrade	**6ES7671-1RC08-0YE0**
CP 5612 communications processor PCI card (32 bit) for connection of a programming device or PC to PROFIBUS	**6GK1561-2AA00**
CP 5621 communications processor PCI Express x1 card (32 bit) for connection of a programming device or PC to PROFIBUS	**6GK1562-2AA00**
CP 5603 Microbox Package Comprising CP 5603 module and Microbox expansion rack	**6GK1560-3AU00**
CP 5613 A2 communications processor PCI card (32 bit; 3.3 V/5 V) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master, incl. PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows 2000 Professional/Server, Windows XP Professional, German/English	**6GK1561-3AA01**
CP 5623 communications processor PCI Express x1 card (32 bit) for connection to PROFIBUS incl. DP-Base software with NCM PC; DP-RAM interface for DP master or DP slave, incl. PG and FDL protocols; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for operating system support see SIMATIC NET software; German/English	**6GK1562-3AA00**
CP 1616 communications processor PCI Card (32 bit; 3.3/5 V universal key) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO controller (RT operation) and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32 bit Windows XP Professional; German/English	**6GK1161-6AA02**

More information

Add-ons for SIMATIC WinAC

PC-based Competence Center Cologne

Our add-ons supplement the WinAC RTX soft PLC by useful functions which have arisen in the context of projects. In this way, you can fully utilize the advantages of PC based Automation.

The applications are available in the form of function blocks and are easy to use without special programming knowledge.

Detailed information and prices can be obtained from your Siemens contact or from:

Contact:

Siemens AG
Competence Center Cologne
E-mail: CCCologne@siemens.com

Application	Function
WinAC serial driver	Communication over serial interfaces
WinAC PC IO driver	Access to central I/O expansion PC IO including interrupt handling
WinAC SQL	Access to SQL databases
WinAC TCP/IP driver	Data exchange between WinAC and other communication partners over Windows interface using TCP/IP, UDP, or ISO-on-TCP
WinAC OPC Client	Access to various OPC servers
WinAC Shutdown	Controlled shutdown of WinAC and the PC system
WinAC File I/O	Reading and writing of DBs as a file on the PC system
WinAC Command	Calling batch commands from WinAC
WinAC Access DB	High-performance accesses to DBs, bit memories or I/O image
WinAC SMX Cover	Provides SMX functions, e.g. for Delphi or VB
WinAC CMI Wrapper	Easy program-controlled operation of WinAC

Brochures

Information material is available for downloading in the Internet at:

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

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Overview



- SIMATIC WinAC software PLCs support powerful interfaces which permit close meshing of the control task with PC-based applications.
- WinAC ODK allows the user to develop applications or to integrate already existing applications into the control task.

New with WinAC ODK V4.2:

- CCX interface:
  - New SFB 65003 for asynchronous execution of ODK applications
  - Expansion of data access functions
  - Creation of Windows DLL with C# and VB
- SMX interface:
  - Access to the Shared Memory interface under IntervalZero RTX
  - Expansion of data access functions
  - Creation of Windows applications with C# and VB
- Supports MS Visual Studio 2005 and 2008 (under Windows)

Technical specifications

	6ES7806-1CC03-0BA0 **SIMATIC WinAC ODK V4.2 SP1**
Hardware requirements	
Hardware required	PC with color monitor, keyboard, mouse or pointing device for Windows
Main memory, min.	1 Gbyte
Required memory on hard disk, min.	30 Mbyte
Processor	Intel Pentium 800 MHz
Software requirement	
Software required	Microsoft Visual Developer Studio, for details see interfaces; CCX and SMX real-time applications in addition: IntervalZero SDK (SDK Version must match the WinAC RTX version used; see Technical Data for WinAC RTX)
Operating systems	
Windows XP	Yes; Professional, SP2 and SP3
Windows 7	Yes; Professional, Enterprise, Ultimate (only 32 bits)
Configuration	
Open Development interfaces	
• CCX (Custom Code Extension)	Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241
• CMI (Controller Management Interface)	Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241
• SMX (Shared Memory Extension)	Yes; See product information: http://support.automation.siemens.com/WW/view/en/48207241
Weights	
Weight, approx.	200 g

Ordering data

	Article No.
SIMATIC WinAC ODK V4.2	
for integration of C/C++ code in WinAC PLCs, executable under Windows XP SP2 or SP3; CD-ROM with electronic documentation	
Single license	**6ES7806-1CC03-0BA0**

More information

Brochures

Information material for downloading can be found in the Internet:

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

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Overview



- Get off to a fast start in automation solutions with embedded PC platforms.
  - Ready-to-use SIMATIC WinAC RTX or WinAC RTX F preinstalled on EC31
  - Prepared for use in a SIMATIC environment with PROFINET and Industrial Ethernet
  - Commissioning by specialist automation personnel as with the S7-300
  - 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
  - Hard-disk-free operation based on flash disk and Windows Embedded Standard
  - Fan-free operation
- 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)

Function

- Control:
  For the optimum control of processes with WinAC RTX, several processing levels are available:
  - Cyclic program processing
  - Interrupt processing
  - Time and date-controlled processing
- Functional safety with WinAC RTX F for EC31-RTX F:
  The functional safety is implemented by means of targeted safety functions in the software. Safety functions are implemented with S7 Distributed Safety, to place the plant in a safe state or to hold it in a safe state. The safety functions are mainly included in 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 reliable processing of the field information (emergency stop pushbutton, light barriers, motor 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 execute the actual user safety function, it will execute the fault response function: e.g. deactivation of the associated outputs and, if appropriate, F-CPU in STOP.
- Retentivity:
  The controller can back up 512 KB of retentive data on an integrated, non-volatile memory, without the need for a UPS. Total retentivity of all process values of SIMATIC WinAC RTX can be achieved with a generally available UPS.
- Access to process values:
  The SIMATIC NET OPC server supplied with EC31-RTX permits open access to all process values. Visualization systems or data processing systems can be linked to SIMATIC WinAC RTX via this interface.
- Communication:
  The Windows Automation Center (WinAC) is programmed with SIMATIC STEP 7 via the integral Industrial Ethernet interface. The SIMATIC NET SOFTNET Lean communication package is pre-installed for this purpose.
- Use of other software:
  The customer can install supporting software products. Windows Embedded Standard is designed so that typical add-on packages can be installed.

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Technical specifications

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
General information						
Hardware product version	01	01	01	01	01	01
Firmware version	V2.0	V2.0	V2.0	V2.0	V2.0	V2.0
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	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	Intel Core Duo 1.2 GHz
Main memory	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM	1 GB RAM
Flash Disk	4 Gbyte	4 Gbyte	4 Gbyte	4 Gbyte	4 Gbyte	4 Gbyte
Operating systems	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows Embedded Standard 2009	Windows Embedded Standard 2009
Installed software						
• Visualization				WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options	WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options	WinCC flexible RT 2008 SP2, incl. Sm@rtAccess, recipes, archives options
• Control		SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX F 2010	SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX 2010	SIMATIC WinAC RTX 2010
• Communication		Yes	Yes	Yes	Yes	Yes
Supply voltage						
Rated value, 24 V DC	Yes	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	20.4 V
Permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
Mains buffering						
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms	5 ms	5 ms	5 ms
Input current						
Rated value at 24 V DC	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	800 mA; without backplane bus and USB power supply
Power losses						
Power loss, typ.	34 W	34 W	34 W	34 W	34 W	34 W
Memory						
Type of memory	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	512 KB non-volatile memory for retentive data
Work memory						
• integrated	1 Gbyte	1 Gbyte	1 Gbyte	1 Gbyte	1 Gbyte	1 Gbyte
CPU processing times						
for bit operations, typ.		0.004 µs	0.004 µs	0.004 µs	0.004 µs	0.004 µs
for fixed point arithmetic, typ.		0.003 µs	0.003 µs	0.003 µs	0.003 µs	0.003 µs
for floating point arithmetic, typ.		0.004 µs	0.004 µs	0.004 µs	0.004 µs	0.004 µs
CPU-blocks						
DB						
• Size, max.		64 kbyte	64 kbyte	64 kbyte	64 kbyte	64 kbyte
FB						
• Size, max.		64 kbyte	64 kbyte	64 kbyte	64 kbyte	64 kbyte
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	Max. code size and max. data size: 4 MB each
• Size, max.		64 kbyte	64 kbyte	64 kbyte	64 kbyte	64 kbyte
OB						
• Size, max.		64 kbyte	64 kbyte	64 kbyte	64 kbyte	64 kbyte
• Number of free cycle OBs		1	1	1	1	1
• Number of time alarm OBs		1	1	1	1	1
• Number of delay alarm OBs		1	1	1	1	1
• Number of time interrupt OBs		9	9	9	9	9
• Number of process alarm OBs		1	1	1	1	1
• Number of startup OBs		2	2	2	2	2
• Number of asynchronous error OBs		7	7	7	7	7
• Number of synchronous error OBs		2	2	2	2	2
Nesting depth						
• per priority class		24	24	24	24	24
• additional within an error OB		24	24	24	24	24

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Technical specifications (continued)

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
Counters, timers and their retentivity						
S7 counter						
• Number		2 048	2 048	2 048	2 048	2 048
• Retentivity						
- adjustable		Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	0	0
- upper limit		2 047	2 047	2 047	2 047	2 047
- preset		8	8	8	8	8
• Counting range						
- adjustable		Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	0	0
- upper limit		999	999	999	999	999
IEC counter						
• present		Yes	Yes	Yes	Yes	Yes
• Type		SFB	SFB	SFB	SFB	SFB
S7 times						
• Number		2 048	2 048	2 048	2 048	2 048
• Retentivity						
- adjustable		Yes	Yes	Yes	Yes	Yes
- lower limit		0	0	0	0	0
- upper limit		2 047	2 047	2 047	2 047	2 047
• Time range						
- lower limit		10 ms	10 ms	10 ms	10 ms	10 ms
- upper limit		9 990 s	9 990 s	9 990 s	9 990 s	9 990 s
IEC timer						
• present		Yes	Yes	Yes	Yes	Yes
• Type		SFB	SFB	SFB	SFB	SFB
Data areas and their retentivity						
retentive data area, total		512 KB	512 KB	512 KB	512 KB	512 KB
Flag						
• Number, max.		16 kbyte	16 kbyte	16 kbyte	16 kbyte	16 kbyte
• of which retentive without battery		MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383	MB 0 to MB 16383
• Retentivity preset		MB 0 to MB 15	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	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	Max. code size and max. data size: 4 MB each
• Size, max.		64 kbyte	64 kbyte	64 kbyte	64 kbyte	64 kbyte
Address area						
I/O address area						
• Inputs		16 kbyte	16 kbyte	16 kbyte	16 kbyte	16 kbyte
• Outputs		16 kbyte	16 kbyte	16 kbyte	16 kbyte	16 kbyte
• of which, distributed						
- Inputs		8 kbyte	8 kbyte	8 kbyte	8 kbyte	8 kbyte
- Outputs		8 kbyte	8 kbyte	8 kbyte	8 kbyte	8 kbyte
Process image						
• Inputs, adjustable		16 kbyte	16 kbyte	8 kbyte	8 kbyte	8 kbyte
• Outputs, adjustable		16 kbyte	16 kbyte	8 kbyte	8 kbyte	8 kbyte
• Inputs, default		512 byte	512 byte	512 byte	512 byte	512 byte
• Outputs, default		512 byte	512 byte	512 byte	512 byte	512 byte
Subprocess images						
• Number of subprocess images, max.		15	15	15	15	15
Digital channels						
• Inputs		128 000	128 000	128 000	128 000	128 000
• Outputs		128 000	128 000	128 000	128 000	128 000
Analog channels						
• Inputs		8 000	8 000	8 000	8 000	8 000
• Outputs		8 000	8 000	8 000	8 000	8 000
Hardware configuration						
Integrated power supply	Yes	Yes		Yes	Yes	Yes
Time of day						
Clock						
• Hardware clock (real-time clock)		Yes	Yes; Resolution: 1 s	Yes	Yes	Yes
Clock synchronization						
• supported		Yes	Yes	Yes	Yes	Yes
• to PC-CP, slave		Yes	Yes	Yes	Yes	Yes
• on Ethernet via NTP		Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
Interfaces						
Number of USB interfaces	2	2		2	2	2
Serial interface	0	0		0	0	0
Industrial Ethernet						
• Industrial Ethernet interface	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s	X1: 2 ports 10/100 Mbit/s (ERTEC-based) X2: 1 port 10/100 Mbit/s
1st interface						
Interface type		PROFINET	PROFINET	PROFINET	PROFINET	PROFINET
Physics		2x RJ45	2x RJ45	2x RJ45	2x RJ45	2x RJ45
Automatic detection of transmission speed		Yes	Yes	Yes	Yes	Yes
Autonegotiation		Yes	Yes	Yes	Yes	Yes
Autocrossing		Yes	Yes	Yes	Yes	Yes
Number of connection resources		32	32	32	32	32
Functionality						
• MPI			No			
• DP master			No			
• DP slave			No			
• PROFINET IO Device		No	No	No	No	No
• PROFINET IO Controller		Yes	Yes	Yes	Yes	Yes
• PROFINET CBA		Yes	Yes	Yes	Yes	Yes
• Open IE communication		Yes	Yes	Yes	Yes	Yes
• Point-to-point connection			No			
PROFINET IO Controller						
• Number of connectable IO devices, max.		256	256	256	256	256
• Max. number of connectable IO devices for RT		256	256	256	256	256
- of which in line, max.		256	256	256	256	256
• Number of IO devices with IRT and the option "high flexibility"		256	256	256	256	256
- of which in line, max.		61	61	61	61	61
• Number of IO Devices with IRT and the option "high performance", max.		256	256	256	256	256
- of which in line, max.		64	64	64	64	64
• IRT, supported		Yes	Yes	Yes	Yes	Yes
• Prioritized startup supported		Yes	Yes	Yes	Yes	Yes
- Number of IO Devices, max.		32	32	32	32	32
• Activation/deactivation of IO Devices		Yes	Yes	Yes	Yes	Yes
- Maximum number of IO devices that can be activated/deactivated at the same time.		8	8	8	8	8
• IO Devices changing during operation (partner ports), supported		Yes	Yes	Yes	Yes	Yes
- Max. number of IO devices per tool		8	8	8	8	8
• Device replacement without swap medium		Yes	Yes	Yes	Yes	Yes
• Send cycles		Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms	Adjustable: 250 µs, 500 µs and 1 ms
• Updating times		250 µs - 128 ms (with signal cycle 250 µs); 500 µs - 256 ms (with signal cycle 500 µs); 1 ms - 512 ms (with signal cycle 1 ms)	250 µs - 128 ms (with signal cycle 250 µs); 500 µs - 256 ms (with signal cycle 500 µs); 1 ms - 512 ms (with signal cycle 1 ms)	250 µs - 128 ms (with signal cycle 250 µs); 500 µs - 256 ms (with signal cycle 500 µs); 1 ms - 512 ms (with signal cycle 1 ms)	250 µs - 128 ms (with signal cycle 250 µs); 500 µs - 256 ms (with signal cycle 500 µs); 1 ms - 512 ms (with signal cycle 1 ms)	250 µs - 128 ms (with signal cycle 250 µs); 500 µs - 256 ms (with signal cycle 500 µs); 1 ms - 512 ms (with signal cycle 1 ms)
• Services						
- PG/OP communication		Yes	Yes	Yes	Yes	Yes
- S7 routing		Yes	Yes	Yes	Yes	Yes
- S7 communication		Yes	Yes	Yes	Yes	Yes
- Isochronous mode		Yes	Yes	Yes	Yes	Yes
• Address area						
- Inputs, max.		16 kbyte	16 kbyte	16 kbyte	16 kbyte	16 kbyte
- Outputs, max.		16 kbyte	16 kbyte	16 kbyte	16 kbyte	16 kbyte
- User data per address area, max.		2 kbyte	2 kbyte	2 kbyte	2 kbyte	2 kbyte
- User data consistency, max.		256 byte	256 byte	256 byte	256 byte	256 byte
PROFINET CBA						
• acyclic transmission		Yes	Yes	Yes	Yes	Yes
• Cyclic transmission		Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
Open IE communication						
• Open IE communication, supported		Yes	Yes	Yes	Yes	Yes
• Number of connections, max.		32	32	32	32	32
• Local port numbers used at the system end		0, 20, 21, 23, 25, 80, 102, 135, 161, 8 080, 34 962, 34 963, 34 964, 65 532, 65 533, 65 534, 65 535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8 080, 34 962, 34 963, 34 964, 65 532, 65 533, 65 534, 65 535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8 080, 34 962, 34 963, 34 964, 65 532, 65 533, 65 534, 65 535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8 080, 34 962, 34 963, 34 964, 65 532, 65 533, 65 534, 65 535	0, 20, 21, 23, 25, 80, 102, 135, 161, 8 080, 34 962, 34 963, 34 964, 65 532, 65 533, 65 534, 65 535
PROFINET functions						
• Detection of accessible nodes, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the IP address, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the device name, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Topology recognition, supported		Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP
• Extended network diagnostics with Standard MIB II, supported		Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP
2nd interface						
Interface type		Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface	Integrated Ethernet interface
Physics		Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45	Ethernet RJ45
Automatic detection of transmission speed		Yes	Yes	Yes	Yes	Yes
Autonegotiation		Yes	Yes	Yes	Yes	Yes
Autocrossing		No	No	No	No	No
Number of connection resources		32	32	32	32	32
Functionality						
• PROFINET IO Controller		No	No	No	No	No
• PROFINET IO Device		No	No	No	No	No
• PROFINET CBA		No	No	No	No	No
PROFINET functions						
• Detection of accessible nodes, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the IP address, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Assignment of the device name, supported		Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP	Yes; DCP
• Topology recognition, supported		Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP	Yes; LLDP, LLDP MIB, SNMP
• Extended network diagnostics with Standard MIB II, supported		Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP	Yes; Standard MIB II, SNMP
Communication functions						
PG/OP communication		Yes	Yes	Yes	Yes	Yes
Global data communication						
• supported		No	No	No	No	No
S7 basic communication						
• supported		No	No	No	No	No
S7 communication						
• supported		Yes	Yes	Yes	Yes	Yes
• as server		Yes	Yes	Yes	Yes	Yes
• As client		Yes	Yes	Yes	Yes	Yes
Open IE communication						
• TCP/IP		Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32	32	32	32	32
- Data length, max.		32 kbyte	32 kbyte	32 kbyte	32 kbyte	32 kbyte
• ISO-on-TCP (RFC1006)		Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32	32	32	32	32
- Data length, max.		32 kbyte	32 kbyte	32 kbyte	32 kbyte	32 kbyte
• UDP		Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs	Yes; Via integrated PROFINET interface (X1) and loadable FBs
- Number of connections, max.		32	32	32	32	32
- Data length, max.		1 472 byte	1 472 byte	1 472 byte	1 472 byte	1 472 byte

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Technical specifications (continued)

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
Number of connections						
• overall		64	64	64	64	64
• usable for PG communication						
- reserved for PG communication		1	1	1	1	1
• usable for OP communication						
- reserved for OP communication		1	1	1	1	1
S7 message functions						
Number of login stations for message functions, max.		62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; The alarm functions cannot currently be used for central bus modules	62; 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	Yes; Alarm_S
Test commissioning functions						
Status/control						
• Status/control variable		Yes	Yes	Yes	Yes	Yes
Forcing						
• Forcing		No	No	No	No	No
Diagnostic buffer						
• present		Yes	Yes	Yes	Yes	Yes
EMC						
Emission of radio interference acc. to EN 55 011						
• Limit class A, for use in industrial areas	Yes	Yes	Yes	Yes	Yes	Yes
Degree and class of protection						
IP20	Yes	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates						
CE mark	Yes	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	Yes; Included in cULus
cULus	Yes	Yes	Yes	Yes	Yes	Yes
RCM (former C-TICK)	Yes	Yes	Yes	Yes	Yes	Yes
FM approval	Yes	Yes	Yes	Yes	Yes	Yes
Ambient conditions						
Operating temperature						
• Min.	0 °C	0 °C	0 °C	0 °C	0 °C	0 °C
• Max.	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Storage/transport temperature						
• Min.	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
• Max.	70 °C	70 °C	70 °C	70 °C	70 °C	70 °C
Vibrations						
• Operation, checked according to IEC 60068-2-6	Yes	Yes	Yes	Yes	Yes	Yes
• Transport tested checked to IEC 60068-2-6	Yes	Yes	Yes	Yes	Yes	Yes
Shock test						
• checked according to IEC 60068-2-27	Yes	Yes	Yes	Yes	Yes	Yes
• checked according to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes
Shock testing						
• checked according to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes
• Operation, checked according to IEC 60068-2-29	Operation, tested according to IEC 60068-2-27	Operation, tested according to IEC 60068-2-27	Operation, tested according to IEC 60068-2-27	Operation, tested according to IEC 60068-2-27	Operation, tested according to IEC 60068-2-27	Operation, tested according to IEC 60068-2-27
• Storage/transport, checked to IEC 60068-2-29	Yes	Yes	Yes	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7677-1DD10-0BA0 SIMATIC S7-mEC, EC31	6ES7677-1DD10-0BB0 S7-mEC, EC31-RTX	6ES7677-1FD10-0FB0 S7-mEC, EC31-RTX F	6ES7677-1DD10-0BF0 S7-mEC, EC31-HMI/RTX 128PT	6ES7677-1DD10-0BG0 S7-mEC, EC31-HMI/RTX 512PT	6ES7677-1DD10-0BH0 S7-mEC, EC31-HMI/RTX 2048PT
Configuration						
Configuration software						
• STEP 7		Yes	Yes; STEP7 V5.5 and higher / S7 Distributed Safety option package V5.4 + SP5 and higher	Yes	Yes	Yes
programming						
• Programming language						
- LAD		Yes	Yes	Yes	Yes	Yes
- FBD		Yes	Yes	Yes	Yes	Yes
- STL		Yes	Yes	Yes	Yes	Yes
- SCL		Yes	Yes	Yes	Yes	Yes
- CFC		Yes	Yes	Yes	Yes	Yes
- GRAPH		Yes	Yes	Yes	Yes	Yes
- HiGraph®		Yes	Yes	Yes	Yes	Yes
Dimensions						
Width	160 mm	160 mm	160 mm	160 mm	160 mm	160 mm
Height	125 mm	125 mm	125 mm	125 mm	125 mm	125 mm
Depth	115 mm	115 mm	115 mm	115 mm	115 mm	115 mm
Weights						
Weight, approx.	1.5 kg	1.5 kg	1.5 kg	1.5 kg	1.5 kg	1.5 kg

Ordering data

	Article No.
SIMATIC S7-modular Embedded Controller	
EC31 Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard preinstalled, Software Development Kit (SDK) for creating C/C++ applications with accesses to central I/O modules	**6ES7677-1DD10-0BA0**
EC31-RTX Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard and WinAC RTX 2010 preinstalled	**6ES7677-1DD10-0BB0**
EC31-RTX F Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard and WinAC RTX F 2010 preinstalled	**6ES7677-1FD10-0FB0**
EC31-HMI/RTX Intel CoreDuo 1.2 GHz processor Memory configuration: 1 GB RAM, 4 GB Flash Disk; interfaces: 1 Industrial Ethernet port, 2 PROFINET ports, 2 USB ports, 1 slot for multimedia card; Software: Windows Embedded Standard, WinAC RTX 2010, SIMATIC SOFTNET-S7/V7.0 Lean preinstalled	
• With WinCC flexible 2008 RT 128 PT	**6ES7677-1DD10-0BF0**
• With WinCC flexible 2008 RT 512 PT	**6ES7677-1DD10-0BG0**
• With WinCC flexible 2008 RT 2048 PT	**6ES7677-1DD10-0BH0**
Accessories	
EM PCI-104 expansion module For fitting up to 3 additional PCI-104 cards	**6ES7677-1DD60-1AA0**
EM PC expansion module 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	**6ES7677-1DD50-2AA0**

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Overview



- Expansion modules for SIMATIC S7-modular Embedded Controller EC31
  - EM PCI-104 for additionally accommodating up to 3 PCI-104 cards
  - EM PC with additional PC interfaces and slots for memory media

Technical specifications

	6ES7677-1DD60-1AA0 EM PCI-104	6ES7677-1DD50-2AA0 EM PC
General information		
Hardware product version	01	01
Input current		
from expansion bus	100 mA	580 mA
Power losses		
Power loss, typ.	2.4 W; Without inserted PCI-104 cards	9 W
Power loss, max.		14 W
Hardware configuration		
Integrated power supply	Yes	No
Interfaces		
Number of USB interfaces	0	2
serial interface	0	1x V.24 (RS232)
Industrial Ethernet		
• Industrial Ethernet interface		Onboard, 10/100/1 000 Mbit/s, RJ45
Ambient conditions		
Operating temperature		
• Min.	0 °C	0 °C
• max.	50 °C	50 °C
Dimensions		
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
Weights		
Weight, approx.	0.5 kg	0.4 kg

Ordering data

	Article No.
EM PCI-104 expansion module For fitting up to 3 additional PCI-104 cards	**6ES7677-1DD60-1AA0**
EM PC expansion module Additional connection options: 1 DVI-I interface, 2 USB interfaces, 1 Gigabit Ethernet interface, 1 serial interface, 1 slot for CF card, 1 slot for SD card/Micro Memory Card	**6ES7677-1DD50-2AA0**

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SIMATIC IPC227D Bundles

Overview



- A quick start in automation solutions with embedded PC platforms
  - SIMATIC WinAC RTX or SIMATIC WinAC RTX F preinstalled on SIMATIC IPC227D and ready for use
  - PROFINET RT and Industrial Ethernet pre-configured for use in a SIMATIC environment
  - Optional WinCC RT Advanced for visualization tasks in parallel with SIMATIC WinAC RTX
  - Configuration and programming with SIMATIC STEP 7 via Industrial Ethernet or PROFINET
- Safety requirements up to SIL 3 in accordance with IEC 61508/62061 or EN ISO 13849-1 up to PL e can be implemented with WinAC RTX F.
- Rugged operation
  - Hard-disk-free operation with CompactFlash card (CF card) or solid-state drive and Windows Embedded Standard 2009 or Windows Embedded Standard 7, 32-bit
  - Fan-free operation
  - 128 KB of retentive data for WinAC RTX, also without uninterruptible power supply (UPS)
- Flexibility of a PC-based automation environment
  - Use of WinAC ODK with SIMATIC WinAC RTX or SIMATIC WinAC RTX F (read-only for fail-safe program section)
  - Connection option for USB devices, flat panel monitor or screen
  - PCIe cards can be plugged in

Technical specifications

See "PC-based Automation -> Industry PC -> Box PC -> SIMATIC IPC227D"

Ordering data

	Article No.
SIMATIC IPC227D	**6ES7647- 8 A ■ ■ ■ - ■ ■ ■ ■**
Atom E620 (600 MHz), 512 MB RAM, without drive, with CF slot, COM1: RS232, without operating system, device version: Base, DIN rail, 1 x DVI-D graphics interface 2 x 10/100/1 000 Mbps Ethernet RJ45 4 x USB V2.0 (high current) CompactFlash slot 24 V DC industrial power supply	
Processors / memory configuration / NVRAM	
• Atom E620 (600 MHz), 512 MB RAM	**A**
• Atom E620 (600 MHz), 512 MB RAM, NVRAM	**B**
• Atom E640 (1.0 GHz), 1 GB RAM	**E**
• Atom E640 (1.0 GHz), 1 GB RAM, NVRAM	**F**
• Atom E660 (1.3 GHz), 2 GB RAM	**G**
• Atom E660 (1.3 GHz), 2 GB RAM, NVRAM	**H**
Drives	
• Without drive, with CF slot	**0**
• 320 GB HDD SATA	**1**
• 160 GB Solid-State Drive SATA	**2**
• 80 GB Solid-State Drive SATA	**4**
• 2 GB SIMATIC IPC CompactFlash	**5**
• 4 GB SIMATIC IPC CompactFlash	**6**
• 8 GB SIMATIC IPC CompactFlash	**7**
• 16 GB SIMATIC IPC Compact-Flash	**8**
COM interface	
• COM1: RS232	**0**
• COM1: RS485	**1**
• COM1: CAN	**2**
Operating system	
• Without operating system	**0**
• Windows Embedded Standard 2009 preinstalled (CF from 2 GB/SSD/HD)	**1**
• XP Prof. MUI preinstalled on SSD/HD	**2**
• Windows Embedded Standard 7 (32-bit) preinstalled (CF from 4 GB/SSD/HD)	**3**
• Windows 7 (32-bit) MUI preinstalled on SSD/HD	**4**

More information

Delivery

Production and delivery of the devices will typically be completed within 15 business days after receipt of order. The hardware and mass memory with the complete, pre-installed, ready-to-use software are supplied fully assembled.

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Overview



SIMATIC IPC427D (Microbox PC): The powerful embedded IPC – maintenance-free with versatile configuration

Ready-to-run, complete solutions (software is already installed and preconfigured) for visualization and automation in connection with WinCC RT Advanced and/or WinAC RTX.

- Ultra-compact
- Maintenance-free
- Third generation Intel Core i technology
- Current product versions of the pre-installed software:
  - SIMATIC WinCC RT Advanced V13
  - SIMATIC WinAC RTX 2010
  - SIMATIC Net V12.1

Benefits

High data processing speed for high productivity

- Up to Core i 7, fan-free
- DDR3 memory technology up to 8 GB

Maximum compactness and ruggedness for use directly on the machine

- Low mounting depth, ambient temperature up to 55 °C
- Upright mounting as second standard mounting position (ambient temperature 50 °C)
- Solid State Drive (SSD) (50 GB high endurance or 80 GB standard, optional), SATA hard disk, or up to two CFast cards with 16 GB

High degree of industrial functionality and flexibility for implementing embedded solutions

- Flexible memory concepts (e.g. second mass storage unit possible)
- 2 x LAN 10/100/1000 Mbit/s connections; teaming capability
- Onboard PROFIBUS or PROFINET interface (optional)
- 4 x high-speed USB 3.0 ports; 2 serial interfaces (2nd interface is optional)
- Flexible installation with mounting options (rail, wall, front upright mounting)
- Simple expansion capability (up to 2 x PCIe slots)
- On-off switch

High system availability in order to reduce the risk of potential failures and maintenance costs

- Maintenance-free since no rotating parts (fans, hard disks) and operation without battery possible
- 512 KB NVRAM can be written by WinAC RTX
- Front LED for efficient self-diagnostics; optimized for headless operation through special BIOS properties
- SIMATIC software system-tested

High investment security in order to reduce engineering costs

- Long-term availability: Service and support period of 8 to 10 years after market launch
- Installation and interface compatibility with predecessor versions as of 2004

Technical specifications

See "PC-based Automation -> Industry PC -> Box PC -> SIMATIC IPC427D"

Ordering data

	Article No.
SIMATIC IPC427D (Box PC)	**6AG4140- ■ ■ ■ ■ ■ ■ - ■ ■ ■ ■**
Processor and field bus	
Mounting accessories	
Main memory/NVRAM/ECC	
Expansions/interfaces	
Operating system	
Mass storage, externally accessible	
Internal mass storage	
SIMATIC Software preinstalled (bundles, only with Windows Embedded Standard 7)	
Power supply	

For detailed ordering data see ST 80 / ST PC "Industrie PC -> Box PC -> SIMATIC IPC427D" or on the internet under:

http://www.automation.siemens.com/mcms/pc-based-automation/en/embedded-bundles

More information

Delivery

Production and delivery of the devices will typically be completed within 15 business days after receipt of order. The hardware and mass memory with the complete, pre-installed, ready-to-use software are supplied fully assembled.

Commissioning

Before the control or visualization application is complete, simply perform the following steps:

- Optional: Installation and setup of additional software on the device
- Optional: Installation and setup of other software on the device
- Transfer of the engineering projects from STEP 7 or WinCC Advanced
- Transfer of the supplied license keys for SIMATIC software
- Backup of the installed software and protection of the flash-based mass memory by switching on the Enhance Write filter

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SIMATIC IPC277D bundles

Overview



SIMATIC IPC277D for implementing simple visualization and control tasks

- High degree of flexibility when selecting rugged widescreen fronts from 7" to 19" for more freely configurable display area
- High resolution, large viewing angle and up to 100% dimmable backlighting for brilliant display with optimized power consumption
- Absolutely maintenance-free due to the use of CompactFlash and SSD as mass storage and fanless operation up to 50 °C ambient temperature
- Maximum industrial functionality due to non-volatile retentive memory for battery-free operation
- Ready-to-run embedded bundles with visualization or/and control software

The following front installation versions are available:

- 7" Touch
- 9" Touch
- 12" Touch
- 15" Touch with front USB interface
- 19" Touch with front USB interface
- All fronts in widescreen design

Benefits

SIMATIC IPC277D

- Rugged, industry-standard widescreen displays (Touch) with 7" / 9" / 12" / 15" / 19"
  - High resolution, 16 million colors, large viewing angle, dimmable from 0 to 100% (this also optimizes the power consumption)
  - Integrated front concept (Panel PC, Comfort Panels)
  - Fanless up to 50°C ambient temperature

High-performance data processing at low power consumption

- Intel Atom technology of the Power-Optimized family E6xx
- Wake-on-LAN for remote-controlled switching between stand-by and active state
- Support of Sleep States/SpeedStep -> dynamic power adaptation depending on the required computing performance
- Intel VT-x technology for virtualization

High degree of industrial functionality and flexibility for implementing the embedded solution

- Flexible memory concepts: CompactFlash or Solid-State Drive
- 2 Gbit Ethernet (teaming-capable); PROFINET with RT functionality (via Standard Ethernet)
- 3 high-speed USB 2.0 ports
- 1 RS232
- Ready-to-run embedded bundles with WinAC RTX2010 and/or WinCC RT Advanced (optional)
- 512 KB retentive memory (MRAM), of which 128 KB can be written to within the buffer time (optional)
- Retentive message buffer for alarms (WinCC RT Advanced)

High system availability in order to reduce the risk of potential failures and maintenance costs

- Maintenance-free since there are no rotating parts (fans, HDD)
- Battery-free operation even if retentive memory option is selected (over the network with time-of-day synchronization)
- Comprehensive self-diagnostics by means of pre-installed local diagnostics software SIMATIC IPC DiagBase

High investment security in order to reduce engineering costs

- Long-term availability: Service and support period of 8 – 10 years after market launch

Technical specifications

See "PC-based Automation -> Industry PC -> Panel PC -> SIMATIC IPC277D"

Ordering data

	Article No.
SIMATIC IPC277D Nanopanel PC	**6AV7881- ■ A ■ 0 0 - ■ ■ ■ 0**
Operating unit	
Processors / memory configuration / NVRAMC	
Drives	
Operating System	
Software bundles	

For detailed ordering data see ST 80 / ST PC "Industrie PC -> Box PC -> SIMATIC IPC427D" or on the internet under:

http://www.automation.siemens.com/mcms/pc-based-automation/en/embedded-bundles

More information

Delivery

Production and delivery of the devices will typically be completed within 15 working days after receipt of order. The hardware and mass memory with the complete, pre-installed, ready-to-use software are supplied fully assembled.

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Overview



SIMATIC IPC477D: The powerful embedded Panel PC – maintenance-free with versatile configuration

Ready-to-run, complete solutions (software is already installed and preconfigured) for visualization and automation in connection with WinCC RT Advanced and/or WinAC RTX.

- 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 even the harshest mechanical stress and is extremely reliable in operation
- Compact design
- Battery-independent retentive memory onboard
- High investment protection
- Fast integration capability
- Safety requirements up to SIL 3 in accordance with IEC 61508/62061 or EN ISO 13849-1 up to PL e can be implemented with WinAC RTX F

The following front versions are available:

- Built-in versions
  - 12" TFT Touch
  - 15" TFT Touch
  - 19" TFT Touch
  - 22" TFT Touch
  - 15" TFT Touch/Key
- Current product versions of the pre-installed SIMATIC software:
  - SIMATIC WinCC RT Advanced V13
  - SIMATIC WinAC RTX 2010 or SIMATIC WinAC RTX F 2010
  - SIMATIC NET V12.1 (including SIMATIC SOFTNET S7 Basis license)
  - and the combinations of the software packages listed above

Benefits

- Excellent industrial compatibility due to rugged construction, even when subjected to extreme vibration and shock
- High degree of investment protection thanks to assured availability of spare parts for a period of 5 years following the end of active marketing
- Excellent continuity of components for machine concepts with a long service life without any new engineering costs
- Cost and time savings due to service-friendly device design:
  - USB interfaces on the front and rear for quick and easy connection of additional hardware components
- High degree of industrial functionality thanks to integral PROFIBUS DP/MPI and PROFINET interfaces
- Maintenance-free due to lack of rotating components (fan and hard disk)
- High flexibility thanks to expansions (optional) such as PCIe, second RS232, DVD
- Minimization of downtimes thanks to high system availability
  - Efficient self-diagnostics (DiagBase and SIMATIC IPC DiagMonitor)
  - High reliability and security of an embedded platform
- An integral component of Totally Integrated Automation (TIA):
  - Enhanced productivity, minimization of engineering costs, reduction of lifecycle costs

Technical specifications

See "PC-based Automation -> Industry PC -> Panel PC -> SIMATIC IPC477D"

Ordering data

	Article No.
SIMATIC IPC477D	**6AV7240-** ■■■■■■ - ■■■■
Processor and fieldbus	
Operator control unit	
Main memory/NVRAM	
Expansions/interface	
Operating system	
Mass storage, externally accessible (without operating system)	
Internal mass storage	
SIMATIC Software preinstalled (bundles)	
Power supply	

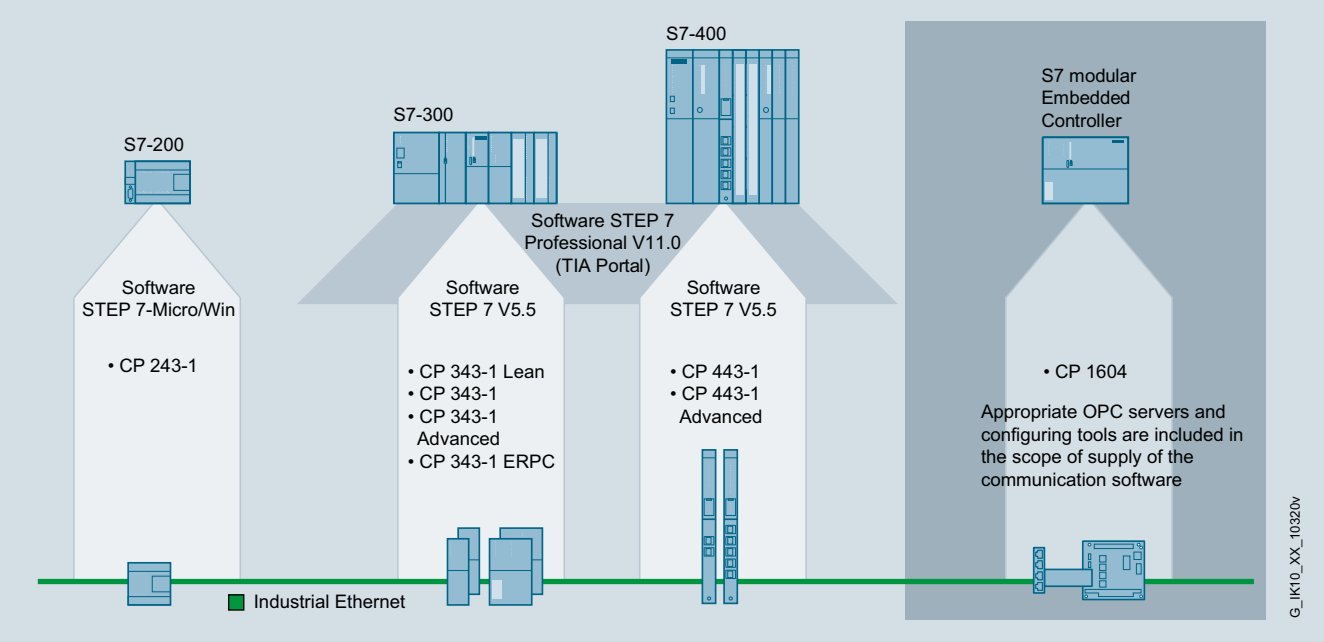
For detailed ordering data see ST 80 / ST PC "Industrie PC -> Box PC -> SIMATIC IPC427D" or on the internet under:

http://www.automation.siemens.com/mcms/pc-based-automation/en/embedded-bundles

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Overview



System connections for SIMATIC

Communication modules for SIMATIC allow further uses through additional functions using CPs such as security, integration in the customer's IT infrastructure, and network separation.
In addition, they allow flexible expansion with additional communication interfaces for PROFIBUS or PROFINET depending on needs.

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, CM 1542-1 for SIMATIC S7-1500.
- Designed for use in harsh industrial environments
- Shipbuilding certification for use on ships and offshore units
- Additional integrated 2-port switch for CP 343-1 Lean, CP 343-1, CP 443-1 and CM 1542-1, e.g. for setting up Industrial Ethernet segments in linear and ring structures
- Increased availability through support for Media Redundancy Protocol (MRP)
- 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 343-1 Advanced for SIMATIC S7-300
  - With security functionality (firewall and VPN)
  - 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 (10/100/1 000 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
- CP 343-1 ERPC optimized for linking to MES or ERP systems by means of additional partner software
- CP 443-1 Advanced for SIMATIC S7-400
  - With security functionality (firewall and VPN)
  - 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
  - Operation in SIMATIC H system for redundant S7 communication
  - Operation in fail-safe applications (PROFIsafe) together with SIMATIC S7-400 CPU 416F
- The CP 443-1 RNA (Redundant Network Access [1]) for interfacing to an S7-400 or S7-400H via the PRP redundancy protocol (Parallel Redundancy Protocol to IEC 62439-3) on parallel, separate networks, in which high reliability is required.
  The CP supports:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- CP 1243-1 for SIMATIC S7-1200
  - With security functionality (firewall and VPN)
  - With IT functionality
  - For remote diagnostics and remote maintenance
  - With TeleControl Basic functionality - rapid and flexible data communication via remote networks with caching of data values including automatic time stamping

[1] At Siemens Industry, RNA stands for hardware and software for implementing redundancy solutions. RNA contains the PRP V1 protocol in accordance with the IEC 62439-3 standard (Parallel Redundancy Protocol) as well as the HSR protocol in accordance with IEC 62439-3 (High-availability Seamless Redundancy Protocol).

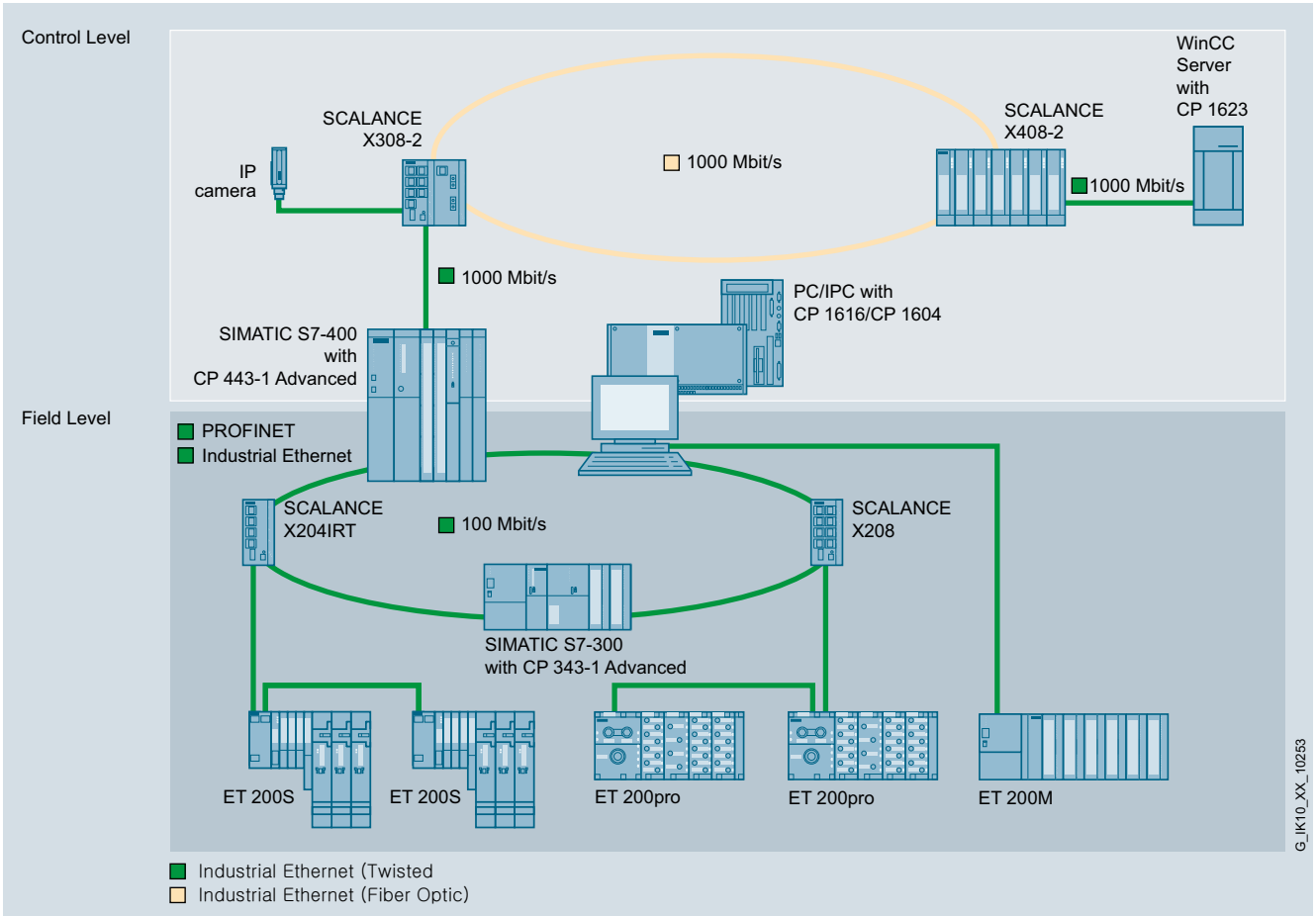
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Overview (continued)

- CP 1543-1 for SIMATIC S7-1500
  - With security functionality (firewall and VPN)
  - With IT functionality
  - For integrating the S7-1500 into IPv6 based networks. For the following communications services, an IP address according to IPv6 can be used:
    - FETCH/WRITE access (CP is server)
    - FTP server mode and FTP client mode with addressing via program block
    - E-mail transfer with addressing via program block

Setup of Industrial Ethernet segments with SIMATIC modules with integrated switch

To set up Industrial Ethernet segments in a line or ring topology, all PROFINET communication modules offer integrated 100 Mbit/s switches with at least 2 RJ45 ports. The integration of the switch in the terminal devices allows the setup of very flexible networks and saves cabling costs.



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Overview (continued)

	Hardware	PROFINET						Ethernet communication						IT communication						Security			Transport protocol						Time			Other			
		IO Controller	IO Device	IRT real-time	CBA	MRP	MRPD	Send/Receice	Fetch/Write	TSend/TReceive	S7 communication	PG/OP communication	S7 routing	Web diagnosis	own web pages	send e-mail	receive e-mail	Filetransfer client	Filetransfer server	Access List ACL	SPI firewall	VPN (IP-Sec)	ISO	TCP	UDP	IPv4	IPv6	IP routing	Sender	Receiver	Transfer	PRP	ERP Connect	SNMP	NTP
SIMATIC S7-200	CP 243-1										•	•		•	•	•		•	•					•		•							○	
SIMATIC S7-1200	S7-1200 CPUs	•								•	•	•	•	•	•									•	•	•				•			○	•
	CP 1243-1									•	•	•	•	•2)						•	•	•		•	•	•	○			•			○	•
SIMATIC S7-1500	CPU 1511-1 PN	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CPU 1513-1 PN	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CPU 1516-3 PN/DP	•	•	•		•				•	•	•	•	•	•					•				•	•	•			•	•			○	•
	CP 1543-1							•	•	•	•	•	•	•2)		•		•	•	•	•	•	•	•	•	•	○			•	•			•	•
	CM 1542-1	•		•		•					•	•	•	•2)		○1)								•	•	•				•	•			•	•
SIMATIC S7-300	S7-300 PN CPUs	•	•	•	•	•				•	○3)	•	•	•	•									•	•	•			•	•				•
	CP 343-1 Lean		•			•		•	•		•	•	•	•						•				•	•	•				•	•			•	•
	CP 343-1	•	•			•		•	•		•	•	•	•						•			•	•	•	•				•	•			•	•
	CP 343-1 Adv	•	•	•	•	•		•	•		•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•		•	•			•	•
	CP 343-1 ERPC							•	•		•	•	•	•						•				•	•	•			•	•	•		•	○	•
SIMATIC S7-400	S7-400 PN CPUs	•	•	•	•	•				•	•	•	•	•	•									•	•	•			•	•				•
	CP 443-1	•		•		•		•	•	○4)	•	•	•	•						•			•	•	•	•					•			•	•
	CP 443-1 Adv	•		•	•	•		•	•	○4)	•	•	•	•	•	•		•	•	•		•	•	•	•	•		•			•			•	•
	CP 443-1 RNA							•	•	•	•	•	•	•						•			•	•	•	•					•	•		•	•

1) SMTP pass-through only
2) via S7-1200/1500 CPU
3) Server (S) only
4) pass-through only

• applies
○ with reservations

G_IK10_XX_10369

Communications overview for SIMATIC

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Overview



The CP 1243-1 communications processor is used for connecting a SIMATIC S7-1200 to the TeleControl Server Basic control center software via Ethernet, and for safe communication via IP-based networks.

The CP has the following features:

- Ethernet-based connection to TeleControl Server basic, e.g. via Internet
- Data transfer of measured values, control variables, or alarms optimized for telecontrol systems
- Automatic sending of alert emails
- Data buffering of up to 64.000 values ensures a secure database even with temporary connection failures
- Secure communication via VPN connections based on IPSec
- Access protection by means of Stateful Inspection Firewall
- Clearly laid out LED signaling for fast and easy diagnostics
- Compact industrial enclosure in S7-1200 design for mounting on a standard mounting rail
- Fast commissioning thanks to easy configuration using STEP 7

Benefits

get Designed for Industry

- **Data security**
  The CP 1243-1 has a large buffer for several thousand data values. Downtimes in the transmission link can then be bridged.
- **Fully automatic time stamp**
  To enable subsequent and correct archiving of process data in the control system, all data frames are assigned with a time stamp at their place of origin.
- **Fast and flexible data communication**
  Operators are therefore quickly provided with alarms, statuses and values from the process, and they can influence process control by entering commands or setpoints at any time.
- **Simple and low-cost engineering**
  The cyclic or event-controller transfer of measurements, setpoints or alarms can be implemented in only a few operations and without programming effort.
- **Remote diagnostics**
  Saving of traveling and maintenance costs due to cost-effective remote programming, diagnostics, control and monitoring via the Internet
- **Industrial Security**
  Securing the system against unauthorized access by means of
  - Central access protection for any devices within an automation cell, e.g. by means of authentication of the network stations
  - Secure remote access via the Internet by means of data encryption (VPN) and data integrity checking

Application

By using the CP 1243-1, the S7-1200 can be used as a remote terminal unit (substation) in telecontrol applications. Typical uses include the collection of measured values in geographically widely distributed outdoor areas (level measurement for water tanks) or centralized opening and closing of valves (oil/gas transport in pipelines).

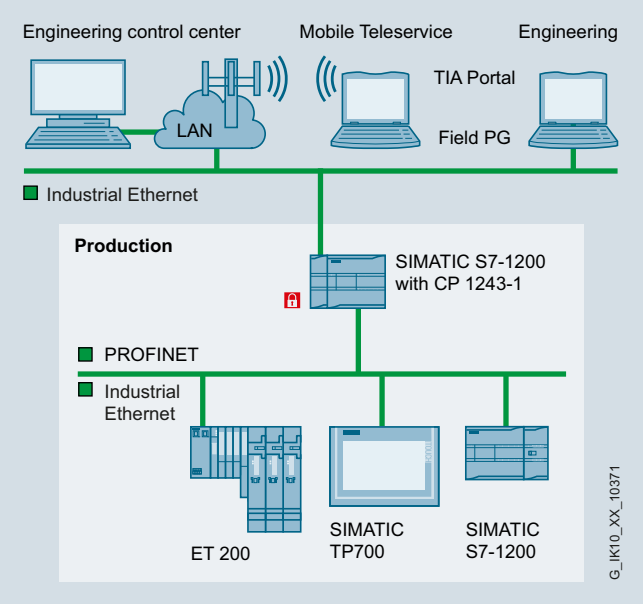
- Plants in water, wastewater or environmental sectors:
  - Irrigation systems
  - Drinking water supply
- Monitoring of power networks for consumption metering and cost control
  - District heating networks
  - Wind farms
- Plants in the oil and gas sector
  - Oilfield water injection
  - Pipelines

Regardless of the telecontrol features of the CP, it can also be used for purely security applications if the automation system is to be connected securely to a higher-level IT network. This protects the SIMATIC S7-1200 against unauthorized access from an Ethernet network. The CP 1243-1 allows safe access via a LAN and allows data transfer between devices or network segments to be protected from data manipulation/espionage.

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Design (continued)



Cell protection for SIMATIC S7-1200 with CP 1243-1 (Security Integrated)

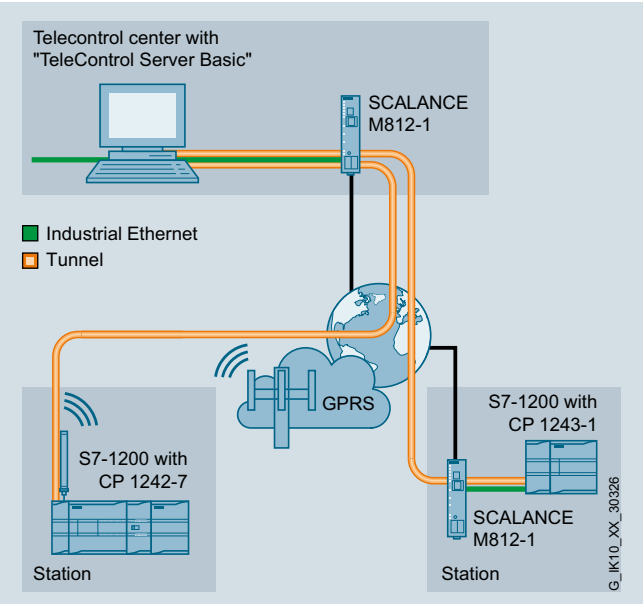
Design

The CP 1243-1 offers all the advantages of the S7-1200 design:

- Rugged, compact plastic enclosure
- Easily accessible connection and diagnostics elements, protected by front flaps
- Simple mounting on the mounting rail of the S7-1200

The CP 1243-1 DNP3 is plugged into the left-hand system bus interface of the S7-1200. Power is supplied directly via the S7-1200. No additional wiring is necessary. Any required modems or routers are connected via the Ethernet interface on the underside of the module.

Function



Connection of the S7-1200 to TeleControl Servers via mobile wireless and DSL Internet access

The CP 1243-1 is a communication module for the S7-1200. The module allows the S7-1200 to be connected as a remote station to TeleControl Server basic in just a few steps.

Completely configurable application through "data point configuration"

The introduction of the "data point configuration" in STEP 7 dispenses with all programming effort for transfer of data to the control center.

The data of the CPU relevant to the control center is selected via user-friendly "item browsing" in STEP 7. In a clearly-arranged menu, the data transfer parameters are then assigned to the data points selected in this way. The cyclic or event-controller transfer of measurements, setpoints or alarms can thus be implemented in only a few operations and without programming effort.

Data backup

Data losses are prevented by the data buffering mechanisms integrated in the product.

In the event of a connection failure, up to 64,000 time-stamped values are buffered. When the connection returns, the buffered values are automatically transferred to the control center in the right order.

E-mail alerting

Alert e-mails can be configured for timely provision of stations' states to service or maintenance personnel. If previously defined events (such as threshold violation) should occur, application-specific information is sent automatically by e-mail.

Diagnostics

The CP 1243-1 offers comprehensive diagnostic options for a quick and informative analysis of the station status. Elementary diagnostic information about the connection to the control center is signaled directly via LEDs at the CP.

Using STEP 7, comprehensive information can be retrieved, such as connection history, buffer status, and the transferred measured values.

Remote maintenance

For remote access from the control center to the substation, the CP provides a remote maintenance port in parallel with process operation. This ensures access for monitoring and program changes.

Interfaces

The CP 1243-1 has an Ethernet interface to connection to the control center. The S7-1200 can be connected via an existing network or via other media by using additional routers (e.g. SCALANCE M for Internet connection via DSL).

Power supply

Extra wiring for the CP power supply is not required. Power is supplied directly via the backplane bus of the S7-1200.

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Technical specifications

Article No.	6GK7243-1BX30-0XE0
Product-type designation	**CP 1243-1**
Transmission rate	
Transfer rate	
• at the interface 1	10 … 100 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
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Resistive loss	1.25 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	-20 … +60 °C
• for horizontal installation during operating phase	-20 … +70 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1200 single width
Width	30 mm
Height	110 mm
Depth	75 mm
Net weight	0.122 kg
Product properties, functions, components general	
Number of modules	
• per CPU maximum	3

Article No.	6GK7243-1BX30-0XE0
Product-type designation	**CP 1243-1**
Performance data	
Performance data open communication	
• note	like CPU
Performance data S7 communication	
Number of possible connections for S7 communication	
• note	like CPU
Performance data telecontrol	
Suitability for use	
• node station	No
• substation	Yes
• control center	No
Connection to the control center	STEP 7 Basic/Professional V13 (TIA Portal) or higher + HSP
• note	Connection to SCADA Systems via TeleControl Server Basic
• by means of a permanent connection	supported
Protocol is supported	
• DNP3	No
• IEC 60870-5	No
Product function data buffering if connection is aborted	Yes
• note	64.000 values
Number of data points per station maximum	200
Performance data Teleservice	
Diagnostic function online diagnostics with SIMATIC STEP 7	Yes
Product function	
• program download with SIMATIC STEP 7	Yes
• remote firmware update	Yes
Product functions management, configuration	
Configuration software required	STEP 7 Basic/Professional V13 (TIA Portal) or higher + HSP
Product functions Security	
Design of the firewall	stateful inspection
Product function with VPN connection	IPSec
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections for VPN connection	8
Product function	
• password protection for Web applications	No
• ACL - IP-based	No
• ACL - IP-based for PLC/routing	No
• switchoff of non-required services	Yes
• blocking of communication via physical ports	No
• log file for unauthorized access	No
Product functions Time	
Protocol is supported NTP	No

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Ordering data

	Article No.
Communications processor CP 1243-1 Communications processor for connection of SIMATIC S7-1200 to TeleControl Server Basic or for secure connection via IP-based networks	**6GK7243-1BX30-0XE0**
Accessories	
TeleControl Server Basic V3.0 Software for 8 to 5 000 stations; Single License for one installation; OPC (UA) server for GPRS and Ethernet/Internet communication with SIMATIC S7-1200 and SIMATIC S7-200 (GPRS only); connection management to remote stations; routing for connections between S7 stations; German and English operator interface; for Windows 7 Professional 32/64-bit + Service Pack 1 Windows 7 Enterprise 32/64-bit + Service Pack 1 Windows 7 Ultimate 32/64-bit + Service Pack 1 Windows Server 2008 32-bit + Service Pack 2 Windows Server 2008 R2 Standard 64-bit Service Pack 1	
• **TeleControl Server Basic 8 V3** Connection management for 8 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AA0**
• **TeleControl Server Basic 32 V3** Connection management for 32 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AF0**
• **TeleControl Server Basic 64 V3** Connection management for 64 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AB0**
• **TeleControl Server Basic 256 V3** Connection management for 256 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AC0**
• **TeleControl Server Basic 1000 V3** Connection management for 1 000 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AD0**
• **TeleControl Server Basic 5000 V3** Connection management for 5 000 SIMATIC S7-1200 or S7-200 stations	**6NH9910-0AA21-0AE0**
• **TeleControl Server Basic UPGR V3** Upgrade package from Version V2.x to V3 for all license sizes	**6NH9910-0AA21-0GA0**
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	**6GK7277-1AA10-0AA0**

	Article No.
Accessories (continued)	
IE FC RJ45 Plugs RJ45 plug connector for Industrial Ethernet with a rugged metal housing 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
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 1 000 m; minimum order 20 m	**6XV1840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**
STEP 7 Basic Engineering Software V13 (TIA Portal) *Target system:* SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional (64 bit), Windows 7 Enterprise (64 bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64 bit), Windows 8.1 Professional (64 bit), Windows 8.1 Enterprise (64 bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Form of delivery:* German, English, Chinese, Italian, French, Spanish	
• STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
• STEP 7 Basic V13, Trial License	**6ES7822-0AA03-0YA7**
• Upgrade STEP 7 Basic V12 to STEP 7 Professional Basic V13, Floating License	**6ES7822-0AA03-0YE5**
Software Update Service For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration. Requires the current software version.	
• STEP 7 Basic V1x, Software Update Service Standard, 1 year	**6ES7822-0AA00-0YL0**
• STEP 7 Basic V1x, Software Update Service Compact, 1 year;	**6ES7822-0AA00-0YM0**

More information

Technical requirements/compatibility

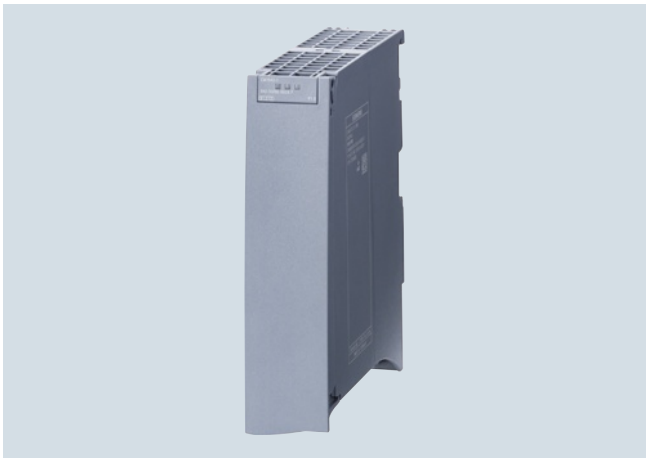
A S7-1200 CPU with firmware version 3 is required to operate the CP 1243-1.

The CP 1243-1 can be configured with STEP 7 Basic/Professional V13 (TIA Portal) or higher.

The TeleControl Server Basic V3 software package is required to connect to the PCS 7/WinCC control center systems.

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●	●	●		●	●

G_IK10_XX_10363

Communication module for connecting a SIMATIC S7-1500 to PROFINET networks as PROFINET IO controller.

The CM 1542-1 supports the following communication services:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication;
  web diagnose by means of access to the Web server of the S7-1500 system

Benefits

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- High level of plant availability due to support of media redundancy (MRP)
- Optimum support of maintenance due to
  - Web-based diagnostics
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without a PG

Application

The CM 1542-1 is used to connect the SIMATIC S7-1500 to PROFINET networks. With its own processor, it relieves the CPU of communications tasks and facilitates additional connections.

The CM 1542-1 provides communication options with:

- PGs/PCs,
- master computers
- operator control and monitoring systems,
- SIMATIC S5/S7 systems
- PROFINET IO devices
- Remote programming via LAN

Design

The CM 1542-1 features all the advantages of the SIMATIC S7-1500 design:

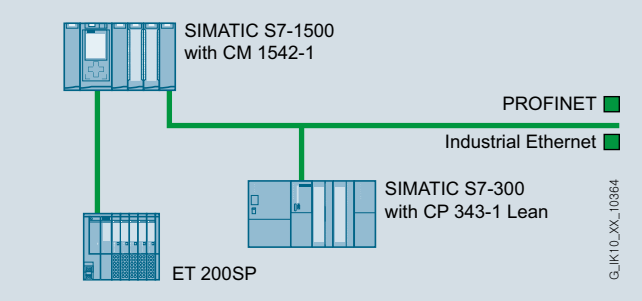
- Compact design:
  - Two RJ45 ports (integrated 2-port switch) for connecting to PROFINET with 10/100 Mbit/s full/half-duplex; automatic data rate detection through autonegotiation and autocrossing; connection via an IE FC RJ45 Plug 180 with180° cable outlet or via standard patch cable
  - The module is supplied with power via the integrated backplane bus
  - Three LEDs for displaying the operational and communications status of the module and two status LEDs (LINK/ ACTIVITY) under the front cover for the PROFINET interface
- Simple installation:
  The CM 1542-1 is mounted on the mounting rail of the S7-1500 and connected to the adjacent modules by means of the bus connectors.
- The CM 1542-1 can be operated without a fan; no backup battery is required.
- The module can be replaced without the need for a programming device.

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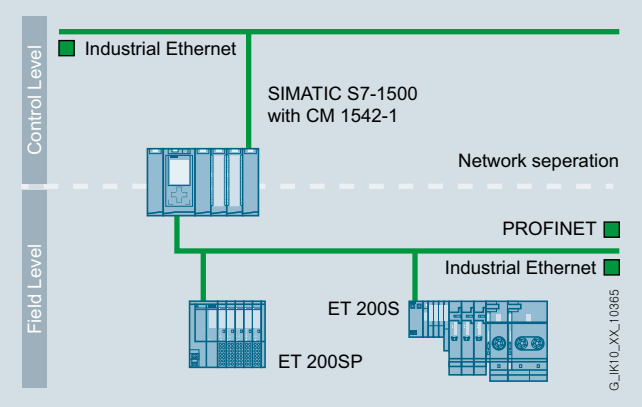
2

Function

- PROFINET IO controller for the connection of up to 128 PN IO devices
- Communications services of the interface:
  - Open communication (TCP/IP, UDP): Multicast with UDP
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server)
  - IT communication (HTTP(S), e-mail)
  - Certified PROFINET IO controller with real-time properties (RT and IRT)
  - IP addressing via DCP
- Media redundancy (MRP);
  - Within an Ethernet network with a ring topology, the CM supports the MRP media redundancy protocol as an MRP manager and/or as an MRP client
- Diagnostics and network management:
  - Extensive diagnostics functions for all modules in the S7-1500 system
  - Integration in network management systems through the support of SNMP V1
- Time synchronization via NTP
- Security mechanisms:
  - Access to the Web server via HTTPS
  - Secure firmware update
- Configuration of all functions with STEP 7 Professional V13 (TIA Portal) or higher
- Module replacement without programming device:
  All information can be stored on the memory card of the CPU.



Use as PROFINET IO controller for operating distributed I/O on PROFINET



Connection to a higher-level network with CM 1542-1 for network separation of the field level and control level

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Technical specifications

Article No.	6GK7542-1AX00-0XE0
Product-type designation	**CM 1542-1**
Transmission rate	
Transfer rate	
• at the interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	2
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at 15 V with DC	3 %
Current consumption from backplane bus at 15 V with DC typical	0.22 A
Resistive loss	3.3 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation during operating phase	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
• Comment	-
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.4 kg
Mounting type S7-1500 rail mounting	Yes
Product properties, functions, components general	
Number of modules	
• per CPU maximum	8
• note	depending on CPU type

Article No.	6GK7542-1AX00-0XE0
Product-type designation	**CM 1542-1**
Performance data	
Performance data open communication	
Number of possible connections for open communication via T-modules	
• maximum	64
• comment	depending on the system upper limit
Data volume as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Number of Multicast stations	16
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	64
• note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	64
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	64
Number of external PN IO lines with PROFINET per rack	10
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	8 Kibyte
• as useful data for output variables with PROFINET IO controller maximum	8 Kibyte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as user data for input variable per PN IO device per submodule as PROFINET IO controller maximum	256 byte
• as user data for output variables per PN IO device per submodule as PROFINET IO controller maximum	256 byte
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 Professional V13 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/ location designation	Yes

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Technical specifications (continued)

Article No.	6GK7542-1AX00-0XE0
Product-type designation	**CM 1542-1**
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes

Article No.	6GK7542-1AX00-0XE0
Product-type designation	**CM 1542-1**
Product functions Security	
Product function	
• switchoff of non-required services	Yes
• blocking of communication via physical ports	No
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

Ordering data

	Article No.
Communication module CM 1542-1 for connection of SIMATIC S7-1500 to PROFINET IO via TCP/IP, ISO-on-TCP, UDP S7 communication, IP broadcast/multicast, SNMPV1, time synchronization via NTP; 1 x RJ45 interface with 10/100 Mbit/s;	**6GK7542-1AX00-0XE0**
Accessories	
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a sturdy 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
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 applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**

	Article No.
Accessories (continued)	
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), , 1 x 10/100/1 000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

More information

You will find more information on SIMATIC S7-1500 at
http://www.siemens.com/simatic-s7-1500

The SIMATIC NET Selection Tool is available to assist in selecting the right Industrial Ethernet switches as well as the configuration of modular variants:

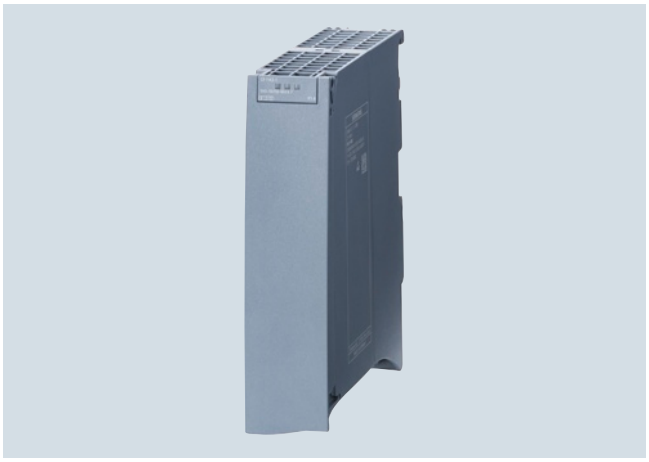
Online version:
http://www.siemens.com/snst

Offline version:
http://www.siemens.com/snst-download

You will find more information on the topic of Industrial Security on the Internet at:
http://www.siemens.com/industrialsecurity

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●			●		●	●

G_IK10_XX_10353

The SIMATIC CP 1543-1 communications processor securely connects the new SIMATIC S7-1500 controller to Industrial Ethernet networks. By combining a variety of security features such as an SPI (Stateful Packet Inspection) firewall, VPN and data encryption protocols such as FTPS and SNMPv3, the communications processor protects individual S7-1500 stations or even entire automation cells against unauthorized access.

The CP can also be used for linking the S7-1500 station into an IPv6-based network. All functions are configured by means of STEP 7 Professional V12 (TIA Portal) or higher.

The CP 1543-1 supports the following communications services:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE, FETCH/WRITE)
- IT communication
  - FTP functions (File Transfer Protocol FTP/FTPS) for file management and access to data blocks in the CPU (client and server function)
  - Sending e-mails via SMTP or ESMTP with "SMTP-Auth" for authentication on an e-mail server (also with IPv6)
- Security functions
  - Stateful Packet Inspection (layers 3 and 4) firewall
  - Secure communication via VPN (IPsec)
  - Secure access to the Web server of the CPU via the HTTPS protocol
  - Secure file transfer using FTPS
  - Secure transfer of the time of day (NTP)
  - SNMPv3 for tap-proof transfer of network analysis information
- Integration of the S7-1500 into IPv6-based networks;
  An IPv6-compliant IP address can be used for the following communication services:
  - FETCH/WRITE access (CP as server)
  - FTP server mode
  - FTP client mode with addressing by program block
  - E-mail transfer with addressing by program block

Benefits

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- Reachability of the SIMATIC S7-1500 station from an IPv6-based infrastructure
- Optimum support of maintenance due to
  - Simple diagnostics via the central Web server
  - Remote programming via LAN
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without a PG
- Securing the system against unauthorized access with
  - Central access protection for any S7 station
  - Secure access to the central Web server
- Network separation for setting up identical machines with the same IP address
- Simple alerting by e-mail and transfer of production data to master computer using FTP
- Protection of investment thanks to simple integration of the SIMATIC S7-1500 system in existing networks with SIMATIC S7-300 / S7-400 / S5 via Industrial Ethernet using the CP 1543-1

Application

The CP 1543-1 is used to connect the SIMATIC S7-1500 to Industrial Ethernet networks. With its own processor, it relieves the CPU of communications tasks and facilitates additional connections.

The CP 1543-1 provides communication options with:

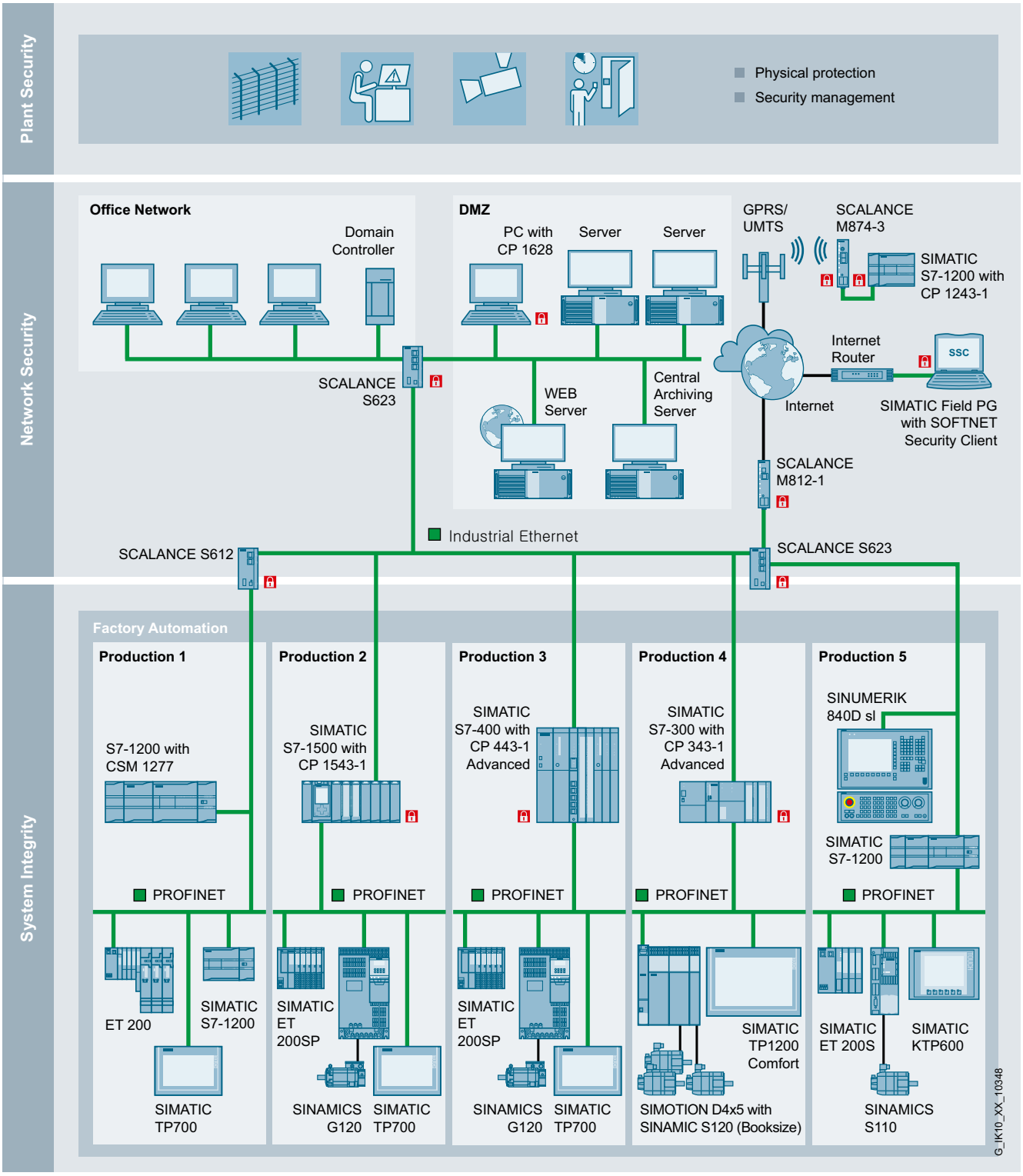
- PGs/PCs,
- master computers
- operator control and monitoring systems,
- other SIMATIC S5/S7 systems.

This can be used to protect the SIMATIC S7-1500 from unauthorized access from an Ethernet network. The CP 1543-1 allows safe remote access via a LAN and allows data transfer between devices or network segments to be protected from data manipulation/espionage.

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Application (continued)



Protection of the SIMATIC S7-1500 system from unauthorized access from the Industrial Ethernet network

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Design

The CP 1543-1 features all the advantages of the SIMATIC S7-1500 design:

- Compact design:
  - One RJ45 jack for connecting to Industrial Ethernet; automatic data rate detection using autosensing, autocrossing and autonegotiation; the connection is made via the IE FC RJ45 Plug 180 with 180° cable outlet or via a standard patch cable
  - The module is supplied with power via the integrated backplane bus
  - Three LEDs for displaying the operational and communications status of the module and one LED under the front cover for the Ethernet interface to display ACTIVITY and LINK.
- Simple installation:
  The CP 1543-1 is mounted on the rail of the S7-1500 and connected to the adjacent modules by means of the bus connectors.
- The CP 1543-1 can be operated without a fan; no backup battery is required.
- The module can be replaced without the need for a programming device.

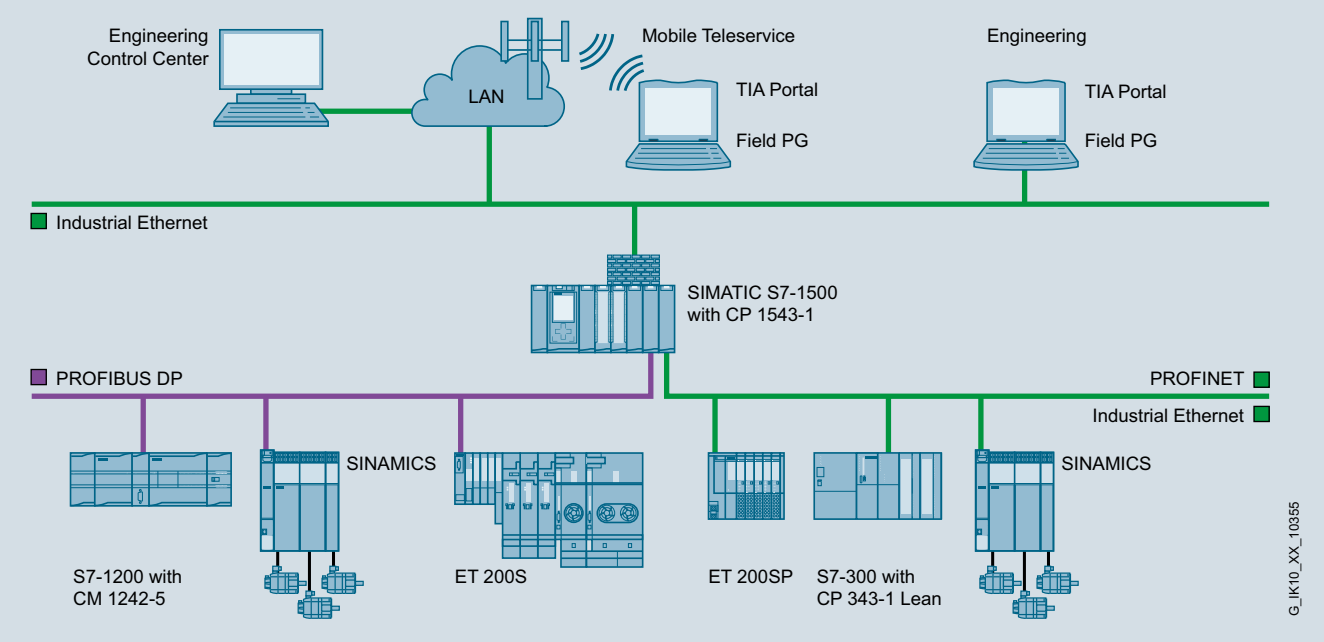
Function

- Gigabit interface with an RJ45 connector with 10/100/1 000 Mbps full/half duplex with autosensing functionality
- Communication services:
  - Open communication (TCP/IP, UDP, ISO): Multicast with UDP
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server)
  - IT communication:
    HTTP communication allows access to the Web server of the S7-1500 system. With the CP 1543-1, HTTPS communication is also possible.
    The e-mail client function allows the sending of e-mails directly from the user program.
    FTP communication allows program-controlled FTP client communication.
    Access to data blocks in the CPU via FTP server.
  - IP address assignment using DHCP with IPv4 or by entering the address directly in the engineering software
    STEP 7 Professional V12 or higher (TIA Portal)
- Diagnostics and network management:
  - Extensive diagnostics functions for all modules in the S7-1500 system
  - Integration in network management systems due to support of SNMP V1/V3
- Security mechanisms:
  - Access protection with firewall for filtering connections on the basis of their IP and MAC addresses
  - Secure communication via VPN (IPsec)
  - Encrypted HTML pages using SSL (HTTPS)
  - Secure file transfer (FTPS)
  - Tap-proof transfer of network analysis information to the network management system (SNMPv3)
  - Secure transfer of the time of day (NTP)
- Configuration of all functions with STEP 7 Professional V13 (TIA Portal) or higher
- Module replacement without programming device:
  All information can be stored on the memory card of the CPU.

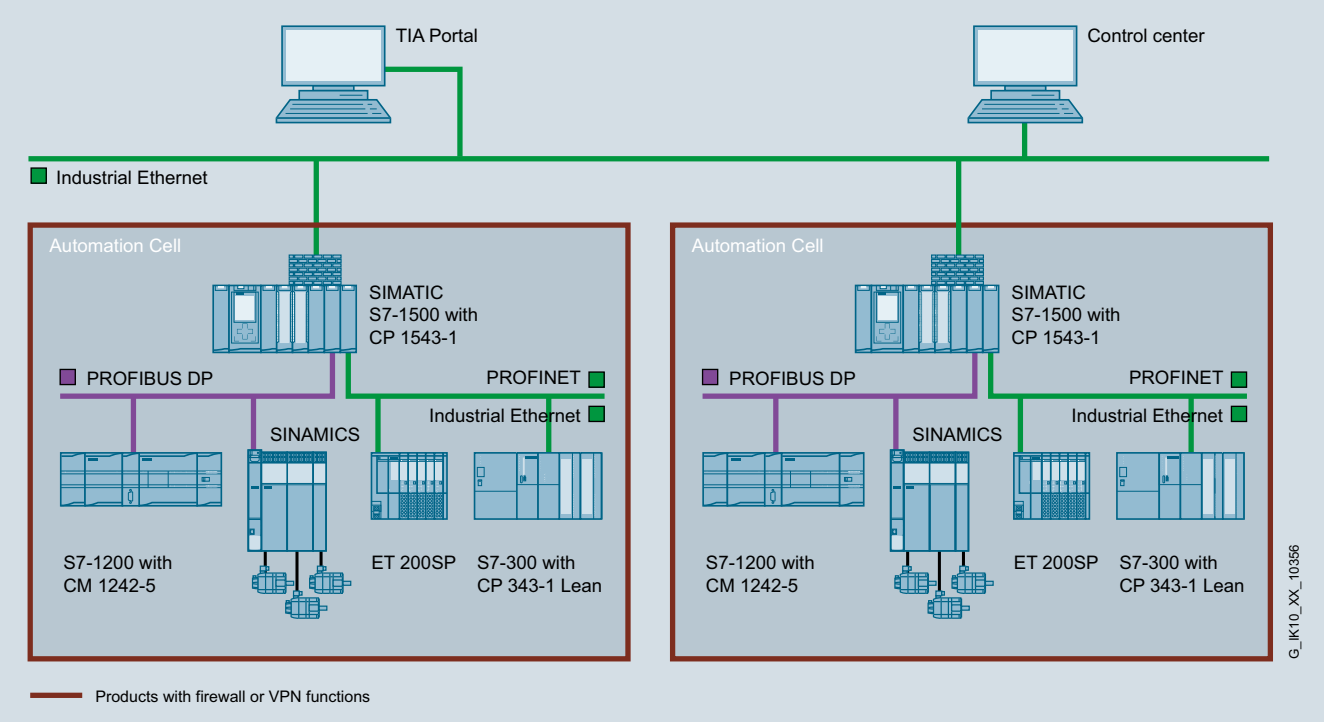
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Integration



Connection to a higher-level network with network separation and access protection (firewall function)



Connection to higher-level network and network separation of automation cells

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Technical specifications

Article No.	6GK7543-1AX00-0XE0
Product-type designation	**CP 1543-1**
Transmission rate	
Transfer rate	
• at the 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
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	15 V
Relative symmetrical tolerance at 15 V with DC	3 %
Current consumption from backplane bus at 15 V with DC typical	0.35 A
Resistive loss	5.3 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation 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 maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-1500 single width
Width	35 mm
Height	142 mm
Depth	129 mm
Net weight	0.35 kg
Mounting type S7-1500 rail mounting	Yes
Product properties, functions, components general	
Number of modules	
• per CPU maximum	8
• note	depending on CPU type
Performance data	
Performance data open communication	
Number of possible connections for open communication via T-modules	
• maximum	118
• comment	depending on the system upper limit
Data volume as user data per ISO on TCP connection for open communication by means of T blocks maximum	65 536 byte
Number of Multicast stations	118

Article No.	6GK7543-1AX00-0XE0
Product-type designation	**CP 1543-1**
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	118
• note	depending on the system upper limit
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	118
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	32
• as server	
- by means of FTP maximum	16
- by means of HTTP maximum	4
• as e-mail client maximum	1
Amount of data as useful data for e-mail maximum	64 Kibyte
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	No
Configuration software required	STEP 7 Professional V12 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/ location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions Security	
Design of the firewall	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections for VPN connection	16
Product function	
• password protection for Web applications	No
• ACL - IP-based	No
• ACL - IP-based for PLC/routing	No
• switchoff of non-required services	Yes
• blocking of communication via physical ports	No
• log file for unauthorized access	Yes
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data

	Article No.
CP 1543-1 communications processor for connection of SIMATIC S7-1500 to Industrial Ethernet via TCP/IP, ISO and UDP and Security functions; 1 x RJ45 interface with 10/100/1 000 Mbit/s; electronic manual on DVD	**6GK7543-1AX00-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbit/s) with a sturdy 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

	Article No.
Accessories *(continued)*	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
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 applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), , 1 x 10/100/1 000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

More information

You will find more information on SIMATIC S7-1500 at
http://www.siemens.com/simatic-s7-1500

The SIMATIC NET Selection Tool is available to assist in selecting the right Industrial Ethernet switches as well as the configuration of modular variants:

Online version:
http://www.siemens.com/snst

Offline version:
http://www.siemens.com/snst-download

You will find more information on the topic of Industrial Security on the Internet at:

http://www.siemens.com/industrialsecurity

Note:

For software ordering data, see page 2/584

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Overview



ISO	TCP	PN	MRP	IT	IP-R	PG/OP	S7
	●			●		●	●

Communications processor for connecting a SIMATIC S7-200 to Industrial Ethernet networks

The CP supports:

- PG/OP communication
- S7 communication
- IT communication

In addition, the CP 243-1 offers e-mail functions and user-created web pages and thus optimally supports maintenance and quality assurance. The Internet functions such as FTP allow connection to the most diverse PC-based systems.

Benefits

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- Process information can be accessed simultaneously (password protected) with standard Web browsers; software costs are reduced on the client side
- Low-cost bulk storage for data, statistics and HTML-based machine or plant documentation
- Simple universal linking of PLCs to different computers by means of FTP
- Local and worldwide transmission of event-driven messages by e-mail
- Time and cost savings due to fast and easy configuration, programming and monitoring from a central location via LAN
- Reduction of complexity and savings for networking all automation levels and devices since only Ethernet is required
- Simple startup and easy diagnostics options due to configuration support by STEP 7 Micro/WIN

Application

- The CP 243-1 communications processor is used to connect S7-200 to Industrial Ethernet.
- Distributed plants can be reached over telephone lines or the Internet by using a router and simple diagnostics, signal or user functions can be performed with the help of a web browser. The CP 243-1 is especially suited for plant sections where using PCs for permanent monitoring functions would not be cost-effective.
- PC applications can access the data of an S7-200 via an S7 OPC server. In this way, process data can be easily archived or further processed.
- SIMATIC S7-300 and S7-400 programmable controllers can communicate with a SIMATIC S7-200 with CP 243-1 over Industrial Ethernet which means that the S7-200 can also be used for more complex applications.

Design

The CP 243-1 offers all the advantages of the S7-200 design:

- Compact design in a rugged plastic enclosure
- Terminal strip for connecting the 24 V DC external supply voltage
- LED status display
- Optional DIN rail mounting or direct wall mounting
- RJ45 socket for connection to Industrial Ethernet with automatic data rate detection

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Function

The CP 243-1 is connected to Industrial Ethernet via an RJ45 interface for 10/100 Mbit/s full/half duplex with autosensing/autonegotiation and autocrossover function.

The CP 243-1 enables communication between an S7-200 module and another S7-200 or S7-300/S7-400 controller via Industrial Ethernet, and access of the S7-200 programming software STEP 7-Micro/WIN to the S7-200 via Industrial Ethernet.

Integration into PC applications is possible by means of the S7-OPC server of the PC software.

IT functions

Simple visualization using Web technology, sending e-mails, and file processing (FTP).
The file system of the CP 243-1 can also be managed through the CPU. It is used as a bulk storage device, a cross-system computer link and a storage location for HTML pages and Java applets. The CP 243-1 has a large file system in which, apart from HTML pages, machine documentation or user guides can also be stored.

Web server;
HTML pages can be downloaded and viewed with standard browsers

Web pages

- For observation of the S7-200 controller: standard pages for system diagnostics and a simple variable editor are supplied.
- Other customer-specific pages can be generated with any HTML tools

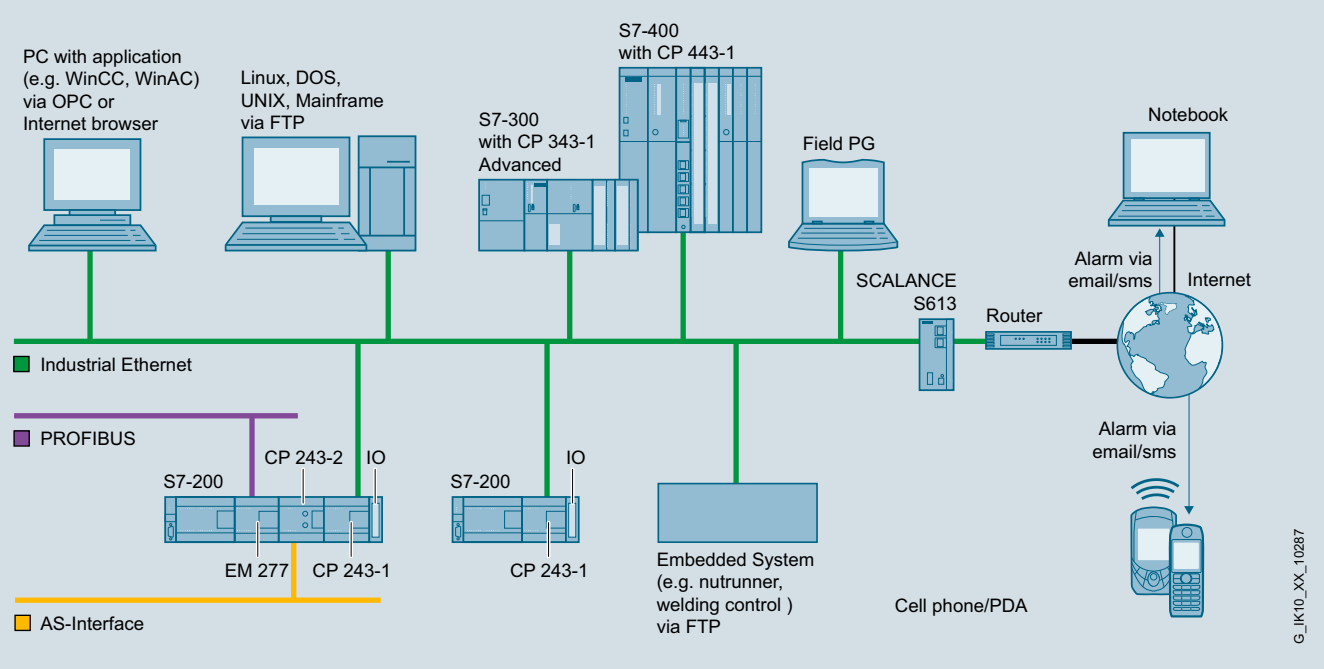
E-mails;
sending of pre-defined e-mails directly from the user program
Variables can be integrated into the text

FTP communication
The CPU can send data blocks as files to other computers or can read or delete the files of other computers (client function). Communication through FTP is possible with most operating systems

Configuration

- STEP 7 Micro/WIN V4.0 SP8 or higher is required for configuring the full functional scope of the CP 243-1.
- The CP 243-1 is supplied with a globally unique MAC address that cannot be changed.

Integration



S7-200 communication options with CP 243-1

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Technical specifications

Article No.	6GK7243-1EX01-0XE0
Product-type designation	**CP 243-1**
Transmission rate	
Transfer rate at the interface 1	10 … 100 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	3-pin termnal strip
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
Consumed current from external supply voltage at 24 V with DC	
• typical	0.053 A
• maximum	0.06 A
Resistive loss	1.5 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 45 °C
• for horizontal installation during operating phase	0 … 55 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-200 double width
Width	71.2 mm
Height	80 mm
Depth	62 mm
Net weight	0.15 kg

Article No.	6GK7243-1EX01-0XE0
Product-type designation	**CP 243-1**
Product properties, functions, components general	
Number of modules	
• per CPU maximum	1
Performance data	
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	8
• with PG connections maximum	1
• with PG/OP connections maximum	8
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	1
• as server by means of HTTP maximum	4
• as e-mail client maximum	1
Number of e-mails with 1 024 characters of e-mail client maximum	32
Number of access rights access protections	8
Storage capacity of user memory as flash memory file system	8 Mibyte
Number of possible write cycles flash memory cells	100 000
Product functions management, configuration	
Product function MIB support	No
Protocol is supported SNMP v1	No
Configuration software required	STEP 7-Micro/WIN V4.0 SP8 or higher
Product functions Diagnosis	
Product function Web-based diagnostics	Yes

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Ordering data

	Article No.
CP 243-1 communications processor for connection of SIMATIC S7-200 to Industrial Ethernet; for S7 communication, PG communication, e-mail and WWW server; with electronic manual on CD-ROM German, English, French, Italian, Spanish	**6GK7243-1EX01-0XE0**
Accessories	
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
SCALANCE X005 Industrial Ethernet Switch for 10/100 Mbit/s; with five 10/100 Mbit/s RJ45 ports for configuring small star and line structures	**6GK5005-0BA00-1AA3**

More information

Selection tools:

To assist in selecting the right Industrial Ethernet switches as well as configuration of modular variants, the SIMATIC NET Selection Tool and the TIA Selection Tool are available at:

SIMATIC NET Selection Tool:

- Online version:
  http://www.siemens.com/snst
- Offline version:
  http://www.siemens.com/snst-download

You will find more information on the topic of Industrial Security on the Internet at:

http://www.siemens.com/industrialsecurity

Note:

For software ordering data, see page 2/584

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
	●	●	●			●	●

Communications processor for connecting a SIMATIC S7-300 to Industrial Ethernet networks, also as PROFINET IO Device.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication

Benefits

get Designed for Industry

- High level of plant availability due to support of media redundancy (MRP)
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via WAN or a telephone network (ISDN)
  - Monitoring by means of IT network management tools (SNMP)
  - Module replacement without programming device thanks to saving of the configuration data on the CPU
- The capability of later connecting existing SIMATIC S7 systems to Industrial Ethernet using the CP 343-1 Lean ensures investment protection

Application

The CP 343-1 Lean is used to connect the SIMATIC S7-300 to Industrial Ethernet networks. With its own processor, it relieves the CPU of communications tasks and facilitates additional connections.

The CP 343-1 Lean offers the communication options of the S7-300 with

- PGs/PCs
- Master computers
- HMI devices
- Other SIMATIC S5/S7 systems
- PROFINET I/O Controllers

Design

The CP 343-1 Lean offers all the advantages of SIMATIC S7-300 system design:

- Compact design;
  the rugged plastic casing features on the front:
  - Two RJ45 sockets for connecting to Industrial Ethernet with automatic detection of transmission rate by means of autosensing;
    RJ45 sockets have an industry-compatible design with additional retaining collars for connection of IE FC RJ45 Plug 145/180
  - Diagnostic LEDs for each switch port
  - 2-pin plug-in terminal strip for connection of the 24 V DC external supply voltage
- Easy installation;
  The CP 343-1 Lean is snap-mounted on the S7-300 DIN rail and connected to adjacent modules through the bus connectors. There are no slot rules.
- The CP 343-1 Lean can be operated without a fan. A standby battery is not required.
- In combination with IM 360/361, CP 343-1 Lean can also be used in an expansion rack (ER).

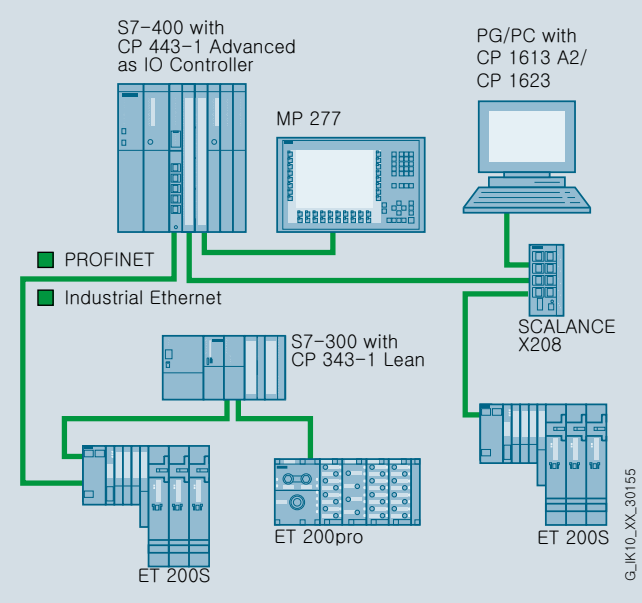
Function

- PROFINET interface with two RJ45 ports, 10/100 Mbit/s full/half duplex with autosensing and autocrossover functionality via 2-port switch
- Communication services via interface:
  - Open communication (TCP/IP, UDP): Multicast for UDP
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (server only)
  - PROFINET IO device
- Media redundancy (MRP):
  - Within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP
- Diagnostics and network management:
  - Extensive diagnostic functions for all modules in the rack
  - Integration into network management systems through the support of SNMP V1
- Configuring of all functions with STEP 7, V5.4 or higher, or STEP 7 Professional V11 (TIA Portal) or higher
- Module replacement without programming device thanks to saving of the configuration data on the CPU

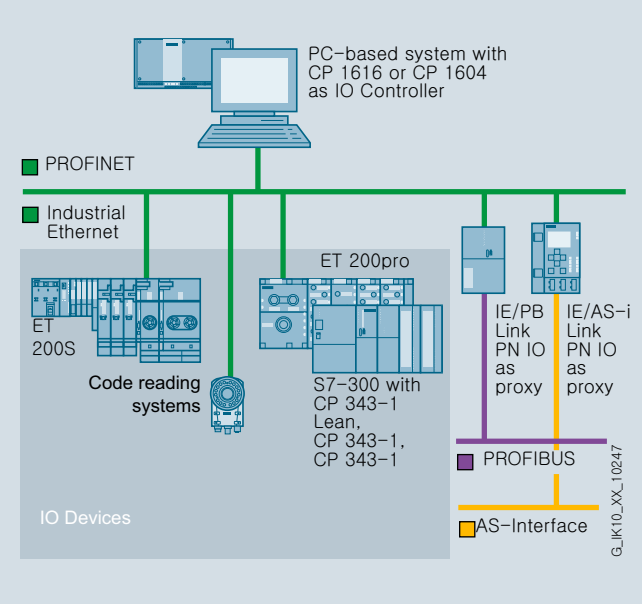
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Integration



Line structure with CP 343-1 Lean with integrated real-time switch as a PROFINET IO device



Connection to higher-level network and PC-based system

Technical specifications

Article No.	**6GK7343-1CX10-0XE0**
Product-type designation	**CP 343-1 Lean**
Transmission rate	
Transfer rate at the 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 plug-in terminal strip
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
Relative positive tolerance at 24 V with DC	20 %
Relative negative tolerance at 24 V with DC	15 %
Consumed current	
• from backplane bus at 5 V for DC, typical	0.2 A
• from external supply voltage at 24 V with DC	-
- typical	0.16 A
- maximum	0.2 A
Resistive loss	5.8 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation during operating phase	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
• Comment	-
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-300 single width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0,22 kg

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Technical specifications (continued)

Article No.	6GK7343-1CX10-0XE0
Product-type designation	**CP 343-1 Lean**
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 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	4
Service of SIMATIC communication as server	Yes
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	12
Performance data PROFINET communication as PN IO-Device	
Product function PROFINET IO device	Yes
Amount of data	
• as useful data for input variables as PROFINET IO device maximum	512 byte
• as useful data for input variables as PROFINET IO device maximum	512 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for the consistency area for each sub-module	240 byte
Number of submodules per PROFINET IO-Device	32

Article No.	6GK7343-1CX10-0XE0
Product-type designation	**CP 343-1 Lean**
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.4 or higher / STEP 7 Professional V11 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Product function	
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data	Article No.
CP 343-1 Lean communications processor For connecting SIMATIC S7-300 to Industrial Ethernet through TCP/IP and UDP, Multicast, S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, PROFINET IO Device, MRP, integrated 2-port switch ERTEC, comprehensive diagnostics facilities, module replacement without PG, SNMP, initial commissioning over LAN; with electronic manual on CD-ROM	**6GK7343-1CX10-0XE0**
Accessories	
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	**6GK1901-1BB30-0AA0**
• 1 pack = 10 units	**6GK1901-1BB30-0AB0**
• 1 pack = 50 units	**6GK1901-1BB30-0AE0**
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
CSM 377 Compact Switch Module Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**

Note:

For software ordering data, see page 2/584

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●			●	●

Communications processor for connecting a SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks, also as PROFINET IO Controller or IO Device.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication

Benefits

get Designed for Industry

- High level of plant availability due to support of media redundancy (MRP)
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via WAN or a telephone network (ISDN)
  - Monitoring by means of IT network management tools (SNMP)
  - Module replacement without programming device thanks to saving of the configuration data on the CPU
- Securing the system against unauthorized access by means of device-related IP address lists
- The capability of later connecting existing SIMATIC S7 systems to Industrial Ethernet using the CP 343-1 ensures investment protection

Application

The CP 343-1 is used for connecting the SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks. With its own processor, it relieves the CPU of communications tasks and facilitates additional connections.

The CP 343-1 permits communication of the S7-300 with:

- PGs/PCs
- Master computers
- HMI devices
- SIMATIC S7/C7 systems
- PROFINET IO devices

Design

The CP 343-1 has all the advantages of the SIMATIC S7-300 design:

- Compact design;
  on the front, the rugged plastic housing features:
  - Two RJ45 sockets for connection to Industrial Ethernet with automatic sensing of the data transmission rate by means of Autosensing/Autonegotiation;
    the RJ45 sockets are industrially compatible and designed with additional holding collars for connecting to the IE FC RJ45 Plug 145/180
  - 2-pole plug-in terminal strip for connection of the 24 V DC external supply voltage
  - 8 LEDs for indication of the operating and communication status (diagnostics for each switch port)
- Easy installation;
  the CP 343-1 is mounted on the S7-300 rail and connected through the bus connector with the neighboring modules. No slot rules apply.
- Fan-free operation;
  A back-up battery is not required.
- Using the IM 360/361, the CP 343-1 can also be operated in the expansion rack (ER)
- Modules can be replaced without the need for a programming device

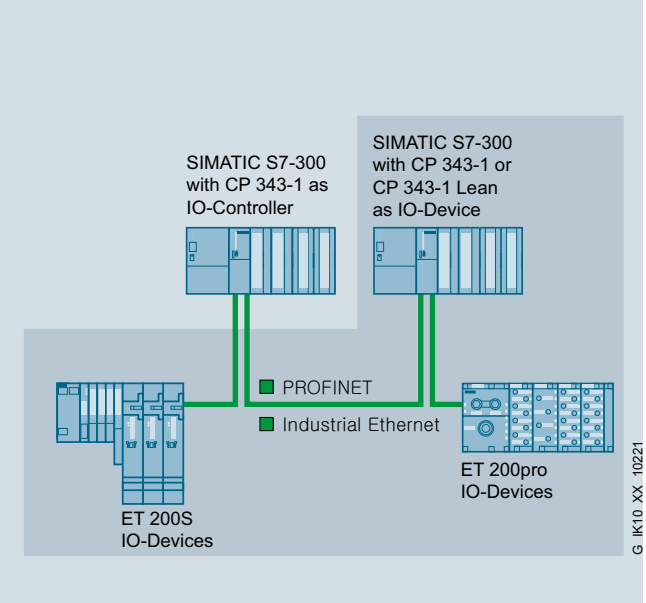
Function

- PROFINET interface with two RJ45 connectors with 10/100 Mbit/s full/half duplex with autosensing and autocrossover functionality via integrated 2-port switch
- Communication services via interface:
  - Open communication (TCP/IP, UDP, ISO): Multicast for UDP
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server, multiplexing)
  - PROFINET IO Controller or IO Device
- Media redundancy (MRP):
  - Within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRP
- Diagnostics and network management:
  - Extensive diagnostic functions for all modules in the rack
  - Integration into network management systems through the support of SNMP V1
- Security mechanisms:
  - Access protection by means of configurable IP access list
- Configuring of all functions with STEP 7, V5.4 or higher, or STEP 7 Professional V11 (TIA Portal) or higher
- Module replacement without programming device thanks to saving of the configuration data on the CPU

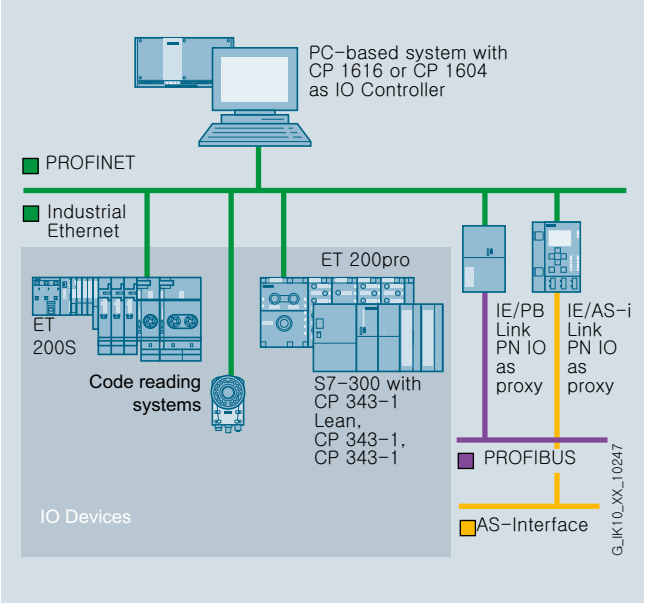
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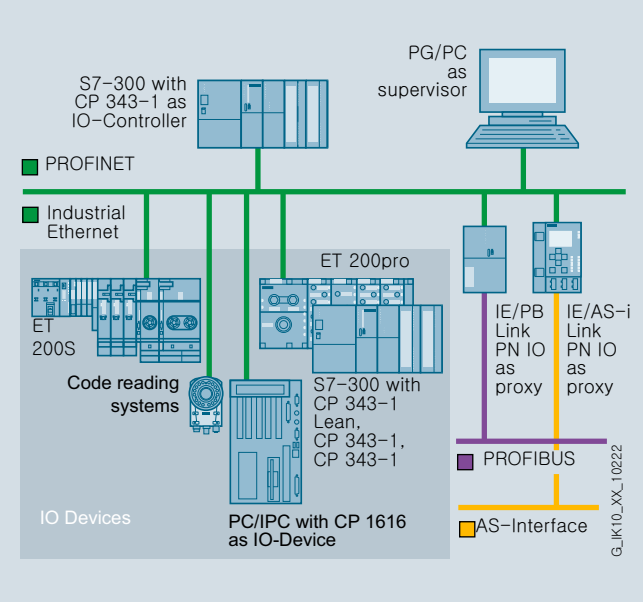
Integration



Line structure with CP 343-1 with integrated real-time switch as a PROFINET IO controller or IO device



Connection to higher-level network and PC-based system



Interfacing to higher-level network with CP 343-1 as PROFINET IO controller

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Technical specifications

Article No.	6GK7343-1EX30-0XE0
Product-type designation	**CP 343-1**
Transmission rate	
Transfer rate at the 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 plug-in terminal strip
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
Relative positive tolerance at 24 V with DC	20 %
Relative negative tolerance at 24 V with DC	15 %
Consumed current	
• from backplane bus at 5 V for DC, typical	0,2 A
• from external supply voltage at 24 V with DC	
- typical	0.16 A
- maximum	0.2 A
Resistive loss	5.8 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation during operating phase	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
• Comment	-
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-300 single width
Width	40 mm
Height	125 mm
Depth	120 mm
Net weight	0.22 kg

Article No.	6GK7343-1EX30-0XE0
Product-type designation	**CP 343-1**
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	16
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	16
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	32
Performance data PROFINET communication as PN IO-Controller	
Number of PN IO-Devices on PROFINET IO-Controller usable total	32
Number of external PN IO lines with PROFINET per rack	1
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	1 Kibyte
• as useful data for output variables with PROFINET IO controller maximum	1 Kibyte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as user data for input variable per PN IO device per submodule as PROFINET IO controller maximum	240 byte
• as user data for output variables per PN IO device per submodule as PROFINET IO controller maximum	240 byte

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Technical specifications (continued)

Article No.	6GK7343-1EX30-0XE0
Product-type designation	**CP 343-1**
Performance data PROFINET communication as PN IO-Device	
Product function PROFINET IO device	Yes
Amount of data	
• as useful data for input variables as PROFINET IO device maximum	512 byte
• as useful data for input variables as PROFINET IO device maximum	512 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for the consistency area for each sub-module	240 byte
Number of submodules per PROFINET IO-Device	32
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.4 SP2 or higher / STEP 7 Professional V11 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes

Article No.	6GK7343-1EX30-0XE0
Product-type designation	**CP 343-1**
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	No
• Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Product function	
• ACL - IP-based	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data	Article No.
CP 343-1 communications processor For connection of SIMATIC S7-300 to Industrial Ethernet over ISO and TCP/IP; PROFINET IO Controller or PROFINET IO Device, MRP, integrated 2-port switch ERTEC; S7 communication, open communication (SEND/RECEIVE), FETCH/WRITE, with and without RFC 1006, multicast, DHCP, CPU clock synchronization via SIMATIC procedure and NTP, diagnostics, SNMP, access protection through IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	**6GK7343-1EX30-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal housing 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
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	**6GK1901-1BB30-0AA0**
• 1 pack = 10 units	**6GK1901-1BB30-0AB0**
• 1 pack = 50 units	**6GK1901-1BB30-0AE0**

	Article No.
Accessories (continued)	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
CSM 377 Compact Switch Module Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**

Note:

For software ordering data, see page 2/584

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CP 343-1 Advanced

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

Communications processor for connecting the SIMATIC S7-300/ SINUMERIK 840D powerline to Industrial Ethernet networks, also as PROFINET IO controller and IO device.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication
- Security functionality, firewall and VPN

In addition, the CP 343-1 Advanced provides e-mail functions and allows users to create their own Web pages - ideal support for maintenance and quality assurance. The Internet functions such as FTP even allow connection to the most diverse PC-based systems. This CP is therefore the bridge between the field level and the management level for the S7-300.
The CP 343-1 Advanced connects seamlessly to the security structures of the office and IT world.

Benefits

get Designed for Industry

- Cost advantage resulting from connection to two separate Ethernet segments with network separation
- High level of plant availability due to support of media redundancy (MRP)
- Optimum support of maintenance due to
  - Web-based diagnostics
  - Remote programming via WAN or telephone network
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without programming device using the C-PLUG swap medium
- Securing the system[1)] against unauthorized access by means of
  - Central access protection for any devices within an automation cell, e.g. by reliable authentication of the network nodes
  - Secure remote access via the Internet by means of data encryption (VPN) and data integrity checking
  - Traceability by means of data logging on the basis of standard IT mechanisms (Syslog)
- The ability to connect existing SIMATIC S7 systems to Industrial Ethernet at a later point in time using the CP 343-1 Advanced ensures investment protection

[1)] Security functions, firewall and VPN only with -1GX31 variant

Application

The CP 343-1 Advanced is used to connect the SIMATIC S7-300 to Industrial Ethernet networks. With its own processor, it relieves the CPU of communications tasks and allows additional connections.

The CP 343-1 Advanced provides the following communications options:

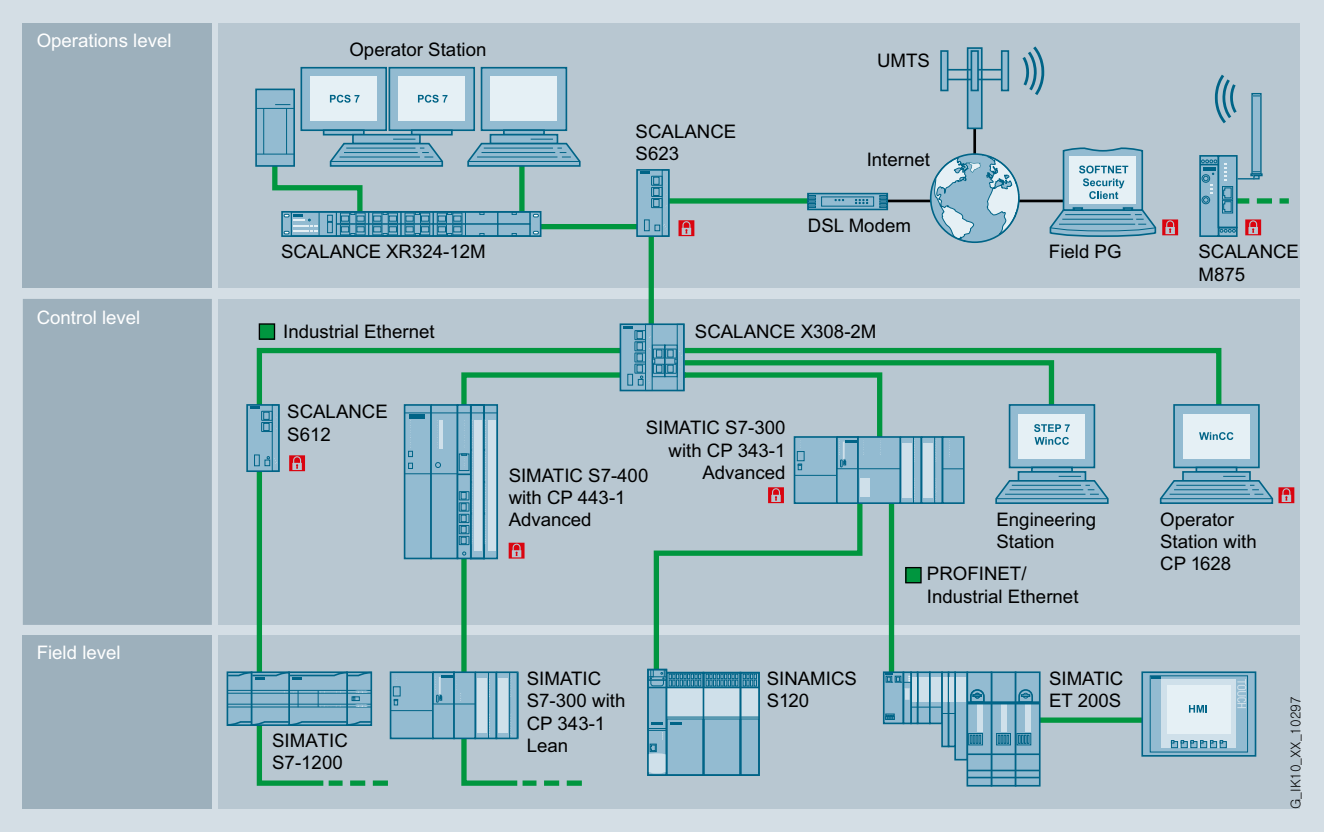
- PGs/PCs
- Master computers
- Operator control and monitoring systems
- SIMATIC S5/S7/C7 systems
- PROFINET IO devices/IO controllers
- PROFINET CBA components

With this, all the devices of an Ethernet network can be protected from unauthorized access. The CP 343-1 Advanced allows secure remote access over the Internet and allows data transfer between devices or network segments to be protected from data manipulation/espionage.

PROFINET CBA components and security functionalities can only be used alternatively.

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Application (continued)



Secure VPN communication between SCALANCE S, SOFTNET Security Client and components with Security Integrated

Design

The CP 343-1 Advanced offers all the advantages of SIMATIC S7-300 system design:

- Compact design:
  - Three RJ45 jacks for connecting to Industrial Ethernet via two independent interfaces;
    one of which is a security jack for externally safeguarding the network cell;
    automatic data rate detection by means of the autosensing, autonegotiation and autocross functions;
    the connection is made via the IE FC RJ45 Plug 180 with 180° cable outlet or via a standard patch cable
  - 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
- Simple installation;
  the CP 343-1 Advanced is mounted on the S7-300 mounting rail and connected to adjacent modules by means of the bus connector. There are no slot rules.
- The CP 343-1 Advanced can be operated without a fan; no backup battery is required.
- In combination with IM 360/361, the CP 343-1 Advanced can also be used in an expansion rack (ER).
- The module can be replaced without the need for a programming device
- C-PLUG (configuration plug) is included in the scope of delivery as a removable storage medium (cannot be operated without C-PLUG)

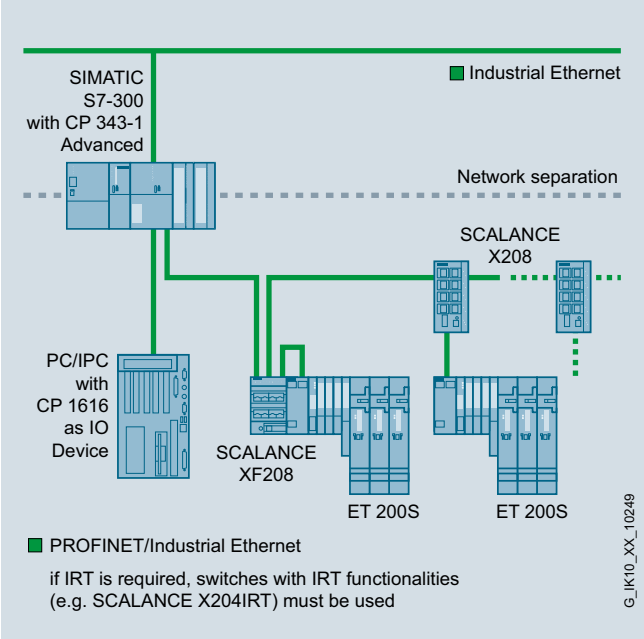
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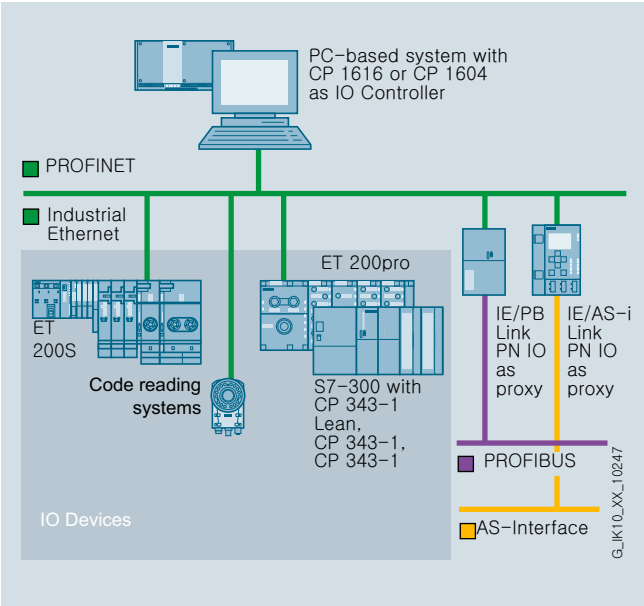
Function

- Two separate interfaces (integrated network separation):
  - Gigabit interface with an RJ45 connector with 10/100/1 000 Mbps full/half duplex with autosensing functionality
  - PROFINET interface with two RJ45 connectors with 10/100 Mbps full/half duplex with autosensing and autocrossover functionality via integrated 2-port switch
- Communications services via both interfaces:
  - Open communication (TCP/IP, UDP, ISO): Multicast with UDP, including routing between both interfaces
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - IT communication: HTTP communication permits access to process data via user's own Web pages. HTTPS communication is also possible with the CP 343-1 Advanced[1]. The e-mail client function allows e-mails to be sent directly from the user program. FTP communication allows program-controlled FTP client communication. Access to data blocks via FTP server.
- Communication services via PROFINET interfaces:
  - PROFINET IO controller and IO device with real-time properties (RT and IRT)
  - PROFINET CBA
  - IP address assignment via DHCP, simple PC tool or via user program
- Media redundancy (MRP):
  - Within an Ethernet network with a ring topology, the CP supports the MRP media redundancy protocol as an MRP manager and as an MRP client
- Diagnostics and network management:
  - Extensive diagnostics functions for all modules in the rack
  - Integration in network management systems due to support of SNMP V1/V3
- Security mechanisms:
  - Access protection by means of configurable IP access list
  - Firewall for filtering connections on the basis of their IP/port addresses
  - Bandwidth limitation to avoid communication overload
  - VPN server and VPN client for tap-proof access to controllers
  - Encrypted HTML pages using SSL (HTTPs)
  - Secure file transfer (FTPs)
  - Tap-proof transfer of network analysis information to the network management system (SNMP)
  - Translation of private and public IP addresses (NAT/NAPT)
  - Secure transfer of the time of day (NTP V3)
- Configuration of all functions using STEP 7; the security functions are configured using the Security Configuration Tool (SCT) which is included in the scope of supply of STEP 7 V5.5 SP3.
- Configuration with STEP 7 Professional V11; only possible with a limited range of functions of the predecessor CP 343-1 (6GK7 343-1GX30-0XE0), without security functions and CBA. Version with security functions[1] for TIA Portal in planning.
- Module replacement without programming device: all information is stored on the C-PLUG (also file system for IT functions)

Integration



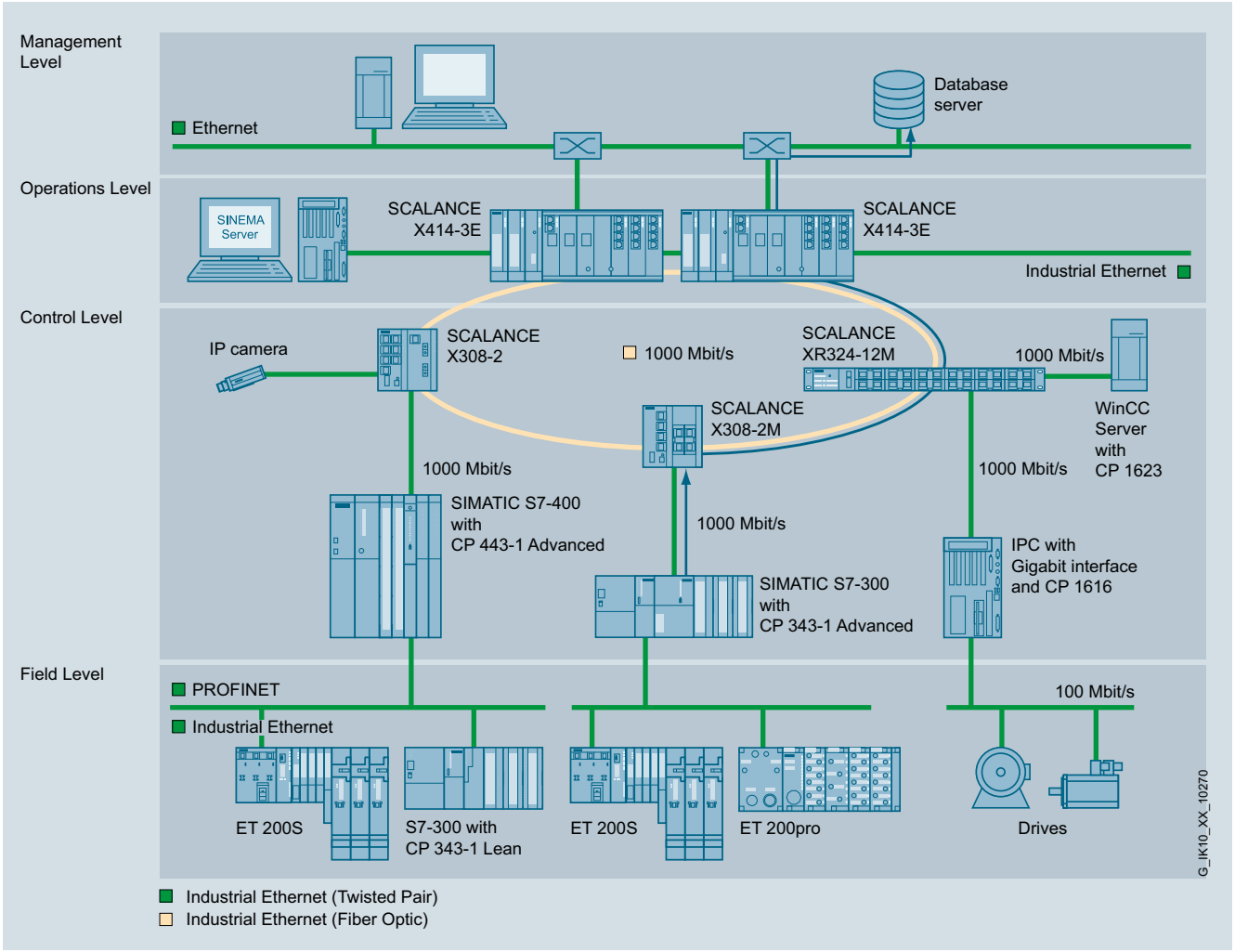
Connection to a higher-level network with network separation and access protection (security functions)



Connection to higher-level network and PC-based system

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Integration (continued)



Gigabit communication at the control level

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Technical specifications

Article No.	6GK7343-1GX31-0XE0
Product-type designation	**CP 343-1 Advanced**
Transmission rate	
Transfer rate	
• at the interface 1	10 … 1 000 Mbit/s
• at the interface 2	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• at interface 2 in accordance with Industrial Ethernet	2
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port
• for power supply	2-pin plug-in terminal strip
Design of the removable storage C-PLUG	Yes
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
Relative positive tolerance at 24 V with DC	20 %
Relative negative tolerance at 24 V with DC	15 %
Consumed current	
• from backplane bus at 5 V for DC Typical	0.14 A
• from external supply voltage at 24 V with DC	
- typical	0.48 A
- maximum	0.62 A
Resistive loss	14.7 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation 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 maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.8 kg

Article No.	6GK7343-1GX31-0XE0
Product-type designation	**CP 343-1 Advanced**
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	16
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	16
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	16
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	48
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	10
• as server	
- by means of FTP maximum	2
- by means of HTTP maximum	4
• as e-mail client maximum	1
Amount of data as useful data for e-mail maximum	8 Kibyte
Storage capacity of user memory	
• as flash memory file system	28 Mibyte
• as RAM	30 Mibyte
Number of possible write cycles flash memory cells	100 000
Performance data PROFINET communication as PN IO-Controller	
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	128
Number of external PN IO lines with PROFINET per rack	1

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Technical specifications (continued)

Article No.	6GK7343-1GX31-0XE0
Product-type designation	**CP 343-1 Advanced**
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	4 Kibyte
• as useful data for output variables with PROFINET IO controller maximum	4 Kibyte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as user data for input variable per PN IO device per submodule as PROFINET IO controller maximum	240 byte
• as user data for output variables per PN IO device per submodule as PROFINET IO controller maximum	240 byte
Performance data PROFINET communication as PN IO-Device	
Product function PROFINET IO device	Yes
Amount of data	
• as useful data for input variables as PROFINET IO device maximum	1 024 byte
• as useful data for input variables as PROFINET IO device maximum	1 024 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for input variables for each sub-module under PROFINET IO device	240 byte
• as useful data for the consistency area for each sub-module	240 byte
Number of submodules per PROFINET IO-Device	32
Performance data PROFINET CBA	
Number of remote connection partners with PROFINET CBA	64
Number of connections with PROFINET CBA total	1 000
Amount of data	
• as useful data for digital inputs with PROFINET CBA maximum	8 192 byte
• as useful data for digital outputs in the case of PROFINET CBA max.	8 192 byte
• as useful data for arrays and data types	
- in the case of acyclic transmission with PROFINET CBA maximum	8 192 byte
- with PROFINET CBA with cyclic transmission maximum	250 byte
- with PROFINET CBA in the case of local interconnection maximum	2 400 byte
Performance data PROFINET CBA remote connection with acyclic transmission	
Updating time of the remote interconnections in the case of acyclic transmission with PROFINET CBA	0.1 s
Number of remote connections to input variables with acyclic transmission with PROFINET CBA maximum	128
Number of remote connections to output variables with acyclic transmission with PROFINET CBA maximum	128

Article No.	6GK7343-1GX31-0XE0
Product-type designation	**CP 343-1 Advanced**
Amount of data	
• as useful data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
• as useful data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
Performance data PROFINET CBA remote connection with cyclic transmission	
Update time of the remote interconnections with PROFINET CBA with cyclic transmission	8 ms
Number of remote connections to input variables with PROFINET CBA with cyclic transmission maximum	200
Number of remote connections to output variables with PROFINET CBA with cyclic transmission maximum	200
Amount of data	
• as useful data for remote interconnections with input variables with PROFINET CBA with cyclic transmission maximum	2 000 byte
• as useful data for remote interconnections with output variables with PROFINET CBA with cyclic transmission maximum	2 000 byte
Performance data PROFINET CBA HMI variables via PROFINET acyclic	
Number of connectable HMI stations for HMI variables with acyclic transmission with PROFINET CBA	3
Updating time of the HMI variables in the case of acyclic transmission with PROFINET CBA	500 ms
Number of HMI variables with acyclic transmission with PROFINET CBA maximum	200
Amount of data as useful data for HMI variables in the case of acyclic transmission with PROFINET CBA maximum	8 Kibyte
Performance data PROFINET CBA device-internal connections	
Number of internal connections with PROFINET CBA maximum	256
Data volume of internal connections with PROFINET CBA maximum	2 400 byte
Performance data PROFINET CBA connections to constants	
Number of connections to constants with PROFINET CBA maximum	200
Amount of data as useful data for interconnections with constants in the case of PROFINET CBA maximum	4 096 byte
Performance data PROFINET CBA PROFIBUS proxy functionality	
Product function with PROFINET CBA PROFIBUS proxy functionality	No

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Technical specifications (continued)

Article No.	6GK7343-1GX31-0XE0
Product-type designation	**CP 343-1 Advanced**
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 V5.5 SP2 HF1 or higher / STEP 7 Professional V12 (TIA Portal) or higher
• for PROFINET CBA required	SIMATIC iMap V3.0 SP4 and higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Design of the firewall	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections for VPN connection	32
Product function	
• password protection for Web applications	Yes
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

Ordering data

	Article No.
CP 343-1 Advanced communications processor For connecting the SIMATIC S7-300 CPU to Industrial Ethernet; 1 x 10/100/1 000 Mbit/s; 2 x 10/100 Mbit/s (IE switch); RJ 45 ports; TCP; UDP; ISO; PROFINET IO-Controller and Device, S7 communication (client + server); open communication (SEND/RECEIVE); S7 routing; IP configuration via DHCP/block; extended web diagnostics; time synchronization; IP Access Control List; IP routing; FTP; email; PROFINET CBA; C-Plug	
• With Security (Firewall + VPN) and PROFIenergy (Controller + Device)	**6GK7343-1GX31-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
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	**6GK1901-1BB30-0AA0**
• 1 pack = 10 units	**6GK1901-1BB30-0AB0**
• 1 pack = 50 units	**6GK1901-1BB30-0AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbit/s) with a sturdy 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**

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Ordering data	Article No.
Accessories	
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 applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
CSM 377 Compact Switch Module Unmanaged switch for connection of a SIMATIC S7-300 CPU, ET 200M, and up to three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1 000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

For software ordering data, see page 2/584

More information

You will find more information on the topic of Industrial Security on the Internet at:
http://www.siemens.com/industrialsecurity

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CP 343-1 ERPC

Overview



ERPC	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●					●	●

The CP 343-1 ERPC (Enterprise Connect) communications processor for connecting a SIMATIC S7-300 to Industrial Ethernet networks.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- ERPC communication

Connection of the SIMATIC S7-300 to various database systems for vertical integration is supported by means of a firmware expansion from ILS-Technology to be ordered separately.

Benefits

get Designed for Industry

- Cost reductions through simply configured database connection by means of a firmware extension from the company ILS-Technology, to be ordered separately; no costly programming and no additional gateway PCs
- 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
- Safeguarding of the system (security) against unauthorized access by means of device-related IP access list (IP-ACL); the capability of later connecting existing SIMATIC S7 systems to Industrial Ethernet using the CP 343-1 Advanced ensures investment protection
- The capability of later connecting existing SIMATIC S7 systems to Industrial Ethernet using the CP 343-1 ERPC ensures investment protection

Application

The CP 343-1 ERPC (Enterprise Connect) is used for connecting the SIMATIC S7-300 to Industrial Ethernet networks and to different ERP or MES systems for vertical integration by means of a firmware extension from the company ILS-Technology, 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:

- PGs/PCs
- Master computers
- HMI devices
- SIMATIC S5/S7/C7 systems
- ERP or MES systems by means of database interface, e.g. ORACLE, MySQL, MS-SQL, DB2, SAP by means of a firmware extension from the company ILS-Technology, to be ordered separately

Design

The CP 343-1 ERPC offers all the advantages of the SIMATIC S7-300 design:

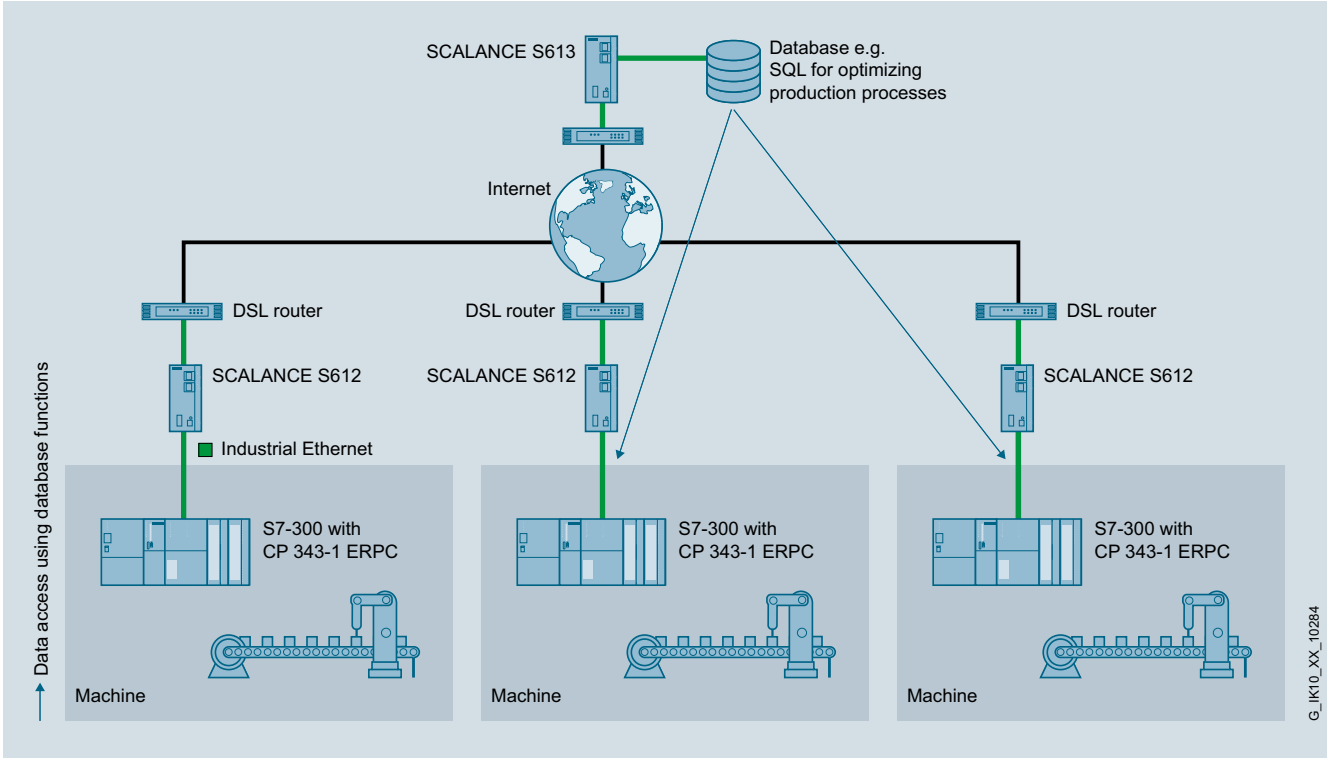
- Compact design;
  the rugged plastic enclosure features the following on the front panel:
  - RJ45 socket for connection to Industrial Ethernet;
    Automatic detection of data transfer rate by means of autosensing function;
    The RJ45 socket is designed to be industry-compatible with an additional 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)

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Function

- Gigabit interface with an RJ45 port with 10/100/1 000 Mbit/s full/half duplex with autosensing and autocrossover functionality
- Communication services:
  - Communication services: Open communication (TCP/IP, UDP)
  - PG/OP communication: across networks by means of S7 routing
  - S7 communication (client, server)
  - ERPC communication by means of a firmware expansion from the company ILS-Technology, to be ordered separately. Connection to databases such as ORACLE, MySQL, MS-SQL, DB2, SAP, and Message Queue systems. For further information on firmware expansion, refer to "deviceWISE Embedded Edition for SIMATIC S7".
- Diagnostics and network management:
  - Extensive diagnostic functions for all modules in the rack
  - Integration in network management systems through the support of SNMP V1
- Security mechanisms:
  - Access protection by means of configurable IP access list
- Configuration
  - For the configuration of the database connection, see "deviceWISE Embedded Edition for SIMATIC S7".
  - Configuration of the automation functionality with STEP 7 V5.5 or STEP 7 Professional V11
- Module replacement without programming device:
  All information is stored on the C-PLUG

Integration

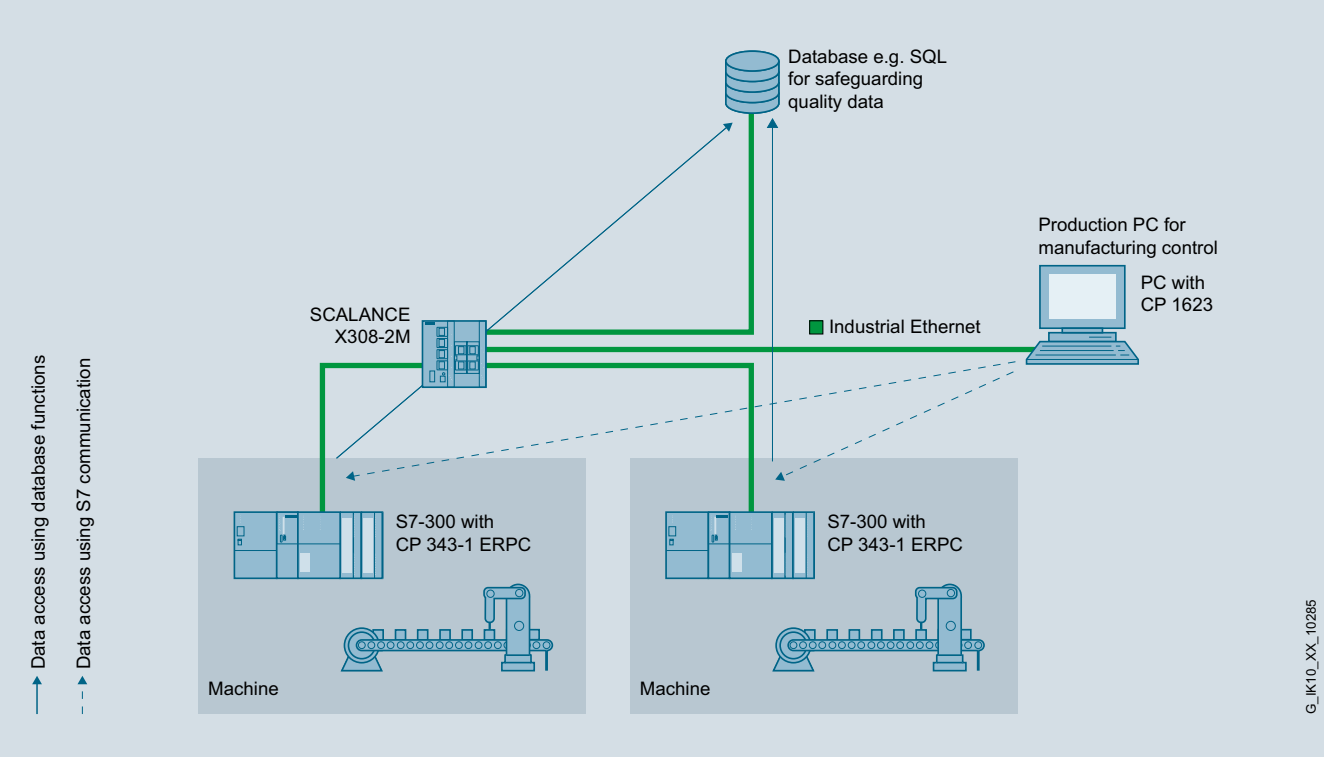


Example configuration of optimization of production process with CP 343-1 ERPC

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Integration (continued)



Example configuration of archiving of quality data with CP 343-1 ERPC

Technical specifications

Article No.	6GK7343-1FX00-0XE0
Product-type designation	**CP 343-1 ERPC**
Transmission rate	
Transfer rate at the 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 plug-in terminal strip
Design of the removable storage C-PLUG	Yes
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
Relative positive tolerance at 24 V with DC	20 %
Relative negative tolerance at 24 V with DC	15 %

Article No.	6GK7343-1FX00-0XE0
Product-type designation	**CP 343-1 ERPC**
Consumed current	
• from backplane bus at 5 V for DC Typical	0.3 A
• from external supply voltage at 24 V with DC	
- typical	0.16 A
- maximum	0.6 A
Resistive loss	14.7 W
Permitted ambient conditions	
Ambient temperature	
• for vertical installation during operating phase	0 … 40 °C
• for horizontal installation 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 maximum	95 %
Protection class IP	IP20

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Technical specifications (continued)

Article No.	6GK7343-1FX00-0XE0
Product-type designation	**CP 343-1 ERPC**
Design, dimensions and weight	
Module format	Compact module S7-300 double width
Width	80 mm
Height	125 mm
Depth	120 mm
Net weight	0.8 kg
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 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
• note	also 2 PG/OP connections and 1 diagnostics connection
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	32
Performance data ERPC functions	
Number of possible connections for communication with ERP or MES stations maximum	8
Number of possible logical triggers per CP maximum	8
Number of configurable ERPC symbols for database access	
• per CPU maximum	2 000
• per logical trigger maximum	255
Data volume as user data and header information per logical trigger	8 Kibyte

Article No.	6GK7343-1FX00-0XE0
Product-type designation	**CP 343-1 ERPC**
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.4 SP5 + HSP / STEP 7 Professional V11 (TIA Portal) or higher
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	No
Product functions Security	
Product function	
• ACL - IP-based	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data

	Article No.
Communications processor CP 343-1 ERPC (Enterprise Connect) 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 10/100/1 000 Mbit/s; with electronic manual on DVD, C-PLUG included in scope of delivery	**6GK7343-1FX00-0XE0**
deviceWISE Embedded Edition for SIMATIC S7 Firmware expansion for database connection of the SIMATIC S7-300 complete with CP 343-1 ERPC to various ERP or MES systems	See Partner solutions/deviceWISE Embedded Edition for SIMATIC S7
Accessories	
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbit/s) with a sturdy 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**
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 applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1 000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

For software ordering data, see page 2/584

More information

You can obtain further information on the software "deviceWISE embedded Edition for SIMATIC S7" from

ILS Technology LLC;
5300 Broken Sound Blvd.
Suite 150
Boca Raton, FL, USA, 33487

Phone: +1-561-982-9898 x124
Fax: +1-561-982-8638
E-mail: devicewise@ilstechnology.com
Internet: http://www.ilstechnology.com/erpc

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Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●		●	●

Communications processor for connecting a SIMATIC S7-400 to Industrial Ethernet networks, also as PROFINET IO controller or in SIMATIC H systems.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication

The communications processor can also be used for redundant S7 communication in SIMATIC H systems and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU.

Benefits

get Designed for Industry

- High plant availability through the support of media redundancy (MRP) and use in the SIMATIC S7-400 H system
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via WAN or a telephone network (ISDN)
  - Monitoring by means of IT network management tools (SNMP)
  - Module exchange without programming device using the C-PLUG swap medium
- Securing the system against unauthorized access by means of
  - Central access protection for any devices within an automation cell, e.g. by means of authentication of the network stations
- The capability of later connecting existing SIMATIC S7 systems to Industrial Ethernet using the CP 443-1 ensures investment protection

Application

- The CP 443-1 is used to connect the SIMATIC S7-400 to Industrial Ethernet networks. With its own processor, it relieves the CPU of communications tasks and facilitates additional connections.

The CP 443-1 offers communication options with

- PGs/PCs
- Host computers
- HMI systems
- SIMATIC S5/S7/C7 systems
- PROFINET IO devices

Design

The CP 443-1 features all the advantages of the SIMATIC S7-400 design:

- Compact design:
  - Two RJ45 sockets for connecting to Industrial Ethernet; automatic data rate detection by means of the autosensing/ autocrossover function; the connection is made via the IE FC RJ45 Plug 180 with 180° cable outlet or via a standard patch cable
  - Diagnostics LEDs for indicating the operational and communication status
- Easy installation:
  The CP 443-1 is mounted on the S7-400 rack and connected to the other modules via the backplane bus. No slot rules apply.
- The CP 443-1 can be operated without a fan
- The CP 443-1 can also be operated in the expansion rack (ER) in conjunction with the IM 460/461
- The module can be replaced without the need for a programming device

Function

- Two RJ45 ports with 10/100 Mbit/s full/half duplex with autosensing and autocrossover functionality via integral 2-port switch
- Communications services of the interface:
  - Open communication (TCP/IP and UDP): Multicast with UDP, including routing between both interfaces
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - S7-H-communication for S7-400-H-systems, now also across network boundaries (ISO-on-TCP)
  - Certified PROFINET IO controller with real-time properties (RT and IRT)
  - IP address assignment via DHCP, simple PC tool or via program block (e.g. for HMI)
- Media redundancy (MRP):
  - Within an Ethernet network with ring topology, the CP supports the media redundancy procedure MRPMRP as an MRP Manager and as an MRP Client
- Diagnostics and network management:
  - Comprehensive diagnostics functions for all modules in the rack (including graphical diagnostics, e.g. topology)
  - Integration in network management systems due to support of SNMP V1/V3

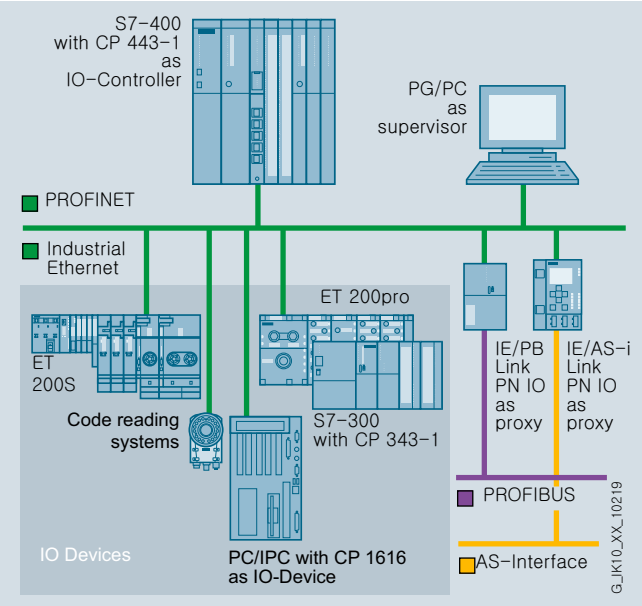
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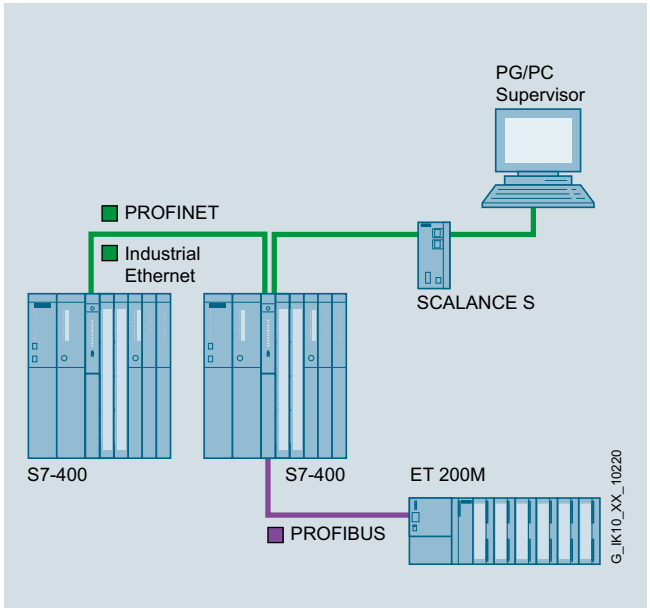
Integration (continued)

- Security mechanisms:
  - Access protection by means of configurable IP access list
  - Secure firmware update
  - Plagiarism detection
  - Certification as per the Achilles Level II Standard
    http://wurldtech.com/product_services/certify_educate/certified_products/
- Configuration of all functions with STEP 7 V5.5 SP2; configuration with STEP 7 Professional V11 only with a limited range of functions of the predecessor CP 443-1 (6GK7 443-1EX20-0XE0) possible
- When using the blocks AG_SSEND (FC53), AG_SRECV (FC63), TSEND (FB63), TRCV (FB64), TCON (FB65) and TDISCON (FB66), please note the following information:
  http://support.automation.siemens.com/WW/view/en/60037071
- Module replacement without programming device:
  All information can be stored on the CPU

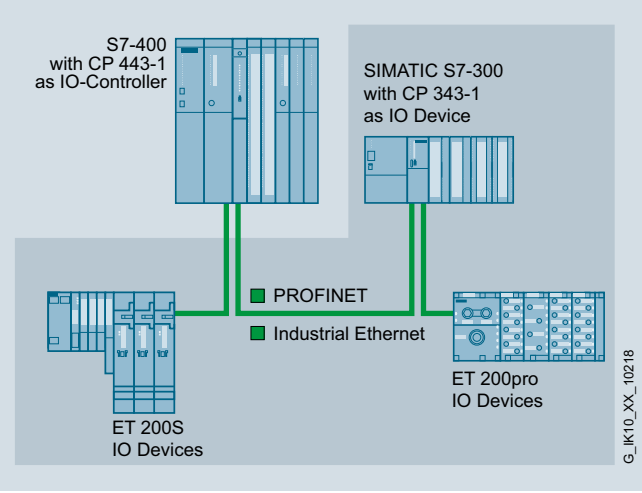
Integration



Interfacing to higher-level network with CP 443-1 as PROFINET IO controller



Line structure at the superordinated control level through integrated 2-port switch



Line structure as PROFINET IO controller with integrated real-time switch

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Technical specifications

Article No.	6GK7443-1EX30-0XE0
Product-type designation	**CP 443-1**
Transmission rate	
Transfer rate at the interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with Industrial Ethernet	2
Design of electrical connection at interface 1 in accordance with Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V with DC	5 %
Consumed current from backplane bus at 5 V for DC Typical	1.4 A
Resistive loss	8.6 W
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
• Comment	-
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components general	
Number of modules	
• per CPU maximum	14
• note	max. 4 as PN IO ctrl.

Article No.	6GK7443-1EX30-0XE0
Product-type designation	**CP 443-1**
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	64
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 possible connections for open communication by means of T blocks maximum	64
Data volume as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	128
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	64
Number of external PN IO lines with PROFINET per rack	4

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Technical specifications (continued)

Article No.	6GK7443-1EX30-0XE0
Product-type designation	**CP 443-1**
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	4 Kibyte
• as useful data for output variables with PROFINET IO controller maximum	4 Kibyte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as user data for input variable per PN IO device per submodule as PROFINET IO controller maximum	240 byte
• as user data for output variables per PN IO device per submodule as PROFINET IO controller maximum	240 byte
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	STEP 7 V5.5 SP3 or higher / STEP 7 Professional V12 (TIA Portal) or higher

Article No.	6GK7443-1EX30-0XE0
Product-type designation	**CP 443-1**
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Product function	
• ACL - IP-based	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data

	Article No.
CP 443-1 communications processor For connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ-45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with and without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s with electronic manual on DVD	**6GK7443-1EX30-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 Mbit/s) with a rugged metal housing 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

	Article No.
Accessories (continued)	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
SCALANCE X308-2 Industrial Ethernet Switch 2 x 1 000 Mbit/s multimode fiber-optic cable ports (SC sockets), 1 x 10/100/1 000 Mbit/s RJ45 port, 7 x 10/100 Mbit/s RJ45 ports; for glass fiber-optic cable (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

For software ordering data, see page 2/584

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CP 443-1 Advanced

Overview



ISO	TCP/ UDP	PN	MRP	IT	IP-R	PG/OP	S7/S5
●	●	●	●	●	●	●	●

G_IK10_XX_10150

Communications processor for connecting a SIMATIC S7-400 to Industrial Ethernet networks, also as PROFINET IO controller or in SIMATIC H systems.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET communication
- IT communication
- Security functionality, firewall and VPN

The communications processor can also be used for redundant S7 communication in SIMATIC H systems and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU. In addition, the CP 443-1 Advanced provides e-mail functions and user-created Web pages, offering ideal support for maintenance and quality assurance. The Internet functions such as FTP even allow connection to the most diverse PC-based systems. This CP is therefore the bridge between the field level and the management level for the S7-400. The CP 443-1 Advanced connects seamlessly to the security structures of the office and IT worlds.

Benefits

get Designed for Industry

- Cost advantage due to connection to two separate Ethernet segments with integrated network separation
- High plant availability through the support of media redundancy (MRP) and use in the SIMATIC S7-400 H system
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via WAN or telephone network (ISDN)
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without programming device using the C-PLUG swap medium
- Securing the system against unauthorized access by means of
  - Central access protection for any devices within an automation cell, e.g. by means of authentication of the network stations
  - Secure remote access via the Internet by means of data encryption (VPN) and data integrity checking
  - Traceability by means of data logging on the basis of standard IT mechanisms (Syslog)
- Later connection of existing SIMATIC S7 systems to Industrial Ethernet using the CP 443-1 Advanced ensures investment protection

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Application

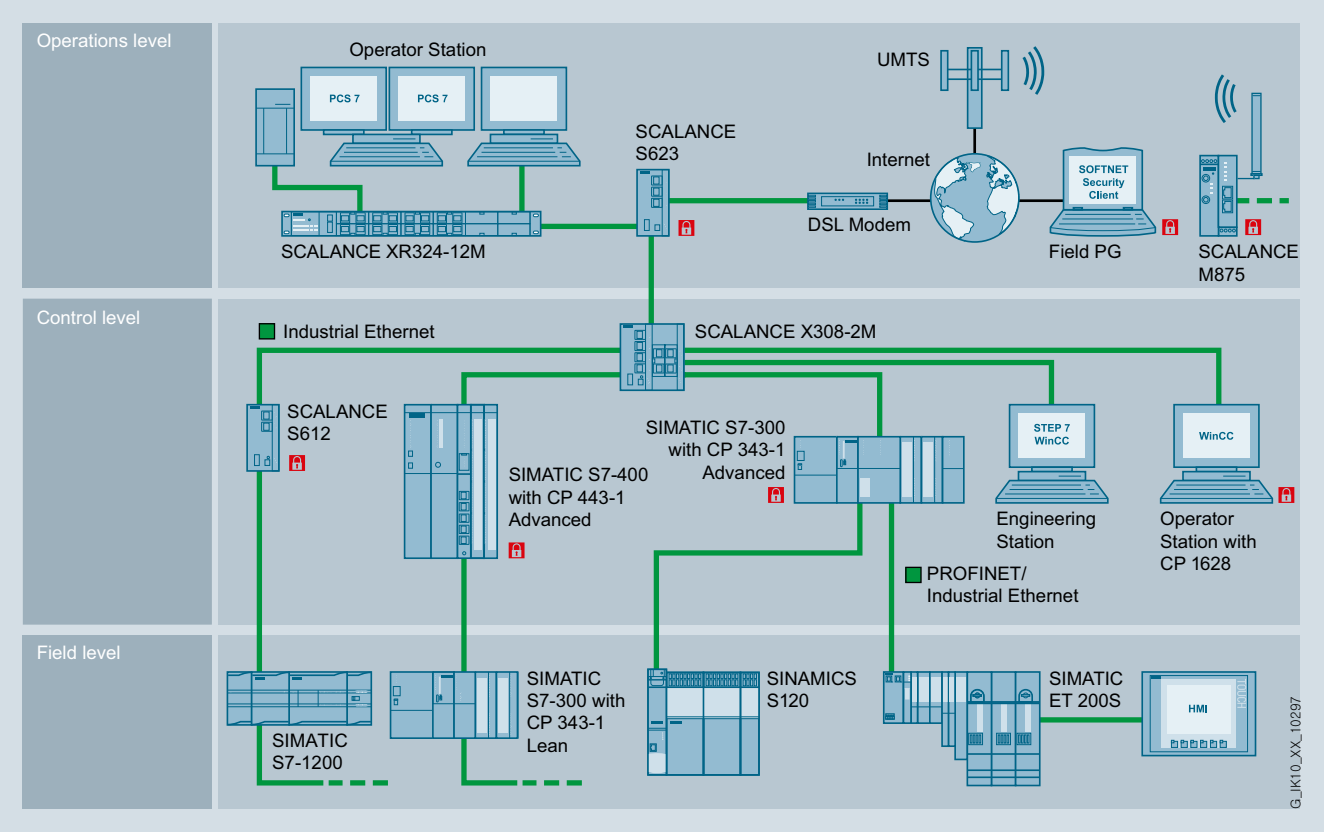
The CP 443-1 Advanced is used to connect the SIMATIC S7-400 to Industrial Ethernet networks. With its own processor, it relieves the CPU of communication tasks and facilitates additional connections.

The CP 443-1 Advanced provides the following communication options:

- PGs/PCs
- Master computers
- HMI systems
- SIMATIC S5/S7/C7 systems
- PROFINET I/O devices
- PROFINET CBA components

All the devices of an Ethernet network can be protected from unauthorized access. The CP 443-1 Advanced allows safe remote access over the Internet and allows data transfer between devices or network segments to be protected from data manipulation/espionage.

PROFINET CBA components and security functionalities can be used as an alternative.



Secure VPN communication between SCALANCE S, SOFTNET Security Client and components with Security Integrated

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Design

The CP 443-1 Advanced offers all the advantages of SIMATIC S7-400 system design:

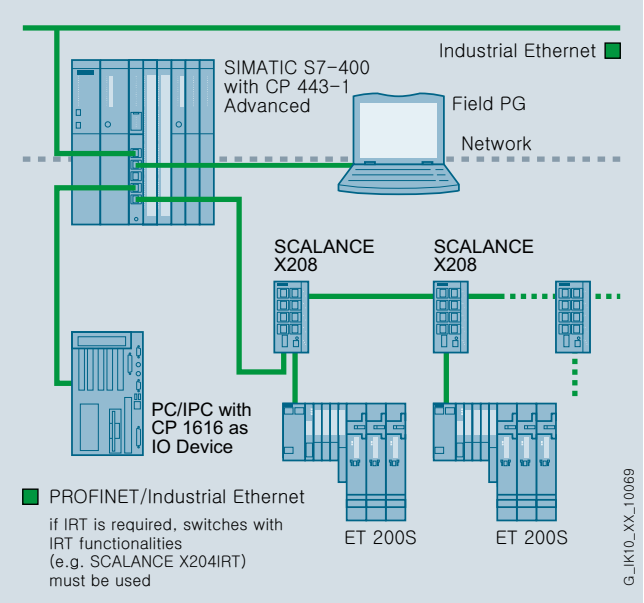
- Compact design:
  - Five RJ45 jacks for connecting to Industrial Ethernet via two independent interfaces; one of which is a security socket for externally safeguarding the network cell; automatic data rate detection by means of the autosensing and autocross function; the connection is made via the IE FC RJ45 Plug 180 with 180° cable outlet or via a standard patch cable
  - Diagnostics LEDs for indicating the operational and communication status
- Simple installation;
  the CP 443-1 Advanced is mounted on the S7-400 rack and connected to other modules by means of the backplane bus. There are no slot rules.
- The CP 443-1 Advanced can be operated without a fan.
- In combination with IM 460/461, the CP 443-1 Advanced can also be used in an expansion rack (ER).
- The module can be replaced without the need for a programming device
- C-PLUG (configuration plug) is included in scope of delivery as a swap medium (cannot be operated without C-PLUG).

Function

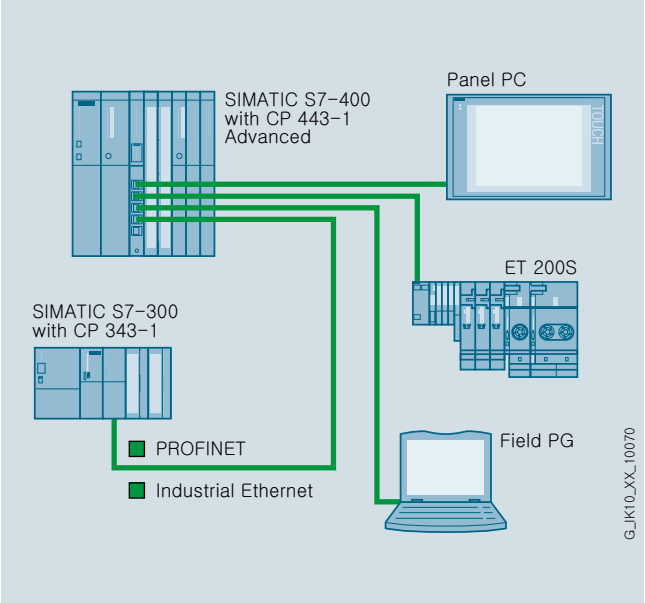
- Two separate interfaces (integrated network separation):
  - Gigabit interface with one RJ45 port with 10/100/1 000 Mbit/s, full/half-duplex with auto-sensing capability
  - PROFINET interface with four RJ45 ports with 10/100 Mbit/s full/half duplex with autosensing and autocrossover functionality via integrated 4-port switch
- Communications services via both interfaces:
  - Open communication (TCP/IP and UDP):
    Multicast with UDP, including routing between both interfaces
  - PG/OP communication: inter-network with S7 routing
  - S7 communication (client, server, multiplexing) including routing between both interfaces
  - S7-H-communication for S7-400-H-systems, now also across network boundaries (ISO-on-TCP)
  - IT communication:
    HTTP communication permits access to process data via user's own Web pages. HTTPS communication is also possible with the CP 443-1 Advanced[1)].
    The e-mail client function allows e-mails to be sent directly from the user program.
    FTP communication allows program-controlled FTP client communication.
    Access to data blocks via FTP server.
- Communication services via PROFINET interfaces:
  - Certified PROFINET IO controller with real-time properties (RT and IRT)
  - PROFINET CBA
  - IP address assignment via DHCP, simple PC tool or via user program (e.g. for HMI)
- Media redundancy (MRP):
  - Within an Ethernet network with a ring topology, the CP supports the MRP media redundancy protocol as an MRP manager and as an MRP client
- Diagnostics and network management:
  - Comprehensive diagnostics functions for all modules in the rack (including graphical diagnostics, e.g. topology)
  - Integration in network management systems due to support of SNMP V1/V3
- Security mechanisms:
  - Access protection by means of configurable IP access list
  - Firewall for filtering connections on the basis of their IP/port addresses
  - Bandwidth limitation to avoid communication overload
  - VPN server and VPN client for tap-proof access to controllers
  - Encrypted HTML pages using SSL (HTTPs)
  - Secure file transfer (FTPs)
  - Tap-proof transfer of network analysis information to the network management system (SNMP)
  - Translation of private and public IP addresses (NAT/NAPT)
  - Secure transfer of the time of day (NTP V3)
  - Secure firmware update
  - Plagiarism detection
  - Certification as per the Achilles Level II Standard
    http://wurldtech.com/product_services/certify_educate/certified_products/
- Configuration of all functions with STEP 7;
  The security functions are configured using the Security Configuration Tool (SCT), which is included in the scope of delivery for STEP 7 V5.5 SP2 HF1.
- Configuration with STEP 7 Professional V11;
  only possible with a limited range of functions of the predecessor CP 443-1 (6GK7 443-1GX20-0XE0), without security functions and CBA.
  Version with security functions[1)] for TIA Portal in planning.
- When using the blocks AG_SSEND (FC53), AG_SRECV (FC63), TSEND (FB63), TRCV (FB64), TCON (FB65) and TDISCON (FB66), please note the following information:
  http://support.automation.siemens.com/WW/view/en/60037071
- Module replacement without programming device:
  all information is stored on the C-PLUG (also file system for IT functions)

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Integration



Connection to higher-level network



Small independent local networks (e.g. within a machine or cell)

Technical specifications

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Transmission rate	
Transfer rate	
• at the interface 1	10 … 1 000 Mbit/s
• at the interface 2	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• at interface 2 in accordance with Industrial Ethernet	4
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port
Design of the removable storage C-PLUG	Yes
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V with DC	5 %
Consumed current from backplane bus at 5 V for DC Typical	1.8 A
Resistive loss	7.25 W

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	25 mm
Height	290 mm
Depth	210 mm
Net weight	0.7 kg
Product properties, functions, components general	
Number of modules	
• per CPU maximum	14
• note	max. 4 as PN IO ctrl.

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Technical specifications (continued)

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	64
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 possible connections for open communication by means of T blocks maximum	64
Data volume as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	128
Performance data IT functions	
Number of possible connections	
• as client by means of FTP maximum	20
• as server	
- by means of FTP maximum	10
- by means of HTTP maximum	4
• as e-mail client maximum	1
Amount of data as useful data for e-mail maximum	8 Kibyte
Memory capacity of user memory	
• as flash memory file system	30 Mibyte
• as RAM	16 Mibyte
• additionally buffered as RAM via central backup battery	512 Kibyte
Number of possible write cycles flash memory cells	100 000

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Performance data PROFINET communication as PN IO-Controller	
Product function PROFINET IO controller	Yes
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	64
Number of external PN IO lines with PROFINET per rack	4
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	8 Kibyte
• as useful data for output variables with PROFINET IO controller maximum	8 Kibyte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as user data for input variable per PN IO device per submodule as PROFINET IO controller maximum	240 byte
• as user data for output variables per PN IO device per submodule as PROFINET IO controller maximum	240 byte
Performance data PROFINET CBA	
Number of remote connection partners with PROFINET CBA	64
Number of connections with PROFINET CBA total	600
Amount of data	
• as useful data for digital inputs with PROFINET CBA maximum	8 Kibyte
• as useful data for digital outputs in the case of PROFINET CBA max.	8 Kibyte
• as useful data for arrays and data types	
- in the case of acyclic transmission with PROFINET CBA maximum	8 Kibyte
- with PROFINET CBA with cyclic transmission maximum	250 byte
- with PROFINET CBA in the case of local interconnection maximum	2 400 byte
Performance data PROFINET CBA remote connection with acyclic transmission	
Updating time of the remote interconnections in the case of acyclic transmission with PROFINET CBA	0.1 s
Number of remote connections to input variables with acyclic transmission with PROFINET CBA maximum	150
Number of remote connections to output variables with acyclic transmission with PROFINET CBA maximum	150

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Technical specifications (continued)

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Amount of data	
• as useful data for remote interconnections with input variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
• as useful data for remote interconnections with output variables in the case of acyclic transmission with PROFINET CBA	8 Kibyte
Performance data PROFINET CBA remote connection with cyclic transmission	
Update time of the remote interconnections with PROFINET CBA with cyclic transmission	10 ms
Number of remote connections to input variables with PROFINET CBA with cyclic transmission maximum	250
Number of remote connections to output variables with PROFINET CBA with cyclic transmission maximum	250
Amount of data	
• as useful data for remote interconnections with input variables with PROFINET CBA with cyclic transmission maximum	2 000 byte
• as useful data for remote interconnections with output variables with PROFINET CBA with cyclic transmission maximum	2 000 byte
Performance data PROFINET CBA HMI variables via PROFINET acyclic	
Number of connectable HMI stations for HMI variables with acyclic transmission with PROFINET CBA	3
Updating time of the HMI variables in the case of acyclic transmission with PROFINET CBA	500 ms
Number of HMI variables with acyclic transmission with PROFINET CBA maximum	200
Amount of data as useful data for HMI variables in the case of acyclic transmission with PROFINET CBA maximum	8 Kibyte
Performance data PROFINET CBA device-internal connections	
Number of internal connections with PROFINET CBA maximum	300
Data volume of internal connections with PROFINET CBA maximum	2 400 byte
Performance data PROFINET CBA connections to constants	
Number of connections to constants with PROFINET CBA maximum	500
Amount of data as useful data for interconnections with constants in the case of PROFINET CBA maximum	4 000 byte
Performance data PROFINET CBA PROFIBUS proxy functionality	
Product function with PROFINET CBA PROFIBUS proxy functionality	No

Article No.	6GK7443-1GX30-0XE0
Product-type designation	**CP 443-1 Advanced**
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software	
• required	STEP 7 V5.5 SP3 or higher / STEP 7 Professional V12 (TIA Portal) or higher
• for PROFINET CBA required	SIMATIC iMap V3.0 SP1 and higher
Identification & maintenance function	
• I&M0 - device-specific information	-
• I&M1 - higher level designation/location designation	-
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	Yes
• Configuration with STEP 7	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes
Product functions Security	
Design of the firewall	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible connections for VPN connection	32
Product function	
• password protection for Web applications	Yes
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
• log file for unauthorized access	No
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

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Ordering data

	Article No.
Communications processor CP 443-1 Advanced for connecting the SIMATIC S7-400 CPU to Industrial Ethernet: 1 x 10/100/1 000 Mbit/s; 4 x 10/100 Mbit/s (IE SWITCH); RJ45 ports; ISO; TCP; UDP; PROFINET IO controller, S7 communication; open communication (SEND/RECEIVE); S7 routing; IP configuration via DHCP/block; IP Access Control List; time synchronization; expanded web diagnostics; Fast Startup; PROFIenergy support; IP routing; FTP; web server; e-mail; PROFINET CBA	
• With security functionality (firewall and VPN)	**6GK7443-1GX30-0XE0**
Accessories	
IE FC RJ45 Plug 180 2 x 2 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	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC RJ45 Plug 4 x 2 RJ45 plug connector for Industrial Ethernet (10/100/1 000 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	**6GK1901-1BB11-2AA0**
• 1 pack = 10 units	**6GK1901-1BB11-2AB0**
• 1 pack = 50 units	**6GK1901-1BB11-2AE0**

	Article No.
Accessories (continued)	
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 1 000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC TP Standard Cable GP 4 x 2 8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	
• AWG22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**
• AWG24, for connection to IE FC RJ45 Plug 4 x 2	**6XV1878-2A**
IE FC stripping tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics for configuring line, star and ring topologies; four 10/100 Mbit/s RJ45 ports and two FO ports	**6GK5204-2BB10-2AA3**
Industrial Ethernet Switch SCALANCE X308-2 2 x 1 000 Mbit/s multimode 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 (multimode) up to max. 750 m	**6GK5308-2FL00-2AA3**

Note:

For software ordering data, see page 2/584

More information

You will find more information on the topic of Industrial Security on the Internet at:
http://www.siemens.com/industrialsecurity

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Overview



ISO	TCP/ UDP	PN	PRP	IT	IP-R	PG/OP	S7/S5
●	●		●			●	●

G_IK10_XX_10151

Communication processor for connecting a SIMATIC S7-400/S7-400H to Industrial Ethernet networks.

The CP supports:

- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)

The communications processor can be used in SIMATIC H systems and for fail-safe applications (PROFIsafe) in connection with an S7-400 F-CPU. The CP 443-1 RNA (**R**edundant **N**etwork **A**ccess) [1] offers the option of using the PRP procedure (**P**arallel **R**edundancy **P**rotocol in accordance with IEC 62439-3) to connect an S7-400 or S7-400H to parallel, separate networks where high availability is required.

The PRP functionality can be deactivated so that standard Industrial Ethernet communication is also possible with the CP.

The PRP redundancy procedure is based on double transmission of message frames over two separate networks (LAN A, LAN B). In the event of a fault in one of the two networks, transmission of the message frame from the second network is ensured without delay. A reconfiguration time (switchover of the communication paths) for the network, such as is required with other redundancy procedures, is thus not necessary.

[1] At Siemens Industry, RNA stands for hardware and software to implement redundancy solutions. RNA contains the PRP V1 protocol in accordance with the IEC 62439-3 standard (Parallel Redundancy Protocol) as well as the HSR protocol in accordance with IEC 62439-3 (High-availability Seamless Redundancy Protocol).

Benefits

get Designed for Industry

- Cost advantage due to connection to two separate Ethernet segments with integrated network separation
- High plant availability through the support of media redundancy (MRP) and use in the SIMATIC S7-400 H system
- Use in plants with high availability requirements
- Use in time-critical applications, since there is bumpless switchover in the event of a fault on the network
- Simple integration, since no additional programming overhead required for communication via PRP (transparent at application level)
- Optimum support of maintenance through
  - Web-based diagnostics
  - Remote programming via WAN or telephone network (ISDN)
  - Monitoring with IT network management tools (SNMP)
  - Module replacement without programming device using the C-PLUG swap medium
- Investment protection thanks to later connection of existing SIMATIC S7 systems to redundant, parallel networks using the CP 443-1 RNA
- The simple, single interfaces of the SEND/RECEIVE blocks enable straightforward parameterization and programming for customized communication requirements

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CP 443-1 RNA

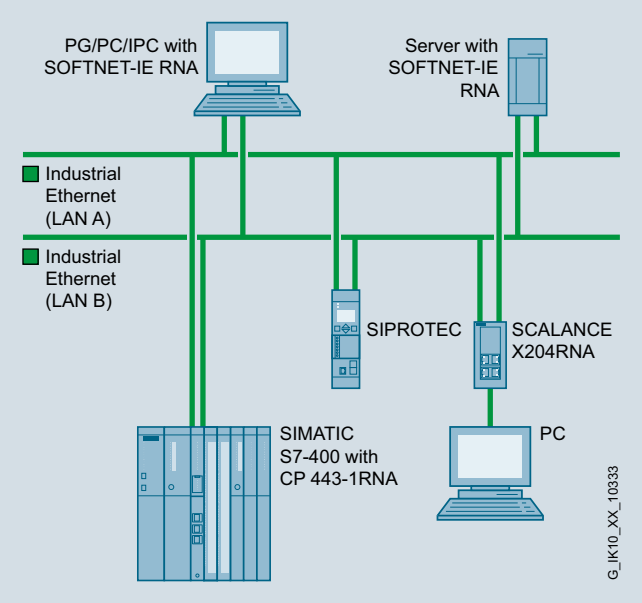
Application

The CP 443-1 RNA enables communication in networks where extremely high plant availability is important.

It offers communication options with

- PGs/PCs
- Master computers
- SIMATIC S5/S7/C7 systems
- Third-party systems

With the CP 443-1 RNA, an S7-400 station can be connected to a high-availability PRP network.



Connection of an S7-400 to a PRP network

Design

The CP 443-1 RNA offers all the advantages of the SIMATIC S7-400 system design:

- Compact design:
  - Three RJ45 jacks for connecting to Industrial Ethernet via two independent interfaces, of which only one can ever be active;
    automatic data rate detection by means of the autonegotiation and autocross function;
    the connection is made via the IE FC RJ45 Plug 180 with 180° cable outlet or via a standard patch cable.
  - Diagnostics LEDs for indicating the operational and communication status
- Simple installation;
  the CP 443-1 RNA is mounted on the S7-400 rack and connected to other modules by means of the backplane bus. There are no slot rules.
- The CP 443-1 RNA can be operated without a fan
- In combination with the IM 460/461, the CP 443-1 RNA can also be used in an expansion rack (ER)
- The module can be replaced without the need for a programming device

Function

A SIMATIC S7-400/S7-400H is connected to two parallel Industrial Ethernet networks via the two RJ45 connections of the CP 443-1 RNA. The CP uses the parallel redundancy protocol in accordance with the IEC 62439-3 standard. It doubles the message frame and feeds it into the two connected networks. The access point on the receiver side forwards the first arriving message frame to the addressee. The frame arriving later is discarded.

Two separate interfaces:

- RNA interface with two RJ45 ports with 100 Mbit/s full duplex with autonegotiation and autocrossover functionality (no switching functionality) for connection to a PRP network
- Ethernet interface with an RJ45 port with 10/100 Mbit/s full/half duplex with autonegotiation and autocrossover functionality

There is only ever one interface active, no IP routing between the interfaces;
communication per interface only possible to the CPU in each case.

The PRP functionality can be deactivated, and the independent Ethernet interface can be activated as an alternative to the RNA interface. Standard Industrial Ethernet communication is thus also possible with the CP. Only the communication service is supported via the ISO transport protocol on the Ethernet interface, and all other services are deactivated. The CP is thus also suitable for applications that require qualification and can manage with the restricted functionality. The qualification costs can be reduced in this way.

Communication services
on the RNA interface (interface X2)**:**

- Open communication (ISO, ISO on TCP, TCP/IP and UDP): Multicast with UDP
- PG/OP communication: across networks by means of S7 routing
- S7 communication (ISO, ISO on TCP, client, server)
- S7 H communication for S7-400 H systems beyond network boundaries (ISO-on-TCP, ISO)
- Time synchronization by means of the SIMATIC procedure and NTP
- IP address assignment via a simple PC tool
- Security mechanisms: Access protection by means of configurable IP access list

Communication services
on the Ethernet interface (interface X1)**:**

- Open communication (ISO only)
- PG/OP communication: across networks by means of S7 routing (ISO)
- S7 communication (ISO client only, server)

Diagnostics and network management:

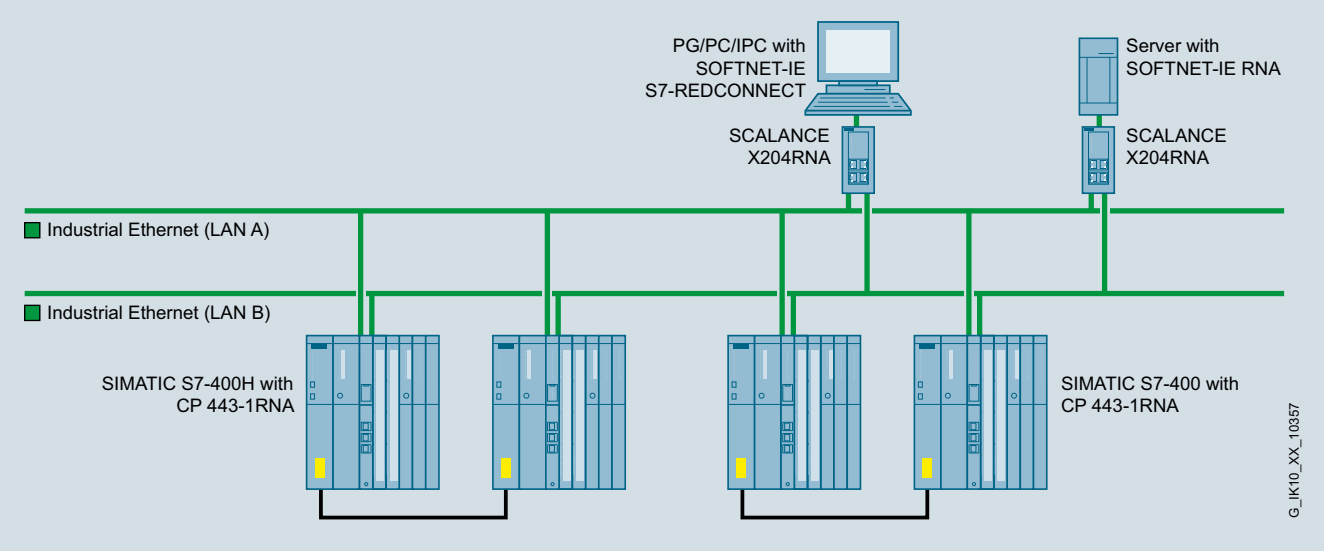
- Extensive diagnostics functions of all modules in the rack via Web diagnostics, integrated into STEP 7
- Integration into network management systems through the support of SNMP V1;
  the following MIBs are supported: MIBII, Automation MIB and PRP-MIB (IEC-62439-3)

Configuring
of all functions with STEP 7 from V5.5 SP2 plus HSP

Module replacement possible without PG.

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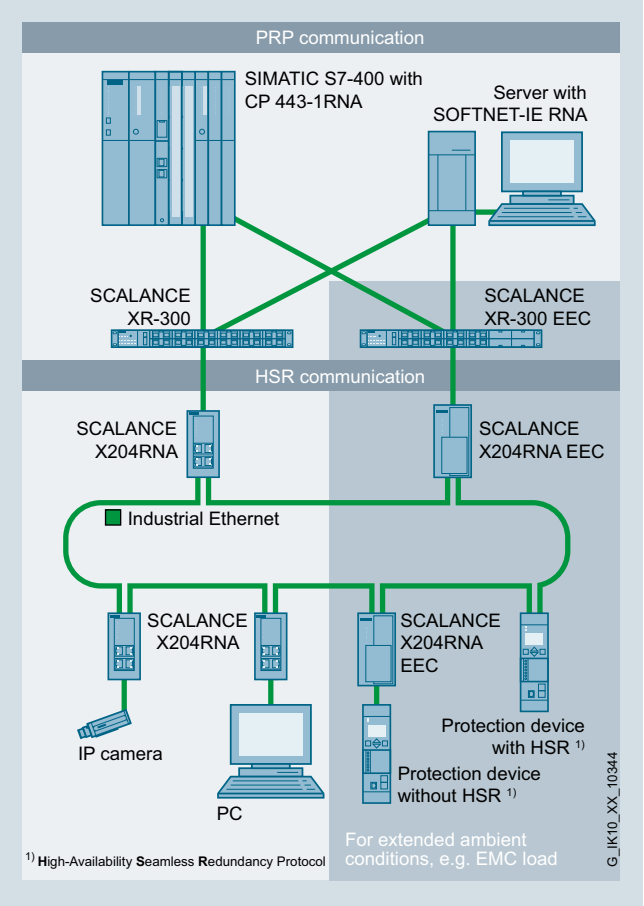
Integration



PRP communication with connected H systems to HMI station

Note:

With the SIMATIC NET DVD V12 it is possible to link SOFTNET REDCONNECT and SOFTNET RNA; in this case, the SCALANCE X switch can be omitted.



Example configuration: redundant network topology with PRP and HSR communication

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Technical specifications

Article No.	6GK7443-1RX00-0XE0
Product-type designation	**CP 443-1 RNA**
Transmission rate	
Transfer rate	
• at the interface 1	10 … 100 Mbit/s
• at the interface 2	100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	1
• at interface 2 in accordance with Industrial Ethernet	2
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• at interface 2 in accordance with Industrial Ethernet	RJ45 port
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V with DC	5 %
Consumed current from backplane bus at 5 V for DC typical	1.8 A
Resistive loss	7.25 W
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP20
Design, dimensions and weight	
Module format	Compact module S7-400 single width
Width	0.025 m
Height	0.29 m
Depth	0.21 m
Net weight	0.7 kg
Product properties, functions, components general	
Number of modules	
• per CPU maximum	14
• note	-

Article No.	6GK7443-1RX00-0XE0
Product-type designation	**CP 443-1 RNA**
Performance data	
Performance data open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks maximum	64
Data volume	
• as user data per ISO connection for open communication by means of SEND/RECEIVE blocks maximum	8 192 byte
• as user data per ISO on TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 192 byte
• as user data per TCP connection for open communication by means of SEND/RECEIVE blocks maximum	8 192 byte
• as user data per UDP connection for open IE communication by means of SEND/RECEIVE blocks maximum	2 048 byte
Number of possible connections for open communication by means of T blocks maximum	64
Data volume as user data per ISO on TCP connection for open communication by means of T blocks maximum	1 452 byte
Performance data S7 communication	
Number of possible connections for S7 communication	
• maximum	128
• with PG connections maximum	2
• note	when using several CPUs
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	128

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Technical specifications (continued)

Article No.	6GK7443-1RX00-0XE0
Product-type designation	**CP 443-1 RNA**
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported SNMP v1	Yes
Configuration software required	STEP 7 V5.5 SP2 + HSP or higher
Product functions Diagnosis	
Product function Web-based diagnostics	Yes
Product functions Redundancy	
Product function Parallel Redundancy Protocol (PRP)	Yes
Product functions Security	
Product function	
• ACL - IP-based	Yes
• ACL - IP-based for PLC/routing	Yes
• switchoff of non-required services	Yes
• blocking of communication via physical ports	Yes
Product functions Time	
Product function	
• SICLOCK support	Yes
• pass on time synchronization	Yes
Protocol is supported NTP	Yes

Ordering data

CP 443-1 RNA communications processor for connecting the SIMATIC S7-400/S7-400H CPU to Industrial Ethernet	**6GK7443-1RX00-0XE0**
Accessories	
SCALANCE X-200RNA Industrial Ethernet network access points	
Industrial Ethernet network access points with integrated SNMP access, web diagnostics and PROFINET diagnostics, for connecting non-PRP-enabled terminal equipment to PRP networks; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; with electrical and optical ports for glass multimode fiber optic cables up to 5 km	
• **SCALANCE X204RNA** with four 100 Mbit/s RJ45 ports	**6GK5204-0BA00-2KB2**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-3LA3**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports with PRP or HSR support	**6GK5204-0BS00-3PA3**
SOFTNET-IE RNA	
Software for connecting PCs to PRP-enabled networks with integrated SNMP, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
SOFTNET-IE RNA V12 for 32/64-bit Windows 7 Professional/Ultimate; for Windows 2008 Server R2; for 32/64-bit Windows 8 Professional/Enterprise; for Windows Server 2012 German/English	
• Single license for one installation	**6GK1711-1EW12-0AA0**
SOFTNET-IE RNA V8.1 for 32-bit Windows XP; German/English	
• Single license for one installation	**6GK1711-1EW08-1AA0**
Software Update Service for 1 year with automatic extension; requirement: Current software version	**6GK1711-1EW00-3AL0**

Note:

For software ordering data, see page 2/584

More information

You will find more information on the topic of Redundant Network Access on the Internet at:
http://www.siemens.com/rna

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Ordering data

	Article No.
Software	
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
For CP 243-1, CP 1243-1, CP 1543-1, CM 1542-1, CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced, CP 443-1 RNA	
SOFTNET-IE S7 V12	
For 32/64-bit Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2 for 32/64-bit: Windows8 Pro for Windows Server 2012 German/English	
up to 64 connections	
• Single License for one installation	**6GK1704-1CW12-0AA0**
SOFTNET-IE S7 Lean Edition V12	
Up to eight connections	
• Single License for one installation	**6GK1704-1LW12-0AA0**
STEP 7 Version 5.5	
Target system: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC	
Requirements: Windows XP Prof., Windows 7 Professional/Ultimate	
Type of delivery: German, English, French, Spanish, Italian; including license key on USB stick, with electronic documentation	
For CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced, CP 443-1 RNA	
• Floating License on DVD	**6ES7810-4CC10-0YA5**
• Rental License for 50 hours	**6ES7810-4CC10-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.5; on DVD	**6ES7810-4CC10-0YE5**
• Trial License STEP 7 V5.5; on DVD, 14 day trial	**6ES7810-4CC10-0YA7**

	Article No.
STEP 7 Professional / Basic engineering software V13 (TIA Portal)	
Target system: SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC	
Requirement: Windows 7 Professional (64 bit), Windows 7 Enterprise (64 bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64 bit), Windows 8.1 Professional (64 bit), Windows 8.1 Enterprise (64 bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation)	
Form of delivery: German, English, Chinese, Italian, French, Spanish	
For CP 1243-1, CP 1543-1, CM 1542-1, CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced	
• STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
• STEP 7 Professional V13, Trial License	**6ES7822-1AA03-0YA7**
• Upgrade STEP 7 Professional V12 to STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YE5**
• Upgrade STEP 7 Professional 2006/2010 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AA03-0XE5**
• PowerPack & Upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AA03-0XC5**
• PowerPack STEP 7 Basic V13 to STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YC5**

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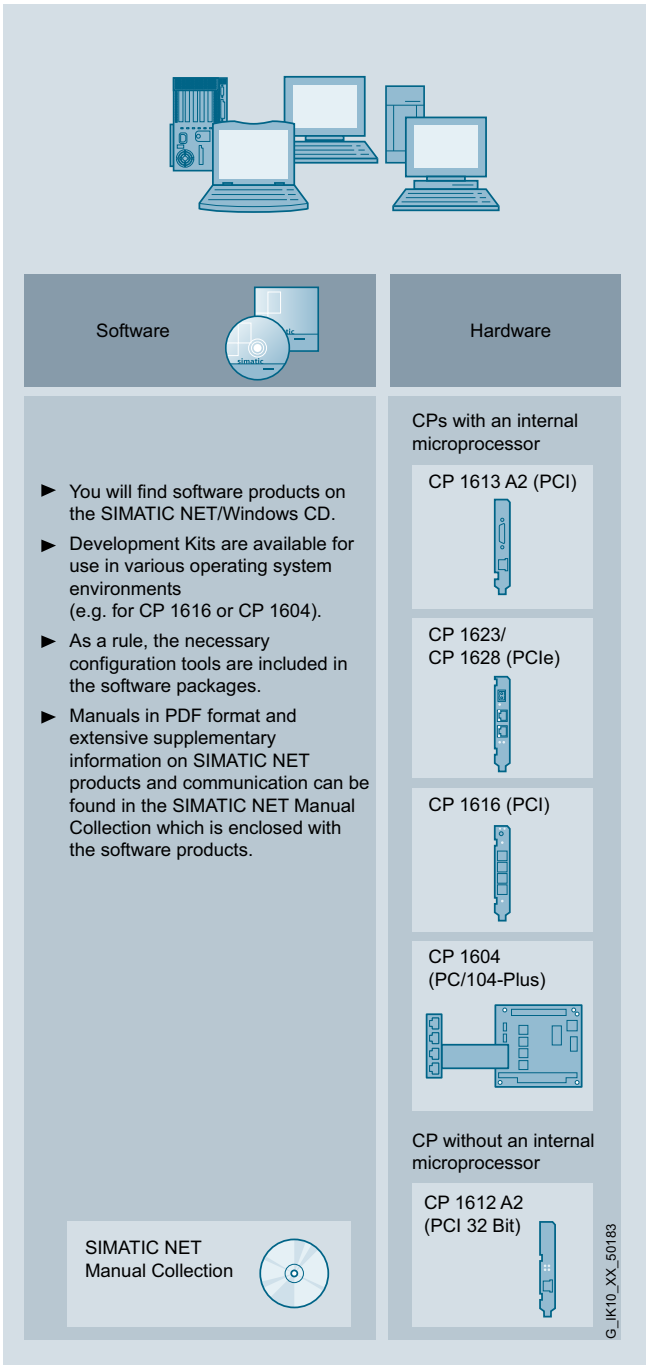
Ordering data	Article No.
STEP 7 Professional engineering software V13; software download incl. license key [1]	
E-mail address required for the delivery	
• STEP 7 Professional V13, Floating License	**6ES7822-1AE03-0YA5**
• Upgrade STEP 7 Professional V12 to STEP 7 Professional V13, Floating License	**6ES7822-1AE03-0YE5**
• Upgrade STEP 7 Professional 2006/2010 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AE03-0XE5**
• PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AE03-0XC5**
• PowerPack STEP 7 Basic V13 to STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YC5**
STEP 7-Micro/WIN V4 programming software	
For CP 243-1	
Target system: All CPUs of the SIMATIC S7-200 *Requirement:* Windows 2000/XP on PG or PC, *available in:* German, English, French, Spanish, Italian, Chinese; with online documentation	
• Single License	**6ES7810-2CC03-0YX0**
• Single license upgrade	**6ES7810-2CC03-0YX3**

Ordering data	Article No.
SIMATIC iMap V3.0 *For CP 343-1 Advanced, CP 443-1 Advanced*	
for configuration of PROFINET CBA	
Requirement: Windows 2000 Prof. with Service Pack 4 or later or Windows XP Prof. with Service Pack 1 or later or Windows 2003 Server with Service Pack 1; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 Service Pack 3 or later, PN OPCServer V6.3 or later	
Form of delivery: German, English, with electronic documentation	
• Single License	**6ES7820-0CC04-0YA5**
• Software Update Service	**6ES7820-0CC01-0YX2**
• Upgrade to V3.0, Single license	**6ES7820-0CC04-0YE5**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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Overview



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 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

CPs with integral switch

- Connection of additional field devices to the Industrial Ethernet by means of additional switch ports
- Switch operation possible via external power supply even with PC turned off

Configuration for SIMATIC NET version V12 or higher

STEP 7 V12 or higher is used for PC configuration. The STEP 7 software is included in the scope of delivery of the SIMATIC NET products. A STEP 7 license is not required for PC configuration.

Configuration for SIMATIC NET versions up to V8.2:

The PC can be configured either in STEP 7 or in NCM PC Version V5.1+SP2 and higher. Both tools offer the same 'look & feel' and create the same database. This enables integrated configuration of the open communication and S7 communication functions. Data only has to be entered once and data consistency is assured.

- A configuration wizard integrated into NCM PC also supports user-driven configuration of the PC station.
- With NCM PC and STEP 7 from Version V5.1+SP2 upwards, a PC similar to a SIMATIC S7 station can be configured and loaded over a network. This applies both to the local station on which NCM PC or STEP 7 is installed and to the remote station that is addressed over the network.

Note:

NCM PC does not contain a conversion function for LDBs that were created using COML S7. Reconfiguration is necessary.

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Overview (continued)

CPs for PG/PC/IPC

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	10 Gigabit Ethernet	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	
CP 1604			•									•	•		•				
CP 1616			•									•	•		•				
CP 1623			•							•		•	•		•				
CP 1628			•							•		•	•		•				

Type of device	Software																												
	Security Integrated (Firewall/VPN)	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)	
CP 1604		•	•		•[1)]	•	•	•		•																		G_IK10_XX_10319
CP 1616		•	•		•[1)]	•	•	•		•																		
CP 1623						•	•																					
CP 1628	•					•	•																					

• applies

1) Port diagnosis possible by means of integrated web server

Function overview of the communication modules with integral switch for SIMATIC PG/PC/IPC

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Overview

The following communications processors are available for connecting to the programming device or PC:

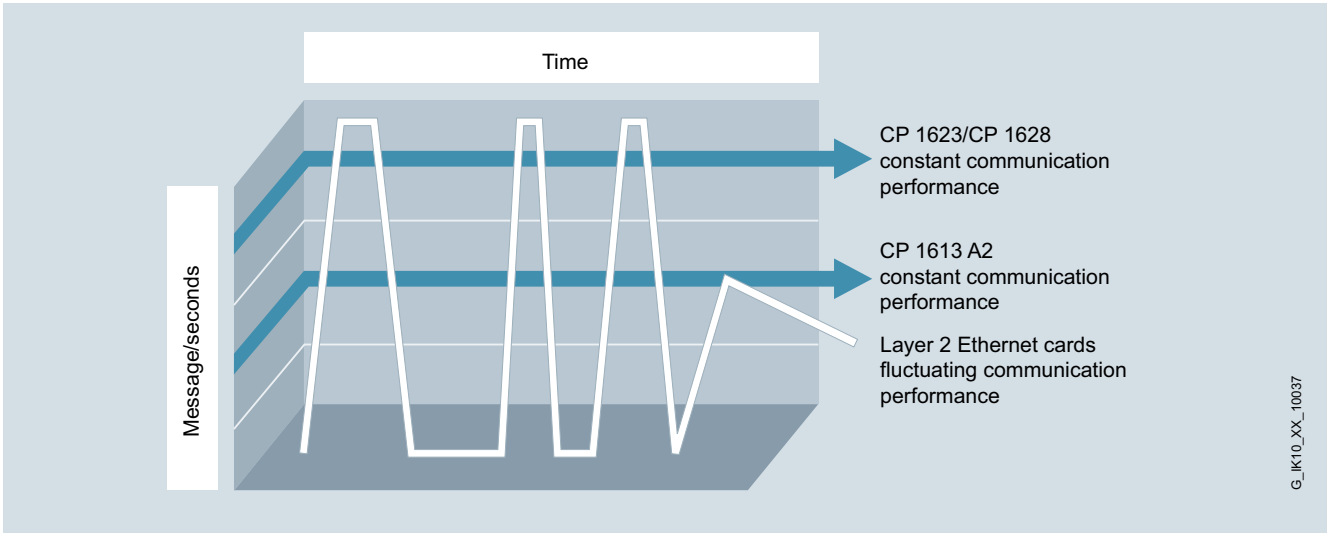
- CPs with an internal microprocessor:
  - CP 1616 (PCI)
  - CP 1604 (PCI-104)
  - CP 1613 A2 (PCI)
  - CP 1623 (PCIe)
  - CP 1628 (PCIe)

Data throughput of Industrial Ethernet

Comparisons between Layer-2 Ethernet cards and CP 1613 A2/CP 1623/CP 1628 show the respective communications throughput.

This throughput varies between 0 and the maximum throughput for Layer-2 Ethernet cards with the corresponding software packages.

When the CP 1613 A2/CP 1623/CP 1628 is used with software packages, the communications performance remains constantly at a high level and ensures fast response times without any variations.



Communication performance comparisons

More information

You can find more information on the Internet at:

http://www.siemens.com/simatic-net/ik-info

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Overview

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.

		Operating system environment of the communication software								SIMATIC Industrial PC/ Field PG									Embedded Systems: Operation system		Embedded Systems: SIMATIC Industrial-PC	
Communication hardware	Communication software	Windows 7 Professional / Ultimate SP1	Windows 8.1 Pro / Enterprise	Windows Server 2008 R2 SP1	Windows Server 2012 R2	Windows Server 2008 + SP1/2	Windows XP Pro + SP3	Windows Server 2003 R2 / SP2	other operating systems	Field PG M4	SIMATIC IPC227D + IPC 277D	SIMATIC IPC427D + IPC 477D	SIMATIC IPC547E	SIMATIC IPC627D	SIMATIC IPC647D	SIMATIC HMI IPC677D	SIMATIC IPC827D	SIMATIC IPC847D	Windows Embedded Standard 2009	Windows Embedded Standard 7 + SP1	SIMATIC IPC427D + 477D + IPC 227D/277D	SIMATIC S7 modular Embedded Controller
CPs and software for Industrial Ethernet																						
CP 1613 A2 (PCI 32 Bit)	HARDNET-IE S7	●	●	●	●	●	●	●					●	●	●	●	●	●	●			
	HARDNET-IE S7 REDCONNECT 1)	●	●	●	●	●	●	●					●	4)5) ○	●	4)5) ○	●	●	●			
	S7 OPC Redundancy for Industrial Ethernet			●									●	●	●		●	●				
CP 1623 (PCIe x1)	HARDNET-IE S7	●	●	●	●	●	●	●				○5)	●	○5)	●	○5)	●	●	●	●	●	
	HARDNET-IE S7 REDCONNECT 1)	●	●	●	●	●	●	●				4)5) ○	●	4)5) ○	●	4)5) ○	●	○5)	●	●	4)5) ○	
	S7 OPC Redundancy for Industrial Ethernet			●									●		●			●				
CP 1628 (PCIe x1)	HARDNET-IE S7	●	●	●	●							○5)	●	○5)	●	○5)	●	●	●	●	●	
	HARDNET-IE S7 REDCONNECT 1)	●	●	●	●							4)5) ○	●	4)5) ○	●	4)5) ○	●	○5)	●	●	4)5) ○	
	S7 OPC Redundancy for Industrial Ethernet			●									●		●			●				
CP 1612 A2 (PCI 32 Bit)	SOFTNET-IE S7	●		●		●	●	●					●	●	●	●	●	●	●			
	SOFTNET-IE S7 Lean	●		●		●	●	●					●	●	●	●	●	●	●			
	SOFTNET-IE PG	●		●		●	●	●					●	●	●	●	●	●	●			
	S7 OPC Redundancy for Industrial Ethernet			●									●		●			●				
SIMATIC PG/PC with integral Ethernet interface	SOFTNET-IE S7	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
	SOFTNET-IE S7 Lean	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
	SOFTNET-IE PG	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
	S7 OPC Redundancy for Industrial Ethernet			●									●		●			●				
CPs and software for PROFINET																						
CP 1616 1) (PCI 32 Bit)	DK-16xx PNIO	●	●				●		○8)			6)7) ○	○	○6)	○6)	○	○6)	○6)	○			
CP 1604 1) (PCI-104)	DK-16xx PNIO	●	●				●		○8)										○			
SIMATIC PG/PC with integral Ethernet interface	SOFTNET PN IO	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
	Support package SIMATIC IPC for VxWorks								●			●		●	●		●	●				

1) and integrated CP1616-compatible onboard 3-port 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 for redundant connection (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) without 4-way redundancy as there are only 2 slots
5) Observe restrictions for some PC versions: Number of slots and tolerable maximum heat loss/ power consumption per slot and in total
6) integrated CP1616-compatible onboard 3-port PROFINET interface is optional
7) only with integrated interface
8) Portioning DL-16xx PNIO

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/en/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 DVD
- 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

● suitable
– not suitable
○ suitable under certain conditions

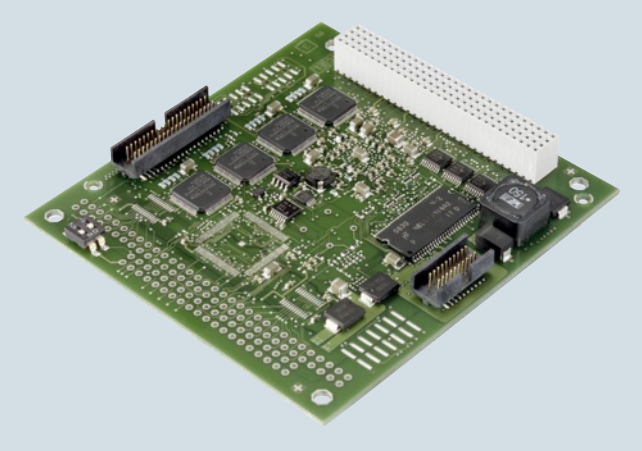
G_IK10_XX_10225

Connection options of Industrial Ethernet CPs to PG/PC/IPC

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Overview



ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●	●				

- PCI-104 module for connecting PCI-104 systems to PROFINET IO
- Full/half duplex with autonegotiation
- With Ethernet real-time ASIC ERTEC 400
- Integral 4-port real-time switch
- Communication services:
  - PROFINET IO controller and/or PROFINET IO device
  - Support of IRT in motion control applications
  - Support of PROFIenergy functionality
- High performance through direct memory access
- Integration in network management systems through the support of SNMP
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are included in delivery of module

Benefits

get Designed for Industry

- Connection of field devices to Industrial Ethernet with PROFINET
- Ideally suited for design of small local networks through integral 4-port real-time switch
- Direct memory access to process data by linking as PROFINET IO-Controller via IO-Base interface
- High computing power is available in the PC by taking the load off the host CPU by means of a real-time ASIC ERTEC 400 with support of the PROFINET real-time features RT and IRT
- Implementation in Motion Control applications thanks to support of IRT
- Energy savings thanks to support of PROFIenergy
- Simple transfer to various operating system environments using HARDNET-PN IO Development Kit
- Switch mode also with the PC switched off, via optional external power supply (in RT mode only)
- Uncrossed connecting cables can be used due to the integrated Autocrossover function

Application

The CP 1604 is used to connect PCI-104 systems to PROFINET IO.

The CP 1604 provides high-performance support for control tasks on the PC (PC based Control, Numeric Control, Robot Control).

With IRT (Isochronous Real-Time), the CP is ideally suited to time-critical applications that are in the range of strictly isochronous closed-loop control in the motion control sector.

The integrated 4-port switch supports low-cost system solutions and the configuration of different topologies.

The CP 1604 offers PCI-104 systems communications facilities with:

- PROFINET IO controller and/or PROFINET IO device

The DK-16xx PN IO development kit enables integration of the module into any operating systems.

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Design

- Industrial Ethernet (via "Connection Board for CP 1604")
  - Ethernet real-time ASIC ERTEC 400
  - 4 x RJ45 connection
  - Integral 4-port real-time switch for 10/100 Mbit/s Ethernet
  - Half/full duplex
  - Autosensing/Autocrossover/Autonegotiation
- PCI-104-Plus interface:
  - PCI 2.2
  - 32 bits
  - 33 MHz or 66 MHz
  - Installation through PCI standard mechanisms (Plug & Play)
- Host interface/processor:
  - Dual-port RAM onboard
  - Flash for program memory onboard
  - ARM 946 RISK processor (32-bit) onboard for preprocessing
- Interface for PROFIenergy:
  - Connection option for user-specific interface for switching back on PC
- Power supply:
  - Operating voltage: 5 V through PCI-104
  - Optional external 24 V DC supply for switch operation when PC is switched off (through "Power Supply for CP 1604")
- Size:
  - PCI-104 format

Function

The CP 1604 can be operated as a PROFINET IO controller and/or PROFINET IO device that stores the process image (input and output data) in the memory area on the CP. With simultaneous controller and device mode, only the controller or the device can be operated in IRT mode. High-performance data transfer to and from the IO devices is performed autonomously by the CP 1604.

Real-time

Support of real-time properties of PROFINET for RT and IRT. The real-time properties of the CP 1604 ensure extremely short cycle times with highly accurate clock-pulse rates.

Switching

According to the industry requirements, the 4-port real-time switch additionally permits the configuration of line topologies with spur lines and makes external switch components unnecessary.

The switch function in RT mode is also available when the PC is turned off thanks to the possibility of independently supplying an external voltage (via "Power Supply for CP 1604").

Energy savings

Thanks to its support of PROFIenergy, CP 1604 allows for the implementation of various energy-saving states during idle times. By connecting an external power supply, the CP 1604 can continue to communicate with the controller as a PROFIenergy device, even while the PC is switched off. By connecting an external hardware circuit, it is then possible to use this to reactivate the PC via PROFIenergy mechanisms.

Software packages

DK-16xx PN IO development kit;
driver and IO-Base software for CP 1604 as PROFINET IO-Controller and IO-Device under Linux in source code for transfer to any PC-based operating systems with IO-Base interface for:

- PROFINET communication:
  - PROFINET IO controller:
    Connection of field devices to Industrial Ethernet with PROFINET
  - PROFINET IO device:
    Link-up with a PROFINET IO controller through real-time communication according to the PROFINET standard
- Access in isochronous mode to real-time data for PROFINET over IRT;
  extremely short cycle times with highly accurate clock-pulse rates;
  jitter accuracy, isochronous mode, and cycle time enable high-performance motion control applications.
- Direct memory access to the process data;
  the process data of the IO-Devices are always consistent. The IO programming interface provides the PC programmer with function calls for data transfer.
- The design of the interface not only permits fast access as a PROFINET IO controller, but also easy transfer to other operating system environments (e.g. VXWorks, QNX, RMOS, RTX).
- The IO-Base interface for the PROFINET IO controller of the CP 1604 is compatible with the interface for SOFTNET PN IO
- The CP 1604 is functionally compatible to the CP 1616

Using the Development Kit DK-16xx PN IO, the CP 1604 communications processor can be integrated into any PC-based operating system environment. The Development Kit contains the driver and IO-Base source code required for this including the transfer instructions and also the example code which executes with SUSE Linux.

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User interfaces

Programming interface through C library

- For applications that want to use the PROFINET IO-Controller or IO-Device functionality directly over C/C++, the IO-Base interface can be used. This interface is of a similar design to the DP Base interface of PROFIBUS modules CP 5613 and CP 5614. It is therefore possible to port existing PROFIBUS DP master applications to PROFINET IO-Controller applications.

Diagnostics data

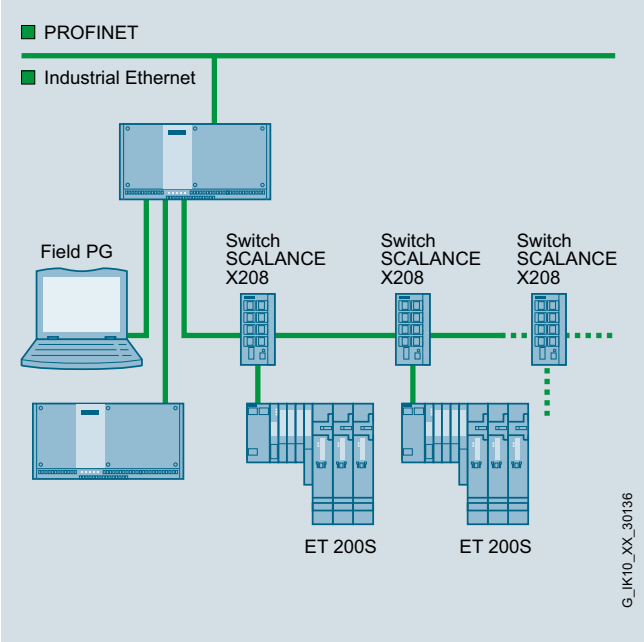
Extensive diagnostic options are available via STEP 7 or SNMP, including:

- General diagnostics functions
- Connection diagnostics
- Diagnostics of the assigned PROFINET field devices
- Integration in network management systems through the support of SNMP

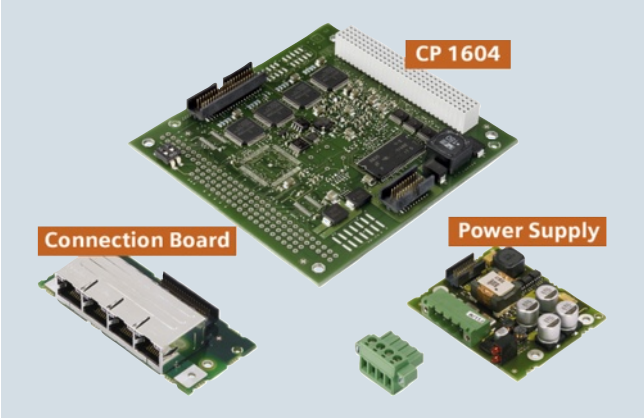
Configuration

Configuration of the CP 1604 is performed with STEP 7/NCM PC, V5.3 SP2 and higher. NCM PC is included with the module.

Integration



CP 1604 as PROFINET IO-Controller and PROFINET IO-Device



CP 1604 with accessories



CP 1604 Microbox Package

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Technical specifications

Article No.	6GK1160-4AA01
Product-type designation	**CP 1604**
Transmission rate	
Transfer rate at the interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	4
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port via connection board
• of the backplane bus	PCI-104 (32Bit)
• for power supply	4-pin terminal block via power supply board
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Type of power supply optional external supply	Yes
Supply voltage	
• 1 from backplane bus	5 V
• external	24 V
• note	optional external power supply and external supply voltage alternatively via power supply board (optional accessory)
Relative symmetrical tolerance	
• at 5 V with DC	5 %
• at 24 V with DC	20 %
Consumed current	
• 1 from backplane bus with DC maximum	0.8 A
• from external supply voltage at 24 V with DC maximum	0.3 A
Resistive loss	4 W
• in switch mode maximum	4.1 W
Permitted ambient conditions	
Ambient temperature	
• during operating	5 … 60 °C
• during storage	-20 … +60 °C
• during transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
Module format	PC/104-Plus
Width	90 mm
Height	24 mm
Depth	95 mm
Net weight	110 g
Product properties, functions, components general	
Number of plug-in cards in the same design can be plugged in per PC station	1

Article No.	6GK1160-4AA01
Product-type designation	**CP 1604**
Performance data	
Performance data PROFINET communication as PN IO-Controller	
Software for PROFINET IO communication required	No
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	64
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	8 192 byte
• as useful data for output variables with PROFINET IO controller maximum	8 192 byte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
Performance data PROFINET communication as PN IO-Device	
Amount of data	
• as useful data for input variables as PROFINET IO device maximum	1 433 byte
• as useful data for input variables as PROFINET IO device maximum	1 433 byte
• as useful data for input variables for each sub-module under PROFINET IO device	254 byte
• as useful data for input variables for each sub-module under PROFINET IO device	254 byte
• as useful data for the consistency area for each sub-module	254 byte
Number of submodules per PROFINET IO-Device	64
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	included in scope of delivery
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
• I&M2 - installation date	Yes
• I&M3 - comment	Yes
• I&M4 - signature	Yes

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Technical specifications (continued)

Article No.	6GK1160-4AA01
Product-type designation	**CP 1604**
Product functions Diagnosis	
Product function	
• Web-based diagnostics	Yes
• Port diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes

Article No.	6GK1160-4AA01
Product-type designation	**CP 1604**
Standards, specifications, approvals	
Standard	
• for EMC	2004/108/EC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes
Accessories	
Accessories	optional: Connection board for CP 1604, power supply board for CP 1604, HARDNET-IE DK (development kit)

Ordering data

	Article No.
CP 1604 communications processor PCI-104 card (32-bit) with ASIC ERTEC 400 for connecting PCI-104 systems to PROFINET IO with 4-port real-time switch (RJ45); incl. IO-Base software for PROFINET IO-Controller and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional and Windows 7; other operating systems using DK-16xx PN IO Development Kit German/English	**6GK1160-4AA01**
CP 1604 Microbox Package Package for implementing the CP 1604 in the SIMATIC Microbox PC; comprising the CP 1604, connection board, power supply and expansion racks for Microbox PC; for use with Development Kit DK-16xx PN IO; NCM PC	**6GK1160-4AU01**
Accessories	
Connection board for CP 1604 Connection board for CP 1604 with four RJ45 sockets incl. connecting cable	**6GK1160-4AC00**
Power supply for CP 1604 Redundant power supply for CP 1604 for operating the integral 4-port switch of the CP 1604 with the PC-104 system switched off; includes connecting cable	**6GK1160-4AP00**

	Article No.
***Accessories** (continued)*	
Development Kit DK-16xx PN IO Software Development Kit for CP 1616/CP 1604; driver and IO-Base software for CP 1616/CP 1604 as PN IO controller and PN IO device in source code for transfer to other PC-based operating systems; incl. executable sample code for SUSE Linux 10, Windows XP Professional and Windows 7	see http://www.siemens.com/simatic-net/dk16xx
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
SCALANCE X204IRT Managed Industrial Ethernet switches; isochronous real time, LED diagnostics, error signaling contact with SET button, redundant power supply; 4 x 10/100 Mbit/s RJ45 ports	**6GK5204-0BA00-2BA3**

Note:

For software ordering data, see page 2/636

More information

The DK-16xx PN IO development kit can be found on the Internet at:
http://www.siemens.com/simatic-net/dk16xx

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Overview



ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●	●				

- PCI module for connecting PCs and SIMATIC PGs/PCs to PROFINET IO (Universal Keyed 3.3 V and 5 V; 33 MHz/66 MHz; 32-bit, runs in 64-bit PCI-X systems)
- Full/half duplex with autonegotiation
- With Ethernet real-time ASIC ERTEC 400
- Integral 4-port real-time switch
- Communication services:
  - PROFINET IO controller and/or PROFINET IO device
  - Support of IRT in motion control applications
- High performance through direct memory access
- Integration in network management systems through the support of SNMP
- Comprehensive diagnostics possibilities for installation, start-up and operation of the module
- Powerful configuration tools are part of the scope of delivery of the module

Benefits

get Designed for Industry

- Connection of field devices to Industrial Ethernet with PROFINET
- Ideally suited for design of small local networks through integral 4-port real-time switch
- Direct memory access to process data by linking as PROFINET IO-Controller via IO-Base interface
- High computing power is available in the PC by taking the load off the host CPU by means of a real-time ASIC ERTEC 400 with support of the PROFINET real-time features RT and IRT
- Implementation in Motion Control applications thanks to support of IRT
- Energy savings thanks to support of PROFIenergy
- Simple transfer to various operating system environments using Development Kit DK-16xx PN IO
- Switch mode also with the PC switched off, via optional external power supply (in RT mode only)
- Uncrossed connecting cables can be used due to the integrated autocrossover function

Application

The CP 1616 enables SIMATIC PGs/PCs and PCs equipped with a PCI slot to be connected to PROFINET IO.

The CP 1616 provides high-performance support for control tasks on the PC (PC-based control, numeric control, robot control).

With IRT (isochronous real-time), the CP is ideally suited to time-critical applications that are in the range of isochronous closed-loop control in the motion control sector.

The integrated 4-port switch supports low-cost system solutions and the configuration of different topologies.

The CP 1616 provides SIMATIC programming devices/PCs and industrial PCs with communication functions as:

- PROFINET IO controller and/or PROFINET IO device

The HARDNET-PN IO Development Kit enables integration of the module into any operating systems.

Design

- Industrial Ethernet
  - Ethernet real-time ASIC ERTEC 400
  - 4 x RJ45 connection
  - Integral 4-port real-time switch for 10/100 Mbit/s Ethernet
  - Half/full duplex
  - Autosensing/Autonegotiation/Autonegotiation
- PCI interface:
  - PCI 2.2
  - 32-bit, for execution in 64-bit PCI X systems
  - 33 MHz or 66 MHz
  - Universal Keyed 3.3 V and 5 V
  - Installation through PCI standard mechanisms (Plug & Play)
- Host interface/processor:
  - Dual-port RAM on board
  - Flash for program memory onboard
  - ARM 946 RISK processor (32-bit) onboard for preprocessing
- Power supply:
  - Operating voltage: 5 V through PCI
  - Optional external 6 to 9 V DC supply for switch operation with PC switched off
- Size:
  - Short PCI format

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Function

The CP 1616 can be operated as a PROFINET IO controller and/or PROFINET IO device that stores the process image (input and output data) in the memory area on the CP. With simultaneous controller and device mode, only the controller or the device can be operated in IRT mode. High-performance data transfer to and from the IO devices is performed autonomously by the CP 1616.

Real-time

Support of real-time properties of PROFINET for RT and IRT. The real-time properties of the CP 1616 ensure extremely short cycle times with highly accurate clock-pulse rates.

Switching

According to the industry requirements, the 4-port real-time switch additionally permits the configuration of line topologies with spur lines and makes external switch components unnecessary.

The switch function is also available in RT mode when the PC is turned off thanks to the possibility of independently supplying an external voltage.

Energy savings

Thanks to support from PROFIenergy, it is possible to implement various energy-saving states during idle times on the CP 1616.

Software packages

DK-16xx PN IO development kit;

driver and IO-Base software for CP 1616 as PROFINET IO-Controller and IO-Device under Linux in source code for transfer to any PC-based operating systems with IO-Base interface for:

- PROFINET communication:
  - PROFINET IO controller:
    Connection of field devices to Industrial Ethernet with PROFINET
  - PROFINET IO device:
    Link-up with a PROFINET IO controller through real-time communication according to the PROFINET standard
- Access in isochronous mode to real-time data for PROFINET over IRT;
  extremely short cycle times with highly accurate clock-pulse rates;
  jitter accuracy, isochronous mode, and cycle time enable high-performance motion control applications.
- Direct memory access to the process data;
  the process data of the IO-Devices are always consistent. The IO programming interface provides the PC programmer with function calls for data transfer.
- The design of the interface not only permits fast access as a PROFINET IO controller, but also easy transfer to other operating system environments (e.g. VXWorks, QNX, RMOS, RTX).
- The IO-Base interface for the PROFINET IO controller of the CP 1616 is compatible with the interface for SOFTNET PN IO
- The CP 1616 is functionally compatible with the CP 1604

Using the Development Kit DK-16xx PN IO, the CP 1616 communications processor can be integrated into any PC-based operating system environment. The Development Kit contains the driver and IO-Base source code required for this including the transfer instructions and also the example code which executes with SUSE Linux.

User interfaces

Programming interface through C library

For applications that want to use the PROFINET IO-Controller or IO-Device functionality directly over C/C++, the IO-Base interface can be used. This interface is of a similar design to the DP Base interface of PROFIBUS modules CP 5613 and CP 5614. It is therefore possible to port existing PROFIBUS DP master applications to PROFINET IO-Controller applications.

Diagnostics

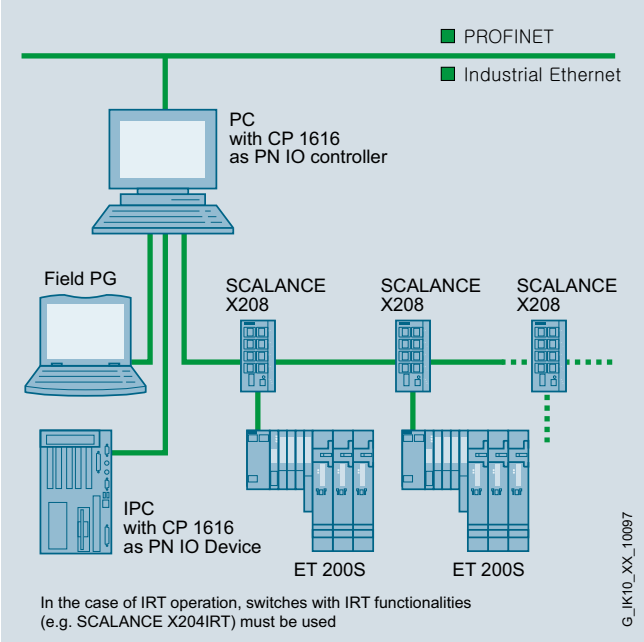
Extensive diagnostic options are available via STEP 7 or SNMP, including:

- General diagnostics functions
- Connection diagnostics
- Diagnostics of the assigned PROFINET field devices
- Integration in network management systems through the support of SNMP

Configuration

Configuration of the CP 1616 is performed with STEP 7/NCM PC, V5.3 SP2 and higher. NCM PC is included with the module.

Integration



CP 1616 as PROFINET IO-Controller and PROFINET IO-Device

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Technical specifications

Article No.	6GK1161-6AA02
Product-type designation	**CP 1616**
Transmission rate	
Transfer rate at the interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections	
• at interface 1 in accordance with Industrial Ethernet	4
• for power supply	1
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port
• of the backplane bus	PCI (32 Bit 3,3 V/5 V UniversalKey 33/66 MHz)
• for power supply	Low-voltage socket for hollow plug 3.5 mm (-) / 1.3 mm (+)
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Type of power supply optional external supply	Yes
Supply voltage	
• 1 from backplane bus	5 V
• external	6 … 9 V
Relative symmetrical tolerance at 5 V with DC	5 %
Consumed current	
• 1 from backplane bus with DC maximum	0.8 A
• from external supply voltage	
- at 9 V with DC max.	0.65 A
- at 9 V with DC max.	0.45 A
Resistive loss	4 W
• in switch mode maximum	4.1 W
Permitted ambient conditions	
Ambient temperature	
• during operating	5 … 70 °C
• during storage	-40 … +70 °C
• during transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
Module format	PCI
Width	18 mm
Height	107 mm
Depth	167 mm
Net weight	110 g
Product properties, functions, components general	
Number of plug-in cards in the same design can be plugged in per PC station	1

Article No.	6GK1161-6AA02
Product-type designation	**CP 1616**
Performance data	
Performance data PROFINET communication as PN IO-Controller	
Software for PROFINET IO communication required	No
Number of PN IO-Devices on PROFINET IO-Controller usable total	128
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	64
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	8 192 byte
• as useful data for output variables with PROFINET IO controller maximum	8 192 byte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 433 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 433 byte
Performance data PROFINET communication as PN IO-Device	
Amount of data	
• as useful data for input variables as PROFINET IO device maximum	1 433 byte
• as useful data for input variables as PROFINET IO device maximum	1 433 byte
• as useful data for input variables for each sub-module under PROFINET IO device	254 byte
• as useful data for input variables for each sub-module under PROFINET IO device	254 byte
• as useful data for the consistency area for each sub-module	254 byte
Number of submodules per PROFINET IO-Device	64
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• DCP	Yes
• LLDP	Yes
Configuration software required	included in scope of delivery
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
• I&M2 - installation date	Yes
• I&M3 - comment	Yes
• I&M4 - signature	Yes

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Technical specifications (continued)

Article No.	6GK1161-6AA02
Product-type designation	**CP 1616**
Product functions Diagnosis	
Product function	
• Web-based diagnostics	Yes
• Port diagnostics	Yes
Product functions switch	
Product feature switch	Yes
Product function switch-managed	No
Product function for IRT PROFINET IO switch	Yes
Product functions Redundancy	
Product function	
• Ring redundancy	Yes
• Redundancy manager	Yes
• Media Redundancy Protocol (MRP)	Yes

Article No.	6GK1161-6AA02
Product-type designation	**CP 1616**
Standards, specifications, approvals	
Standard	
• for EMC	89/336/EEC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
CP 1616 communications processor PCI Card (32 bit; 3.3/5 V universal keyed) with ASIC ERTEC 400 for connecting PCs to PROFINET IO with 4-port real-time switch (RJ45); incl. IO Base software for PROFINET IO Controller and NCM PC; single license for one installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional and Windows 7; other operating systems via Development Kit DK-16xx PN IO; German/English	**6GK1161-6AA02**

	Article No.
Accessories	
Development Kit DK-16xx PN IO Software development kit for CP 1616/CP 1604; driver and IO-Base software for CP 1616/CP 1604 as PN IO controller and IO device in source code for transfer to other PC-based operating systems; including executable example code for SUSE Linux 10, Windows XP Professional and Windows 7	see http://www.siemens.com/simatic-net/dk16xx
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**
SCALANCE X204IRT Managed Industrial Ethernet switches; isochronous real time, LED diagnostics, error signaling contact with SET button, redundant power supply; 4 x 10/100 Mbit/s RJ45 ports	**6GK5204-0BA00-2BA3**

Note:

For software ordering data, see page 2/636

More information

The DK-16xx PN IO development kit can be found on the Internet at:
http://www.siemens.com/simatic-net/dk16xx

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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 10/100/1 000 Mbit/s RJ45 port, electrical
- Automatic data transmission rate detection (10/100/1 000 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

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- Low commissioning overhead due to plug & play and autosensing/autocrossover/autonegotiation (10/100/ 1 000 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 (10/100/1 000 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 10/100/1 000 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 is provided in combination with the Windows software of the PC.

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.
- A configuration tool is included in the scope of delivery of the CP 1612 A2 software packages.

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Technical specifications

Article No.	6GK1161-2AA01
Product-type designation	**CP 1612 A2**
Transmission rate	
Transfer rate at the 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 Bit 3.3 V/5 V UniversalKey 33/66 MHz)
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• 2 from the backplane bus	12 V
Relative symmetrical tolerance	
• at 5 V with DC	5 %
• at 12 V with DC	5 %
Consumed current	
• 1 from backplane bus with DC maximum	0.45 A
• 2 from backplane bus with DC maximum	0.5 A
Resistive loss	3.65 W
Permitted ambient conditions	
Ambient temperature	
• during operating	0 … 55 °C
• during storage	-10 … +70 °C
• during transport	-10 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
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 in the same design can be plugged in per PC station	2

Article No.	6GK1161-2AA01
Product-type designation	**CP 1612 A2**
Performance data	
Performance data open communication	
Software for open communication by means of SEND/RECEIVE required	Yes, SOFTNET-IE S7 (64 conn.) / SOFTNET-IE S7 Lean (8 conn.)
Number of possible connections for open communication by means of SEND/RECEIVE maximum	64
Performance data S7 communication	
Software for S7 communication required	Yes, SOFTNET-IE S7 (64 conn.) / SOFTNET-IE S7 Lean (8 conn.)
Number of possible connections for S7/PG communication maximum	64
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	64
Number of configurable connections per PC station	207
Performance data PROFINET communication as PN IO-Controller	
Software for PROFINET IO communication required	Yes, SOFTNET-IE PN IO
Number of PN IO-Devices on PROFINET IO-Controller usable total	64
Number of PN IO IRT-Devices on PROFINET IO-Controller usable	0
Data volume	
• as useful data for input variables as PROFINET IO controller maximum	4 096 byte
• as useful data for output variables with PROFINET IO controller maximum	4 096 byte
• as useful data for input variables per PN IO device with PROFINET IO controller maximum	1 472 byte
• as useful data for output variables per PN IO device with PROFINET IO controller maximum	1 472 byte
Performance data PROFINET CBA	
Software for PROFINET CBA communication required	Yes, PN CBA OPC server
Number of remote connection partners with PROFINET CBA	228
Number of connections with PROFINET CBA total	10 000

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Technical specifications (continued)

Article No.	6GK1161-2AA01
Product-type designation	**CP 1612 A2**
Product functions management, configuration	
Product function MIB support	No
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
Configuration software	
• required	
• for PROFINET CBA required	Yes, SIMATIC iMAP
Standards, specifications, approvals	
Standard	
• for EMC	2004/108/EC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1, UL 1950
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
CP 1612 A2 communications processor	**6GK1161-2AA01**
PCI card (32 bit, 33 MHz/66 MHz; 3.3 V/5 V universal keyed) for connection to Industrial Ethernet (10/100/1 000 Mbit/s) with RJ45 interface, incl. driver for 32-bit Windows XP Professional SP2/3, 32/64-bit Windows 7, 2003 R2 Server SP2, Vista Business/Ultimate SP1, Windows 2008 Server; German/English	
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

Note:
For software ordering data, see page 2/636

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CP 1613 A2

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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) with microprocessor for connection of PG/PC to Industrial Ethernet with 10/100 Mbit/s Autosensing/Autonegotiation
- Communication services using
  - Open IE communication via TCP/IP and UDP)
  - ISO transport protocol
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- 15-pole ITP connection
- RJ45 connection
- Time synchronization
- ISO and TCP/IP transport protocol onboard
- SNMP-supported diagnostics
- The appropriate OPC server and configuration tools are included in the respective scope of supply of the communication software

Benefits

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- Constant data throughput through protocol processing on the CP
- Can be connected to many devices through ITP or RJ45 connections on the module
- Free computing capacity for other applications on the PC e.g. HMI (ISO and TCP/IP transport onboard)
- Simple handling through Plug&Play and Autosensing (10/100 Mbit/s)
- Operation of large network configurations with a single card through high number of connections
- Can be used for redundant communication
- OPC as standard interface

Application

The CP 1613 A2 is used to connect SIMATIC PGs/PCs and PCs with a PCI slot to Industrial Ethernet (10/100 Mbit/s).

Design

The module CP 1613 A2 (PCI card with 32-bit microprocessor; 33 MHz/66 MHz; 3.3 V/5 V Universal Key) is inserted directly into a SIMATIC PG/PC or into a PC and requires a short PCI slot. It is capable of running in 64-bit PCI-X slots (PCI 2.2 and PCI-X-compatible).

Ports:

- 15-pin Sub-D socket for ITP
- RJ45 jack for twisted pair
- Automatic recognition and selection of the interface during booting (ITP or RJ45)

The module is connected, for example,

- in the case of ITP via the ITP standard cable 9/15 to OSM/ESM
- in the case of TP via TP cord up to 10 m or via FastConnect system up to 100 m (IE FC RJ45 Plug and FC cables) to SCALANCE X or SCALANCE S

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Function

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.)

Programming interface through C library

The programming interfaces for the S7 communication, PG/OP communication, and open communication protocols for existing applications are implemented as Dynamic Link Library (DLL) interfaces.

You can find the released compilers in the Readme file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

Software for PG/OP communication

This software makes it possible to program the S7 controllers via Industrial Ethernet in conjunction with the STEP 7 engineering software.

It is included in all CP 1613 A2 software packages.

Software for S7 communication (HARDNET-IE S7 or S7-REDCONNECT)

The S7 interface allows PG/PC applications (e.g. WinCC) and user programs to access the SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

S7 communication offers:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE

H-communication

For redundant S7 communication with a high availability S7-400H system, the CP 1613/CP 1623/CP 1628 can be used in connection with the S7-REDCONNECT software.

Software for open communication (SEND/RECEIVE)

This interface is used for communication between

- PG/PC and SIMATIC S5
- PG/PC and SIMATIC S7
- PG/PC and PG/PC

Open communication (SEND/RECEIVE) offers the following services:

- Management services
- Connection establishment services
- Data transfer services

These functionalities are a component part of the HARDNET-IE S7 software product.

Mode of operation

Protocols up to Level 4 (Transport) are processed autonomously on the module.

16 MB of memory is available for this to support a large quantitative framework and reliable communication.

Data is exchanged between the module and the host in master mode. This means that the CP 1613 A2 accesses the physical RAM of the host.

A Windows driver is responsible for transferring data between the host system and the CP 1613 A2. The transmission rate to Industrial Ethernet is detected and automatically switched over (autosensing).

The IT functionality is provided in combination with the Windows software of the PC.

Diagnostics

Via SNMP all MIB-2 objects can be read out. This enables the current status of the Ethernet interfaces to be retrieved.

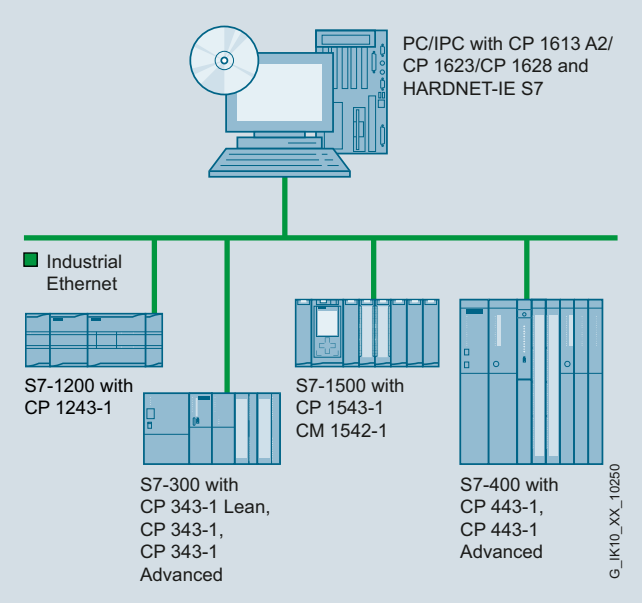
Configuration

- The S7 communication and open communication protocols are configured in STEP 7 or NCM PC.
- A configuration tool is included in the scope of delivery of the CP 1613 A2 software packages.

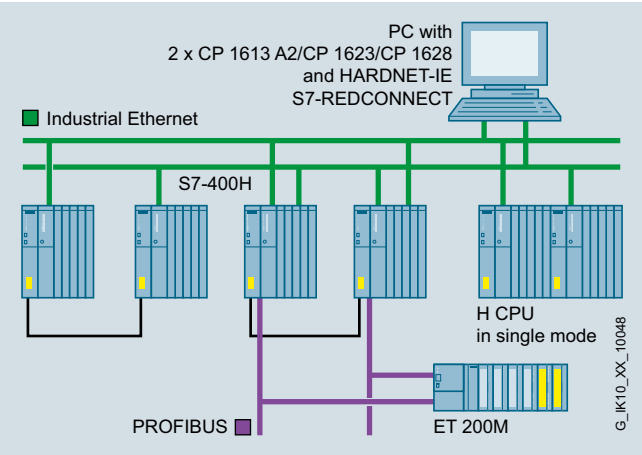
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Integration



System configuration with CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7



Example of redundant network structure with CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7-REDCONNECT

Technical specifications

Article No.	**6GK1161-3AA01**
Product-type designation	**CP 1613 A2**
Transmission rate	
Transfer rate at the interface 1	10 … 100 Mbit/s
Interfaces	
Number of electrical connections at interface 1 in accordance with Industrial Ethernet	2
Design of electrical connection	
• at interface 1 in accordance with Industrial Ethernet	RJ45 port / 15-pin ITP connection
• of the backplane bus	PCI (32 Bit 3.3 V/5 V UniversalKey 33/66 MHz)
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• 2 from the backplane bus	12 V
Relative symmetrical tolerance	
• at 5 V with DC	5 %
• at 12 V with DC	5 %
Consumed current	
• 1 from backplane bus with DC maximum	0.45 A
• 2 from backplane bus with DC maximum	0.5 A
Resistive loss	4 W
Permitted ambient conditions	
Ambient temperature	
• during operating	5 … 55 °C
• during storage	-20 … +60 °C
• during transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
Module format	PCI
Width	21.6 mm
Height	107 mm
Depth	167 mm
Net weight	140 g
Product properties, functions, components general	
Number of plug-in cards in the same design can be plugged in per PC station	4

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Technical specifications (continued)

Article No.	6GK1161-3AA01
Product-type designation	**CP 1613 A2**
Performance data	
Performance data open communication	
Software for open communication by means of SEND/RECEIVE required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections for open communication by means of SEND/RECEIVE maximum	120
Performance data S7 communication	
Software for S7 communication required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections	
• for S7/PG communication maximum	120
• for optimized S7 communication maximum	40
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	120
Number of configurable connections per PC station	207
Performance data PROFINET CBA	
Software for PROFINET CBA communication required	Yes, PN CBA OPC server
Number of remote connection partners with PROFINET CBA	228
Number of connections with PROFINET CBA total	10 000
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
Configuration software	
• required	included in scope of delivery of the required software
• for PROFINET CBA required	Yes, SIMATIC iMAP
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes
Product functions Redundancy	
Software for redundancy function required	Yes, HARDNET-IE S7-REDCONNECT for communication with SIMATIC S7 H systems
Product functions Time	
Product function SICLOCK support	Yes
Protocol is supported NTP	No
Standards, specifications, approvals	
Standard	
• for EMC	2004/108/EC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1, UL 1950
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
CP 1613 A2 communications processor	**6GK1161-3AA01**
PCI card (32-bit, 33 MHz/66 MHz; 3.3 V/5 V universal keyed) for connection to Industrial Ethernet (10/100 Mbit/s) with ITP and RJ45 connection over HARDNET-IE S7/ S7-1613 and S7-REDCONNECT, for operating system support see SIMATIC NET Software	
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

[1] also S5-compatible communication

Note:

For software ordering data, see page 2/636

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Overview



ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●	●			●	●	●	●

- PCI Express Card (PCIe x1) with an internal microprocessor for connection of PG/PC to Industrial Ethernet
- 10/100/1 000 Mbit/s (Autosensing/Autocrossover/Autonegotiation)
- Integrated 2-port switch (2 x RJ45 connection)
- Communications services via
  - Open IE communication (TCP/IP and UDP)
  - ISO transport protocol
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Time synchronization
- ISO and TCP/IP transport protocol on board
- Integration into network management systems through the support of SNMP (V1)
- The appropriate OPC server and configuration tools are included in the scope of supply of the respective communication software.

Benefits

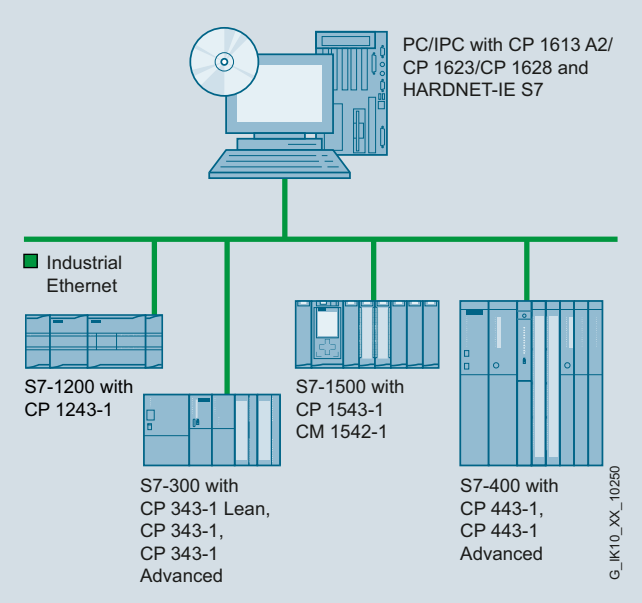
get Designed for Industry

- High plant availability thanks to
  - stable and constant data communication by means of protocol processing on the CP
  - Optional: redundant communication via intelligent CPs combined with high-availability software package (S7-REDCONNECT)
- IT cost savings (e.g. no additional computer) and use of free computer capacity for further applications since the intelligent CPs facilitate large quantity structures and enable the workload of the host CPU to be reduced
- Simple access to automation/diagnostic data via SNMP and OPC as standard interface
- Easy and cost-efficient commissioning due to plug & play technology
- Connection of additional field devices to the Industrial Ethernet by means of an additional switch port
- Switch operation possible via external power supply even with PC turned off

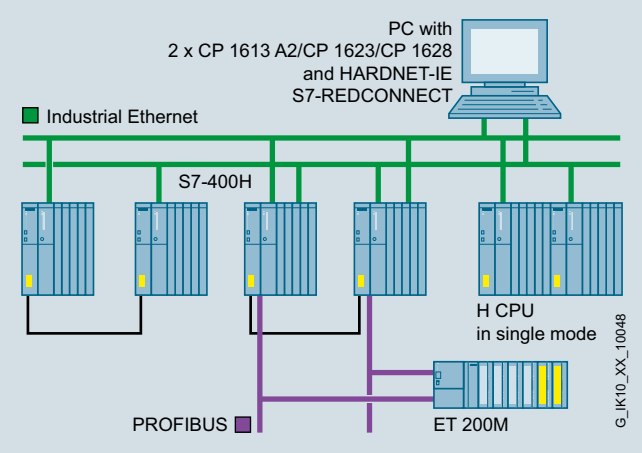
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Application

The CP 1623 makes it possible to connect to the Industrial Ethernet (10/100/1 000 Mbit/s) for SIMATIC PG/PC and PCs with PCI Express slot. Additional field devices can be flexibly connected to the Industrial Ethernet via the integrated switch.



System configuration with CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7



Example of redundant network structure with CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7-REDCONNECT

Design

Industrial Ethernet:

- 2 x RJ45 connection
- Integrated 2-port switch for 10/100/1 000 Mbit/s (half/full/duplex)
- Autosensing/Autocrossover/Autonegotiation

PG/PC slot:

- PCI Express x1 card
- Can also be operated in PCIe x4-, x8- or x16 slots
- Installation via PCIe standard mechanisms (Plug & Play)

Power supply:

- Operating voltage 3.3 V/12 V via PCIe interface
- Optional external 12 - 24 V DC power supply for switch operation with PG/PC turned off

Size:

- Short PCIe format

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Function

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.)

Programming interface through C library

The programming interfaces for the S7 communication, PG/OP communication, and open communication protocols for existing applications are implemented as Dynamic Link Library (DLL) interfaces.

The released compilers can be found in the readme file of the SIMATIC NET CD products at
http://www.siemens.com/automation/csi/net

Software for PG/OP communication

This software makes it possible to program the S7 controllers via Industrial Ethernet in conjunction with the STEP 7 engineering software.

It is contained in all CP 1623 software packages.

Software for S7 communication (HARDNET-IE S7 or S7-REDCONNECT)

The S7 interface allows PG/PC applications (e.g. WinCC) and user programs to access the SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

S7 communication offers:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE

H-communication

For redundant S7 communication with a high availability S7-400H system, the CP 1613/CP 1623/CP 1628 can be used in connection with the S7-REDCONNECT software.

Software for open communication (SEND/RECEIVE)

This interface is used for communication between

- PG/PC and SIMATIC S5
- PG/PC and SIMATIC S7
- PG/PC and PG/PC

Open communication (SEND/RECEIVE) offers the following services:

- Management services
- Connection establishment services
- Data transfer services

These functionalities are a component part of the HARDNET-IE S7 software product.

Mode of operation

Protocols up to Level 4 (Transport) are processed autonomously on the module.

The internal memory is available for this purpose and it also provides for a large quantity structure and high communication reliability.

Data is exchanged between the module and the host in master mode. This means that the CP 1623 accesses the physical RAM of the host.

A Windows driver transfers the data between the host system and the CP 1623. The transmission rate to Industrial Ethernet is detected and automatically switched over (autosensing).

The IT functionality is provided in combination with the Windows software of the PC.

Diagnostics

All MIB-2 objects, for example, can be read out via SNMP. This enables the current status of the Ethernet interfaces to be retrieved.

Configuration

- The S7 communication and open communication protocols are configured in STEP 7 or NCM PC.
- A configuration tool is included in the scope of delivery of the CP 1623 software packages.

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Technical specifications

Article No.	6GK1162-3AA00
Product-type designation	**CP 1623**
Transmission rate	
Transfer rate at the interface 1	10 … 1 000 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
• of the backplane bus	PCI Express x1
• for power supply	2-pin terminal block
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Type of power supply optional external supply	Yes
Supply voltage	
• 1 from backplane bus	3.3 V
• 2 from the backplane bus	12 V
• external	24 V
- minimum	10.5 V
- maximum	32 V
• note	-
Relative symmetrical tolerance	
• at 3.3 V with DC	9 %
• at 12 V with DC	8 %
• at 24 V with DC	33 %
Consumed current	
• 1 from backplane bus with DC maximum	0.85 A
• 2 from backplane bus with DC maximum	0.4 A
• from external supply voltage	
- at 12 V with DC max.	0.55 A
- at 24 V with DC maximum	0.3 A
Resistive loss	7.6 W
• in switch mode maximum	7.2 W
Permitted ambient conditions	
Ambient temperature	
• during operating	5 … 55 °C
• during storage	-20 … +60 °C
• during transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00
Design, dimensions and weight	
Module format	PCI Express x1 (half length)
Width	18 mm
Height	111 mm
Depth	167 mm
Net weight	124 g

Article No.	6GK1162-3AA00
Product-type designation	**CP 1623**
Product properties, functions, components general	
Number of plug-in cards in the same design can be plugged in per PC station	4
Number of modules note	-
Performance data	
Performance data open communication	
Software for open communication by means of SEND/RECEIVE required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections for open communication by means of SEND/RECEIVE maximum	120
Performance data S7 communication	
Software for S7 communication required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections	
• for S7/PG communication maximum	120
• for optimized S7 communication maximum	40
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	120
Number of configurable connections per PC station	207
Performance data PROFINET CBA	
Software for PROFINET CBA communication required	Yes, PN CBA OPC server
Number of remote connection partners with PROFINET CBA	228
Number of connections with PROFINET CBA total	10 000
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	No
• DCP	Yes
Configuration software	
• required	included in scope of delivery of the required software
• for PROFINET CBA required	Yes, SIMATIC iMAP
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes

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Technical specifications (continued)

Article No.	6GK1162-3AA00
Product-type designation	**CP 1623**
Product functions switch	
Product feature switch	Yes
Product function switch-managed	No
Product function for IRT PROFINET IO switch	No
Product functions Redundancy	
Software for redundancy function required	Yes, HARDNET-IE S7-REDCONNECT for communication with SIMATIC S7 H systems
Product functions Time	
Product function SICLOCK support	Yes
Protocol is supported NTP	No
Standards, specifications, approvals	
Standard	
• for EMC	2004/108/EC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1, UL 1950
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
CP 1623 communications processor	**6GK1162-3AA00**
PCI Express x1 card for connection to Industrial Ethernet (10/100/ 1 000 Mbit/s), with 2-port switch (RJ45) via HARDNET-IE S7/S7-1613 and S7-REDCONNECT. For operating system support, see SIMATIC NET Software	
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

Note:

For software ordering dara, see page 2/636

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Overview



ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●	●			●	●	●	●

- PCI Express card (PCIe x1) with its own microprocessor and integrated 2-port switch (2 x RJ45 connection, 10/100/1000 Mbit/s) for the connection of a PG/PC to Industrial Ethernet
- Integrated security mechanisms (e.g. Firewall, VPN)
- ISO and TCP/IP transport protocol on board
- Communications services via
  - Open IE communication (TCP/IP and UDP)
  - ISO transport protocol
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Integration into network management systems through the support of SNMP (V1/V3)

Benefits

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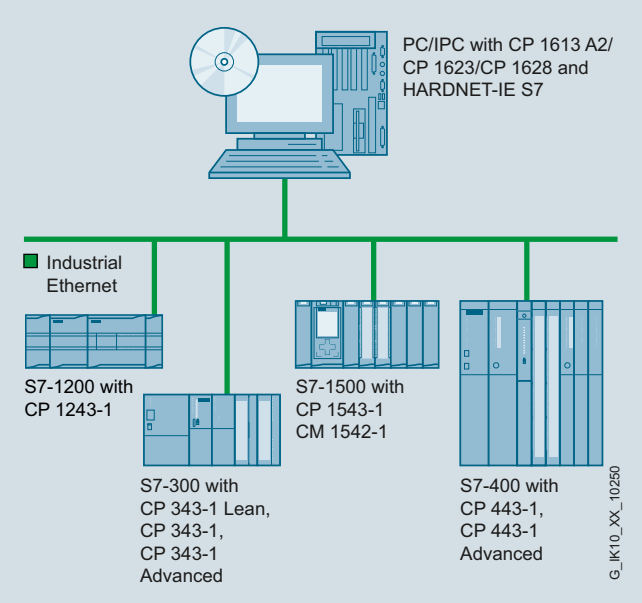
- High plant availability thanks to
  - stable and constant data communication by means of protocol processing on the CP
  - Optional: redundant communication via intelligent CPs combined with high-availability software package (HARDNET-IE S7-REDCONNECT)
- Safeguarding of important computer systems and their associated data communication by means of integrated security mechanisms on the CP, such as firewall and VPN
- IT cost savings (e.g. no additional computer) and use of free computer capacity for further applications since intelligent CPs facilitate large quantity structures and enable the workload of the host CPU to be reduced
- Simple access to automation/diagnostic data via SNMP and OPC as standard interface e

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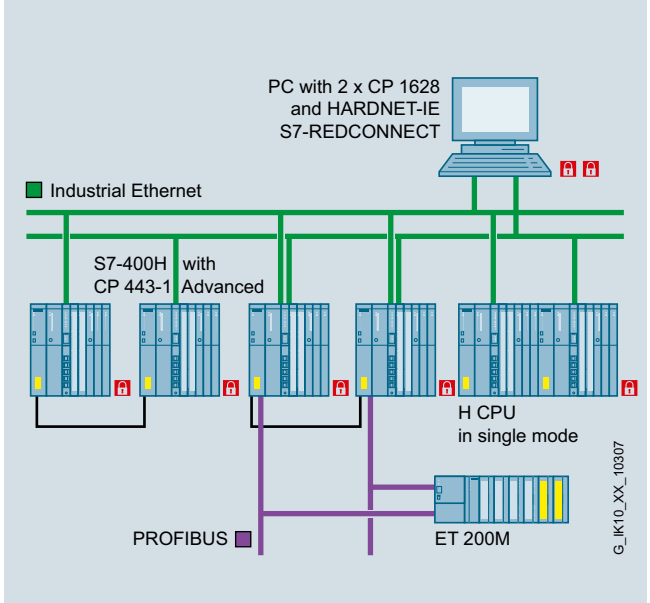
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Application

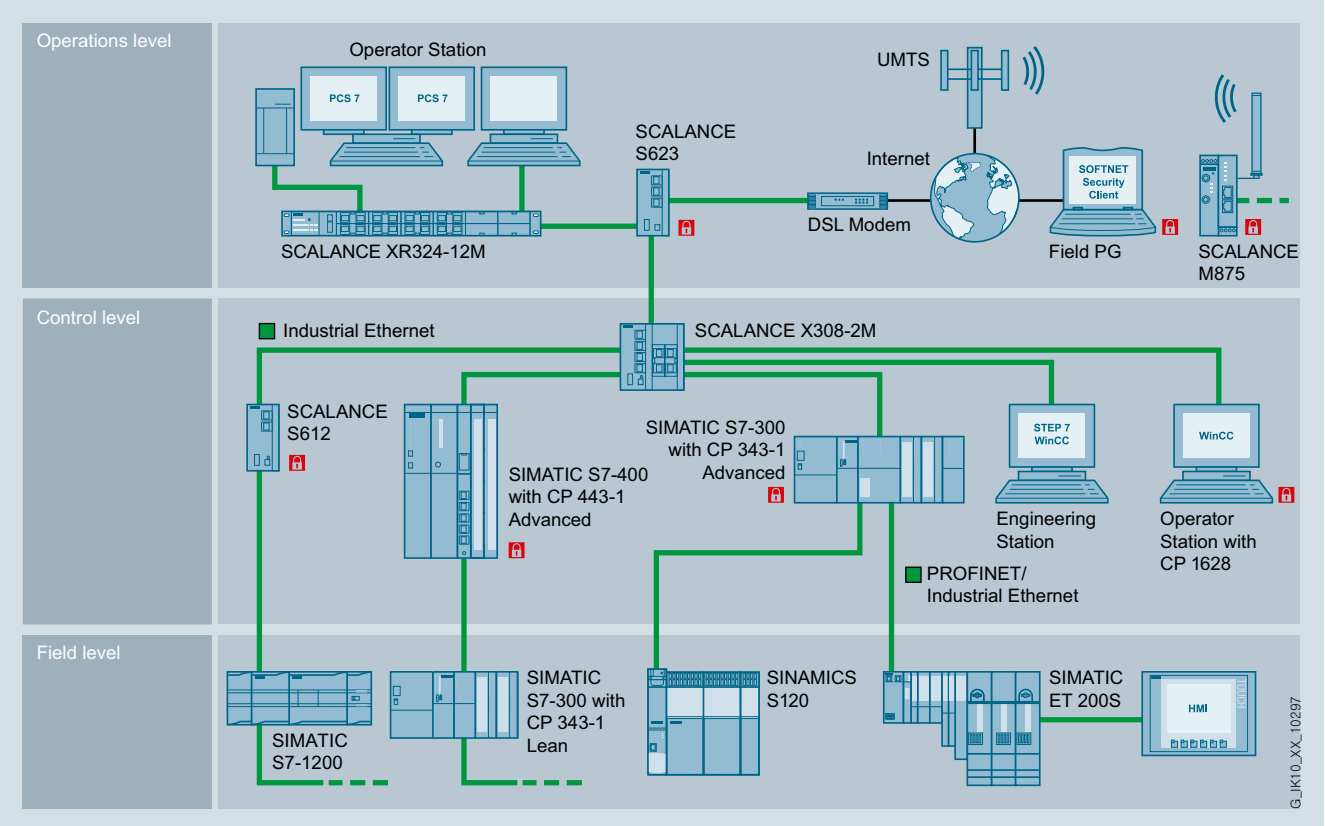
The CP 1628 makes it possible to connect SIMATIC PG/PC and PCs with PCI Express slot to the Industrial Ethernet (10/100/1000 Mbps). Additional field devices can be flexibly connected to the Industrial Ethernet via the integrated switch.



System configuration with CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7



Example of redundant and secure network structure with CP 1628 and HARDNET-IE S7-REDCONNECT



Secure VPN communication between SCALANCE S, SOFTNET Security Client and components with Security Integrated

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Design

Industrial Ethernet:

- 2 x RJ45 connection
- Integrated 2-port switch for 10/100/1 000 Mbps (half/full duplex)
- Autosensing/Autocrossover/Autonegotiation

PG/PC slot:

- PCI Express x1 card
- Can also be operated in PCIe x4, x8 or x16 slots
- Installation via PCIe standard mechanisms (Plug & Play)

Power supply:

- Operating voltage 3.3 V/12 V via PCIe interface
- Optional external 12 - 24 V DC power supply for switch operation with PG/PC turned off

Size:

- Short PCIe format

Function

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.)

Programming interface through C library

The programming interfaces for the S7 communication, PG/OP communication, and open communication protocols for existing applications are implemented as Dynamic Link Library (DLL) interfaces.

The released compilers can be found in the readme file of the SIMATIC NET CD products at
http://www.siemens.com/automation/csi/net

Software for PG/OP communication

This software makes it possible to program the S7 controllers via Industrial Ethernet in conjunction with the STEP 7 engineering software.

It is contained in all CP 1628 software packages.

Software for S7 communication (HARDNET-IE S7 or HARDNET-IE S7-REDCONNECT)

The S7 interface allows PG/PC applications (e.g. WinCC) and user programs to access the SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

S7 communication offers:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE

H-communication

For redundant S7 communication with a fault-tolerant S7-400H system, the CP 1613/CP1623/CP 1628 can be used in connection with the HARDNET-IE S7-REDCONNECT software.

Software for open communication (SEND/RECEIVE)

This interface is used for communication between

- PG/PC and SIMATIC S5
- PG/PC and SIMATIC S7
- PG/PC and PG/PC

Open communication (SEND/RECEIVE) offers the following services:

- Management services
- Connection establishment services
- Data transfer services

These functionalities are a component part of the HARDNET-IE S7 software product.

Security mechanisms:

Integrated security mechanisms enable safeguarding of important computer systems, including their associated data communication systems:

- Stateful Inspection Firewall for filtering connections on the basis of their IP/port addresses
- Bandwidth limitation to avoid communication overload
- Secure and encrypted access to controllers or remote access over the Internet by means of VPN Server and VPN Client and checking of data integrity
- Tap-proof transmission of network analysis information to the network management system (SNMP V3)
- Secure transfer of the time of day (NTP V3)
- Traceability by means of data logging on the basis of standard IT mechanisms (Syslog)

Mode of operation

Protocols up to Level 4 (Transport) are processed autonomously on the module.

The internal memory is available for this purpose and it also provides for a large quantity structure and high communication reliability.

Data is exchanged between the module and the host in master mode. This means that the CP 1628 accesses the physical RAM of the host.

A Windows driver transfers the data between the host system and the CP 1628. The transmission rate to Industrial Ethernet is detected and automatically switched over (autosensing).

The IT functionality is provided in combination with the Windows software of the PC.

Diagnostics

All MIB-2 objects, for example, can be read out via SNMP. This enables the current status of the Ethernet interfaces to be retrieved.

Configuration

- The S7 communication and open communication protocols are configured in STEP 7 or NCM PC.
- A configuration tool is included in the scope of delivery of the CP 1628 software packages.

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Technical specifications

Article No.	6GK1162-8AA00
Product-type designation	**CP 1628**
Transmission rate	
Transfer rate at the interface 1	10 … 1 000 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
• of the backplane bus	PCI Express x1
• for power supply	2-pin terminal block
Supply voltage, current consumption, power loss	
Type of supply voltage	DC
Type of power supply optional external supply	Yes
Supply voltage	
• 1 from backplane bus	3.3 V
• 2 from the backplane bus	12 V
• external	24 V
- minimum	10.5 V
- maximum	32 V
Supply voltage note	-
Relative symmetrical tolerance	
• at 3.3 V with DC	9 %
• at 12 V with DC	8 %
• at 24 V with DC	33 %
Consumed current	
• 1 from backplane bus with DC maximum	0.85 A
• 2 from backplane bus with DC maximum	0.4 A
• from external supply voltage	
- at 12 V with DC max.	0.55 A
- at 24 V with DC maximum	0.3 A
Resistive loss	7.6 W
Resistive loss in switch mode maximum	7.2 W
Permitted ambient conditions	
Ambient temperature	
• during operating	5 … 55 °C
• during storage	-20 … +60 °C
• during transport	-20 … +60 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %
Protection class IP	IP00

Article No.	6GK1162-8AA00
Product-type designation	**CP 1628**
Design, dimensions and weight	
Module format	PCI Express x1 (half length)
Width	18 mm
Height	111 mm
Depth	167 mm
Net weight	0.124 kg
Product properties, functions, components general	
Number of plug-in cards in the same design can be plugged in per PC station	4
Performance data	
Performance data open communication	
Software for open communication by means of SEND/RECEIVE required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections for open communication by means of SEND/RECEIVE maximum	120
Performance data S7 communication	
Software for S7 communication required	Yes, HARDNET-IE S7 (S7-1613)
Number of possible connections	
• for S7/PG communication maximum	120
• for optimized S7 communication maximum	64
Performance data multi-protocol mode	
Number of active connections with multiprotocol mode	120
Number of configurable connections per PC station	207
Performance data PROFINET CBA	
Software for PROFINET CBA communication required	Yes, PN CBA OPC server
Number of remote connection partners with PROFINET CBA	228
Number of connections with PROFINET CBA total	10 000
Product functions management, configuration	
Product function MIB support	Yes
Protocol is supported	
• SNMP v1	Yes
• SNMP v3	Yes
• DCP	Yes
Configuration software	
• required	included in scope of delivery of required software
• for PROFINET CBA required	Yes, SIMATIC iMAP
Identification & maintenance function	
• I&M0 - device-specific information	Yes
• I&M1 - higher level designation/location designation	Yes

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Technical specifications (continued)

Article No.	6GK1162-8AA00
Product-type designation	**CP 1628**
Product functions switch	
Product feature switch	Yes
Product function	
• switch-managed	No
• for IRT PROFINET IO switch	No
Product functions Redundancy	
Software for redundancy function required	Yes, HARDNET-IE S7-REDCONNECT for communication with SIMATIC S7 H systems
Product functions Security	
Design of the firewall	stateful inspection
Product function with VPN connection	IPSec
Type of encryption algorithms with VPN connection	AES-256, AES-192, AES-128, 3DES-168, DES-56
Type of authentication procedure with VPN connection	Preshared key (PSK), X.509v3 certificates
Type of hashing algorithms with VPN connection	MD5, SHA-1
Number of possible VPN tunnels	64
Number of possible connections for S7 communication	
• via ISO and VPN with S7-REDCONNECT maximum	64
• via TCP and VPN with S7-REDCONNECT maximum	120
Number of available IP addresses with VPN connection maximum	16
Product functions Time	
Product function SICLOCK support	Yes
Protocol is supported NTP	Yes
Standards, specifications, approvals	
Standard	
• for EMC	2004/108/EC
• for safety of CSA and UL	CAN/CSA C22.2 & UL 60950-1, UL 1950
• for emitted interference	EN 61000-6-3, EN 61000-6-4
• for interference immunity	EN 61000-6-1, EN 61000-6-2
Verification of suitability	
• CE mark	Yes
• C-Tick	Yes

Ordering data

	Article No.
CP 1628 communications processor	**6GK1162-8AA00**
PCI Express x1 card for connection to Industrial Ethernet (10/100/ 1 000 Mbit/s), with 2-port switch (RJ45) and integrated security (fire-wall, VPN) via HARDNET-IE S7 and S7-REDCONNECT. For operating system support, see SIMATIC NET Software	
Accessories	
IE TP Cord RJ45/RJ45	
TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	**6XV1870-3QE50**
• 1 m	**6XV1870-3QH10**
• 2 m	**6XV1870-3QH20**
• 6 m	**6XV1870-3QH60**
• 10 m	**6XV1870-3QN10**

Note:

For software ordering data, see page 2/636

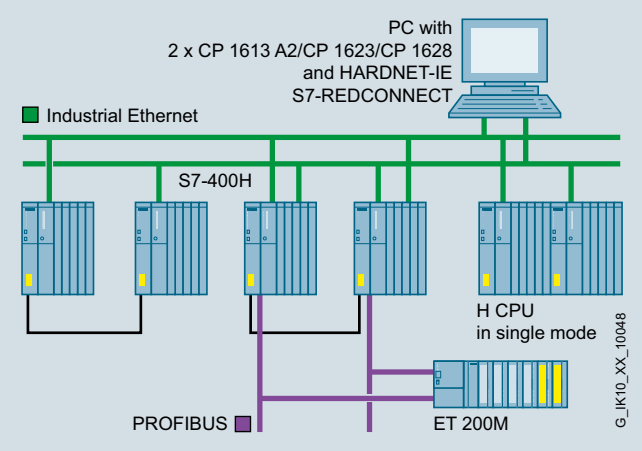
More information

You will find more information on the topic of Industrial Security on the Internet at:
http://www.siemens.com/industrialsecurity

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HARDNET-IE S7-REDCONNECT

Overview



System configuration for S7-REDCONNECT

ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●				●	●	●	

- For connecting PCs over redundant Industrial Ethernet to the SIMATIC S7-400H
- Protected from communication failures arising from a fault in the double bus or in redundant rings
- For redundant Layer 2 or Layer 3 Industrial Ethernet
- Can also be implemented in non-redundant networks
- No additional programming overhead for the PC and in H systems
- The appropriate OPC server and configuration tools are included in the scope of supply of the respective communication software
- Enhanced redundancy over 4-way communication (STEP 7 V5.1 + SP4 and higher)

Benefits

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- Protects against communication failures arising from a fault in the double bus or in redundant rings
- Simplifies communication between a PC application and the SIMATIC S7-400H system
- Secures the investment thanks to the use of existing applications and flexible application options
- No additional programming overhead for the PC and in H systems
- Increases the availability of the PC application (e.g. PCS 7) thanks to redundant Layer 2 or Layer 3 communication

Application

The HARDNET-IE S7-REDCONNECT software package connects the SIMATIC S7-400H with applications on the PC such as WinCC.

A redundant Industrial Ethernet is typically used. The software package can also be used if SIMATIC H systems are operated on non-redundant networks.

Combined operation of redundant and single systems is also possible.

Design

The following components are required to design a SIMATIC H system with PC connection

PC with:

- up to four CP 1613 A2/CP 1623/CP 1628 and HARDNET-IE S7-REDCONNECT to connect the PC to Industrial Ethernet with ISO or ISO-on-TCP protocol

S7-400H with:

- CP 443-1 to connect the S7-400H to Industrial Ethernet with ISO or ISO-on-TCP protocol
- STEP 7 V5.0 to V5.5 for configuring

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Function

- HARDNET-IE S7-REDCONNECT contains the functional scope of the HARDNET-IE S7 software package (S7-communication, open communication and PG/OP communication) as well as additional redundant communication over S7 connections. No additional license is required for HARDNET-IE S7.
- Open communication
- Time synchronization
- Existing Windows applications can be used
- Services for monitoring the redundant communication
- Diagnostic tool for visualizing the communication status
- Simple redundancy over 2-way communication (STEP 7 V5.0 SP2 and higher)
- Enhanced redundancy over 4-way communication (STEP 7 V5.1 + SP4 and higher)

Fault-tolerant S7 communication is carried out via a standard connection and a standby connection. These are monitored during operation and switched in the event of a fault. With HARDNET-IE S7-REDCONNECT, these remain hidden from the PC application.

Fault detection, changeover (if required), communication monitoring, and synchronization are all invisible to the application.

The application, e.g. WinCC, communicates with both subunits of the S7-400H as with an S7-CPU.

User interfaces

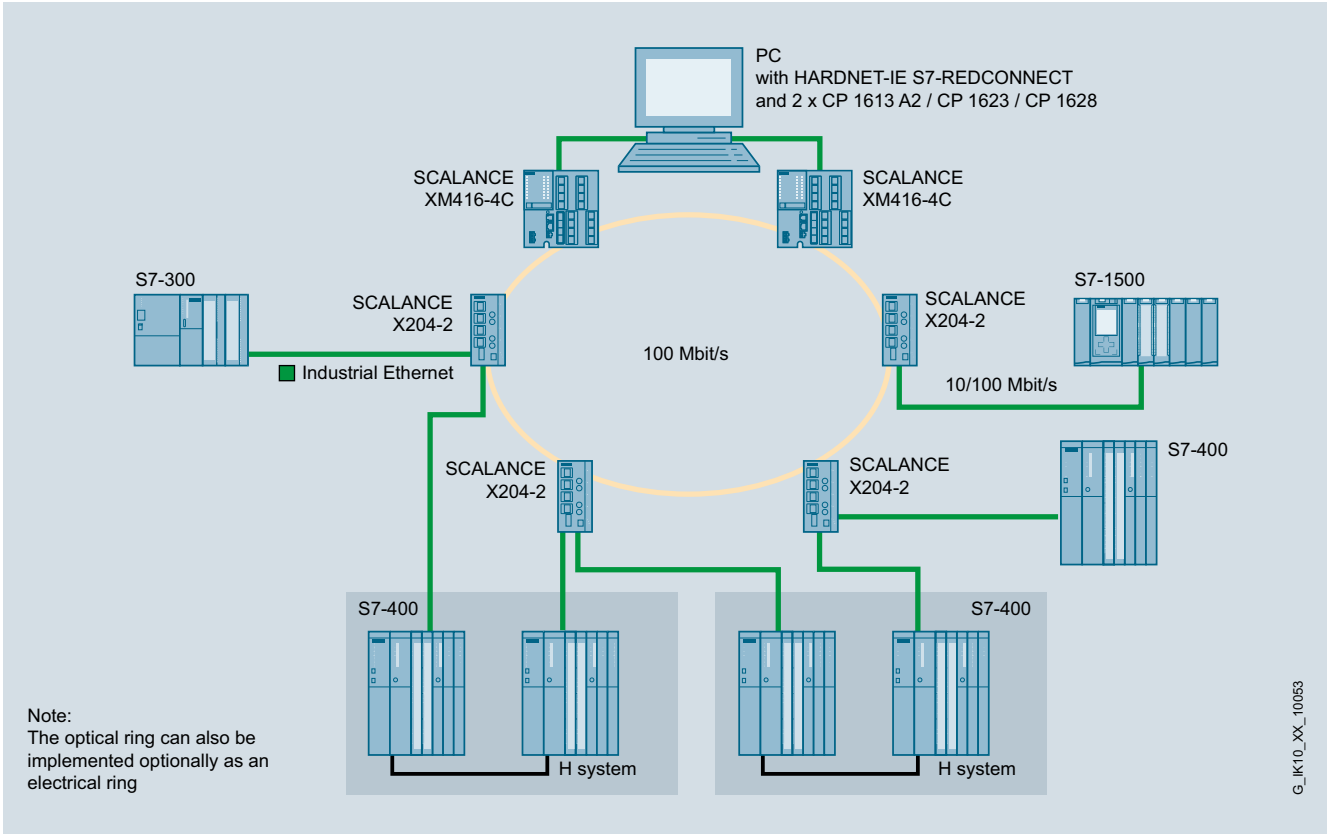
OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the S7 communication and open communication protocols in order to connect automation technology applications to OPC-compatible Windows applications such as Office, HMI systems, etc.

Configuration

- H-connections are configured and engineered using STEP 7 (V5.0 to V5.5)

Integration



Redundant optical ring for connection of high-availability systems

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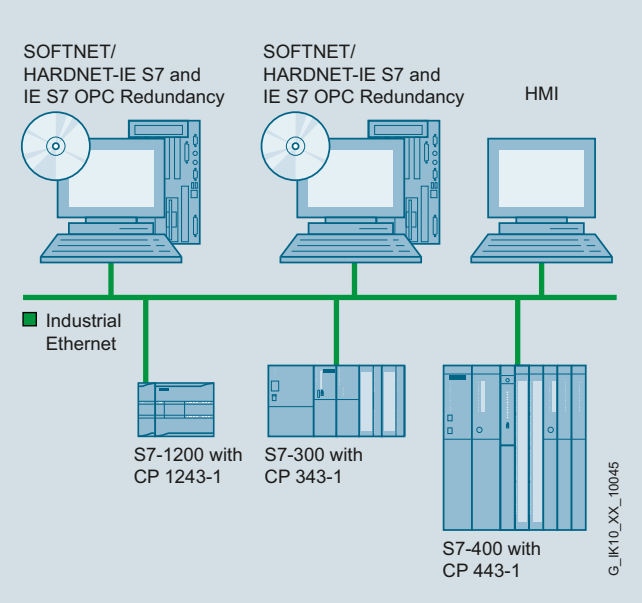
HARDNET-IE S7-REDCONNECT

Ordering data	Article No.
HARDNET-IE S7-REDCONNECT	
Software for fail-safe S7 communication via redundant networks, incl. S7 OPC server, HARDNET-IE S7, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A;	
For CP 1613 A2, CP 1623, CP 1628	
HARDNET-IE S7-REDCONNECT V12	
for 32/64-bit: Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2 for 32/64 Bit Windows 8 Pro; for Windows Server 2012 German/English	
• Single License for one installation	**6GK1716-0HB12-0AA0**
Software Update Service	**6GK1716-0HB00-3AL0**
For one year with automatic extension; requirement: current software version	
Upgrade	
• As of Edition 2006 to S7-REDCONNECT Edition 2008 or HARDNET-IE S7-REDCONNECT V12	**6GK1716-0HB00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to S7-REDCONNECT Edition 2008 or HARDNET-IE S7-REDCONNECT V12	**6GK1716-0HB00-3AE1**

	Article No.
HARDNET-IE S7-REDCONNECT PowerPack	
For expansion from HARDNET-IE S7 to HARDNET-IE S7-REDCONNECT / from S7-1613 to S7 REDCONNECT, Single License for one installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A;	
HARDNET-IE S7-REDCONNECT PowerPack V12	**6GK1716-0HB12-0AC0**
for 32/64-bit: Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English;	
CP 1613 A2 communications processor	**6GK1161-3AA01**
PCI card (32-bit, 33 MHz/66 MHz; 3.3 V/5 V universal keyed) for connection to Industrial Ethernet (10/100 Mbit/s) with ITP and RJ45 connection over HARDNET-IE S7 and S7-REDCONNECT, for operating system support see SIMATIC NET Software	
CP 1623 communications processor	**6GK1162-3AA00**
PCI Express x1 card for connection to Industrial Ethernet (10/100/1 000 Mbit/s), with 2-port switch (RJ45) via HARDNET-IE S7 and S7-REDCONNECT. For operating system support, see SIMATIC NET Software	
CP 1628 communications processor	**6GK1162-8AA00**
PCI Express x1 card for connection to Industrial Ethernet (10/100/1 000 Mbit/s), with 2-port switch (RJ45) and integrated security (firewall, VPN) via HARDNET-IE S7 and S7-REDCONNECT. For operating system support, see SIMATIC NET Software	

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Overview



System configuration SOFTNET for Industrial Ethernet

ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
●	●			●	●	●	

G_IK10_XX_10185

- Software for coupling programming devices/workstations to automation systems
- Communication services:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Can be used with
  - Layer 2 Ethernet card (PCI/PCIe), e.g. CP 1612 A2
  - Integrated Industrial Ethernet interface
  - Modem/ISDN (Remote Access Service RAS)
- Complete protocol stack as a software package
- Increased availability thanks to additional option packages such as OPC Server Redundancy

Benefits

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- Maximum transparency due to integrated communication with SIMATIC via Industrial Ethernet and OPC as the standard interface
- Low-cost solution for industrial use in PCs that require smaller quantity structures
- Simple and low-cost commissioning thanks to uniform procedure and configuration functionality with NCM PC and STEP 7
- Increased availability of the plant information by means of redundant SIMATIC NET OPC server

Application

With SOFTNET for Industrial Ethernet, PC/PG and workstations can be connected to programmable controllers, such as SIMATIC S7, over Industrial Ethernet.

The following user interfaces are available:

- PG/OP communication for SIMATIC S7
- Open communication (SEND/RECEIVE) for communication with SIMATIC S5 and S7
- S7 communication

SOFTNET is available for the following interfaces:

- Layer 2 Ethernet card (PCI/PCIe), e.g. CP 1612 A2
- integrated Industrial Ethernet interface
- Modem/ISDN (Remote Access Service RAS)

Function

With SOFTNET, the complete protocol stack is processed in the PC.

This architecture means that in contrast to the CP 1613 A2/ CP 1623/CP 1628 communications processors, the performance of the SOFTNET packages is dependent on the configuration or capacity utilization of the PC used.

The IT functionality is established in connection with the interfaces and 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 S7 communication and open communication protocols in order to connect automation technology applications to OPC-compatible Windows applications such as Office, HMI systems, etc.

Software for PG/OP communication

This software makes it possible to program the S7 controllers via Industrial Ethernet in conjunction with the STEP 7 engineering software.

Software for S7 communication

SIMATIC S7 system components communicate with each other using S7 communication functions.

The S7 communication can be based optionally on the ISO protocol or the TCP/IP protocol.

S7 communication offers the following services:

- Administrative services
- S7 connection management services
- Variable services
- VFD (Virtual Field Device) services
- Trace and mini database

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2

Function (continued)

Open communication *(SEND/RECEIVE)*

This interface based on Layer 4 (ISO Transport or TCP/IP with RFC 1006) is used for communication between

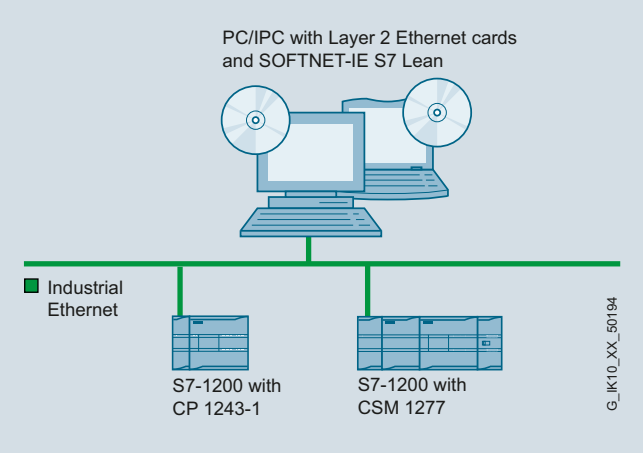
- PG/PC and SIMATIC S5
- PG/PC and SIMATIC S7
- PG/PC and PG/PC

Open communication (SEND/RECEIVE) offers the following services:

- Management services
- Dial-up services
- Data transfer services

Configuration

- The complete configuration of the S7 communication and open communication protocols takes place in STEP 7 or NCM PC V5.1 SP2 or higher
- A configuration tool is included in the scope of delivery of the corresponding packages
- H-connections are configured using STEP 7 (V5.0 to V5.5)



System configuration with SOFTNET-S7 Lean for Industrial Ethernet and SIMATIC S7-1200

Technical specifications

Product-type designation	SOFTNET für Industrial Ethernet
Performance data	
S7 and PG/OP communication (number of operable connections)	
• SOFTNET-IE S7	max. 64
• SOFTNET-IE S7 Lean	max. 8

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Ordering data	Article No.
SOFTNET S7 for Industrial Ethernet	
Software for S7 and open communication, incl. OPC server, PG/OP communication, and NCM PC / STEP 7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A	
SOFTNET-IE S7 V12	
For 32/64-bit Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English	
Up to 64 connections	
• Single License for one installation	**6GK1704-1CW12-0AA0**
Software Update Service	**6GK1704-1CW00-3AL0**
For 1 year with automatic extension; requirement: current software version	
Upgrade	
• From Edition 2006 to Edition 2008 or V12	**6GK1704-1CW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1704-1CW00-3AE1**
SOFTNET-IE S7 REDCONNECT VM V12	
Software for fail-safe S7 communication via redundant networks, incl. S7 OPC server, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A for 32/64-bit: Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English;	
• Single License for one installation	**6GK1704-0HB12-0AA0**
SOFTNET-IE S7 Lean Edition V12	
For 32/64-bit Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English	
Up to eight connections	
• Single License for one installation	**6GK1704-1LW12-0AA0**
Software Update Service	**6GK1704-1LW00-3AL0**
For 1 year with automatic extension; requirement: Current software version	
Upgrade	
• From Edition 2006 to Edition 2008 or V12	**6GK1704-1LW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1704-1LW00-3AE1**

Ordering data	Article No.
SOFTNET-PG for Industrial Ethernet	
Software for PG/OP communication, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
SOFTNET-IE PG V12	
For 32/64-bit: Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012: German/English	
• Single License for one installation	**6GK1704-1PW12-0AA0**
Software update	**6GK1704-1PW00-3AL0**
For 1 year with automatic extension; requirement: Current software version	
Upgrade	
• From Edition 2006 to Edition 2008 or V12	**6GK1704-1PW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1704-1PW00-3AE1**
IE S7 OPC Redundancy	
Software for redundant OPC servers in the environment of Industrial Ethernet software, S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
IE S7 OPC Redundancy V12	
For 64-bit: Windows 2008 Server R2; German/English	
• Single License for one installation	**6GK1706-1CW12-0AA0**

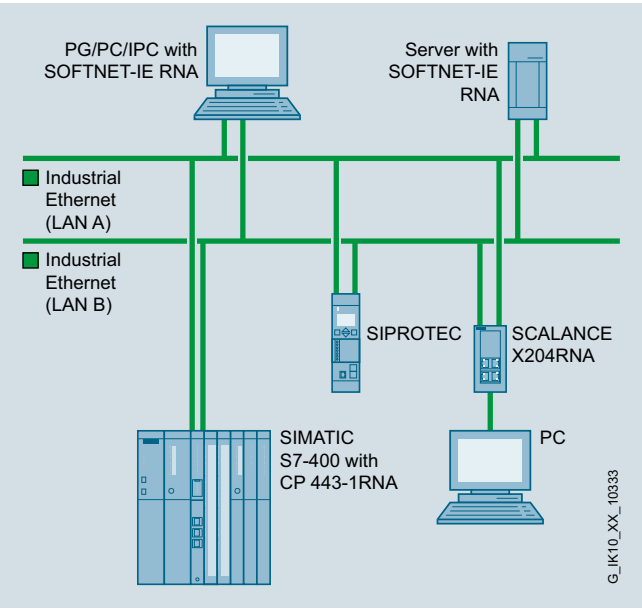
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SOFTNET-IE RNA

Overview



- SOFTNET-IE RNA (Redundant Network Access is the software for connecting a PC to networks with PRP (**P**arallel **R**edundancy **P**rotocol in accordance with IEC62439-3) capability
- High level of plant availability thanks to duplicate transmission of frames in two parallel, separate networks
- Reconfiguration times in a subnetwork do not affect the propogation time because the frames are transmitted via two separate networks (bumpless redundancy)
- Integration in network management systems through support for SNMP
- Configuring tools are included in the scope of delivery of the communication software in each case



Benefits

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- Increases the availability of the PC application by establishing Industrial Ethernet networks with high network availability (bumpless media redundancy through parallel data transfer in parallel networks)
- High availability of the overall plant
- No additional programming overhead required in the PC
- Secures the investment thanks to the use of existing applications and flexible application options
- Simple integration into existing network management systems thanks to access to diagnostic data via SNMP as the standard interface

Application

The SOFTNET-IE RNA software package enables low-cost connection of non-PRP-enabled terminal equipment to parallel, separate networks in which high availability is demanded.

Function

- Connection of PCs to parallel, separate networks (PRP)
- Parallel data transfer over two parallel, separate networks
- Simple diagnostics via SNMP

Configuration

A configuration tool is included in the scope of delivery of the software package.

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Ordering data

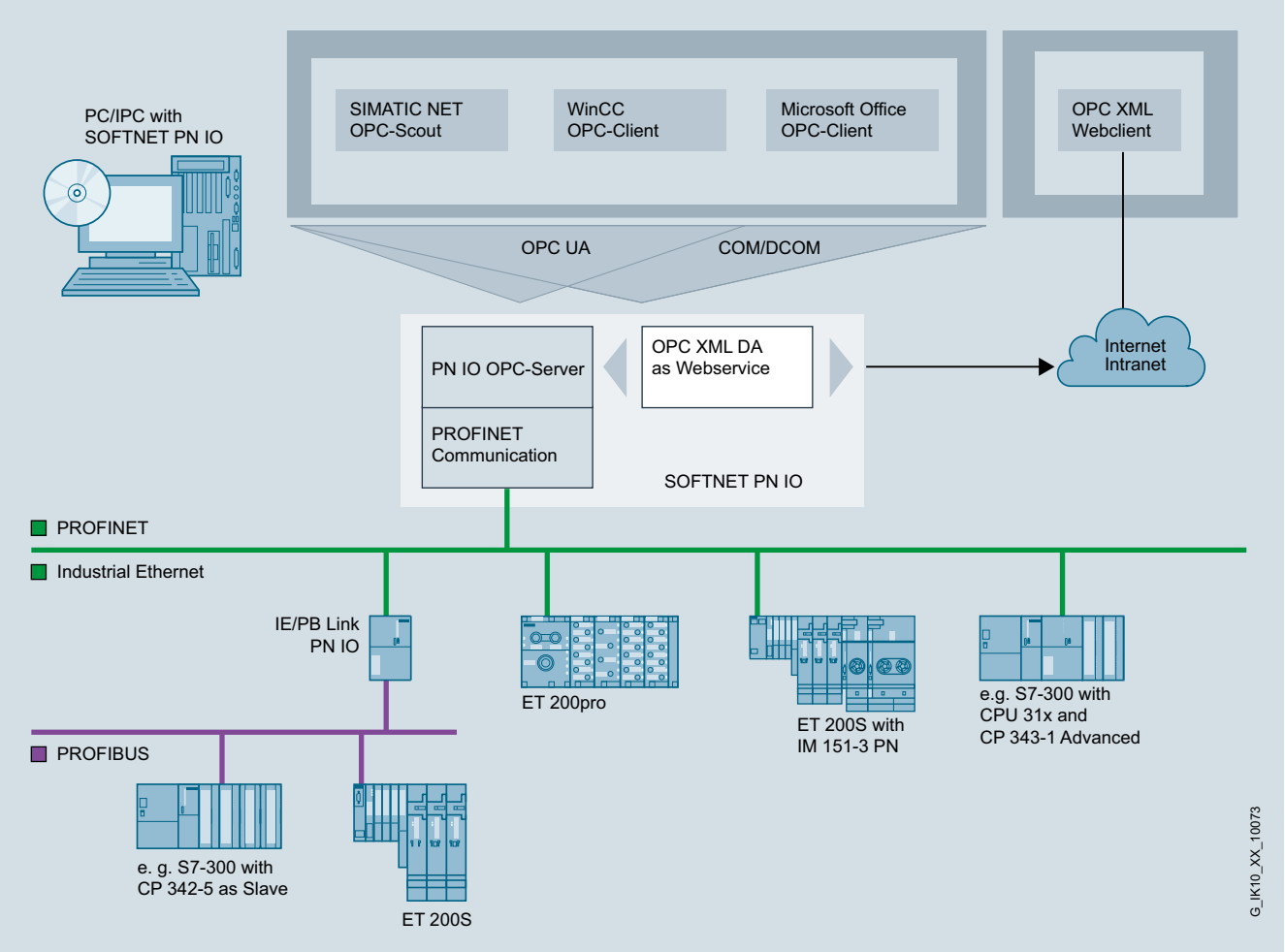
	Article No.
SOFTNET-IE RNA	
Software for connecting PCs to PRP-enabled networks with integrated SNMP, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
For CP1612 A2	
SOFTNET-IE RNA V12	
For 32/64-bit Windows 7 Professional/Ultimate; for 64-bit Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English	
• Single License for one installation	**6GK1711-1EW12-0AA0**
Software Update Service	**6GK1711-1EW00-3AL0**
For 1 year with automatic extension; requirement: current software version	
Upgrade	
• From V8.1 to V12	**6GK1711-1EW00-3AE0**

	Article No.
SCALANCE X-200RNA Industrial Ethernet network access points	
Industrial Ethernet network access points with integrated SNMP access, web diagnostics and PROFINET diagnostics, for connecting non-PRP-enabled terminal equipment to PRP networks; incl. operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; with electrical and optical ports for glass multimode fiber-optic cable up to 5 km	
• **SCALANCE X204RNA** with four 100 Mbit/s RJ45 ports	**6GK5204-0BA00-2KB2**
• **SCALANCE X204RNA EEC** with two 100 Mbit/s RJ45 ports and two RJ45/SFP combo ports	**6GK5204-0BS00-3LA3**
CP 443-1 RNA communications processor	**67443-1RX00-0XE0**
for connecting the SIMATIC S7-400/S7-400H CPU to Industrial Ethernet	

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SOFTNET PN IO

Overview



PC with SOFTNET PN IO as PROFINET IO Controller

ISO	TCP/ UDP	PN	MRP	OPC	PG/OP	S7/S5	IT
	●	●		●			

G_IK10_XX_10179

- Software with PROFINET IO Controller function for coupling PG/PC and IPC with PROFINET IO Devices
- Possible applications:
  - PC-based control systems
  - HMI systems
  - Test applications
- Communication services:
  - PROFINET IO controller
- Can be used with
  - Layer 2 Ethernet card (PCI/PCIe), e.g. CP 1612 A2
  - Integral Industrial Ethernet interfaces of SIMATIC programming devices/PCs
- Cost-effective solution for the low-end performance range
- OPC server for I/O connection over PROFINET included in scope of delivery

Benefits

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- Cost-effective interfacing of field devices to Industrial Ethernet with PROFINET
- Simple porting of the application with OPC as a standard interface
- High-performance IO data access through RT Base interface for linking into C/C++ applications
- Simple changeover from PROFIBUS modules CP 5613 A2/CP 5614 A2 with DP-Base interface to PROFINET through IO-Base interface
- Uniform procedure and configuration functions for NCM PC and STEP 7

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Application

Using SOFTNET PN IO, PCs can be linked with PROFINET field devices including PC-based PN IO devices (e.g. with CP 1616 or CP 1604) via Industrial Ethernet.

SOFTNET PN IO is available for the following interfaces:

- CP 1612 A2
- Integral Industrial Ethernet interfaces of SIMATIC programming devices/PCs

Function

PROFINET communication

PROFINET IO controller

Connection of field devices to Industrial Ethernet with PROFINET

User interfaces

OPC interface

The supplied OPC server can be used as a standard programming interface for PROFINET IO controller to link automation applications to OPC-capable Windows applications (Office, HMI systems, etc.).

Programming interface via C Library;

For applications that want to use the PROFINET IO controller functionality directly over C/C++, the IO-Base interface can be used. This interface is of a similar design to the DP Base interface of PROFIBUS modules CP 5613 A2 and CP 5614 A2.
It is therefore possible to port existing PROFIBUS DP master applications to PN IO-Controller applications.

The released compilers can be found in the readme file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

SOFTNET PN IO and CP 1616 use compatible functions of the IO-Base interface.

Mode of operation

With SOFTNET, the complete protocol stack is processed in the PC. This architecture means that the performance depends on the configuration of the PC used or the loading on the PC.

Configuration

Configuration is performed with STEP 7/NCM PC

Technical specifications

Product-type designation	SOFTNET PN IO
Performance data	
• Number of operable IO devices	Max. 64
• Number of external IO-lines in one central rack	Max. 1
• Size of IO data areas overall	
- I/O input area	Max. 2 KB
- I/O output area	Max. 2 KB
• Size of I/O data area per connected I/O device	
- I/O input range	Max. 1 433 byte
- I/O output range	Max. 1 433 byte

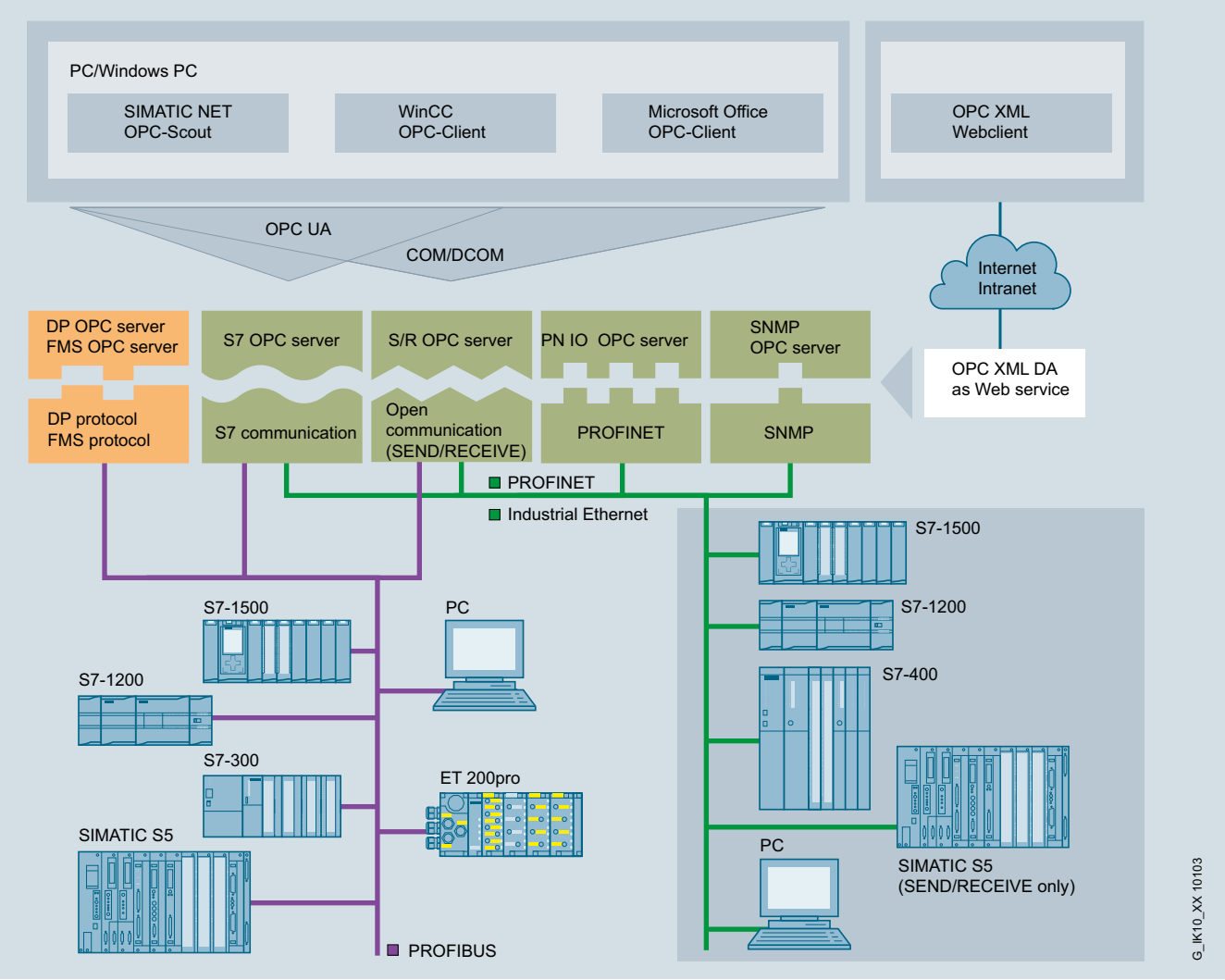
Ordering data

	Article No.
SOFTNET PN IO	
Software for PROFINET IO Controller with OPC server and NCM PC / STEP7 Professional V12, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
SOFTNET-IE PN IO V12	
for 32/64-bit Windows 7 Professional/Ultimate for Windows 2008 Server R2 for 32/64 Bit Windows 8 Pro for Windows Server 2012 German/English	
• Single License for one installation	**6GK1704-1HW12-0AA0**
Software Update Service for 1 year with automatic extension Requirement: current software version	**6GK1704-1HW00-3AL0**
Upgrade	
• from Edition 2006 to SOFTNET PN IO Edition 2008 or V12	**6GK1704-1HW00-3AE0**
• from V6.0, V6.1, V6.2 or V6.3 to SOFTNET PN IO Edition 2008 or V12	**6GK1704-1HW00-3AE1**

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OPC server for Industrial Ethernet

Overview



System integration with OPC server

OPC (**O**penness, **P**roductivity & **C**ollaboration) is a standardized, open, and vendor-independent interface that is widely used in automation.

A fundamental distinction is made between the classic OPC and its consistent further development OPC UA (**U**nified **A**rchitecture). Smooth migration to the new OPC UA standard is easily possible; this offers further value added, such as security. The SIMATIC NET OPC servers offer the two interfaces OPC UA and classic OPC for SIMATIC S7 and PROFINET.

- The corresponding OPC servers are included in the scope of supply of the respective communication software
- Standardized, open, multi-vendor interface
- It permits interfacing of OPC-capable Windows applications to S7 communication, open communication (SEND/RECEIVE), PROFINET, and SNMP
- Increased availability thanks to additional option packages such as OPC server redundancy
- OPC Scout with browser functionality as an OPC client and OCX Data Control/.NET Data Control for simple OPC client creation

Benefits

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- Simple use of different networks and protocols through uniform interface
- Reduced training and familiarization overhead
- Increased availability of the plant information by means of redundant SIMATIC NET OPC server
- Simple integration into the system environment and office applications via C++, Visual Basic- and .NET interfaces
- Short setup times for applications
- Simple handling and cost effective since the appropriate OPC servers are included in the scope of supply of the respective communication software

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Application

The basic principle of OPC is that OPC client applications communicate with the OPC server over a standardized, open and manufacturer-independent interface.

It is also possible to connect to OPC-capable Windows applications (Microsoft Office or HMI systems) that are already available on the market.

The following communication possibilities are available for Industrial Ethernet with OPC server:

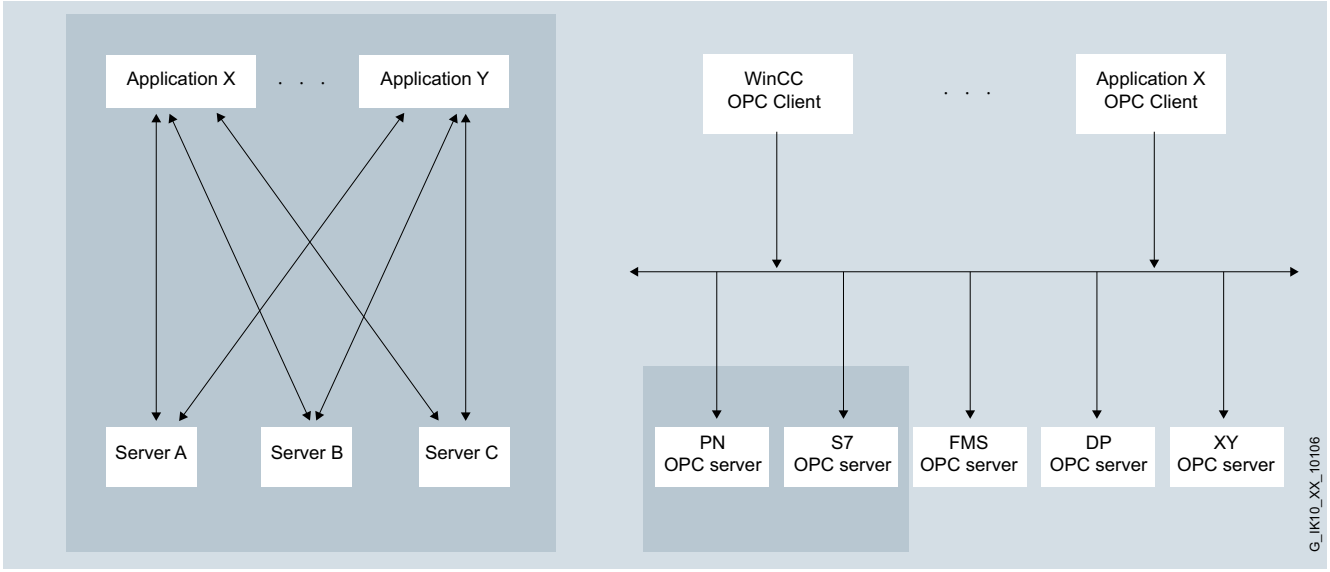
- S7 communication
- Open communication (SEND/RECEIVE)
- PROFINET
- SNMP (Simple Network Management Protocol)

The OPC server offers, for example:

- Data Access interfaces 2.0, 2.05a and 3.0
- Alarm and event interface 1.1
- OPC XML DA interface 1.0
- Integration of automation products of different manufacturers
- Uniform, easy user interface for different components
- Can be accessed from every computer in the LAN
- High-performance data access over the Custom Interface (C++, NET)
- Easy to use with the “Automation Interface“ (VB, NET) or the supplied OCX Data Control or .NET Data Control
- Grouping of variables (Items); which allows a large quantity of data to be pre-processed in a short time.
- Optional redundancy expansion for S7 communication

Function

- Optimized data block access to S7-1500
- Open standardization of the addressing using logical names for objects from an automation component or an automation system
- Supports STEP 7 symbols
- Efficient data transfer from a process component to an application for further processing
- One client application can use several servers simultaneously
- Simultaneous execution of more than one client is possible on one OPC server
- Communication protocols can be used in parallel by means of the multiplexer function
- Interfaces
  - "Custom Interface“ for high-performance C++/NET applications
  - "Automation Interface" for easily created Visual Basic applications (or similar)
  - XML DA interface;
    Data access to S7 CPUs is therefore possible over the Internet.
  - OCX Data Control or .NET Data Control for direct integration in Windows applications that support COM/DCOM



Comparison of conventional client/server architecture with an OPC architecture

Configuration

The communication parameters are configured entirely using the tools of the installed SIMATIC NET software

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OPC server for Industrial Ethernet

Technical specifications

Product-type designation	OPC-Server für Industrial Ethernet
Programming	• Synchronous and asynchronous reading and writing of variables • Monitoring of variables using the OPC server with a signal to the client when a change occurs • Use of quantity operations; so a large amount of data can be processed in a short time.
Interfaces	• Custom Interface (C++, NET) for high OPC performance • Automation Interface (VB, Excel, Access, Delphi, ...) for ease-of-use • Graphics with OCX or .NET Data Control; for configuring instead of programming • OPC XML-Interface for Data Access
Products	**include OPC servers for:**
Industrial Ethernet	
• HARDNET-IE S7, SOFTNET-IE S7, SOFTNET-IE S7 Lean	S7 OPC server for S7 communication, XML-DA S5 OPC server for open communication [1] communication, XML-DA
• SNMP OPC server	SNMP OPC server for SNMP protocol access; XML-DA
• S7 OPC Redundancy	Redundant S7-OPC server for S7 communication
PROFINET	
• SOFTNET-IE PN IO	PN IO OPC server for PROFINET IO communication; XML-DA
PROFIBUS	
• HARDNET-PB DP, SOFTNET-PB DP, SOFTNET-PB DP slave	DP-OPC server for PROFIBUS DP communication; XML-DA
• FMS-5613	FMS-OPC server for PROFIBUS FMS communication; XML-DA
• HARDNET-PB S7, SOFTNET-PB S7	S7-OPC server for S7 communication, XML-DA
• S7 OPC Redundancy	Redundant S7-OPC server for S7 communication

[1] also S5-compatible communication

Ordering data

	Article No.
SNMP OPC server	
Status monitoring of SNMP-capable devices in any OPC client systems; e.g. SIMATIC WinCC/PCS 7	See SNMP OPC server
S7 OPC Redundancy	
Software for redundant OPC servers in the environment of Industrial Ethernet software, S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
S7 OPC Redundancy V12	
for 64-bit: Windows 2008 Server R2; German/English	
• Single License for one installation	**6GK1706-1CW12-0AA0**
Software Update Service	**6GK1706-1CW00-3AL0**
For 1 year with automatic extension; requirement: current software version	

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Overview

OPC (**O**penness, **P**roductivity & **C**ollaboration) is a standardized, open, and vendor-independent interface that is widely used in automation. OPC UA (**U**nified **A**rchitecture) is the result of consistent further development of this standard, offering additional functions such as security or redundancy.

S7 OPC Redundancy is a software product compliant with the OPC UA standard that enables the redundant configuration of OPC UA servers to SIMATIC S7. The availability of automation data to operator control and monitoring systems is guaranteed thanks to the redundant use of OPC UA servers. This requires neither additional cabling for synchronizing the redundant OPC UA servers, nor additional programming overhead in the PC. The OPC UA servers are synchronized via high-performance Industrial Ethernet network access points at 10/100 and 1 000 Mpbs. S7 OPC Redundancy represents an integrated customer solution for all SIMATIC NET S7 SOFTNET and HARDNET software products in the automation world.

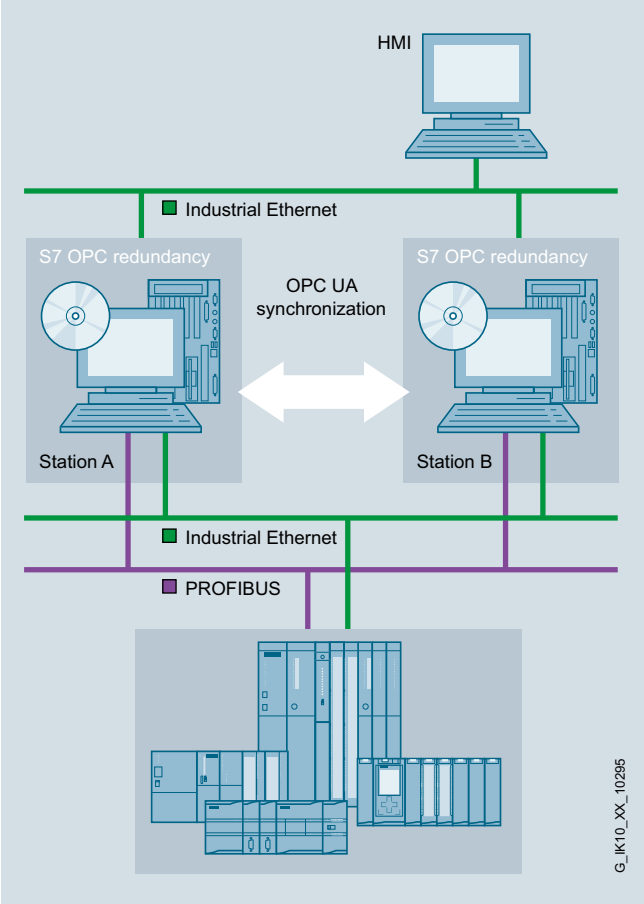
Benefits

- Enhanced plant availability thanks to redundant OPC UA servers that ensure plant access for operator control and monitoring systems
- Secures investments thanks to the use of existing applications (OPC clients) and flexible application options, regardless of the SIMATIC S7 controller used
- Improved utilization of IT resources thanks to even distribution of the OPC clients among the redundant OPC servers

Application

The redundant OPC UA server software enables redundant configuration of SIMATIC NET OPC UA servers. Failure of one OPC UA server, as a result of power outage or system failure, for example, results in immediate use of the other OPC UA server, and continuation of the existing OPC UA client connection. This ensures increased availability of automation data to operator control and monitoring systems.

Design



Redundant use of OPC servers

A redundant OPC UA server system comprises the following:

Server PC with

- Operating system for Windows server
- SOFTNET-IE S7 or HARDNET-IE S7 software based on OPC UA server
- S7 OPC Redundancy software

The redundant operation of up to two OPC UA servers is possible.

Client PC (HMI)

- Software for OPC clients that supports OPC UA (incl. reconnect functionalities in accordance with OPC UA specification)

The communication parameters are configured using STEP 7 or SIMATIC NET NCM PC. A configuration tool is included in the scope of delivery of the corresponding packages.

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S7 OPC Redundancy for Industrial Ethernet

Function

S7 OPC Redundancy enables the setup of redundant OPC UA servers, thus ensuring plant access for the operator control and monitoring systems.

This means, for example, that the information synchronization between two SIMATIC NET S7 OPC servers via the S7 OPC Redundancy software package is guaranteed. This is handled transparently for the OPC Client application so that in the event of a fault, the redundant OPC server takes over the tasks from the failed OPC server system.

Data exchange between the OPC clients and the OPC servers takes place via the standardized OPC UA communication. Communication with the SIMATIC S7 controller takes place using the S7 protocol. This is ensured by the software products SIMATIC NET SOFTNET or HARDNET-S7 for Industrial Ethernet that are necessary as the basis for SIMATIC NET IE S7 OPC Redundancy.

The S7 OPC Redundancy software package supports:

- High availability;
  Failure of one OPC UA server results in immediate use of the other OPC UA server, and continuation of the existing OPC UA client connection. The basis for this is the OPC UA synchronization that ensures synchronization of the necessary client information.
- Load compensation;
  Even distribution of OPC clients among the available OPC servers

Configuration

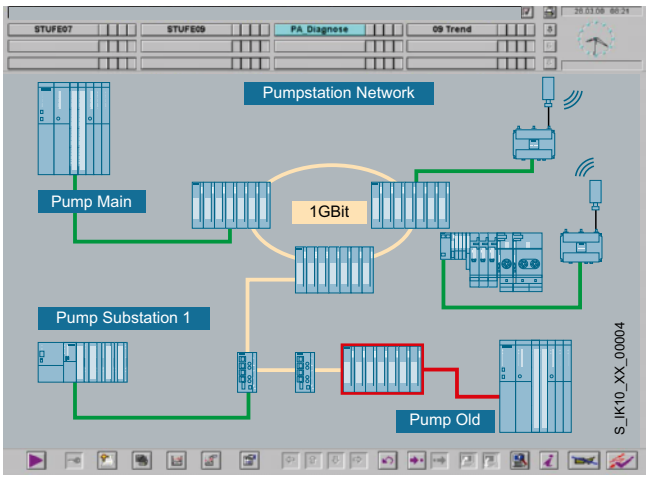
A configuration tool is included in the scope of delivery of the software package.

Ordering data

	Article No.
S7 OPC Redundancy	
Software for redundant OPC servers in the environment of Industrial Ethernet software, S7 products, runtime software, software and electronic manual on CD-ROM, license key on USB flash drive, Class A	
S7 OPC Redundancy V12 for Industrial Ethernet	
for 64-bit: Windows 2008 Server R2; German/English	
• Single License for one installation	**6GK1706-1CW12-0AA0**

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Overview



- Status monitoring of SNMP-capable devices in any OPC client systems; e.g. SIMATIC WinCC/PCS 7
- Easy access to SNMP-capable devices over the OPC interface
- Devices without SNMP agents can be monitored using the ping mechanism
- Configuration with STEP 7 (up to STEP 7 V5.5) or NCM PC
- Ready-to-use SNMP diagnostics profiles for Siemens devices, e.g. SCALANCE X/W
- Generation of any SNMP diagnostics profiles by means of the integral MIB compiler
- Easy setup of the monitored devices with the help of an Autodiscovery function

Benefits

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- Network view and process view in a single system
- Easy network diagnostics in SIMATIC HMI/SCADA systems and office applications
- Easy configuration and engineering without the need for detailed knowledge of SNMP:
  embedded in the SIMATIC tool landscape
- It can operate in parallel with other communication protocols

Application

The SNMP OPC server makes data available for the administration of TCP/IP networks for any OPC client systems.

SNMP (Simple Network Management Protocol) is a protocol that has been specifically designed for administration of TCP/IP networks. The individual nodes in the network (network components or data terminals) are equipped with a so-called SNMP agent that provides information in structured form.

OPC (Openness, Productivity & Collaboration) provides a standardized, open, multi-vendor interface for automation engineering.

The SNMP OPC server supports access to device information over the OPC interface. This means that network visualization, system diagnostics and plant status monitoring can be implemented in any OPC client systems (with OPC clients such as WinCC, WinCC flexible, PCS 7). In addition to simple device diagnostics, detailed information such as redundant network structures or network load distribution can be displayed. This increases the operational safety and improves the availability of the plant.

The device information can be visualized according to individual requirements and can be adapted to the special requirements of the respective customer installation. The information that is made available can also be integrated into the signaling system and alarm log of an HMI/SCADA system for example.

Using the SNMP information, it is possible to expand an existing HMI/SCADA system as far as a customer-specific network management station.

The SNMP OPC server can be operated over the following interfaces:

- CP 1613 A2 (PCI)
- CP 1623 (PCIe)
- CP 1628 (PCIe)
- Integrated Industrial Ethernet interface or CP 1612 A2

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Function

The SNMP OPC server supports access to SNMP-capable devices in the OPC client systems. For all configured TCP/IP devices that are not SNMP-capable, one OPC variable for sign-of-life monitoring (ICMP-PING) is offered.

Read access and in part write access to the respective device information is possible. Thus the diagnosis of individual devices is possible as well as diagnosis of the complete plant and device characteristics can be actively controlled.

STEP 7/NCM PC contains an MIB compiler (Management Information Base) for integrating SNMP-enabled devices. This allows device profiles to be created on the basis of an MIB file

Devices with SNMP agents:

SIMATIC NET devices that feature special SNMP agents such as switches, WLAN Access Points and Industrial Ethernet PC and S7 communication processors are already included complete with their device profiles.

Thanks to MIB compilers (Management Information Base), other SNMP-enabled devices can be integrated into the OPC configuration through loading of MIBs in accordance with the SMI V1 and SMI V2 standard from STEP 7 V5.4.

Devices with IP addresses without SNMP agents:

Devices without SNMP agents can be monitored using the ping mechanism. The user can edit and save device-specific information such as the contact person, site and device description for this purpose.

- Any SNMP-capable devices such as printers or PCs can be depicted using a predefined library.
- The devices are integrated into the desktop of a client application using preconfigured ActiveX Controls.

The predefined device profiles and the associated ActiveX controls allow easy administration of the devices in OPC client applications. Individual expansions can also be implemented.

The SNMP OPC server is integrated in the SIMATIC NET OPC server. The OPC Scout is also included in the functional scope for browsing the displayed SNMP information. The SNMP OPC server can use, for example, PROFINET or S7 communication at the same time as PROFIBUS and Industrial Ethernet communication. This means that existing installations can also be expanded with SNMP functionality. The SNMP OPC server also enables several clients to execute simultaneously on one server.

User interfaces

- "Custom Interface“ for high-performance C++ applications
- "Automation Interface" for easily created Visual Basic applications (or similar).
- OPC Data Control for easy creation of client applications by configuring ActiveX controls
- OPC Alarms & Events (Subset)
- Preconfigured ActiveX controls for the device profile used

Configuration

Configuration and engineering with STEP 7 (up to STEP 7 V5.5) or NCM PC (e.g. component SIMATIC NET DVD V8.2; Order No.: 6GK1700-0AA12-3AA0)

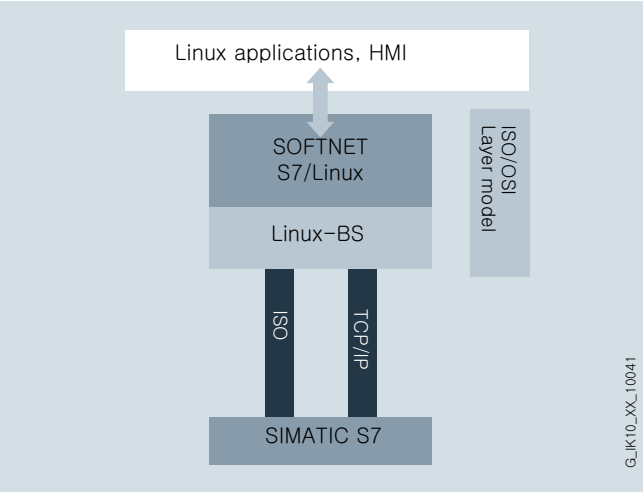
Ordering data

	Article No.
SNMP OPC server	
Including MIB compiler; single license for one installation of runtime software; software and electronic manual on CD-ROM; license key on USB stick, Class A	
SNMP OPC Server Basic	
Administration of up to 20 IP addresses	
• **Basic V12** for 32/64-bit: Windows 7 Professional/Ultimate for 64-bit: • Windows 2008 Server R2 for 32/64-bit: Windows 8 Pro for Windows Server 2012 Single License for one installation	**6GK1706-1NW12-0AA0**
Software Update Service SNMP OPC Server Basic for 1 year with automatic extension Requirement: current software version	**6GK1706-1NW00-3AL0**
Upgrade SNMP OPC Server Basic	
• from Edition 2006 to Edition 2008 or V12	**6GK1706-1NW00-3AE0**
• from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1706-1NW00-3AE1**
SNMP OPC Server Extended	
Administration of up to 200 IP addresses	
• **Extended V12** for 32/64-bit: Windows 7 Professional/Ultimate for 64-bit: Windows 2008 Server R2 for 32/64-bit Windows Pro for Windows Server 2012 Single License for one installation	**6GK1706-1NX12-0AA0**
Software Update Service SNMP OPC Server Extended for 1 year with automatic extension Requirement: Current software version	**6GK1706-1NX00-3AL0**
Upgrade SNMP OPC Server Extended	
• from Edition 2006 to Edition 2008 or V12	**6GK1706-1NX00-3AE0**
• from V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1706-1NX00-3AE1**
SNMP OPC Server Power Pack	
for upgrade from SNM OPC Server Basic to SNM OPC Server Extended	
PowerPack V12	**6GK1706-1NW12-0AC0**

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Overview

- Software for connecting SIMATIC S7
- Provision of S7 communication via SAPI-S7 interface
- Support of ISO and TCP/IP (RFC 1006) protocol
- Available on Linux operating systems
- Simultaneous operation of several cards



SOFTNET-S7/Linux system configuration

Benefits

get Designed for Industry

- High-speed communication with the S7 based on the S7 protocol
- Cost-saving programming thanks to user-friendly and simple interface
- Flexible in use thanks to hardware-independent software

Application

For Linux systems, Siemens offers high-speed communication with the SIMATIC S7 for Industrial Ethernet based on the S7 protocol.

SAPI-S7 (Simple Application Programmer Interface) provides you with a user-friendly call interface for communication between HMI systems or other Linux applications and the SIMATIC S7.

Function

SOFTNET uses internal standard interfaces of the operating system for accessing the Ethernet connections. This supports the interface cards enabled by the operating system. Simultaneous operation of several cards is possible.

During communication, you can choose between the protocols ISO and TCP/IP with RFC1006 for each connection.

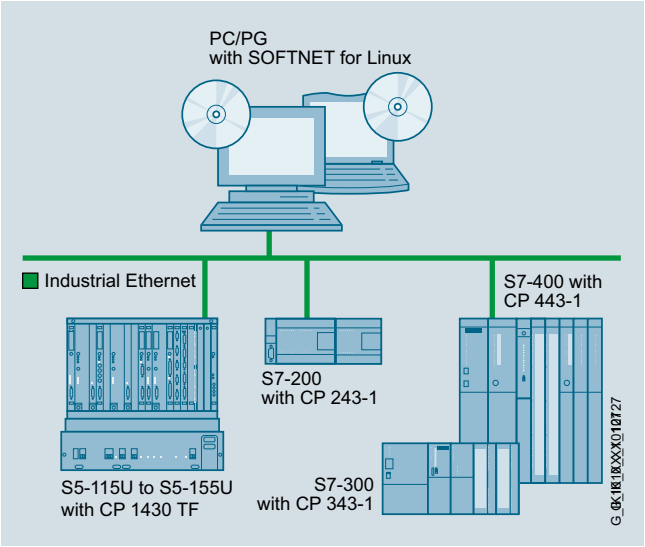
The SOFTNET products offer the user diagnostics and trace functions.

SOFTNET-S7/Linux functions

SIMATIC S7 system components communicate with each other using S7 communication functions. The programming interface SAPI-S7 (Simple Application Programmer Interface) is available for Linux operating systems as well as for the Windows operating systems.

S7 communication offers the following services:

- Administrative services
- Variable services
- BSEND/BRECV



SOFTNET-S7/Linux system configuration

Ordering data

Ordering data	Article No.
SOFTNET-S7/Linux for Industrial Ethernet Software for S7 communication for SIMATIC S7 including Level 4 interface over ISO or TCP/IP, single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key by fax, Class A, German/English Version 4.x	**2XV9450-1CG00**
SOFTNET-S7/Linux Lean max. 8 connections The original distributions of SUSE and RedHat Linux are supported. Please contact your Siemens contacts for information about the latest versions and their variants (32-bit and 64-bit).	**2XV9450-2CG00**

More information

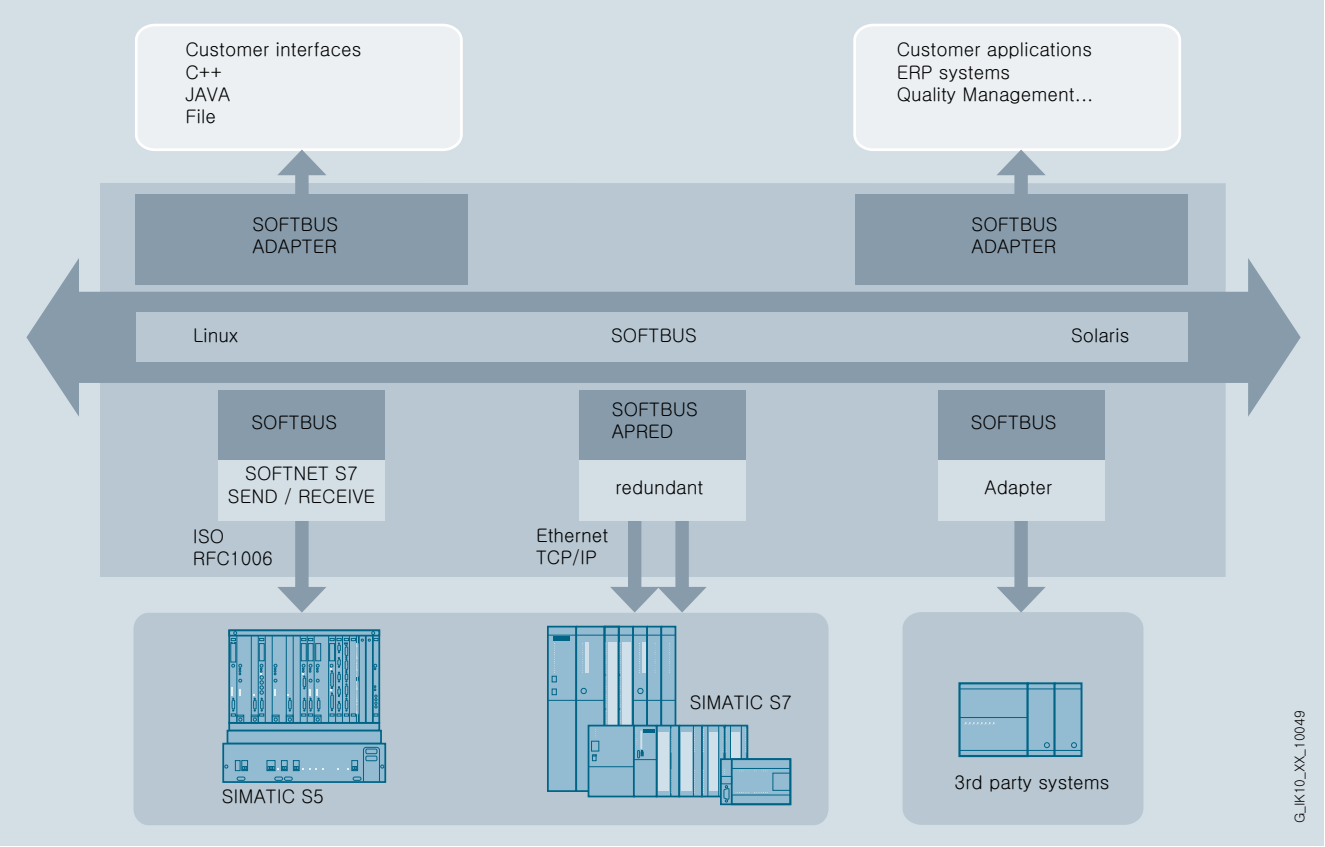
Support for Linux distributors:
Contact for sales, service and training can be found at:
www.siemens.com/simatic-net/ik-info

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SOFTBUS for Linux

Overview

- Integrated communication
- Cross-computer communication
- Uniform interface
  - Link to ERP and DB systems
  - To SIMATIC S7



System configuration for SOFTBUS-SOFTNET

Benefits

get Designed for Industry

- Communication across the system with standardized interface.
- Incorporation of ERP and DB systems.
- Interfacing of SIMATIC control systems
- Fast and automatic data flow

Application

The process landscape in industrial companies is frequently a product of historical developments. Thus there are many isolated solutions that function optimally within their own terms of reference but operate in a vacuum.

Integrating these requires a smooth, loss-free and integrated communication system. Only this guarantees that the right information arrives at the right place and at the right time.

SOFTBUS together with SOFTNET-S7 consists of matched modules that are available on the commonly used system platforms and thus ensure smooth communication between the system platforms.

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Function

SOFTBUS functions

SOFTBUS comprises software modules that can be used on all commonly available computer systems (Windows, Linux).

The modules are compatible and have been adapted to standards such as SIMATIC NET and thus secure vertical integration with short start-up times.

Interfaces

Thanks to the combination of different modules, all commonly used platforms can be supported and linked together heterogeneously or homogeneously.

The programming interface of SOFTBUS is identical to the WVS-KOM interface of the SIPAX package.

This means that SIPAX applications can migrate to SOFTBUS without any problems.

Ordering data

Ordering data	Article No.
SOFTBUS	
Version 2.3	
SOFTBUS Linux	
• SOFTBUS/Linux redundant (TCP) (32 bit)	**2XV9450-1CG02**
• SOFTBUS/Linux redundant (ISO) (32 bit)	**2XV9450-1CG04**
• SOFTBUS/Linux (TCP) (32 bit)	**2XV9450-1CG08**
• SOFTBUS/Linux (ISO) (32 bit)	**2XV9450-1CG10**
Please contact your Siemens contacts for information about the latest versions and their variants (32-bit and 64-bit).	

More information

Support for Linux distributors can be found at:
www.siemens.com/simatic-net/ik-info

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Ordering data	Article No.
Software	
SOFTNET Security Client V4 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; for 32/64-bit Windows 7 Ultimate/Business *For CP 1612 A2*	**6GK1704-1VW04-0AA0**
Upgrade	
• From V3.0 to SOFTNET Security Client V4	**6GK1704-1VW00-0AE0**
• From Edition 2008+HF1 to SOFTNET Security Client V4	**6GK1704-1VW00-0AE1**
SOFTNET PN IO	
Software for PROFINET IO Controller with OPC server and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, *For CP 1612 A2*	
SOFTNET-IE PN IO V12 for 32/64-bit: Windows Server 2012, Windows 8 Pro, Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2 German/English	
• Single License for one installation	**6GK1704-1HW12-0AA0**
Software Update Service For 1 year with automatic extension; requirement: current software version	**6GK1704-1HW00-3AL0**
Upgrade	
• From Edition 2006 to SOFTNET PN IO Edition 2008 or V12	**6GK1704-1HW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to SOFTNET PN IO Edition 2008 or V12	**6GK1704-1HW00-3AE1**

Note:
The Windows XP software version is still available for older CPs; see the Industry Mall: www.siemens.com/industrymall

Article No.
SOFTNET S7 for Industrial Ethernet
Software for S7 and open communication, including OPC server, PG/OP communication and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on a USB stick, Class A *For CP 1612 A2*
SOFTNET-IE S7 V12 for 32/64-bit: Windows Server 2012, Windows 8 Pro, Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; German/English
up to 64 connections
• Single License for one installation — **6GK1704-1CW12-0AA0**
Software Update Service — **6GK1704-1CW00-3AL0** For 1 year with automatic extension; requirement: current software version
Upgrade
• From Edition 2006 to Edition 2008 or V12 — **6GK1704-1CW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12 — **6GK1704-1CW00-3AE1**
SOFTNET-IE S7 Lean Edition V12
Up to eight connections
• Single License for one installation — **6GK1704-1LW12-0AA0**
Software Update Service — **6GK1704-1LW00-3AL0** For 1 year with automatic extension; requirement: current software version
Upgrade
• From Edition 2006 to Edition 2008 or V12 — **6GK1704-1LW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12 — **6GK1704-1LW00-3AE1**

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Ordering data

	Article No.
SOFTNET-IE PG for Industrial Ethernet	
Software for PG/OP communication, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A	
For CP 1612 A2	
SOFTNET-IE PG V12	
for 32/64-bit: Windows Server 2012, Windows 8 Pro, Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; German/English	
• Single License for one installation	**6GK1704-1PW12-0AA0**
• Single License for one installation	**6GK1704-1PW71-3AA0**
Software update	**6GK1704-1PW00-3AL0**
For 1 year with automatic extension; requirement: current software version	
Upgrade	
• From Edition 2006 to Edition 2008 or V12	**6GK1704-1PW00-3AE0**
• From V6.0, V6.1, V6.2 or V6.3 to Edition 2008 or V12	**6GK1704-1PW00-3AE1**

	Article No.
HARDNET-IE S7 for Industrial Ethernet	
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 CP 1613/CP 1613 A2/ CP 1623/CP 1628	
For CP 1613 A2, CP 1623, CP 1628	
HARDNET-IE S7 V8.2	
for 32/64-bit: Windows Server 2012, Windows 8 Pro, Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2 German/English	
• Single License for one installation	**6GK1716-1CB12-0AA0**
Software Update Service	**6GK1716-1CB00-3AL0**
For 1 year with automatic extension; requirement: current software version	
Upgrade	
• S7-1613, Edition 2006 or higher, to S7-1613 Edition 2008 or HARDNET-IE S7 V12	**6GK1716-1CB00-3AE0**
• from S7-1613 V6.0, V6.1, V6.2 or V6.3 to S7-1613 Edition 2008 or HARDNET-IE S7 V12	**6GK1716-1CB00-3AE1**

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Overview

The SIMATIC Basic Panel, Comfort Panel and Mobile Panel offer HMI functionality for the control systems:

- SIMATIC S7
- Non-Siemens controllers:
  - Allen Bradley
  - Mitsubishi
  - Modicon
  - Omron

For more detailed information, refer to the WinCC (TIA Portal) user manual, the "Windows-based systems communication" manual, or the WinCC (TIA Portal) online help.

OPC communication and HTTP communication are offered for all Panels with an integrated Ethernet interface. Both OPC and HTTP communication can be used in parallel with the process links to SIMATIC S7 or non-Siemens PLCs.

1) For the sake of simplicity, SIMATIC Panel is always used in the text below. This is not restrictive, as the information is valid for all systems referred to above. If there are constraints, direct reference is made to them in the text.

Note:

Interface options for HMI devices: See the individual device descriptions.

OPC communication

OPC Data Access is an open standard for exchanging both local and remote variables between various applications via Industrial Ethernet.

HTTP communication for variable exchange between SIMATIC HMI systems

Communication based on HTTP message frames enables variables to be exchanged between SIMATIC HMI systems.

Communication standard	SIMATIC HMI			
Version	**Comfort Panel**	**Mobile Panel 177 PN**	**Mobile Panel 277**	**WinCC Runtime Advanced**
OPC Data Access V2.05a + OPC UA Data Access V1.01 + OPC Data Access XML V1.00				
OPC DA client (COM/DCOM)	–	–	–	•
OPC DA server (COM/DCOM)	–	–	–	•
OPC UA DA client	•	–	–	•
OPC UA DA server (SOAP/XML)	•	–	–	•
HTTP communication for variable exchange between SIMATIC HMI systems				
HTTP client	•	•	•	•
HTTP server	•	•	•	•

• System interface possible
– System interface not possible

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Overview

The following types of interface are differentiated in respect of the link between the SIMATIC Panels and SIMATIC S7 controllers:

- PROFINET interface:
  Coupling of SIMATIC Panel to SIMATIC S7 controllers via Industrial Ethernet TCP/IP using the integrated PROFINET interface of the CPU or, alternatively, a PROFINET interface module.
- MPI/PROFIBUS interface:
  Coupling of SIMATIC Panel to SIMATIC S7 controllers via MPI/PROFIBUS using the integrated MPI/PROFIBUS interface of the CPU or the integrated PPI interface of the CPU in the case of S7-200 or, alternatively, a PROFIBUS interface module in the case of S7-1200, S7-1500, S7-300 and S7-400.
- PPI interface:
  Coupling of SIMATIC Panel to SIMATIC S7-200 via PPI network using the integrated PPI interface of the CPU

The maximum possible number of S7 connections of one CPU is determined by its performance capacity (see Catalog ST 70); from the point of view of SIMATIC Panel, the following restrictions apply:

- Basic Panel, Comfort Panel 4",
  Mobile Panel 177: max. 4 connections
- Comfort Panel 7" - 22": max. 8 connections
- Mobile Panel 277: max. 6 connections
- PC with WinCC Runtime Advanced: max. 8 connections

PPI interface

The PPI interface is a point-to-point connection between a SIMATIC Panel (PPI master) or alternatively a PG (PPI master) and an S7-200 (PPI slave).

MPI/PROFIBUS interface or PROFINET interface

The corresponding multipoint-enabled communication interfaces of SIMATIC Panels and SIMATIC S7 are used.
The following are possible:

- Interface between one or more SIMATIC Panels (MPI master) and one or more S7-1200/S7-1500/S7-300/S7-400s or WinAC (MPI master) (possible network topology: MPI/PROFIBUS or Industrial Ethernet, TCP/IP)
- Interface between one or a number of SIMATIC Panels (MPI master) and one or a number of S7-200s (MPI slave)[1)] (possible network topology: PPI, MPI/PROFIBUS)

Unlike PPI connections, MPI connections are static connections that are set up during booting and then monitored.

The original format of a master/master link has been joined by a master/slave link, which has enabled integration of the S7-200 (except CPU 212).[1)]

In principle this type of information exchange between SIMATIC Panels and SIMATIC S7 is independent of the network used, PPI, MPI/PROFIBUS or Industrial Ethernet: SIMATIC Panels are S7 clients and SIMATIC S7 CPUs are S7 servers.

[1)] With regard to restricted baud transmission rates for S7-200, see Catalog ST 70.

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Overview (continued)

Controller	SIMATIC HMI				
Target hardware (PROTOCOL) (physics)	**Basic Panel**	**Comfort Panel**	**Mobile Panel 177 DP** [1] **Mobile Panel 177 PN** [1]	**Mobile Panel 277** [1] **MP 177 MP 277 MP 377**	**WinCC Runtime Advanced**
SIMATIC S7-1200 [2]					
over Ethernet (TCP/IP) to max. 4 x S7-1200	• [3]	•	• [3]	•	•
over MPI or PROFIBUS network to max. 4 x S7-1200 with PROFIBUS modul (DP-Master) CM 1243-5	• [4]	•	• [3]	•	• [5]
SIMATIC S7-300, -400, Win AC [2]					
over Ethernet (TCP/IP) to max. 4 x S7-300, -400, WinAC	• [3]	•	• [3]	•	•
over MPI or PROFIBUS network to max. 4 x S7-300, -400, WinAC	• [4]	•	• [4]	•	• [5]

• System interface possible
– System interface not possible

[1] Mobile Panel connection via special connecting cable and junction box (see Mobile Panel), see Manual for cable layout

[2] Controllers can be combined as desired

[3] Basic Panel PN and Mobile Panel 177 PN only

[4] Basic Panel PN DP only or Mobile Panel 177 PN DP only

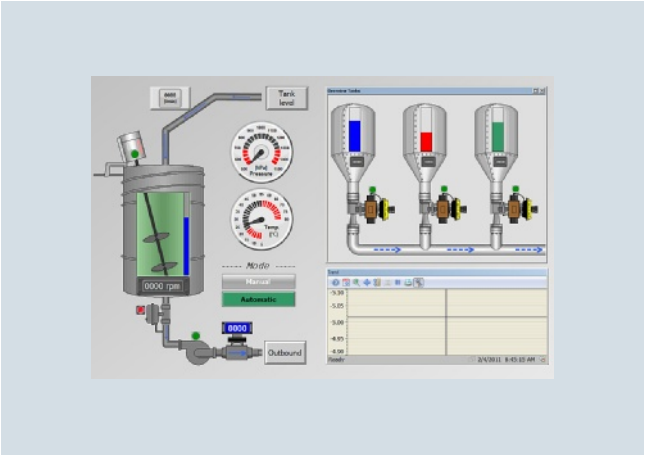
[5] Connection via integrated MPI/PROFIBUS interface; in the case of a standard PC, a communications processor (CP) is to be used (e.g. CP 5611 A2)

Note:

Detailed information regarding cable layout can be found in the online help for WinCC.

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Overview



SIMATIC WinCC Runtime Advanced visualization software

- PC-based HMI solution for single-user systems directly at the machine
- Basic package for visualization, reporting and logging, user administration, can be expanded flexibly with VB scripts
- Basic package expandable by means of option packages
- Can be integrated into automation solutions based on TCP/IP networks
- Expanded service concepts with remote operation, diagnostics and administration over the intranet and Internet in combination with email communication

SIMATIC WinCC Runtime Professional visualization software

- PC-based operator control and monitoring system for visualization and operator control of processes, production flows, machines and plants in all sectors – from the simple single-user station through to distributed multi-user systems and cross-location solutions with web clients. WinCC Runtime Professional is the information hub for corporation-wide vertical integration.
- Industry-standard functions for signaling and acknowledging events, archiving of messages and measured values, logging of all process and configuration data, user administration, can be expanded flexibly with VB and C scripts
- Basic package expandable by means of option packages
- Also included are APIs for the Runtime to utilize the open programming interfaces

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2

Overview

Communication – SIMATIC WinCC Runtime Advanced

WinCC Advanced is an open visualization system and offers the option of connecting the most diverse control systems.

Number of connectable controllers

WinCC Advanced permits the parallel coupling of up to 8 controllers.
Connection to third-party controllers

The following "Coupling overview" table lists third-party protocols and controllers which are directly supported by WinCC Advanced. Generally it is also possible to connect third-party controllers via OPC (OLE for Process Control).

Current notes and information about OPC servers from many different suppliers can be found at:
http://www.opcfoundation.org/

WinCC Advanced supports the standards:

- OPC Data Access 2.05a
- OPC UA Data Access 1.01
- OPC XML Data Access 1.00 (client via DCOM/XML gateway)

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Overview (continued)

Coupling overview for WinCC Runtime Advanced

Protocol	Description	PC interface
SIMATIC HMI		
Ethernet TCP/IP (HTTP communication)	HTTP communication for data exchange between SIMATIC HMI (client + server) [1]	CP 1612 A2
SIMATIC S7		
Ethernet TCP/IP (S7 communication)	Channel for communication via Ethernet TCP/IP with max. 8 x SIMATIC S7 controllers S7-1200, S7-1500 S7-300, S7-400, S7-200 with CP 243-1	CP 1612 A2 CP 1613 A2 CP 1623
SINUMERIK [2]		
Ethernet TCP/IP (S7 communication)	Channel for communication via Ethernet TCP/IP with SINUMERIK 840D sl	CP 1612 A2 CP 1613 A2 CP 1623
Third-party controllers (from WinCC V11.0) [3]		
Allen Bradley Ethernet IP	Channel for communication with max. 4 x Allen Bradley controllers via Ethernet TCP/IP with Allen Bradley Ethernet IP protocol The controllers ControlLogix / CompactLogix, SLC500 / MicroLogix and PLC5 are supported	CP 1612 A2
Allen Bradley DF1	Channel for communication with Allen Bradley controllers via DF1 protocol The controllers SLC500 / MicroLogix and PLC5 are supported [3]	COM1/COM2
Mitsubishi MC TCP/IP	Channel for communication with max. 4 x Mitsubishi controllers via Ethernet TCP/IP with Mitsubishi MC TCP/IP protocol The FX3, Q, and iQ/QnUD controller series are supported	CP 1612 A2
Mitsubishi FX	Channel for communication with Mitsubishi controllers via FX protocol The FX1N, FX2N controllers are supported	COM1/COM2
Modbus TCP/IP	Channel for communication with max. 4 x Modicon controllers via Ethernet TCP/IP using the Modbus TCP/IP protocol The Quantum, Momentum, Premium, TSX Micro, Compact and M340 controllers are supported	CP 1612 A2
Modbus RTU	Channel for communication with Modicon controllers via the Modbus RTU protocol The Quantum, Momentum, and Compact controllers are supported	COM1/COM2
Omron Link / Multi Link	Channel for communication with Omron controllers via the Link/Multi protocol The CP1x, CJ1x, CJ2H, CS1x, and CP2MC controllers are supported	COM1/COM2
Cross-manufacturer		
OPC client [1] [4] for OPC DA, OPC UA DA, XML DA	Channel for OPC communication, WinCC can acquire data from OPC server applications	CP 1612 A2
OPC server for OPC DA	Server applications for OPC communication; WinCC provides process data to PC clients	CP 1612 A2

[1] HTTP and OPC communication can be used in combination with the other couplings; regarding SIMATIC Panels that support HTTP or OPC communication, see the overview under "System interfaces (WinCC V11)".

[2] "SINUMERIK Operate WinCC RT Advanced" license required; for further information, see NC 60 Catalog.

[3] For detailed information regarding supported controllers, see "System interfaces (WinCC V11)"

[4] Application note:
Parallel use of the OPC client channel allows, for example, connection to an SNMP OPC Server for visualization of the data present there.
The SNMP OPC Server enables monitoring of any network components (e.g. switches) that support the SNMP protocol.
Further information can be foundunder SIMATIC NET communications systems/SNMP OPC Server.

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Overview (continued)

Communication – SIMATIC WinCC Runtime Professional

WinCC Professional is an open process visualization system and offers the option of connecting the most diverse control systems.

Released communication software

Only communication software with the listed (or higher) product versions should be used. Corresponding SIMATIC NET upgrades are available for the upgrading of older versions.

Number of connectable controllers

With CP 1613/CP 1623, a maximum of 64 S7 controllers can be connected via Industrial Ethernet; with CP 5612/CP 5622 a maximum of 8, and with CP 5613 A3 a maximum of 44 S7 controllers can be connected via PROFIBUS. With approx. 10 or more controllers, the use of Industrial Ethernet is recommended.

Client-server communication

Communication between the clients and the server is implemented using the TCP/IP protocol. The construction of a separate PC-LAN is recommended. For small projects with correspondingly small message frame advent, a SIMATIC NET Industrial Ethernet can be used for both process communication (WinCC/server ↔ PLC) and for PC-PC communication (WinCC/client ↔ WinCC/server)

Connection to third-party controllers

The following "Coupling overview" table lists third-party protocols and controllers which are directly supported by WinCC Professional. Generally it is also possible to connect third-party controllers via OPC (OLE for Process Control).

Current notes and information about OPC servers from many different suppliers can be found at:
http://www.opcfoundation.org/

WinCC Professional supports the standards:

- OPC Data Access 2.05a
- OPC Data Access 3.00
- OPC UA Data Access 1.01
- OPC XML Data Access 1.00
- OPC HDA 1.20
- OPC A&E 1.10

Coupling overview for WinCC Runtime Professional

Protocol	Description	PC interface
SIMATIC S7		
SIMATIC S7	Protocol Suite with channel units for communication with SIMATIC S7 via • Ethernet TCP/IP (S7 communication) to S7-1200, S7-1500, S7-300, S7-400	CP 1612 A2 CP 1613 A2 CP 5611 A2 CP 5621 CP 5512 CP 5711 CP 5613 A2 CP 5623
Third-party controllers (from WinCC V11.0)		
Allen Bradley Ethernet IP	Channel for communication with Allen Bradley controllers via Ethernet TCP/IP with Ethernet IP protocol The controllers ControlLogix / CompactLogix, SLC500 / MicroLogix, and PLC5 are supported	CP 1612 A2
Mitsubishi MC TCP/IP	Channel for communication with Mitsubishi controllers via Ethernet TCP/IP with Mitsubishi MC TCP/IP protocol The FX3, Q, and iQ/QnUD controller series are supported	CP 1612 A2
Modbus TCP/IP	Channel for communication with Modicon controllers via Ethernet TCP/IP using the Modbus TCP/IP protocol The Quantum, Momentum, Premium, TSX Micro, Compact and M340 controllers are supported	CP 1612 A2
Cross-manufacturer		
OPC client [1] for OPC DA, OPC XML DA	Channel for OPC communication, WinCC can acquire data from OPC server applications	CP 1612 A2
OPC server for OPC DA, OPC UA DA, OPC XML DA, OPC A&E, OPC HDA	Server applications for OPC communication; WinCC provides process data to OPC Clients	CP 1612 A2

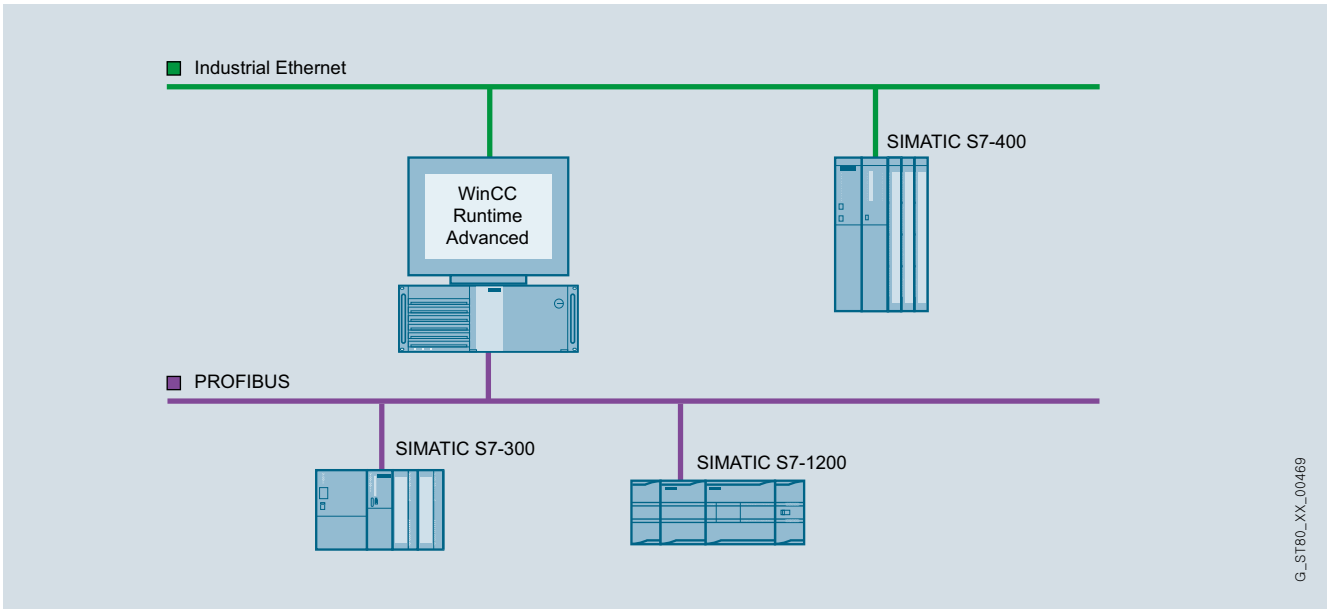
[1] Application note:

Parallel use of the OPC client channel allows, for example, connection to an SNMP OPC Server for visualization of the data present there.
The SNMP OPC Server enables monitoring of any network components (e.g. switches) that support the SNMP protocol.
Further information can be found under SIMATIC NET communications systems/SNMP OPC Server.

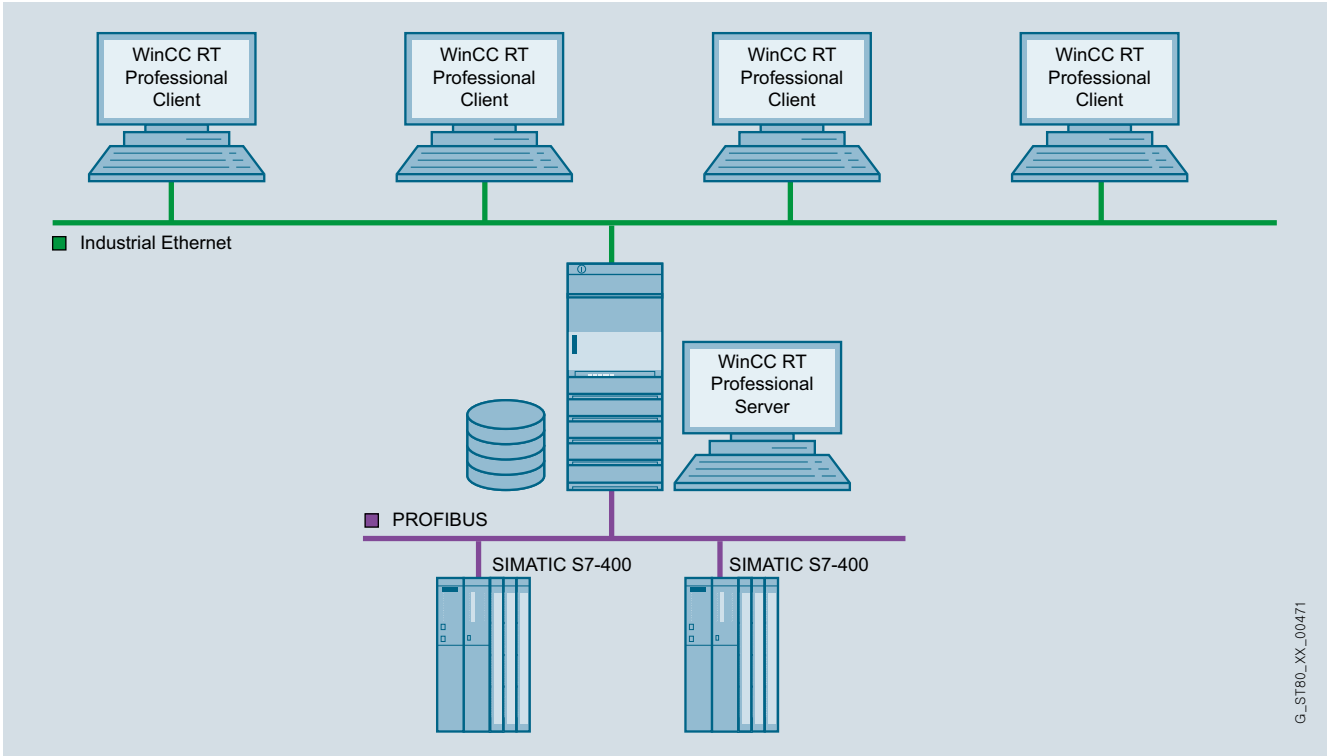
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Overview (continued)

Communications examples



WinCC Runtime Advanced single-user system

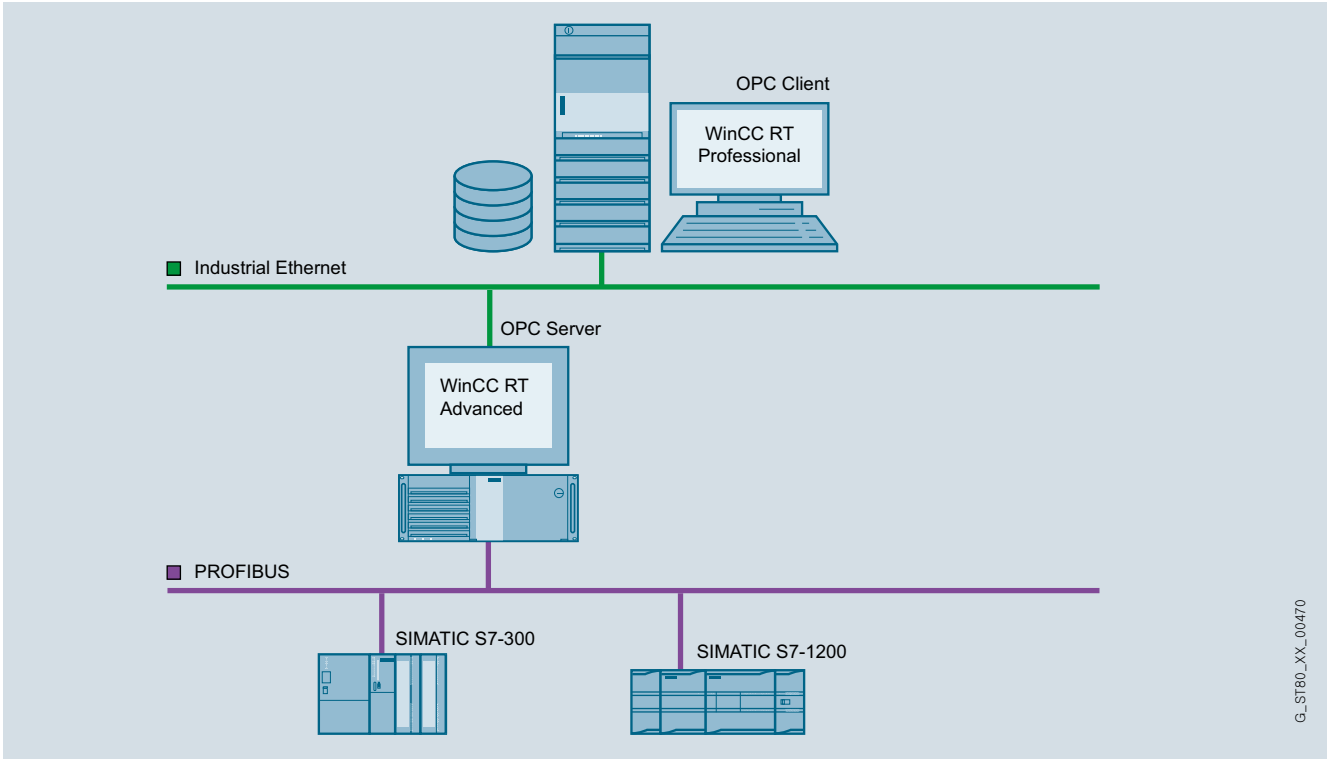


WinCC Runtime Professional multi-user system with operable server

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2

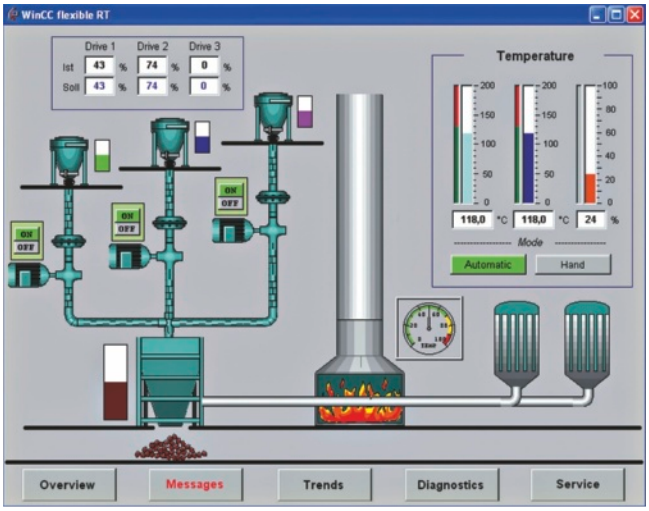
Overview (continued)



OPC coupling

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Overview



PC-based visualization software for single-user systems directly at the machine.

- Runs under Windows XP Professional and Windows 7 Professional, Ultimate, Enterprise
- Current version: SIMATIC WinCC flexible 2008 SP3 Runtime

SIMATIC WinCC flexible Runtime is configured with the SIMATIC WinCC flexible Advanced configuration software.

Benefits

- Optimum price/performance ratio thanks to individually scalable system functionality
- Functions for all visualization tasks:
  Operator functions, graphical and trend displays, signaling system, log system, archiving (option), recipe management (option), Audit Trail (option), process fault diagnostics (option)
- Flexible runtime functionality thanks to Visual Basic scripts
- Innovative service concepts with remote operation, diagnostics and administration via intranet and Internet as well as e-mail communication to increase availability (option)
- Support for simple distributed automation solutions based on TCP/IP networks at the machine level (option)

Application

SIMATIC WinCC flexible Runtime is the high-performance visualization software for simple visualization tasks at machine level. It can be used as a single-user solution for all automation applications in factory automation, process automation and building services automation.

SIMATIC WinCC flexible Runtime can be used in combination with the following operator panels:

- SIMATIC Panel PCs
  - PC IL 70/77
  - Microbox 420
  - Panel PC 477
  - Panel PC 577
  - Panel PC 670/677
  - Panel PC 870/877
- SIMOTION Panel PCs
  - P012, P015
  - PCR, PCR-Touch
- SINUMERIK Panel PCs
  - HT8; OP08T
  - OP010, OP012, OP015
  - TP012, TP015, OP015A
- Standard PCs with resolutions (W x H in pixels) of:
  - 4:3 format: 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200
  - Widescreen format: 800 x 480, 1280 x 800, 1366 x 768, 1440 x 900, 1680 x 1050, 1920 x 1080, 1920 x 1200, 1980 x 1080

Design

SIMATIC WinCC flexible Runtime is available as a software package with 128, 512, 2048 or 4096 PowerTags. The term PowerTags is used exclusively to identify process variables and range pointers that have a process link to the controller. Variables without process link, constant limit values of variables, and messages (up to 4000 bit-triggered messages) are also available for additional system performance.

The range of functions of WinCC flexible Runtime includes the centralized HMI components for visualizing and reporting, and it can be expanded to suit requirements and costs by using optional packages.

SIMATIC WinCC flexible Runtime is configured with the SIMATIC WinCC flexible Advanced configuration software.

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Function

Visualization via Windows-compliant operator interface

made up of parameterizable screen objects and image blocks created on a project-specific basis:

- Numeric and alphanumeric input/output fields
- Static text and graphic display plus vector graphics
- Dynamizable graphics from HMI symbol library
- Bar graph, trend curve graph with scroll and zoom function as well as read line
- Signal-specific text and graphic lists
- Buttons and switches for operator-process communication
- Editing fields for process values (signals)
- Analog display, slider as example for further screen objects
- Project-specific image blocks created from system basic objects
- Graphic displays for various standard graphic formats, e.g., bitmaps, .jpg, .wmf

Alarms and messages

- Discrete alarms and analog alarms as well as event-driven Alarm-S/Alarm-D message procedure with SIMATIC S7 and SIMOTION
- Freely-definable message classes for definition of acknowledgment response and display of message events

Logging of alarms and process values [1)]

- Archiving in files (e.g. CSV or TXT file) and Microsoft SQL databases
- Online evaluation of process value archives and alarm logs
- Evaluation of process value archives and alarm logs using standard Microsoft tools such as Excel

Recipes [1)]

- Generation of data records for machine or production data
- Display or entry of data records via a configurable screen object or via process images when distributed within the project
- Transmission of data records from or to the PLC
- Import/export for data records from/to CSV files

Documentation of process data, alarm events and recipes

- Time- or event-driven report output
- User-definable layout

Flexible expansion of system function

- thanks to Visual Basic Script

Language support for multilingual projects

- Up to 16 online languages (incl. Asian and Cyrillic)
- Language-dependent texts and graphics
- Language selection during runtime

User-oriented access protection according to requirements of regulated sectors

- Authentication with user ID and password
- User-group-specific rights
- Central system-wide user administration based on SIMATIC Logon [1)]
- Monitoring of changes by operators in runtime operation [1)]
- Recording of operator actions in an Audit Trail [1)]

PLC link for a wide variety of PLCs on-board

- Simultaneous connection using several protocols: OPC Client or SIMATIC HMI HTTP protocol are additive, i.e. can be used in conjunction with other PLC links
- Communication via native drivers and standard OPC channel

Open communication between HMI systems and with higher-level systems [1)]

- OPC server
- Sm@rtAccess for communication between HMI systems based on Ethernet networks, or via the intranet/Internet:
- Read and write access to variables; WinCC flexible Runtime or SIMATIC Panels make data (variables) available to other SIMATIC HMI systems or Office applications.
- A SIMATIC HMI system can be used to control or monitor another system remotely; entry level for client/server configurations for distributed operator stations or for solutions with headend or control room.

Sm@rtService for remote control, diagnostics and administration via intranet and Internet [1)]

- Display and control of process images on remote PC or Panel
- Sending of e-mails on demand or event-driven
- System diagnostics visualized via device-specific HTML pages

1) Option for SIMATIC WinCC flexible Runtime; runtime licenses must be purchased separately. For further information, refer to "WinCC flexible options".

System requirements	WinCC flexible Runtime
Operating system	Windows XP Professional SP3 (32 bit) Windows XP Embedded [1)] Windows 7 Professional / Ultimate / Enterprise (32 bit and 64 bit)
Processor[4)]	
• Minimum	Windows XP: 300 MHz Windows 7: 1 GHz
• Recommended	Windows XP: ≥ Pentium III, 500 MHz Windows 7: ≥ 1 GHz
Graphics	
• Minimum	SVGA
• Resolution	640 x 480 to 1600 x 1200 or 800 x 480 to 1980 x 1080
RAM [2)]	
• Minimum	Windows XP: 128 MB Windows 7: 1 GB
• Recommended	Windows XP: ≥ 512 MB Windows 7: ≥ 1 GB
Hard disk (free memory space) [3)]	≥ 250 MB

1) Only for enabled platforms (e.g. Panel PC 477). You can get information from your Siemens contact.

2) RAM requirements are determined primarily by the size of the graphics used.

3) Without taking archives into account. In addition to the space needed by WinCC flexible, Windows also requires space on the hard disk; e.g., for the swap file. The following formula has proven itself in the past: The size of the swap file = 3 x the size of the RAM. For further information, refer to your Windows documentation

4) More powerful systems (Pentium 4 and higher) may be required in order to use options

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Integration

SIMATIC WinCC flexible Runtime supports linking to:

Protocol	PC interfaces
SIMATIC S7 via Ethernet (TCP/IP)	
S7-200 with CP 243-1	CP 1612 [1] CP 1613 A2
S7-300 CPUs with integral Ethernet interface	
S7-300 with CP 343-1	
S7-400 CPUs with integral Ethernet interface	
S7-400 with CP 443-1	
WinAC Basis (V3.0 and higher)	
WinAC RTX	
SIMATIC S7 via integrated interface	
WinAC Basis (V2.0 and higher)	Internal system interface
WinAC RTX	
SIMOTION [2]	
SINUMERIK [3]	
Third-party controllers	
Allen Bradley (DF1/DH485)	COM1/COM2
Allen Bradley (Ethernet)	CP 1612 [1]
GE Fanuc (SNP/SNPX)	COM1/COM2
LG GLOFA GM	COM1/COM2
Mitsubishi (FX/MP4)	COM1/COM2
Modicon (Modbus)	COM1/COM2
Modicon (Modbus TCP/IP)	CP 1612 [1]
OMRON (Link/Multilink)	COM1/COM2
OPC [4] [6]	
Data Access V2.05a (client + server)	CP 1612 [1]
Data Access XML V1.00 (client)	
HTTP communication for data exchange between SIMATIC HMI (client + server) [5] [6]	CP 1612 [1]

1) For Microbox 427 and Panel PC 477/577/677/877 via internal Ethernet interface

2) For further information, see Catalog PM 10

3) "SINUMERIK HMI copy license OA" option required; for further information, see Catalog NC 60

4) OPC Client is included in scope of delivery, the "WinCC flexible/OPC Server for WinCC flexible Runtime" license is required for the OPC Server option

5) "WinCC flexible/Sm@rtAccess for WinCC flexible Runtime" license required

6) OPC and HTTP communication are additive, i.e. can be used in conjunction with the PLC links listed above

7) Via PC cable with integrated level converter RS 232/TTY; Article number: 6ES5734-1BD20

8) For information about SIMATIC Panels that support OPC/http communication, see the overview under "System interfaces".

Application note

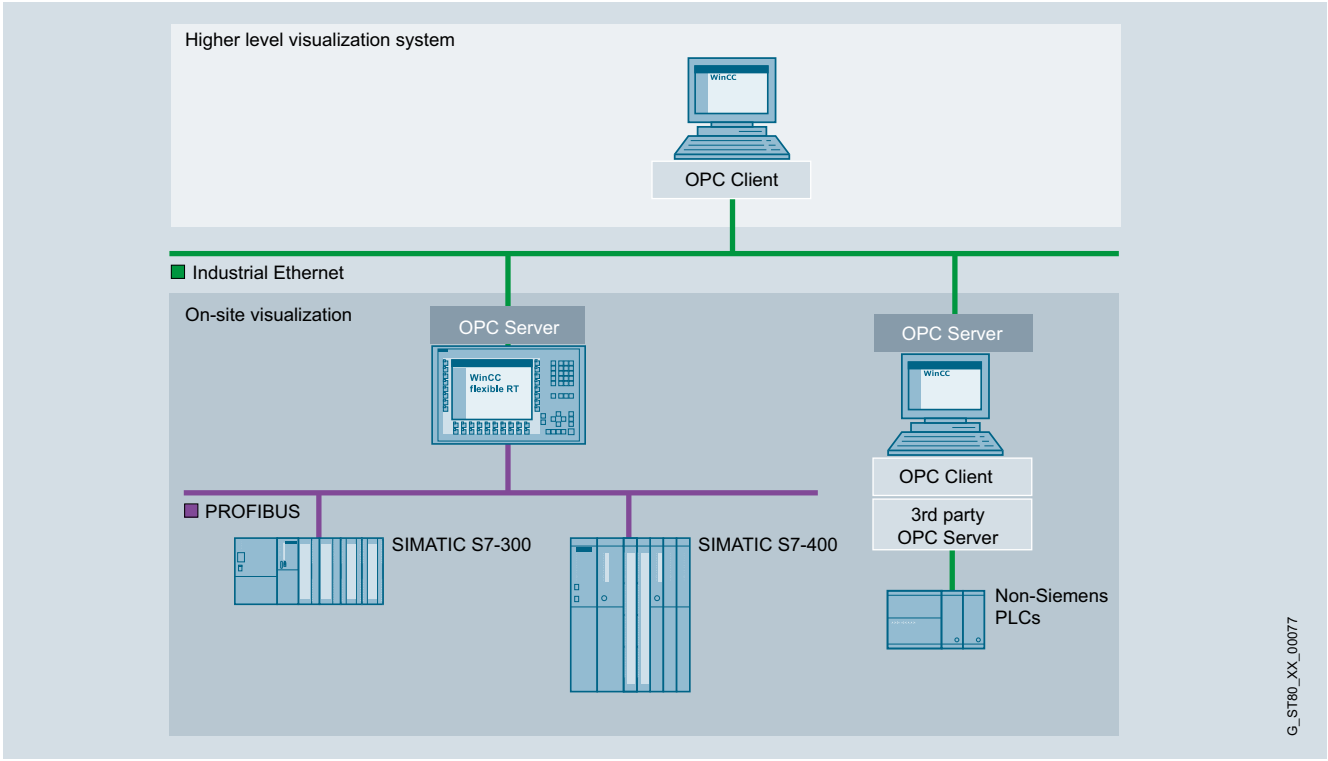
In parallel with each and every PLC link, WinCC flexible Runtime supports the use of the OPC Client channel; this enables, for example, connection to an SNMP OPC Server for the purpose of visualizing the data stored there. The SNMP OPC Server provides a means of monitoring network components of any type (e.g. switches) which support the SNMP protocol. For further information, see Catalog IK PI.

Note:

For further information, see "HMI devices/System interfaces"

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Integration (continued)



SIMATIC WinCC flexible Runtime application example

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Technical specifications

Type	SIMATIC WinCC flexible Runtime The specifications are maximum values
Displays	500
• Fields per screen	400
• Variables per screen	400
• Static text	30 000
• Graphics objects	2 000
• Complex objects per display (e.g. bars)	40
• Trends	800
• Graphics lists [1]	500
• Text lists [1]	500
• Number of entries in symbol tables	3 500
Variables	4 096 [3]
Messages bit-triggered / analog	4 000 / 500
• Message text (number of characters)	80
• Number of process values per message	8
• Size of message buffer	1 024
• Pending message events	500
Archives [4]	100
• Archivable data	Process data, messages
• Max. number of entries per archive (incl. all archive segments)	500,000
• Archive types	Short-term archive, sequence archive (max. 400 per archive)
• Data storage format	CSV (**C**omma **S**eparated **V**ariable), RDB (**R**untime **D**ata **B**ase), interface to MS SQL database
Recipes[4]	1 000
• Elements per recipe	2 000 [3]
• Data records per recipe	5 000 [2]

Type	SIMATIC WinCC flexible Runtime The specifications are maximum values
Password protection	
• User rights	32
• Number of user groups	50
Visual Basic scripts	200
Online languages, max.	16
Communication	
SIMATIC S7 MPI interface/ PROFIBUS DP interface	
• Number of connectable stations, max.	Depending on the scope of the configuration (communication) from the point of view of WinCC flexible Runtime, as many as 8 connections are possible
SIMATIC S7 PPI interface	
• Number of connectable stations, max.	1 from viewpoint of WinCC flexible Runtime
SIMATIC S5 PROFIBUS DP interface	
• Number of connectable stations, max.	1 from viewpoint of WinCC flexible Runtime
Multi-protocol operation	Yes, OPC Client or SIMATIC HMI HTTP protocol are additive, i.e. can be used in conjunction with other PLC links

1) Together only 500 text and graphics lists

2) Dependent on memory medium used

3) Dependent on number of licensed PowerTags

4) Option for SIMATIC WinCC flexible Runtime. For further information, refer to "WinCC flexible options".

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SIMATIC WinCC flexible RT

2

Ordering data

	Article No.
SIMATIC WinCC flexible 2008 Runtime	
for PC systems; incl. SW for PC systems options [1] Single license, on CD-ROM incl. licensing, for:	
• 128 PowerTags (RT 128)	**6AV6613-1BA51-3CA0**
• 512 PowerTags (RT 512)	**6AV6613-1DA51-3CA0**
• 2 048 PowerTags (RT 2048)	**6AV6613-1FA51-3CA0**
• 4 096 PowerTags (RT 4096)	**6AV6613-1GA51-3CA0**
Power Packs	
SIMATIC WinCC flexible 2008 Runtime	
Single license, only license key for PowerTags, from	
• 128 to 512 PowerTags	**6AV6613-4BD01-3AD0**
• 128 to 2 048 PowerTags	**6AV6613-4BF01-3AD0**
• 512 to 2 048 PowerTags	**6AV6613-4DF01-3AD0**
• 128 to 4 096 PowerTags	**6AV6613-4BG01-3AD0**
• 512 to 4 096 PowerTags	**6AV6613-4DG01-3AD0**
• 2 048 to 4 096 PowerTags	**6AV6613-4FG01-3AD0**
Updates	
SIMATIC WinCC flexible 2008 Runtime Update 2008, 2008 SP1, 2008 SP2 -> 2008 SP3	**6AV6613-1XA51-3CU8**
Upgrades	
SIMATIC WinCC flexible 2004/ 2005/2007 Runtime to SIMATIC WinCC flexible 2008 Runtime	
Upgrade to SIMATIC WinCC flexible Runtime 2008 PowerTags incl. Runtime Options for:	**6AV6613-1XA51-3CE0**
• WinCC flexible /Archives	
• WinCC flexible /Recipes	
• WinCC flexible /Audit	
• WinCC flexible /Sm@rtAccess	
• WinCC flexible /Sm@rtService	
• WinCC flexible /OPC server	
• WinCC flexible /ProAgent	
Upgrade of the SIMATIC WinCC flexible Panel options:	**6AV6618-7XX01-3AF0**
• WinCC flexible /Audit for SIMATIC Panel	
• WinCC flexible /Sm@rtAccess for SIMATIC Panel	
• WinCC flexible /Sm@rtService for SIMATIC Panel	
• WinCC flexible /OPC server for SIMATIC Multi Panel	
• WinCC flexible /ProAgent for SIMATIC Multi Panel	

	Article No.
Documentation (must be ordered separately)	
User Manual WinCC flexible Runtime	
• German	**6AV6691-1BA01-3AA0**
• English	**6AV6691-1BA01-3AB0**
• French	**6AV6691-1BA01-3AC0**
• Italian	**6AV6691-1BA01-3AD0**
• Spanish	**6AV6691-1BA01-3AE0**
User Manual WinCC flexible Communication	
• German	**6AV6691-1CA01-3AA0**
• English	**6AV6691-1CA01-3AB0**
• French	**6AV6691-1CA01-3AC0**
• Italian	**6AV6691-1CA01-3AD0**
• Spanish	**6AV6691-1CA01-3AE0**
SIMATIC HMI Manual Collection Electronic documentation, on DVD 5 languages (English, French, German, Italian and Spanish); contains: all currently available user manuals, device manuals and communication manuals for SIMATIC HMI	**6AV6691-1SA01-0AX0**

[1] Runtime licenses for WinCC flexible Runtime options must be purchased separately for each target system.

More information

Additional information is available in the Internet under:

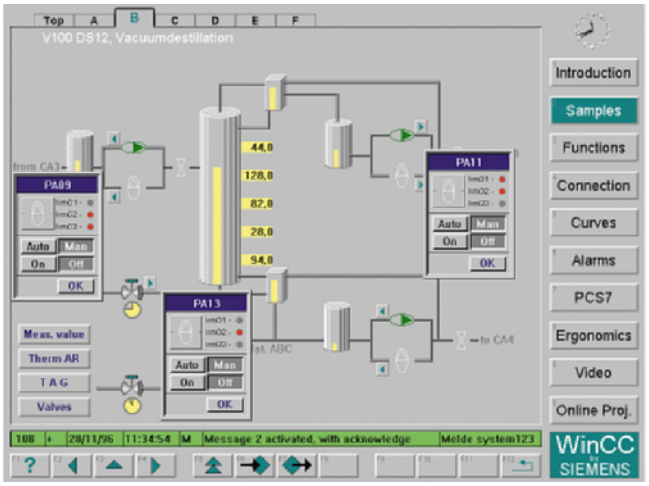
http://www.siemens.com/wincc-flexible

Note:

Do you need a specific modification or option for the products described here? You will find information about the Open Platform Program for the creation of user-specific functions and controls for WinCC flexible under "Customized Products".

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Overview



- PC-based operator control and monitoring system for visualizing and operating processes, production flows, machines and plants in all sectors – from the simple single-user station through to distributed multi-user systems with redundant servers and cross-location solutions with Web clients. WinCC is the information hub for corporation-wide vertical integration.
- The basic system configuration (WinCC basic software) includes industry-standard functions for signaling and acknowledging events, archiving of messages and measured values, logging of all process and configuration data, user administration and visualization.
- The WinCC basic software forms the core of a wide range of different applications. Based on the open programming interfaces, a wide range of WinCC options (from Siemens Industry Automation) and WinCC add-ons have been developed (by Siemens-internal and external partners).
- WinCC can be operated with every PC that meets the given HW requirements. The SIMATIC IPC product range is available in particular for the industrial use of WinCC systems. SIMATIC IPCs impress with their powerful PC technology, are designed for round-the-clock operation, and can be operated in both office areas and harsh industrial environments.

Current versions:

SIMATIC WinCC V7.3

Executable with

- Windows 7 SP1 (32 / 64 bit) Professional, Enterprise, Ultimate
- Windows 8.1 (32 / 64 bit) Professional, Enterprise
- Windows 2008 Server SP2 (32 bit) Standard
- Windows 2008 Server R2 SP1(64 bit) Standard
- Windows Server 2012 R2 (64 bit) Standard
  includes the Microsoft SQL Server 2008 R2 SP2 (32 bit)

SIMATIC WinCC V7.2

Executable with:

- Windows 7 SP1 (32 / 64 bit) Professional, Enterprise, Ultimate
- Windows XP Professional SP3
- Windows Server 2003 SP2, Standard
- Windows Server 2008 SP2 (32 bit) Standard
- Windows Server 2008 R2 SP1 (64 bit) Standard
  contains the Microsoft SQL Server 2008 R2 SP1 (32 bit)

SIMATIC WinCC V7.0 SP3

Executable with:

- Windows 7 SP1 (32 / 64 bit) Professional, Enterprise, Ultimate
- Windows XP Professional SP3
- Windows Server 2003 SP2 and Windows Server 2003 R2 SP2 Standard
- Windows Server 2008 SP2 (32 bit) Standard
- Windows Server 2008 R2 SP1 (64 bit) Standard
  includes the Microsoft SQL Server 2005 SP4
- Use in virtual environments – for additional information, see
  http://support.automation.siemens.com/WW/view/en/49370459

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Benefits

- All-purpose
  - Solutions for all sectors
  - Multilingual for worldwide usage
  - Can be integrated into all automation solutions
- All HMI functions on board
  - User administration
  - Operator control and monitoring
  - Reporting, acknowledging, and archiving of events
  - Acquisition, compression and archiving of measured values (incl. long-term backup)
  - Logging and documenting of process and configuration data
- Can be configured simply and efficiently
  - Configuration wizards let the user focus on the essentials
  - In the picture by means of cross-reference lists and screen property displays
  - Configuration of multilingual applications
  - Configuring tool for configuring bulk data
- Universally scalable
  - Expandable from single station to client-server configurations
  - Increased availability by means of redundant servers
  - Process visualization via the web with the WinCC WebNavigator
- Open standards for simple integration
  - Powerful real-time database Microsoft SQL Server 2008 R2 SP1 (32 bit)
  - Open for application modules with ActiveX controls
  - Visual Basic for Applications for individual expansions
  - OPC for cross-vendor communication
- Process visualization with Plant Intelligence
  - Integrated high-performance Historian on the basis of the Microsoft SQL Server 2008 R2 SP1 (32 bit)
  - Integrated evaluation functions for the online analysis (statistical process control)
  - Production optimization with the help of diverse options
- Expandable using options and add-ons
  - Options for scalable configurations
  - Options for increasing the availability
  - Options for IT & business integration
  - Options for SCADA expansions
  - Options for validation in accordance with FDA 21 CFR Part 11
  - Options for the use of telecontrol protocols
- Part of Totally Integrated Automation
  - Direct access to the tag and message configuration of the SIMATIC control system
  - Integrated diagnostic functions for increasing productivity
  - Options for the use of telecontrol protocols

New in V7.2

- Expansion into Graphic Designer
  - Know-how protection by means of password protection for PDL images and image blocks
- Unicode support
  - WinCC SETUP in 5 languages / up to 9 installed languages
  - Individual language selection for engineering and runtime, regardless of the language settings in the operating system
- Simplified configuration of the Tag Management by means of the innovative WinCC Configuration Studio
  - Configuration options similar to those in Excel
  - Simplified tags / structure tag management
- New communication channels
  - Communication channel to new CPU (S7-1200 / S7-1500) (absolute address only, no CPU alarming support)
  - Introduction of the OPC UA server (DA, HDA)
- Expansion into archive system
  - New archive recording (day, weak, year)
  - New archiving methods (difference)

and more ...

Application

SIMATIC WinCC is designed for visualization and operation of processes, manufacturing cycles, machines and plants. With its powerful process interface, especially to the SIMATIC family, and the secure data archiving, WinCC enables highly available solutions for the process control.

The sector-neutral basic system enables universal usage in all automation applications. Sector-specific solutions can, for example, be implemented using WinCC options (e.g. FDA options for the pharmaceutical industry) and sector-specific add-ons (e.g. for the water industry).

Design

SIMATIC WinCC is available as a complete package and as a runtime package with 128, 512, 2048, 8192, 65536, 102400, 153600, 262144 PowerTags [1]. PowerTags are data points that are connected to controllers or other data sources over a WinCC channel. Up to 32 alarms can be obtained from one data point. Moreover, internal tags without coupling are available for additional system performance. In addition WinCC also contains 512 archive tags. Individual archive licenses can be obtained for greater quantity structures.

Licenses for a multi-user configuration

The system software with the required number of PowerTags and additionally the option WinCC/Server must be installed on the WinCC server. In the basic configuration, an RT128 or RT client license is sufficient for the WinCC clients. In order to perform configuration on clients, an RC128 license is required. Remote configuration is possible if WinCC clients without their own project (UniClient) on the server project are configured.

[1] V6: 128, 256, 1024, 8192, 65536 PowerTags

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Function

The powerful configuration functions of SIMATIC WinCC contribute to a reduced engineering and training overhead and lead to a more flexible use of personnel and greater operational reliability. Whoever is familiar with Microsoft Windows can also operate the WinCC Explorer, the central switching point of WinCC.

In combination with other SIMATIC components, the system is also equipped with auxiliary functions such as process diagnostics and maintenance. All SIMATIC engineering tools work together in the configuration of the functions.

SIMATIC WinCC offers a complete basic functionality for process visualization and operation. To this end WinCC has a number of editors and interfaces that can be used to individually configure this functionality according to the respective application. Expansions of a WinCC station for control tasks are also possible with minimal engineering effort.

WinCC editors	Task or configurable runtime functionality
WinCC Explorer	Central project management for the quick access to all project data and central settings
WinCC Graphics Designer	Graphics system for user-defined visualization and operation via pixel-graphic objects
WinCC Alarm Logging	Signaling system for detecting and archiving events with display and control options according to DIN 19235; freely selectable message classes, message display and logging
WinCC Tag Logging	Process archiving for the acquisition, compression and storage of measured values, e.g., presentation in trend and table format as well as further processing
WinCC Report Designer	Reporting and logging system for time and event-controlled documentation of messages, operator inputs and current process data in the form of user reports or project documentation in an arbitrary layout
WinCC User Administrator	Tool for user-friendly administration of users and authorizations
WinCC Global Script	Processing functions with limitless functionality by means of the use of VBScript and ANSI-C

Interfaces

	Task or configurable runtime functionality
Communication channels	For communication with subordinate controls (SIMATIC protocols, PROFIBUS DP, PROFIBUS FMS, DDE and OPC server included in the scope of delivery)
Standard interfaces	For the open integration of other Windows applications via WinCC, WinCC-OLE-DB, ActiveX, OLE, DDE, OPC, etc.)
Programming ports	For the individual access to data and functions of WinCC and for the integration in user programs with VBA, VB Script, C-API (ODK), C-Script (ANSI-C)

Integration

Integration in company-wide solutions (IT and business integration)

WinCC is strictly based on Microsoft technology, which provides the greatest possible compatibility and integration ability. ActiveX and .net [1] controls support technology-specific and industry-specific expansions. Cross-manufacturer communication is also a simple exercise. The reason: WinCC can be used as an OPC client and server, and in addition to access to current process values, it also supports standards such as OPC HDA (Historical Data Access), OPC Alarm & Events, and OPC XML Data Access.

Just as important: Visual Basic for Applications (VBA) for user-specific expansions of the WinCC Graphics Designer and Visual Basic Scripting (VBS) as an easy-to-learn, open runtime language. If desired, professional application developers can also use ANSI-C. And access to the API programming interfaces is really simple with the Open Development Kit ODK.

WinCC integrates a powerful and scalable historian function based on Microsoft SQL Server 2005 into the basic system. As a result, users have every possibility: from high-performance archiving of current process data, to long-term archiving with high data compression, through to a central information hub in the form of a company-wide process historian. With the help of the Central Archive Server option, this can be set up within the framework of a WinCC solution. Versatile clients and tools for evaluation, the open interfaces, and special options (Connectivity Pack, Connectivity Station, IndustrialDataBridge) provide the basis for effective IT and business integration.

If external networks are accessed, suitable protective measures (incl. IT security measures, such as network segmentation) should be taken in order to ensure safe operation of the system.

You can find more information on the topic of Industrial Security on the Internet at:

http://www.siemens.com/industrialsecurity

[1] Only supported in WinCC V7.0 or higher

Integration in automation solutions

WinCC is an open process visualization system and provides the option to connect the most diverse control systems.

Approved communication software

Only communication software with the listed product versions (or higher) should be used. Corresponding SIMATIC NET upgrades are available for upgrading older versions.

Number of connectable controls

For the number of controls connectable via Industrial Ethernet CP 1613, the following applies to a message frame length of 512 bytes:

Type of connection	Number of nodes
SIMATIC S5 Ethernet Layer 4 + TCP/IP	Up to 60
SIMATIC S7 Protocol Suite	Up to 64
SIMATIC 505 Ethernet Layer 4 + TCP/IP	up to 60

Via PROFIBUS, a maximum of 8 controls can be connected with CP 5611, and a maximum of 44 controls with CP 5613. With approx. 10 or more controls, the usage of Industrial Ethernet is recommended.

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Integration (continued)

Mixed operation with different controls

With their multi-protocol stack, the CP 1613 and CP 5613 communication processors allow parallel operation of two protocols, such as for the mixed operation of different controls, via a bus cable. WinCC supports the operation of two similar interface boards only in connection with the channels SIMATIC S5 Ethernet Layer 4 (2 x CP 1613), SIMATIC S7 Protocol Suite (2 x CP 1613, 2 x CP 5613) as well as PROFIBUS DP (4 x CP 5613; each CP 5613 max. 122 slaves). In addition to communication over industrial Ethernet CP 1613 or PROFIBUS CP 5613, one CP 5611 can be used in each case for communication with SIMATIC S7 via MPI.

Client-server communication

Communication between the clients and the server is via TCP/IP protocol. Setting up a separate PC LAN is recommended. For small projects with a correspondingly low incidence of message frames, SIMATIC NET Industrial Ethernet communication can be used for both process communication (WinCC/Server ↔ PLC) and PC-PC communication (WinCC/client ↔ WinCC/server).

Channel DLL PROFIBUS DP

In accordance with the PROFIBUS standard, DP/slaves are always permanently assigned to a DP master; i.e. a second WinCC station (DP/master) cannot access the same controls (DP/slave). This means that redundant operation of two WinCC stations is not possible using the PROFIBUS DP connection.

Connection to controls from other manufacturers:

OPC (OLE for Process Control) is recommended for the connection of controls from other manufacturers.

Current notes and information about OPC servers from various suppliers can be found at:
http://www.opcfoundation.org

WinCC supports the standards:

- OPC Data Access 2.05a
- OPC Data Access 3.00
- OPC XML Data Access 1.00 (Connectivity Pack/Connectivity Station)
- OPC HDA 1.20 (Connectivity Pack/Connectivity Station)
- OPC A&E 1.10 (Connectivity Pack/Connectivity Station)
- OPC UA Client Data Access
- OPC UA Server Data Access, HDA (Connectivity Pack / Connectivity Station)

Connection overview

Protocol	Description
SIMATIC S7	
SIMATIC S7 Protocol Suite	Channel DLL for S7 functions via MPI, PROFIBUS or Ethernet Layer 4 + TCP/IP
SIMATIC S5	
SIMATIC S5 Ethernet Layer 4	Channel DLL for S5 Layer 4 communication + TCP/IP
SIMATIC S5 Programmer Port AS511	Channel DLL and driver for serial communication with S5 using AS511 protocol to programmers port
SIMATIC S5 Serial 3964R	Channel DLL and driver for serial communication with S5 using RK512 protocol
SIMATIC S5 PROFIBUS-FDL	Channel DLL for S5-FDL
SIMATIC 505	
SIMATIC 505 Serial	Channel DLL and driver for serial communication with 505 using NITP/TBP protocol to SIMATIC 535/545/555/565/575
SIMATIC 505 Ethernet Layer 4	Channel DLL for 505 Layer 4 communication
SIMATIC 505 TCP/IP	Channel DLL for 505 TCP/IP communication
SIMATIC S7-1200, S7-1500 (WinCC 7.2 or higher)	
SIMATIC S7-1200, S7-1500 Channel [1]	Channel DLL for S7-1200 and S7-1500 communication
Controllers from other manufacturers (from WinCC V7.0 SP3)	
Allen Bradley Ethernet IP	Channel DLL and drivers for communication with Allen Bradley controllers via Ethernet TCP/IP using Ethernet IP protocol
Modbus TCP/IP	Channel DLL and drivers for communication with Modicon controllers via Ethernet TCP/IP using Modbus TCP/IP protocol
Mitsubishi MC TCP/IP	Channel DLL and drivers for communication with Mitsubishi controllers via Ethernet TCP/IP using Mitsubishi MC TCP/IP protocol
Cross-manufacturer	
OPC Client [2] [3] for DA, XML DA	Channel DLL for OPC communication, WinCC can acquire data from OPC server applications.
OPC Server for DA, XML DA, A&E, HDA	Server applications for OPC communication; WinCC provides process data to OPC clients
OPC UA server for DA, HDA	Server applications for OPC UA communication
PROFIBUS FMS	Channel DLL for PROFIBUS FMS
PROFIBUS DP	Channel DLL for PROFIBUS DP
SIMOTION	Channel DLL for SIMOTION

[1] WinCC version V7.2 or higher supports communication with S7-1200 / S7-1500 CPU.
Restrictions:
No symbolic address, type safe structure support (absolute address only)
No CPU alarming support

[2] Application note:
Parallel usage of the OPC client channel allows, for example, connection to an SNMP-OPC server for visualization of the data contained there. The SNMP OPC server enables monitoring of any network components (such as switches) that support the SNMP protocol. You can find more information under SIMATIC NET Communications Systems/SNMP OPC Server.

[3] WinCC V7.0 SP3 and later supports OPC UA (United Architecture) Client for DA.

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Integration (continued)

Communications components for PG/PC for SIMATIC (for WinCC V7.2)

Industrial Ethernet	SIMATIC S5 Ethernet Layer 4	SIMATIC S5 TCP/IP	SIMATIC S7 Protocol Suite	SIMATIC 505 Ethernet Layer 4	SIMATIC 505 TCP/IP [1]	Article No.
WinCC – channel DLL						
SIMATIC S5 Ethernet Layer 4 Channel DLL for S5 Layer 4 communication + TCP/IP	•	•				Included in the basic package
SIMATIC S7 Protocol Suite Channel DLL for S7 functions			•			Included in the basic package
SIMATIC 505 Ethernet Layer 4 Channel DLL for 505 Layer 4 communication				•		Included in the basic package
SIMATIC 505 TCP/IP [1] Channel DLL for 505 TCP/IP communication					•	Included in the basic package
Communication components for extension of the OS/OP						
CP 1612 A2 PCI card for connecting a PG/PC to Industrial Ethernet (SOFTNET-S7 or SOFTNET-S7 Lean communication software must be ordered separately)		•	•		•	**6GK1161-2AA01**
SOFTNET-IE S7 communication software for S7 functions (max. 64 connections)		•	•			
• Version 12 [2] for 32/64-bit Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; for Windows Server 2012 German/English						**6GK1704-1CW12-0AA0**
• Edition 2008 SP2 (V7.1) [2] for Windows XP/2003 Server/(32-bit) 2008 Server						**6GK1704-1CW71-3AA0**
SOFTNET-IE S7 Lean communication software for S7 functions (max. 8 connections)		•	•			
• Version 12 [2] for 32/64-bit Windows 7 Professional/Ultimate; for 64-bit: Windows 2008 Server R2; for 32/64-bit Windows 8 Pro; German/English						**6GK1704-1LW12-0AA0**
• Edition 2008 SP2 (V7.1) [2] [3] for Windows XP/2003 Server / (32-bit) 2008 Server						**6GK1704-1LW71-3AA0**
CP 1613 A2 PCI card (32-bit) for connecting a PG/PC to Industrial Ethernet (S7-1613 communication software required)	•	•	•	•	•	**6GK1161-3AA01**
CP 1623 PCI Express X1 card (32-bit) for connecting a PG/PC to Industrial Ethernet (S7-1613 communication software required)	•	•	•	•	•	**6GK1162-3AA00**
HARDNET-IE S7 communication software for S7 functions and S5/505 Layer 4 communication with TCP/IP	•	•	•	•		
• Version 12 [2] for 32/64-bit Windows Server 2012, Windows 8 Pro, Windows 7 Professional / Ultimate; for 64-bit: Windows 2008 Server R2; German/English						**6GK1716-1CB08-2AA0**
• Edition 2008 SP2 (V7.1) [2] for Windows XP/2003 Server / (32-bit) 2008 Server						**6GK1716-1CB71-3AA0**

• System interface possible

1) Via any interface board with NDIS 3.0 interface; no separate communication software required

2) See ordering data for SIMATIC NET upgrade packages

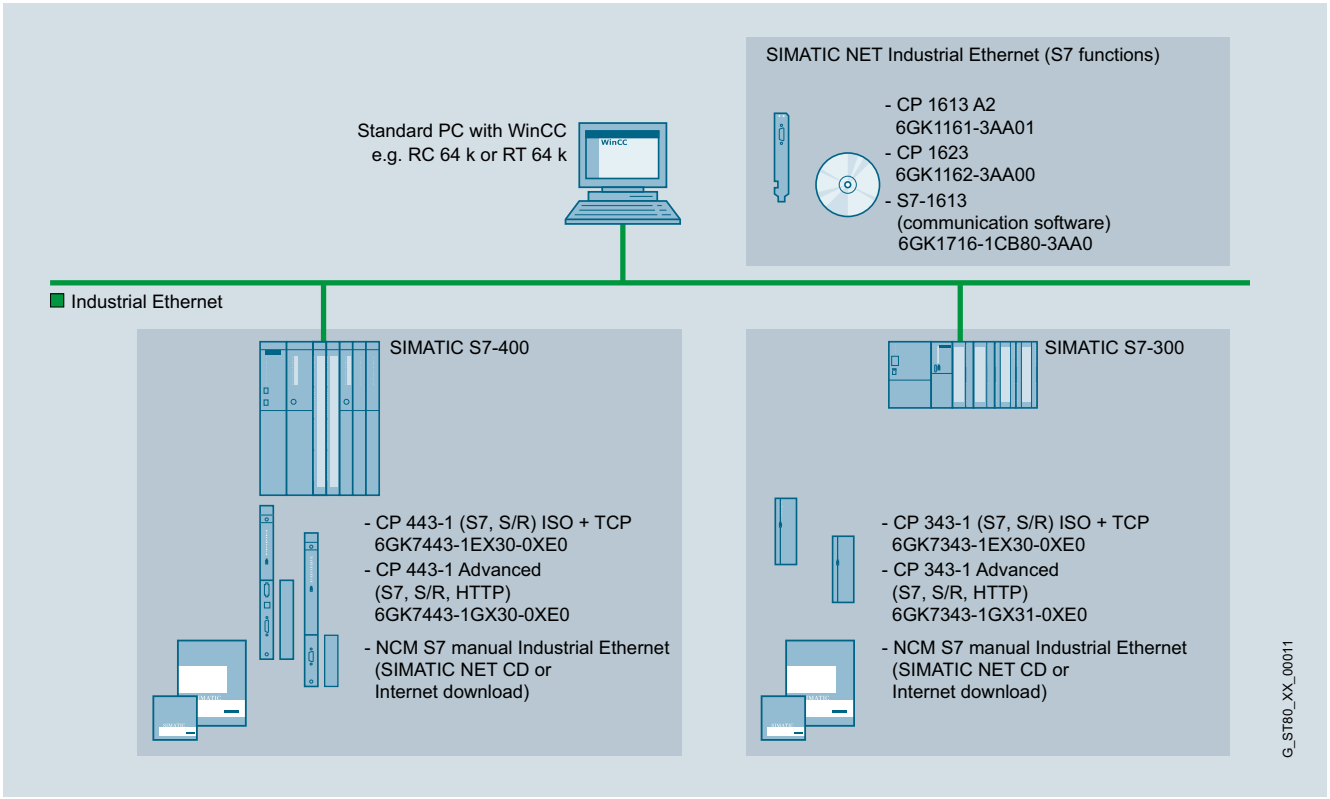
3) SOFTNET-S7 Lean included in scope of supply of WinCC V7.2

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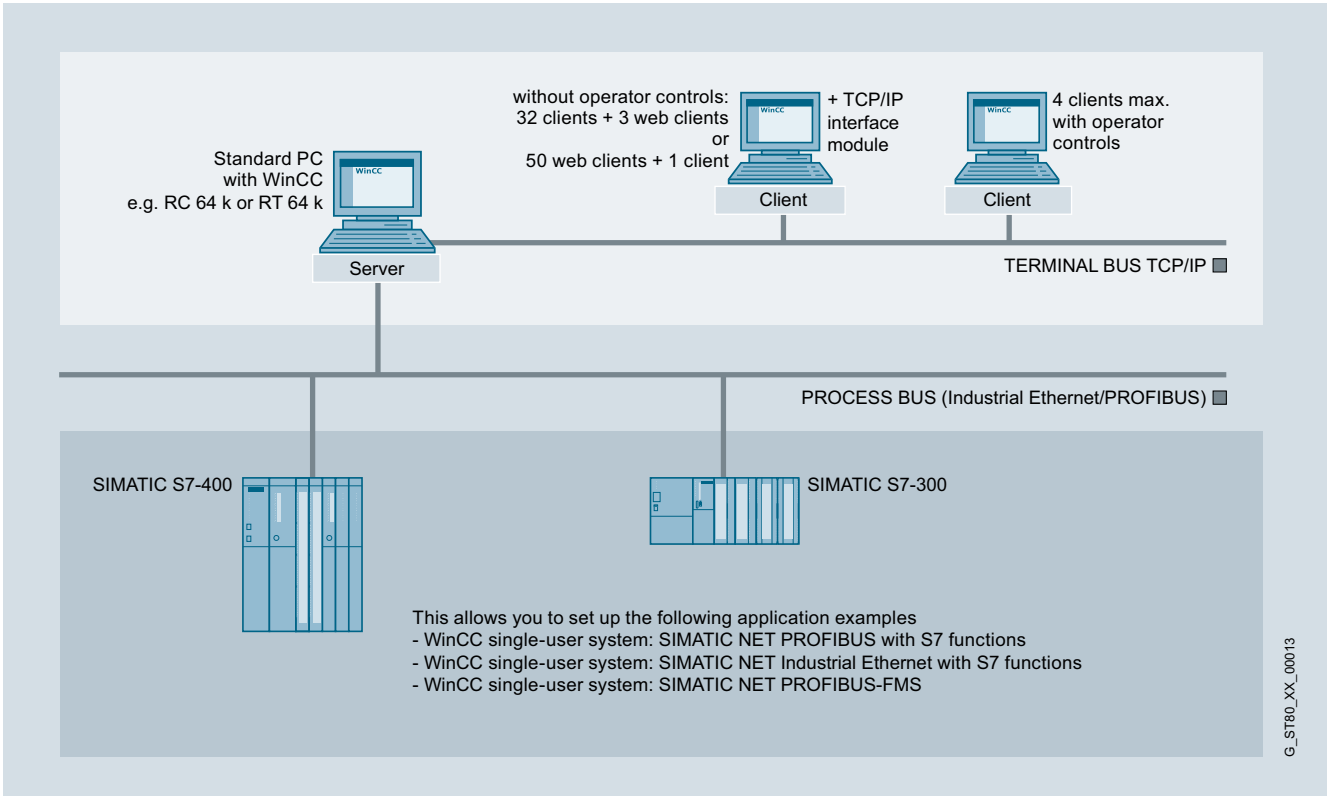
2

Integration (continued)

Communication examples



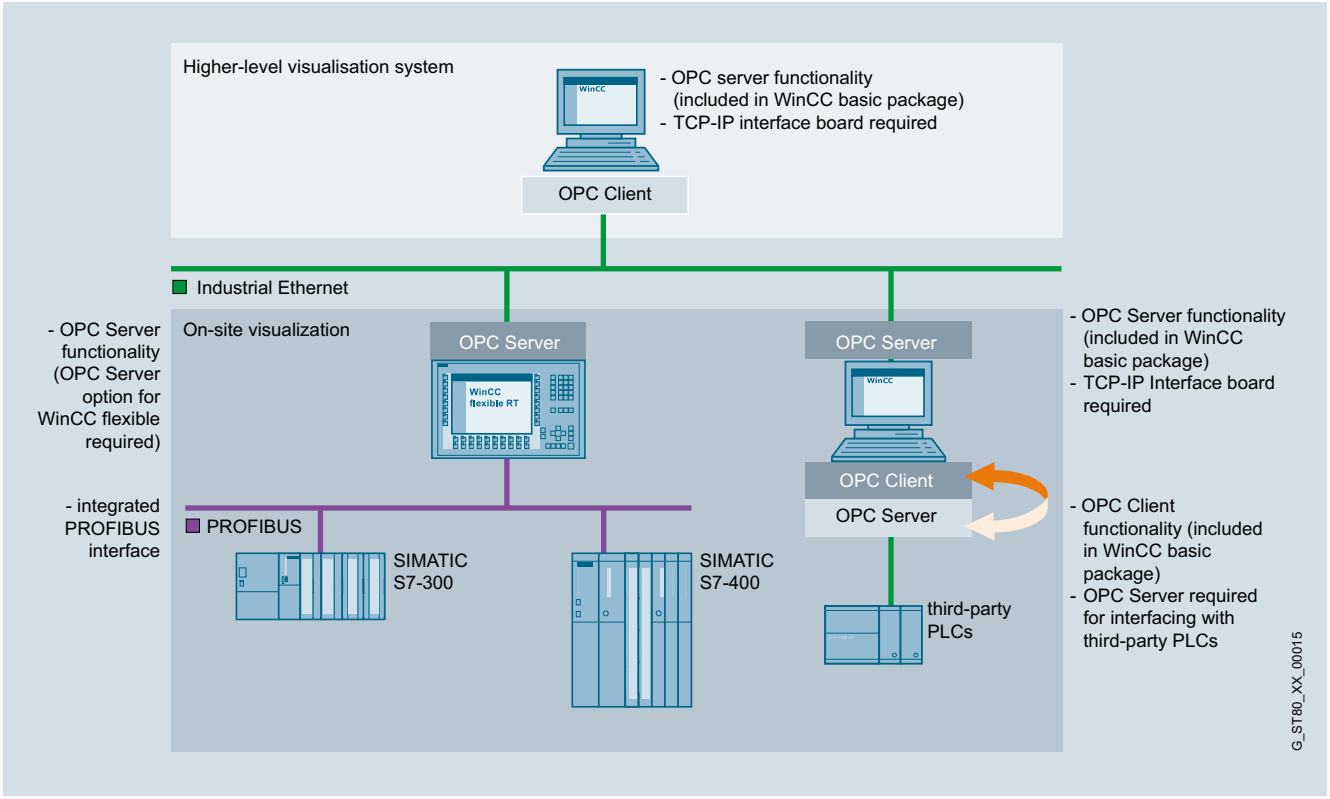
WinCC single-user system: Industrial Ethernet with S7 communication



WinCC multi-user system with operable server

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Integration (continued)



OPC link

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Technical specifications

Type	SIMATIC WinCC V7.2 and V7.0 SP3	SIMATIC WinCC V6.2 SP3
Operating system	• Windows 7 (32 bit / 64 bit) Ultimate, Professional and Enterprise • Windows XP Professional SP3 • Windows 2003 Server SP2 and Windows 2003 Server R2 SP2 • Windows Server 2008 SP2 (32 bit) Standard • Windows Server 2008 R2 SP1 (64 bit) Standard	• Windows XP Professional SP3, • Windows 2000 Professional SP4, • Windows Server 2003 SP2, • Windows Server 2003 R2 SP2
PC hardware requirements		
Processor type [1]		
• Minimum	Single-user station/server: Pentium 4, 2.5 GHz [2] Central Archive Server (V7.0 SP3): Pentium 4, 2.5 GHz Client: Pentium 3, 1 GHz [2] WebClient/DataMonitor Client: Pentium III, 600 MHz [2]	Single-user station/server: Pentium III, 1 GHz Central Archive Server: Pentium 4, 2 GHz Client: Pentium III, 600 MHz
• Recommended	Single-user station/server: Pentium 4 or Dual Core, 3 GHz [2] Central Archive Server (V7.0 SP3): Pentium 4 or Dual Core, 3 GHz Client: Pentium 4, 2 GHz [2] WebClient/DataMonitor Client: Pentium III, 1 GHz	Single-user station/server: Pentium 4, 2 GHz Central Archive Server: Pentium 4, 2.5 GHz Client: Pentium III, 1 GHz WebClient/DataMonitor Client: Pentium III, 1 GHz
RAM		
• Minimum	Single-user station/server: 4 GB [2] Central Archive Server: 4 GB Client: 1 GB [2] WebClient/DataMonitor Client: 512 MB [2]	Single-user station: 512 MB, server: 1 GB Central Archive Server: 1 GB Client: 512 MB WebClient/DataMonitor Client: 256 MB
• Recommended	Single-user station/server: 8 GB [2] Central Archive Server: ≥ 4 GB Client: 2 GB [2] WebClient/DataMonitor Client: 1 GB [2]	Single-user station: >= 1 GB, server: >1 GB Central Archive Server: ≥ 2 GB Client: 512 MB WebClient/DataMonitor Client: 512 MB
Graphics card		
• Minimum	16 MB, 800 x 600 [2]	16 MB, 800 x 600
• Recommended	32 MB, 1 280 x 1 024 [2]	32 MB, 1 280 x 1 024
Hard disk		
• Minimum	Single-user station/server: 80 GB Client: 20 GB Central Archive Server: 40 GB WebClient/DataMonitor Client: 5 GB	Single-user station/server: 20 GB Client: 5 GB Central Archive Server: 40 GB WebClient/DataMonitor Client: 5 GB
• Recommended	Single-user station/server: 160 GB Client: 40 GB Central Archive Server: 2 x 80 GB WebClient/DataMonitor Client: 10 GB	Single-user station/server: 80 GB Client: 20 GB Central Archive Server: 2 x 80 GB WebClient/DataMonitor Client: 10 GB
• Hard disk (available memory for installation)		
- Minimum	Server: >1.5 GB Client: 1.5 GB	Server: 1.5 GB Client: 1 GB
- Recommended	Server: >10 GB Client: >1.5 GB	Server: >10 GB Client: >1.5 GB
CD-ROM/DVD-ROM/ disk drive/ USB port	for software installation	for software installation

[1] An AMD system with comparable performance can also be used

[2] Hardware requirements when using Microsoft XP Professional

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Technical specifications (continued)

Type	SIMATIC WinCC
Functionality/quantity structure	
Number of messages	150 000
• Message text (number of characters)	10 x 256
• Message archive	> 500 000 messages [1]
• Process values per message	10
• Constant load of messages, max.	Central Archive Server: 100/sec Server/single-user station: 10/s
• Message burst, max.	Server/single-user station: 2 000/10 s every 5 min
Archives	
• Archive data points	Max. 120 000 per server [2]
• Archive types	Short-term archive with and without long-term archiving
• Data storage format	Microsoft SQL Server 2005
• Measured values per second, max.	Server/single-user station: 5 000/s
User archive	
• Archives and views	500 each
• Product consisting of data record and column per user archive	320 000
• Fields per user archive	500
Graphics system	
• Number of screens	System-limited [1]
• Number of objects per screen	System-limited [1]
• Number of controllable fields per screen	System-limited [1]
PowerTags	256 K [3]
Trends	
• Trend views per image	25
• Trends per trend view	80
User administration	
• User groups	128
• Number of users	128
• Authorization groups	999
Configuration languages	5 European (Eng., Fr., Ger., It., Sp.), 4 Asian (simpl.+trad. Chi/Kor/Jpn) [4]
Protocols	
• Message sequence reports (simultaneously)	1 per server/single-user station
• Message archive reports (simultaneously)	3
• User reports	System-limited [1]
• Report lines per group	66
• Variables per report	300 [5]
Multi-user system	
• Server	18
• Clients for server with operator station	4
• Clients for server without operator station	32 clients + 3 WebClients or 50 WebClients + 1 client

1) Dependent on the available storage space
2) Dependent on the number of licensed archive variables
3) Dependent on number of licensed PowerTags
4) Asian versions for Version 7 SP1 or higher
5) The number of variables per report is dependent on process communication performance

Ordering data

	Article No.
SIMATIC WinCC system software V7.2	
Runtime packages on DVD	
Language/script versions: DE/EN/FR/IT/ES; with license for	
• WinCC RT Client	**6AV6381-2CA07-2AX0**
• 128 PowerTags (RT 128)	**6AV6381-2BC07-2AX0**
• 512 PowerTags (RT 512)	**6AV6381-2BD07-2AX0**
• 2 048 PowerTags (RT 2048)	**6AV6381-2BE07-2AX0**
• 8 192 PowerTags (RT 8192)	**6AV6381-2BH07-2AX0**
• 65 536 PowerTags (RT 65536)	**6AV6381-2BF07-2AX0**
• 102 400 PowerTags (RT 102400)	**6AV6381-2BJ07-2AX0**
• 153 600 PowerTags (RT 153600)	**6AV6381-2BK07-2AX0**
• 262 144 PowerTags (RT 262144)	**6AV6381-2BL07-2AX0**
Including 512 archive tags each	
Complete packages on DVD	
Language versions: DE/EN/FR/IT/ES; with license for	
• WinCC RC Client	**6AV6381-2CB07-2AX0**
• 128 PowerTags (RC 128)	**6AV6381-2BM07-2AX0**
• 512 PowerTags (RC 512)	**6AV6381-2BN07-2AX0**
• 2 048 PowerTags (RC 2048)	**6AV6381-2BP07-2AX0**
• 8 192 PowerTags (RC 8192)	**6AV6381-2BS07-2AX0**
• 65 536 PowerTags (RC 65536)	**6AV6381-2BQ07-2AX0**
• 102 400 PowerTags (RC 102400)	**6AV6381-2BT07-2AX0**
• 153 600 PowerTags (RC 153600)	**6AV6381-2BU07-2AX0**
• 262 144 PowerTags (RC 262144)	**6AV6381-2BV07-2AX0**
SIMATIC WinCC system software V7.2 ASIA	
Runtime packages on DVD	
Language/script versions: EN, CHS, CHT, KOR, JPN; with license for	
• WinCC RT Client	**6AV6381-2CA07-2AV0**
• 128 PowerTags (RT 128)	**6AV6381-2BC07-2AV0**
• 512 PowerTags (RT 512)	**6AV6381-2BD07-2AV0**
• 2 048 PowerTags (RT 2048)	**6AV6381-2BE07-2AV0**
• 8 192 PowerTags (RT 8192)	**6AV6381-2BH07-2AV0**
• 65 536 PowerTags (RT 65536)	**6AV6381-2BF07-2AV0**
• 102 400 PowerTags (RT 102400)	**6AV6381-2BJ07-2AV0**
• 153 600 PowerTags (RT 153600)	**6AV6381-2BK07-2AV0**
• 262 144 PowerTags (RT 262144)	**6AV6381-2BL07-2AV0**
Including 512 archive tags each	
Complete packages on DVD	
Language versions: EN, CHS, CHT, KOR, JPN; with license for	
• WinCC RC Client	**6AV6381-2CB07-2AV0**
• 128 PowerTags (RC 128)	**6AV6381-2BM07-2AV0**
• 512 PowerTags (RC 512)	**6AV6381-2BN07-2AV0**
• 2 048 PowerTags (RC 2048)	**6AV6381-2BP07-2AV0**
• 8 192 PowerTags (RC 8192)	**6AV6381-2BS07-2AV0**
• 65 536 PowerTags (RC 65536)	**6AV6381-2BQ07-2AV0**
• 102 400 PowerTags (RC 102400)	**6AV6381-2BT07-2AV0**
• 153 600 PowerTags (RC 153600)	**6AV6381-2BU07-2AV0**
• 262 144 PowerTags (RC 262144)	**6AV6381-2BV07-2AV0**

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Ordering data	Article No.
SIMATIC WinCC V7.2 Powerpacks	
For upgrading from:	
Runtime packages	
• 128 to 512 PowerTags	**6AV6371-2BD07-2AX0**
• 512 to 2 048 PowerTags	**6AV6371-2BG07-2AX0**
• 2 048 to 8 192 PowerTags	**6AV6371-2BM07-2AX0**
• 8 192 to 65 536 PowerTags	**6AV6371-2BN07-2AX0**
• 65 536 to 102 400 PowerTags	**6AV6371-2BP07-2AX0**
• 102 400 to 153 600 PowerTags	**6AV6371-2BQ07-2AX0**
• 153 600 to 262 144 PowerTags	**6AV6371-2BR07-2AX0**
Complete packages	
• 128 to 512 PowerTags	**6AV6371-2BD17-2AX0**
• 512 to 2 048 PowerTags	**6AV6371-2BG17-2AX0**
• 2 048 to 8 192 PowerTags	**6AV6371-2BM17-2AX0**
• 8 192 to 65 536 PowerTags	**6AV6371-2BN17-2AX0**
• 65 536 to 102 400 PowerTags	**6AV6371-2BP17-2AX0**
• 102 400 to 153 600 PowerTags	**6AV6371-2BQ17-2AX0**
• 153 600 to 262 144 PowerTags	**6AV6371-2BR17-2AX0**
SIMATIC WinCC V7.2 archives	
• 1 500 archives	**6AV6371-1DQ17-2AX0**
• 5 000 archives	**6AV6371-1DQ17-2BX0**
• 10 000 archives	**6AV6371-1DQ17-2CX0**
• archives	**6AV6371-1DQ17-2EX0**
• 80 000 archives	**6AV6371-1DQ17-2GX0**
SIMATIC WinCC V7.2 Archive Powerpacks	
For upgrading archiving from	
• 1 500 to 5 000 archive tags	**6AV6371-1DQ17-2AB0**
• 5 000 to 10 000 archive tags	**6AV6371-1DQ17-2BC0**
• 10 000 to 30 000 archive tags	**6AV6371-1DQ17-2CE0**
• 30 000 to 80 000 archive tags	**6AV6371-1DQ17-2EG0**
SIMATIC WinCC Upgrade/Software Update Service	
SIMATIC WinCC V7.2 upgrade [1]	
For upgrading the RT version	
• from V6.2 to V7.2	**6AV6381-2AA07-2AX4**
• from V7.0 to V7.2	**6AV6381-2AA07-2AX3**
• from V6.2 ASIA to V7.2 ASIA	**6AV6381-2AA07-2AV4**
• from V7.0 ASIA to V7.2 ASIA	**6AV6381-2AA07-2AV3**
For upgrading the Client RT version	
• from V6.2 to V7.2	**6AV6381-2BC07-2AX4**
• from V7.0 to V7.2	**6AV6381-2BC07-2AX3**
• from V6.2 ASIA to V7.2 ASIA	**6AV6381-2BC07-2AV4**
• from V7.0 ASIA to V7.2 ASIA	**6AV6381-2BC07-2AV3**
For upgrading the RC version	
• from V6.2 to V7.2	**6AV6381-2AB07-2AX4**
• from V7.0 to V7.2	**6AV6381-2AB07-2AX3**
• from V6.2 ASIA to V7.2 ASIA	**6AV6381-2AB07-2AV4**
• from V7.0 ASIA to V7.2 ASIA	**6AV6381-2AB07-2AV3**
SIMATIC WinCC Software Update Service (SUS) [2] [3]	
SIMATIC WinCC V7 Update	
Software Update Service for WinCC basic software and options:	
• 1 license	**6AV6381-1AA00-0AX5**
• 3 licenses	**6AV6381-1AA00-0BX5**
• 10 licenses	**6AV6381-1AA00-0CX5**

	Article No.
SIMATIC WinCC system software V6.2 SP3	
Runtime packages on CD-ROM	
Language/script versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RT 128)	**6AV6381-1BC06-2AX0**
• 256 PowerTags (RT 256)	**6AV6381-1BD06-2AX0**
• 1 024 PowerTags (RT 1024)	**6AV6381-1BE06-2AX0**
• 8 192 PowerTags (RT 8192)	**6AV6381-1BH06-2AX0**
• 65 536 PowerTags (RT 65536)	**6AV6381-1BF06-2AX0**
• 102 400 PowerTags (RT 102400)	**6AV6381-1BJ06-2AX0**
• 153 600 PowerTags (RT 153600)	**6AV6381-1BK06-2AX0**
• 262 144 PowerTags (RT 262144)	**6AV6381-1BL06-2AX0**
Including 512 archive tags each	
Complete packages on CD-ROM	
Language versions: DE/EN/FR/IT/ES; with license for	
• 128 PowerTags (RC 128)	**6AV6381-1BM06-2AX0**
• 256 PowerTags (RC 256)	**6AV6381-1BN06-2AX0**
• 1 024 PowerTags (RC 1024)	**6AV6381-1BP06-2AX0**
• 8 192 PowerTags (RC 8192)	**6AV6381-1BS06-2AX0**
• 65 536 PowerTags (RC 65536)	**6AV6381-1BQ06-2AX0**
• 102 400 PowerTags (RC 102400)	**6AV6381-1BT06-2AX0**
• 153 600 PowerTags (RC 153600)	**6AV6381-1BU06-2AX0**
• 262 144 PowerTags (RC 262144)	**6AV6381-1BV06-2AX0**
• Including 512 archive tags each	
SIMATIC WinCC system software V6.2 SP3 ASIA	
Runtime packages on CD-ROM	
Language versions: English/simplified and traditional Chinese/Korean/Taiwanese/ Japanese; with license for	
• 128 PowerTags (RT 128)	**6AV6381-1BC06-2AV0**
• 256 PowerTags (RT 256)	**6AV6381-1BD06-2AV0**
• 1 024 PowerTags (RT 1024)	**6AV6381-1BE06-2AV0**
• 8 192 PowerTags (RT 8192)	**6AV6381-1BH06-2AV0**
• 65 536 PowerTags (RT 65536)	**6AV6381-1BF06-2AV0**
Including 512 archive tags each	
Complete packages on CD-ROM	
Language versions: English/simplified and traditional Chinese/Korean/Taiwanese, Japanese; with license for	
• 128 PowerTags (RC 128)	**6AV6381-1BM06-2AV0**
• 256 PowerTags (RC 256)	**6AV6381-1BN06-2AV0**
• 1 024 PowerTags (RC 1024)	**6AV6381-1BP06-2AV0**
• 8 192 PowerTags (RC 8192)	**6AV6381-1BS06-2AV0**
• 65 536 PowerTags (RC 65536)	**6AV6381-1BQ06-2AV0**
Including 512 archive tags each	

[1] According to licensing provisions, 1 upgrade package must be ordered for each WinCC station

[2] The Software Update Service is valid for 1 year. The contract is automatically extended by 1 more year unless canceled 3 months prior to expiration. According to licensing provisions, 1 Software Update Service must be ordered for each WinCC station.

[3] Requires the current software version

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Ordering data

	Article No.
SIMATIC WinCC V6.2 PowerPacks	
For upgrading from:	
Runtime packages	
• 128 to 256 PowerTags	**6AV6371-1BD06-2AX0**
• 128 to 1 024 PowerTags	**6AV6371-1BE06-2AX0**
• 128 to 8 192 PowerTags	**6AV6371-1BK06-2AX0**
• 128 to 65 536 PowerTags	**6AV6371-1BF06-2AX0**
• 256 to 1 024 PowerTags	**6AV6371-1BG06-2AX0**
• 256 to 8 192 PowerTags	**6AV6371-1BL06-2AX0**
• 256 to 65 536 PowerTags	**6AV6371-1BH06-2AX0**
• 1 024 to 8 192 PowerTags	**6AV6371-1BM06-2AX0**
• 1 024 to 65 536 PowerTags	**6AV6371-1BJ06-2AX0**
• 8 192 to 65 536 PowerTags	**6AV6371-1BN06-2AX0**
Complete packages	
• 128 to 256 PowerTags	**6AV6371-1BD16-2AX0**
• 128 to 1 024 PowerTags	**6AV6371-1BE16-2AX0**
• 128 to 8 192 PowerTags	**6AV6371-1BK16-2AX0**
• 128 to 65 536 PowerTags	**6AV6371-1BF16-2AX0**
• 256 to 1 024 PowerTags	**6AV6371-1BG16-2AX0**
• 256 to 8 192 PowerTags	**6AV6371-1BL16-2AX0**
• 256 to 65 536 PowerTags	**6AV6371-1BH16-2AX0**
• 1 024 to 8 192 PowerTags	**6AV6371-1BM16-2AX0**
• 1 024 to 65 536 PowerTags	**6AV6371-1BJ16-2AX0**
• 8 192 to 65 536 PowerTags	**6AV6371-1BN16-2AX0**

	Article No.
SIMATIC WinCC V6.2 Archive	
• 1 500 archives	**6AV6371-1DQ16-2AX0**
• 5 000 archives	**6AV6371-1DQ16-2BX0**
• 10 000 archives	**6AV6371-1DQ16-2CX0**
• 30 000 archives	**6AV6371-1DQ16-2EX0**
• 80 000 archives	**6AV6371-1DQ16-2GX0**
• 120 000 archives	**6AV6371-1DQ16-2JX0**
SIMATIC WinCC V6.2 Archive Powerpacks	
For upgrading archiving from	
• 1 500 to 5 000 archive tags	**6AV6371-1DQ16-2AB0**
• 5 000 to 10 000 archive tags	**6AV6371-1DQ16-2BC0**
• 10 000 to 30 000 archive tags	**6AV6371-1DQ16-2CE0**
• 30 000 to 80 000 archive tags	**6AV6371-1DQ16-2EG0**
• 80 000 to 120 000 archive tags	**6AV6371-1DQ16-2GJ0**
SIMATIC WinCC V6.2 upgrade [1]	
For upgrading the RT version	
• from V5.x to V6.2 SP3	**6AV6381-1AA06-2AX4**
• from V6.x to V6.2 SP3	**6AV6381-1AA06-2AX3**
• from V5.x ASIA to V6.2 SP3 ASIA	**6AV6381-1AA06-2AV4**
• from V6.x ASIA to V6.2 SP3 ASIA	**6AV6381-1AA06-2AV3**
For upgrading the RC version	
• from V5.x to V6.2 SP3	**6AV6381-1AB06-2AX4**
• from V6.x to V6.2 SP3	**6AV6381-1AB06-2AX3**
• from V5.x ASIA to V6.2 SP3 ASIA	**6AV6381-1AB06-2AV4**
• from V6.x ASIA to V6.2 SP3 ASIA	**6AV6381-1AB06-2AV3**

[1] According to licensing provisions,
1 upgrade package must be ordered for each WinCC station.

More information

WinCC language versions

SIMATIC WinCC is also offered in simplified Chinese, traditional Chinese, Korean and Japanese especially for Asian markets. These WinCC versions are intended for machine manufacturers, plant constructors and exporters who supply the regions of China, Taiwan, Korea and Japan.

WinCC ASIA includes all familiar WinCC functions and offers in addition the configuration user interface in the respective national language and English. The online help is available in simplified Chinese, traditional Chinese, Korean, Japanese and English. A Chinese, Korean, Japanese or multilingual Windows operating system is required for operation.

WinCC ASIA is delivered on a separate DVD which contains all of the above mentioned language versions. The corresponding documentation can be obtained from the national subsidiaries in China, Korea, Taiwan and Japan.

The runtime licenses are language-neutral. The English handling program (Automation License Manager – ALM) is executable under the Chinese, Korean and Japanese Windows versions.

In order to use the Asian languages in WinCC, an Asia hardware dongle is required.

Additional information is available on the Internet at:

http://www.siemens.com/wincc

Separate configurators are available for PC hardware:

- SIMATIC IPC547C
- SIMATIC IPC647C
- SIMATIC IPC847C
- SIMATIC IPC427C, SIMATIC IPC427D
- SIMATIC IPC627C
- SIMATIC Box PC 827C
- SIMATIC IPC477C, SIMATIC IPC477D
- SIMATIC HMI IPC577C
- SIMATIC HMI IPC677C

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C-PLUG

Overview



- Swap media that supports the fast and easy replacement of SIMATIC NET components without a programming device in the event of a fault
- For implementation in all SIMATIC NET products with C-PLUG slot
- For automatic backing up of configuration or engineering data from the SIMATIC NET components
- The C-PLUG can also be used to store application data such as documents or Web pages
- In some SIMATIC S7 CP modules, such as the CP 443-1 Advanced, the C-PLUG is a standard component of the scope of supply and is required to guarantee the complete functional scope of the respective component.

Benefits

get Designed for Industry

- Quick and easy replacement of SIMATIC NET components without the need to reconfigure the replacement part
- The device can be replaced without the need for specially trained personnel or a programming device or PC
- The downtime of network segments and connected Industrial Ethernet stations in the event of a fault is minimized.

Application

The C-PLUG is used when it is necessary for network components or communication modules to be replaced quickly and easily in the event of a fault without the need for reconfiguring the replacement part and without the need for special training.

Design

The C-PLUG has degree of protection IP20. The degree of protection of IP65 components is ensured by the design of the target device. The power supply is also provided by the end device.

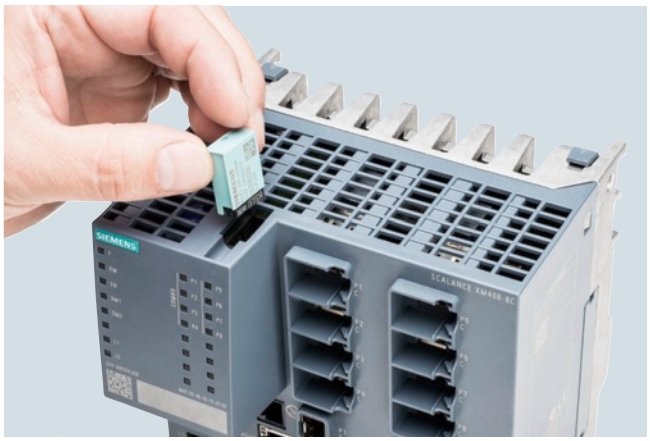
The C-PLUG is inserted in the associated slot of the SIMATIC NET component. The configuration data are automatically saved to the C-PLUG during device start-up and reconfiguring.

If a device needs to be replaced, the C-PLUG is simply removed from the failed component and plugged into the replacement device. The replacement device installed in the network or automation system now starts up automatically with the same device configuration as the failed device.

To prevent unintentional removal or falling out, the C-PLUG slot is usually located on the rear of the terminal devices.



Plugging the C-PLUG into the rear of the CP 443-1 Advanced



Plugging the C-PLUG into the SCALANCE XM408-8C switch

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Function

During start-up, the device automatically backs up the configuration data on an unwritten C-PLUG (delivery condition) that has been plugged into a SIMATIC NET component. Changes to the configuration during normal operation are also backed up on the C-PLUG without any additional operator intervention.

During start-up an unconfigured device automatically loads the configuration data from an inserted, written C-PLUG provided the data were written by a compatible device type.

Diagnostics

Incorrect C-PLUG handling, such as inserting a C-PLUG that contains the configuration of another device group or general malfunctions of the C-PLUG are signaled over the diagnostic mechanisms for the respective data terminal (LEDs, PROFINET, SNMP, Web-based Management, etc.).

Integration

Supported products

SCALANCE X Industrial Ethernet switches

- SCALANCE X-200
- SCALANCE X-300 (included in scope of supply)
- SCALANCE X-400 (included in scope of supply)
- SCALANCE X-500 (included in scope of supply)

SCALANCE S security modules

- SCALANCE S -600

Industrial Wireless LAN SCALANCE W

- W78x, W77x IWLAN Access Points
- W74x, W76x IWLAN Client Modules

SCALANCE M industrial modems and routers

- SCALANCE M81x
- SCALANCE M826
- SCALANCE M874

System connections for SIMATIC S7

- CP 443-1 Advanced (included in delivery)
- CP 343-1 Advanced (included in delivery)
- CP 343-1 ERPC (included in delivery)

Network transitions

- IE/PB Link PN IO
- IE/AS-i LINK PN IO
- DP/AS-i LINK Advanced

Technical specifications

Product-type designation	C-PLUG
Supply voltage	Via terminal device
Power loss	0.015 mW
Installation	Can be plugged into C-PLUG slot
Constructional design	
• Dimensions (W x H x D) in mm	24.3 x 17 x 8.1
• Weight	Approx. 5 g
Memory capacity	32 MB
Degree of protection	IP20

Ordering data

	Article No.
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with PLUG slot	**6GK1900-0AB00**

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Overview

Introduction



In many applications it is becoming increasingly important to synchronize the time in plants and systems. Only if all network stations are supplied cyclically with a reliable time frame from a central location can optimum process operation be ensured. This results in benefits for the plant operator such as increased operational reliability, the possibility of tracing system faults in a targeted manner, increased economic efficiency due to fewer production outages, and increased productivity in manufacture.

For this purpose, the SICLOCK product family offers a comprehensive range of optimally matched components for setting up highly reliable time synchronization systems.

Typical industries and fields of application for time synchronization systems are:

- Factory/process automation
- Power supply
- Building automation
- Transportation systems
- Safety engineering
- IT systems

The SICLOCK product range comprises the following product groups:

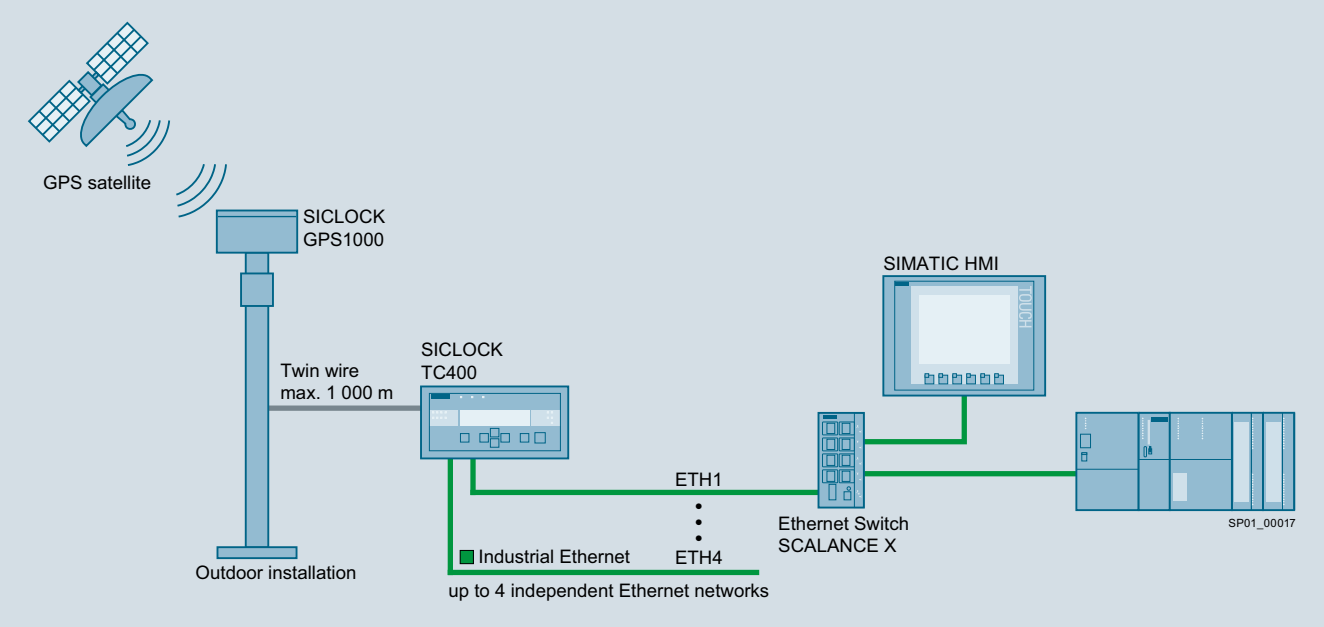
- Wireless receivers
- Central plant clocks
- Pulse converters
- Accessories

System description

Satellites or long-wave transmitters are used as primary time sources. The SICLOCK wireless receivers (e.g. SICLOCK GPS1000) receive these high-frequency signals and transmit the demodulated time signal to the central plant clock via a robust and interference-proof 2-wire connection.

The central plant clock converts the time signal into an Ethernet-based network frame (e.g. NTP, SIMATIC procedure) and thus provides all connected network stations with precise and uniform time information.

Furthermore, in the event of failure or loss of reception from the primary time source, the central plant clock ensures stable continuation of the clock time and tracking of the system time without time jumps as soon as reception is restored.



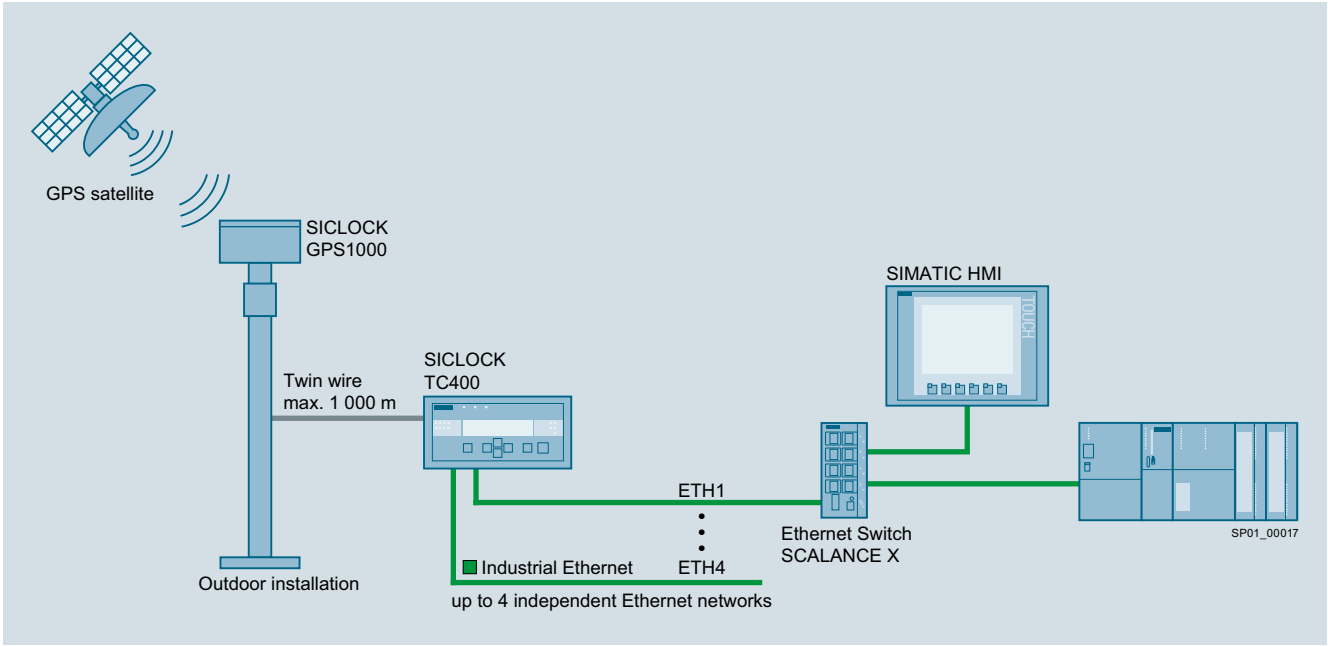
SICLOCK TC400 central plant clock with SICLOCK GPS1000 wireless receiver

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Application

Application examples

System with GPS reception



SICLOCK TC400 central plant clock with SICLOCK GPS1000 wireless receiver

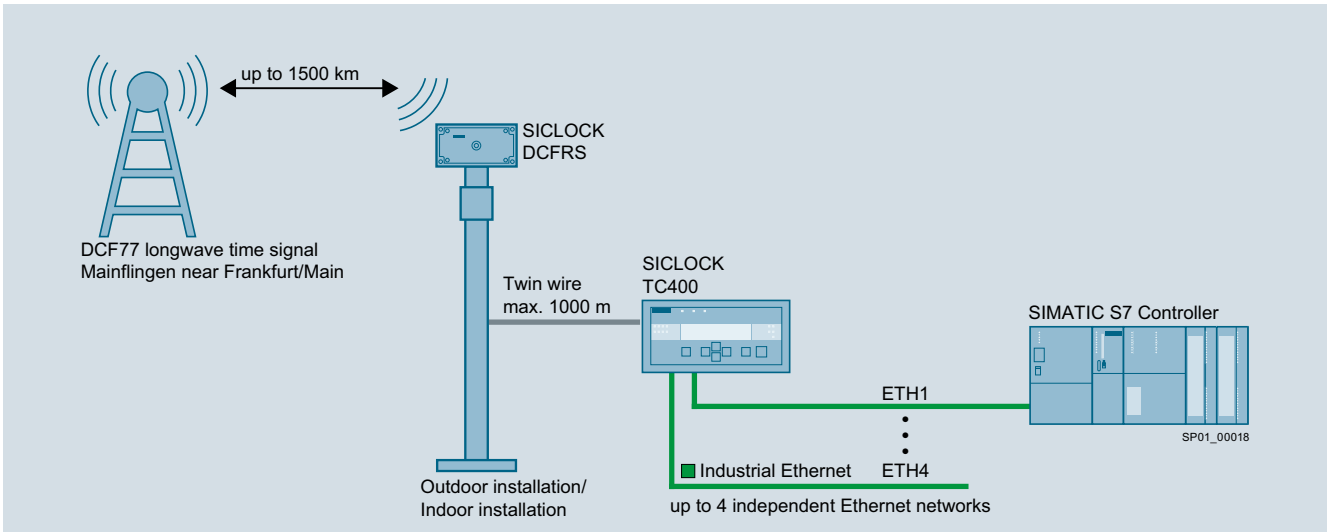
The SICLOCK GPS1000 wireless receiver (Article No. 2XV9450-1AR84) is used in this example. The wireless receiver is mounted outdoors with "visual contact" to the navigation satellites for optimum reception quality.

The line current method (TTY - 20 mA) used in the SICLOCK system permits distances of up to one kilometer between the wireless receiver and the central plant clock and also supplies the receiver with power, which eliminates the need for any additional power supply components. This makes it possible to install the central plant clock at a central location, even in plants spread over a very large area.

The SICLOCK TC400 central plant clock shown in the example features four 10/100 Mbit Ethernet interfaces for supplying up to four independent IP networks. The SICLOCK TC100 central plant clock with one Ethernet interface has been designed for smaller, cost-sensitive plants.

The central plant clocks do not have Ethernet switching functionality for safety reasons. SIMATIC NET SCALANCE X switches are recommended for this purpose, see http://support.automation.siemens.com/WW/view/en/18689247/133200.

System with DCF77 reception



SICLOCK TC400 central plant clock with SICLOCK DCFRS wireless receiver

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Application (continued)

As an alternative to receiving satellite signals, the DCF77 time signal transmitter can be used as primary time source. The transmitter is located near Frankfurt am Main and transmits longwave signals at a frequency of 77.5 kHz. Under normal conditions, reception is possible up to a distance of about 1 500 km from the transmitter.

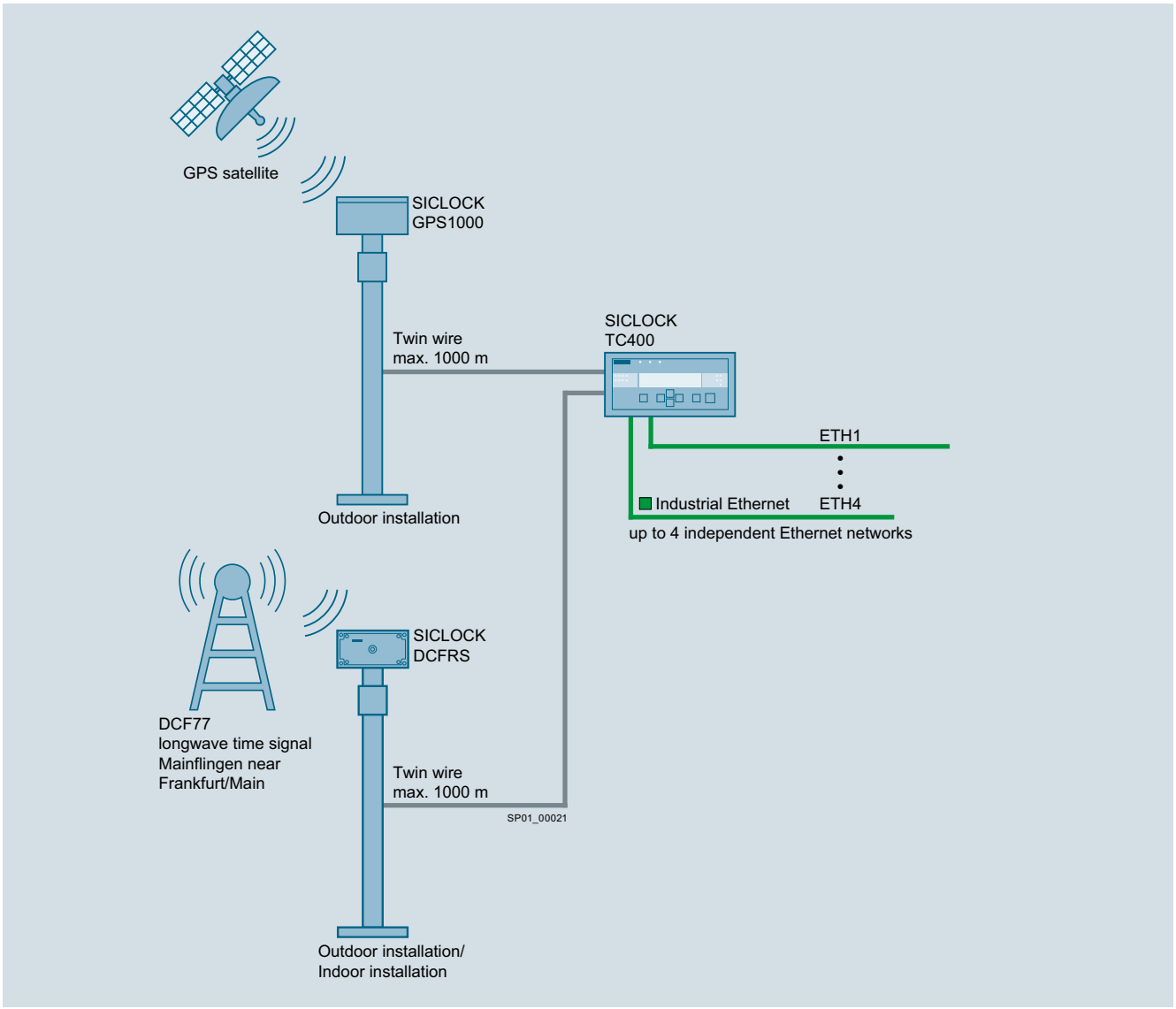
The SICLOCK DCFRS wireless receiver with TTY output (Article No. 2XV9450-1AR16) is used in this application. Here too, a separate power supply is not required if a SICLOCK TC100 or SICLOCK TC400 central plant clock is used.

The advantages over satellite reception are lower costs and the option of mounting the receiver inside a building. The last advantage is especially useful if outdoor installation is not advisable, e.g. due to vandalism.

Redundant modes

Due to the importance of having a reliable time supply in many demanding applications, the SICLOCK system offers optional redundant modes to further increase plant reliability. The redundancy can be on the reception side, the network side, or even be combined with a redundant central plant clock for highly sensitive applications.

Reception-side redundancy



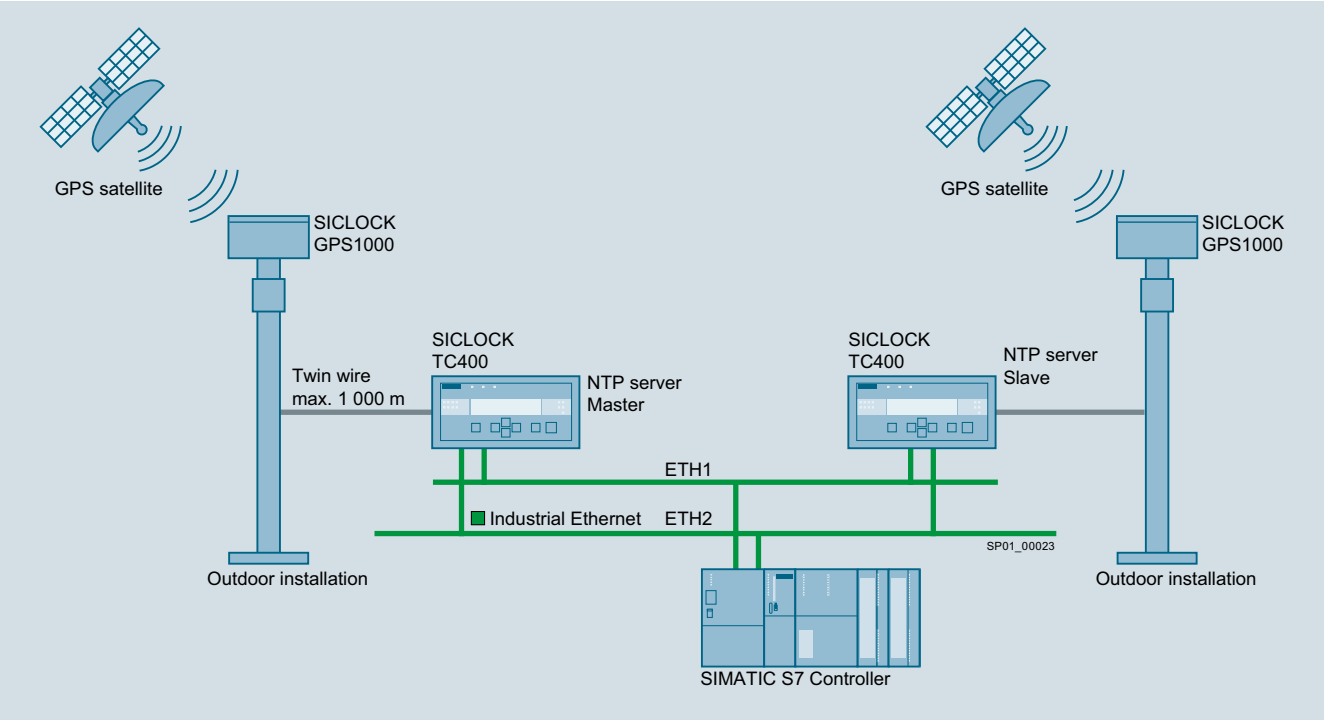
SICLOCK TC400 central plant clock with SICLOCK GPS1000 and SICLOCK DCFRS wireless receivers

In this application, SICLOCK GPS1000 and SICLOCK DCFRS wireless receivers are used in parallel. External time information can continue to be received even if one of the two primary time sources fails. The SICLOCK TC100 and SICLOCK TC400 central plant clocks each have two inputs for the wireless receivers.

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Application (continued)

Highly redundant system



SICLOCK TC400 central plant clocks with SICLOCK GPS1000 wireless receiver

This application can satisfy the highest redundancy requirements. The system uses two SICLOCK TC400 central plant clocks, each with separate SICLOCK GPS1000 wireless receivers

One central plant clock is parameterized as the NTP server master, the other as the NTP server slave. The NTP server slave takes over if the NTP master or the connected wireless receiver fails.

If SICLOCK GPS1000 wireless receivers are used, they should be mounted as far away from each other as possible so that the receiver with the better reception conditions can be used and, for example, to avoid damage to both receivers in the event of a lightning strike. Instead of using two GPS wireless receivers, one SICLOCK DCFRS wireless receiver can of course be used.

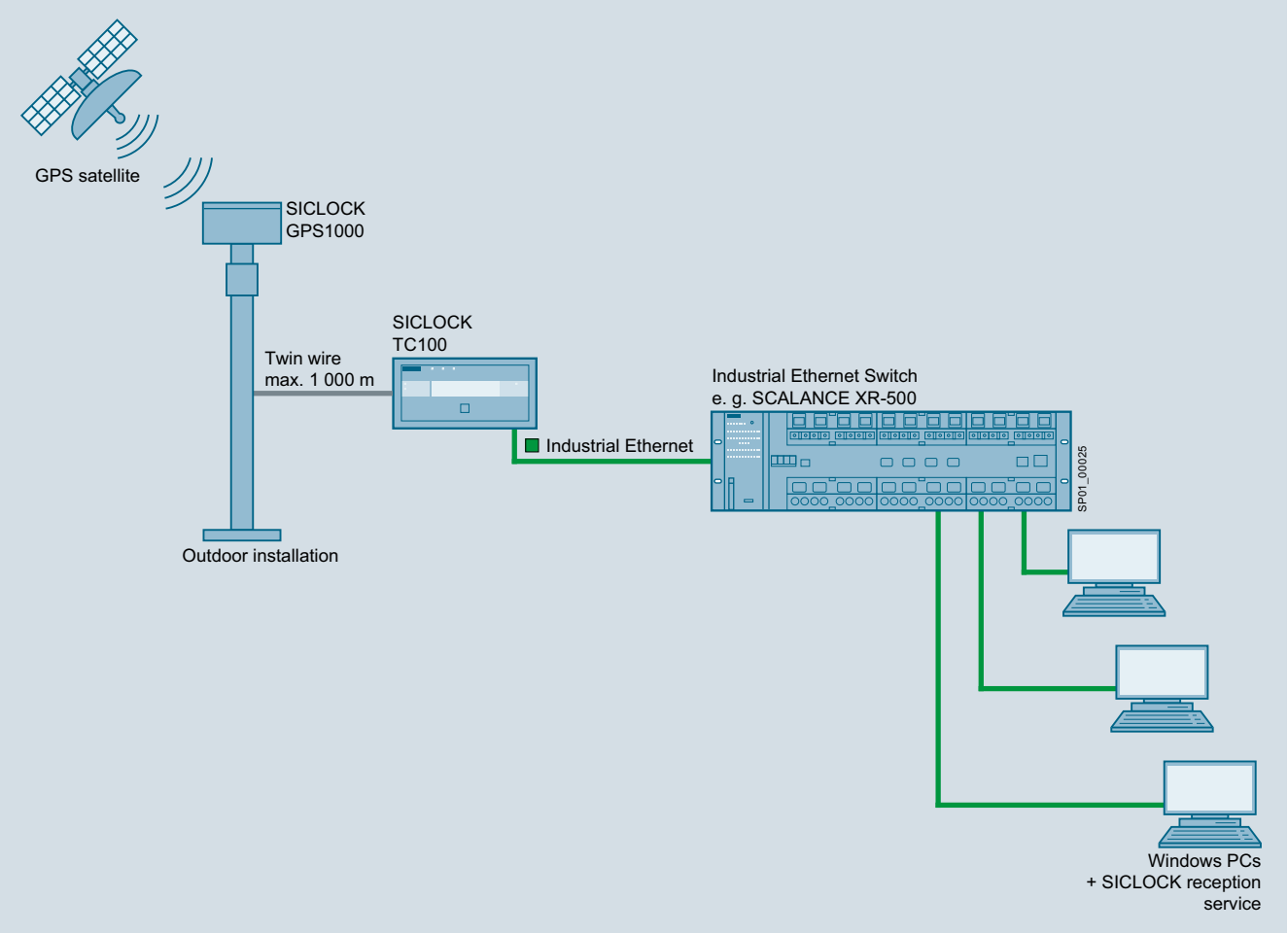
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Application (continued)

Synchronization of IT networks

IT network with a central plant clock



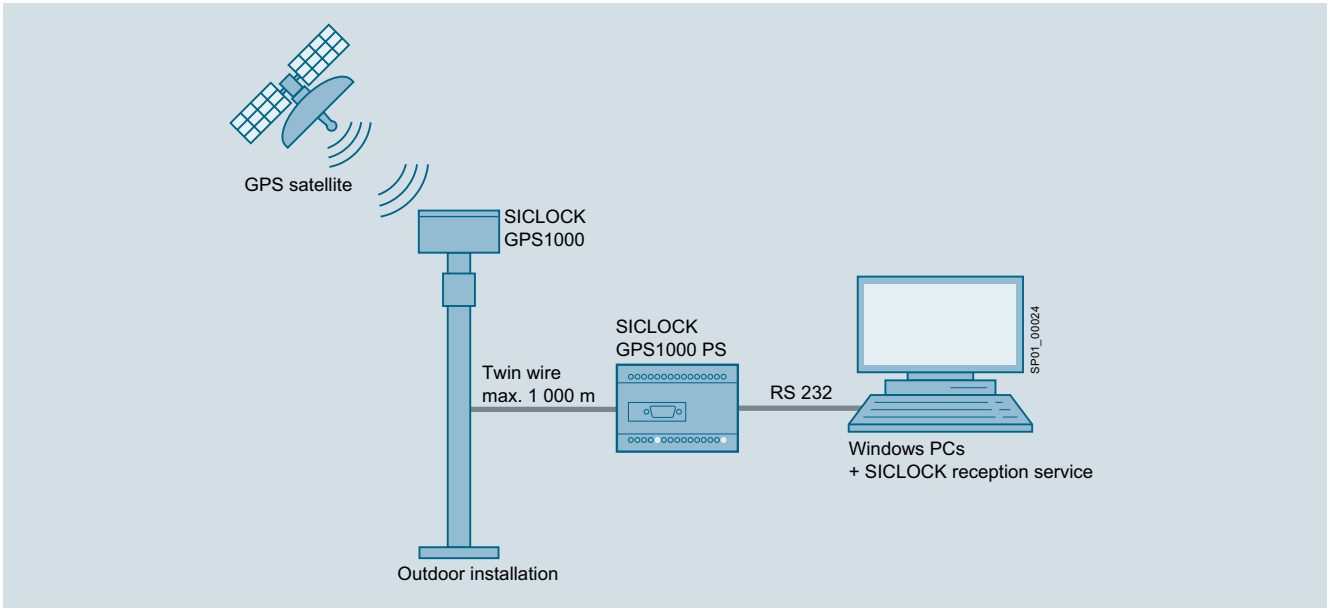
SICLOCK TC100 central plant clock with SICLOCK GPS1000 wireless receiver: Synchronization of IT systems (with failure protection)

This application can be used for the synchronization of a large number of IT devices. The cost-optimized SICLOCK TC100 central plant clock can be used if all the stations that have to be synchronized belong to the same IP subnet. A wide range of SCALANCE X Ethernet switches is available for selection according to the number of terminal devices to be synchronized; see http://support.automation.siemens.com/WW/view/en/18689247/133200.

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Application (continued)

Simple solution without failure protection for the direct supply of clock time to IT systems



SICLOCK GPS1000 PS pulse converter with SICLOCK GPS1000 wireless receiver, synchronization of IT systems (without failure protection)

Direct connection to an IT system can be considered in applications with low failure protection requirements.

All of the required components are included in the SICLOCK GPS1000 package (Article No. 2XV9450-1AR82). The scope of delivery includes the SICLOCK GPS1000 wireless receiver with antenna base, the SICLOCK GPS1000 PS pulse converter, and a receiving software that runs on Windows systems.

More information

For more information, go to

- www.siemens.com/siclock
- E-mail: siclock@siemens.com

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Overview



SICLOCK TC100 and SICLOCK TC400 central plant clocks

The central plant clocks evaluate the clock time data that was transmitted from the wireless receiver and generate diverse output signals in order to synchronize the connected I/O devices.

If the wireless receiver fails or signal transmission is interrupted, the central plant clocks switch over to their internal high-precision quartz system and thus ensure reliable tracking of the clock time. When the input signal is available again, the central plant clock adjusts any time differences that may have occurred without time jumps by means of "microsteps".

Inputs and outputs

The high-precision SICLOCK TC100 and SICLOCK TC400 central plant clocks have one (SICLOCK TC100) or two (SICLOCK TC400) inputs for connection to wireless receivers.

The central plant clocks have one (SICLOCK TC100) or four (SICLOCK TC400) independent 10/100 Mbit Ethernet interfaces.

The network stations are synchronized using the proven SNTP standard and by means of the SIMATIC procedure.

The SICLOCK central plant clocks have two relay outputs for signaling alarms or warnings.

Alternatively and/or in addition, two point-to-point connections TTY (20 mA current interface) or one RS 422 (5 V level) connection can be set up for the SICLOCK TC400 central plant clock.

Operation

Parameterization of the interfaces, setting of the signal types, redundancy modes, and read-out of the status messages stored in the device are conveniently implemented via the integrated web interface.

LEDs and a display indicate operating states and show any error messages, which can also be read out via the web interface.

Ordering data

	Article No.
Central plant clock	
A wireless receiver supplies the central plant clocks with time data; these then generate signals which are used to synchronize the connected I/O devices.	
• SICLOCK TC400 central plant clock, single device	**2XV9450-2AR01**
• SICLOCK TC100 central plant clock, single device	**2XV9450-2AR22**

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Overview



SICLOCK GPS1000 wireless receiver

The SICLOCK GPS1000 wireless receiver is designed to receive signals on the 1.575 GHz frequency from the GPS satellite system. The wireless receiver generates the time information (UTC – coordinated universal time) from this high frequency signal and converts it on the output side into the DCF77 time signal. The wireless receiver can be used all over the world.

The SICLOCK GPS1000 wireless receiver is designed for direct connection to SICLOCK TC100 and SICLOCK TC400 central plant clocks. The line current method used permits a distance of up to one kilometer between the wireless receiver and the central plant clock.

The antenna has to be installed outdoors for optimum reception of the satellite signals. The wireless receiver needs no parameter assignment or maintenance and, when used with SICLOCK TC100 or SICLOCK TC400 central plant clocks, is supplied by them with its operational energy.

The 2XV9450-1AR82 package is available for the direct synchronization of PCs. This package also includes the SICLOCK GPS1000 PS pulse converter for level conversion and the receiving software, which runs on PCs.

Ordering data

	Article No.
Wireless receivers	
SICLOCK GPS1000 package GPS radio clock for the time synchronization of PCs as well as programmable controllers via RS 232 interface; in industrial environments with high levels of interference; with distances up to 1000 m between the antenna and the device, package comprises • GPS1000 antenna head with antenna frame • GPS1000 power supply • Distribution socket • 5 m RS232 connecting cable • DCF77 receiving service for Windows	**2XV9450-1AR82**
SICLOCK GPS1000 GPS radio clock for the time synchronization of PCs, programmable controllers, as well as the SICLOCK TC100 and SICLOCK TC400 central plant clocks; Single device incl. installation material	**2XV9450-1AR84**

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Overview



SICLOCK DCFRS wireless receiver (without antenna base)

SICLOCK DCFRS wireless receivers receive signals from the DCF77 time signal transmitter. The DCF77 transmitter is located in Mainflingen near Frankfurt am Main and transmits long-wave signals at a frequency of 77.5 kHz. Under good reception conditions, signals can be received within a radius of up to 1 500 km of the transmitter location.

Unlike devices that receive signals from satellites, the SICLOCK DCFRS can also be used inside buildings. SICLOCK DCF77 wireless receivers output the demodulated DCF77 time signal.

SICLOCK DCF77 wireless receivers are available in two versions:

- SICLOCK DCFRS with TTY interface (20 mA current interface) for direct connection to central plant clocks
- SICLOCK DCFRS with RS 232 signal level for connection to PCs

Note:

We recommend the software DCF77 receiving service (Article No. 2XV9450-1AR28) if the RS 232 version is used, see "Accessories". Parameter assignment is not necessary for both receiver versions.

Ordering data

	Article No.
Wireless receivers	
SICLOCK DCFRS DCF radio clock for the time synchronization of PCs and programmable controllers • Active DCF77 antenna with TTY output (20 mA line current) spare part	**2XV9450-1AR16**
SICLOCK DCFRS DCF radio clock for the time synchronization of individual PCs over short distances, package comprises • Active DCF77 antenna with RS 232 interface and mounting bracket • 20 m connecting cable, mounted	**2XV9450-1AR06**
SICLOCK DCFRS DCF radio clock for the time synchronization of individual PCs over short distances, package comprises • Active DCF77 antenna with RS 232 interface and mounting bracket • 20 m connecting cable, mounted • DCF77 receiving service for Windows	**2XV9450-1AR14**
SICLOCK DCFRS DCF radio clock for the time synchronization of PCs and programmable controllers package comprises • Active DCF77 antenna with TTY output (20 mA line current) and antenna frame • TTY/RS 232 converter • Plug-in power supply • Two distribution sockets • 1 m connecting cable mounted, extendable to 1000 m • DCF77 receiving service for Windows	**2XV9450-1AR21**

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Overview

The pulse converter is available in three versions:

- SICLOCK PCON
- SICLOCK EOPC
- SICLOCK GPS1000 PS



SICLOCK GPS1000 PS, SICLOCK PCON and SICLOCK EOPC pulse converters

SICLOCK PCON pulse converter

The SICLOCK PCON is a single-channel, electrical-optical pulse converter. It enables electrical and optical time frames and pulses to be distributed.

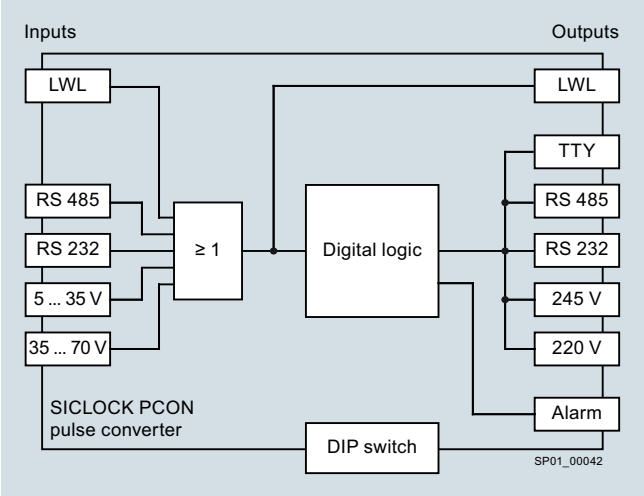
The device has three inputs for electrical signals (RS 422, RS 232, etc.), one optical input, as well as five electrical outputs and one optical output. By using fiber-optic cables, longer distances can be bridged with very high interference immunity.

The SICLOCK PCON pulse converter can be operated in two modes:

- In transparent mode, the input signal is output at all outputs without any change.
- In pulse mode, an edge change at the input triggers a pulse with parameterizable length at all outputs.

The device is easily parameterized by means of DIP switches located directly on the device.

Inputs X1	Outputs X2
RS 422 (non-isolated)	RS 422 (non-isolated)
RS 232 (non-isolated)	RS 232 (non-isolated)
Pulse input 5 ... 35 V or 5 ... 70 V	Pulse output 24 V (non-isolated)
	Pulse output 24 ... 220 V (isolated)
FOC	FOC
BFOC connection system	BFOC connection system
	TTY 20 mA current interface



SICLOCK PCON pulse converter (functional diagram)

SICLOCK EOPC pulse converter

The SICLOCK EOPC is an electrical-optical converter and hub. It features two electrical inputs, which can be alternatively used, and transfers these signals at its 32 fiber-optic outputs. This pulse converter is therefore the ideal choice for applications with numerous nodes with optical pulse interface which have to be synchronized.

Inputs X1	Outputs
TTY 20 mA current interface	32 x BFOC 62.5/125 µm
Pulse input 10 ... 65 V	

SICLOCK GPS1000 PS pulse converter

The SICLOCK GPS1000 PS pulse converter is always used when a SICLOCK wireless receiver is used as stand-alone unit, i.e. without a central plant clock. It fulfills two main functions:

- On the one hand, the pulse converter is used as an energy source for SICLOCK wireless receivers.
- On the other hand, the device is used as a level converter.

The time signal received at input 11/12 is output as RS 232 level at the Sub-D interface X3.

Inputs	Outputs
TTY 20 mA current interface to the wireless receiver	9-pole Sub-D RS 232 level
	TTY 20 mA current interface
	TTY-inverted 20 mA current interface

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Ordering data	Article No.
Pulse converters	
SICLOCK PCON Single-channel, electrical-optical pulse converter for industrial applications, 820 nm, 24 ... 230 V AC/DC, with multimode fiber optic connection	**2XV9450-1AR63-1SA3**
SICLOCK EOPC Electrical-optical pulse converter for industrial applications with 32 fiber-optic cable outlets for transparent operation and pulse mode, 24 ... 110 V DC	**2XV9450-1AR72**
SICLOCK GPS1000 power supply 230 V	**2XV9450-1AR85-0AA2**

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Overview

Software

For less complex applications, the wireless receivers can even be operated without central plant clocks.

Two software packages are available for such applications to process the time information on Windows computers or in a SIMATIC PLC.

- 2XV9450-1AR28: SICLOCK DCF77 receiving service software for Windows XP, Windows Vista, Windows 7, Windows Server 2003/2008/2008 R2
- 2XV9450-1AR32: SICLOCK DCF77 receiving service software for SIMATIC S7-300 and S7-400

Lightning protection

The 2XV9450-1AR83 lightning protection element is integrated by default into the connecting cable downstream of the wireless receiver and protects the components connected to it against overvoltage caused by lightning strikes.

Mounting hardware

For easy installation in 19" rack units, a 2XV9450-2AR81 mounting frame for two SICLOCK TC100 and/or SICLOCK TC400 central plant clocks each is available.

Ordering data

	Article No.
Accessories	
Software	
• Receiving service software for Windows	**2XV9450-1AR28**
• Receiving service software for SIMATIC	**2XV9450-1AR32**
Lightning protection for antenna cable Lightning protection for TTY connection cable for SICLOCK GPS1000 or SICLOCK DCFRS wireless receivers	**2XV9450-1AR83**
Mounting frame for SICLOCK TC100 and SICLOCK TC400 central plant clocks	**2XV9450-2AR81**

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Overview



SIMATIC PCS 7 automation systems in various designs:
Modular S7-400 systems as well as embedded systems (mEC and Microbox system)

Automation systems are available in three different designs for the SIMATIC PCS 7 process control system. The automation performance can therefore be finely scaled within wide limits.

The automation systems offered can be classified as follows:

- Modular systems of the S7-400 series with hardware controller in the versions "Standard", "High availability" and "Safety-related"
  - AS 410 automation systems
  - Complementary S7-400 systems
- Embedded systems with software controller
  - mEC automation system
  - Microbox automation system

Application

Automation system with APL	AS 412H	AS 414-3	AS 414-3IE	AS 414H	AS 416-2	AS 416-3	AS 416-3IE	AS 416H	AS 417-4	AS 417H	AS RTX	AS mEC
	AS 410											
Analog value measurements	10	50	100	100	200	400	400	400	500	600	300	300
Digital value measurements	20	160	250	250	450	800	800	800	1 000	1 000	600	600
PID controls	5	35	50	50	75	150	150	150	180	200	200	200
Motors	7	40	75	75	100	200	200	200	350	400	150	150
Valves	7	40	75	75	100	200	200	200	350	400	250	250
SFC	0	15	15	15	40	100	100	100	200	200	100	100
Steps	0	150	150	150	400	1 000	1 000	1 000	2 000	2 000	800	800
Dosing	0	3	3	3	15	25	25	25	50	50	50	50
Digital inputs DI	30	200	350	300	600	1 200	1 200	1 200	1 700	1 800	1 200	1 200
Digital outputs DO	10	60	100	110	200	400	400	400	550	650	400	400
Analog inputs AI	15	100	175	150	300	600	600	600	800	900	600	600
Analog outputs AO	5	30	75	50	100	200	200	200	250	350	200	200
Process objects (PO)	30	200	350	350	600	1 200	1 200	1 200	1 800	2 000	1 200	1 200

Typical mixed configuration limits for SIMATIC PCS 7 automation systems, based on the SIMATIC PCS 7 Advanced Process Library (APL)

Note:

The values quoted here are not AS-specific maximum values for the particular item. Instead, they represent a typical distribution of the available total capacity of the AS during mixed operation of all the items of a contiguous block.

The number of process objects is not an absolute value, but depends on the library used as well as on the number and type of blocks used in the application.

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Application (continued)

Modular automation systems of the S7-400 range

The rugged automation systems of the S7-400 series are suitable for universal use. They are characterized by high processing and communication performance. The product range offered differs with regard to the area of application as follows:

- **AS 410 automation systems**
  - Preferred systems for new plants with SIMATIC PCS 7 V8.0
  - Suitable for SIMATIC PCS 7 as of V8.0+SP1, including hardware upgrade package (HUP CPU 410-5H)
  - Performance of the general purpose CPU scalable based on the number of process objects

AS type	Features
Standard systems, high availability and safety-related systems	
AS 410S/H/F/FH	CPU 410-5H Process Automation (1 x or 2 x) Interfaces: 1 x PN/IE (2 ports), 1 x DP

- **Complementary S7-400 systems**
  - Can be used in plants with SIMATIC PCS 7 V8.0, V7.1, or V7.0
  - As an alternative to AS 410, primarily in systems with SIMATIC PCS 7 V7.0/V7.1
  - Scalable based on types of CPU differing in performance

AS type	Features
Standard systems	
AS 414-3	Standard CPU, interfaces: 1 x MPI/DP, 1 x DP, 1 x DP module can be optionally inserted
AS 414-3IE	Standard CPU, interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP module can be optionally inserted
AS 416-2	Standard CPU, interfaces: 1 x MPI/DP, 1 x DP
AS 416-3	Standard CPU, interfaces: 1 x MPI/DP, 1 x DP, 1 x DP module can be optionally inserted
AS 416-3IE	Standard CPU, interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP module can be optionally inserted
AS 417-4	Standard CPU, interfaces: 1 x MPI/DP, 1 x DP, 2 x DP module can be optionally inserted
High availability and safety-related systems	
AS 412H/F/FH	H-CPU (1 x or 2 x), interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP
AS 414H/F/FH	H-CPU (1 x or 2 x), interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP
AS 416H/F/FH	H-CPU (1 x or 2 x), interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP
AS 417H/F/FH	H-CPU (1 x or 2 x), interfaces: 1 x PN/IE (2 ports), 1 x MPI/DP, 1 x DP

Embedded automation systems

The SIMATIC PCS 7 AS mEC RTX and SIMATIC PCS 7 AS RTX embedded automation systems are low-price, compact systems for the lower and medium performance ranges. They are particularly suitable for small applications, especially at plant level and as OEM products, e.g. in package units.

Both systems have exceptional physical properties, but differ with regard to design and expandability.

- SIMATIC PCS 7 AS mEC RTX
  - S7-300 design
  - Centrally expandable with up to 8 S7-300 I/O modules
  - PROFINET IO interface for connection to ET 200M distributed remote I/O stations
- SIMATIC PCS 7 AS RTX
  - Microbox design
  - Routing-capable PROFIBUS DP interface for connecting ET 200M, ET 200iSP, ET 200S and ET 200pro distributed remote I/O stations and intelligent field and process devices to PROFIBUS DP/PA

More information

Catalog information

- For detailed information and ordering data for AS 410 automation systems, refer to the following catalog section "Modular AS 410 systems".
- For information and ordering data for AS 412 to AS 417 automation systems (standard systems, high availability and safety-related systems), see "Complementary S7-400 systems" in the following.
- For detailed information and ordering data for the SIMATIC PCS 7 AS mEC RTX automation system, see the section "Embedded systems", "mEC automation system" below.
- For detailed information and ordering data for the SIMATIC PCS 7 AS RTX automation system, see the section "Embedded systems", "Microbox automation system" below.

Online configurators

Selected SIMATIC S7-400 components are combined as "AS bundles" according to the task involved for the modular SIMATIC PCS 7 automation systems. Configurators in the Industry Mall (www.siemens.com/industrymall) help you to assemble the AS bundles:

- Online configurators for AS 410 automation systems
  - SIMATIC PCS 7 AS 410 Single Station configurator
  - SIMATIC PCS 7 AS 410 Redundancy Station configurator
- Online configurators for complementary S7-400 systems
  - SIMATIC PCS 7 AS Single Station configurator
  - SIMATIC PCS 7 AS Redundancy Station configurator

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Overview

With the rugged all-round system AS 410, the SIMATIC PCS 7 process control system for the first time offers an exclusive automation system from the SIMATIC S7-400 series, which can be used in all domains due to its versatility. For specific requirements, you can configure it as a:

- Standard AS 410S automation system
- Fault-tolerant AS 410H automation system
- Safety-related AS 410F/FH automation system

With its high-performance hardware and optimized V8.0 firmware, the innovative CPU 410-5H Process Automation of the AS 410 covers the entire spectrum of conventional AS 412 to AS 417 automation systems. Its automation performance can be flexibly scaled based on the number of SIMATIC PCS 7 process objects (PO).

System expansion cards are available for

- 100 PO
- 500 PO
- 1 000 PO
- 1 600 PO
- ≥ 2 000 PO (PO 2k+)

The type reduction to a single CPU offers numerous advantages. It significantly simplifies selection and configuration of the automation system as well as spare part inventory and plant expansion.

Note:

The configuration of the CPU 410-5H Process Automation of the AS 410 and the loading of the user blocks is only possible with SIMATIC PCS 7 engineering software as of V8.0+SP1 (including hardware upgrade package HUP CPU 410-5H) .

Design

Similar to all SIMATIC PCS 7 automation systems of the S7-400 series, AS 410 automation systems are available as "AS bundles" as follows:

- Individual components bundled per system in one delivery
- Pre-assembled and tested complete systems (no extra charge compared to delivery of individual components)

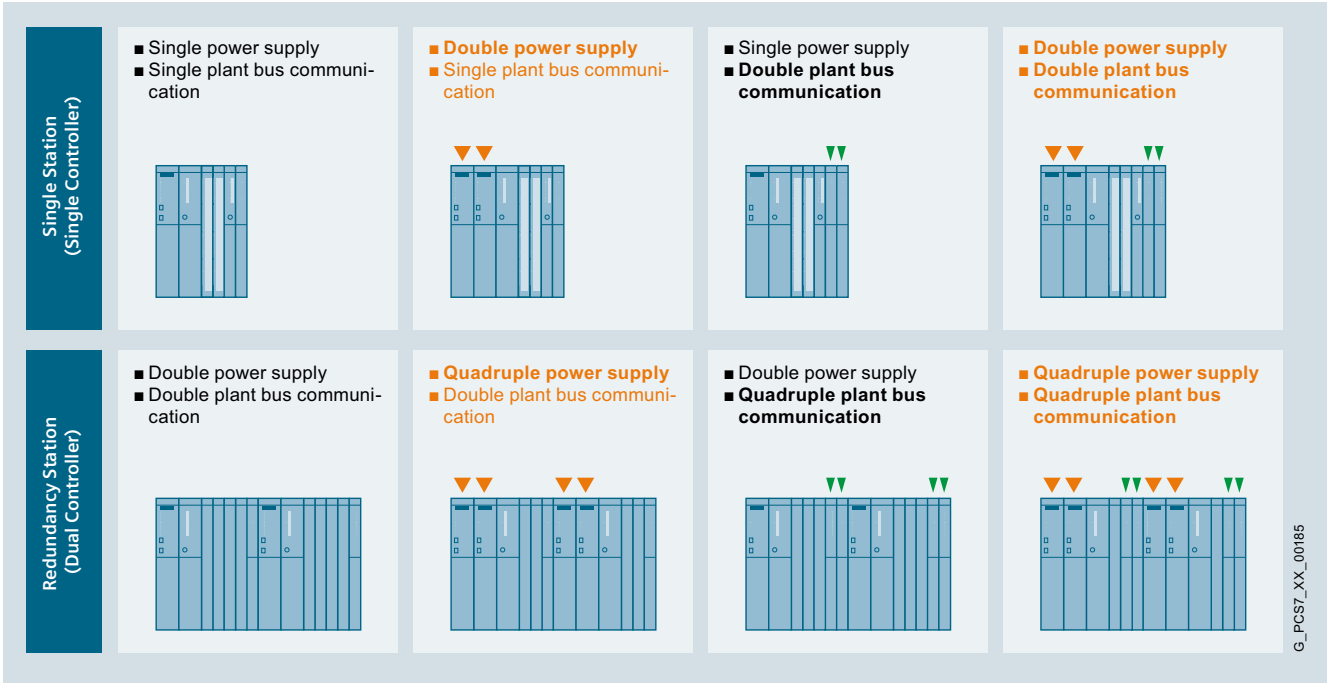
With a SIMATIC PCS 7 Industry Library Runtime license and a SIMATIC PCS 7 AS Runtime license, the AS bundles are equipped for 100 process objects (PO). Building on this, the number of process objects can be increased with cumulative AS Runtime licenses for 100, 1 000 or 10 000 POs.

The configuration of the AS bundles and their article numbers can be defined by selecting pre-configured ordering units. System-specific ordering configurations are available in tabular form for this purpose in the sections "Standard automation systems", "Fault-tolerant automation systems" and "Safety-related automation systems".

For interactive configuration of AS bundles, two online configurators are also available in the Industry Mall (www.siemens.com/industrymall):

- SIMATIC PCS 7 AS 410 Single Station configurator
- SIMATIC PCS 7 AS 410 Redundancy Station configurator

Flexible and scalable availability



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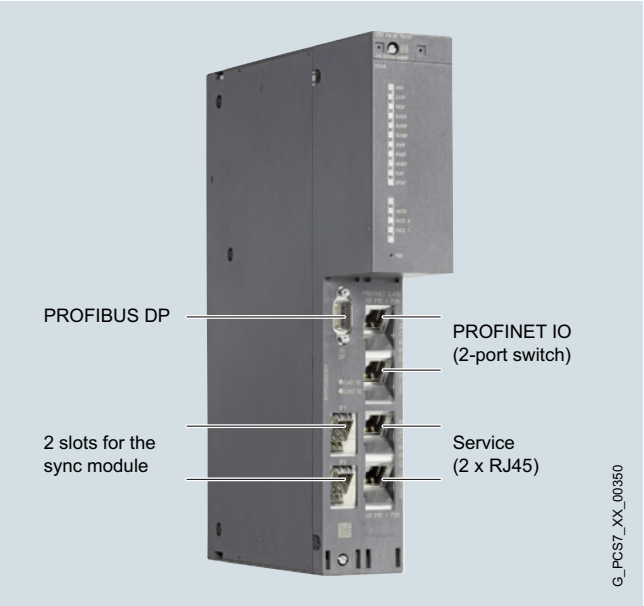
Design (continued)

A particular characteristic of the modular S7-400 systems is the flexible and scalable availability of various components.

For a SIMATIC PCS 7 AS Single Station of the AS 410 type, you have the option of specifically increasing the availability by implementing a redundant configuration of the power supply or the Industrial Ethernet communications module, and combining these measures.

Even the AS Redundancy Station of the AS 410 type with its redundant CPUs offers significantly higher availability. It operates according to the 1oo2 principle, in which a switch is made from the active subsystem to the standby system in the event of a fault. Starting from here, you can double the power supply or the Industrial Ethernet communications module for each subsystem, and combine these measures.

CPU 410-5H Process Automation



CPU 410-5H Process Automation

The CPU 410-5H Process Automation is the heart of standard automation systems, as well as the fault-tolerant and safety-related AS 410 automation systems. Expansion cards for 100 PO, 500 PO, 1 000 PO, 1 600 PO and ≥ 2 000 PO (PO 2k+) can be used to increase their performance in a user-defined manner to up to approximately 2 600 PO.

As shown in the figure, CPU 410-5H Process Automation is equipped with a PROFINET IO interface (2-port switch) for up to 250 I/O devices and a PROFIBUS DP interface for up to 96 PROFIBUS DP slaves. Two integrated slots allow the synchronization of two redundant subsystems via sync modules and sync cables (FOC).

CPU 410-5H Process Automation supports NTP as well as S7 time synchronization.

Other features include:

- Integrated 48 MB load memory and 16 MB RAM each for program and data
- Cycle time up to 10 ms/9 process tasks
- Total number of I/Os (on PROFIBUS DP and PROFINET IO) approx. 7 500 (16 KB each for inputs and outputs)
- Additional protection of the circuit board with coating (conformal coating)
- High-precision time stamping
- Recessed RESET button
- Preset hardware parameters (PCS 7 skinning)

For detailed information about CPU 410-5H Process Automation, see "Technical specifications".

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level fieldbus (PROFIBUS PA or FOUNDATION Fieldbus H1). For details on this, see sections "PROFIBUS DP", "PROFIBUS PA" and "FOUNDATION Fieldbus H1" in the "Communication" chapter.

PROFIBUS DP segments with distributed process I/O can be operated on a PROFIBUS DP interface in the CPU and on additive CP 443-5 Extended (conformal coating) PROFIBUS DP interfaces. You can configure up to 4 individual or redundant CP 443-5 Extended PROFIBUS DP interfaces (conformal coating) for an automation system using the configurators for SIMATIC PCS 7 automation systems in the Industry Mall as well as in the catalog sections "Standard automation systems", "Fault-tolerant automation systems" and "Safety-related automation systems".

You can additionally implement further PROFIBUS interfaces using separately ordered CP 443-5 Extended PROFIBUS DP interfaces (conformal coating). According to the manual, up to 10 CP 443-5 Extended interfaces (conformal coating) can be operated in one automation system.

I/O connection via PROFINET IO

You can easily and efficiently connect AS 410 automation systems to remote I/O stations via the PROFINET IO interface integrated in the CPU 410-5H Process Automation, for example, to remote ET 200M I/O stations (see also the "PROFINET" section in the "Communication" chapter). PROFINET IO interfaces made available by additive communication modules of the CP 443-1 type (conformal coating) cannot be used.

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Technical specifications

CPU 410-5H Process Automation	
General information	
Firmware version	V8.0
Engineering with	SIMATIC PCS 7 V8.0+SP1 + HUP CPU 410-5H
Degree of protection	IP20
Version	Conformal coating
Power supply	
Supply voltage	5 V DC from SV system
Input current	
• From backplane bus, 5 V DC max.	1.7 A
• From interface 5 V DC, max.	90 mA
Power loss, typical	7.5 W
Memory	
RAM	
• For program	16 MB
• For data	16 MB
Load memory, integrated	48 MB
Buffering with battery	Yes, all data
CPU performance	
Clock	450 MHz (multiprocessor system)
Average processing time of APL typicals	Approx. 110 µs
PCS 7 process objects, can be set with system expansion card	Up to approx. 2 600
Process tasks	
Cyclic interrupts (can be set from 10 ms to 5 s)	9
I/O	
Total number of I/Os	Approx. 7 500 (16 KB inputs/outputs)
Number of I/Os per DP interface	Approx. 3 800 (8 KB inputs/outputs)
Number of I/Os per PN interface	Approx. 3 800 (8 KB inputs/outputs)

CPU 410-5H Process Automation	
Communication	
Number of S7 connections	120
Alarm_8P	10 000 (max. 80 000 messages)
Interfaces	
• X1: PROFIBUS DP	1 x up to 12 Mbps, 9-pin Sub-D socket
• X5: PROFINET IO with 2 ports	2 x 10/100 Mbps, RJ45
• X8: Service	2 x RJ45
• IF1: Sync module slot (redundant systems)	Sync module 1
• IF2: Sync module slot (redundant systems)	Sync module 2
Electromagnetic compatibility (EMC)	
Emission of radio interference acc. to EN 55011	Limit class A, for use in industrial areas
Climatic conditions	
Temperature	
• Operation	0 ... 60 °C
Relative humidity	
• Operation	0 to 95%, without condensation
Standards, specifications, approvals	
CE mark	Yes
cULus	Yes
CSA approval	Yes
FM approval	Yes
ATEX approval	Yes
Dimensions and weights	
Dimensions (W x H x D in mm)	50 x 290 x 219
Weight	approx. 1.1 kg

Accessories

Backup batteries

Lithium backup batteries of type AA with 2.3 Ah are used in the power supply modules of all SIMATIC PCS 7 automation systems of the S7-400 range (AS bundles). Since lithium batteries are easily inflammable, more rigorous transport and storage regulations apply to them.

To avoid subjecting the AS bundles to these more rigorous transport and storage regulations, the backup batteries must be ordered and delivered separately (order no. 6ES7971-0BA00).

The following backup batteries are required depending on the configuration of the AS bundles:

- SIMATIC PCS 7 AS Single Station with
  - 1 power supply module: 2 units
  - 2 redundant power supply modules: 4 units
- SIMATIC PCS 7 AS Redundancy Station with
  - 2 power supply modules: 4 units
  - 2 x 2 redundant power supply modules: 8 units

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Overview



Standard AS 410S automation system

The AS 410S modular standard automation systems are suitable for general use. These are always your first choice if high availability through redundancy and safety-related functions are not relevant for the application.

In the range from 100 to approx. 2 600 PO, their performance can be customized to meet the task at hand using expansion cards (for more information, see the previous section of the catalog "Modular S7-400 systems").

An AS 410S is also the base system for a fault-tolerant (AS 410H) or a safety-related automation system (AS 410F, AS 410FH). Your decision for the AS 410S is therefore not final, you can remain flexible. If the task changes, the automation system can be used differently at any time and the target system can be expanded accordingly.

Design

Individual configuration of AS bundles

The equipment of the standard automation systems as well as their article numbers can be individually compiled by selecting pre-configured ordering units.

Typical combinations can be selected from tables in the section "Ordering data". The complete range is available to you via the SIMATIC PCS 7 AS 410 Single Station online configurator in the Industry Mall (www.siemens.com/industrymall).

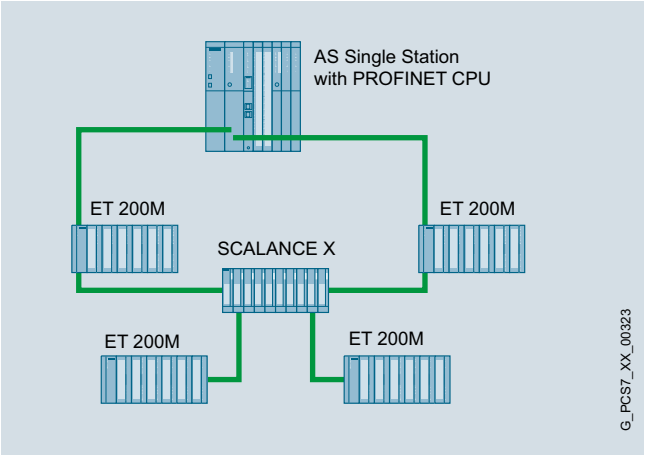
I/O connection via PROFIBUS DP

Several PROFIBUS DP segments with distributed process I/Os can be operated on one standard automation system.
A PROFIBUS DP interface is already integrated in the CPU 410-5H Process Automation. Using the configurator in the Industry Mall or in the selection and ordering data, up to four more PROFIBUS DP interfaces can be configured via additional CP 443-5 PROFIBUS DP interfaces (conformal coating).

I/O connection via PROFINET IO

Standard automation systems AS 410S can only be connected to remote I/O stations, for example, ET 200M remote I/O stations via the PROFINET interface (2-port switch) integrated in CPU 410-5H Process Automation (see also chapter "Communications", section "PROFINET").

The availability of the I/O devices can be increased by a ring topology with media redundancy (MRP). If the transmission link in the ring is interrupted at a given location, for example, due to a break in the ring cable or the failure of a station, the redundancy manager, e.g. the CPU, immediately activates the alternative communication path.



Example for PROFINET IO communication with media redundancy

Industrial Ethernet (IE) plant bus communication

If the PROFINET interface integrated in the CPU is not used for PROFINET IO, it can also be used for the connection to the Industrial Ethernet plant bus. Otherwise, the AS 410S standard automation system can be connected to the Industrial Ethernet plant bus via a CP 443-1 (conformal coating) communication module. The availability of the plant bus communication can be increased with a second communication module.

Redundant power supply

If you have two separate power supply networks for your plant, you can increase the availability of the AS 410S standard automation systems by using two redundant power supplies.

Runtime licenses

With a SIMATIC PCS 7 Industry Library Runtime license and a SIMATIC PCS 7 AS Runtime license, the AS bundle is equipped for 100 process objects (PO). The number of process objects can be extended by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1 000) of additional Runtime licenses are irrelevant with regard to the implementable quantity framework.

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Ordering data

	Article No.									
AS 410S CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	**6ES7654-**	■	**C**	■	**0**	■	**-**	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**5**								
• Pre-assembled and tested		**6**								
System expansion card										
• System expansion card 100 PO				**J**						
• System expansion card 500 PO				**L**						
• System expansion card 1 000 PO				**N**						
• System expansion card 1 600 PO				**P**						
• System expansion card PO 2k+ (≥ 2 000)				**Q**						
Additive Industrial Ethernet interfaces[1]										
• Without CP 443-1					**0**					
• 1 x CP 443-1 (conformal coating)					**3**					
• 2 x CP 443-1 (conformal coating)					**4**					
Racks										
• UR2 (9 slots), aluminum[1]							**3**			
• UR2 (9 slots), steel[1]							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC, redundant								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces[1]										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended (conformal coating)									**1**	
• 2 x CP 443-5 Extended (conformal coating)									**2**	
• 3 x CP 443-5 Extended (conformal coating)									**3**	
• 4 x CP 443-5 Extended (conformal coating)									**4**	

[1] Up to 5 CPs (Industrial Ethernet/PROFIBUS) can be plugged into the UR2 rack with a single power supply, or up to 3 with a redundant power supply.

Individual components

	Article No.
Individual components for AS 410S standard automation systems	
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	**6ES7410-5HX08-0AB0**
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	**6ES7654-5CJ00-0XF0**
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	**6ES7654-5CL00-0XF0**
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	**6ES7654-5CN00-0XF0**
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	**6ES7654-5CP00-0XF0**
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	**6ES7654-5CQ00-0XF0**
SIMATIC NET CP 443-1 (conformal coating) Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO, and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	**6GK7443-1EX30-0XE1**
SIMATIC NET CP 443-5 Extended (conformal coating) Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamping, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE1**

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Ordering data	Article No.
Individual components for AS 410S standard automation systems	
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A, redundant** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA0**
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	**6ES7407-0RA02-0AA0**
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A, redundant** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA0**
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, • module occupies 2 slots	**6ES7405-0RA02-0AA0**
Backup battery Type AA, 2.3 Ah	**6ES7971-0BA00**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2, 9 slots	**6ES7400-1JA11-0AA0**
Steel rack	
• UR1, 18 slots	**6ES7400-1TA01-0AA0**
• UR2, 9 slots	**6ES7400-1JA01-0AA0**

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 PO	**6ES7653-2BA00-0XB5**
- 1 000 PO	**6ES7653-2BB00-0XB5**
- 10 000 PO	**6ES7653-2BC00-0XB5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 PO	**6ES7653-2BA00-0XH5**
- 1 000 PO	**6ES7653-2BB00-0XH5**
- 10 000 PO	**6ES7653-2BC00-0XH5**

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Overview



Redundancy Station AS 410H

Fault-tolerant automation systems are used to reduce the risk of production failures. The higher investment costs for fault-tolerant automation systems are frequently negligible compared to the costs resulting from production failures. The higher the costs of a production failure, the more worthwhile it is to use a fault-tolerant system.

The SIMATIC PCS 7 fault-tolerant automation systems can be used on their own in a plant configuration, or together with standard and safety-related automation systems.

Design

The AS 410H, which consists of two redundant, galvanically isolated subsystems, can be mounted on a UR2-H compact rack with a split backplane bus or on two separate racks (UR1 or UR2). The configuration in two racks has the advantage that the redundant subsystems are spatially separated (for example, by a fire-proof wall) and can be located far apart from each other. Depending on the sync modules used, distances from 10 m to 10 km are possible between the two subsystems. As a result of the electrical isolation, the system is also resistant to EMC interference.

Individual configuration of AS bundles

The equipment of the high availability automation systems as well as their article numbers can be individually defined by selecting pre-configured ordering units.

Typical combinations can be selected from tables in the section "Ordering data". The complete range for selection is available via the SIMATIC PCS 7 AS 410 Redundancy Station online configurator in the Industry Mall (www.siemens.com/industrymall).

Ordering information:

- For an AS 410H redundant configuration based on two AS Single Stations (AS 410S), you additionally require 4 sync modules (up to 10 m or up to 10 km) and 2 fiber-optic sync cables. The selection depends on the distance between the two AS Single Stations.
- FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level field-bus (PROFIBUS PA or FOUNDATION Fieldbus H1).

Several PROFIBUS DP segments with distributed process I/Os can be operated on an AS 410H high availability automation system. A PROFIBUS DP interface is integrated in each of the two CPUs 410-5H Process Automation. Using the online configurator in the Industry Mall or in the selection and ordering data, up to four more PROFIBUS DP interfaces can be configured for each redundant subsystem with add-on CP 443-5 PROFIBUS DP interfaces (conformal coating).

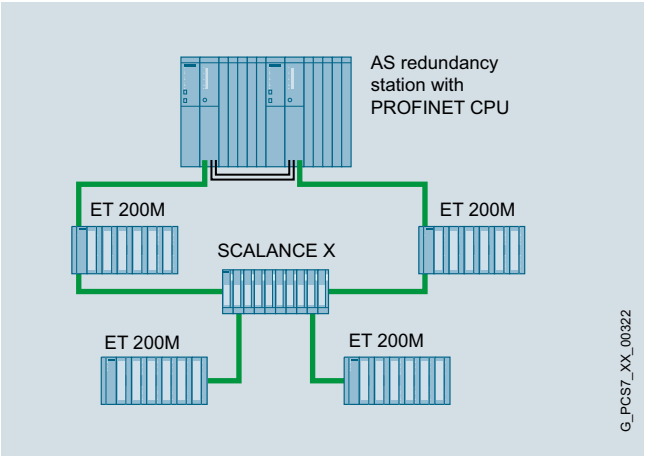
With redundant PROFIBUS DP lines, the process I/Os can be connected to an AS 410H as follows:

- ET 200M remote I/Os stations with two IM 153-2 High Feature interface modules on a special bus module
- ET 200iSP remote I/Os stations with two IM 152-1 on a special terminal module
- Field devices on the PROFIBUS PA over a PA link to two redundant IM 153-2 High Feature interface modules
- Field devices on the FOUNDATION Fieldbus H1 via an FF link with two redundant IM 153-2 FF interface modules
- Non-redundant PROFIBUS DP devices, e.g. ET 200S or ET 200pro remote I/O stations per Y-Link

I/O connection via PROFINET IO

High availability AS 410H automation systems can be connected via PROFINET IO with remote I/O stations, for example, ET 200M remote I/O stations. Only the PROFINET interfaces integrated in the CPUs can be used for this on the automation system.

The maximum availability with minimum error reaction times is achieved by the AS 410H when used in conjunction with system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication in which each I/O device establishes a communication link to each of the two CPUs of an AS 410H over the topological network. Then, the failure of a CPU does not automatically lead to failure of the connected I/O devices.



PROFINET IO communication with system redundancy

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Design (continued)

Communication via the Industrial Ethernet (IE) plant bus

If the PROFINET interface integrated in the CPUs of the AS 410H is not used for PROFINET IO, it can also be used for the connection to the Industrial Ethernet plant bus. Otherwise, the two subsystems of the AS 410H can be connected to the plant bus using one CP 443-1 communication module (conformal coating) each.

The plant bus can be implemented in the form of a ring structure, which can also be configured with redundant architecture if the availability requirements are high. When there are two redundant rings it makes sense to use two communications processors in each case and to distribute their connections between the two rings (4-way connection). Double faults such as failure of the switch on ring 1 with simultaneous interruption of the bus cable on ring 2 can thus be tolerated.

Runtime licenses

With SIMATIC PCS 7 Industry Library Runtime and the SIMATIC PCS 7 AS Runtime license, the automation systems are equipped with 100 process objects (PO) on delivery. The number of process objects can be extended by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1 000) of additional Runtime licenses are irrelevant.

Ordering data

	Article No.										
AS 410H (Redundancy Station) 2 x CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	**6ES7656-**	■	**C**	■	■	■	**-**	■	■	**F**	■
Type of delivery											
• Individual components, not pre-assembled		**5**									
• Pre-assembled and tested		**6**									
System expansion card											
• 2 x System expansion card 100 POs				**J**							
• 2 x System expansion card 500 POs				**L**							
• 2 x System expansion card 1 000 POs				**N**							
• 2 x System expansion card 1 600 POs				**P**							
• 2 x System expansion card PO 2k+ (≥ 2 000)				**Q**							
Sync modules and cables											
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					**3**						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					**4**						
Additive Industrial Ethernet interfaces[1]											
• Without CP 443-1						**0**					
• 2 x 1 CP 443-1 (conformal coating)						**3**					
• 2 x 2 CP 443-1 (conformal coating)						**4**					
Racks											
• 1 x UR2-H (2 x 9 slots), aluminum[1]							**1**				
• 1 x UR2-H (2 x 9 slots), steel[1]							**2**				
• 2 x UR2 (9 slots), aluminum[1]							**3**				
• 2 x UR2 (9 slots), steel[1]							**4**				
Power supply (without backup batteries)											
• 2 x PS 407, 10 A for 120/230 V AC/DC								**B**			
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**			
• 2 x PS 407, 20 A for 120/230 V AC/DC								**D**			
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC, redundant								**E**			
• 2 x PS 405, 10 A for 24 V DC								**G**			
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								**H**			
• 2 x PS 405, 20 A for 24 V DC								**J**			
• 2 x 2 PS 405, 10 A for 24 V DC, redundant								**K**			
Additive PROFIBUS DP interfaces[1]											
• Without CP 443-5 Extended										**0**	
• 2 x 1 CP 443-5 Extended (conformal coating)										**1**	
• 2 x 2 CP 443-5 Extended (conformal coating)										**2**	
• 2 x 3 CP 443-5 Extended (conformal coating)										**3**	
• 2 x 4 CP 443-5 Extended (conformal coating)										**4**	

[1] In configurations with UR2/UR2-H racks, up to 5 CPs (Industrial Ethernet/PROFIBUS) can be configured with a single power supply, or up to 3 CPs for each subsystem with a redundant power supply.

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Ordering data

Individual components

	Article No.
Individual components of the fault-tolerant SIMATIC PCS 7 AS 410H automation systems	
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	**6ES7410-5HX08-0AB0**
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	**6ES7654-5CJ00-0XF0**
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	**6ES7654-5CL00-0XF0**
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	**6ES7654-5CN00-0XF0**
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	**6ES7654-5CP00-0XF0**
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	**6ES7654-5CQ00-0XF0**
Sync set For coupling two redundant CPUs; for distances up to	
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	**6ES7656-7XX30-0XE0**
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	**6ES7656-7XX40-0XE0**
Sync module For coupling two redundant CPUs; 2 modules required for each CPU; for distances up to	
• 10 m	**6ES7960-1AA06-0XA0**
• 10 km	**6ES7960-1AB06-0XA0**
Sync cable (fiber-optic cable) For connecting two redundant CPUs, 2 cables required for each redundant automation system	
• 1 m	**6ES7960-1AA04-5AA0**
• 2 m	**6ES7960-1AA04-5BA0**
• 10 m	**6ES7960-1AA04-5KA0**
Other lengths	On request

	Article No.
SIMATIC NET CP 443-1 (conformal coating) Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	**6GK7443-1EX30-0XE1**
SIMATIC NET CP 443-5 Extended (conformal coating) Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE1**
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A, redundant** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA0**
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	**6ES7407-0RA02-0AA0**
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A, redundant** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA0**
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	**6ES7405-0RA02-0AA0**
Backup battery Type AA, 2.3 Ah	**6ES7971-0BA00**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2, 9 slots	**6ES7400-1JA11-0AA0**
• UR2-H, for divided central controllers; 2 x 9 slots	**6ES7400-2JA10-0AA0**
Steel rack	
• UR1, 18 slots	**6ES7400-1TA01-0AA0**
• UR2, 9 slots	**6ES7400-1JA01-0AA0**
• UR2-H, for divided central controllers; 2 x 9 slots	**6ES7400-2JA00-0AA0**

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Ordering data

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 PO	**6ES7653-2BA00-0XB5**
- 1 000 PO	**6ES7653-2BB00-0XB5**
- 10 000 PO	**6ES7653-2BC00-0XB5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 PO	**6ES7653-2BA00-0XH5**
- 1 000 PO	**6ES7653-2BB00-0XH5**
- 10 000 PO	**6ES7653-2BC00-0XH5**
Y-Link	
Y-Link For connection of devices with only 1 PROFIBUS DP interface to a redundant automation system	**6ES7197-1LA11-0XA0**

Options

Y-Link

- Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system
- For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system

The Y-link comprises:

- Two IM 153-2 High Feature interface modules for extended temperature range
- One Y coupler including RS 485 repeater
- One BM IM157 (IM/IM) bus module for two IM 153-2 High Feature modules, for extended temperature range
- One BM Y coupler bus module

Evaluation of the Y-Link diagnostics (and hence indirectly of the connected DP standard slaves) is supported by driver blocks.

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Overview



AS Single Station AS 410F

Safety-related automation systems are used for critical applications where a fault could endanger life or result in damage to the plant or the environment. These F/FH systems also referred to as "fail-safe automation systems" detect both faults in the process and their own internal faults in association with the safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus. They automatically transfer the plant to a safe state in the event of a fault.

Design

The PROFIsafe profile allows safety-related communication between the automation system (controller) and the process I/O via both PROFIBUS and PROFINET. The decision for choosing either PROFINET IO or the PROFIBUS DP/PA fieldbuses has a significant influence on the architecture of the safety-related system.

For information on the safety-related design versions with PROFIBUS DP/PA and PROFINET IO, refer to the section "Introduction" in the "Safety Integrated for Process Automation" chapter.

The safety-related SIMATIC PCS 7 automation systems are based either on the hardware of the AS 410S standard automation system (F systems) or the hardware of the AS 410H high availability automation system (FH systems), which have been supplemented with safety functions using S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Station AS 410F**
  with only one CPU (safety-related)
- **AS Redundancy Station AS 410FH**
  with two redundant CPUs (safety-related and high availability)

The availability can be flexibly increased with a redundant design for the power supply or the Industrial Ethernet communications module (for details, see the section "Modular S7-400 systems" under "Flexible and scalable availability").

All AS 410F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

In these systems with multitasking capability, several programs can be executed simultaneously in one CPU – basic process control (BPCS) applications or also safety-related applications. The programs are reaction-free, i.e. faults in BPCS applications have no effect on safety-related applications, and vice versa. Special tasks with very short response times can also be implemented.

The redundant FH systems operating according to the 1-out-of-2 principle consist of two subsystems of identical design. These are electrically isolated from each other to achieve optimum EMC, and are synchronized with each other via fiber-optic cables. A bumpless switchover is made from the active subsystem to the standby subsystem in the event of a fault. The two subsystems can be present in the same rack or separated by up to 10 km. The spatial separation provides additional security in the case of extreme influences in the environment of the active subsystem, e.g. resulting from a fire.

The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

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Design (continued)

Individual configuration of AS bundles

The configuration of the safety-related automation systems and their article numbers can be defined by selecting pre-configured ordering units.

Typical combinations for the respective system can be selected using tables in the section "Ordering data". These are divided into:

- AS Single Station AS 410F with one CPU
- AS Redundancy Station AS 410FH with two redundant CPUs, mounted on one common rack (UR2-H) or two separate racks (UR2)

The complete range for selection is available using two correspondingly structured online configurators in the Industry Mall (www.siemens.com/industrymall):

- SIMATIC PCS 7 AS 410 Single Station configurator
- SIMATIC PCS 7 AS 410 Redundancy Station configurator

System expansion cards including an S7 F systems Runtime license should be selected here for safety-related AS 410 F/FH automation systems.

FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

The components suitable for engineering the safety-related applications can be ordered in the section "Safety Integrated for Process Automation":

- S7 F Systems
  F programming tool with F block library for programming safety-related user programs on the engineering system
- SIMATIC Safety Matrix
  Convenient safety lifecycle tool for configuration, operation and servicing

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level PROFIBUS PA fieldbus. Several PROFIBUS DP segments with distributed process I/Os can be operated on an AS 410F/FH automation system.

A PROFIBUS DP interface is already integrated in each CPU 410-5H Process Automation. Using the online configurator in the Industry Mall or in the selection and ordering data, up to four additional PROFIBUS DP interfaces can be configured with additive CP 443-5 PROFIBUS DP interfaces (conformal coating) for each AS 410F as well as for each subsystem of the AS 410FH.

Connection of the process I/Os to two redundant PROFIBUS DP lines of an FH system (AS Redundancy Station) is carried out as described in the section "High availability automation systems".

The FOUNDATION Fieldbus (FF) H1 and the FF devices are not supported by Safety Integrated for Process Automation.

I/O connection via PROFINET IO

Safety-related AS 410F/FH automation systems can be connected via PROFINET IO with remote I/O stations, for example, ET 200M remote I/O stations. Only the PROFINET interface (2-port switch) integrated in the CPU can be used for this on the automation system. For additional information, refer to section "Introduction" in the "Safety Integrated for Process Automation" chapter.

Communication over the plant bus

If the PROFINET interface integrated in the CPU of the safety-related automation systems is not used for PROFINET IO, it is available for connection to the Industrial Ethernet plant bus. Otherwise, the AS 410F and the two subsystems of the AS 410FH can be connected to the plant bus via one CP 443-1 (conformal coating) communication module each.

The plant bus can be implemented in the form of a ring structure, which can also be configured with redundant architecture if the availability requirements are high. When there are two redundant rings, it makes sense to use two communication modules per AS (AS 410F) or AS subsystem (AS 410FH) and to distribute their connections over the two rings (4-way connection).
Double faults such as failure of the switch on ring 1 with simultaneous interruption of the bus cable on ring 2 can thus be tolerated.

Runtime licenses

In the factory state, safety-related automation systems come with a SIMATIC PCS 7 AS Runtime license for 100 process objects (PO), SIMATIC PCS 7 Industry Library Runtime and the S7 F systems RT license. The 100 POs of the SIMATIC PCS 7 AS Runtime license can be expanded by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1 000) of additional Runtime licenses are irrelevant.

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Ordering data

	Article No.									
AS 410F (Single Station) CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	**6ES7654-**	■	**C**	■	**0**	■	**-**	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**5**								
• Pre-assembled and tested		**6**								
System expansion card										
• System expansion card 100 PO including S7 F systems Runtime license				**A**						
• System expansion card 500 PO including S7 F systems Runtime license				**C**						
• System expansion card 1 000 PO including S7 F systems Runtime license				**E**						
• System expansion card 1 600 PO including S7 F systems Runtime license				**F**						
• System expansion card PO 2k+ (≥ 2 000) including S7 F systems Runtime license				**G**						
Additive Industrial Ethernet interfaces[1]										
• Without CP 443-1					**0**					
• 1 x CP 443-1 (conformal coating)					**3**					
• 2 x CP 443-1 (conformal coating)					**4**					
Racks										
• UR2 (9 slots), aluminum[1]							**3**			
• UR2 (9 slots), steel[1]							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC, redundant								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC, redundant								**K**		
Additive PROFIBUS DP interfaces[1]										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended (conformal coating)									**1**	
• 2 x CP 443-5 Extended (conformal coating)									**2**	
• 3 x CP 443-5 Extended (conformal coating)									**3**	
• 4 x CP 443-5 Extended (conformal coating)									**4**	

[1] Up to 5 CPs (Industrial Ethernet/PROFIBUS) can be pluggedinto the UR2 rack with a single power supply, or up to 3 with a redundant power supply.

	Article No.									
AS 410FH (Redundancy Station) 2 x CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	**6ES7656-**	■	**C**	■	■	**-**	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**5**								
• Pre-assembled and tested		**6**								
System expansion card										
• 2 x system expansion card 100 PO including S7 F systems Runtime license			**A**							
• 2 x system expansion card 500 PO including S7 F systems Runtime license			**C**							
• 2 x system expansion card 1 000 PO including S7 F systems Runtime license			**E**							
• 2 x system expansion card 1 600 PO including S7 F systems Runtime license			**F**							
• 2 x system expansion card PO 2k+ (≥ 2 000) including S7 F systems Runtime license			**G**							
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m				**3**						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing				**4**						
Additive Industrial Ethernet interfaces[1]										
• Without CP 443-1					**0**					
• 2 x 1 CP 443-1 (conformal coating)					**3**					
• 2 x 2 CP 443-1 (conformal coating)					**4**					
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum[1]						**1**				
• 1 x UR2-H (2 x 9 slots), steel[1]						**2**				
• 2 x UR2 (9 slots), aluminum[1]						**3**				
• 2 x UR2 (9 slots), steel[1]						**4**				
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC							**B**			
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**C**			
• 2 x PS 407, 20 A for 120/230 V AC/DC							**D**			
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC, redundant							**E**			
• 2 x PS 405, 10 A for 24 V DC							**G**			
• 2 x PS 405, 10 A for 24 V DC, optional redundancy							**H**			
• 2 x PS 405, 20 A for 24 V DC							**J**			
• 2 x 2 PS 405, 10 A for 24 V DC, redundant							**K**			
Additive PROFIBUS DP interfaces[1]										
• Without CP 443-5 Extended									**0**	
• 2 x 1 CP 443-5 Extended (conformal coating)									**1**	
• 2 x 2 CP 443-5 Extended (conformal coating)									**2**	
• 2 x 3 CP 443-5 Extended (conformal coating)									**3**	
• 2 x 4 CP 443-5 Extended (conformal coating)									**4**	

[1] In configurations with UR2/UR2-H racks, up to 5 CPs (Industrial Ethernet/PROFIBUS) can be configured with a single power supply, or up to 3 CPs for each subsystem with a redundant power supply.

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Ordering data

Individual components

	Article No.
Individual components of the safety-related SIMATIC PCS 7 automation systems AS 410F and AS 410FH	
S7 F Systems RT License For processing safety-related application programs, for one AS 410F/FH system each	**6ES7833-1CC00-6YX0**
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	**6ES7410-5HX08-0AB0**
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	**6ES7654-5CJ00-0XF0**
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	**6ES7654-5CL00-0XF0**
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	**6ES7654-5CN00-0XF0**
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	**6ES7654-5CP00-0XF0**
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	**6ES7654-5CQ00-0XF0**
Sync set For coupling two redundant CPUs; for distances up to	
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	**6ES7656-7XX30-0XE0**
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	**6ES7656-7XX40-0XE0**
Sync module For coupling two redundant CPU; 2 modules required for each CPU, for distances up to	
• 10 m	**6ES7960-1AA06-0XA0**
• 10 km	**6ES7960-1AB06-0XA0**
Sync cable (fiber-optic cable) For connecting two redundant CPUs, 2 cables required for each redundant automation system	
• 1 m	**6ES7960-1AA04-5AA0**
• 2 m	**6ES7960-1AA04-5BA0**
• 10 m	**6ES7960-1AA04-5KA0**
Other lengths	On request

	Article No.
SIMATIC NET CP 443-1 (conformal coating) Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	**6GK7443-1EX30-0XE1**
SIMATIC NET CP 443-5 Extended (conformal coating) Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE1**
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**
• **10 A, redundant** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA0**
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	**6ES7407-0RA02-0AA0**
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A, redundant** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA0**
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	**6ES7405-0RA02-0AA0**
Backup battery Type AA, 2.3 Ah	**6ES7971-0BA00**
Aluminum rack	
• UR1, 18 slots	**6ES7400-1TA11-0AA0**
• UR2, 9 slots	**6ES7400-1JA11-0AA0**
• UR2-H, for divided central controllers; 2 x 9 slots	**6ES7400-2JA10-0AA0**
Steel rack	
• UR1, 18 slots	**6ES7400-1TA01-0AA0**
• UR2, 9 slots	**6ES7400-1JA01-0AA0**
• UR2-H, • for divided central controllers; 2 x 9 slots	**6ES7400-2JA00-0AA0**

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Ordering data	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 PO	**6ES7653-2BA00-0XB5**
- 1 000 PO	**6ES7653-2BB00-0XB5**
- 10 000 PO	**6ES7653-2BC00-0XB5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 PO	**6ES7653-2BA00-0XH5**
- 1 000 PO	**6ES7653-2BB00-0XH5**
- 10 000 PO	**6ES7653-2BC00-0XH5**

	Article No.
AS 410F/FH Engineering See section "Safety Integrated for Process Automation", S7 F Systems	
Y-Link	
Y-Link For connection of devices with only one PROFIBUS DP interface to a redundant automation system	**6ES7197-1LA11-0XA0**

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Overview

With the S7-400 automation systems, which are scalable via different types of CPU, you have an alternative to AS 410 automation systems. The systems that can be used in plants with SIMATIC PCS 7 V8.0, V7.1 or V7.0 can be classified as follows:

- Standard automation systems
- High availability automation systems
- Safety-related automation systems

Standard automation systems

The AS 414-3, AS 414-3IE, AS 416-2, AS 416-3, AS 416-3IE and AS 417-4 standard automation systems are extremely robust and feature high processing and communication performance.

The AS 414-3 and AS 414-3IE are tailored for smaller-scale applications with smaller quantity structures, which allows for a low-cost starter solution with a modular and scalable system based on the S7-400 controller range. Larger quantity structures can be implemented using the AS 416-2, AS 416-3/416-3IE and AS 417-4 automation systems. These systems are preferred for medium and large-sized plants.

High availability automation systems

The aim in using high availability automation systems is to minimize the risk of a production outage. In accordance with their basic design, these systems are categorized as:

- AS Single Stations: AS 412-5-1H, AS 414-5-1H, AS 416-5-1H, and AS 417-5-1H with only one CPU, e.g. for the following applications:
  - Subsequent expansion to a redundant system
  - Redundant configuration on UR1 racks, comprising 2 Single Stations, 4 sync modules, and 2 sync fiber-optic cables
- AS Redundancy Stations: AS 412-5-2H, AS 414-5-2H, AS 416-5-2H and AS 417-5-2H with two redundant CPUs, mounted on one common rack (UR2-H) or two separate racks (UR2)

Safety-related automation systems

Safety-related automation systems (F/FH systems) are available for safety-relevant applications in which an incident can result in danger to persons, plant damage or environmental pollution. These are based on the hardware of the high availability automation systems, which is expanded by safety functions with S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Stations**
  AS 412F, AS 414F, AS 416F, and AS 417F with only one CPU (safety-related)
- **AS Redundancy Stations**
  AS 412FH, AS 414FH, AS 416FH, and AS 417FH with two redundant CPUs (safety-related and high availability)

The safety-related F/FH systems collaborate with safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus to detect not only faults in the process, but also their own, internal faults. They automatically transfer the plant to a safe state in the event of a fault. The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

All F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

Design

Racks

Automation systems based on only one CPU (AS Single Station) can be mounted on a UR1 rack (18 slots) or UR2 rack (9 slots).

The automation systems (AS Redundancy Station) consisting of two electrically isolated redundant subsystems can be mounted on a UR2-H compact rack with divided backplane bus or on two separate racks (UR1 or UR2). The design with two racks allows physical separation of the redundant subsystems, e.g. by a fireproof partition and over a distance of up to 10 km. As a result of the galvanic isolation, the system is insensitive to electromagnetic interferences.

Redundant power supply

If you have two separate power supplies for supplying your system, you can increase the availability of the automation systems with redundant power supplies (2 power supplies for one AS Single Station or 1 or 2 power supplies for each subsystem of an AS Redundancy Station).

Communication via the Industrial Ethernet (IE) plant bus

Each standard automation system is connected to the Industrial Ethernet plant bus by means of a CP 443-1 communication module.

If the PN/IE interface integrated in the CPUs of the high availability and safety-related automation systems is not used for PROFINET IO, it is available for the connection to the Industrial Ethernet plant bus. Otherwise, the 1H/F systems (AS Single Station) and the two subsystems of the 2H/FH systems (AS Redundancy Station) can be connected to the plant bus via one CP 443-1 communication module each.

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level fieldbus (PROFIBUS PA or FOUNDATION Fieldbus H1).

Several PROFIBUS DP segments with distributed process I/Os can be operated on a standard automation system, an 1H/F system (AS Single Station), or a 2H/FH system (AS Redundancy Station). The following table provides an overview of the number and type of configurable PROFIBUS DP interfaces.

I/O connection via PROFINET (PN)

Standard automation systems, high availability and safety-oriented automation systems (AS Single Stations and AS Redundancy Stations) can be networked simply and effectively with ET 200M remote I/O stations over PROFINET IO. If a PN/IE interface is integrated in the CPU of the automation system (AS 414-3IE, AS 416-3IE, and all H/F/FH systems), then it is to be used for connecting ET 200M remote I/O stations via PROFINET IO. In standard automation systems, the PN/IE interfaces of type CP 443-1 communication modules can also be used for PROFINET IO.

The maximum availability with minimum error handling times is achieved by the AS Redundancy Station (2 H/FH systems) in conjunction with the system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication where each I/O device establishes a communication connection to each of the two CPUs of an AS Redundancy Station over the topological network.

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Design (continued)

Runtime licenses

Each automation system is already provided as standard with the SIMATIC PCS 7 Industry Library Runtime and the SIMATIC PCS 7 AS Runtime license for 100 process objects (PO); safety-oriented automation systems additionally with the S7 F Systems RT license. The 100 POs of the SIMATIC PCS 7 AS Runtime license can be expanded by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1 000) of additional Runtime licenses are irrelevant.

Individual configuration of AS bundles

The various versions of the SIMATIC PCS 7 automation systems AS 412 to AS 417 are available as AS bundles as follows:

- Individual components, combined per station in one consignment
- Preassembled and tested complete systems (no extra charge compared to delivery of individual components)

Typical combinations can be selected from tables in the section "Ordering data".

The complete range is available to you via two configurators in the Industry Mall (www.siemens.com/industrymall):

- SIMATIC PCS 7 AS Single Station configurator
- SIMATIC PCS 7 AS Redundancy Station configurator

Ordering notes

- For a redundant configuration based on 2 AS Single Stations, you additionally require 4 sync modules (up to 10 m or 10 km) and 2 fiber-optic sync cables. The selection depends on the distance between the two AS Single Stations.
- FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

Ordering data

Article No.

Configuration tables for standard automation systems

AS 414-3IE	**6ES7654-**	■	■	■	■	■	**-**	■	■	**F**	■
with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 DP interfaces (MPI/DP and slot for IF module) 4 MByte main memory (2 MByte each for program and data)											
Type of delivery											
• Individual components, not pre-assembled		**7**									
• Pre-assembled and tested		**8**									
Memory card											
• Memory card 2 MB RAM (up to approx. 100 POs)			**B**								
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**								
• Memory card 8 MB RAM (up to approx. 800 POs)			**D**								
CPU type											
• CPU 414-3 PN/DP (up to approx. 350 POs)				**D**							
Additive IF 964-DP interface module											
• Without additive IF 964-DP					**0**						
• 1 x IF 964-DP					**1**						
Interface to Industrial Ethernet/ PROFINET plant bus											
• integrated, without CP 443-1						**0**					
• 1 × CP 443-1EX30						**3**					
• 2 × CP 443-1EX30						**4**					
Racks											
• UR2 (9 slots), aluminum							**3**				
• UR2 (9 slots), steel							**4**				
• UR1 (18 slots), aluminum							**5**				
• UR1 (18 slots), steel							**6**				
Power supply (without backup batteries)											
• 1 x PS 407, 10 A for 120/230 V AC/DC									**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC									**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									**E**		
• 1 x PS 405, 10 A for 24 V DC									**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy									**H**		
• 1 x PS 405, 20 A for 24 V DC									**J**		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy									**K**		
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended										**0**	
• 1 x CP 443-5 Extended										**1**	
• 2 x CP 443-5 Extended										**2**	
• 3 x CP 443-5 Extended										**3**	
• 4 x CP 443-5 Extended[1)]										**4**	

[1)] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

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Ordering data

Configuration tables for standard automation systems

	Article No.									
AS 416-3IE with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 DP interfaces (MPI/DP and slot for IF module) 16 MByte main memory (8 MByte each for program and data)	**6ES7654-**					**-**			**F**	
Type of delivery										
• Individual components, not pre-assembled		**7**								
• Pre-assembled and tested		**8**								
Memory card										
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**							
• Memory card 8 MB RAM (up to approx. 800 POs)			**D**							
• Memory card 16 MB RAM (up to approx. 2 100 POs)			**E**							
CPU type										
• CPU 416-3 PN/DP (up to approx. 1 200 POs)				**J**						
Additive IF 964-DP interface module										
• Without additive IF 964-DP					**0**					
• 1 × IF 964-DP					**1**					
Interface to Industrial Ethernet/ PROFINET plant bus										
• integrated, without CP 443-1						**0**				
• 1 × CP 443-1EX30						**3**				
• 2 × CP 443-1EX30						**4**				
Racks										
• UR2 (9 slots), aluminum							**3**			
• UR2 (9 slots), steel							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended									**1**	
• 2 x CP 443-5 Extended									**2**	
• 3 x CP 443-5 Extended									**3**	
• 4 x CP 443-5 Extended[1)]									**4**	

[1)] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

Configuration tables for high availability automation systems

	Article No.									
AS 412-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 1 MB RAM (512 KB each for program and data)	**6ES7654-**						**-**			**F**
Type of delivery										
• Individual components, not pre-assembled		**7**								
• Pre-assembled and tested		**8**								
Memory card										
• Memory card 1 MB RAM (up to approx. 30 POs)			**A**							
• Memory card 2 MB RAM (up to approx. 100 POs)			**B**							
CPU type										
• CPU 412-5H (up to approx. 30 POs)				**A**						
Additive IF 964-DP interface module										
• Without additive IF 964-DP					**0**					
Interface to Industrial Ethernet plant bus										
• Without interface module						**0**				
• 1 x CP 443-1EX30[1)]						**3**				
• 2 x CP 443-1EX30 for redundant connection[1)]						**4**				
Racks										
• UR2 (9 slots), aluminum							**3**			
• UR2 (9 slots), steel							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC (redundant)								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended									**1**	
• 2 x CP 443-5 Extended[1)]									**2**	
• 3 x CP 443-5 Extended[1)]									**3**	
• 4 x CP 443-5 Extended[1)]									**4**	

[1)] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for high availability automation systems

	Article No.									
AS 414-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 4 MB RAM (2 MB each for program and data)	**6ES7654-**	■	■	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**7**								
• Pre-assembled and tested		**8**								
Memory card										
• Memory card 2 MB RAM (up to approx. 100 POs)			**B**							
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**							
CPU type										
• CPU 414-5H (up to approx. 350 POs)				**E**						
Additive IF 964-DP interface module										
• Without additive IF 964-DP					**0**					
Interface to Industrial Ethernet plant bus										
• Without interface module						**0**				
• 1 x CP 443-1EX30[1]						**3**				
• 2 x CP 443-1EX30 for redundant connection[1]						**4**				
Racks										
• UR2 (9 slots), aluminum							**3**			
• UR2 (9 slots), steel							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC (redundant)								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended									**1**	
• 2 x CP 443-5 Extended[1]									**2**	
• 3 x CP 443-5 Extended[1]									**3**	
• 4 x CP 443-5 Extended[1]									**4**	

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.									
AS 416-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 16 MB RAM (6 MB for program and 10 MB for data)	**6ES7654-**	■	■	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**7**								
• Pre-assembled and tested		**8**								
Memory card										
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**							
• Memory card 8 MB RAM (up to approx. 800 POs)			**D**							
• Memory card 16 MB RAM (up to approx. 2 100 POs)			**E**							
CPU type										
• CPU 416-5H (up to approx. 1 200 POs)				**P**						
Additive IF 964-DP interface module										
• Without additive IF 964-DP					**0**					
Interface to Industrial Ethernet plant bus										
• Without interface module						**0**				
• 1 x CP 443-1EX30[1]						**3**				
• 2 x CP 443-1EX30 for redundant connection[1]						**4**				
Racks										
• UR2 (9 slots), aluminum							**3**			
• UR2 (9 slots), steel							**4**			
• UR1 (18 slots), aluminum							**5**			
• UR1 (18 slots), steel							**6**			
Power supply (without backup batteries)										
• 1 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 1 x PS 407, • 20 A for 120/230 V AC/DC								**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)								**E**		
• 1 x PS 405, 10 A for 24 V DC								**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 1 x PS 405, 20 A for 24 V DC								**J**		
• 2 x PS 405, 10 A for 24 V DC (redundant)								**K**		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended									**0**	
• 1 x CP 443-5 Extended									**1**	
• 2 x CP 443-5 Extended[1]									**2**	
• 3 x CP 443-5 Extended[1]									**3**	
• 4 x CP 443-5 Extended[1]									**4**	

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for high availability automation systems

AS 417-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 32 MB RAM (16 MB each for program and data)	**Article No.** 6ES7654-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• Memory card 4 MB RAM (up to approx. 210 POs)			C								
• Memory card 8 MB RAM (up to approx. 800 POs)			D								
• Memory card 16 MB RAM (up to approx. 2 100 POs)			E								
CPU type											
• CPU 417-5H (up to approx. 2 000 POs)				M							
Additive IF 964-DP interface module											
• Without additive IF 964-DP					0						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 1 x CP 443-1EX30[1]						3					
• 2 x CP 443-1EX30 for redundant connection[1]						4					
Racks											
• UR2 (9 slots), aluminum							3				
• UR2 (9 slots), steel							4				
• UR1 (18 slots), aluminum							5				
• UR1 (18 slots), steel							6				
Power supply (without backup batteries)											
• 1 x PS 407, 10 A for 120/230 V AC/DC								B			
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C			
• 1 x PS 407, 20 A for 120/230 V AC/DC								D			
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)								E			
• 1 x PS 405, 10 A for 24 V DC								G			
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								H			
• 1 x PS 405, 20 A for 24 V DC								J			
• 2 x PS 405, 10 A for 24 V DC (redundant)								K			
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 1 x CP 443-5 Extended											1
• 2 x CP 443-5 Extended[1]											2
• 3 x CP 443-5 Extended[1]											3
• 4 x CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

AS 412-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 1 MB RAM (512 KB each for program and data)	**Article No.** 6ES7656-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• 2 x memory card 1 MB RAM (up to approx. 30 POs)			A								
• 2 x memory card 2 MB RAM (up to approx. 100 POs)			B								
CPU type											
• 2 x CPU 412-5H (up to approx. 30 POs)				A							
Sync modules and cables											
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 2 x CP 443-1EX30 for redundant connection[1]						3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4					
Racks											
• 1 x UR2-H (2 x 9 slots), aluminum							1				
• 1 x UR2-H (2 x 9 slots), steel							2				
• 2 x UR2 (9 slots), aluminum							3				
• 2 x UR2 (9 slots), steel							4				
Power supply (without backup batteries)											
• 2 x PS 407, 10 A for 120/230 V AC/DC								B			
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C			
• 2 x PS 407, 20 A for 120/230 V AC/DC								D			
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E			
• 2 x PS 405, 10 A for 24 V DC								G			
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H			
• 2 x PS 405, 20 A for 24 V DC								J			
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K			
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 2 x CP 443-5 Extended											1
• 2 x 2 CP 443-5 Extended[1]											2
• 2 x 3 CP 443-5 Extended[1]											3
• 2 x 4 CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for high availability automation systems

	Article No.										
AS 414-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 4 MB RAM (2 MB each for program and data)	6ES7656-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• 2 x memory card 2 MB RAM (up to approx. 100 POs)			B								
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			C								
CPU type											
• 2 x CPU 414-5H (up to approx. 350 POs)				E							
Sync modules and cables											
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					4						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 2 x CP 443-1EX30 for redundant connection[1]						3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4					
Racks											
• 1 x UR2-H (2 x 9 slots), aluminum								1			
• 1 x UR2-H (2 x 9 slots), steel								2			
• 2 x UR2 (9 slots), aluminum								3			
• 2 x UR2 (9 slots), steel								4			
Power supply (without backup batteries)											
• 2 x PS 407, 10 A for 120/230 V AC/DC									B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									C		
• 2 x PS 407, 20 A for 120/230 V AC/DC									D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)									E		
• 2 x PS 405, 10 A for 24 V DC									G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy									H		
• 2 x PS 405, 20 A for 24 V DC									J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)									K		
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 2 x CP 443-5 Extended											1
• 2 x 2 CP 443-5 Extended[1]											2
• 2 x 3 CP 443-5 Extended[1]											3
• 2 x 4 CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

	Article No.										
AS 416-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 16 MB RAM (6 MB each for program and 10 MB each for data)	6ES7656-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			C								
• 2 x memory card 8 MB RAM (up to approx. 800 POs)			D								
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)			E								
CPU type											
• 2 x CPU 416-5H (up to approx. 1 200 POs)				P							
Sync modules and cables											
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					4						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 2 x CP 443-1EX30 for redundant connection[1]						3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4					
Racks											
• 1 x UR2-H (2 x 9 slots), aluminum								1			
• 1 x UR2-H (2 x 9 slots), steel								2			
• 2 x UR2 (9 slots), aluminum								3			
• 2 x UR2 (9 slots), steel								4			
Power supply (without backup batteries)											
• 2 x PS 407, 10 A for 120/230 V AC/DC									B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									C		
• 2 x PS 407, 20 A for 120/230 V AC/DC									D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)									E		
• 2 x PS 405, 10 A for 24 V DC									G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy									H		
• 2 x PS 405, 20 A for 24 V DC									J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)									K		
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 2 x CP 443-5 Extended											1
• 2 x 2 CP 443-5 Extended[1]											2
• 2 x 3 CP 443-5 Extended[1]											3
• 2 x 4 CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for high availability automation systems

	Article No.										
AS 417-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 32 MB RAM (16 MB each for program and data)	6ES7656-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			C								
• 2 x memory card 8 MB RAM (up to approx. 800 POs)			D								
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)			E								
CPU type											
• 2 x CPU 417-5H (up to approx. 2 000 POs)				M							
Sync modules and cables											
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					4						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 2 x CP 443-1EX30 for redundant connection[1]						3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4					
Racks											
• 1 x UR2-H (2 x 9 slots), aluminum							1				
• 1 x UR2-H (2 x 9 slots), steel							2				
• 2 x UR2 (9 slots), aluminum							3				
• 2 x UR2 (9 slots), steel							4				
Power supply (without backup batteries)											
• 2 x PS 407, 10 A for 120/230 V AC/DC								B			
• 2 x PS 407, • 10 A for 120/230 V AC/DC, optional redundancy								C			
• 2 x PS 407, 20 A for 120/230 V AC/DC								D			
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E			
• 2 x PS 405, 10 A for 24 V DC								G			
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H			
• 2 x PS 405, 20 A for 24 V DC								J			
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K			
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 2 x CP 443-5 Extended											1
• 2 x 2 CP 443-5 Extended[1]											2
• 2 x 3 CP 443-5 Extended[1]											3
• 2 x 4 CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

Configuration tables for safety-related automation systems

	Article No.										
AS 412F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 1 MB RAM (512 KB each for program and data)	6ES7654-						-			F	
Type of delivery											
• Individual components, not pre-assembled		7									
• Pre-assembled and tested		8									
Memory card											
• Memory card 1 MB RAM (up to approx. 30 POs)			A								
• Memory card 2 MB RAM (up to approx. 100 POs)			B								
CPU type											
• CPU 412-5H with S7 F Systems RT license (up to approx. 30 POs)				B							
Additive interface modules											
• Without additive interface module					0						
Interface to Industrial Ethernet plant bus											
• Without interface module						0					
• 1 x CP 443-1EX30[1]						3					
• 2 x CP 443-1EX30 for redundant connection[1]						4					
Racks											
• UR2 (9 slots), aluminum							3				
• UR2 (9 slots), steel							4				
• UR1 (18 slots), aluminum							5				
• UR1 (18 slots), steel							6				
Power supply (without backup batteries)											
• 1 x PS 407, 10 A for 120/230 V AC/DC								B			
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C			
• 1 x PS 407, 20 A for 120/230 V AC/DC								D			
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)								E			
• 1 x PS 405, 10 A for 24 V DC								G			
• 1 x PS 405, 10 A for 24 V DC, optional redundancy								H			
• 1 x PS 405, 20 A for 24 V DC								J			
• 2 x PS 405, 10 A for 24 V DC (redundant)								K			
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											0
• 1 x CP 443-5 Extended											1
• 2 x CP 443-5 Extended[1]											2
• 3 x CP 443-5 Extended[1]											3
• 4 x CP 443-5 Extended[1]											4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for safety-related automation systems

	Article No.										
AS 414F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 4 MB RAM (2 MB each for program and data)	**6ES7654-**	■	■	■	■	■	-	■	■	F	■
Type of delivery											
• Individual components, not pre-assembled		**7**									
• Pre-assembled and tested		**8**									
Memory card											
• Memory card 2 MB RAM (up to approx. 100 POs)			**B**								
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**								
CPU type											
• CPU 414-5H with S7 F Systems RT license (up to approx. 350 POs)				**F**							
Additive interface modules											
• Without additive interface module					**0**						
Interface to Industrial Ethernet plant bus											
• Without interface module						**0**					
• 1 x CP 443-1EX30[1]						**3**					
• 2 x CP 443-1EX30 for redundant connection[1]						**4**					
Racks											
• UR2 (9 slots), aluminum								**3**			
• UR2 (9 slots), steel								**4**			
• UR1 (18 slots), aluminum								**5**			
• UR1 (18 slots), steel								**6**			
Power supply (without backup batteries)											
• 1 x PS 407, 10 A for 120/230 V AC/DC									**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC									**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)									**E**		
• 1 x PS 405, 10 A for 24 V DC									**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy									**H**		
• 1 x PS 405, 20 A for 24 V DC									**J**		
• 2 x PS 405, 10 A for 24 V DC (redundant)									**K**		
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											**0**
• 1 x CP 443-5 Extended											**1**
• 2 x CP 443-5 Extended[1]											**2**
• 3 x CP 443-5 Extended[1]											**3**
• 4 x CP 443-5 Extended[1]											**4**

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.										
AS 416F (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 16 MB RAM (6 MB for program and 10 MB for data)	**6ES7654-**	■	■	■	■	■	-	■	■	F	■
Type of delivery											
• Individual components, not pre-assembled		**7**									
• Pre-assembled and tested		**8**									
Memory card											
• Memory card 4 MB RAM (up to approx. 210 POs)			**C**								
• Memory card 8 MB RAM (up to approx. 800 POs)			**D**								
• Memory card 16 MB RAM (up to approx. 2 100 POs)			**E**								
CPU type											
• CPU 416-5H with S7 F Systems RT license (up to approx. 1 200 POs)				**Q**							
Additive IF 964-DP interface module											
• Without additive IF 964-DP					**0**						
Interface to Industrial Ethernet plant bus											
• Without interface module						**0**					
• 1 x CP 443-1EX30[1]						**3**					
• 2 x CP 443-1EX30 for redundant connection[1]						**4**					
Racks											
• UR2 (9 slots), aluminum								**3**			
• UR2 (9 slots), steel								**4**			
• UR1 (18 slots), aluminum								**5**			
• UR1 (18 slots), steel								**6**			
Power supply (without backup batteries)											
• 1 x PS 407, 10 A for 120/230 V AC/DC									**B**		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy									**C**		
• 1 x PS 407, 20 A for 120/230 V AC/DC									**D**		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)									**E**		
• 1 x PS 405, 10 A for 24 V DC									**G**		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy									**H**		
• 1 x PS 405, 20 A for 24 V DC									**J**		
• 2 x PS 405, 10 A for 24 V DC (redundant)									**K**		
Additive PROFIBUS DP interfaces											
• Without CP 443-5 Extended											**0**
• 1 x CP 443-5 Extended											**1**
• 2 x CP 443-5 Extended[1]											**2**
• 3 x CP 443-5 Extended[1]											**3**
• 4 x CP 443-5 Extended[1]											**4**

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for safety-related automation systems

AS 417F (Single Station) mit SIMATIC PCS 7 AS Runtime License für 100 PO CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 32 MB RAM (16 MB each for program and data)	**Article No.** **6ES7654-** ■ ■ ■ ■ ■ - ■ ■ **F** ■
Type of delivery	
• Individual components, not pre-assembled	**7**
• Pre-assembled and tested	**8**
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	**C**
• Memory card 8 MB RAM (up to approx. 800 POs)	**D**
• Memory card 16 MB RAM (up to approx. 2 100 POs)	**E**
CPU type	
• CPU 417-5H with S7 F Systems RT license (up to approx. 2 000 POs)	**N**
Additive interface modules	
• Without additive interface module	**0**
Interface to Industrial Ethernet plant bus	
• Without interface module	**0**
• 1 x CP 443-1EX30[1]	**3**
• 2 x CP 443-1EX30 for redundant connection[1]	**4**
Racks	
• UR2 (9 slots), aluminum	**3**
• UR2 (9 slots), steel	**4**
• UR1 (18 slots), aluminum	**5**
• UR1 (18 slots), steel	**6**
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	**B**
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	**C**
• 1 x PS 407, 20 A for 120/230 V AC/DC	**D**
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	**E**
• 1 x PS 405, 10 A for 24 V DC	**G**
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	**H**
• 1 x PS 405, 20 A for 24 V DC	**J**
• 2 x PS 405, 10 A for 24 V DC (redundant)	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**
• 1 x CP 443-5 Extended	**1**
• 2 x CP 443-5 Extended[1]	**2**
• 3 x CP 443-5 Extended[1]	**3**
• 4 x CP 443-5 Extended[1]	**4**

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply 3.

AS 412FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 1 MB RAM (512 KB each for program and data)	**Article No.** **6ES7656-** ■ ■ ■ ■ ■ - ■ ■ **F** ■
Type of delivery	
• Individual components, not pre-assembled	**7**
• Pre-assembled and tested	**8**
Memory card	
• 2 x memory card 1 MB RAM (up to approx. 30 POs)	**A**
• 2 x memory card 2 MB RAM (up to approx. 100 POs)	**B**
CPU type	
• 2 x CPU 412-5H with S7 F Systems RT license (up to approx. 30 POs)	**B**
Sync modules and cables	
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m	**3**
Interface to Industrial Ethernet plant bus	
• Without interface module	**0**
• 2 x CP 443-1EX30 for redundant connection[1]	**3**
• 2 x 2 CP 443-1EX30 for 4-way connection[1]	**4**
Racks	
• 1 x UR2-H (2 x 9 slots), aluminum	**1**
• 1 x UR2-H (2 x 9 slots), steel	**2**
• 2 x UR2 (9 slots), aluminum	**3**
• 2 x UR2 (9 slots), steel	**4**
Power supply (without backup batteries)	
• 2 x PS 407, 10 A for 120/230 V AC/DC	**B**
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	**C**
• 2 x PS 407, 20 A for 120/230 V AC/DC	**D**
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)	**E**
• 2 x PS 405, 10 A for 24 V DC	**G**
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	**H**
• 2 x PS 405, 20 A for 24 V DC	**J**
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)	**K**
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	**0**
• 2 x CP 443-5 Extended	**1**
• 2 x 2 CP 443-5 Extended[1]	**2**
• 2 x 3 CP 443-5 Extended[1]	**3**
• 2 x 4 CP 443-5 Extended[1]	**4**

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Configuration tables for safety-related automation systems

	Article No.									
AS 414FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 4 MB RAM (2 MB each for program and data)	6ES7656-	■	■	■	■	■ -	■	■	F	■
Type of delivery										
• Individual components, not pre-assembled		7								
• Pre-assembled and tested		8								
Memory card										
• 2 x memory card 2 MB RAM (up to approx. 100 POs)			B							
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			C							
CPU type										
• 2 x CPU 414-5H with S7 F Systems RT license (up to approx. 350 POs)				F						
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3					
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					4					
Interface to Industrial Ethernet plant bus										
• Without interface module						0				
• 2 x CP 443-1EX30 for redundant connection[1]						3				
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4				
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum							1			
• 1 x UR2-H (2 x 9 slots), steel							2			
• 2 x UR2 (9 slots), aluminum							3			
• 2 x UR2 (9 slots), steel							4			
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC								B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C		
• 2 x PS 407, 20 A for 120/230 V AC/DC								D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E		
• 2 x PS 405, 10 A for 24 V DC								G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H		
• 2 x PS 405, 20 A for 24 V DC								J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										0
• 2 x CP 443-5 Extended										1
• 2 x 2 CP 443-5 Extended[1]										2
• 2 x 3 CP 443-5 Extended[1]										3
• 2 x 4 CP 443-5 Extended[1]										4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

	Article No.									
AS 416FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 16 MB RAM (6 MB each for program and 10 MB each for data)	6ES7656-	■	■	■	■	■ -	■	■	F	■
Type of delivery										
• Individual components, not pre-assembled		7								
• Pre-assembled and tested		8								
Memory card										
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			C							
• 2 x memory card 8 MB RAM (up to approx. 800 POs)			D							
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)			E							
CPU type										
• 2 x CPU 416-5H with S7 F Systems RT license (up to approx. 1 200 POs)				Q						
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					3					
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					4					
Interface to Industrial Ethernet plant bus										
• Without interface module						0				
• 2 x CP 443-1EX30 for redundant connection[1]						3				
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						4				
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum							1			
• 1 x UR2-H (2 x 9 slots), steel							2			
• 2 x UR2 (9 slots), aluminum							3			
• 2 x UR2 (9 slots), steel							4			
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC								B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C		
• 2 x PS 407, 20 A for 120/230 V AC/DC								D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E		
• 2 x PS 405, 10 A for 24 V DC								G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H		
• 2 x PS 405, 20 A for 24 V DC								J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										0
• 2 x CP 443-5 Extended										1
• 2 x 2 CP 443-5 Extended[1]										2
• 2 x 3 CP 443-5 Extended[1]										3
• 2 x 4 CP 443-5 Extended[1]										4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Ordering data

Article No.

Configuration tables for safety-related automation systems

AS 417FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs 2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch) 2 x 32 MB RAM (16 MB each for program and data)	**6ES7656-**	■	■	■	■	**-**	■	■	**F**	■
Type of delivery										
• Individual components, not pre-assembled		**7**								
• Pre-assembled and tested		**8**								
Memory card										
• 2 x memory card 4 MB RAM (up to approx. 210 POs)			**C**							
• 2 x memory card 8 MB RAM (up to approx. 800 POs)			**D**							
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)			**E**							
CPU type										
• 2 x CPU 417-5H with S7 F Systems RT license (up to approx. 2 000 POs)				**N**						
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m					**3**					
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing					**4**					
Interface to Industrial Ethernet plant bus										
• Without interface module						**0**				
• 2 x CP 443-1EX30 for redundant connection[1]						**3**				
• 2 x 2 CP 443-1EX30 for 4-way connection[1]						**4**				
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum							**1**			
• 1 x UR2-H (2 x 9 slots), steel							**2**			
• 2 x UR2 (9 slots), aluminum							**3**			
• 2 x UR2 (9 slots), steel							**4**			
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC								**B**		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								**C**		
• 2 x PS 407, 20 A for 120/230 V AC/DC								**D**		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								**E**		
• 2 x PS 405, 10 A for 24 V DC								**G**		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								**H**		
• 2 x PS 405, 20 A for 24 V DC								**J**		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								**K**		
Additive PROFIBUS DP interfaces[1]										
• Without CP 443-5 Extended									**0**	
• 2 x CP 443-5 Extended									**1**	
• 2 x 2 CP 443-5 Extended[1]									**2**	
• 2 x 3 CP 443-5 Extended[1]									**3**	
• 2 x 4 CP 443-5 Extended[1]									**4**	

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply..

Accessories

Backup batteries

Lithium backup batteries of type AA with 2.3 Ah are used in the power supply modules of all SIMATIC PCS 7 automation systems AS 412 to AS 417. Since lithium batteries are easily inflammable, more rigorous transport and storage regulations apply to them.

To avoid subjecting the AS bundles to these more rigorous transport and storage regulations, the backup batteries must be ordered and delivered separately (order no. 6ES7971-0BA00).

The following backup batteries are required depending on the configuration of the AS bundles:

- SIMATIC PCS 7 AS Single Station:
  - With 1 power supply module: 2 units
  - With 2 redundant power supply modules: 4 units
- SIMATIC PCS 7 AS Redundancy Station:
  - With 2 power supply modules: 4 units
  - With 2 x 2 redundant power supply modules: 8 units

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SIMATIC ET 200M for SIMATIC PCS 7

Overview



Within the SIMATIC ET 200 range, ET 200M represents the main series of distributed I/O systems for process control applications with SIMATIC PCS 7.

The ET 200M I/O system offers a comprehensive range of I/O modules of S7-300 design, including ones with special I&C functions:

- Standard analog and digital modules
- Redundant I/O modules
- I/O modules with enhanced diagnostics capability
- Ex I/O modules
- Controller and counter modules
- HART modules
- F-modules for safety-related applications

When using active bus modules, faulty I/O modules can be replaced while the plant is in operation (RUN) without influencing adjacent modules (hot swapping function).

The following actions are possible with the automation system in RUN:

- Adding new modules to the station
- Re-configuration of modules
- Addition of ET 200M stations
- Configuration of connected HART field devices with SIMATIC PDM

Note:

Apart from these selected modules, it is also possible to use – with limitations in functions - all other I/O modules from the current range of S7-300 signal modules.

Design

An ET 200M remote I/O station comprises:

- 1 or 2 (redundant) power supply modules (can be omitted in the case of a central 24 V DC supply for the plant)
- Up to 2 interface modules:
  - 1 or 2 (redundant) IM 153-2 High Feature for PROFIBUS DP connection or
  - 1 IM 153-4 PN High Feature for PROFINET connection
- Up to 12 I/O modules for connection of sensors/actuators

All I/O modules have optical electrical isolation from the backplane bus. Up to 12 I/O modules can connected to an IM 153-2 High Feature or IM 153-4 PN High Feature interface module. The IM 153-2 High Feature interface modules can also be configured redundantly.

In addition to the standard SIMATIC S7 I/O modules, special I/O modules with diagnostics capability offer the following functions, among others:

- Channel-based diagnostics, e.g. open-circuit, short-circuit, limit violations
- Internal module monitoring, e.g. configuration error, RAM error, tripped fuse
- Flatter monitoring for sensors
- Pulse stretching
- Output of a selectable substitute value on failure of the central processing unit

In the event of a fault, the modules with diagnostics capability automatically pass on the corresponding message to the operator station, permitting fast and simple troubleshooting.

The ET 200M stations can be used in standard environments and also in Ex zone 2/22. The actuators/sensors can be positioned in Ex zone 1/21 when suitable Ex input/output modules are used. Hot swapping of I/O modules within Ex zone 2 is allowed with the right permit (e.g. fire certificate).

Technical specifications

You can find detailed technical data on the ET 200M and S7-300 I/O modules in the following places:

- Catalog ST 70 or
- Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"

Options

SIPLUS extreme range for extended temperature ranges and corrosive environments

The "standard" properties of an individual device or system are often insufficient for harsh environmental conditions, applications in corrosive environments or extreme temperature ranges. Depending on the location of use, the result could be limitations in functionality or operational safety or even total failure of the plant.

The SIPLUS extreme range offers individually adapted standard products which permit retention of the functionality of your plant or process even under extreme conditions of use. These include:

- Ambient temperature range from -25 to +60/+70 °C
- Condensation, high humidity
- Increased mechanical stress
- Extreme loading by media, e.g. toxic atmospheres
- Voltage ranges deviating from the standard
- Increased degree of protection (dust, water)

You can find a summary of the available range of products classified according to their special properties on the Internet. The corresponding SIPLUS product is assigned there to the standard product:

http://www.siemens.com/siplus

Note:

SIPLUS products are also included in the ST 70 Catalog.

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Overview



IM 153-2 High Feature interface module for PROFIBUS connection

Interface module for the PROFIBUS connection

The IM 153-2 High Feature interface module (electrical PROFIBUS DP transmission mode) is available for connecting the ET 200M remote I/O station to the PROFIBUS DP fieldbus. Depending on the fieldbus configuration (single/redundant), the ET 200M remote I/O station can be connected via one single or two redundant interface modules.



IM 153-4 High Feature interface module for PROFINET connection

Interface module for PROFINET connection

The IM 153-4 PN High Feature interface module is used to connect the ET 200M remote I/O station to PROFINET via copper cables (RJ45). It autonomously handles communication between the I/O modules and the higher-level PROFINET I/O controller.

Function

IM 153-2 High Feature

The IM 153-2 High Feature supports the following functions:

- HART configuring of intelligent field devices
- Configuration of ET 200M I/Os in RUN mode of the automation system
- Connection to redundant automation systems
- Use of ET 200M function modules (controller and counter modules)
- Operation of up to 12 I/O modules per remote I/O station
- Time stamping (SOE) with the safety-related SM 326F digital input module (F-DI24)
- Transmission of additional values with HART secondary variables of the HART SM 331 and SM 332 analog modules (up to 4 per channel or up to 8 per module)

IM 153-4 PN High Feature

- Integrated 2-port switch
- Baud rate 10 Mbps / 100 Mbps (Autonegotiation/Full Duplex)
- Operation of up to 12 I/O modules per remote I/O station
- I&M functions in accordance with PROFIBUS International Guidelines, order no. 3.502, version V1.1

Note:

In order to be able to use the hot swapping function, use of the active bus module and the mounting rail for hot swapping is necessary (see under the following section "Accessories").

Ordering data

	Article No.
Interface module for the PROFIBUS connection	
IM 153-2 High Feature Slave interface module for connection of an ET 200M station to PROFIBUS DP, with time stamp (accuracy 1 ms), support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems	**6ES7153-2BA02-0XB0**
Interface module for PROFINET connection	
IM 153-4 PN High Feature Interface for connecting an ET 200M station to PROFINET	**6ES7153-4BA00-0XB0**

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IM 155-6

Overview



- Interface module for linking the ET 200SP to PROFINET or PROFIBUS
- Handles all data exchange with the controller
- BusAdapter (BA) for individual PROFINET connection
- Integrated 2-port switch for line configuration
- Depending on the selected interface module
  - up to max. 64 I/O modules per station; all I/O modules, including fail-safe modules, can be used.
  - Replacement of I/O modules during operation
- Operation with gaps (non-equipped BaseUnits) possible
- Replacement of an I/O module possible during operation (hot swapping)
- Load group formation without power module

Technical specifications

	6ES7155-6AA00-0BN0 IM 155-6 PN ST with BA 2xRJ45 and server module	6ES7155-6AU00-0BN0 IM 155-6 PN ST with server module	6ES7155-6AU00-0CN0 IM 155-6 PN HF with server module
General information			
Firmware version			V2.2.0
Vendor identification (VendorID)		002AH	
Device identifier (DeviceID)		0313H	
Product function			
• I&M data	Yes	Yes	Yes; I&M0 to I&M4
Engineering with			
• STEP 7 TIA Portal can be configured/integrated as of version	V11 SP2 with HSP0024 / -	V12 / V12	V12 SP1 / V13
• STEP 7 can be configured/ integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -	V5.5 SP3 / -
• PROFIBUS as of GSD version/ GSD revision			
• PROFINET as of GSD version/ GSD revision	V2.3 / -	V1.0 / V2.23	V2.3 / -
Supply voltage			
Type of supply voltage		24 V DC	DC
Rated value (DC)	24 V	24 V	24 V
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V
Reverse polarity protection	Yes	Yes	Yes
Mains buffering			
• Mains/voltage failure stored energy time	5 ms	5 ms	5 ms
Input current			
Current consumption, max.	450 mA	450 mA	
Inrush current, max.			4.5 A
I^2t			0.09 $A^2 \cdot s$
Power losses			
Power loss, typ.	1.9 W	1.9 W	2.4 W
Address area			
Address space per module			
• Address space per module, max.			32 byte
Address space per station			
• Address space per station, max.	256 byte	256 byte	1 440 byte
Hardware configuration			
Rack			
• Modules per rack, max.	32	32	64

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Technical specifications (continued)

	6ES7155-6AA00-0BN0 IM 155-6 PN ST with BA 2xRJ45 and server module	6ES7155-6AU00-0BN0 IM 155-6 PN ST with server module	6ES7155-6AU00-0CN0 IM 155-6 PN HF with server module
Interfaces			
Number of PROFINET interfaces	1	1	1
Number of PROFIBUS interfaces			
1st interface			
• Interface types			
- Number of ports	2	2	2
- Integrated switch	Yes	Yes	Yes
- RJ 45 (Ethernet)	Yes; Pre-assembled bus adapter BA 2x RJ45		
- RS 485			
- Bus adapter (PROFINET)	Yes; Applicable bus adapters: BA 2x RJ45, BA 2x FC	Yes; pplicable bus adapters: BA 2x RJ45, BA 2x FC	Yes; Applicable bus adapters: BA 2xRJ45, BA 2xFC, BA 2xSCRJ (as from FS03)
• Protocols			
- PROFINET IO Device	Yes	Yes	Yes
- Open IE communication	Yes	Yes	Yes
- Media redundancy	Yes	Yes	Yes; As MRP or MRPD client; max. 50 or 30 devices in the ring
Interface types			
RJ 45 (Ethernet)			
• 10 Mbps	Yes; for Ethernet services	Yes; for Ethernet services	Yes; for Ethernet services
• 100 Mbps	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)	Yes; PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes	Yes	Yes
• Autocrossing	Yes	Yes	Yes
Protocols			
PROFINET IO			
• Supports protocol for PROFINET IO	Yes	Yes	Yes
PROFINET IO Device			
• Services			
- Isochronous mode			Yes; Bus cycle time: min. 250 µs
- Open IE communication	Yes	Yes	Yes
- IRT, supported	Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	Yes; with send cycles of between 250 µs and 4 ms in increments of 125 µs	Yes; 250 µs, 500 µs, 1 ms, 2 ms, 4 ms additionally with IRT with high performance: 250 µs to 4 ms in 125 µs frame
- MRP, supported			Yes
- MRPD, supported			Yes
- PROFIenergy		Yes	Yes
- Prioritized startup	Yes	Yes	Yes
- Shared device	Yes	Yes	Yes
- Number of IO controllers with shared device, max.		2	4
Open IE communication			
• TCP/IP	Yes	Yes	Yes
• SNMP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
Isochronous mode			
Isochronous operation (application synchronized up to terminal)			Yes
equidistance			Yes
shortest clock pulse			250 µs
max. cycle			4 ms
Jitter, max.			1 µs
Interrupts/diagnostics/ status information			
Status indicator	Yes	Yes	Yes
Alarms			
• Alarms	Yes	Yes	Yes

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Technical specifications (continued)

	6ES7155-6AA00-0BN0 IM 155-6 PN ST with BA 2xRJ45 and server module	6ES7155-6AU00-0BN0 IM 155-6 PN ST with server module	6ES7155-6AU00-0CN0 IM 155-6 PN HF with server module
Diagnostic messages			
• Diagnostic functions	Yes	Yes	Yes
Diagnostics indication LED			
• RUN LED	Yes; Green LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED	Yes; Red LED
• MAINT LED	Yes; yellow LED	Yes; yellow LED	Yes; yellow LED
• Monitoring the supply voltage (PWR-LED)	Yes; Green LED	Yes; Green LED	Yes; Green LED
• Connection display LINK TX/RX	Yes	Yes; 2x green LED	Yes; 2x green LED
• Connection display DP			
Galvanic isolation			
between backplane bus and electronics	No		
between PROFINET and all other circuits	Yes	Yes	Yes
between supply and all other circuits	Yes	Yes	Yes
Permissible potential difference			
between different circuits	75 V DC / 60 V AC	75 V DC/60 V AC (base isolation)	75 V DC/60 V AC (base isolation)
Isolation			
Isolation checked with	707 V DC between supply voltage and electronics; 1 500 V AC between Ethernet and electronics	707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test)	707 V DC between supply voltage and electronics (type test); 1 500 V AC between Ethernet and electronics (type test)
Standards, approvals, certificates			
Network loading class	3	3	3
Security level	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1	According to Security Level 1 Test Cases V1.1.1
Dimensions			
Width	50 mm	50 mm	50 mm
Height	117 mm	117 mm	117 mm
Depth	74 mm	74 mm	74 mm
Weights			
Weight, approx.	191 g; IM155PN ST with BA 2x RJ45 (mounted)	147 g; without bus adapter	147 g; without bus adapter

Ordering data

	Article No.
Interface module Standard	
• IM 155-6PN ST, with server module and installed BusAdapter BA 2xRJ45	**6ES7155-6AA00-0BN0**
• IM 155-6PN ST, with server module, without BusAdapter	**6ES7155-6AU00-0BN0**
Interface module High Feature	
• IM 155-6PN HF, incl. server module, without BusAdapter	**6ES7155-6AU00-0CN0**

	Article No.
Accessories	
Digital input modules	
Digital input module DI 8x24 V DC Standard, BU type A0, color code CC01	**6ES7131-6BF00-0BA0**
Digital input module DI 16x24 V DC Standard, BU type A0, color code CC00	**6ES7131-6BH00-0BA0**
Digital input module DI 8x24 V DC High Feature, BU type A0, color code CC01, channel-specific diagnostics, isochronous mode, shared input (MSI)	**6ES7131-6BF00-0CA0**
Digital input module DI 8x24 V DC Source Input, Basic, BU type A0, color code CC02	**6ES7131-6BF60-0AA0**
Digital input module DI 8xNAMUR High Feature, BU type A0, color code CC01	**6ES7131-6TF00-0CA0**
Digital input module DI 4x120 V AC-230 V AC Standard, BU type B1, color code CC41	**6ES7131-6FD00-0BB1**
Fail-safe digital input module F-DI 8x24 V DC High Feature, BU type A0, color code CC01, SIL3/Cat.4/PLe	**6ES7136-6BA00-0CA0**

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Ordering data

	Article No.
Accessories (continued)	
Digital output modules	
Digital output module DQ 4x24 V DC/ 2 A Standard, BU type A0, color code CC02	**6ES7132-6BD20-0BA0**
Digital output module DQ 4x24 V DC/ 2 A High Feature, BU type A0, color code CC02, channel-precise diagnostics, isochronous mode, shared output (MSO)	**6ES7132-6BD20-0CA0**
Digital output module DQ 4x24 V AC-230 V AC/2 A Standard for BU type B1, color code CC41	**6ES7132-6FD00-0BB1**
Digital output module DQ 8x24 V DC/ 0.5 A Standard, BU type A0, color code CC02	**6ES7132-6BF00-0BA0**
Digital output module DQ 8x24 V DC/ 0.5 A High Feature, BU type A0, color code CC02	**6ES7132-6BF00-0CA0**
Digital output module DQ 8x24 V DC/ 0.5 A Sink output, Basic, BU type A0, color code CC01	**6ES7132-6BF60-0AA0**
Digital output module DQ 16x24 V DC/ 0.5 A Standard, BU type A0, color code CC00	**6ES7132-6BH00-0BA0**
Relay module RQ NO 4x120 V DC - 230 V AC/5 A Standard, normally-open, BU type B0, color code CC00	**6ES7132-6HD00-0BB0**
Signal relay module RQ CO 4x24 V UC/2 A Standard, changeover contact, BU type A0, color code CC00	**6ES7132-6GD50-0BA0**
Fail-safe digital output module F-DQ 4x24 V DC High Feature, BU type A0, color code CC01, SIL3/Cat.4/PLe	**6ES7136-6DB00-0CA0**
Fail-safe digital F output module relay 1 F-RQ, BU type F0, relay output (2 NO contacts), total output current 5 A, load voltages 24 V DC and 24...230 V AC; can be used up to SIL3 / Category 4/PLe if controlled via F-DQ	**6ES7136-6RA00-0BF0**
Analog input modules	
Analog input module AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	**6ES7134-6HD00-0BA1**
Analog input module AI 4xI 2-/4-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	**6ES7134-6GD00-0BA1**
Analog input module AI 4xRTD/TC 2-, 3-, 4-wire High Feature, BU type A0 or A1, color code CC00, 16 bit, ± 0.1%, scalable measuring range	**6ES7134-6JD00-0CA1**
Analog input module AI 2xU/I 2-/4-wire High Speed, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%, isochronous mode above 250 µs, oversampling above 50 µs	**6ES7134-6HB00-0DA1**
Analog input module AI 8xRTD/TC 2-wire High Feature, BU type A0 or A1, color code CC00, 16 bit, ± 0.1%, scalable measuring range	**6ES7134-6JF00-0CA1**
Analog input module AI 2xU/I 2-/4-wire High Feature, BU type A0 or A1, color code CC05, 16 bit, ± 0.1%, independent channel isolation, isochronous mode above 1 ms	**6ES7134-6HB00-0CA1**
Analog input module AI Energy Meter Standard, BU type D0, color code CC00	**6ES7134-6PA00-0BD0**

	Article No.
Accessories (continued)	
Analog output modules	
Analog output module AQ 4xU/I Standard, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	**6ES7135-6HD00-0BA1**
Analog output module AQ 2xU/I High Speed, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	**6ES7135-6HB00-0DA1**
Analog output module AQ 2xU/I High Feature, BU type A0 or A1, color code CC00, 16 bit, ± 0.1%	**6ES7135-6HB00-0CA1**
Communication modules	
Communication module CM 1xPtP Standard, for serial communication connections with RS232 and RS422 interfaces. RS485, BU type A0, color code CC00	**6ES7137-6AA00-0BA0**
CM 4xIO-Link Master V1.1 Standard communication module, for connecting up to 4 IO-Link devices, time-based IO, BU type A0, color code CC04	**6ES7137-6BD00-0BA0**
CM AS-i Master ST communication module, BU type C0 or C1, color code CC00	**3RK7137-6SA00-0BC1**
Special modules	
Fail-safe power module F-PM-E 24 V DC/8 A PPM Standard, BU type C0, color code CC52. 2 inputs, 1 output, SIL3/Cat.4/PLe	**6ES7136-6PA00-0BC0**
BusAdapter BA 2xRJ45	**6ES7193-6AR00-0AA0**
BusAdapter BA 2xFC for increased vibration and EMC loads	**6ES7193-6AF00-0AA0**
BusAdapter BA 2xSCRJ, fiber-optic connection for POF or PCF cables up to 250 m, with monitoring of damping	**6ES7193-6AP00-0AA0**
Can only be used with High Feature interface modules	
Reference identification label	**6ES7193-6LF30-0AW0**
10 sheets of 16 labels	
Shield connection	**6ES7193-6SC00-1AM0**
5 shield connections and 5 shield terminals each for plugging onto BaseUnits with automatic low-impedance connection to functional ground	
Labeling strips	
500 labeling strips on roll, light gray, for inscription with thermal transfer roll printer	**6ES7193-6LR10-0AA0**
500 labeling strips on roll, yellow, for inscription with thermal transfer roll printer	**6ES7193-6LR10-0AG0**
1000 labeling strips DIN A4, light gray, card, for inscription with laser printer	**6ES7193-6LA10-0AA0**
1000 labeling strips DIN A4, yellow, card, for inscription with laser printer	**6ES7193-6LA10-0AG0**

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Ordering data	Article No.
Accessories *(continued)*	
IE FC RJ45 plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 Plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
DIN rail 35 mm	
Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
Length: 2 m	**6ES5710-8MA41**
Manuals for ET 200SP distributed I/O system	
ET 200SP library: ET 200SP Manual Collection, comprising system manual, product information, and device manuals	
Manuals can be downloaded from the Internet as PDF files:	http://www.siemens.com/simatic-doku
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multi-language: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
Spare parts	
Server module	**6ES7193-6PA00-0AA0**
Power supply connector for interface module	
for connecting the 24 V DC supply voltage	
with push-in terminals (10 units)	**6ES7193-4JB00-0AA0**
with screw-type terminals (10 units)	**6ES7193-4JB50-0AA0**

More information

Brochures

Information material for downloading can be found on the Internet:

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Overview



- Interface module for SIMATIC ET 200S with integrated CPU S7-314
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- PROFINET IO Controller for up to 128 IO Devices
- PROFINET I-Device for connecting the CPU as an intelligent PROFINET device under a SIMATIC or non-Siemens PROFINET IO controller
- PROFINET interface with integrated 3-port switch
- Isochronous mode on PROFINET
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)
- Fail-safe IM 151-8F PN/DP CPU PROFIsafe available

Note:

SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7151-8AB01-0AB0 IM 151-8 PN/DP CPU
General information	
Engineering with	
• Programming package	STEP7 V 5.5 or higher
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	5.5 W
Memory	
Work memory	
• integrated	192 kbyte
• Size of retentive memory for retentive data blocks	64 kbyte
Load memory	
• pluggable (MMC), max.	8 Mbyte
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
IEC counter	
• present	Yes
S7 times	
• Number	256
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	256 byte

	6ES7151-8AB01-0AB0 IM 151-8 PN/DP CPU
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	1
1st interface	
Interface type	PROFINET
Physics	Ethernet
Number of ports	3; RJ45
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET CBA	Yes
• Point-to-point connection	No
PROFINET IO Controller	
• Max. number of connectable IO devices for RT	128
• Number of IO devices with IRT and the option "high flexibility"	128
• Number of IO Devices with IRT and the option "high performance", max.	64

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Technical specifications (continued)

	6ES7151-8AB01-0AB0 IM 151-8 PN/DP CPU
2nd interface	
Interface type	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
DP master	
• Number of DP slaves, max.	32; Per station
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
• supported	No
S7 basic communication	
• supported	Yes; I blocks
S7 communication	
• supported	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
Web server	
• supported	Yes
Number of connections	
• overall	12
Configuration	
programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes; Optional
- CFC	Yes; Optional
- GRAPH	Yes; Optional
- HiGraph®	Yes; Optional
Know-how protection	
• User program protection/ password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	120 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
Weights	
Weight, approx.	320 g; DP master module: Approx. 100 g

Ordering data

	Article No.
IM 151-8 PN/DP CPU interface module (192 K) Including termination module	**6ES7151-8AB01-0AB0**
Accessories	
MMC 64 kByte [1] for program backup	**6ES7953-8LF30-0AA0**
MMC 128 kByte [1] for program backup	**6ES7953-8LG30-0AA0**
MMC 512 kByte [1] for program backup	**6ES7953-8LJ30-0AA0**
MMC 2 MByte [1] for program backup and/or firmware update	**6ES7953-8LL31-0AA0**
MMC 4 MByte [1] for program backup	**6ES7953-8LM31-0AA0**
MMC 8 MByte [1] for program backup	**6ES7953-8LP31-0AA0**
External prommer for MMC, among others, with USB interface	**6ES7792-0AA00-0XA0**
PG with integrated MMC interface	On request
Label sheets DIN A4 (10 units) Each sheet contains 60 label strips for peripheral modules and 20 label strips for interface modules	
• petrol	**6ES7193-4BH00-0AA0**
• red	**6ES7193-4BD00-0AA0**
• yellow	**6ES7193-4BB00-0AA0**
• light beige	**6ES7193-4BA00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files:	http://www.siemens.com/simatic-docu
Terminating module as spare part for ET 200S	**6ES7193-4JA00-0AA0**
Power supply connector Spare part for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
• with screw terminals, 2-pin	**6ES7193-4JB50-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
• 2 m long	**6ES5710-8MA41**
Industrial Ethernet FC RJ45 Plug 90 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
• 1 unit	**6GK1901-1BB20-2AA0**
• 10 units	**6GK1901-1BB20-2AB0**
• 50 units	**6GK1901-1BB20-2AE0**
Industrial Ethernet FastConnect installation cables	
• FastConnect Standard Cable	**6XV1840-2AH10**
• FastConnect Trailing Cable	**6XV1840-3AH10**
• FastConnect Marine Cable	**6XV1840-4AH10**
Industrial Ethernet FastConnect stripping tool	**6GK1901-1GA00**

[1] An MMC is essential to operate the CPU

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Master interface module for IM 151 CPU interface modules

Overview



PROFIBUS DP master interface module for IM 151-7(F) CPU / IM 151-8(F) PN/DP CPU interface modules

- Integrated 12 Mbit/s PROFIBUS DP master interface in copper design
- Facilitates parallel operation of two PROFIBUS DP interfaces on one IM 151-7 (F-)CPU
- Enables operation of a PROFIBUS DP interface on an IM 151-8(F) PN/DP CPU
- Increases the availability of plants and machinery
- Functionality corresponds to the interface of an S7-300 CPU 314-2 DP configured as DP master

Programming is with STEP 7 from Version V5.2 with Service Pack 1.

Technical specifications

	6ES7138-4HA00-0AB0
Hardware configuration	
Number of modules per CPU	1
Dimensions	
Width	35 mm
Height	119.5 mm
Depth	75 mm
Weights	
Weight, approx.	100 g

Ordering data

	Article No.
Master interface module for IM 151-7 CPU / IM 151-7 F-CPU / IM 151-8 PN/DP CPU / IM 151-8F PN/DP CPU interface modules	**6ES7138-4HA00-0AB0**
Accessories	
PROFIBUS DP bus connector RS 485	
with 90° cable outlet, max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7972-0BA12-0XA0**
• with PG interface	**6ES7972-0BB12-0XA0**
with 90° cable outlet for FastConnect connection system, max. transfer rate 12 Mbit/s	
• without PG interface, 1 unit	**6ES7972-0BA52-0XA0**
• without PG interface, 100 units	**6ES7972-0BA52-0XB0**
• with PG interface, 1 unit	**6ES7972-0BB52-0XA0**
• with PG interface, 100 units	**6ES7972-0BB52-0XB0**
PROFIBUS Fast Connect bus cable	**6XV1830-0EH10**
Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum ordering quantity 20 m	
PROFIBUS bus components	See CA 01 catalog
For establishing MPI/PROFIBUS communication	
Label sheets DIN A4 (10 pieces)	
Each sheet contains 60 labeling strips for peripheral modules and 20 labeling strips for interface modules	
• petrol	**6ES7193-4BH00-0AA0**
• red	**6ES7193-4BD00-0AA0**
• yellow	**6ES7193-4BB00-0AA0**
• light beige	**6ES7193-4BA00-0AA0**
ET 200S distributed I/O system manuals	
are available on the Internet as PDF files:	http://www.siemens.com/simatic-doku

More information

Brochures

Information material for downloading can be found in the Internet:

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

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IM 151-8 F PN/DP CPU

Overview



- Interface module with integrated fail-safe CPU for SIMATIC ET 200S
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061, up to PLe according to ISO 13849-1:2006 and PL e according to ISO 13849.1
- For high-performance control solutions in ET 200S
- Increase of the availability of systems and machines
- PROFINET IO Controller for up to 128 IO Devices
- PROFINET interface with integrated 3-port switch
- With many communication options: PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)
- Optional PROFIBUS master for 32 PROFIBUS DP slaves (with master interface 6ES7138-4HA00-0AB0)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7151-8FB01-0AB0 IM 151-8 F PN/DP CPU
General information	
Hardware product version	01
Firmware version	V3.2
Engineering with • Programming package	 STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	5.5 W
Memory	
Work memory • integrated • Size of retentive memory for retentive data blocks	 256 kbyte; F or program and data 64 kbyte
Load memory • pluggable (MMC), max.	 8 Mbyte
CPU processing times	
for bit operations, typ.	0.06 µs
for word operations, typ.	0.12 µs
for fixed point arithmetic, typ.	0.16 µs
for floating point arithmetic, typ.	0.59 µs
Counters, timers and their retentivity	
S7 counter • Number	 256
IEC counter • present	 Yes
S7 times • Number	 256
IEC timer • present	 Yes
Data areas and their retentivity	
Flag • Number, max.	 256 byte
Address area	
I/O address area • Inputs • Outputs	 2 048 byte 2 048 byte
Process image • Inputs, adjustable • Outputs, adjustable	 2 048 byte 2 048 byte
Time of day	
Clock • Hardware clock (real-time clock)	 Yes
Operating hours counter • Number	 1

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Technical specifications (continued)

	6ES7151-8FB01-0AB0 IM 151-8 F PN/DP CPU
1st interface	
Interface type	PROFINET
Physics	Ethernet
Number of ports	3; RJ45
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET CBA	Yes
• Open IE communication	Yes
• Web server	Yes
- Number of HTTP clients	5
• Point-to-point connection	No
PROFINET IO Controller	
• Number of connectable IO devices, max.	128
• Number of IO devices with IRT and the option "high flexibility"	128
• Number of IO Devices with IRT and the option "high performance", max.	64
2nd interface	
Interface type	External interface via master module 6ES7138-4HA00-0AB0
Physics	RS 485
Functionality	
• MPI	No
• DP master	Yes
• DP slave	No
• PROFINET IO Controller	No
• PROFINET IO Device	No
• PROFINET CBA	No
DP master	
• Number of DP slaves, max.	32; Per station
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	No

	6ES7151-8FB01-0AB0 IM 151-8 F PN/DP CPU
Communication functions	
PG/OP communication	Yes
Data record routing	Yes; With DP master module
Global data communication	
• supported	No
S7 basic communication	
• supported	Yes; I blocks
S7 communication	
• supported	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• ISO-on-TCP (RFC1006)	Yes; via integrated PROFINET interface and loadable FBs
• UDP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
Web server	
• supported	Yes
Number of connections	
• overall	12
Configuration	
Configuration software	
• STEP 7	Yes; V5.5 or higher
programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes; Optional
- CFC	Yes; Optional
- GRAPH	Yes; Optional
- HiGraph®	Yes; Optional
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	120 mm; DP master module: 35 mm
Height	119.5 mm
Depth	75 mm
Weights	
Weight, approx.	320 g; DP master module: Approx. 100 g

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IM 151-8 F PN/DP CPU

Ordering data	Article No.
IM 151-8F PN/DP CPU interface module (256 K) Including termination module	**6ES7151-8FB01-0AB0**
Distributed Safety V5.4 programming tool *Task:* Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software and documentation[1]; email address required for delivery.	**6ES7833-1FC02-0YH5**
Distributed Safety Upgrade from V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**
STEP 7 Safety Advanced V13 *Task:* Engineering too l for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 Professional V13	
Floating license for 1 user	**6ES7833-1FA13-0YA5**
Floating license for 1 user, license key download without software or documentation[1]; email address required for delivery	**6ES7833-1FA13-0YH5**
Accessories	
SIMATIC Micro Memory Cards	
MMC 64 KB [2] for program backup	**6ES7953-8LF30-0AA0**
MMC 128 KB [2] for program backup	**6ES7953-8LG30-0AA0**
MMC 512 KB [2] for program backup	**6ES7953-8LJ30-0AA0**
MMC 2 MB [2] for program backup and/or firmware update	**6ES7953-8LL31-0AA0**
MMC 4 MB [2] for program backup	**6ES7953-8LM31-0AA0**
MMC 8 MB [2] for program backup	**6ES7953-8LP31-0AA0**
External prommer for MMC with USB interface	**6ES7792-0AA00-0XA0**
PG with integrated MMC interface	On request

	Article No.
Accessories *(continued)*	
Label sheets DIN A4 (10 pieces) Each sheet contains 60 labeling strips for peripheral modules and 20 labeling strips for interface modules	
• Petrol	**6ES7193-4BH00-0AA0**
• Red	**6ES7193-4BD00-0AA0**
• Yellow	**6ES7193-4BB00-0AA0**
• Light beige	**6ES7193-4BA00-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files:	http://www.siemens.com/simatic-docu
Termination module as spare part for ET 200S	**6ES7193-4JA00-0AA0**
Power supply connector Spare part for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
• with screw terminals, 2-pin	**6ES7193-4JB50-0AA0**
SIMATIC S5, 35 mm DIN rail	
• Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
• Length: 2 m	**6ES5710-8MA41**
Industrial Ethernet FC RJ45 Plug 90 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
• 1 unit	**6GK1901-1BB20-2AA0**
• 10 units	**6GK1901-1BB20-2AB0**
• 50 units	**6GK1901-1BB20-2AE0**
Industrial Ethernet FastConnect installation cables	
• FastConnect Standard Cable	**6XV1840-2AH10**
• FastConnect Trailing Cable	**6XV1840-3AH10**
• FastConnect Marine Cable	**6XV1840-4AH10**
Industrial Ethernet FastConnect stripping tool	**6GK1901-1GA00**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

[2] An MMC is essential for operating the CPU

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Overview



- Interface module for linking the ET 200S to PROFINET
- Handles all data exchange with the PROFINET I/O Controller
- 3 versions:
  - IM151-3 PN STANDARD
  - IM151-3 PN HIGH FEATURE and IM 151-3 PN FO: supports, in contrast to the STANDARD version, the operation of PROFIsafe F modules
- with integrated 2-port switch for line topology
- Delivery including connecting module

Note:

Micro Memory Card required for operation depending on the configuration.

Technical specifications

	6ES7151-3AA23-0AB0 IM 151-3 PN	6ES7151-3BA23-0AB0 IM 151-3 PN PROFINET High Feature
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0301H	0301H
Supply voltage		
Mains buffering		
• Mains buffering, min.	20 ms	20 ms
Address area		
Addressing volume		
• Inputs	256 byte	256 byte
• Outputs	256 byte	256 byte
Interfaces		
Supports protocol for PROFINET IO		
• RJ45	Yes	Yes
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	No	No
Interrupts/diagnostics/ status information		
Alarms		
• Alarms	Yes	Yes
Diagnostic messages		
• Diagnostic functions	Yes	Yes
Diagnostics indication LED		
• Bus fault BF (red)	Yes	Yes
• Group error SF (red)	Yes	Yes
• Monitoring 24 V voltage supply ON (green)	Yes	Yes
• Connection to network LINK (green)	Yes	Yes
• Transmit/receive RX/TX (yellow)	Yes	Yes
Galvanic isolation		
between backplane bus and electronics	No	No
between supply voltage and electronics	No	No
between Ethernet and electronics	Yes	Yes
Dimensions		
Width	60 mm	60 mm
Height	119.5 mm	119.5 mm
Depth	75 mm	75 mm
Weights		
Weight, approx.	120 g	135 g

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Ordering data

	Article No.
IM 151-3 PN interface module For ET 200S; transfer rates up to 100 Mbit/s; data volume depends on the number of modules inserted, up to 63 modules can be connected, bus connection through RJ45	**6ES7151-3AA23-0AB0**
IM 151-3 PN PROFINET High Feature interface module for ET 200S; transfer rate up to 100 Mbit/s; max. 63 modules up to 2 m wide can be connected; bus connection via RJ45, incl. termination module	**6ES7151-3BA23-0AB0**
IM 151-3 FO interface module for ET 200S; with 2 PROFINET FO-interfaces and integrated 2-port switch, max. 63 modules up to 2 m wide can be connected, incl. termination module	**6ES7151-3BB23-0AB0**
Accessories	
Industrial Ethernet FC RJ45 Plug 90 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
1 unit	**6GK1901-1BB20-2AA0**
10 units	**6GK1901-1BB20-2AB0**
50 units	**6GK1901-1BB20-2AE0**
Industrial Ethernet FastConnect installation cables	
Fast Connect standard cable	**6XV1840-2AH10**
Fast Connect trailing cable	**6XV1840-3AH10**
Fast Connect marine cable	**6XV1840-4AH10**
Termination Kits	
SC RJ POF Plug Assembly case for on-site assembly of SC RJ plugs consisting of stripping tool, kevlar cutter, microscope, abrasive paper, grinding support	**6GK1900-0ML00-0AA0**
IE SC RJ POF Plug Screw-in plug for on-site assembly to POF fiber optic cable (1 pack = 20 units)	**6GK1900-0MB00-0AC0**
IE SC RJ Refill Set POF Refill set for Termination Kit SC RJ POF Plug, consisting of abrasive paper and grinding plate (set of 5)	**6GK1900-0MN00-0AA0**
SC RJ POF Plug Assembly case for on-site assembly of SC RJ plugs consisting of stripping tool, buffer stripping tool, kevlar cutter, fiber breaking tool, microscope	**6GK1900-0NL00-0AA0**
Industrial Ethernet SC RJ PCF Plug Screw-in plug for on-site assembly to PCF fiber optic cable (1 pack = 10 units)	**6GK1900-0NB00-0AC0**
Industrial Ethernet Fast Connect stripping tool	**6GK1901-1GA00**

	Article No.
MMCs for storing the device name	
MMC 64 kByte [1]	**6ES7953-8LF30-0AA0**
MMC 128 kByte [1]	**6ES7953-8LG30-0AA0**
MMC 512 kByte [1]	**6ES7953-8LJ30-0AA0**
MMCs for storing the device name and/or firmware update	
MMC 2 MByte [1]	**6ES7953-8LL31-0AA0**
MMC 4 MByte [1]	**6ES7953-8LM31-0AA0**
MMC 8 MByte [1]	**6ES7953-8LP31-0AA0**
ET 200S distributed I/O system manuals are available on the Internet as PDF files:	http://www.siemens.com/simatic-doku
SIMATIC Manual Collection 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)	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	**6ES7998-8XC01-8YE2**
Label sheets DIN A4 (10 pieces) Each sheet contains 60 labeling strips for peripheral modules and 20 labeling strips for interface modules	
• petrol	**6ES7193-4BH00-0AA0**
• red	**6ES7193-4BD00-0AA0**
• yellow	**6ES7193-4BB00-0AA0**
• light beige	**6ES7193-4BA00-0AA0**
Termination module as spare part for ET 200S	**6ES7193-4JA00-0AA0**
Power supply connector Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
• with screw-type terminals	**6ES7193-4JB50-0AA0**
DIN rail 35 mm	
• Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
• Length: 2 m	**6ES5710-8MA41**
Industrial Ethernet Switches Managed Industrial Ethernet Switches; Isochronous real time, LED diagnostics, fault signaling contact with SET button, redundant power supply	
• SCALANCE X202-2P IRT; 2 x 10/100 Mbit/s RJ45 ports, 2 x 100 Mbit/s POF/PCF SC RJ	**6GK5202-2BH00-2BA3**
• SCALANCE X201-3P IRT; 1 x 10/100 Mbit/s RJ45 ports, 3 x 100 Mbit/s POF/PCF SC RJ	**6GK5201-3BH00-2BA3**
• SCALANCE X200-4P IRT; 4 x 100 Mbit/s POF/PCF SC RJ	**6GK5200-4AH00-2BA3**

[1] For operating the IM 151-3, an MMC is essential

More information

Brochures

Information material for downloading can be found in the Internet:
http://www.siemens.com/simatic/printmateria

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Overview



- Interface modules for linking the ET 200MP to PROFINET
- These handle data exchange with the PROFINET I/O controller in the PLC
- Integrated 2-port switch for line topology
- Max. 30 I/O modules
- Shortest bus cycle 250 µs
- Linking to the isochronous task of the CPU

- Prioritized fast startup (FSU) with 500 ms (max. 12 I/O modules)
- Media Redundancy Protocol (MRP)
- Shared device on up to two I/O controllers (when configuring using GSD file; depends on the respective configuration tool)
- Omission of SIMATIC memory card (SMC); IM replacement without PG using LLDP

Starting from FW version V2.0.0, the IM155-5 PN ST interface module supports the following new functions:

- Submodule-granular shared device with up to two I/O controllers
- Configuration control (option handling)
- Module-internal shared input and output (MSI/MSO), i.e. the inputs or outputs of a module can be made available simultaneously to up to two I/O controllers

The IM155-5 PN HF interface module has the following additional functions:

- Shared device on up to 4 IO controllers
- Module-internal shared input and output (MSI/MSO) on up to four IO controllers
- Operation on a highly available SIMATIC S7-400H
- Support for the MRPD function (media redundancy with planned duplication)

Technical specifications

	6ES7155-5AA00-0AB0 IM 155-5 PN ST	6ES7155-5AA00-0AC0 IM 155-5 PN HF
General information		
Product function		
• I&M data	Yes; I&M0 to I&M3	Yes; I&M0 to I&M3
Engineering with		
• STEP 7 TIA Portal can be configured/integrated as of version	V13 / V13	V13 / V13
• STEP 7 can be configured/integrated as of version	V5.5 SP3 / -	V5.5 SP3 / -
• PROFINET as of GSD version/GSD revision	V2.3 / -	V2.3 / -
Supply voltage		
Type of supply voltage	DC	DC
Rated value (DC)	24 V	24 V
Reverse polarity protection	Yes	Yes
Short-circuit protection	Yes	Yes
Mains buffering		
• Mains/voltage failure stored energy time	5 ms	5 ms
Hardware configuration		
Integrated power supply		Yes
Rack		
• Modules per rack, max.	30; I/O modules	30; I/O modules
Interfaces		
Number of PROFINET interfaces	1	1
1st interface		
• Interface types		
- Number of ports	2	2
- Integrated switch	Yes	Yes
- RJ 45 (Ethernet)	Yes	Yes
• Protocols		
- PROFINET IO Device	Yes	Yes
- Media redundancy	Yes	Yes

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Technical specifications (continued)

	6ES7155-5AA00-0AB0 IM 155-5 PN ST	6ES7155-5AA00-0AC0 IM 155-5 PN HF
Interface types		
RJ 45 (Ethernet)		
• 10 Mbps		No
• 100 Mbps	Yes	Yes
• Transmission procedure	PROFINET with 100 Mbit/s full duplex (100BASE-TX)	PROFINET with 100 Mbit/s full duplex (100BASE-TX)
• Autonegotiation	Yes	Yes
• Autocrossing	Yes	Yes
Protocols		
PROFINET IO	Yes	Yes
PROFINET IO Device		
• Services		
- Isochronous mode	Yes	Yes
- IRT, supported	Yes	Yes
- MRP, supported	Yes	Yes
- MRPD, supported		Yes
- PROFINET system redundancy		Yes
- Prioritized startup	Yes	Yes
- Shared device	Yes	Yes
- Number of IO controllers with shared device, max.	2	4
Open IE communication		
• TCP/IP	Yes	Yes
• SNMP	Yes	Yes
• LLDP	Yes	Yes
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes	Yes
equidistance	Yes	Yes
shortest clock pulse	250 µs	250 µs
max. cycle	4 ms	4 ms
Interrupts/diagnostics/ status information		
Status indicator	Yes	Yes
Alarms		
• Alarms	Yes	Yes
Diagnostic messages		
• Diagnostic functions	Yes	Yes
Diagnostics indication LED		
• RUN LED	Yes; Green LED	Yes; Green LED
• ERROR LED	Yes; Red LED	Yes; Red LED
• MAINT LED	Yes; yellow LED	Yes; yellow LED
• Connection display LINK TX/RX	Yes; yellow LED	Yes; yellow LED
Isolation		
Isolation checked with	707 V DC (type test)	707 V DC (type test)
Dimensions		
Width	35 mm	35 mm
Height	147 mm	155 mm
Depth	129 mm	120 mm
Weights		
Weight, approx.	310 g	350 g

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Ordering data

	Article No.
IM 155-5 PN interface module	
IP 20 degree of protection, module width 35 mm, installation on S7-1500 mounting rail	
IM 155-5 PN ST, standard version	**6ES7155-5AA00-0AB0**
IM 155-5 PN HF, High Feature version with additional functions	**6ES7155-5AA00-0AC0**
Accessories	
Front flap for IM 155-5 PN (spare part), 5 units	**6ES7528-0AA70-7AA0**
SIMATIC S7-1500 mounting rail	
Fixed lengths, with grounding elements	
• 160 mm	**6ES7590-1AB60-0AA0**
• 482 mm	**6ES7590-1AE80-0AA0**
• 530 mm	**6ES7590-1AF30-0AA0**
• 830 mm	**6ES7590-1AJ30-0AA0**
For cutting to length by customer, without drill holes; grounding elements must be ordered separately	
• 2000 mm	**6ES7590-1BC00-0AA0**
PE connection element for mounting rail 2000 mm	**6ES7590-5AA00-0AA0**
20 units	
Power supply	
For supplying the backplane bus of the S7-1500	
24 V DC input voltage, power 25 W	**6ES7505-0KA00-0AB0**
24/48/60 V DC input voltage, power 60 W	**6ES7505-0RA00-0AB0**
120/230 V AC input voltage, power 60 W	**6ES7507-0RA00-0AB0**
Power connector	**6ES7590-8AA00-0AA0**
With coding element for power supply module; spare part, 10 units	
Load power supply	
24 V DC/3 A	**6EP1332-4BA00**
24 V DC/8 A	**6EP1333-4BA00**
Power supply connector	
Spare part; for connecting the 24 V DC supply voltage	
• with push-in terminals	**6ES7193-4JB00-0AA0**
IE FC RJ45 Plugs	
RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
IE FC RJ45 plug 180	
180° cable outlet	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**

	Article No.
IE FC TP Standard Cable GP 2x2	**6XV1840-2AH10**
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	
IE FC TP Trailing Cable 2 x 2 (Type C)	**6XV1840-3AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 for trailing cable use; PROFINET-compatible; with UL approval;	
Sold by the meter, max. length 1000 m; minimum order 20 m	
IE FC TP Marine Cable 2 x 2 (Type B)	**6XV1840-4AH10**
4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/ IE FC RJ45 Plug 180/90 marine certified,	
Sold by the meter, max. length 1000 m; minimum order 20 m	
IE FC Stripping Tool	**6GK1901-1GA00**
Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	
Client Modules SCALANCE W734	
IWLAN Ethernet client modules with built-in wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbit/s; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20 °C to +60 °C); scope of delivery: Mounting hardware, 4-pin screw terminal for 24V DC; manual on CD-ROM; German/English	
SCALANCE W734-1 RJ45	
for managing the wireless connection of up to eight linked devices with Industrial Ethernet connection	
• National approvals for operation outside the USA	**6GK5734-1FX00-0AA0**
• National approvals for operation within the USA[1)]	**6GK5734-1FX00-0AB0**
KEY-PLUG W740 iFeatures	**6GK5907-4PA00**
Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W client modules with PLUG compartment	

1) Please note national approvals under http://www.siemens.com/wireless approvals

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IM 153-4 PN

Overview



- To connect ET 200M to PROFINET IO (via copper line, RJ45) as an IO device
- 2 versions:
  - IM 153-4 PN STANDARD
  - IM 153-4 PN HIGH FEATURE:
    supports, in contrast to the STANDARD version, the operation of PROFIsafe F and HART modules. The operation of an S7-400H (system redundancy) is likewise possible.
- Integrated 2-port switch
- 12 modules per station
- Usable I/O capacity: 192 bytes each
- Active bus backplane to hot-swap modules available as an option
- Baud rate 10 Mbit/s / 100 Mbit/s (autonegotiation / full duplex)
- I&M functions according to PNO-Guideline Order-No. 3.502, Version V1.1

Note:

Micro Memory Card with at least 64 KB required if not all the stations in the network support LLDP (Link Layer Discovery Protocol; proximity detection).

Technical specifications

	6ES7153-4AA01-0XB0 IM 153-4 PN STANDARD	6ES7153-4BA00-0XB0 IM 153-4 PN HIGH FEATURE
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0302H	0302H
Supply voltage		
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
permissible range (ripple included), lower limit (DC)	20.4 V	18.5 V
permissible range (ripple included), upper limit (DC)	28.8 V	30.2 V
External protection for supply cables (recommendation)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)	In a construction with grounded reference potential, a fuse is necessary for redundant interface modules (Recommendation: 2.5 A)
Mains buffering		
• Mains/voltage failure stored energy time	5 ms	5 ms
Input current		
Current consumption, max.	600 mA	600 mA
Inrush current, typ.	4 A	4 A
I^2t	0.09 $A^2 \cdot s$	0.09 $A^2 \cdot s$

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Technical specifications (continued)

	6ES7153-4AA01-0XB0 IM 153-4 PN STANDARD	6ES7153-4BA00-0XB0 IM 153-4 PN HIGH FEATURE
Output voltage		
Rated value (DC)	5 V	5 V
Rated value, 5 V DC	Yes	Yes
Output current		
for backplane bus (5 V DC), max.	1.5 A	1.5 A
Power losses		
Power loss, typ.	6 W	6 W
Address area		
Addressing volume		
• Inputs	192 byte	672 byte; Extended HART user data
• Outputs	192 byte	192 byte
Hardware configuration		
Number of modules per DP slave interface, max.	12	12
1st interface		
PROFINET IO Controller		
• Services		
- PROFINET system redundancy		Yes
Communication functions		
Bus protocol/transmission protocol	PN IO	PN IO
Interrupts/diagnostics/status information		
Diagnostics indication LED		
• Connection to network LINK (green)	Yes	Yes
• Transmit/receive RX/TX (yellow)	Yes	Yes
Isolation		
Isolation checked with	500 V DC	Between PROFINET and 24 V supply: 1 500 V AC, between functional grounding and 24 V supply: 500 V DC
Degree and class of protection		
IP20	Yes	Yes
Ambient conditions		
Operating temperature		
• Min.	0 °C	0 °C
• max.	60 °C	60 °C
Air pressure		
• Operating altitude above sea level, max.	2 000 m	2 000 m
Dimensions		
Width	40 mm	40 mm
Height	125 mm	125 mm
Depth	118 mm	118 mm
Weights		
Weight, approx.	215 g	215 g

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Ordering data	Article No.
IM 153-4 PN interface module	
I/O device to connect an ET 200M to PROFINET	
Standard	**6ES7153-4AA01-0XB0**
High Feature	**6ES7153-4BA00-0XB0**
Accessories	
Bus modules for ET 200M	
• To accommodate a power supply and an IM 153 module for the hot-swapping function during RUN, incl. bus module cover	**6ES7195-7HA00-0XA0**
• To accommodate two 40-mm wide I/O modules for the hot-swapping function	**6ES7195-7HB00-0XA0**
• To accommodate one 80-mm wide I/O module for the hot-swapping function	**6ES7195-7HC00-0XA0**
SIMATIC Micro Memory Card	
64 KB[1]	**6ES7953-8LF30-0AA0**
SIMATIC DP DIN rail for ET 200M	
Accommodates up to 5 bus modules; for hot-swapping function	
• Length: 483 mm (19“)	**6ES7195-1GA00-0XA0**
• Length: 530 mm	**6ES7195-1GF30-0XA0**
• Length: 620 mm	**6ES7195-1GG30-0XA0**
• Length: 2 000 mm	**6ES7195-1GC00-0XA0**
SIMATIC S7-300 mounting rail	
Length: 160 mm	**6ES7390-1AB60-0AA0**
Length: 480 mm (19“)	**6ES7390-1AE80-0AA0**
Length: 530 mm	**6ES7390-1AF30-0AA0**
Length: 830 mm	**6ES7390-1AJ30-0AA0**
Length: 2000 mm	**6ES7390-1BC00-0AA0**
Power supply connector	
For connection of the 24 V DC power supply; spare part, 1 pack containing 10 units	
Spring-loaded connection	**6ES7193-4JB00-0AA0**
Screw terminal connections	**6ES7193-4JB50-0AA0**

	Article No.
S7 Manual Collection	**6ES7998-8XC01-8YE0**
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)	
S7 Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	
Industrial Ethernet 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	
1 unit	**6GK1901-1BB10-2AA0**
10 units	**6GK1901-1BB10-2AB0**
50 units	**6GK1901-1BB10-2AE0**
Industrial Ethernet FastConnect installation cables	
• Fast Connect standard cable	**6XV1840-2AH10**
• Fast Connect trailing cable	**6XV1840-3AH10**
• Fast Connect marine cable	**6XV1840-4AH10**
Industrial Ethernet FastConnect	
Stripping Tool	**6GK1901-1GA00**

[1] To operate the IM153-4, an MMC is required with at least 64 KB memory. Cards with higher memory capacity may also be used.

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Overview



Interface module for processing the communication between ET 200pro and a higher-level controller over PROFINET IO.

Technical specifications

	6ES7154-4AB10-0AB0 IM 154-4 PN High Feature
General information	
Vendor identification (VendorID)	0x002A
Device identifier (DeviceID)	0x0305
Supply voltage	
24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Load voltage 1L+	
• Rated value (DC)	24 V
• Short-circuit protection	Yes; Fuse in lower part is exchangeable, the fuse on the IM-LP is not
• Reverse polarity protection	Yes; against destruction
Input current	
from supply voltage 1L+, max.	400 mA; Dependent on terminal module, typ. maximum value for FO connection method, full load on RWB and 20.4 V input voltage
Power losses	
Power loss, typ.	6 W; Dependent on terminal module, typ. maximum value for CU connection method, full load on RWB, for FO the value is approx. 0.7 W higher
Memory	
Micro Memory Card	No; Internal memory medium
Address area	
Addressing volume	
• Inputs	256 byte
• Outputs	256 byte
Interfaces	
Supports protocol for PROFINET IO	
• Automatic detection of transmission speed	Yes
• Transmission rate, max.	100 Mbit/s
• Services	ARP, PING, SNMP
Protocols	
Supports protocol for PROFINET IO	Yes

	6ES7154-4AB10-0AB0 IM 154-4 PN High Feature
Interrupts/diagnostics/ status information	
Diagnostics indication LED	
• Bus fault BF (red)	Yes; Additional LEDs (MAINT, P1/2 LINK, P1/2 RX/TX) available
• Group error SF (red)	Yes
• Monitoring 24 V voltage supply ON (green)	Yes
• Load voltage monitoring DC 24 V (green)	Yes
Parameter	
Diagnostic alarm	1
Hardware interrupt	1
Swapping interrupt	1
identifier-related diagnostic data	1
Module status	1
Channel-related diagnostics	1
Startup if setpoint not equal to actual configuration	1
Hot swapping of modules	1
Galvanic isolation	
between backplane bus and electronics	No
Isolation	
Isolation checked with	500 V DC
Degree and class of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Ambient conditions	
Operating temperature	
• Min.	-25 °C
• max.	55 °C
Storage/transport temperature	
• Min.	-40 °C
• max.	70 °C
Dimensions	
Width	135 mm
Height	130 mm
Depth	59.3 mm
Weights	
Weight, approx.	490 g

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Ordering data	Article No.
IM 154-4 PN High Feature interface module For communication between ET 200pro and higher-level controllers over PROFINET IO; support of PROFIsafe.	**6ES7154-4AB10-0AB0**
Accessories	
CM IM PN connection module M12, 7/8" For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x M12 and 2 x 7/8".	**6ES7194-4AJ00-0AA0**
CM IM PN connection module 2xRJ45 For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x RJ45 and 2 x push-pull power connector.	**6ES7194-4AF00-0AA0**
CM IM PN 2xSCRJ FO connection module For connecting PROFINET PN and 24 V power supply to PROFINET interface modules, 2 x SCRJ FO and 2 x push-pull power connector.	**6ES7194-4AG00-0AA0**
M12 sealing cap For protection of unused M12 connections with ET 200pro.	**3RX9802-0AA00**
IE M12 connecting cables Preassembled with two M12 connectors, up to 85 m, in various lengths:	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1.0 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2.0 m	**6XV1870-8AH20**
3.0 m	**6XV1870-8AH30**
5.0 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**
Other special lengths with 90° or 180° cable outlet.	See http://support.automation.siemens.com/WW/view/en/26999294
7/8" sealing caps 1 pack = 10 units	**6ES7194-3JA00-0AA0**
7/8" connecting cable to power supply 5-core, 5 x 1.5 mm^2, trailing type, preassembled with two 7/8" connectors, 5-pin, up to 50 m, in various lengths:	
1.5 m	**6XV1822-5BH15**
2.0 m	**6XV1822-5BH20**
3.0 m	**6XV1822-5BH30**
5.0 m	**6XV1822-5BH50**
10 m	**6XV1822-5BN10**
15 m	**6XV1822-5BN15**
Other special lengths with 90° or 180° cable outlet.	See http://support.automation.siemens.com/WW/view/en/26999294

	Article No.
Accessories (continued)	
Power cable 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.	**6XV1830-8AH10**
7/8" cable connector For ET 200eco, with axial cable outlet.	
• With male insert, 5-pack	**6GK1905-0FA00**
• With female insert, 5-pack	**6GK1905-0FB00**
Industrial Ethernet FastConnect installation cables	
• **IE FC TP Standard Cable GP 2 x 2**; Sold by the meter, max. delivery unit 1 000 m; Minimum order quantity 20 m.	**6XV1840-2AH10**
• **IE FC TP Trailing Cable 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m.	**6XV1840-3AH10**
• **IE FC TP Trailing Cable GP 2 x 2**; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m.	**6XV1870-2D**
• **IE TP Torsion Cable GP 2 x 2**; sold by the meter, max. delivery unit 1000 m; minimum order quantity 20 m.	**6XV1870-2F**
• **IE FC TP Marine Cable 2 x 2**; Sold by the meter, max. order quantity 1000 m; Minimum order quantity 20 m.	**6XV1840-4AH10**
IE RJ45 Plug PRO RJ45 plug in IP65/67-rated design for on-site assembly, plastic housing, insulation/displacement connection system, for SCALANCE X-200IRT PRO and ET200pro: 1 pack = 1 unit.	**6GK1901-1BB10-6AA0**
IE SC RJ POF Plug PRO SC RJ plug for POF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO and ET 200pro 1 pack = 1 unit	**6GK1900-0MB00-6AA0**
IE SC RJ PCF Plug PRO SC RJ plug connector for PCF fibers in IP65/67-rated design for on-site assembly, plastic housing, for SCALANCE X-200IRT PRO 1 pack = 1 unit.	**6GK1900-0NB00-6AA0**
Power Plug PRO 5-pole power plug for 2 x 24 V power supply in IP65/67-rated design, for on-site assembly, plastic housing, for SCALANCE X-200IRT and ET200 pro 1 pack = 1 unit.	**6GK1907-0AB10-6AA0**
IE panel feedthrough Control cabinet feedthrough for converting M12 D-coded connection system (IP65) to RJ45 connection system (IP20).	
• 1 pack = 5 units	**6GK1901-0DM20-2AA5**
Push-Pull cable connector For 1L+/ 2L+, unassembled	**6GK1907-0AB10-6AA0**
Cover caps for Push-Pull RJ45 female connectors 5 items per pack	**6ES7194-4JD50-0AA0**

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Ordering data

	Article No.
General accessories	
ET 200pro rack	
• Narrow, for interface, electronics and power modules	
- 500 mm	**6ES7194-4GA00-0AA0**
- 1000 mm	**6ES7194-4GA60-0AA0**
- 2000 mm, can be cut to length	**6ES7194-4GA20-0AA0**
• Compact, for interface, electronics and power modules	
- 500 mm	**6ES7194-4GC70-0AA0**
- 1000 mm	**6ES7194-4GC60-0AA0**
- 2000 mm, can be cut to length	**6ES7194-4GC20-0AA0**
• Wide, for interface, electronics, power modules and motor starters	
- 500 mm	**6ES7194-4GB00-0AA0**
- 1000 mm	**6ES7194-4GB60-0AA0**
- 2000 mm, can be cut to length	**6ES7194-4GB20-0AA0**
• Wide, for I/O modules and motor starters	
- 500 mm	**6ES7194-4GD00-0AA0**
- 1000 mm	**6ES7194-4GD10-0AA0**
- 2000 mm	**6ES7194-4GD20-0AA0**

	Article No.
General accessories (continued)	
Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack.	**6ES7194-4HB00-0AA0**
SIMATIC Manual Collection 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).	**6ES7998-8XC01-8YE0**
SIMATIC Manual Collection – Update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates.	**6ES7998-8XC01-8YE2**

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IM 154-8 PN/DP CPU

Overview



- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Interface module for exchanging pre-processed I/O data between the ET 200pro and a higher-level master/IO Controller via PROFIBUS DP/PROFINET IO
- PROFINET IO Controller to operate distributed I/Os on PROFINET
- Component based Automation (CBA) on PROFINET
- PROFINET proxy for intelligent devices on PROFIBUS DP in Component Based Automation (CBA)
- PROFINET interface with 3-port switch
- Isochronous mode on PROFIBUS or PROFINET
- Integrated web server with the option of creating user-defined web pages
- CPU with PLC functionality equivalent to S7-315-2 PN/DP provides distributed intelligence for preprocessing
- Interface module to exchange preprocessed I/O data from ET 200pro with a higher-level master through PROFIBUS DP
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Fail-safe IM 154-8F PN/DP CPU PROFIsafe available

Note:

Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7154-8AB01-0AB0 IM 154-8 PN/DP CPU
General information	
Engineering with	
• Programming package	STEP7 V 5.5 or higher
Supply voltage	
24 V DC	Yes
Power losses	
Power loss, typ.	8.5 W
Memory	
Work memory	
• integrated	384 kbyte
Load memory	
• pluggable (MMC), max.	8 Mbyte
CPU processing times	
for bit operations, typ.	0.05 µs
for word operations, typ.	0.09 µs
for fixed point arithmetic, typ.	0.12 µs
for floating point arithmetic, typ.	0.45 µs
Counters, timers and their retentivity	
S7 counter	
• Number	256
IEC counter	
• present	Yes
S7 times	
• Number	256
IEC timer	
• present	Yes
Data areas and their retentivity	
Flag	
• Number, max.	2 048 byte
Address area	
I/O address area	
• Inputs	2 048 byte
• Outputs	2 048 byte
Process image	
• Inputs, adjustable	2 048 byte
• Outputs, adjustable	2 048 byte
Time of day	
Clock	
• Hardware clock (real-time clock)	Yes
Operating hours counter	
• Number	1

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Technical specifications (continued)

	6ES7154-8AB01-0AB0 IM 154-8 PN/DP CPU
1st interface	
Interface type	Integrated RS 485 interface
Physics	RS 485/connection: 2 x M12 b-coded
Functionality	
• MPI	Yes
• DP master	Yes
• DP slave	Yes
• Point-to-point connection	No
DP master	
• Number of DP slaves, max.	124
2nd interface	
Interface type	PROFINET
Physics	Ethernet (2 x M12 d-coded; 1 x RJ45)
Number of ports	3
Functionality	
• MPI	No
• DP master	No
• DP slave	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA	Yes
PROFINET IO Controller	
• Max. number of connectable IO devices for RT	128
• Number of IO devices with IRT and the option "high flexibility"	128
• Number of IO Devices with IRT and the option "high performance", max.	64
Isochronous mode	
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface

	6ES7154-8AB01-0AB0 IM 154-8 PN/DP CPU
Communication functions	
PG/OP communication	Yes
Global data communication	
• supported	Yes
S7 basic communication	
• supported	Yes
S7 communication	
• supported	Yes
Open IE communication	
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8
• ISO-on-TCP (RFC1006)	Yes
- Number of connections, max.	8
• UDP	Yes
- Number of connections, max.	8
Web server	
• supported	Yes
Configuration	
programming	
• Programming language	
- LAD	Yes
- FBD	Yes
- STL	Yes
- SCL	Yes
- CFC	Yes
- GRAPH	Yes
- HiGraph®	Yes
Know-how protection	
• User program protection/password protection	Yes
• Block encryption	Yes; With S7 block Privacy
Dimensions	
Width	135 mm
Height	130 mm
Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket
Weights	
Weight, approx.	720 g

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IM 154-8 PN/DP CPU

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Ordering data	Article No.
IM 154-8 PN/DP CPU interface module, V3.2 PROFINET IO Controller for operating distributed I/Os on PROFINET, with integrated PLC functionality.	**6ES7154-8AB01-0AB0**
Accessories	
MMC for program backup	
MMC 64 Kbyte [1]	**6ES7953-8LF30-0AA0**
MMC 128 Kbyte [1]	**6ES7953-8LG30-0AA0**
MMC 512 Kbyte [1]	**6ES7953-8LJ30-0AA0**
MMC 4 Mbyte [1]	**6ES7953-8LM31-0AA0**
MMC 8 Mbyte [1]	**6ES7953-8LP31-0AA0**
MMC for program backup and/or firmware updates	
MMC 2 Mbyte [1]	**6ES7953-8LL31-0AA0**
Connection module For CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", for connecting PROFINET and PROFIBUS DP.	**6ES7194-4AN00-0AA0**
SCALANCE X-200 Industrial Ethernet Switches With integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps.	**6GK5208-0HA00-2AA6**
Industrial Ethernet FC RJ45 Plug 180 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	
• 1 unit	**6GK1901-1BB10-2AA0**
• 10 units	**6GK1901-1BB10-2AB0**
• 50 units	**6GK1901-1BB10-2AE0**
Industrial Ethernet Fast Connect installation cables	
• FastConnect Standard Cable	**6XV1840-2AH10**
• FastConnect Trailing Cable	**6XV1840-3AH10**
• FastConnect Marine Cable	**6XV1840-4AH10**
Industrial Ethernet FastConnect installation cables	
• **IE FC TP Trailing Cable GP 2 x 2**; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m.	**6XV1870-2D**
• **IE TP Torsion Cable GP 2 x 2**; sold by the meter, max. delivery unit 1 000 m; minimum order quantity 20 m.	**6XV1870-2F**
Industrial Ethernet Fast Connect Stripping Tool	**6GK1901-1GA00**

[1] An MMC is essential for operating the CPU

	Article No.
Accessories (continued)	
IE Connecting Cable M12-180/M12-180	
• Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths:	
- 0.3 m	**6XV1870-8AE30**
- 0.5 m	**6XV1870-8AE50**
- 1.0 m	**6XV1870-8AH10**
- 1.5 m	**6XV1870-8AH15**
- 2.0 m	**6XV1870-8AH20**
- 3.0 m	**6XV1870-8AH30**
- 5.0 m	**6XV1870-8AH50**
- 10 m	**6XV1870-8AN10**
- 15 m	**6XV1870-8AN15**
• PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male insert), in various lengths:	
- 3.0 m	**3RK1902-2NB30**
- 5.0 m	**3RK1902-2NB50**
- 10 m	**3RK1902-2NC10**
• PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male insert at one end, other end open), in various lengths:	
- 3.0 m	**3RK1902-2HB30**
- 5.0 m	**3RK1902-2HB50**
- 10 m	**3RK1902-2HC10**
IE FC M12 Plug PRO PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet.	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB20-6AA8**
• PROFINET M12 plug connector, D-coded, angled.	**3RK1902-2DA00**
IE panel feedthrough Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units.	**6GK1901-0DM20-2AA5**

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Ordering data

	Article No.
Accessories *(continued)*	
7/8" connecting cable to power supply	
5-core, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths:	
- 1.5 m	**6XV1822-5BH15**
- 2.0 m	**6XV1822-5BH20**
- 3.0 m	**6XV1822-5BH30**
- 5.0 m	**6XV1822-5BH50**
- 10 m	**6XV1822-5BN10**
- 15 m	**6XV1822-5BN15**
- Other special lengths with 90° or 180° cable outlet.	See http://support.automation.siemens.com/WW/view/en/26999294
• Power cable, can be trailed, 5 x 1.5 mm², preassembled at both ends with 7/8" angled connectors (female insert at one end, male insert at the other end), in various lengths:	
- 3.0 m	**3RK1902-3NB30**
- 5.0 m	**3RK1902-3NB50**
- 10 m	**3RK1902-3NC10**
• Power cable, can be trailed, 5 x 1.5 mm², preassembled at one end with 7/8" angled connector with female insert (female insert at one end, other end open), in various lengths:	
- 3.0 m	**3RK1902-3GB30**
- 5.0 m	**3RK1902-3GB50**
- 10 m	**3RK1902-3GC10**
Power line	**6XV1830-8AH10**
5-core, 5 x 1.5 mm², trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m.	
7/8" cable connector	
For ET 200eco, with axial cable outlet.	
• with male insert, 5-pack	**6GK1905-0FA00**
• with female insert, 5-pack	**6GK1905-0FB00**
• angled, with female insert, 1 unit	**3RK1902-3DA00**
• angled, with male insert, 1 unit	**3RK1902-3BA00**
7/8" cover cap, 10 per pack	**6ES7194-3JA00-0AA0**
Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	**6XV1870-3QE50**
1 m	**6XV1870-3QH10**
2 m	**6XV1870-3QH20**
6 m	**6XV1870-3QH60**
10 m	**6XV1870-3QN10**
Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	**6XV1870-3RE50**
1 m	**6XV1870-3RH10**
2 m	**6XV1870-3RH20**
6 m	**6XV1870-3RH60**
10 m	**6XV1870-3RN10**

	Article No.
Accessories *(continued)*	
M12 sealing cap	**3RX9802-0AA00**
For protection of unused M12 connections with ET 200pro	
M12 sealing caps with female thread	**6ES7194-4JD60-0AA0**
5 units	
PROFIBUS M12 connecting cable	
Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m, in various lengths:	
1.5 m	**6XV1830-3DH15**
2.0 m	**6XV1830-3DH20**
3.0 m	**6XV1830-3DH30**
5.0 m	**6XV1830-3DH50**
10 m	**6XV1830-3DN10**
15 m	**6XV1830-3DN15**
Other special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
M12 bus termination connector for PROFIBUS, female insert	**6GK1905-0ED00**
M12 bus termination connector for PROFIBUS, male insert	**6GK1905-0EC00**
M12 plug connector, axial outlet, with male insert	**6GK1905-0EA00**
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-core, shielded. Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m.	
PROFIBUS FC Trailing Cable	**6XV1830-3EH10**
2-wire, shielded.	
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded. Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m.	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-core, shielded Sold by the meter; max. delivery unit 1 000 m, minimum order quantity 20 m.	
PROFIBUS M12 cable connector	
5-pole, B-coded, metal casing, 1 pack = 5 units.	
• Female insert	**6GK1905-0EB00**

[1] An MMC is essential for operating the CPU

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IM 154-8 F PN/DP CPU

Overview



- Interface module for SIMATIC ET 200pro with integrated fail-safe CPU
- CPU with PLC functionality equivalent to CPU S7-315F PN/DP; with distributed intelligence for preprocessing
- For constructing a fail-safe automation system for plants with increased safety requirements
- Complies with safety requirements up to SIL 3 according to IEC 61508, IEC 62061 and PLe according to ISO 13849.1:2006
- For high-performance control solutions in ET 200pro
- Increase of the availability of systems and machines
- Integral Web server with the option of creating user-defined Web sites
- Isochronous mode on PROFIBUS or PROFINET
- PROFINET IO Controller for up to 128 IO Devices
- PROFINET interface with integrated 3-port switch
- With many communication options:
  PG/OP communication, PROFINET IO, PROFINET CBA, open IE communication (TCP, ISO-on-TCP and UDP), web server and S7-communication (with loadable FBs)
- Fast, simple and end-to-end programming of a system with modular programs via STEP 7
- Compact SIMATIC Micro Memory Card (MMC)

Note:

SIMATIC Micro Memory Card required for operation of CPU.

Technical specifications

	6ES7154-8FB01-0AB0 **IM 154-8 F PN/DP CPU** **Work memory 512 Kbyte**	**6ES7154-8FX00-0AB0** **IM 154-8 F PN/DP CPU** **Work memory 1.5 MByte**
General information		
Engineering with		
• Programming package	STEP 7 V 5.5 or higher, Distributed Safety V 5.4 SP4	As of STEP7 V5.5 with HSP 222 + Distributed Safety V5.4 SP4
Supply voltage		
24 V DC	Yes	Yes
Power losses		
Power loss, typ.	8.5 W	8.5 W
Memory		
Work memory		
• integrated	512 kbyte	1 536 kbyte
Load memory		
• pluggable (MMC), max.	8 Mbyte	8 Mbyte
CPU processing times		
for bit operations, typ.	0.05 µs	0.025 µs
for word operations, typ.	0.09 µs	0.03 µs
for fixed point arithmetic, typ.	0.12 µs	0.04 µs
for floating point arithmetic, typ.	0.45 µs	0.16 µs
Counters, timers and their retentivity		
S7 counter		
• Number	256	256
IEC counter		
• present	Yes	Yes
S7 times		
• Number	256	256
IEC timer		
• present	Yes	Yes
Data areas and their retentivity		
Flag		
• Number, max.	2 048 byte	2 048 byte

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Technical specifications (continued)

	6ES7154-8FB01-0AB0 IM 154-8 F PN/DP CPU Work memory 512 Kbyte	6ES7154-8FX00-0AB0 IM 154-8 F PN/DP CPU Work memory 1.5 MByte
Address area		
I/O address area		
• Inputs	2 048 byte	2 048 byte
• Outputs	2 048 byte	2 048 byte
Process image		
• Inputs, adjustable	2 048 byte	2 048 byte
• Outputs, adjustable	2 048 byte	2 048 byte
Time of day		
Clock		
• Hardware clock (real-time clock)	Yes	Yes
Operating hours counter		
• Number	1	1
1st interface		
Interface type	Integrated RS 485 interface	Integrated RS 485 interface
Physics	RS 485/connection: 2 x M12 b-coded	RS 485/connection: 2 x M12 b-coded
Functionality		
• MPI	Yes	Yes
• DP master	Yes	Yes
• DP slave	Yes	Yes
• Point-to-point connection	No	No
DP master		
• Number of DP slaves, max.	124	124
2nd interface		
Interface type	PROFINET	PROFINET
Physics	Ethernet (2 x M12 d-coded; 1 x RJ45)	Ethernet (2 x M12 d-coded; 1 x RJ45)
Number of ports	3	3
Functionality		
• MPI	No	No
• DP master	No	No
• DP slave	No	No
• PROFINET IO Controller	Yes; Also simultaneously with IO-Device functionality	Yes; Also simultaneously with IO-Device functionality
• PROFINET IO Device	Yes; Also simultaneously with IO Controller functionality	Yes; Also simultaneously with IO Controller functionality
• PROFINET CBA	Yes	Yes
PROFINET IO Controller		
• Max. number of connectable IO devices for RT	128	128
• Number of IO devices with IRT and the option "high flexibility"	128	128
• Number of IO Devices with IRT and the option "high performance", max.	64	64
Isochronous mode		
Isochronous operation (application synchronized up to terminal)	Yes; Via PROFIBUS DP or PROFINET interface	Yes; Via PROFIBUS DP or PROFINET interface
Communication functions		
PG/OP communication	Yes	Yes
Global data communication		
• supported	Yes	Yes
S7 basic communication		
• supported	Yes	Yes
S7 communication		
• supported	Yes	Yes
Open IE communication		
• TCP/IP	Yes; via integrated PROFINET interface and loadable FBs	Yes; via integrated PROFINET interface and loadable FBs
- Number of connections, max.	8	8
• ISO-on-TCP (RFC1006)	Yes	Yes
- Number of connections, max.	8	8
• UDP	Yes	Yes
- Number of connections, max.	8	8
Web server		
• supported	Yes	Yes

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Technical specifications (continued)

	6ES7154-8FB01-0AB0 IM 154-8 F PN/DP CPU Work memory 512 Kbyte	6ES7154-8FX00-0AB0 IM 154-8 F PN/DP CPU Work memory 1.5 MByte
Configuration		
programming		
• Programming language		
- LAD	Yes	Yes
- FBD	Yes	Yes
- STL	Yes	Yes
- SCL	Yes	Yes
- CFC	Yes	Yes
- GRAPH	Yes	Yes
- HiGraph®	Yes	Yes
Know-how protection		
• User program protection/password protection	Yes	Yes
• Block encryption	Yes; With S7 block Privacy	Yes; With S7 block Privacy
Dimensions		
Width	135 mm	135 mm
Height	130 mm	130 mm
Depth	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket	65 mm; 60 mm without cover for RJ45 socket; 65 mm with cover for RJ45 socket
Weights		
Weight, approx.	720 g	720 g

Ordering data

	Article No.
IM 154-8 F PN/DP CPU interface module, V3.2	
Fail-safe PROFINET IO Controller for operating distributed I/Os on PROFINET, with integrated PLC functionality.	
• 512 KB RAM	**6ES7154-8FB01-0AB0**
• 1.5 MB RAM	**6ES7154-8FX00-0AB0**
Distributed Safety V5.4 programming tool	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-300F, S7-400F, WinAC RTX F, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 V5.3 SP3 and higher	
Floating license	**6ES7833-1FC02-0YA5**
Floating license for 1 user, license key download without software and documentation [2]; email address required for delivery.	**6ES7833-1FC02-0YH5**
Distributed Safety Upgrade	
from V5.x to V5.4; Floating license for 1 user	**6ES7833-1FC02-0YE5**

	Article No.
STEP 7 Safety Advanced V13	
Task: Engineering tool for configuring fail-safe user programs for SIMATIC S7-1500F, S7-300F, S7-400F, WinAC RTX F, ET 200SP, ET 200S, ET 200M, ET 200iSP, ET 200pro, ET 200eco *Requirement:* STEP 7 Professional V13	
Floating license for 1 user	**6ES7833-1FA13-0YA5**
Floating license for 1 user, license key download without software or documentation [1]; email address required for delivery	**6ES7833-1FA13-0YH5**

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Ordering data	Article No.
Accessories	
MMC for program backup	
MMC 64 Kbyte [1]	**6ES7953-8LF30-0AA0**
MMC 128 Kbyte [1]	**6ES7953-8LG30-0AA0**
MMC 512 Kbyte [1]	**6ES7953-8LJ30-0AA0**
MMC 4 Mbyte [1]	**6ES7953-8LM31-0AA0**
MMC 8 Mbyte [1]	**6ES7953-8LP31-0AA0**
MMC for program backup and/or firmware updates	
MMC 2 Mbyte [1]	**6ES7953-8LL31-0AA0**
Connection module for CPU IM154-8 PN/DP, with 4 x M12 and 2 x 7/8", for connecting PROFINET and PROFIBUS DP.	**6ES7194-4AN00-0AA0**
SCALANCE X-200 Industrial Ethernet Switches with integral SNMP access, Web diagnostics, copper cable diagnostics and PROFINET diagnostics, for setting up linear, star and ring structures SCALANCE X208PRO, in degree of protection IP65, with eight 10/100 Mbit/s M12 ports, incl. eleven M12 dust caps.	**6GK5208-0HA00-2AA6**
Industrial Ethernet FC RJ45 Plug 90 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 90° cable outlet.	
• 1 unit	**6GK1901-1BB20-2AA0**
• 10 units	**6GK1901-1BB20-2AB0**
Industrial Ethernet FC RJ45 Plug 180 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	
• 1 unit	**6GK1901-1BB10-2AA0**
• 10 units	**6GK1901-1BB10-2AB0**
• 50 units	**6GK1901-1BB10-2AE0**
Industrial Ethernet FastConnect installation cables	
• FastConnect Standard Cable	**6XV1840-2AH10**
• FastConnect Trailing Cable	**6XV1840-3AH10**
• FastConnect Marine Cable	**6XV1840-4AH10**
Industrial Ethernet FastConnect installation cables	
• **IE FC TP Trailing Cable GP 2 x 2** Sold by the meter, max. delivery unit 1 000 m Minimum order quantity 20 m.	**6XV1870-2D**
• **IE TP Torsion Cable GP 2 x 2** Sold by the meter, max. delivery unit 1 000 m Minimum order quantity 20 m.	**6XV1870-2F**
Industrial Ethernet FastConnect	
Stripping Tool	**6GK1901-1GA00**

	Article No.
Accessories (continued)	
IE Connecting Cable M12-180/ M12-180	
• Preassembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (4-pin, D-coded), degree of protection IP65/IP67, in various lengths:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1.0 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2.0 m	**6XV1870-8AH20**
• 3.0 m	**6XV1870-8AH30**
• 5.0 m	**6XV1870-8AH50**
• 10 m	**6XV1870-8AN10**
• 15 m	**6XV1870-8AN15**
• PROFINET M12 connecting cable, trailing cable preassembled at both ends with angled M12 connectors (male contact insert), in various lengths:	
• 3.0 m	**3RK1902-2NB30**
• 5.0 m	**3RK1902-2NB50**
• 10 m	**3RK1902-2NC10**
• PROFINET M12 connecting cable, trailing cable preassembled at one end with angled M12 connector (male contact insert at one end, other end open), in various lengths:	
• 3.0 m	**3RK1902-2HB30**
• 5.0 m	**3RK1902-2HB50**
• 10 m	**3RK1902-2HC10**
IE FC M12 Plug PRO PROFINET M12 plug connector, D-coded with fast connection system, axial cable outlet	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB20-6AA8**
• PROFINET M12 plug connector, D-coded, angled	**3RK1902-2DA00**
IE panel feedthrough Cabinet feedthrough for converting from the M12 connection system (D-coded, IP65/IP67) to the RJ45 connection system (IP20), 1 pack = 5 units	**6GK1901-0DM20-2AA5**

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IM 154-8 F PN/DP CPU

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Ordering data	Article No.
Accessories *(continued)*	
7/8" connecting cable to power supply	
• 5-core, 5 x 1.5 mm², trailing type, preassembled with two 7/8" connectors (axial cable outlet), 5-pin, up to 50 m, in various lengths:	
• 1.5 m	**6XV1822-5BH15**
• 2.0 m	**6XV1822-5BH20**
• 3.0 m	**6XV1822-5BH30**
• 5.0 m	**6XV1822-5BH50**
• 10 m	**6XV1822-5BN10**
• 15 m	**6XV1822-5BN15**
• Other special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
• Power cable, can be trailed, 5 x 1.5 mm², preassembled at both ends with 7/8" angled connectors (female contact insert at one end, male contact insert at the other end), in various lengths:	
• 3.0 m	**3RK1902-3NB30**
• 5.0 m	**3RK1902-3NB50**
• 10 m	**3RK1902-3NC10**
• Power cable, can be trailed, 5 x 1.5 mm², preassembled at one end with 7/8" angled connector with female contact insert (female contact insert at one end, other end open), in various lengths:	
• 3.0 m	**3RK1902-3GB30**
• 5.0 m	**3RK1902-3GB50**
• 10 m	**3RK1902-3GC10**
Power line	**6XV1830-8AH10**
5-core, 5 x 1.5 mm², trailing type, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m	
7/8" cable connector	
For ET 200eco, with axial cable outlet	
• with male contact insert, 5-pack	**6GK1905-0FA00**
• with female contact insert, 5-pack	**6GK1905-0FB00**
• Angled, with female contact insert, 1 unit	**3RK1902-3DA00**
• Angled, with male contact insert, 1 unit	**3RK1902-3BA00**
7/8" cover cap, 10 per pack	**6ES7194-3JA00-0AA0**
Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	**6XV1870-3QE50**
1 m	**6XV1870-3QH10**
2 m	**6XV1870-3QH20**
6 m	**6XV1870-3QH60**
10 m	**6XV1870-3QN10**
Crossed Twisted Pair cables 4x2 with RJ45 connectors	
0.5 m	**6XV1870-3RE50**
1 m	**6XV1870-3RH10**
2 m	**6XV1870-3RH20**
6 m	**6XV1870-3RH60**
10 m	**6XV1870-3RN10**

	Article No.
Accessories *(continued)*	
M12 sealing cap	**3RX9802-0AA00**
for protection of unused M12 connections with ET 200pro	
M12 sealing caps with female thread	**6ES7194-4JD60-0AA0**
5 units	
PROFIBUS M12 connecting cable	
Preassembled, with two 5-pole M12 connectors/sockets, up to 100 m, in various lengths:	
1.5 m	**6XV1830-3DH15**
2.0 m	**6XV1830-3DH20**
3.0 m	**6XV1830-3DH30**
5.0 m	**6XV1830-3DH50**
10 m	**6XV1830-3DN10**
15 m	**6XV1830-3DN15**
Additional special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
M12 bus termination connector for PROFIBUS, female contact insert	**6GK1905-0ED00**
M12 bus termination connector for PROFIBUS, male contact insert	**6GK1905-0EC00**
M12 plug connector, axial outlet, with male contact insert	**6GK1905-0EA00**
PROFIBUS FC Standard Cable GP	**6XV1830-0EH10**
Standard type with special design for fast mounting, 2-core, shielded	
Sold by the meter Max. delivery unit 1 000 m Minimum order quantity 20 m	
PROFIBUS FC Trailing Cable	**6XV1830-3EH10**
2-wire, shielded	
PROFIBUS FC Food Cable	**6XV1830-0GH10**
2-wire, shielded	
Sold by the meter Max. delivery unit 1 000 m Minimum order quantity 20 m	
PROFIBUS FC Robust Cable	**6XV1830-0JH10**
2-wire, shielded	
Sold by the meter Max. delivery unit 1 000 m Minimum order quantity 20 m	
PROFIBUS M12 cable connector	
5-pole, B-coded, metal casing 1 pack = 5 units	
• Female contact insert	**6GK1905-0EB00**

1) An MMC is essential for operating the CPU

2) For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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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)
  - 8 AI (TC, RTD)
  - 4 AO (U, I)
  - 4 IO-Link + 8 DI + 4 DO (1.3 A)
- Channel-specific diagnostics
- Ambient temperature range -40 °C to 60 °C

Technical specifications

Digital input modules	6ES7141-6BF00-0AB0 8 DE 24 V DC; 4 x M12	6ES7141-6BG00-0AB0 8 DE 24 V DC; 8 x M12	6ES7141-6BH00-0AB0 8 DE DC 24 V DC; 8 x M12
General information			
Vendor identification (VendorID)	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H
Supply voltage			
24 V DC	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
Input current			
Current consumption, typ.	100 mA	100 mA	100 mA
Encoder supply			
Number of outputs	4	8	8
Output current			
• 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
Power losses			
Power loss, typ.	5.5 W	4.5 W	6.5 W

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Technical specifications (continued)

Digital input modules	6ES7141-6BF00-0AB0 8 DE 24 V DC; 4 x M12	6ES7141-6BG00-0AB0 8 DE 24 V DC; 8 x M12	6ES7141-6BH00-0AB0 8 DE DC 24 V DC; 8 x M12
Digital inputs			
Number of digital inputs	8	8	16
• In groups of	2	1	2
Input characteristic curve in accordance with IEC 61131, type 3	Yes	Yes	Yes
Number of simultaneously controllable inputs			
• all mounting positions			
- up to 60 °C, max.	8	8	16
Input voltage			
• Type of input voltage	DC	DC	DC
• 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.	typically 3 ms	typically 3 ms	typically 3 ms
- at "1" to "0", max.	typically 3 ms	typically 3 ms	typically 3 ms
Cable length			
• Cable length unshielded, max.	30 m	30 m	30 m
Interfaces			
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX
Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s
Supports protocol for PROFINET IO			
• Number of PROFINET interfaces	1	1	1
• Autocrossing	Yes	Yes	Yes
• Automatic detection of transmission speed	Yes	Yes	Yes
• Integrated switch	Yes	Yes	Yes
• PROFINET IO Device			
- IRT with the option "high flexibility" supported	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes
Protocols			
Supports protocol for PROFINET IO	Yes	Yes	Yes
PROFINET CBA	No	No	No
Supports protocol for PROFIsafe	No	No	No
Protocols (Ethernet)			
• SNMP	Yes	Yes	Yes
• DCP	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes
• ping	Yes	Yes	Yes
• ARP	Yes	Yes	Yes
Interrupts/diagnostics/ status information			
Status indicator	Yes; Green LED	Yes; Green LED	Yes; Green LED
Alarms			
• Diagnostic alarm	Yes	Yes	Yes
Diagnostic messages			
• Diagnostic functions	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire break in signal transmitter 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

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Technical specifications (continued)

Digital input modules	6ES7141-6BF00-0AB0 8 DE 24 V DC; 4 x M12	6ES7141-6BG00-0AB0 8 DE 24 V DC; 8 x M12	6ES7141-6BH00-0AB0 8 DE DC 24 V DC; 8 x M12
Galvanic 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 VAC	75 V DC / 60 VAC	75 V DC / 60 VAC
Isolation			
tested with			
• 24 V DC circuits	500 V	500 V	500 V
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection			
IP65	Yes	Yes	Yes
IP66	Yes	Yes	Yes
IP67	Yes	Yes	Yes
Connection method			
M12	Yes	Yes	Yes
Dimensions			
Width	30 mm	60 mm	60 mm
Height	200 mm	175 mm	175 mm
Depth	49 mm	49 mm	49 mm
Weights			
Weight (without packaging)	550 g	910 g	910 g

Digital output modules	6ES7142-6BF50-0AB0 8 DA 24 V DC/0.5 A, 4 x M12	6ES7142-6BF00-0AB0 8 DA 24 V DC/1.3 A, 4 x M12	6ES7142-6BG00-0AB0 8 DA 24 V DC/1.3 A, 8 x M12	6ES7142-6BR00-0AB0 8 DA 24 V DC/2 A, 8 x M12	6ES7142-6BH00-0AB0 16 DA 24 V DC/1.3 A, 8 x M12
General information					
Vendor identification (VendorID)	002AH	002AH	002AH	002AH	002AH
Device identifier (DeviceID)	0306H	0306H	0306H	0306H	0306H
Supply voltage					
Load voltage 1L+					
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V
• 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
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Load voltage 2L+					
• Rated value (DC)	24 V	24 V	24 V	24 V	24 V
• 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
• Reverse polarity protection	Yes	Yes	Yes	Yes	Yes
Input current					
from load voltage 1L+ (unswitched voltage)	100 mA	4 A	4 A	4 A	4 A
from load voltage 2L+, max.	4 A	4 A	4 A	4 A	4 A
Power losses					
Power loss, typ.	3 W	5.5 W	5.5 W	5 W	5.5 W

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Technical specifications (continued)

Digital output modules	6ES7142-6BF50-0AB0 8 DA 24 V DC/0.5 A, 4 x M12	6ES7142-6BF00-0AB0 8 DA 24 V DC/1.3 A, 4 x M12	6ES7142-6BG00-0AB0 8 DA 24 V DC/1.3 A, 8 x M12	6ES7142-6BR00-0AB0 8 DA 24 V DC/2 A, 8 x M12	6ES7142-6BH00-0AB0 16 DA 24 V DC/1.3 A, 8 x M12
Digital outputs					
Number of digital outputs	8	8	8	8	16
• In groups of	8	4	4	4	8
Short-circuit protection	Yes	Yes	Yes	Yes	Yes
• Response threshold, typ.	0,7 A	1,8 A	1,8 A	2,8 A	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
Controlling a digital input	Yes	Yes	Yes	Yes	Yes
Switching capacity of the outputs					
• on lamp load, max.	5 W	5 W	5 W	10 W	5 W
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 outputs (per group)					
• all mounting positions					
- 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
Interfaces					
Transmission procedure	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX	100BASE-TX
Transmission rate, max.	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s	100 Mbit/s
Supports protocol for PROFINET IO					
• Number of PROFINET interfaces	1	1	1	1	1
• Autocrossing	Yes	Yes	Yes	Yes	Yes
• Automatic detection of transmission speed	Yes	Yes	Yes	Yes	Yes
• Integrated switch	Yes	Yes	Yes	Yes	Yes
• PROFINET IO Device					
- IRT with the option "high flexibility" supported	Yes	Yes	Yes	Yes	Yes
- Prioritized startup	Yes	Yes	Yes	Yes	Yes
Protocols					
Supports protocol for PROFINET IO	Yes	Yes	Yes	Yes	Yes
PROFINET CBA	No	No	No	No	No
Supports protocol for PROFIsafe	No	No	No	No	No
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
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
Diagnostic messages					
• Diagnostic functions	Yes	Yes	Yes	Yes	Yes
• Diagnostic information readable	Yes	Yes	Yes	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED	Yes; Green "ON" LED
• Wire break in actuator 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

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Technical specifications (continued)

Digital output modules	6ES7142-6BF50-0AB0 8 DA 24 V DC/0.5 A, 4 x M12	6ES7142-6BF00-0AB0 8 DA 24 V DC/1.3 A, 4 x M12	6ES7142-6BG00-0AB0 8 DA 24 V DC/1.3 A, 8 x M12	6ES7142-6BR00-0AB0 8 DA 24 V DC/2 A, 8 x M12	6ES7142-6BH00-0AB0 16 DA 24 V DC/1.3 A, 8 x M12
Galvanic 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
Galvanic 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
Isolation					
tested with					
• 24 V DC circuits	500 V	500 V	500 V	500 V	500 V
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection					
IP65	Yes	Yes	Yes	Yes	Yes
IP66	Yes	Yes	Yes	Yes	Yes
IP67	Yes	Yes	Yes	Yes	Yes
Connection method					
M12	Yes	Yes	Yes	Yes	Yes
Dimensions					
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
Weights					
Weight (without packaging)	550 g	550 g	910 g	910 g	910 g

Digital input/output modules	6ES7147-6BG00-0AB0 8 DE/DA 24 V DC/1.3 A; 8 x M12
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Supply voltage	
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
Input current	
from load voltage 1L+ (unswitched voltage)	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	8
Output current	
• Output current, rated value	100 mA; per output
24 V encoder supply	
• short-circuit protection	Yes
Power losses	
Power loss, typ.	6.5 W

Digital input/output modules	6ES7147-6BG00-0AB0 8 DE/DA 24 V DC/1.3 A; 8 x M12
Digital inputs	
Number of digital inputs	8
• In groups of	4
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Number of simultaneously controllable inputs	
• all mounting positions	
- up to 60 °C, max.	8
Input voltage	
• Type of input voltage	DC
• 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
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	typically 3 ms
- at "1" to "0", max.	typically 3 ms
Cable length	
• Cable length unshielded, max.	30 m

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Technical specifications (continued)

Digital input/output modules	6ES7147-6BG00-0AB0 8 DE/DA 24 V DC/1.3 A; 8 x M12
Digital outputs	
Number of digital outputs	8
• In groups of	4
Short-circuit protection	Yes; Electronic
• Response threshold, typ.	1.8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes
Switching capacity of the outputs	
• on lamp load, max.	5 W
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 outputs (per group)	
• all mounting positions	
- up to 60 °C, max.	3.9 A
Cable length	
• Cable length unshielded, max.	30 m
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
Supports protocol for PROFINET IO	
• Number of PROFINET interfaces	1
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO Device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
Supports protocol for PROFIsafe	No
PROFIBUS	No
Protocols (Ethernet)	
• TCP/IP	No
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes

Digital input/output modules	6ES7147-6BG00-0AB0 8 DE/DA 24 V DC/1.3 A; 8 x M12
Interrupts/diagnostics/ status information	
Status indicator	Yes; Green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED
• Wire break in actuator cable	Yes
• Wire break in signal transmitter cable	Yes
• Short circuit	Yes
• Short circuit encoder supply	Yes
• Group error	Yes; Red/yellow "SF/MT" LED
Galvanic 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
Galvanic isolation digital outputs	
• between the channels	No
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; According to IEEE 802.3
Degree and class of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions	
Width	60 mm
Height	175 mm
Depth	49 mm
Weights	
Weight (without packaging)	910 g

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Technical specifications (continued)

Analog input modules	6ES7144-6KD00-0AB0 8 AE 4 U/I + 4 RTD/TC; 8 x M12	6ES7144-6KD50-0AB0 8 AE RTD/TC; 8 x M12
General information		
Vendor identification (VendorID)	002AH	002AH
Device identifier (DeviceID)	0306H	0306H
Supply voltage		
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
Reverse polarity protection	Yes	Yes; against destruction
Input current		
Current consumption, typ.	110 mA	110 mA
Encoder supply		
Number of outputs	4	
24 V encoder supply		
• short-circuit protection	Yes; Electronic at 1.4 A	
• Output current, max.	1 A	
Power losses		
Power loss, typ.	2.8 W	2.8 W
Analog inputs		
Number of analog inputs	8	8
Number of analog inputs for voltage/current measurement	4	
Number of analog inputs for resistance/resistance thermometer measurement	4	8
permissible input voltage for voltage input (destruction limit), max.	28.8 V permanent, 35 V for max. 500 ms	
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	Yes
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	Yes
• Type J	Yes	Yes
• Type K	Yes	Yes
• Type N	Yes	Yes
Input ranges (rated values), resistance thermometers		
• Ni 100	Yes	Yes
• Ni 1000	Yes	Yes
• Ni 120	Yes	Yes
• Ni 200	Yes	Yes
• Ni 500	Yes	Yes
• Pt 100	Yes	Yes
• Pt 1000	Yes	Yes
• Pt 200	Yes	Yes
• Pt 500	Yes	Yes
Input ranges (rated values), resistors		
• 0 to 150 ohms	Yes	Yes
• 0 to 300 ohms	Yes	Yes
• 0 to 600 ohms	Yes	Yes
• 0 to 3000 ohms	Yes	Yes

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Technical specifications (continued)

Analog input modules	6ES7144-6KD00-0AB0 8 AE 4 U/I + 4 RTD/TC; 8 x M12	6ES7144-6KD50-0AB0 8 AE RTD/TC; 8 x M12
Thermocouple (TC)		
• Temperature compensation		
- Parameterizable	Yes	Yes
- internal temperature compensation	Yes	Yes
- external temperature compensation with compensations socket	Yes	Yes
- external temperature compensation with Pt100		Yes
- dynamic reference temperature value		Yes
- for definable comparison point temperature		Yes
Cable length		
• Cable length, shielded, max.	30 m	30 m
Analog value creation		
Analog value display	SIMATIC S7 format	SIMATIC S7 format
Measurement principle	integrating	integrating
Integrations and conversion time/resolution per channel		
• Resolution (incl. overrange)	15 bits + sign	15 bits + sign
• Integration time, parameterizable	Yes	Yes
• Integration time, ms	2/16.67/20/100 ms	2/16.67/20/100 ms
• Interference voltage suppression for interference frequency f1 in Hz	500 / 60 / 50 / 10 Hz	500 / 60 / 50 / 10 Hz
• Conversion time (per channel)	4 / 19 / 22 / 102 ms	4 / 19 / 22 / 102 ms
Smoothing of measured values		
• Parameterizable	Yes	Yes
• Step: None	Yes; 1 x cycle time	Yes; 1 x cycle time
• Step: low	Yes; 4 x cycle time	Yes; 4 x cycle time
• Step: Medium	Yes; 16 x cycle time	Yes; 16 x cycle time
• Step: High	Yes; 64 x cycle time	Yes; 64 x cycle time
Encoder		
Number of connectable encoders, max.	8	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 two-wire connection	Yes	Yes
• for resistance measurement with three-wire connection	Yes	Yes
• for resistance measurement with four-wire connection	Yes	Yes
Errors/accuracies		
Linearity error (relative to input range), (+/-)	0.01 %	0.01 %
Temperature error (relative to input range), (+/-)	U: 0.0035%/°C; I: 0.006%/°C; RTD: 0.0005%/°C; TC: 0.0035%/°C	RTD: 0.0005%/°C; TC: 0.0035%/°C
Crosstalk between the inputs, min.	85 dB	-85 dB
Repeat accuracy in steady state at 25 °C (relative to input area), (+/-)	0.008 %	0.008 %
Interference voltage suppression for f = n x (f1 +/- 1 %), f1 = interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	46 dB	46 dB
• Common mode interference, min.	70 dB	70 dB

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Technical specifications (continued)

Analog input modules	6ES7144-6KD00-0AB0 8 AE 4 U/I + 4 RTD/TC; 8 x M12	6ES7144-6KD50-0AB0 8 AE RTD/TC; 8 x M12
Interfaces		
Transmission procedure	100BASE-TX	100BASE-TX
Transmission rate, max.	100 Mbit/s	100 Mbit/s
Supports protocol for PROFINET IO		
• Number of PROFINET interfaces	1	1
• Autocrossing	Yes	Yes
• Automatic detection of transmission speed	Yes	Yes
• Integrated switch	Yes	Yes
• PROFINET IO Device		
- IRT with the option "high flexibility" supported	Yes	
- Prioritized startup	Yes	Yes
Protocols		
Supports protocol for PROFINET IO	Yes	Yes
PROFINET CBA	No	No
Supports protocol for PROFIsafe	No	No
Protocols (Ethernet)		
• SNMP	Yes	Yes
• DCP	Yes	Yes
• LLDP	Yes	Yes
• ping	Yes	Yes
• ARP	Yes	Yes
Interrupts/diagnostics/ status information		
Status indicator	Yes	
Alarms		
• Diagnostic alarm	Yes	Yes
Diagnostic messages		
• Diagnostic functions	Yes	Yes
• Diagnostic information readable	Yes	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED	Yes; Green "ON" LED
• Short circuit encoder supply	Yes; per module	
• Group error	Yes; Red/yellow "SF/MT" LED	Yes; Red/yellow "SF/MT" LED
• Overflow/underflow	Yes	Yes
Galvanic isolation		
between the load voltages	Yes	Yes
between load voltage and all other switching components	No	No
between Ethernet and electronics	Yes	Yes
Galvanic isolation analog inputs		
• between the channels	No	No
Permissible potential difference		
between inputs and MANA (UCM)	10 Vpp AC	10 Vpp AC
Isolation		
tested with		
• 24 V DC circuits	500 V	500 V
• Interface	1 500 V; According to IEEE 802.3	1 500 V; According to IEEE 802.3
Degree and class of protection		
IP65	Yes	Yes
IP66	Yes	Yes
IP67	Yes	Yes
Connection method		
M12	Yes	Yes
Dimensions		
Width	60 mm	60 mm
Height	175 mm	175 mm
Depth	49 mm	49 mm
Weights		
Weight (without packaging)	930 g	930 g

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Technical specifications (continued)

Analog output modules	6ES7145-6HD00-0AB0 4 AA U/I; 4 x M12
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Supply voltage	
24 V DC	Yes
permissible range, lower limit (DC)	20.4 V
permissible range, upper limit (DC)	28.8 V
Reverse polarity protection	Yes
Input current	
Current consumption, typ.	280 mA
Encoder supply	
Number of outputs	4
24 V encoder supply	
• short-circuit protection	Yes; Electronic at 1.4 A
• Output current, max.	1 A
Power losses	
Power loss, typ.	5.5 W
Analog outputs	
Number of analog outputs	4
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 two-wire connection	Yes
• for current output two-wire 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
Cable length	
• Cable length, shielded, max.	30 m

Analog output modules	6ES7145-6HD00-0AB0 4 AA U/I; 4 x M12
Analog value creation	
Analog value display	SIMATIC S7 format
Measurement principle	Resistor network
Integrations and conversion time/resolution per channel	
• Resolution (incl. overrange)	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
Errors/accuracies	
Output ripple (based on output area, bandwidth 0 to 50 kHz), (+/-)	U: ±0.6 mVrms; I: ±0.4 nArms
Linearity error (relative to output range), (+/-)	0.02 %
Temperature error (relative to output range), (+/-)	U: 0.001%/°C; I: 0.0025%/°C
Crosstalk between the outputs, min.	70 dB
Repeat accuracy in steady state at 25 °C (relative to output area), (+/-)	0.008 %
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
Supports protocol for PROFINET IO	
• Number of PROFINET interfaces	1
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO Device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
Supports protocol for PROFIsafe	No
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes

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Technical specifications (continued)

Analog output modules	6ES7145-6HD00-0AB0 4 AA U/I; 4 x M12
Interrupts/diagnostics/ status information	
Status indicator	Yes
Substitute values connectable	Yes
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage	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
Galvanic isolation	
between the load voltages	Yes
between load voltage and all other switching components	No
between Ethernet and electronics	Yes
Galvanic isolation analog outputs	
• between the channels	No
Permissible potential difference	
between M internally and the outputs	10 Vpp AC
Degree and class of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions	
Width	60 mm
Height	175 mm
Depth	49 mm
Weights	
Weight (without packaging)	930 g

IO-Link master module	6ES7148-6JA00-0AB0 4 IO-L + 8 DE + 4 DA 24 V DC/1.3 A; 8 X M12
General information	
Vendor identification (VendorID)	002AH
Device identifier (DeviceID)	0306H
Supply voltage	
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

IO-Link master module	6ES7148-6JA00-0AB0 4 IO-L + 8 DE + 4 DA 24 V DC/1.3 A; 8 X M12
Input current	
from load voltage 1L+ (unswitched voltage)	4 A
from load voltage 2L+, max.	4 A
Encoder supply	
Number of outputs	6
Output current	
• Output current, rated value	200 mA; 100 mA per output to X5-X6
24 V encoder supply	
• short-circuit protection	Yes
Power losses	
Power loss, typ.	8 W
Digital inputs	
Number of digital inputs	8
Input characteristic curve in accordance with IEC 61131, type 3	Yes
Number of simultaneously controllable inputs	
• all mounting positions	
- up to 60 °C, max.	8
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
Input delay (for rated value of input voltage)	
• for standard inputs	
- at "0" to "1", max.	typically 3 ms
- at "1" to "0", max.	typically 3 ms
Cable length	
• Cable length unshielded, max.	30 m
Digital outputs	
Number of digital outputs	4
Short-circuit protection	Yes; Electronic
• Response threshold, typ.	1,8 A
Limitation of inductive shutdown voltage to	Typ. (L1+, L2+) -47 V
Controlling a digital input	Yes
Switching capacity of the outputs	
• on lamp load, max.	5 W
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 outputs (per group)	
• all mounting positions	
- up to 60 °C, max.	3.9 A
Cable length	
• Cable length unshielded, max.	30 m

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Technical specifications (continued)

IO-Link master module	6ES7148-6JA00-0AB0 4 IO-L + 8 DE + 4 DA 24 V DC/1.3 A; 8 X M12
Interfaces	
Transmission procedure	100BASE-TX
Transmission rate, max.	100 Mbit/s
Supports protocol for PROFINET IO	
• Number of PROFINET interfaces	1
• Autocrossing	Yes
• Automatic detection of transmission speed	Yes
• Integrated switch	Yes
• PROFINET IO Device	
- IRT with the option "high flexibility" supported	Yes
- Prioritized startup	Yes
Protocols	
Supports protocol for PROFINET IO	Yes
PROFINET CBA	No
Supports protocol for PROFIsafe	No
Protocols (Ethernet)	
• SNMP	Yes
• DCP	Yes
• LLDP	Yes
• ping	Yes
• ARP	Yes
IO-Link	
Number of ports	4
• of which simultaneously controllable	4
Transmission rate	4.8 kBd (COM1); 38.4 kBd (COM2)
Cable length unshielded, max.	20 m
Operating modes	
• IO-Link	Yes
• DI	Yes
• DQ	Yes
Connection of IO-Link devices	
• via three-wire connection	Yes
Interrupts/diagnostics/ status information	
Status indicator	Yes; Green LED
Alarms	
• Diagnostic alarm	Yes
Diagnostic messages	
• Diagnostic functions	Yes
• Diagnostic information readable	Yes
• Monitoring the supply voltage	Yes; Green "ON" LED
• Wire break in actuator cable	Yes
• Wire break in signal transmitter cable	Yes
• Short circuit	Yes
• Short circuit encoder supply	Yes
• Group error	Yes; Red/yellow "SF/MT" LED

IO-Link master module	6ES7148-6JA00-0AB0 4 IO-L + 8 DE + 4 DA 24 V DC/1.3 A; 8 X M12
Galvanic 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
Galvanic isolation digital outputs	
• between the channels	No
Permissible potential difference	
between different circuits	75 V DC / 60 V AC
Isolation	
tested with	
• 24 V DC circuits	500 V
• Interface	1 500 V; According to IEEE 802.3
Degree and class of protection	
IP65	Yes
IP66	Yes
IP67	Yes
Connection method	
M12	Yes
Dimensions	
Width	60 mm
Height	175 mm
Depth	49 mm
Weights	
Weight (without packaging)	910 g

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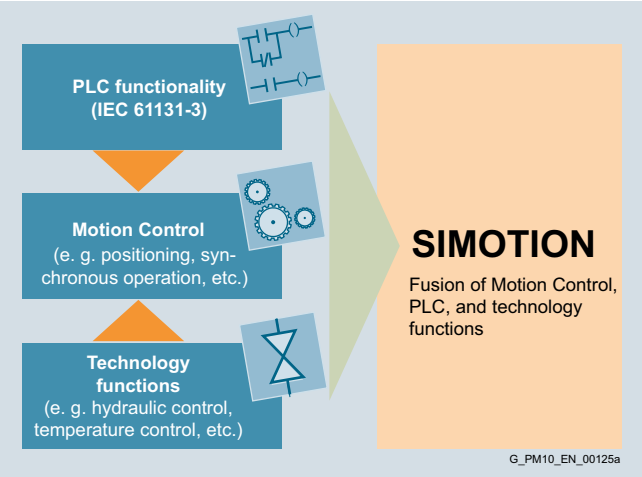
Ordering data	Article No.
ET 200eco PN digital input module	
• 8 DI 24 V DC; 4 x M12, dual assignment, degree of protection IP67	**6ES7141-6BF00-0AB0**
• 8 DI 24 V DC; 8 x M12, degree of protection IP67	**6ES7141-6BG00-0AB0**
• 16 DI 24 V DC; 8 x M12, dual assignment, degree of protection IP67	**6ES7141-6BH00-0AB0**
ET 200eco PN digital output module	
• 8 DO 24 V DC/0.5 A; 4 x M12, dual assignment, 1 load voltage supply DO; degree of protection IP67	**6ES7142-6BF50-0AB0**
• 8 DO 24 V DC/1.3 A; 4 x M12, dual assignment, degree of protection IP67	**6ES7142-6BF00-0AB0**
• 8 DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67	**6ES7142-6BG00-0AB0**
• 8 DO 24 V DC/2 A; 8 x M12, degree of protection IP67	**6ES7142-6BR00-0AB0**
• 16 DO 24 V DC/1.3 A; 8 x M12, dual assignment, degree of protection IP67	**6ES7142-6BH00-0AB0**
ET 200eco PN digital input/output modules	
• 8 DI/DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67	**6ES7147-6BG00-0AB0**
ET 200eco PN analog input modules	
• 8 AI 4 U/I + 4 RTD/TC; 8 x M12, degree of protection IP67	**6ES7144-6KD00-0AB0**
• 8 AI RTD/TC; 8 x M12, degree of protection IP67	**6ES7144-6KD50-0AB0**
ET 200eco PN analog output modules	
• 4 AO U/I; 4 x M12, degree of protection IP67	**6ES7145-6HD00-0AB0**
ET 200eco PN IO-Link master module	
• 4 IO-L + 8 DI + 4 DO 24 V DC/1.3 A; 8 x M12, degree of protection IP67	**6ES7148-6JA00-0AB0**

	Article No.
Accessories	
• PD voltage distributor, 24 V DC; 1 X 7/8", 4 X M12	**6ES7148-6CB00-0AA0**
• Terminal block for ET 200eco PN, 10 A insulation-piercing terminals	**6ES7194-6CA00-0AA0**
• Spare fuses for terminal block, 10 units	**6ES7194-6HB00-0AA0**
• Mounting rail 0.5 m	**6ES7194-6GA00-0AA0**
• Profile screw for mounting rail, 50 units	**6ES7194-6MA00-0AA0**
• Sealing cap M12 for IP67 modules, 10 units	**3RX9802-0AA00**
• Labels 10 × 7 mm, pastel turquoise, 816 units	**3RT1900-1SB10**
PROFINET M12 connector, for user assembly	
IE FC M12 connector PRO, for user assembly	
• 1 unit	**6GK1901-0DB20-6AA0**
• 8 units	**6GK1901-0DB20-6AA8**
PROFINET M12 connecting cables	
Preassembled connecting cables with 2 M12 connectors (D-coded) in various lengths:	
• 0.3 m	**6XV1870-8AE30**
• 0.5 m	**6XV1870-8AE50**
• 1.0 m	**6XV1870-8AH10**
• 1.5 m	**6XV1870-8AH15**
• 2.0 m	**6XV1870-8AH20**
• 3.0 m	**6XV1870-8AH30**
• 5.0 m	**6XV1870-8AH50**
• 10.0 m	**6XV1870-8AN10**
• 15.0 m	**6XV1870-8AN15**
M12 connector for 24 V DC load power supply	
Connection socket for 24 V DC incoming supply; 4-pin, A-coded, 3 units	**6GK1907-0DC10-6AA3**
Connector for loop-through of 24 V DC; 4-pin, A-coded, 3 units	**6GK1907-0DB10-6AA3**
M12 plug-in power cables	
Preassembled plug-in power cables, fitted at each end with M12 socket and plug 4 x 0.75 mm^2, in various lengths:	
• 0.3 m	**6XV1801-5DE30**
• 0.5 m	**6XV1801-5DE50**
• 1.0 m	**6XV1801-5DH10**
• 1.5 m	**6XV1801-5DH15**
• 2.0 m	**6XV1801-5DH20**
• 3.0 m	**6XV1801-5DH30**
• 5.0 m	**6XV1801-5DH50**
• 10.0 m	**6XV1801-5DN10**
• 15.0 m	**6XV1801-5DN15**
M12 coupler plug	
Can be assembled, for connecting actuators or sensors, 5-pin	**3RK1902-4BA00-5AA0**
Y cable M12	
For double connection of I/O by means of single cable to ET 200, 5-pin	**6ES7194-6KA00-0XA0**

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Overview





SIMOTION is recommended for all machines with Motion Control tasks – from simple to high-performance. The focus is on a simple and flexible solution for the greatest possible range of Motion Control tasks.

SIMOTION is based on the fusion of Motion Control with two other control functions which are found in most machines: PLC and technology functions.

This approach means that Motion Control of axes and control of the complete machine can be implemented within the same system. The same applies to technology functions, such as pressure control of a hydraulic axis. A seamless switch can be made from position-controlled positioning mode to pressure control.

Combining the three open-loop control functions of Motion Control, PLC and technology functions has the following benefits:

- Reduced engineering overhead and increased machine performance
- Fast system response – Time-critical interfaces between the individual components are no longer required
- Simple, uniform and transparent programming as well as diagnostics of the entire machine

The SIMOTION system is made up of three components:

Engineering system

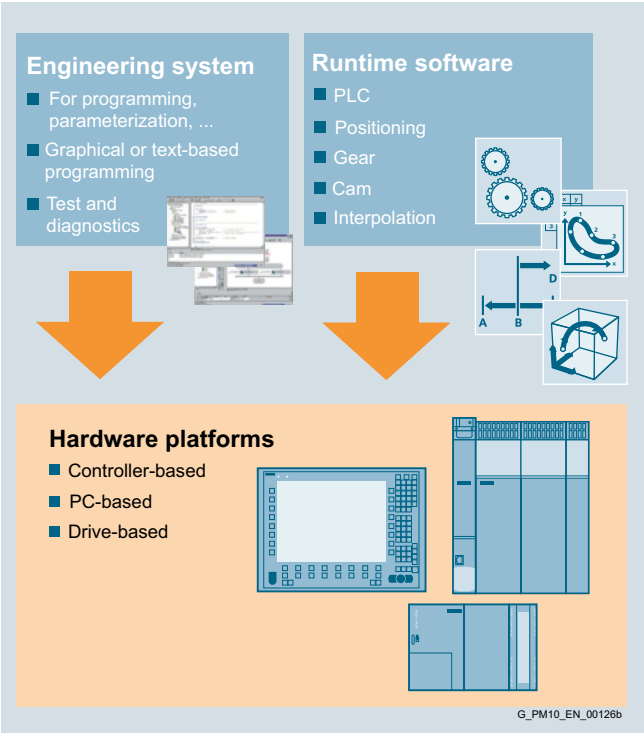
SCOUT enables Motion Control, PLC and technology functions to be incorporated in one comprehensive, integrated system and provides all the necessary tools: From programming and parameterization through testing and commissioning, to diagnostics.

Runtime software

The runtime software offers a high-performance execution system for cyclic and sequential tasks. The runtime software modules make the different PLC, Motion Control and technology functions available. By selecting the appropriate modules, the overall functionality of the system can be flexibly adapted to the machine.

Hardware platforms

The hardware platforms are the basis of the SIMOTION Motion Control System. The application created with the engineering system and the associated runtime software modules can be implemented on different hardware platforms.



The fast path to the automation solution

Thanks to our wide range of sector-specific solutions it is possible to reduce engineering costs, speed up project completion times and implement successful automation systems more quickly.

The SIMOTION easyProject project generator enables you to significantly accelerate the creation of a standardized project framework for machine applications.

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Overview

One concept – 3 platforms

Automation systems are primarily identified by the following characteristics:

- System-specific characteristics, e.g. functionality and engineering
- Hardware-dependent characteristics, e.g. performance, design and expandability

However, mechanical engineering demands vary greatly, depending on the version of the machine in question.

Every hardware platform has its benefits when used in certain applications.

The various platforms can also be combined very easily, which is a particular advantage in modular machines and plants. This is because the individual hardware platforms always have the same system characteristics, i.e. functionality and engineering are always identical, irrespective of the platform used.

PROFIBUS or PROFINET can be used to create the link to the drives and the I/Os remotely.

PROFINET/PROFIBUS can also be used for communication with HMI devices such as SIMATIC HMI or higher-level controllers such as SIMATIC S7. This means that SIMATIC HMI panels as well as PCs with WinCC flexible can be used as operator systems. Even 3rd party applications communicate with SIMOTION by means of the OPC interface.

SIMOTION D – Compact and integrated in the drive



In SIMOTION D, the SIMOTION functionality is integrated directly in the closed-loop control module of the SINAMICS S120 drive system. Therefore, the complete system (consisting of the open-loop control and the drive) is extremely compact and powerful.

Two SIMOTION D versions are available:

- As a SIMOTION D410-2 single-axis system with multi-axis option (blocksize format)
- As a SIMOTION D4x5-2 multi-axis system in four performance variants for up to 128 axes (booksize format)

This finely graded performance ensures the highest degree of scalability and flexibility. The field of application ranges from single axes to high-performance multi-axis machines.
For visualization and operation SIMATIC HMI devices can be connected via PROFINET, Ethernet or PROFIBUS depending on the SIMOTION D variant. Distributed I/O is connected via PROFINET or PROFIBUS.

SIMOTION C – Modularity and flexibility



SIMOTION C is a Motion Controller based on the SIMATIC S7-300 design.

It is available in two variants which differ in terms of their interfaces, but not with respect to Motion Control functionality or performance. In addition to the already integrated interfaces, both controllers can be expanded using I/O modules from the SIMATIC S7-300 range.

Variant C240 with its four drive and encoder interfaces is ideal for machine automation applications and the operation of drives with analog setpoint interface or stepper drives. As a result, this variant is particularly suitable for machine retrofits.

Variant C240 PN with its three PROFINET ports, which support PROFINET with IRT as well as TCP/IP and RT communication, is used to automate machines on the basis of PROFINET. It is capable of operating PROFINET drives with PROFIdrive, as well as PROFINET I/Os, such as SIMATIC ET 200S High Speed.

Both variants are equipped additionally with two PROFIBUS interfaces via which drives with PROFIdrive profile as well as standard I/Os can be connected. In addition, both controllers feature an Industrial Ethernet interface, thus offering further communication options.

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Overview (continued)

SIMOTION P – Open for multiple tasks



SIMOTION P is a PC-based Motion Control System.
The capabilities of the portfolio of PC-based controllers with SIMOTION P320-3, the embedded PC for Motion Control, and SIMOTION P350-3 with the operating system Windows XP Professional are well-demonstrated in practice – and not just for high-end tasks.

SIMOTION P320-3 has been created for Embedded PC Motion Control applications. Thanks to the Embedded Windows operating system and elimination of rotating parts in the PC, the SIMOTION P320-3 is particularly compact and ideal for applications in harsh environments. Both PCs are equipped with the usual real-time expansion for SIMOTION. This means that in addition to SIMOTION machine applications, it is possible to run other PC applications at any time including, for example, the SIMOTION engineering system, an operator application, a process data evaluation routine or standard PC applications.

With its excellent processor performance, SIMOTION P350-3 is predestined for applications with exacting performance requirements (such as hydraulic applications with highly dynamic position and pressure control loops). SIMOTION P320-3 is particularly suitable for harsh operating environments. Its small footprint makes it the preferred choice for many applications in which available space and rugged design play a key role.

The SIMOTION P350-3 can be operated by a variety of different SIMOTION panel fronts. These are available in various screen sizes and can either be operated using a keyboard and mouse, or a touch screen. The SIMOTION P320-3 can be linked to the SIMOTION fronts by means of the Remote Panel PC Kit. For both PC variants, the SIMATIC flat panel series offers further scope for solutions in which the PC is not directly connected to the front panel.

SIMOTION P350-3 is available in either a PROFINET or PROFIBUS variant for the connection of I/Os, while SIMOTION P320-3 is available only as a PROFINET variant.

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Overview

Motion Control architectures with SIMOTION and SINAMICS

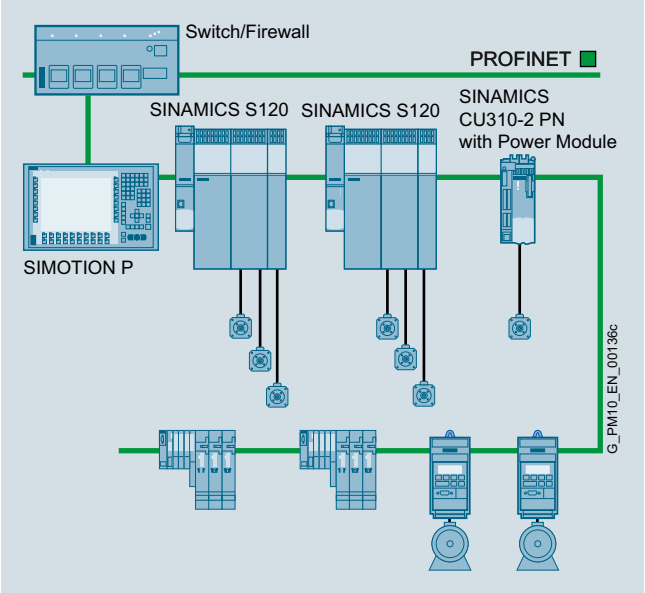
With SIMOTION and SINAMICS, a range of different automation structures can be implemented over PROFINET. In this case, central architectures comprising a controller (e.g. SIMOTION P) are supported as well as decentralized, distributed architectures with several distributed controllers (e.g. SIMOTION D with SINAMICS S120).

When SIMOTION is integrated in a complete automation system, hierarchic automation structures often result.

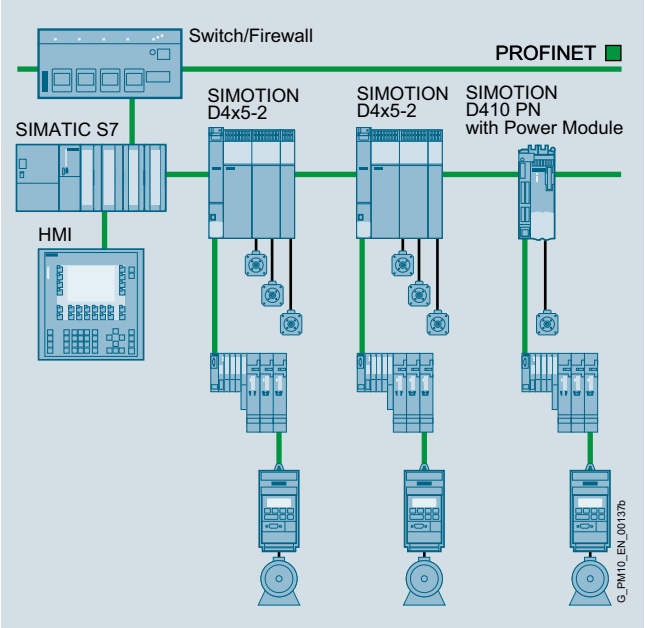
Thanks to the ability to configure SIMOTION as controller and device concurrently on the same PROFINET interface (I-Device), both hierarchic automation structures and modular machine concepts can be implemented easily and without additional components:

- On the one hand, SIMOTION as a device can communicate with a higher-level controller, e.g. a SIMATIC S7 PLC or a non-Siemens PLC.
- On the other hand, SIMOTION can also communicate with local IO devices, such as drives and I/O modules, in the role of IO Controller.

Via controller-to-controller and controller-to-device relationships based on PROFINET IO with IRT, it is also possible to synchronize large axis quantity structures via several SIMOTION IO Controllers. This functionality is known as distributed synchronous operation.



Central Motion Control architecture



Distributed Motion Control architecture

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Overview

PROFINET – Functions of SIMOTION motion controllers

SIMOTION device	C240 PN	D410-2 DP/PN	D425-2 DP/PN	D435-2 DP/PN	D445-2 DP/PN	D455-2 DP/PN	P350-3	P320-3
Number of PROFINET interfaces	1	1	1 ... 2 (second interface is an option)	1 ... 2 (second interface is an option)	1 ... 2 (second interface is an option)	1 ... 2 (second interface is an option)	1	1
Interface 1								
PROFINET with IRT (isochronous mode)	✓	✓	✓	✓	✓	✓	✓	✓
Number of ports	3	2	3	3	3	3	4	3
Max. number of devices	64	64	64	64	64	64	64	64
Min. send clock in ms	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25
I-Device	✓	✓	✓	✓	✓	✓	✓	✓
Bumpless media redundancy (MRPD) [1]	✓	–	✓	✓	✓	✓	–	✓
Step-change media redundancy (MRP)	✓	–	✓	✓	✓	✓	–	✓
PROFIsafe routing	✓	✓	✓	✓	✓	✓	✓	✓
PROFIenergy (as controller)	✓	✓	✓	✓	✓	✓	✓	✓
Interface 2 (option) [2]								
PROFINET with IRT (isochronous mode)	–	–	✓	✓	✓	✓	–	–
Number of ports (CBE30-2 option board)	–	–	4	4	4	4	–	–
Max. number of devices	–	–	64	64	64	64	–	–
Min. send clock in ms	–	–	0.25	0.25	0.25	0.25	–	–
I-Device	–	–	✓	✓	✓	✓	–	–
Bumpless media redundancy (MRPD)	–	–	✓	✓	✓	✓	–	–
Step-change media redundancy (MRP)	–	–	✓	✓	✓	✓	–	–
PROFIsafe routing	–	–	✓	✓	✓	✓	–	–
PROFIenergy (as controller)	–	–	✓	✓	✓	✓	–	–

[1] To establish bumpless media redundancy (MRPD), a separate switch from the SCALANCE X200IRT series is required.

[2] Optional second PROFINET interface over CBE30-2 (4 ports).

PROFINET – Functions of the SINAMICS S120 Control Units

SINAMICS S120	CU320-2 PN	CU320-2 DP (CBE20)	CU310-2 PN
PROFINET with IRT (isochronous mode)	✓	✓	✓
Number of ports	2	4	2
Min. send clock in ms	0.25	0.5	0.25
Shared device	✓	✓	✓
Bumpless media redundancy (MRPD)	✓	✓	✓
Step-change media redundancy (MRP)	✓	✓	✓
PROFIsafe	✓	✓	✓
PROFIenergy	✓	✓	✓
PROFIdrive	✓	✓	✓

PROFINET for SIMOTION

SIMOTION is fully integrated into the PROFINET communication. Interaction with the following PROFINET components is possible:

- Distributed I/O with SIMOTION
- Drives via PROFIdrive on SIMOTION
- SIMOTION as an IO-Device with a SIMATIC S7 CPU
- Active network components (e.g. SCALANCE) with SIMOTION
- PROFIsafe to a SIMATIC F-CPU. The PROFIsafe message frames are routed from SIMOTION to the lower-level drives.

When an automation topology is configured, the real-time classes RT and IRT can be used alongside each other on the same network or cable. It must be noted that not all devices support both real-time classes RT and IRT. For devices that should be synchronized with IRT, it is important that all the PROFINET components that lie in between support the IRT real-time class.

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Overview

PROFIdrive – The standardized drive interface for PROFINET and PROFIBUS

PROFIdrive defines the device behavior and the access procedure to internal drive data for electrical drives on PROFINET and PROFIBUS, from simple frequency converters up to high-performance servo controllers.

It contains a detailed description of how the communication functions "slave-to-slave communication", "constant bus cycle time" and "isochronous operation" are used for drive applications. In addition, it clearly specifies all device characteristics which influence interfaces connected to a controller over PROFINET or PROFIBUS. This includes the sequence control, encoder interface, standardization of values, definition of standard messages, and access to drive parameters, etc.

The PROFIdrive profile supports both central as well as distributed motion control concepts.

What are profiles?

Profiles specify specific properties and responses for devices and systems in automation. In this manner, manufacturers and users pursue the goal of defining common standards. Devices and systems that comply with a multi-vendor profile can interoperate on a fieldbus and can be operated interchangeably to a certain extent.

Do different profile types exist?

A distinction is made between application profiles (general or specific) and system profiles:

- Application profiles (also known as device profiles) mainly refer to devices (e.g. drives) and contain an agreed selection of bus communication modes, as well as specific device applications.
- System profiles describe system classes and include the master functionality, program interfaces and integration methods.

Is PROFIdrive future-proof?

PROFIdrive has been specified by PROFIBUS and PROFINET International (PI) and has been laid down in IEC 61800-7 as a future-proof standard.

The basic philosophy: Keep it simple

The PROFIdrive profile tries to keep the drive interface as simple as possible and free from technology functions. This philosophy ensures that reference models as well as the functionality and performance of the PROFINET/PROFIBUS master have no or very little influence on the drive interface.

One drive profile – Different application categories

The integration of drives into automation solutions depends strongly upon the drive task. To cover the extensive range of drive applications from the simple frequency converter up to highly dynamic, synchronized multi-axis systems with a single profile, PROFIdrive defines six application categories which define most drive applications:

- Category 1 – Standard drives (such as pumps, fans, stirring units, etc.)
- Category 2 – Standard drives with technology functions
- Category 3 – Positioning drives
- Category 4 – Motion control drives with central, higher-level motion control intelligence and the patented "Dynamic Servo Control" position control concept
- Category 5 – Motion control drives with central, higher-level motion control intelligence and position setpoint interface
- Category 6 – Motion control drives with distributed motion control intelligence integrated in the drives

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Design

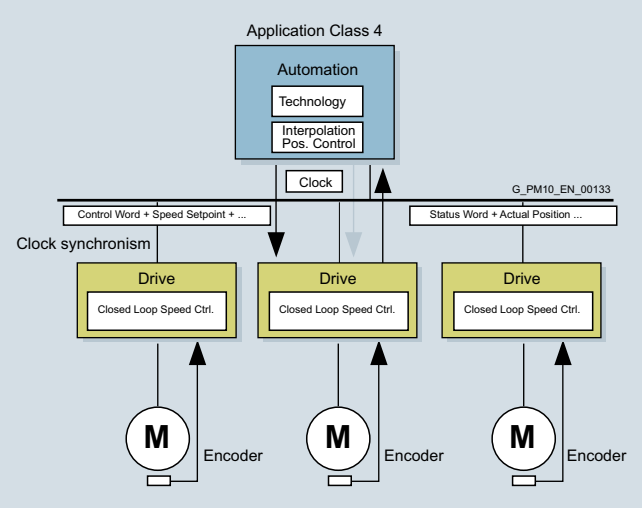
The device model of PROFIdrive

PROFIdrive defines a device model based on function modules which cooperate in the device and generate the intelligence of the drive system. These modules have objects assigned to them which are described in the profile and are defined with respect to their functions. The overall functionality of a drive is therefore described through the sum of its parameters.

In contrast to other drive profiles, PROFIdrive defines only the access mechanisms to the parameters as well as a subset of approx. 30 profile parameters such as the fault buffer, drive control and device identification.

All other parameters are vendor-specific which gives drive manufacturers great flexibility with respect to implementing function modules. The elements of a parameter are accessed acyclically via data records.

As a communication protocol, PROFIdrive uses DP-V0, DP-V1, and the DP-V2 expansions for PROFIBUS including the functions "Slave-to-slave communication" and "Isochronous operation", or PROFINET IO with real-time classes RT and IRT.



PROFIdrive for Motion Control

Utilization category 4 is the most important for highly dynamic and highly complex Motion Control tasks. This application category describes in detail the master/slave relationship between the Controller and the drives which are connected to each other over PROFINET and PROFIBUS.

The DSC (Dynamic Servo Control) function significantly improves the dynamic response and stiffness of the position control loop by minimizing the dead times which usually occur for speed setpoint interfaces with an additional, relatively simple feedback network in the drive. The position control loop is closed in the drive which permits very fast position control cycles (e.g. 125 µs for SINAMICS S120) and thus limits dead times exclusively to the control behavior.

PROFIdrive for SIMOTION

In SIMOTION, the drive interface has been implemented according to the PROFIdrive profile V4 and application categories 1 to 4 (category 4 with and without DSC).

When SINAMICS S120 operates with SIMOTION, utilization category 4 with DSC is used as standard.

More information

Further information about PROFINET and PROFIBUS can be found at
www.profibus.com

See Downloads / Technical descriptions & books / PROFIdrive Technology and Application – System Description

Further information about SIMOTION can be found in catalog PM 21 and on the internet at:
www.siemens.com/simotion

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Overview



Compact, strong, straightforward – simply ingenious

The compact, operator-panel based SINUMERIK 828D BASIC T/BASIC M CNC controls offer maximum ruggedness and easy maintainability.

Powerful CNC functions coupled with a unique 80 bit NANO^{FP} accuracy result in maximum workpiece precision and minimum machining time. Thanks to a flexible CNC programming language and the exceptional ShopTurn/ShopMill machining step programming, both mass produced components and individual workpieces can be programmed and machined with the maximum possible efficiency. Pre-configured technology-specific system software and unique servicing functions reduce the costs for commissioning and servicing to an absolute minimum.

Tailored for standard turning machines ...

The SINUMERIK 828D BASIC T CNC control is perfectly tailored to the requirements of modern standard turning machines. With powerful kinematic transformers and a comprehensive selection of technology cycles, the SINUMERIK 828D BASIC T is also well-equipped for sophisticated machining with rotating tools.

Perfectly tailored and pre-configured for:

- Up to 5 axes/spindles in one machining channel
- Front side machining with rotating tools
- Lateral surface machining with rotating tools

... Standard milling machines

The SINUMERIK 828D BASIC M CNC control is perfectly tailored to the requirements of modern standard milling machines. With the integrated SINUMERIK MDynamics technology package including the new intelligent motion and velocity control Advanced Surface, the SINUMERIK 828D BASIC M is also well-equipped for the machining of mold making workpieces.

Perfectly tailored and pre-configured for:

- Up to 5 axes/spindles in one machining channel
- Lateral surface machining with A axis
- Machining and use in mold making

More information

- Catalog NC 82
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinumerik
  www.siemens.com/industrymall

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Overview



SINUMERIK 840D sl offers modularity, openness, flexibility and uniform structures for operation, programming, and visualization. It provides a system platform with trend-setting functions for almost all technologies.

Integrated into the SINAMICS S120 drive system and complemented by the SIMATIC S7-300 automation system, the SINUMERIK 840D sl forms a complete digital system that is optimally suited to the mid and upper performance range.

SINUMERIK 840D sl is characterized by:

- A high level of flexibility
- Maximum dynamics and precision
- Optimum integration into networks

Benefits

- Maximum performance and flexibility for medium to complex multi-axis systems, thanks to scalable hardware and software
- Consistent openness in the area of the user interface, the PLC, and the NC core for the integration of your specific know-how
- Integrated safety functions for man and machine: SINUMERIK Safety Integrated
- Comprehensive range of functions for the integration of machine tools into communication, engineering and production processes: SINUMERIK Integrate

Application

The SINUMERIK 840D sl can be used globally in the following technologies:

- Turning
- Drilling
- Milling
- Grinding
- Laser cutting
- Nibbling
- Punching
- Toolmaking and moldmaking
- High-speed cutting applications
- Woodworking and glass processing
- Handling
- Transfer lines
- Rotary indexing machines
- Mass series production
- JobShop production

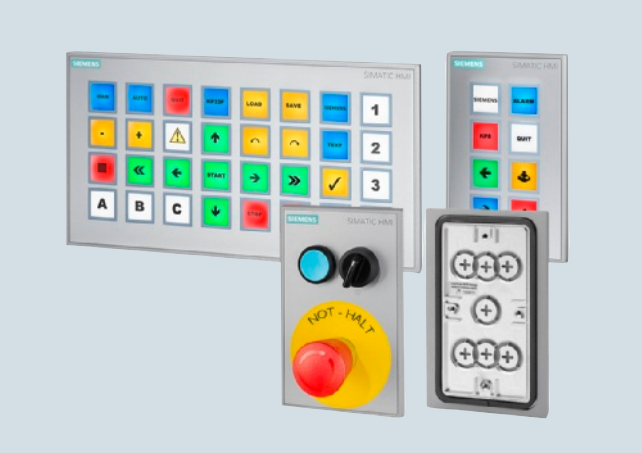
For use in countries requiring approval, there is the export version SINUMERIK 840DE sl.

More information

- Catalog NC 62
- Interactive Catalog CA 01
- Internet:
  www.siemens.com/sinumerik
  www.siemens.com/industrymall

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Overview



SIMATIC HMI Key Panels

- Optimum operability thanks to large mechanical keys and multi-colored LED backlighting (daylight readable)
- Over 60% time savings for wiring and installation (Plug&Play)
- More than 30% savings in material costs compared to conventional keypad operator panels
- 2 PROFINET ports (incl. switch) already integrated for setting up line and ring topologies
- Freely configurable digital I/Os on the rear for connecting key-operated switches, indicator lamps, etc.
- Connection of fail-safe emergency stop buttons or other fail-safe signals with KP8F and KP32F (in SIL2 or SIL3)
- Functionally compatible with all standard PROFINET master CPUs, also non-Siemens
  KP8 and empty front design, also optimized for installation in IPC Extension Units in IP65
- Maximum flexibility due to parameterization
- Empty front design for standardized assembly of flexible operator panels

SIMATIC HMI Key Panel – Blank front design

- Simple seamless installation with mounting clips
- Rugged design, suitable for harsh industrial environments
- Prepared for installation of 22.5 mm standard components
  Easy installation, or retrofitting during operation, of standard 22.5 mm operator controls

Ordering data

Ordering data	Article No.
SIMATIC HMI Key Panel KP8 PN Key Panel, 8 short-stroke keys with multicolored LEDs, PROFINET interfaces, 2 x parameterizable with STEP 7 V5.5 or higher	**6AV3688-3AY36-0AX0**
SIMATIC HMI Key Panel KP8F PN Key Panel, 8 short-stroke keys with multicolored LEDs, PROFINET interfaces with PROFIsafe, parameterizable with STEP 7 V5.5 or higher; 4 additional fail-safe inputs. Can be used as 2 x SIL 2 or 1 x SIL 3	**6AV3688-3AF37-0AX0**
SIMATIC HMI KP32F PN Key Panel, 32 short-stroke keys with multicolored LEDs, PROFINET interfaces with PROFIsafe, parameterizable with STEP 7 V5.5 or higher; including 8 fail-safe inputs. Can be used as 4 x SIL 2 or 2 x SIL 3	**6AV3688-3EH47-0AX0**
Empty front design for standard 22.5 mm operator controls, same mounting dimensions as KP8	**6AV3688-3XY38-3AX0**
Demo case (Only by fax to +49 911 750 2411) includes: 1 x case 1 x KP8 PN1 x CPU 1211C 1 x stand, permanently wired, including program; Power supply possible with a standard laptop mains adapter (not included in scope of supply)	**A5E314777880**
12-pole connector set for KP8 PN 10 items per packaging unit	**6AV6671-3XY38-4AX0**
16-pole connector set for KP8F PN 10 items per packaging unit	**6AV6671-3XY48-4AX0**
16-pole connector set for KP8F PN 4 items per packaging unit	**6AV6671-3XY58-4AX0**
Documentation You can find the manual for the Key Panels on the Internet at:	http://support.automation.siemens.com/WW/view/en/56652789

Note:

For further information see Catalog ST 80 / ST PC and Industry Mall at www.siemens.com/industrymall

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Overview



With their fully developed HMI basic functions, 2nd generation SIMATIC HMI Basic Panels are the ideal entry level series for simple HMI applications.

The device family offers panels with 4", 7", and 9" displays, as well as combined key and touch operation.

The innovative high-resolution widescreen displays with 64 000 colors are also suitable for upright installation, and they can be dimmed down to 100 %.

The innovative operator interface with improved usability opens up a diverse range of options thanks to new controls and graphics.

The new USB interface enables the connection of keyboard, mouse or barcode scanner, and supports the simple archiving of data on a USB stick.

Ordering data

	Article No.
SIMATIC HMI Basic Panels 2nd Generation	
SIMATIC HMI Basic Panels, Key and Touch	
• SIMATIC HMI KTP400 Basic	**6AV2123-2DB03-0AX0**
• SIMATIC HMI KTP700 Basic	**6AV2123-2GB03-0AX0**
• SIMATIC HMI KTP900	**6AV2123-2JB03-0AX0**
SIMATIC HMI Basic Panels 1st Generation	
• SIMATIC HMI KP300 Basic mono PN	**6AV6647-0AH11-3AX0**
• SIMATIC HMI KTP400 Basic mono PN	**6AV6647-0AA11-3AX0**
• SIMATIC HMI KTP600 Basic mono PN	**6AV6647-0AB11-3AX0**
• SIMATIC HMI KTP600 Basic color DP	**6AV6647-0AC11-3AX0**
• SIMATIC HMI KTP600 Basic color PN	**6AV6647-0AD11-3AX0**
• SIMATIC HMI KTP1000 Basic color DP	**6AV6647-0AE11-3AX0**
• SIMATIC HMI KTP1000 Basic color PN	**6AV6647-0AF11-3AX0**
• SIMATIC HMI TP1500 Basic color PN	**6AV6647-0AG11-3AX0**
Starter kit SIMATIC S7-1200 + KP300 Basic mono PN	**6AV6651-7HA01-3AA4**
Starter kit SIMATIC S7-1200 + KTP400 Basic	**6AV6651-7AA01-3AA4**
Starter kit SIMATIC S7-1200 + KTP700 Basic	**6AV6651-7DA01-3AA4**
Starter kits consisting of: • the respective SIMATIC HMI Basic Panel - SIMATIC HMI KP300 Basic mono PN - SIMATIC HMI KTP400 Basic mono PN - SIMATIC HMI KTP600 Basic color PN • SIMATIC S7-1200 CPU 1212C AC/DC/Rly • SIMATIC S7-1200 Simulator Module SIM 1274 • SIMATIC STEP 7 BASIC CD • SIMATIC S7-1200 HMI Manual Collection CD • Ethernet CAT5 cable, 2 m	

	Article No.
SIMATIC HMI Basic Panels 1st Generation (continued)	
Starter kit LOGO! + HMI Basic Panel consisting of: SIMATIC HMI Basic Panel LOGO! 12/24 RCE LOGO! Power 24 V / 1,3 A LOGO! Soft Comfort V7 WinCC Basic (TIA Portal) HMI manual CD Ethernet cable, 2 m	
• LOGO! 0BA7 + KP300 Basic starter kit	**6AV2132-0HA00-0AA1**
• LOGO! 0BA7 + KTP400 Basic starter kit	**6AV2132-0KA00-0AA1**
Configuration	
All device variants: SIMATIC WinCC Basic/Comfort/ Professional or SIMATIC STEP 7 Basic/Professional (with integrated WinCC Basic)	see catalog ST 80 / ST PC
Documentation	
You can find the manual for the Basic Panels on the Internet at:	http://support.automation.siemens.com

Note:

For further information see Catalog ST 80 / ST PC and Industry Mall at www.siemens.com/industrymall

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Overview



- Excellent HMI functionality for demanding applications
- Widescreen TFT displays with 4", 7", 9", 12", 15", 19" and 22" diagonals (all 16 million colors) with up to 40% more visualization area as compared to the predecessor devices
- Integrated high-end functionality with archives, scripts, PDF/Word/Excel viewer, Internet Explorer, Media Player and Web Server
- Dimmable displays from 0 to 100% via PROFIenergy, via the HMI project or via a controller
- Modern industrial design, cast aluminum fronts for 7" upwards
- Upright installation for all touch devices
- Optimal selection option: seven touch and five key versions are available
- Data security in the event of a power failure for the device and for the SIMATIC HMI Memory Card
- Innovative service and commissioning concept through second SD card (automatic backup)
- Easy project transfer via standard cable (standard Ethernet cable, standard USB cable)
- Maximum performance with short screen refresh times
- Suitable for extremely harsh industrial environments thanks to extended approvals such as ATEX 2/22 and marine approvals
- Wide range of communication options: PROFIBUS and PROFINET onboard; 2 x PROFINET with integrated switch for 7" models or larger; plus 1 x PROFINET with Gigabit support for 15" models or larger
- All variants can be used as an OPC UA client or as an OPC DA server
- Key-operated devices with LED in every function key and new text input mechanism, similar to the keypads of mobile phones
- All keys have a service life of 2 million operations
- Configuring with the WinCC engineering software of the TIA Portal

Ordering data

Ordering data	Article No.
SIMATIC HMI Comfort Panels, Touch	
SIMATIC HMI KTP400 Comfort, Key and Touch	**6AV2124-2DC01-0AX0**
SIMATIC HMI TP700 Comfort	**6AV2124-0GC01-0AX0**
SIMATIC HMI TP900 Comfort	**6AV2124-0JC01-0AX0**
SIMATIC HMI TP1200 Comfort	**6AV2124-0MC01-0AX0**
SIMATIC HMI TP1500 Comfort	**6AV2124-0QC02-0AX0**
SIMATIC HMI TP1900 Comfort	**6AV2124-0UC02-0AX0**
SIMATIC HMI TP2200 Comfort	**6AV2124-0XC02-0AX0**
SIMATIC HMI Comfort Panels, Key	
SIMATIC HMI KP400 Comfort	**6AV2124-1DC01-0AX0**
SIMATIC HMI KP700 Comfort	**6AV2124-1GC01-0AX0**
SIMATIC HMI KP900 Comfort	**6AV2124-1JC01-0AX0**
SIMATIC HMI KP1200 Comfort	**6AV2124-1MC01-0AX0**
SIMATIC HMI KP1500 Comfort	**6AV2124-1QC02-0AX0**
Starter kits for HMI Comfort Panels	
consisting of: the respective SIMATIC HMI Comfort Panel, SIMATIC WinCC Comfort, Ethernet cable, 2 m SIMATIC HMI memory card 2 GB 10 protective films for touch screen devices	
Starter kit for HMI KTP400 Comfort, Key and Touch	**6AV2181-4DB20-0AX0**
Starter kit for HMI TP700 Comfort	**6AV2181-4GB00-0AX0**
Starter kit for HMI TP900 Comfort	**6AV2181-4JB00-0AX0**
Starter kit for HMI TP1200 Comfort	**6AV2181-4MB00-0AX0**
Starter kit for HMI TP1500 Comfort	**6AV2181-4QB00-0AX0**
Starter kit for HMI TP1900 Comfort	**6AV2181-4UB00-0AX0**
Starter kit for HMI TP2200 Comfort	**6AV2181-4XB00-0AX0**
Starter kit for HMI KP400 Comfort, key	**6AV2181-4DB10-0AX0**
Starter kit for HMI KP700 Comfort, key	**6AV2181-4GB10-0AX0**
Starter kit for HMI KP900 Comfort, key	**6AV2181-4JB10-0AX0**
Starter kit for HMI KP1200 Comfort, key	**6AV2181-4MB10-0AX0**
Starter kit for HMI KP1500 Comfort, key	**6AV2181-4QB10-0AX0**

Note:

For further information see Catalog ST 80 / ST PC and Industry Mall at www.siemens.com/industrymall

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Overview



SIMATIC Mobile Panel

- Mobile operator panel for direct operator control of the plant and machine from any point
- Supports an optimum view of the workpiece or process and, at the same time, direct access and visual contact with the operator panel
- Versatile use thanks to easy unplugging and replugging during normal operation (Mobile Panel 177 and Mobile Panel 277) or
- Wireless freedom (Mobile Panel 277(F) IWLAN)
- Pixel-graphics, high-luminance color display with touch screen (analog/resistive)
- PROFIBUS or PROFINET communication, PROFINET over WLAN for Mobile Panel 277(F) IWLAN
- Freely-configurable function keys with customized labels (with LED) (not for Mobile Panel 277 10")

SIMATIC Mobile Panel 177 and SIMATIC Mobile Panel 277

- Two three-stage acknowledgement buttons;
  Optional versions include:
  - STOP button
  - STOP button, handwheel, key-operated switch and illuminated pushbutton (not for Mobile Panel 277 10")
- Communication is supported via a serial link, MPI/PROFIBUS or PROFINET
- Connection point recognition for local identification of the device based on the connection point ID
- Fast system availability after plugging into the connection boxes
- Connection to the controller and power supply is made via the connection box and the connecting cable

SIMATIC Mobile Panel 277(F) IWLAN

- Wireless, mobile operator panel for flexible and location-independent system and machine operation
- WLAN communication in accordance with IEEE 802.11 (a/b/g/h) and PROFINET support
- Powerful batteries and flexible concept for changing permit battery replacement "on the fly" without interrupting operation
- Effective range limitation and the local identification of the device by using transponder technology
- Low-cost, safety-related mobile operator control and monitoring via RFID technology (MOBY D) for plants with pre-installed safety resources (e.g. robot cells)
- Optional variants with: Handwheel, key switch and illuminated pushbutton
- Fail-safe operator controls of the SIMATIC Mobile Panel 277F IWLAN using PROFIsafe:
  - Two three-stage acknowledgment buttons
  - Emergency stop button

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Ordering data	Article No.
SIMATIC Mobile Panel 177 PN (PROFINET) [1]	
• With integrated acknowledgement button	**6AV6645-0BA01-0AX0**
• With integrated acknowledgement button and STOP button	**6AV6645-0BB01-0AX0**
• With integrated acknowledgement button, STOP button, handwheel, key-operated switch and illuminated pushbutton	**6AV6645-0BC01-0AX0**
SIMATIC Mobile Panel 277 8" [1]	
• With integrated acknowledgement button	**6AV6645-0CA01-0AX0**
• With integrated acknowledgement button and STOP button	**6AV6645-0CB01-0AX0**
• With integrated acknowledgement button, STOP button, handwheel, key-operated switch and two illuminated pushbuttons	**6AV6645-0CC01-0AX0**
SIMATIC Mobile Panel 277 10"	
• With integrated acknowledgement button and STOP button	**6AV6645-0BE02-0AX0**
SIMATIC Mobile Panel 277 IWLAN V2 (RoW version)	
• Communication via WLAN (PROFINET)	**6AV6645-0DD01-0AX1**
• Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons	**6AV6645-0DE01-0AX1**
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (RoW version)	
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button	**6AV6645-0EB01-0AX1**
• Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6645-0EC01-0AX1**
• RFID tag version: Communication via WLAN (PROFINET) with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6645-0EF01-0AX1**
SIMATIC Mobile Panel 277 IWLAN V2 (USA version)	
• Communication via WLAN (PROFINET)	**6AV6645-0FD01-0AX1**
• Communication via WLAN (PROFINET) with integrated handwheel, key-operated switch and two illuminated pushbuttons	**6AV6645-0FE01-0AX1**
SIMATIC Mobile Panel 277F IWLAN V2 PROFIsafe (USA version)	
• with acknowledgement button and emergency stop button	**6AV6645-0GB01-0AX1**
• with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons	**6AV6645-0GC01-0AX1**
• with acknowledgement button and emergency stop button with integrated handwheel, key-operated switch, and two illuminated pushbuttons (tag version)	**6AV6645-0GF01-0AX1**

[1] The system components (connection cable and connection boxes) must be ordered separately

	Article No.
Starter kit SIMATIC Mobile Panel 277(F) IWLAN (RoW VERSION)	
for	
• Mobile Panel 277 IWLAN V2	**6AV6651-5GA01-0AA1**
• Mobile Panel 277F IWLAN V2	**6AV6651-5HA01-0AA1**
Accessories for Mobile Panel 277 IWLAN/277(F) IWLAN	
Note: Please order the table-top power supply or charging station as well. Required for charging the battery.	
• Power supply unit, external, Mobile Panel IWLAN; Only suitable for operation under laboratory/office conditions	**6AV6671-5CN00-0AX2**
• Charging station for SIMATIC Mobile Panels	**6AV6671-5CE00-0AX1**
• Main rechargeable battery for Mobile Panel IWLAN; For contents and matching devices, see Technical Data	**6AV6671-5CL00-0AX0**
• Transponder V2 incl. batteries (3x AA)	**6AV6671-5CM00-0AX1**
• Transponder V1 incl. batteries (3x AA) required for the operation of plants with Mobile Panels 277(F) IWLAN V1	**6AV6671-5CM00-0AX0**
• Service set V2 for Mobile Panel 277(F) IWLAN V2 consists of 2x covers for charging station l/r, 1x connector for charging station, 2x corner seals l/r, 2x gasket corner seals, 4x decorative film corner seals l/r, 1x spare key for charging cradle	**6AV6671-5CA00-0AX2**
• Service set V1 for Mobile Panel 277(F) IWLAN V1 consists of 2x covers for charging station l/r, 1x connector for charging station, 2x corner seals l/r, 2x gasket corner seals, 4x decorative film corner seals l/r, 1x backup battery 3.6 V / 1.5 Ah including cover, 1x spare key for charging cradle	**6AV6671-5CA00-0AX1**

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Ordering data	Article No.
Access Points SCALANCE W and Power Supplies PS791	see chapter 6
Configuration	
with SIMATIC WinCC flexible	see catalog ST 80 / ST PC
Documentation (to be ordered separately)	
User Manual WinCC flexible Compact/ Standard/Advanced	
• German	**6AV6691-1AB01-3AA0**
• English	**6AV6691-1AB01-3AB0**
• French	**6AV6691-1AB01-3AC0**
• Italian	**6AV6691-1AB01-3AD0**
• Spanish	**6AV6691-1AB01-3AE0**
User Manual WinCC flexible Communication	
• German	**6AV6691-1CA01-3AA0**
• English	**6AV6691-1CA01-3AB0**
• French	**6AV6691-1CA01-3AC0**
• Italian	**6AV6691-1CA01-3AD0**
• Spanish	**6AV6691-1CA01-3AE0**

	Article No.
System components for Mobile Panels	
PN connection box for Mobile Panel (PROFINET)	
• Basic	**6AV6671-5AE01-0AX0**
• Plus	**6AV6671-5AE11-0AX0**
PN (PROFINET) connecting cable	
Standard cable	
• 2 m	**6XV1440-4BH20**
• 5 m	**6XV1440-4BH50**
• 8 m	**6XV1440-4BH80**
• 10 m	**6XV1440-4BN10**
• 15 m	**6XV1440-4BN15**
• 20 m	**6XV1440-4BN20**
• 25 m	**6XV1440-4BN25**
Accessories	see catalog ST 80 / ST PC

Note:
For further information see Catalog ST 80 / ST PC and Industry Mall at www.siemens.com/industrymall

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Overview



IPC rack family

Rack PCs are flexible, high-availability industrial PC systems for powerful yet compact applications using 19" technology.

Three device classes are available for various requirements:

SIMATIC IPC547 –
maximum performance at an attractive price

SIMATIC IPC647 –
maximum compactness combined with maximum industrial functionality

SIMATIC IPC847 –
maximum expandability and industrial functionality

Shared industrial functionality of the IPC series 547, 647 and 847

- Maximum system performance for complex automation tasks and computationally intensive PC tasks in the industrial environment through use of Intel Core processors
- Designed for 24-hour continuous operation
- Monitoring and diagnostics functions (e.g. temperature, fan, watchdog)
- RAID1 configuration (mirrored drives), optionally in hot swap drive bays
- Hard disks with capacities up to 1 TB for large volumes of data
- Solid-state drive (SSD) with MLC technology, optional
- Redundant AC power supply, optional
- Compact dimensions for installation in control cabinets only 500 mm deep
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Lockable front panel or front door
- Service-friendly equipment design due to prepared telescopic rail mounting
- Universal implementation as an industrial workstation or server
- Operating system preinstalled and activated for fast startup
- Fast restoration of the delivery status of the HDD thanks to restore DVD
- High flexibility and expandability of components
- PCI and PCI Express expansion slots
- Independent industrial product design

SIMATIC IPC547E –
maximum performance at an attractive price

- Intel Core i processors 4th generation
- Maximum processor performance in maximum configuration without loss of power (throttling) at ambient temperatures of up to 40 °C
- Optional RAID5 configuration (striping with parity) in hot swap drive bays
- RAID1 and RAID5 configurations with additional hot spare hard disk, optional
- Low noise output thanks to controlled fans
- Status and alarm LEDs at the front for signaling critical system states
- Availability for at least 1.5 years
- Guaranteed spare parts availability for at least 3 years

SIMATIC IPC647D – maximum compactness combined with maximum industrial functionality

- Maximum compactness due to 4 free PCI/PCI Express slots for installing long expansion cards and integrated interfaces for communication, e.g. integrated PROFIBUS/MPI or PROFINET interface
- High thermal stability up to 50 °C ambient temperature, even at maximum processor performance
- High vibration/shock resistance thanks to special hard disk holders
- Intel Core i processors 4th generation
- ECC memory, optional
- Service-friendly device design due, for example, to the replacement of filters/fans from the front without the need for tools, or opening of the enclosure with just one screw.
- Front LED concept for efficient self-diagnostics, e.g. monitoring of hard disks in RAID1 configurations, fans or the status display for Ethernet, PROFINET and PROFIBUS.
- Integrated PROFIBUS DP/MPI or PROFINET interface (optional)
- High component/design continuity
- Motherboard developed and manufactured by Siemens
- Availability for up to 6 years
- Guaranteed spare parts availability for at least 5 years

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Overview (continued)

SIMATIC IPC847D – maximum expandability and industrial functionality

- Maximum expandability due to 11 free PCI/PCI Express slots for installing long expansion cards and integrated interfaces for communication, e.g. integrated PROFIBUS/MPI or PROFINET interface
- High thermal stability up to 50 °C ambient temperature, even at maximum processor performance
- High vibration/shock resistance thanks to special hard disk holders
- Intel Core i processors 4th generation
- Optional RAID5 configuration (striping with parity) in hot swap drive bays
- RAID1 and RAID5 configurations with additional hot spare hard disk, optional
- ECC memory, optional
- Service-friendly device design due, for example, to the replacement of filters/fans from the front without the need for tools, or opening of the enclosure with just one screw.
- Front LED concept for efficient self-diagnostics, e.g. monitoring of hard disks in RAID1 configurations, fans or status displays for Ethernet, PROFINET and PROFIBUS
- Integrated PROFIBUS DP/MPI or PROFINET interface (optional)
- High component/design continuity
- Motherboard developed and manufactured by Siemens
- Availability for up to 6 years
- Guaranteed spare parts availability for at least 5 years

Benefits

Rugged design

The overall design aims to achieve maximum safety for electromagnetic, vibration and shock loads. A well-designed pressurized ventilation concept ensures that even the maximum configuration can support high operating temperatures – and dust protection is included.

Service-friendly device design

Particular attention was paid to making servicing extremely simple. PC components (e.g. slots, memory modules) are readily accessible. Fan filters and fans can be replaced without tools even when unit is built-in.

Performance

Thanks to the use of the latest generation of Intel Pentium Dual Core to Core i processors (2nd generation technology), SIMATIC Rack PCs are flexibly scalable for your application.

System availability

SIMATIC racks can be ordered in custom configurations and are supplied ready for use. The design's high system availability can be further extended by means of additional data backup options (e.g. RAID1 or RAID5 system, redundant power supply, SIMATIC IPC Image & Partition Creator) and efficient self-diagnostics software (SIMATIC IPC DiagMonitor).

Integrated interfaces

Two onboard Gbit Ethernet interfaces are available for communication in the office world or at the control level. Integrated USB interfaces on the rear and front panels make connecting I/O devices from the PC world (e.g. external hard disks for mobile data backup, keyboard and/or mouse for operation) child's play. For advanced graphics applications, a spare PCI Express slot and a high-performance graphics card for the connection of two monitors are available.

Expandability

With up to 11 free PC slots, the SIMATIC Rack PC offers maximum leeway for expansions for installation in space-saving cabinets with a depth of just 500 mm.

The continuity with IPC547, IPC647, IPC847

The SIMATIC Rack PC models can be ordered for a period of at least 1.5 years; spare parts remain obtainable for at least 3 years after active marketing is concluded. Long-term functionality of the hardware and software is also ensured. Long-term availability of PC components from the Intel embedded line ensures high investment protection.

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Technical specifications

Rack PC	SIMATIC IPC347D	SIMATIC IPC547E Enclosure depth 356 mm	SIMATIC IPC547E Enclosure depth 446 mm	SIMATIC IPC647D	SIMATIC IPC847D
Design					
19" rack	4 HU	4 U	4 U	2 HU	4 HU
Prepared for telescopic rails	•	•	•	•	•
Horizontal/vertical installation	• / -	• / •	• / •	• / -	• / •
19" mounting bracket can be removed from outside	•	•	•	•	•
Tower Kit (optional)	-	•	•	-	•
General features					
Processor	• Intel Core i5-3340S (4C/4T, 2.8 (3.3) GHz) • Intel Pentium G2010 (2C/2T, 2.8 GHz)	• Intel Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache) • Intel Celeron G1820 (2C/2T, 2.7 GHz, 2 MB cache)	• Intel Core i7-4770S (4C/8T, 3.1 (3.9) GHz) • Intel Core i5-4570S (4C/4T, 2.9 (3.6) GHz • Intel Pentium G3420 (2C/2T, 3.2 GHz)	• Intel Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz) • Intel Core i5-4570TE (2C/4T, 2.7 (3.3) GHz) • Intel Core i3-4330TE (2C/4T, 2.4 GHz)	• Intel Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz) • Intel Core i5-4570TE (2C/4T, 2.7 (3.3) GHz) • Intel Core i3-4330TE (2C/4T, 2.4 GHz)
Main memory	• 2 GB or 4 GB, expandable up to 16 GB	• 2 GB, expandable up to 16 GB	• 2 GB, expandable up to 32 GB	• 2 GB, expandable up to 32 GB • ECC optional	• 2 GB, expandable up to 32 GB • ECC optional
Slots for expansions (all long, up to 312 mm)	• 4 x PCI • 1 x PCI Express x16 • 1 x PCI-Express x8 (1 lane) • 1 x PCI-Express x1	• 4 x PCI • 1 x PCI-Express x16 • 1 x PCI-Express x16 (2 lanes) • 1 x PCI-Express x8 (1 lane)	• 4 x PCI • 1 x PCI-Express x16 Gen 3 • 1 x PCI Express x16 (4 lanes) • 1 x PCI-Express x8 (1 lane)	• 2 x PCI • 2 x PCI-Express x16 (8 lanes) or • 3 x PCI-Express x16 (4 lanes) • 1 x PCI-Express x16 (8 lanes) or • 2 x PCI-Express x16 (4 lanes)	• 7 x PCI • 1 x PCI-Express x16 • 3 x PCI-Express x4 (1 lane) or • 3 x PCI • 1 x PCI-Express x16 (8 lanes) • 4 x PCI-Express x16 (4 lanes) • 3 x PCI Express x4
Onboard graphics	• 1 x DVI-D • 1 x VGA	• 1 x DisplayPort V1.2 • 1 x DVI-I • 1 x VGA (via adapter cable, optional)	• 2 x DisplayPort V1.2 • 1 x DVI-I • 1 x VGA (via adapter cable, optional)	• 2 x DisplayPort • 1 x DVI-I • 1 x VGA (via adapter cable, optional)	• 2 x DisplayPort • 1 x DVI-I • 1 x VGA (via adapter cable, optional)
Graphics card (optional)	-	• PCI-Express x16 (2 x VGA or 2 x DVI-D)	• PCI Express x16 (2 x VGA or 2 x DVI-D)	• PCI Express x16 (2 x VGA or 2 x DVI-D)	• PCI Express x 16 (2 x VGA or 2 x DVI-D)
Operating system					
without	•	•	•	•	•
Preinstalled and activated, supplied on restore DVD	• Windows 7 Ultimate Multi-Language (64-bit)	• Windows 7 Ultimate Multi-Language (32/64-bit)	• Windows 7 Ultimate Multi-Language (32/64-bit) • Windows Server 2008 R2 incl. 5 Clients Multi-Language (64-bit)	• Windows 7 Ultimate Multi-Language (32/64-bit) • Windows Server 2008 R2 incl. 5 Clients Multi-Language (64-bit)	• Windows 7 Ultimate Multi-Language (32/64-bit) • Windows Server 2008 R2 incl. 5 Clients Multi-Language (64-bit)
Project-specific on request	-	• Linux [1] • Other	• Linux [1] • Other	• Linux [1] • Other	• Linux [1] • Other
Interfaces					
PROFIBUS/MPI	-	-	-	12 Mbit/s (compatible with CP 5622), optional	12 Mbit/s (compatible with CP 5622), optional
PROFINET	-	-	-	3 x RJ45 (compatible with CP 1616), optional	3 x RJ45 (compatible with CP 1616), optional
Ethernet	2 x Realtek 10/100/1000 Mbps	1 x Intel Gigabit Ethernet (RJ45)	2 x Intel Gigabit Ethernet (RJ45, teaming-capable)	2 x Intel 10/100/1000 Mbps	2 x Intel 10/100/1000 Mbps
USB 3.0 (high current)	-	2 x	4 x, 2 of which at front	4 x, 1 of which at front, 1 x internal	4 x, 1 of which at front, 1 x internal
USB 2.0 (high current)	6 x, 2 of which at front	6 x at the rear	7 x: 6 x rear, 1 x internal, e.g. for USB dongle with optional interlocking	3 x, 1 of which at front	3 x, 1 of which at front
VGA	•	• optional	• optionally via adapter cable	• optional	• optional
DVI	•	• 1 x	• 1 x	•	•
DisplayPort	-	• 1 x	• 2 x	•	•

• Available
- Not available

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Technical specifications (continued)

Rack PC	SIMATIC IPC347D	SIMATIC IPC547E Enclosure depth 356 mm	SIMATIC IPC547E Enclosure depth 446 mm	SIMATIC IPC647D	SIMATIC IPC847D
Drives					
SATA hard disks					
• Internal installation	•	•	•	-	•
• Installation at the front in the removable drive bay	-	-	•	•	•
• Internal installation in drive holder (shock and vibration-damped)	-	-	-	•	•
RAID1/5 configuration with onboard RAID	-	-	• / •	• / -	• /•
RAID configuration with additional hot spare hard disk	-	-	•	•	•
Solid-state drive (SSD), MLC	-	•	•	•	•
Optical drives					
DVD-ROM	•	-	•	-	-
DVD±R/RW	•	• (Slim)	• (Slim)	• (Slim)	• (Slim)
AC power supply	•	•	•	•	•
Redundant (optional)	-	-	•	•	•
Ambient conditions [2]					
Vibration/shock load during operation	-	0.2 g / 1 g	0.2 g / 1 g	0.5 g / 5 g	0.5 g / 5 g
Ambient temperature during operation	5 ... 40 °C	With maximum configuration: 5 ... 40 °C	With maximum configuration: 5 ... 40 °C Note: Limitations for operation of DVD±R/RW	With maximum configuration: 5 ... 50 °C	With maximum configuration: 5 ... 50 °C

• Available
- Not available

1) Suitable for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX", see www.siemens.com/simatic-pc/suited-for-linux
(LINUX is a trademark of Linus Torvalds)

2) Restrictions when using DVD±R/RW and hard disks in removable drive bay.

More information

Further information can be found in the Internet under:

http://www.siemens.com/simatic-pc

Information material can be ordered or downloaded from the Internet:

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

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Overview



IPC547E long and short enclosure design

The SIMATIC IPC547E is a rugged industrial PC in 19" rack design (4 U).

It offers:

- Maximum performance
- Attractive price
- Intel Core i technology

Benefits

Maximum system performance for complex automation and visualization tasks

- State-of-the-art PC technology (e.g. Intel Core i processors 4th generation with Turbo Boost 2.0, hyper-threading and virtualization technology)
- Memory and graphics controller integrated into processor for extraordinary memory and graphics performance
- Maximum performance (e.g. Intel Q87 chipset, DDR3 1600 memory with support of dual channel technology)
- High data transfer rates (e.g. with serial ATA solid-state drives up to 240 GB, serial ATA hard disks up to 1 TB, dual Gigabit Ethernet, PCI Express 3.0 technology)

Reduction in downtimes through high system availability

- Secure 24-hour operation (high MTBF, variable-speed fan)
- Efficient self-diagnostics (front status LEDs for fan and temperature, SIMATIC IPC DiagMonitor)
- High degree of data security due to RAID1 (mirror disk system) or RAID5 (striping with parity), also with additional hot spare hard disk
- "Hot swap" removable drive bay in RAID configuration (replacement of hard disk during operation)
- Fast identification and replacement of the hard disk in the event of a fault by means of HDD alarm LEDs for RAID configurations
- Solid-state drive option in conjunction with RAID1 (data in the RAID1 network on hard disks, preinstalled and activated operating system on solid-state drive)
- Redundant power supply with "hot swap" functionality (replacement of power supply module during operation)

High flexibility and user friendliness during commissioning, operation and service

- Preinstalled and activated operating system
- IAMT (Intel Active Management Technology) functionality for remote access to the IPC (remote maintenance)
- Fast restoration of the delivery status of the hard disk(s) thanks to restore DVD
- Low noise output thanks to controlled fans
- Universal implementation as an industrial workstation or server
- RAID1/RAID5 onboard (a PCI slot is not occupied by the RAID Controller)
- Flexible applications in many different positions with telescopic rails or as tower industrial PC
- High degree of flexibility and expandability thanks to integrated interfaces and 7 slots (PCI and PCI-Express)

High industrial compatibility and compactness for 24-hour use in an industrial environment

- Maximum processor performance (in maximum configuration) without loss of power (throttling) at ambient temperatures of up to 40 °C
- Distinct product design with dirt-resistant surfaces
- Metal enclosure with a high degree of electromagnetic compatibility for use in industrial areas and in domestic, business and commercial environments
- Suitable for installing in space-saving control cabinets only 400 mm deep
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Special hard disk holders and card retainers for protection against vibration and shock

Cost reductions through high investment security

- Availability of at least 1.5 years, guaranteed availability of spare parts for 3 years
- System-tested with SIMATIC components
- Certification for worldwide marketing (cULus)
- Support for legacy interfaces (PS/2, COM, LPT)
- Installation compatible for many device generations
- Worldwide service and support

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Technical specifications

	IPC547E (enclosure depth 356 mm)	IPC547E (enclosure depth 446 mm)
General features		
Design	19" rack PC, 4 U	
Processors	• Intel Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache) • Intel Celeron G1820 (2C/2T, 2.7 GHz, 2 MB cache)	• Intel Core i7-4770S (4C/8T, 3.1 (3.9) GHz, 8 MB cache, iAMT) • Intel Core i5-4570S (4C/4T, 2.9 (3.6) GHz, 6 MB cache, iAMT) • Intel Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache)
Chipset	• Intel H81	• Intel Q87
Main memory	• From 2 GB DDR3-1600 SDRAM • Dual channel support • 2 DIMM base • Expandable up to 16 GB [1]	• From 2 GB DDR3-1600 SDRAM • Dual channel support • 4 DIMM base • Expandable up to 32 GB [1]
Spare slots for expansions (all long)	• 1 x PCI-Express x16 • 1 x PCI-Express x16 (2 lanes) • 1 x PCI-Express x8 (1 lane) • 4 x PCI	• 1 x PCI-Express x16 • 1 x PCI-Express x16 (4 lanes) • 1 x PCI-Express x8 (1 lane) • 4 x PCI
Graphics	• Onboard Intel HD / Intel HD graphics 4600 graphics controller integrated into the processor Dynamic video memory up to 1.7 GB; up to 3840 x 2160 pixels at 60 Hz image refresh rate and 32-bit colors • PCI Express graphics card (Dual Head: 2 x VGA or 2 x DVI-D) in the PCIe x16 slot (optional), 512 MB; up to 2048 x 1536 pixels at 60 Hz image refresh rate and 32-bit colors	
Operating Systems	• Without Preinstalled and activated (supplied on restore DVD): • Windows 7 Ultimate MUI (32/64-bit) MUI (Multilanguage User Interface, 5 languages): English, German, French, Italian, Spanish Project-specific on request: • Linux [2] • Other	• Without Preinstalled and activated (supplied on restore DVD): • Windows 7 Ultimate MUI (32/64-bit) • Windows Server 2008 R2 incl. 5 Client MUI (64 bit) MUI (Multilanguage User Interface, 5 languages): English, German, French, Italian, Spanish Project-specific on request: • Linux [2] • Other
Power supplies	• 100 ... 240 V AC, 50 ... 60 Hz, with bridging of short-term power failures: max. 20 ms at 0.85 % rated voltage	• 100 ... 240 V AC, 50 ... 60 Hz, with bridging of short-term power failures: max. 20 ms at 0.85 % rated voltage • Redundant 2 x 100 ... 240 V AC, 50 ... 60 Hz
Drives		
Hard disks, SATA 3.5" with NCQ technology Solid-state drives, SATA 2.5" with MLC technology	Internal installation • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD	Internal installation • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • 1 x 240 GB SSD • RAID1, 1 TB (2 x 1 TB HDD, mirror disks) [3] Installation at the front in swap frame (low-profile) • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • 1 x 240 GB SSD • RAID1, 1 TB (2 x 1 TB HDD, mirror disks), "hot swap" [3] • RAID1, 1 TB (2 x 1 TB HDD, mirror disks), "hot swap" [3] + 1 x 1 TB HDD as hot spare • RAID1, 1 TB (2 x 1 TB HDD, mirror disks), "hot swap" [3] + 1 x 240 GB SSD (operating system installed on SSD if configured) • RAID5, 2 TB (3 x 1 TB HDD, striping with parity), "hot swap" [3] • RAID5, 2 TB (3 x 1 TB HDD, striping with parity), "hot swap" [3] + 1 x 1 TB HDD as hot spare
DVD±R/RW, 5.25" (slim), SATA	-	• 8 x 8 x 6 x (DVD media) • 24 x 10 x 16 x (CD media)
Slots for drives	Internal: • 2 x 3.5"	Front: • 3 x 5.25" / 4 x low-profile swap frame • 1 x 5.25" (slimline) Internal: • 2 x 3.5"

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Technical specifications (continued)

	IPC547E (enclosure depth 356 mm)	IPC547E (enclosure depth 446 mm)
Interfaces		
Ethernet	1 x Intel Gigabit Ethernet (RJ45)	2 x Intel Gigabit Ethernet (RJ45, teaming-capable)
USB 3.0	• 2 x front (high current)	• 2 x front (high current) • 2 x rear (high current)
USB 2.0	• 6 x rear (high current)	• 6 x rear (high current) • 1 x internal (high current), e.g. for USB dongle with optional interlocking
Serial	9-pin COM2 (V.24) (optional)	9-pole COM1 (V.24); COM2 (V.24) (optional)
Parallel	LPT (optional)	
VGA	Optionally via adapter cable	
DVI-I	1 x	
DisplayPort V1.2	1 x	2 x
PS/2	2 x (keyboard, mouse)	
Audio	1 x Line In; 1 x Line Out; 1 x Mic.	
Monitoring functions		
Basic functionality	Message locally via DiagBase software	
Temperature	When permitted operating temperature range is exceeded	
Fan	Speed monitoring • 1 x front fan • 1 x CPU fan • 1 x power supply fan	
Watchdog	• Monitoring of program execution • Monitoring time can be parameterized in software	
Monitoring functions via the network	SIMATIC IPC DiagMonitor Version V4.4.x.x or higher (optional) Remote monitoring capability for: • Watchdog • Temperature • Fan speed • Battery • Hard disks (SMART) • System/Ethernet Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Client server architecture • Structure of log files	
Front LEDs	• POWER (PC switched on) • HDD (access to hard disk) • TEMP (temperature monitoring) • FAN (fan monitoring)	
Ambient conditions		
Degree of protection	IP30 front, IP20 rear according to EN 60529	
Dust protection	With the front door closed according to IEC 60529 filter class G2 EN 779, 99% of particles > 0.5 mm are filtered	
Protection class	Protection class I according to IEC 61140	
Vibration load during operation [4)]	IEC 60068-2-6, 10 cycles • 20 ... 58 Hz: 0.015 mm • 58 ... 200 Hz: 2 m/s^2 (approx. 0.2 g)	
Shock load in operation [4)]	IEC 60068-2-27 • Half-sine: 9.8 m/s^2, 20 ms (approx. 1 g), 100 shocks per axis	

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Technical specifications (continued)

	IPC547E (enclosure depth 356 mm)	IPC547E (enclosure depth 446 mm)
Electromagnetic compatibility (EMC)		
Emitted interference	EN 61000-6-3; EN 61000-6-4; CISPR 22 / EN 55022 Class B; FCC Class A; EN 61000-3-2 Class D; EN 61000-3-3	
Immunity to conducted interference on the supply lines	• ± 2 kV (IEC 61000-4-4, burst) • ± 1 kV (IEC 61000-4-5, symm. surge) • ± 2 kV (IEC 61000-4-5, asymm. surge)	
Noise immunity on signal lines	• ±2 kV (IEC 61000-4-4, burst, length > 30 m) • ± 1 kV (IEC 61000-4-4, burst, length < 30 m) • ± 2 kV (IEC 61000-4-5, Surge, Length > 30 m)	
Immunity to static discharge	• ±4 kV, contact discharge (IEC 61000-4-2) • ± 8 kV, air discharge (IEC 61000-4-2)	
Immunity to high radio frequency interference	• 10 V/m; 80 to 1000 MHz, 80 % AM (IEC 61000-4-3) • 3 V/m; 1.4 to 2 GHz, 80 % AM (IEC 61000-4-3) • 1 V/m, 2 to 2.7 GHz, 80 % AM (IEC 61000-4-3) • 10 V, 150 kHz to 80 MHz, 80 % AM (IEC 61000-4-6)	
Immunity to magnetic fields	30 A/m, 50/60 Hz (IEC 61000-4-8)	
Ambient temperature during operation	5 ... 40 °C	5 ... 40 °C Note: Limitations for operation of DVD±R/RW
Humidity during operation	5 ... 80 % at 25 °C (no condensation)	
Approvals and safety regulations		
Safety regulations	IEC 60950-1; UL60950; CSA	
Approvals	cULus 60950	
CE mark	For use in industrial areas as well as domestic, business and commercial environments: • Emitted interference: EN 61000-6-3:2007 • Noise immunity: EN 61000-6-2:2005	
Dimensions and weights		
Installation dimensions (W x H x D) in mm	434 x 177 x 356	434 x 177 x 446
Weight, approx.	15 kg	19 kg

1) Memory information: In order to use a memory expansion with more than 4 GB, a 64-bit operating system is required.

2) Suitable for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX", see http://www.siemens.com/simatic-pc/suited-for-linux (LINUX is a trademark of Linus Torvald)

3) SATA RAID controller onboard in Intel Q87 chipset

4) Restrictions with operation of optical drives and hard disks in swap frames

Note regarding SIMATIC PC operating system licenses

The accompanying operating system license is only valid for installation on the respective supplied SIMATIC IPC. Installation can only be performed on these SIMATIC systems in accordance with Microsoft OEM licensing regulations.

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Ordering data

	Article No.
SIMATIC IPC547E [1]	**6AG4104 - 3** ■■■■■ - ■■■■
Interfaces: 2 x USB 3.0 at the front, 1 x DVI-I, 6 x USB 2.0 at the rear, 2 x PS/2, audio; 7 slots: 2 x PCIe x16, 1 x PCIe x8, 4 x PCI; temperature and fan monitoring; watchdog; card retainers;	
Processors and mainboards	
• Celeron G1820 (2C/2T, 2.7 GHz, 2 MB cache); 1 x Gigabit Ethernet (IE/PN), 1 x DisplayPort V1.2 (only in combination with short enclosure)	**A**
• Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache); 1 x Gigabit Ethernet (IE/PN), 1 x DisplayPort V1.2 (only in combination with short enclosure)	**C**
• Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN), 2 x DisplayPort V1.2, 2 x USB 3.0 at rear, 1 x USB 2.0 internal, 1 x COM1;	**D**
• Core i5-4570S (4C/4T, 2.9 (3.6) GHz, 6 MB cache, iAMT); 2 x Gigabit Ethernet (IE/PN), 2 x DisplayPort V1.2, 2 x USB 3.0 at rear, 1 x USB 2.0 internal, 1 x COM1;	**H**
• Core i7-4770S (4C/8T, 3.1 (3.9) GHz, 8 MB cache, iAMT); 2 x Gigabit Ethernet (IE/PN), 2 x DisplayPort V1.2. 2 x USB 3.0 at rear, 1 x USB 2.0 internal, 1 x COM1;	**K**
Drives (SATA)	
• 1 x 500 GB HDD, internal;	**A**
• 1 x 1 TB HDD, internal;	**B**
• 2 x 1 TB HDD, internal;	**D**
• 1 x 240 GB SSD, internal;	**E**
• RAID1, 1 TB (2 x 1 TB HDD, mirror disks), internal;	**G**
• 1 x 500 GB HDD in removable drive bay, at the front;	**H**
• 1 x 1 TB HDD in removable drive bay, at the front;	**K**
• 2 x 1 TB HDD in removable drive bay, at the front;	**M**
• 1 x 240 GB SSD in removable drive bay, at the front;	**N**
• RAID1, 1 TB (2 x 1 TB HDD, mirror disks) in removable drive bay, hot swap, at the front;	**P**
• RAID1, 1 TB (2 x 1 TB HDD, mirror disks) in removable drive bay; hot swap + 1 x 1 TB HDD as hot spare in removable drive bay, at the front;	**Q**
• RAID1, 1 TB (2 x 1 TB HDD, mirror disks) in removable drive bay, hot swap + 240 GB SSD in removable drive bay, at the front (operating system installed on SSD if configured);	**R**
• RAID5, 2 TB (3 x 1 TB HDD, striping with parity) in removable drive bay, hot swap, at the front;	**S**
• RAID5, 2 TB (3 x 1 TB HDD, striping with parity) in removable drive bay, hot swap + 1 x 1 TB HDD as hot spare in removable drive bay, at the front;	**T**

	Article No.
SIMATIC IPC547E [1]	**6AG4104 - 3** ■■■■ - ■■■■
Memory configuration	
• 2 GB DDR3 SDRAM (1 x 2 GB), single channel;	**1**
• 4 GB DDR3 SDRAM (2 x 2 GB), dual channel;	**2**
• 8 GB DDR3 SDRAM [2] (2 x 4 GB), dual channel;	**3**
• 16 GB DDR3 SDRAM [2] (2 x 8 GB), dual channel;	**4**
• 32 GB DDR3 SDRAM [2] (4 x 8 GB), dual channel;	**5**
Type of enclosure and swap media	
• Enclosure (short), painted on the front, no removable media;	**0**
• Enclosure, painted on the front, no removable media;	**1**
• Enclosure, painted on the front, + DVD±RW (slimline);	**2**
• Unpainted enclosure, no removable media;	**3**
• Painted enclosure, + DVD±RW (slimline);	**4**
Expansions (hardware)	
• Without expansions (hardware), onboard graphics;	**0**
• Without expansions (hardware), onboard graphics; DVI-I adapter cable, VGA-compliant for onboard graphics;	**1**
• Serial (COM2) & parallel (LPT), onboard graphics;	**2**
• Serial (COM2) and parallel (LPT), onboard graphics; DVI-I adapter cable, VGA-compliant for onboard graphics;	**3**
• Serial (COM2) & parallel (LPT) + PCIe x16 graphics card (Dual Head: 2 x VGA or 2 x DVI-D), 512 MB;	**4**
Operating systems (preinstalled and activated)	
• Windows 7 Ultimate, MUI (Eng, Ger, Fr, It, Sp), 32-bit, SP1;	**A**
• Windows 7 Ultimate, MUI (Eng, Ger, Fr, It, Sp), 64-bit, SP1;	**B**
• Windows Server 2008 R2 Standard Edition incl. 5 clients, MUI (Eng, Ger, Fr, It, Sp), 64-bit, SP1;	**F**
• Without operating system;	**X**
Expansions (software)	
• SIMATIC IPC DiagMonitor V4.4 software included;	**A**
• SIMATIC IPC Image & Partition Creator V3.3 software included;	**B**
• SIMATIC IPC DiagMonitor V4.4 + Image & Partition Creator V3.3 software included;	**C**
• Without expansions (software);	**X**
• Without expansions (software) / TPM (not for China and Russia);	**Y**
Country-specific versions/ power supplies:	
• 100/240 V AC industrial power supply, Europe power cable;	**0**
• 100/240 V AC industrial power supply, USA power cable;	**4**
• 100/240 V AC industrial power supply, China power cable;	**5**
• 2 x 100/240 V AC redundant industrial power supply, without power cable;	**6**

[1] For an up-to-date overview, see the SIMATIC PC Online Configurator at: https://www.siemens.com/ipc-configurator

[2] Can only be used with 64-bit operating systems

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SIMATIC IPC547E

Ordering data

	Article No.
Preferred variants (ex-stock)	
SIMATIC IPC547E	
• Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache); 2x USB 3.0 on front, 6x USB 2.0 at the rear, 1x Gbit Ethernet, 1x DisplayPort V1.2, 1x DVI-I, 2x PS/2, audio; painted enclosure (short) no removable media; 1x 1 TB HDD, internal (0.2 g vibration, 1 g shock); 2 GB DDR3 SDRAM (1x 2 GB), single-channel; serial (COM2) + parallel (LPT), onboard graphics, DVI-I adapter cable VGA-compliant for onboard graphics; without operating system; without expansions (software); 100/240 V AC industrial power supply, Europe power cable;	**6AG4104-3CB10-3XX0**
• Pentium Dual Core G3420 (2C/2T, 3.2 GHz, 3 MB cache); 2x USB 3.0 on front, 2x USB 3.0 and 6x USB 2.0 at the rear, 1 x USB 2.0 internal, 2x Gbit Ethernet, 2x DisplayPort V1.2, 1x DVI-I, 1x COM1, 2x PS/2, Audio; painted enclosure + DVD±RW (slimline); 1x 1 TB HDD, internal; 4 GB DDR3 SDRAM (2x 2 GB), dual channel; serial (COM2) + parallel (LPT), onboard graphics, DVI-I adapter cable VGA-compliant for onboard graphics; without operating system; without expansions (software); 100/240 V AC industrial power supply, Europe power cable;	**6AG4104-3DB24-3XX0**
• Core i5-4570S (4C/4T, 2.9 (3.6) GHz, 6 MB cache, iAMT); 2x USB 3.0 on front, 2x USB 3.0 and 6x USB 2.0 at the rear, 1x USB 2.0 internal, 2x Gbit Ethernet, 2x DisplayPort V1.2, 1x DVI-I, 1x COM1, 2x PS/2, Audio; painted enclosure + DVD±RW (slimline); RAID1, 1 TB (2x 1 TB HDD, mirror disks) in the removable drive bay, hot-swap, on front; 4 GB DDR3 SDRAM (2x 2 GB), dual channel; serial (COM2) + parallel (LPT), onboard graphics, DVI-I adapter cable VGA-compliant for onboard graphics; Windows 7 Ultimate, Multi Language (Eng, Ger, Fr, It, Sp), 32-bit, SP1; without expansions (software); 100/240 V AC industrial power supply, Europe power cable;	**6AG4104-3HP24-3AX0**
• Core i7-4770S (4C/8T, 3.1 (3.9) GHz, 8 MB cache, iAMT); 2x USB 3.0 on front, 2x USB 3.0 and 6x USB 2.0 on rear, 1x USB 2.0 internal, 2x Gbit Ethernet, 2x DisplayPort V1.2, 1x DVI-I, 1x COM1, 2x PS/2, audio; painted enclosure + DVD±RW (slimline); RAID1, 1 TB (2x 1 TB HDD, mirror disks) in removable drive bay, hot-swap, on front; 8 GB DDR3 SDRAM (2x 4 GB), dual channel; serial (COM2) + parallel (LPT) + PCIe x16 graphics card (dual-head: 2x VGA or 2x DVI-D), 512 MB; Windows 7 Ultimate, multi-language (En, Ger, Fr, It, Sp), 64-bit, SP1; without expansions (software); 2x 100/240 V AC redundant industrial power supply, without power cable;	**6AG4104-3KP34-4BX6**

	Article No.
Accessories	
Memory expansion	
• 2 GB DDR3 SDRAM (1 x 2 GB)	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 SDRAM (1 x 4 GB)	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 SDRAM (1 x 8 GB)	**6ES7648-2AJ70-0MA0**
Tower Kit For converting the computer into an industrial tower PC	**6ES7648-1AA00-0XC0**
Retainer for interlocking the internal USB port	**6ES7648-1AA00-0XK0**
Adapter cable	
• DisplayPort to DVI-D for onboard graphics	**6ES7648-3AF00-0XA0**
• DisplayPort to VGA for onboard graphics	**6ES7648-3AG00-0XA0**
Power cable, straight, 3 m long	
• Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden	**6ES7900-0AA00-0XA0**
• United Kingdom	**6ES7900-0BA00-0XA0**
• Switzerland	**6ES7900-0CA00-0XA0**
• USA	**6ES7900-0DA00-0XA0**
• Italy	**6ES7900-0EA00-0XA0**
• China	**6ES7900-0FA00-0XA0**
Rack unit for low-profile removable drive bay for 3.5" hard drive (SATA/SAS) and 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0** See catalog ST 80/ST PC
Expansion components	See Expansion components

Note:

Software Packages with SIMATIC WinCC flexible, SIMATIC WinCC RT Advanced, SIMATIC WinCC, and SIMATIC WinAC RTX (F) can be ordered together with the SIMATIC IPC at favorable prices.

More information under "Embedded Bundles / Packages for industrial PCs".

More information

Further information can be found in the Internet at:

http://www.siemens.com/simatic-pc

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Overview



The SIMATIC IPC547D is a rugged industrial PC in 19" rack design (4 U).

It offers:

- Maximum performance
- Attractive price
- Intel Core i technology

Benefits

Maximum system performance for complex automation and visualization tasks

- State-of-the-art PC technology (e.g. Intel Core i processors 2nd generation with Turbo Boost 2.0, hyper-threading and virtualization technology)
- Memory and graphics controller integrated into processor for extraordinary memory and graphics performance
- Maximum performance (e.g. Intel Q67 chipset, DDR3 1333 memory with support of dual channel technology)
- High data transfer rates (e.g. with serial ATA Solid-State Drive (SLC) with 50 GB, serial ATA hard disks up to 1 TB, Dual Gigabit Ethernet, PCI-Express 2.0 technology)

Reduction in downtimes through high system availability

- Secure 24-hour operation (high MTBF, variable-speed fan)
- Efficient self-diagnostics (front status LEDs for fan and temperature, SIMATIC IPC DiagMonitor)
- High degree of data security due to RAID1 (mirror disks system) or RAID5 (striping with parity)
- "Hot swap" removable drive bay in RAID configuration (replacement of hard disk during operation)
- Fast identification and replacement of the hard disk in the event of a fault by means of HDD alarm LEDs for RAID configurations
- Solid-State Drive (SSD) in single level cell (SLC) architecture
- Redundant power supply with "hot swap" functionality (replacement of power supply module during operation)

High flexibility and user friendliness during commissioning, operation and service

- Preinstalled and activated operating system
- IAMT (Intel Active Management Technology) functionality for remote access to the IPC (remote maintenance)
- Fast restoration of the delivery status of the hard disk(s) thanks to restore DVD
- Low noise output thanks to controlled fans
- Universal implementation as an industrial workstation or server
- RAID1/RAID5 onboard (a PCI slot is not occupied by the RAID Controller)
- Flexible applications in many different positions with telescopic rails or as tower industrial PC.
- High degree of flexibility and expandability thanks to integrated interfaces and 7 slots (PCI and PCI-Express)

High industrial compatibility and compactness for 24-hour use in an industrial environment

- Maximum processor performance (in maximum configuration) without loss of power (throttling) at ambient temperatures of up to 40 °C
- Distinct product design with fully-coated, dirt-resistant surfaces
- Metal enclosure with a high degree of electromagnetic compatibility for use in industrial areas and in domestic, business and commercial environments
- Suitable for installing in space-saving control cabinets only 500 mm deep
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Special hard disk holders and card retainers for protection against vibration and shock

Cost reductions through high investment security

- Availability of at least 1.5 years, guaranteed availability of spare parts for 3 years
- System-tested with SIMATIC components
- Certification for worldwide marketing (cULus)
- Support for legacy interfaces (PS/2, COM, LPT)
- Installation compatible for many device generations
- Worldwide service and support

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Technical specifications

	SIMATIC IPC547D
General features	
Design	19" rack, 4 U, externally painted
Processor	• Intel Core i7-2600 (4C/8T, 3.40 GHz, 8 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT) • Intel Core i5-2400 (4C/4T, 3.10 GHz, 6 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT) • Intel Pentium Dual Core G850 (2C/2T, 2.90 GHz, 3 MB Last Level Cache, EM64T, VT)
Chipset	• Intel Q67
Main memory	• From 1 GB DDR3 1333 SDRAM • Dual channel support • 4 DIMM base • Expandable up to 32 GB [1]
Spare slots for expansions (all long)	• 4 x PCI • 1 x PCI Express x16 • 1 x PCI-Express x16 (4 lanes) • 1 x PCI-Express x8 (1 lane)
Graphic	• Onboard Intel HD 2000 graphics controller integrated into the processor; Shared Video Memory up to 1.7 GB; up to 2560 x 1600 pixels at 60 Hz image refresh rate and 32-bit colors • PCI Express graphics card (Dual Head: 2 x VGA or 2 x DVI-D) in the PCIe x16 slot; 512 MB; up to 2048 x 1536 pixels at 85 Hz image refresh rate and 32 bit colors (optional)
Operating system	• Without Preinstalled and activated (supplied on restore DVD): • Windows XP Professional MUI (32-bit) • Windows 7 Ultimate MUI (32/64-bit) • Windows Server 2008 • incl. 5 Client MUI (32 bit) • Windows Server 2008 R2 • incl. 5 Client MUI (64 bit) MUI (Multilanguage User Interface, 5 languages): English, German, French, Italian, Spanish Project-specific on request: • Linux [3] • Other
Power supply	• 100 ... 240 V AC, 50 ... 60 Hz, with bridging of short-term power failures: max. 20 ms at 0.85% rated voltage • Redundant 100 ... 240 V AC, 50 ... 60 Hz

	SIMATIC IPC547D
Drives	
Hard disk, SATA 3.5" with NCQ technology Solid State Drive, SATA 2.5" with SLC technology	Installation in internal drive support • 500 GB • 1 TB • RAID1 [2] 1 TB (2 x 1 TB, mirror disks) • 50 GB solid-state drive Installation at the front in removable drive bay (low profile) • 500 GB • 2 x 500 GB • RAID1 [2] 1 TB (2 x 1 TB, mirror disks), "hot swap" • RAID5 [2] 2 TB (3 x 1 TB, striping with parity), "hot swap" • 50 GB solid-state drive • RAID1 [2] 1 TB (2 x 1 TB, mirror disks), "hot swap" + 50 GB solid-state drive (operating system installed on SSD if configured)
DVD-ROM, 5.25", SATA	• 16 x (DVD media) • 32 x (CD media)
DVD±R/RW, 5.25", SATA	• 16 x 24 x 8 x (DVD media) • 48 x 48 x 32 x (CD media)
Slots for drives	Front: • 3 x 5.25" • 1 x 3.5" Internal: • 2 x 3.5"
Ports	
Ethernet	2 x Intel Gbit Ethernet (RJ45, teaming-capable)
USB 2.0	• 2 x front (high current) • 8 x rear (high current) • 1 x internal (high current), e.g. for USB dongle with optional interlocking
Serial	9-pole COM1 (V.24); COM2 (V.24) (optional)
Parallel	LPT (optional)
VGA	Optionally via adapter cable
DVI-I	1 x
DisplayPort	1 x
Keyboard	PS/2
Mouse	PS/2
Audio	1 x Line In; 1 x Line Out; 1 x Mic.

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Technical specifications (continued)

	SIMATIC IPC547D
Monitoring functions	
Basic functionality	Message locally via DiagBase software
Temperature	When permitted operating temperature range is exceeded
Fan	Speed monitoring • 1 x front fan • 1 x CPU fan • 1 x power supply fan
Watchdog	• Monitoring of program execution • Monitoring time can be parameterized in software
Monitoring functions via the network	SIMATIC IPC DiagMonitor Version V4.3.x.x or higher (optional) Remote monitoring capability for: • Watchdog • Temperature • Fan speed • Battery • Hard disks (SMART) • System/Ethernet Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Client server architecture • Structure of log files
Front LEDs	• POWER (PC switched on) • HDD (access to hard disk) • TEMP (temperature monitoring) • FAN (fan monitoring) Additional HDD alarm LEDs for RAID configurations behind the front flap
Environmental conditions	
Degree of protection	IP30 front, IP20 rear according to EN 60529
Dust protection	With the front door closed according to IEC 60529 filter class G2 EN 779, 99% of particles > 0.5 mm are filtered
Protection class	Protection class I according to IEC 61140
Vibration load during operation [4]	IEC 60068-2-6, 10 cycles • 20 ... 58 Hz: 0.015 mm • 58 ... 200 Hz: 2 m/s^2 (approx. 0.2 g)
Shock load in operation [4]	IEC 60068-2-27 • Half-sine: 9.8 m/s^2, 20 ms (approx. 1 g), 100 shocks per axis

	SIMATIC IPC547D
Electromagnetic compatibility (EMC)	
Emitted interference	EN 61000-6-3; EN 61000-6-4; CISPR 22 / EN 55022 Class B; FCC Class A; EN 61000-3-2 Class D; EN 61000-3-3
Immunity to conducted interference on the supply lines	• ± 2 kV (IEC 61000-4-4, burst) • ± 1 kV (IEC 61000-4-5, symm. surge) • ±2 kV (IEC 61000-4-5, asymm. surge)
Noise immunity on signal lines	• ±2 kV (IEC 61000-4-4, burst, length > 30 m) • ± 1 kV (IEC 61000-4-4, Burst, Length < 30 m), • ± 2 kV (IEC 61000-4-5, Surge, Length > 30 m)
Immunity to static discharge	• ±4 kV, contact discharge (IEC 61000-4-2) • ±8 kV, air discharge (IEC 61000-4-2)
Immunity to high radio frequency interference	• 1 V/m 80% AM; 2 ... 2.7 GHz (IEC 61000-4-3) • 10 V/m 80% AM; 80 MHz ... 1 GHz and 1.4 GHz … 2 GHz (IEC 61000-4-3); • 10 V, 10 kHz ... 80 MHz (IEC 61000-4-6)
Immunity to magnetic fields	100 A/m, 50/60 Hz (IEC 61000-4-8)
Ambient temperature during operation	5 ... 40 °C Note: Limitations for operation of DVD±R/RW
Humidity during operation	5 ... 80 % at 25 °C (no condensation)
Approvals and safety regulations	
Safety regulations	IEC 60950-1; UL60950; CSA
Approvals	cULus 60950
CE mark	For use in industrial areas as well as domestic, business and commercial environments: • Emitted interference: EN 61000-6-3:2007 • Noise immunity: EN 61000-6-2:2005
Dimensions and weights	
Installation dimensions (W x H x D) in mm	434 x 177 x 446
Weight, approx.	19 kg

[1] Memory information:
In order to use a memory with more than 4 GB, a 64-bit operating system is required. In the case of configurations with 4 GB, the visible memory can be reduced to about 3.5 GB or less (with 32-bit operating systems).
In configurations with 8 GB, the visible memory can be reduced to about 7.5 GB or less.

[2] SATA RAID controller onboard in Intel Q67 chipset

[3] Suitable for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX", see http://www.siemens.com/simatic-pc/suited-for-linux
(LINUX is a trademark of Linus Torvalds).

[4] Restrictions in use of optical drives and HDD in removable drive bays.

Note regarding SIMATIC PC operating system licenses

The accompanying operating system license is only valid for installation on the respective supplied SIMATIC IPC. Installation can only be performed on these SIMATIC systems in accordance with Microsoft OEM licensing regulations.

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SIMATIC IPC547D

2

Ordering data

	Article No.
SIMATIC IPC547D [3]	**6AG4104 - 2**
Interfaces: 2 x Gbit Ethernet (RJ45), 1 x DisplayPort, 1 x DVI-I, 8 x USB on the rear, 2 x USB on the front, 1 x USB internal, 1 x serial (COM1), 2 x PS/2, audio; 7 slots (all long): 4 x PCI, 1 x PCIe x16, 1 x PCIe x16 (4 lanes), 1 x PCIe x8 (1 lane); mounting locations: 6 (3 x 5.25", 1 x 3.5" externally accessible; 2 x 3.5" internal); temperature and fan monitoring; watchdog; card retainer	
Processors	
• Pentium Dual Core G850 (2C/2T, 2.90 GHz, 3 MB Last Level Cache, EM64T, VT)	**A**
• Core i5-2400 (4C/4T, 3.10 GHz, 6 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT)	**C**
• Core i7-2600 (4C/8T, 3.40 GHz, 8 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT)	**D**
Drives	
• 500 GB HDD SATA; internal	**A**
• 1 TB HDD SATA; internal	**B**
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks); internal [1]	**D**
• 50 GB solid-state drive (SLC) SATA; internal	**E**
• 500 GB HDD SATA in removable drive bay; front	**G**
• 2 x 500 GB HDD SATA in removable drive bay; front	**H**
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay; for hot swapping; at the front	**P**
• RAID5, 2 TB (3 x 1 TB HDD SATA, striping with parity) in removable drive bay; for hot swapping; at the front	**R**
• 50 GB solid-state drive (SLC) SATA in removable drive bay; at the front	**S**
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay; hot swapping; at the front + 50 GB solid-state drive (SLC) SATA in removable drive bay; at the front (operating system installed on SSD, if configured)	**T**
Memory configuration	
• 1 GB DDR3 SDRAM (1 x 1 GB), single channel	**0**
• 2 GB DDR3 SDRAM (2 x 1 GB), dual channel	**1**
• 4 GB DDR3 SDRAM (2 x 2 GB), dual channel	**2**
• 8 GB DDR3 SDRAM [2] (2 x 4 GB), dual channel	**3**
• 16 GB DDR3 SDRAM [2] (4 x 4 GB), dual channel	**4**
• 32 GB DDR3 SDRAM [2] (4 x 8 GB), dual channel	**5**

	Article No.
SIMATIC IPC547D [3]	**6AG4104 - 2 - **
Removable media	
• DVD-ROM	**1**
• DVD±RW	**2**
Expansions (hardware)	
• Without expansions (HW); onboard graphics	**0**
• No expansions (HW);	**1**
• onboard graphics; DVI-I VGA-compliant adapter	
• cable for onboard graphics	
• Serial (COM2) & parallel (LPT); onboard graphics	**2**
• Serial (COM2) and parallel (LPT); onboard graphics; DVI-I VGA-compliant adapter	**3**
• cable for onboard graphics	
• Serial (COM2) & parallel (LPT) + PCIe x16 graphics card (Dual Head: 2 x VGA or 2 x DVI-D), 512 MB	**4**
Operating systems (preinstalled and activated)	
• Windows XP Professional, MUI (Eng, Ger, Fr, It, Sp), 32-bit, SP3	**B**
• Windows 7 Ultimate, MUI (Eng, Ger, Fr, It, Sp), 32-bit, SP1	**E**
• Windows 7 Ultimate, MUI (Eng, Ger, Fr, It, Sp), 64-bit, SP1	**F**
• Windows Server 2008 Standard Edition incl. 5 Client, MUI (Eng, Ger, Fr, It, Sp), 32 bit, SP2	**P**
• Windows Server 2008 R2 Standard Edition including 5 clients, MUI (Eng, Ger, Fr, It, Sp), 64-bit, SP1	**Q**
• Without operating system	**X**
Expansions (software)	
• SIMATIC IPC DiagMonitor V4.3 software included	**A**
• SIMATIC IPC Image & Partition Creator V3.2 software included	**B**
• SIMATIC IPC DiagMonitor V4.3 + Image & Partition Creator V3.2 software included	**C**
• Without expansions (software)	**X**
Power supply, with country-specific cable:	
• 100/240 V AC industrial power supply; power cable for Europe	**0**
• 100/240 V AC industrial power supply; USA power cable	**4**
• 100/240 V AC industrial power supply; power cable for China	**5**
• 2 x 100/240 V AC redundant industrial power supply; without power cable	**6**

[1] Not in combination with redundant power supply

[2] Can only be used on 64-bit operating systems

[3] For an up-to-date overview, see the SIMATIC PC online configurator at: www.siemens.com/ipc-configurator

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Ordering data

	Article No.
Preferred variants (ex-stock)	
SIMATIC IPC547D	
• Pentium Dual Core G850 (2C/2T, 2.90 GHz, 3 MB Last Level Cache, EM64T, VT); 500 GB HDD SATA internal; 1 GB DDR3 SDRAM (1 x 1 GB), single channel; DVD-ROM; interfaces: 2 x Gbit Ethernet (RJ45), 1 x serial, 8 x USB rear, 2 x USB front, 1 x USB internal, 2 x PS/2, audio; 100/240 V industrial power supply, power cable for Europe; without operating system	**6AG4104-2AA01-0XX0**
• Core i5-2400 (4C/4T, 3.10 GHz, 6 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT); RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay, for hot swapping, at the front; 4 GB DDR3 SDRAM (2 x 2 GB) dual channel; DVD±RW; interfaces: 2 x Gbit Ethernet (RJ45), 2 x serial, 1 x parallel, 8 x USB rear, 2 x USB front, 1 x USB internal, 2 x PS/2, Audio; 100/240 V industrial power supply, power cable for Europe; without operating system	**6AG4104-2CP22-2XX0**
• Core i7-2600 (4C/8T, 3.40 GHz, 8 MB Last Level Cache, Turbo Boost 2.0, EM64T, VT-x/-d, iAMT); RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay, for hot swapping, at the front; 8 GB DDR3 SDRAM (2 x 4 GB) dual channel; DVD±RW; interfaces: 2 x Gbit Ethernet (RJ45), 2 x serial, 1 x parallel, 8 x USB rear, 2 x USB front, 1 x USB internal, 2 x PS/2, audio; 100/240 V industrial power supply, power cable for Europe, Windows 7 Ultimate MUI (Eng, Ger, Fr, It, Sp), 64-bit, SP1 supplied	**6AG4104-2DP32-2FX0**

	Article No.
Accessories	
Memory expansion	
• 1 GB DDR3 1333 SDRAM, DIMM (1 x 1 GB)	**6ES7648-2AJ40-0LA0**
• 2 GB DDR3 1333 SDRAM, DIMM, kit for dual-channel technology (2 x 1 GB)	**6ES7648-2AJ50-0LB0**
• 4 GB DDR3 1333 SDRAM, DIMM, kit for dual-channel technology (2 x 2 GB)	**6ES7648-2AJ60-0LB0**
• 8 GB DDR3 1333 SDRAM, DIMM, kit for dual-channel technology (2 x 4 GB)	**6ES7648-2AJ70-0LB0**
Tower Kit For converting the computer into an industrial tower PC	**6ES7648-1AA00-0XC0**
Retainer for pin assignment of the internal USB port	**6ES7648-1AA00-0XK0**
Power cable, straight, 3 m long	
• Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden	**6ES7900-0AA00-0XA0**
• United Kingdom	**6ES7900-0BA00-0XA0**
• Switzerland	**6ES7900-0CA00-0XA0**
• USA	**6ES7900-0DA00-0XA0**
• Italy	**6ES7900-0EA00-0XA0**
• China	**6ES7900-0FA00-0XA0**
Rack unit for low-profile HDD removable drive bay for 3.5" hard disk, SATA (without hard disk)	**6ES7648-0EG00-1BA0**
Expansion components	See catalog ST 80 / ST PC

Note:

Software Packages with SIMATIC WinCC flexible, SIMATIC WinCC RT Advanced, SIMATIC WinCC, and SIMATIC WinAC RTX (F) can be ordered together with the SIMATIC IPC at favorable prices.

More information under "Embedded Bundles / Packages for industrial PCs".

More information

Further information can be found on the Internet at:

http://www.siemens.com/simatic-pc

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SIMATIC IPC647D

Overview



IPC 647D front view

The SIMATIC IPC647D is a very rugged, high-performance industrial PC in 19" rack design (2 U) with excellent industrial functionality.

It offers:

- Extreme compactness
- Extreme ruggedness
- 4th generation Intel® Core™ i technology

Benefits

Extremely compact and industry-compatible for 24-hour continuous use in an industrial environment

- Compact enclosure design (2 HMs)
- Suitable for installing in space-saving control cabinets only 500 mm deep
- Maximum processor performance (in maximum configuration) without loss of power (throttling) at ambient temperatures of up to 50 °C
- Distinct product design with new front design and fully-coated, dirt-resistant surfaces
- All-metal housing with high EMC for use in industrial environment
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Special hard disk holders and card retainers for protection against vibration and shock

High productivity thanks to faster data processing

- 4th generation Intel® processors: Xeon, Core i5 or Core i3 with turbo-boost, hyper-threading and virtualization technology
- Graphics controller (HD 4600 graphics) integrated in the processor for exceptionally high graphics performance
- Maximum performance (e.g. Intel C226 Express chipset, DDR3 memory with the support of dual-channel technology)
- High data transfer rates (e.g. PCI-Express technology: Gen 2 and Gen 3, USB 3.0 SuperSpeed (500 Mbit/s), SATA III / 6 Gbit/s)

Reduction in downtimes through high system availability

- Secure 24-hour operation (high MTBF, variable-speed fan) at ambient temperature up to 50 °C
- High degree of data security thanks to RAID configurations (RAID controllers onboard)
- RAID1 configuration: data mirroring on two SATA hard disks, also in hot-removable drive bay
- "Hot swap" HDD in removable drive bay in RAID configurations (replacement of hard disk during operation)
- Fast identification and replacement of the hard disk in the event of a fault by means of HDD alarm LEDs for RAID configurations and unambiguous numbering
- Status display (front LEDs) for Ethernet and PROFIBUS or PROFINET; alarm indication for fan, temperature, watchdog and hard disks in RAID1/5 configurations
- Efficient self-diagnostics per SIMATIC PC DiagBased or DiagMonitor software (optional)
- Remote control and maintenance with iAMT 9.0 (Intel® Active Management Technology)
- Solid-state drive (SSD) in multi-level cell (MLC) architecture and ECC memory (optional)
- Redundant power supply with "hot swap" functionality (replacement of power supply module during operation)
- Redundant gigabit LAN connections (teaming capability)
- Securing of the replaceable components at the front (e.g. USB software dongle) against unauthorized access by means of a lockable door
- Locked fan cover: Filter mat and front fan can only be replaced when front door is open
- The enclosure cover can only be opened if the front door is open
- Secure internal USB slot in device for software dongle, for example
- Service-friendly device design (modifications, service) e.g. filter replacement or front fan replacement without tools

Cost reductions through high investment security

- Availability of 3 to 6 years, guaranteed availability of spare parts for 5 years
- System-tested with SIMATIC components
- Certification for worldwide marketing (cULus)
- Support for legacy interfaces (PS/2, COM, LPT)
- Installation compatible for many device generations
- Worldwide service and support

Reduced costs due to time savings for commissioning, operation and servicing

- High degree of flexibility and expandability thanks to integrated interfaces and up to 4 slots (PCI and PCI-Express)
- Preinstalled and activated operating system
- Fast restoration of the delivery status of the HDD thanks to restore DVD
- Low noise output thanks to controlled fan
- Universal implementation as an industrial workstation or server
- PROFIBUS or PROFINET interface and RAID1 controller onboard (optional)
- 2 x LAN 10/100/1000 Mbit/s connections (Gbit LAN with teaming capability)
- Flexible application options in locations with telescopic rails or as desktop industrial PC
- Remote maintenance with iAMT technology and SIMATIC IPC Remote Manager software

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Technical specifications

	SIMATIC IPC647D
General features	
Design	19" rack, 2 U, external coating
Processor	• Intel® Xeon™ E3-1268L v3 4C/8T, 2.3 (3.3) GHz, 8 MB cache, turbo-boost 2.0, Extended Memory 64 (EM64) and virtualization technology (VT-x/-d), iAMT 9.0 • Intel® Core™ i5-4570TE 2C/4T, 2.7 (3.3) GHz, 4 MB cache, turbo-boost 2.0, Extended Memory 64 (EM64) and virtualization technology (VT-x/-d), iAMT 9.0 • Intel® Core™ i3-4330TE 2C/4T, 2.4 GHz, 4 MB cache, Extended Memory 64 (EM64) and virtualization technology (VT-x)
Chipset	Intel C226
Main memory	• From 2 GB DDR3 1600 SDRAM • Dual channel support • 4 DIMM bases expandable up to 32 GB [1] • ECC memory (optional)
Spare slots for expansions (all long)	PCI slots (2 PCI, 2 PCI-Express): • 2 x PCI • 2 x PCI-Express x16 (8 lanes) Gen 3 or PCI-Express slots (4 PCI-Express): • 1 x PCI-Express x16 (4 lanes) Gen 3 • 1 x PCI-Express x16 (4 lanes) Gen 2 • 1 x PCI-Express x16 (4 lanes) Gen 3 • 1 x PCI-Express x16 (8 lanes) Gen 3
Graphics	• Onboard Intel HD 4600 graphics controller integrated into the processor Dynamic video memory up to 1.7 GB, up to 3840 x 2160 pixels at 60 Hz image refresh rate and 32-bit colors • PCI Express graphics card (Dual Head: 2 x VGA or 2 x DVI-D) in the PCIe x16 slot (optional) 512 MB, up to 2048 x 1536 pixels at 60 Hz image refresh rate and 32-bit colors
Operating system	• without • Preinstalled, activated, and supplied on restore DVD • Windows 7 Ultimate MUI, 32/64-bit • Windows Server 2008 R2 incl. 5 Client MUI, 64-bit (MUI: Multi-Language User Interface; 5 languages (English, French, German, Italian, Spanish) • Project-specific on request Linux [2] • Other
Power supply	• 100 ... 240 V AC, 50 ... 60 Hz; with bridging of temporary power failures in accordance with NAMUR: max. 20 ms at 0.85 % rated voltage • Redundant 100 ... 240 V AC, 50 ... 60 Hz

	SIMATIC IPC647D
Drives	
Serial ATA 3.5" hard disks (HDD) with NCQ technology and serial ATA 2.5" solid-state drive (SSD) with MLC technology	Mounted internally on the permanent hard disk support: • 1x 240 GB SSD Mounted internally in vibration/shock-absorbing hard disk support • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) Installed on the front in the low-profile removable drive bay (hot swapping in RAID configurations): • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • 1 x 240 GB SSD • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks)
DVD±R/RW, 5.25", SATA	• 8 x 8 x 6 x (DVD media) • 24 x 10 x 16 x (CD media)
Slots for drives	Front: • 2 x low profile removable drive bays (for 3.5" HDD) • 1 x 12.7 mm slimline (for ODD or SSD) Internal: • 2 x 3.5" as an alternative to removable drive bays (in the optional, shock and vibration-damped drive cage)
Interfaces	
PROFINET	3 x RJ45 (CP 1616-compatible), optional
PROFIBUS/MPI	12 Mbit/s (isolated, compatible with CP 5622), optional
Ethernet	2 x 10/100/1000 Mbit/s (RJ45, teaming-capable)
USB 3.0	• 1 x front (high current) • 2 x rear (high current) • 1 x internal (high current), e.g. for USB dongle
USB 2.0	• 1 x front (high current), can be used with door closed • 2 x rear (high current)
Serial	• 9-pin COM1 (V.24) • 9-pin COM2 (V.24) optional
Parallel	LPT1 (optional)
VGA	Optionally via adapter cable
DVI-I	1 x
DisplayPort V1.2	2 x
Keyboard	PS/2
Mouse	PS/2
Audio	1 x Line Out; 1 x Micro

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Technical specifications (continued)

	SIMATIC IPC647D
Monitoring functions	
Basic functionality	Message locally via DiagBase software
Temperature	• Overshoot/undershoot of permissible operating temperature range • Messages can be evaluated by the application program
Fan	• Speed monitoring • 2 x enclosure fans • 1 x fan power supply
Watchdog	• Monitoring of program execution • Monitoring time can be parameterized in software • Restart can be parameterized in the event of a fault • Messages can be evaluated by the application program
Monitoring functions via the network	SIMATIC PC DiagMonitor (optional) Remote monitoring capability for: • Watchdog • Temperature • Fan speed • Hard disk monitoring (SMART) • System/Ethernet monitoring (heartbeat) Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Configuration of client/server architectures, configuration of log files
Front LEDs	• POWER (internal power supply unit, PC switched on) • HDD (access to hard disk) • ETHERNET1 (Ethernet status, "heartbeat") • ETHERNET2 (Ethernet status, "heartbeat") • PROFIBUS/MPI (PROFIBUS status) • SF PROFINET (PROFINET status) • WATCHDOG (ready/fault indication) • TEMP (temperature status) • FAN (fan speed monitoring) • HDD0 ALARM [4] • HDD1 ALARM [4]
Ambient conditions	
Degree of protection	IP41 at the front, IP20 at the rear acc. to EN 60529
Dust protection	with front door closed: G2 EN 779, 99 % of particles > 0.5 mm are held back
Protection class	Protection class I according to IEC 61140
Vibration load during operation	DIN EN 60068-2-6, 10 cycles Internal mounting of the hard disk drives in optional, internal drive cage: • 10 ... 58 Hz: 0.0375 mm; • 58 ... 500 Hz: 5 m/s2 (approx. 0.5 g) Note: There are limitations when DVD+/-RW and HDD are operated in a removable drive bay
Shock loading during operation	DIN EN 60068-2-27, IEC 60068-2-29 Internal mounting of the hard disk drives in optional, internal drive cage: • Half-sine: 50 m/s^2, 30 ms (approx. 5 g), 100 shocks per axis Note: There are limitations when DVD+/-RW and HDD are operated in a removable drive bay

	SIMATIC IPC647D
Electromagnetic compatibility (EMC)	
Emitted interference (AC)	• EN 61000-6-3, FCC Class A • EN 61000-6-4; CISPR 22, EN 55022 Class B • EN 61000-3-2 Class D, EN 61000-3-3
Immunity to conducted interference on the supply lines	• ± 2 kV (IEC 61000-4-4, burst) • ± 1 kV (IEC 61000-4-5, symm. surge) • ± 2 kV (IEC 61000-4-5, asymm. surge)
Noise immunity on signal lines	• ± 1 kV (IEC 61000-4-4, burst, length < 30 m) • ± 2 kV (IEC 61000-4-4, symm. surge, length > 30 m) • ± 2 kV (IEC 61000-4-5, asymm. surge, length > 30 m)
Immunity to static discharge	• ± 6 kV, contact discharge (IEC 61000-4-2) • ± 8 kV, air discharge (IEC 61000-4-2)
Immunity to high radio frequency interference	• 10 V/m, 80 to 1000 MHz and 1.4 to 2 GHz, 80% AM (according to IEC 61000-4-3) • 3 V/m, 2 to 2.7 GHz, 80% AM (according to IEC 61000-4-3) • 10 V, 10 kHz to 80 MHz, 80% AM (according to IEC 61000-4-6)
Immunity to magnetic fields	100 A/m, 50/60 Hz (IEC 61000-4-8)
Ambient temperature during operation	5 … 50 °C Note: Limitations for operation of DVD+/-RW
Humidity during operation	5 ... 85 % at 30 °C (no condensation)
Approvals and safety regulations	
Safety regulations	• IEC 60950-1 • EN 60950-1 • UL 60950-1 • CSA C22.2 No 60950-1-07
Approvals	cULus 60950, KCC
CE mark	For use in industrial areas as well as domestic, business and commercial environments: • Emitted interference: EN 61000-6-3: 2007 +A1:2011 • Noise immunity: EN 61000-6-2:2005
Dimensions and weights	
Installation dimensions (W x H x D) in mm	430 x 88 x 445

[1] Memory information: In order to use a memory with more than 4 GB, a 64-bit operating system is required. In the case of configurations with at least 4 GB, the visible memory can be reduced to about 3.5 GB or less (with 32-bit operating systems)

[2] Suitable for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX" (LINUX is a trademark of Linus Torvalds).

[3] SATA RAID controller on board in Intel chipset

[4] Hard disk alarm in conjunction with RAID and monitoring software

Note regarding SIMATIC PC operating system licenses

The accompanying operating system license is only valid for installation on the respective supplied SIMATIC IPC. Installation can only be performed on these SIMATIC systems in accordance with Microsoft OEM licensing regulations.

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Ordering data

	Article No.
SIMATIC IPC647D [1]	**6AG4112 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
Interfaces: RACK PC, 19", 2 HU; Interfaces: 2 x GBIT LAN (RJ45); 1 x DVI-I; 2 x DisplayPort; 1 x COM; 2 x PS/2; Audio; 2 x USB 3.0, 2 x USB 2.0 at rear; 1 x USB 3.0, 1 x USB 2.0 at front, 1 x USB 3.0 internal; Temperature and fan monitoring, watchdog, card retainer;	
Processor/motherboard	
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache); mainboard without fieldbus	**D**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB, VT-x); mainboard with PROFIBUS/MPI (CP 5622-compatible)	**E**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache); mainboard with PROFINET (3 x RJ45, CP 1616-compatible)	**F**
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB Cache, TB, VT-d, AMT); mainboard without fieldbus	**G**
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB cache, TB, VT-x, VT-d, AMT); mainboard with PROFIBUS/MPI (CP 5622-compatible)	**H**
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB cache, TB, VT-d, AMT); mainboard with PROFINET (3 x RJ45, CP 1616-compatible)	**J**
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-d, AMT); mainboard without fieldbus	**K**
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-x, VT-d, AMT); mainboard with PROFIBUS/MPI (CP 5622-compatible)	**L**
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-d, AMT); mainboard with PROFINET (3 x RJ45, CP 1616-compatible)	**M**
Hard drives / SSD	
• 500 GB HDD SATA, internal (0.5 g vibration, 5 g shock)	**A**
• 1 TB HDD SATA, internal (0.5 g vibration, 5 g shock)	**B**
• 2 x 1 TB HDD SATA, internal (0.5 g vibration, 5 g shock)	**C**
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks), internal (0.5 g vibration, 5 g shock)	**D**
• 500 GB HDD SATA in removable drive bay; front	**H**
• 1 TB HDD SATA in removable drive bay; front	**K**
• 2 x 1 TB HDD SAT in removable drive bay; front	**M**
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay, hot-swappable, front	**P**
• 240 GB SSD SATA, internal	**S**
• 240 GB SSD SATA in removable drive bay; front	**T**

	Article No.
SIMATIC IPC647D [1]	**6AG4112 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
Memory configuration	
• 2 GB DDR3 SDRAM (1 x 2 GB), single channel	**1**
• 4 GB DDR3 SDRAM (2 x 2 GB), dual channel	**2**
• 8 GB DDR3 SDRAM (2 x 4 GB), dual channel	**3**
• 16 GB DDR3 SDRAM (2 x 8 GB), dual channel	**4**
• 32 GB DDR3 SDRAM (4 x 8 GB), dual channel	**5**
• 8 GB DDR3 SDRAM, (2 x 4 GB), ECC, dual channel	**6**
• 16 GB DDR3 SDRAM, (2 x 8 GB), ECC, dual channel	**7**
• 32 GB DDR3 SDRAM, (4 x 8 GB), ECC, dual channel	**8**
Bus module / swap media / SSD:	
• Bus module 2-slot: 2 x PCIe x16; without drives	**0**
• Bus module 4-slot: 2 x PCI, 2 x PCIe x16; without drives	**1**
• Bus module 4-slot: 4 x PCIe x16; without drives	**2**
• Bus module 2-slot: 2 x PCIe x16; DVD±RW (slim)	**3**
• Bus module 4-slot: 2 x PCI, 2x PCIe x16; DVD±RW (slim)	**4**
• Bus module 4-slot: 4 x PCIe x16; DVD±RW (slim)	**5**
• Bus module 2-slot: 2 x PCIe x16 / 1 x 240 GB SSD (for operating system), internal	**6**
• Bus module 4-slot: 2 x PCI, 2 x PCIe x16 / 1 x 240 GB SSD (for operating system), internal	**7**
• Bus module 4-slot: 4 x PCIe x16 / 1 x 240 GB SSD (for operating system), internal	**8**
Expansion hardware	
• Without expansions (hardware), onboard graphics;	**0**
• Without expansions (hardware), onboard graphics, DVI-I adapter cable, VGA-compliant for onboard graphics;	**1**
• Serial (COM2) + parallel (LPT, 1 slot reserved), onboard graphics;	**2**
• Serial (COM2) + parallel (LPT, 1 slot reserved), onboard graphics; DVI-I adapter cable, VGA-compliant for onboard graphics;	**3**
• Serial (COM2) + Parallel (LPT, 1 slot reserved) + PCIe x16 Graphics Card (Dual-Head: 2 x VGA or 2 x DVI-D), 512 MB, (1 slot reserved);	**4**

[1] For an up-to-date overview, see the SIMATIC IPC online configurator at:
http://www.siemens.com/ipc-configurator

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SIMATIC IPC647D

Ordering data

	Article No.														
SIMATIC IPC647D [1]	**6AG4112**	**-**	**2**	■	■	■	■	**-**	■	■	■	■			
Operating system (preinstalled and activated)															
• Windows 7 Ultimate, 32-bit MUI (Eng, Ger, Fr, It, Sp), SP1									**A**						
• Windows 7 Ultimate, 64-bit MUI (Eng, Ger, Fr, It, Sp), SP1									**B**						
• Windows Server 2008 R2 Standard Edition incl. 5 Clients, 64-bit, MUI (Eng, Ger, Fr, It, Sp), SP1									**F**						
• Without operating system									**X**						
Expansions (software) / Security															
• SIMATIC IPC DiagMonitor software V4.4 included										**A**					
• SIMATIC IPC Image Creator software V3.3 included										**B**					
• SIMATIC IPC DiagMonitor 4.4 and Image Creator Software 3.3 included										**C**					
• Without software										**X**					
• Without expansions (software) / TPM (not for China and Russia)										**Y**					
Power supply, country-specific cable															
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Europe											**0**				
• 110 / 240 V industrial power supply unit with NAMUR; power cable for United Kingdom											**1**				
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Switzerland											**2**				
• 110 / 240 V industrial power supply unit with NAMUR; power cable for USA											**3**				
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Italy											**4**				
• 110 / 240 V industrial power supply unit with NAMUR; power cable for China											**5**				
• 2 x 110 / 240 V redundant power supply; without power cable											**6**				

[1] For an up-to-date overview, see the SIMATIC IPC online configurator at: http://www.siemens.com/ipc-configurator

	Article No.
Accessories	
Memory expansions	
• 2 GB DDR3 1600 DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 DIMM, ECC	**6ES7648-2AJ70-1MA0**
Hardware accessories	
Rack unit for low-profile removable drive bay For 3.5" hard drive (SATA/SAS) and 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0**
Filter mats for SIMATIC IPC647D (packing unit: 10 units)	**A5E02396171**
Adapter cable	
• Adapter cable DisplayPort to DVI-D for onboard graphics	**6ES7648-3AF00-0XA0**
• Adapter cable DisplayPort to VGA for onboard graphics	**6ES7648-3AG00-0XA0**
Power cable, straight, 3 m long	
• Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden	**6ES7900-0AA00-0XA0**
• United Kingdom	**6ES7900-0BA00-0XA0**
• Switzerland	**6ES7900-0CA00-0XA0**
• USA	**6ES7900-0DA00-0XA0**
• Italy	**6ES7900-0EA00-0XA0**
• China	**6ES7900-0FA00-0XA0**
USB retainer for interlocking the internal USB port	**6ES7648-1AA00-0XK0**
Expansion components	See catalog ST 80 / ST PC

Note:

Software Packages with SIMATIC WinCC flexible, WinCC RT Advanced, SIMATIC WinCC, and SIMATIC WinAC RTX (F) can be ordered together with the SIMATIC IPC at a price advantage. More information under "Embedded Bundles / Packages for industrial PCs".

More information

Additional information is available on the Internet at:

http://www.siemens.com/simatic-pc

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Overview



IPC 847D front view

The SIMATIC IPC847D is an extremely robust, high-performance industrial PC in 19" rack design (4 U) with excellent industrial functionality.

It offers:

- Maximum expandability
- Extreme ruggedness
- 4th generation Intel® Core™ i technology

Benefits

Maximum industrial compatibility and compactness for 24-hour use in an industrial environment

- Maximum processor performance (in maximum configuration) without loss of power (throttling) at ambient temperatures of up to 50 °C
- Distinct product design with new front design and fully-coated, dirt-resistant surfaces
- All-metal housing with high EMC for use in industrial environment
- Suitable for installing in space-saving control cabinets only 500 mm deep
- Dust protection thanks to overpressure ventilation concept with fan on the front and dust filter
- Special hard disk holders and card retainers for protection against vibration and shock

High productivity thanks to faster data processing

- 4th generation Intel® processors: Xeon, Core i5 or Core i3 with turbo-boost, hyper-threading and virtualization technology
- Graphics controller (HD graphics 4600) integrated in the processor for exceptionally high graphics performance
- Maximum performance (e.g. Intel C226 Express chipset, DDR3 memory with the support of dual-channel technology)
- High data transfer rates (e.g. PCI-Express technology: Gen 2 and Gen 3, USB 3.0 SuperSpeed (500 Mbit/s), SATA III/6 Gbit/s)

Reduction in downtimes through high system availability

- Secure 24-hour operation (high MTBF, variable-speed fan) at ambient temperature up to 50° C
- High data security thanks to RAID configurations (RAID controller onboard)
- RAID1 configuration: Redundant data storage on two SATA hard disks, also in hot-removable drive bays and with additional SSD (for operating system) or hot spare hard disk option
- RAID5 configuration: Striping with parity on three SATA hard disks for increased memory capacity in hot-removable drive bays, with additional hot spare hard disk option
- "Hot swap" HDD in removable drive bay in RAID configurations (replacement of hard disk during operation)
- "Hot spare" HDD in removable drive bay in RAID configurations (the rebuild process on the "hot spare" hard disk starts up automatically)
- Fast identification and replacement of the hard disk in the event of a fault by means of HDD alarm LEDs for RAID configurations and unambiguous numbering
- Status display (front LEDs) for Ethernet and PROFIBUS or PROFINET; alarm indication for fan, temperature, watchdog and hard disks in RAID1/5 configurations
- Efficient self-diagnostics per SIMATIC PC DiagBased or DiagMonitor software (optional)
- Remote control and maintenance with iAMT 9.0 (Intel® Active Management Technology)
- Solid-state drive (SSD) in multi-level cell (MLC) architecture and ECC memory (optional)
- Redundant power supply with "hot swap" functionality (replacement of power supply module during operation)
- Redundant Gbit LAN connections (teaming capability)
- Securing of the replaceable components at the front (e.g. USB software dongle) against unauthorized access by means of a lockable door
- Locked fan cover: Filter mat and front fan can only be replaced when front door is open
- The enclosure cover can only be opened if the front door is open
- Secure internal USB slot in device for software dongle, for example
- Service-friendly device design (modifications, service) e.g. filter replacement or front fan replacement without tools

Cost reductions through high investment security

- Platform with long-term stability and embedded Intel components
- Availability of 3 to 6 years, guaranteed availability of spare parts for 5 years
- System-tested with SIMATIC components
- Certification for worldwide marketing (cULus)
- Support for legacy interfaces (PS/2, COM, LPT)
- Installation compatible for many device generations
- Worldwide service and support

Reduced costs due to time savings for commissioning, operation and servicing

- High degree of flexibility and expandability thanks to integrated interfaces and up to 11 slots (PCI and PCI-Express)
- Preinstalled and activated operating system
- Fast restoration of the delivery status of the HDD thanks to restore DVD
- Low noise output thanks to controlled fan
- Universal implementation as an industrial workstation or server
- PROFIBUS or PROFINET interface and RAID1/5 controller onboard (optional)
- 2 x LAN 10/100/1000 Mbit/s connections (Gbit LAN with teaming capability)
- Flexible applications in many different positions with telescopic rails or as tower industrial PC
- Remote maintenance with iAMT technology and SIMATIC IPC Remote Manager software

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2

Technical specifications

	SIMATIC IPC847D
General features	
Design	19" rack, 4 U, externally painted
Processor	• Intel® Xeon™ E3-1268L v3 4C/8T, 2.3 (3.3) GHz, 8 MB cache, turbo-boost 2.0, Extended Memory 64 (EM64) and virtualization technology (VT-x/-d), iAMT 9.0 • Intel® Core™ i5-4570TE 2C/4T, 2.7 (3.3) GHz, 4 MB cache, turbo-boost 2.0, Extended Memory 64 (EM64) and virtualization technology (VT-x/-d), iAMT 9.0 • Intel® Core™ i3-4330TE 2C/4T, 2.4 GHz, 4 MB cache, Extended Memory 64 (EM64) and virtualization technology (VT-x)
Chipset	Intel C226
Main memory	• From 2 GB DDR3 1600 SDRAM • Dual channel support • 4 DIMM base • Expandable up to 32 GB [1] • ECC memory (optional)
Spare slots for expansions (all 312 mm long)	More PCI slots (7 PCI, 4 PCI-Express): • 7 x PCI • 1 x PCI-Express x16 (16 lanes) Gen 3 • 3 x PCI-Express x4 (1 lane) Gen 2 or More PCI-Express slots (8 PCI-Express, 3 PCI): • 3 x PCI • 1 x PCI-Express x16 (8 lanes) Gen 3 • 2 x PCI-Express x16 (4 lanes) Gen 3 • 2 x PCI-Express x16 (4 lanes) Gen 2 • 3 x PCI-Express x4 (4 lane) Gen 2
Graphics	Onboard Intel HD 4600 graphics controller integrated into the processor Dynamic Video Memory up to 1.7 GB Up to 3840 x 2160 pixels at 60 Hz image refresh rate and 32-bit colors PCI Express graphics card (Dual Head: 2 x VGA or 2 x DVI-D) in the PCIe x16 slot (optional) 512 MB, up to 2048 x 1536 pixels at 60 Hz image refresh rate and 32-bit colors
Operating system	• without • Preinstalled and activated / supplied on restore DVD • Windows 7 Ultimate MUI, 32/64-bit • Windows Server 2008 R2 incl. 5 client MUI, 64-bit MUI: Multi-language User Interface; 5 languages (English, French, German, Italian, Spanish) • Project-specific on request • Linux [2] • Other
Power supply	• 100 ... 240 V AC, 50 ... 60 Hz with bridging of temporary power failures in accordance with NAMUR: max. 20 ms at 0.85 % rated voltage • Redundant 100 ... 240 V AC, 50 ... 60 Hz

	SIMATIC IPC847D
Drives	
Serial ATA 3.5" hard disks (HDD) with NCQ technology and serial ATA 2.5" solid-state drive (SSD) with MLC technology	Mounted internally on the permanent hard disk support: • 1 x 500 GB HDD • 1 x 240 GB SSD Can be installed in internal shock and vibration-damped drive cage (optional) • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) + 1 x 240 GB SSD (for operating system) in removable drive bay Installed on the front in the low-profile removable drive bay (hot swapping in RAID configurations): • 1 x 500 GB HDD • 1 x 1 TB HDD • 2 x 1 TB HDD • 1 x 240 GB SSD • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) + • 1 x 1 TB HDD as hot spare • RAID1[3], 1 TB (2 x 1 TB HDD, mirror disks) + 1 x 240 GB SSD (for operating system) • RAID5[3], 2 TB (3 x 1 TB HDD, striping with parity) • RAID5[3], 2 TB (3 x 1 TB HDD, striping with parity) + 1 x 1 TB HDD as hot spare
DVD+/-R/RW, slim, SATA	• 8 x 8 x 6 x (DVD media) • 24 x 10 x 16 x (CD media)
Slots for drives	Front: • 3 x 5.25" / 4 x low-profile removable drive bay • 1 x slim (ODD) Internal: • 2 x 3.5" or • 2 x 3.5" (in the optional, vibration-damping drive cage)
Interfaces	
PROFINET	3x RJ45 (CP 1616-compatible), optional
PROFIBUS/MPI	12 Mbit/s (isolated, compatible with CP 5622), optional
Ethernet	2 x 10/100/1000 Mbit/s (RJ45, teaming-capable)
USB 3.0	• 1 x front (high current) • 2 x rear (high current) • 1 x internal (high current), e.g. for USB dongle
USB 2.0	• 1 x front (high current), can be used with door closed • 2 x rear; (high current)
Serial	• 9-pin COM1 (V.24) • 9-pin COM2 (V.24) (optional)
Parallel	• LPT1 (optional)
VGA	Optionally via adapter cable
DVI-I	• 1 x
DisplayPort V1.2	• 2 x
Keyboard	PS/2
Mouse	PS/2
Audio	1 x Line Out; 1 x Micro

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Technical specifications (continued)

	SIMATIC IPC847D
Monitoring functions	
Basic functionality	Message locally via DiagBase software
Temperature	• Overshoot/undershoot of permissible operating temperature range • Messages can be evaluated by the application program
Fan	• Speed monitoring • 2 x enclosure fans • 1 x fan power supply
Watchdog	• Monitoring of program execution • Monitoring time can be parameterized in software • Restart can be parameterized in the event of a fault • Messages can be evaluated by the application program
Monitoring functions via the network	SIMATIC PC DiagMonitor (optional) Remote monitoring capability for: • Watchdog • Temperature • Fan speed • Hard disk monitoring (SMART) • System/Ethernet monitoring (Heartbeat) Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Configuration of client/server architectures • Structure of log files
Front LEDs	• POWER (internal power supply unit, PC switched on) • ETHERNET1 (Ethernet status, "Heartbeat") • ETHERNET2 (Ethernet status, "Heartbeat") • PN / MPI/DP (PROFINET/PROFIBUS status) • WATCHDOG (ready/fault indication) • TEMP (temperature status) • FAN (fan speed monitoring) • HDD0 ALARM [4] • HDD1 ALARM [4] • HDD2 ALARM [4] • HDD (access to hard disk) / HDD3 ALARM [4]
Ambient conditions	
Degree of protection	IP41 at the front, IP20 at the rear acc. to EN 60529
Dust protection	With front door closed: G2 EN 779, 99 % of particles > 0.5 mm are held back
Protection class	Protection class I according to IEC 61140
Vibration load during operation	DIN EN 60068-2-6, 10 cycles Internal mounting of the hard disk drives in optional, internal drive cage: • 10 ... 58 Hz: 0.0375 mm; • 58 ... 500 Hz: 5 m/s2 (approx. 0.5 g) Permanently installed internal hard disk drives: • 10 ... 58 Hz: 0.019 mm; • 58 ... 500 Hz: 3 m/s2 (approx. 0.3 g) Note: There are limitations when DVD+/-RW and HDD are operated in a removable drive bay
Shock loading during operation	DIN EN 60068-2-27, IEC 60068-2-29 Internal mounting of the hard disk drives in optional, internal drive cage: • Half-sine: 50 m/s2, 30 ms (approx. 5 g), 100 shocks per axis • Permanently installed internal hard disk drives: 30 m/s2, 30 ms (approx. 3 g) Note: There are limitations when DVD+/-RW and HDD are operated in a removable drive bay
Electromagnetic compatibility (EMC)	
Emitted interference (AC)	• EN 61000-6-3, FCC Class A • EN 61000-6-4; • CISPR 22, EN 55022 Class B • EN 61000-3-2 Class D, EN 61000-3-3
Immunity to conducted interference on the supply lines	• ± 2 kV (IEC 61000-4-4, burst) • ± 1 kV (IEC 61000-4-5, symm. surge) • ± 2 kV (IEC 61000-4-5, asymm. surge)
Noise immunity on signal lines	• ± 1 kV (IEC 61000-4-4, burst, length < 30 m) • ± 2 kV (IEC 61000-4-4, symm. surge, length > 30 m) • ± 2 kV (IEC 61000-4-5, asymm. surge, length > 30 m)
Immunity to static discharge	• ± 6 kV, contact discharge (IEC 61000-4-2) • ± 8 kV, air discharge (IEC 61000-4-2)
Immunity to high radio frequency interference	• 10 V/m, 80 to 1000 MHz and 1.4 to 2 GHz, 80% AM (according to IEC 61000-4-3) • 3 V/m, 2 to 2.7 GHz, 80% AM (to IEC 61000-4-3) • 10 V, 10 kHz to 80 MHz, 80% AM (according to IEC 61000-4-6)
Immunity to magnetic fields	100 A/m, 50/60 Hz (IEC 61000-4-8)
Ambient temperature during operation	5 ... 50 °C Note: Limitations for operation of DVD+/-RW
Relative humidity during operation	5 ... 80 % at 25 °C (no condensation)
Approvals and safety regulations	
Safety regulations	• IEC 60950-1 • EN 60950-1 • UL 60950-1 • CSA C22.2 No 60950-1-07
Approvals	cULus 60950-1 Second Edition, KCC
CE mark	• Emitted interference: EN 61000-6-3: 2007 +A1:2011 • Noise immunity: EN 61000-6-2:2005
Dimensions and weights	
Installation dimensions (W x H x D) in mm	430 x 177 x 448

[1] Memory information: in order to use a memory with more than 4 GB, a 64-bit operating system is required. In the case of configurations with at least 4 GB, the visible memory can be reduced to about 3.5 GB or less (with 32-bit operating systems).

[2] Suitable for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX" (LINUX is a trademark of Linus Torvalds).

[3] SATA RAID controller on board in Intel chipset

[4] Hard disk alarm in conjunction with RAID and monitoring software

Note regarding SIMATIC PC operating system licenses

The accompanying operating system license is only valid for installation on the respective supplied SIMATIC IPC. Installation can only be performed on these SIMATIC systems in accordance with Microsoft OEM licensing regulations.

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SIMATIC IPC847D

Ordering data

SIMATIC IPC847D [1]	Article No. 6AG4114 - 2					-				
Interfaces: RACK PC, 19", 4 U; Interfaces: 2 x GBIT LAN (RJ45); 1 x DVI-I; 2 x DisplayPort; 1 x COM; 2 x PS/2; Audio; 2 x USB 3.0, 2 x USB 2.0 at rear; 1 x USB 3.0, 1 x USB 2.0 at front, 1 x USB 3.0 internal; Temperature and fan monitoring, watchdog, card retainer;										
Processor/motherboard										
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache); mainboard without fieldbus		D								
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); mainboard with PROFIBUS/MPI (CP 5622-compatible)		E								
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache); mainboard with PROFINET (3 x RJ45, CP 1616-compatible)		F								
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB Cache, TB, VT-d, AMT); mainboard without fieldbus		G								
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB cache, TB, VT-x, VT-d, AMT); mainboard with PROFIBUS/MPI (CP 5622-compatible)		H								
• Core i5-4570TE (2C/4T, 2.7 (3.3) GHz, 4 MB cache, TB, VT-d, AMT); mainboard with PROFINET (3 x RJ45, CP 161-compatible)		J								
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-d, AMT); mainboard without fieldbus		K								
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-x, VT-d, AMT); mainboard with PROFIBUS/MPI (CP 5622-compatible)		L								
• Xeon E3-1268L v3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, TB, VT-d, AMT); mainboard with PROFINET (3 x RJ45, CP 1616-compatible)		M								
Drives										
• 500 GB HDD SATA, internal (0.3 g vibration, 3 g shock)			A							
• 500 GB HDD SATA, internal (0.5 g vibration, 5 g shock)			B							
• 1 TB HDD SATA, internal (0.5 g vibration, 5 g shock)			C							
• 2 x 1 TB HDD SATA, internal (0.5 g vibration, 5 g shock)			D							
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks), internal (0.5 g vibration, 5 g shock)			E							
• 500 GB HDD SATA in removable drive bay; front			F							
• 1 TB HDD SATA in removable drive bay; front			G							
• 2 x 1 TB HDD SAT in removable drive bay; front			H							
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) in removable drive bay, hot-swappable, front;			J							
• RAID5, 2 TB (3 x 1 TB HDD, SATA, striping with parity) in removable drive bay, hot-swappable, front			K							

SIMATIC IPC847D [1]	Article No. 6AG4114 - 2					-				
Drives (continued)										
• RAID5, 2 TB (3 x 1 TB HDD, SATA, striping with parity) in removable drive bay, hot swap + 1 TB SATA HDD as hot spare in removable drive bay, front;				L						
• 240 GB SSD SATA, internal				M						
• 240 GB SSD SATA in removable drive bay; front				N						
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks), internal (0.5 g vibration, 5 g shock) + 240 GByte SSD SATA (for operating system) in removable drive bay				P						
• RAID1, 1 TB (2 x 1 TB HDD, SATA, mirror disks) in removable drive bay, hot swap + 1 TB HDD SATA as hot spare in removable drive bay, front;				Q						
• RAID1, 1 TB (2 x 1 TB HDD SATA, mirror disks) i+ 240 GByte SSD SATA (for operating system) in removable drive bay, hot-swap; front				R						
Memory configuration										
• 2 GB DDR3 SDRAM (1 x 2 GB), single channel					1					
• 4 GB DDR3 SDRAM (2 x 2 GB), dual channel					2					
• 8 GB DDR3 SDRAM (2 x 4 GB), dual channel					3					
• 16 GB DDR3 SDRAM (2 x 8 GB), dual channel					4					
• 32 GB DDR3 SDRAM (4 x 8 GB), dual channel					5					
• 8 GB DDR3 SDRAM, (2 x 4 GB), ECC, dual channel					6					
• 16 GB DDR3 SDRAM, (2 x 8 GB), ECC, dual channel					7					
• 32 GB DDR3 SDRAM, (4 x 8 GB), ECC, dual channel					8					
Bus module / swap media						0				
• Bus module 11-slot: 7 x PCI, 3 x PCIe x4, 1 x PCIe x16; without swap media						1				
• Bus module 11-slot: 3 x PCI, 3 x PCIe x4, 5 x PCIe x16; without swap media						2				
• Bus module 11-slot: 7 x PCI, 3 x PCIe x4, 1 x PCIe x16; DVD±RW (slim)						3				
• Bus module 11-slot: 3 x PCI, 3 x PCIe x4, 5 x PCIe x16; DVD±RW (slim)										
Expansion hardware							0			
• Without expansions (hardware), onboard graphics;							1			
• Without expansions (hardware), onboard graphics, DVI-I adapter cable, VGA-compliant for onboard graphics;							2			
• Serial (COM2) + parallel (LPT, 1 slot reserved), onboard graphics;							3			
• Serial (COM2) + parallel (LPT, 1 slot reserved), onboard graphics; DVI-I adapter cable, VGA-compliant for onboard graphics;							4			
• Serial (COM2) + Parallel (LPT, 1 slot reserved) + PCIe x16 Graphics Card (Dual-Head: 2 x VGA or 2 x DVI-D), 512 MB, (1 slot reserved);										

[1] For an up-to-date overview, see the SIMATIC IPC online configurator at:
http://www.siemens.com/ipc-configurator

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Ordering data

	Article No.
SIMATIC IPC847D [1]	**6AG4114 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
Operating system (preinstalled and activated)	
• Windows 7 Ultimate, 32-bit MUI (Eng, Ger, Fr, It, Sp), SP1	**A**
• Windows 7 Ultimate, 64-bit MUI (Eng, Ger, Fr, It, Sp), SP1	**B**
• Windows Server 2008 R2 Standard Edition incl. 5 Clients, 64-bit, MUI (Eng, Ger, Fr, It, Sp), SP1	**F**
• Without operating system	**X**
Expansions (software) / Security	
• SIMATIC IPC DiagMonitor software V4.4 included	**A**
• SIMATIC IPC Image Creator software V3.3 included	**B**
• SIMATIC IPC DiagMonitor 4.4 and Image Creator Software 3.3 included	**C**
• Without software (software)	**X**
• Without expansions (software) / TPM (not for China and Russia)	**Y**
Power supply, country-specific cable	
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Europe	**0**
• 110 / 240 V industrial power supply unit with NAMUR; power cable for United Kingdom	**1**
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Switzerland	**2**
• 110 / 240 V industrial power supply unit with NAMUR; power cable for USA	**3**
• 110 / 240 V industrial power supply unit with NAMUR; power cable for Italy	**4**
• 110 / 240 V industrial power supply unit with NAMUR; power cable for China	**5**
• 2 x 110 / 240 V redundant power supply; without power cable	**6**

[1] For an up-to-date overview, see the SIMATIC IPC online configurator at: http://www.siemens.com/ipc-configurator

	Article No.
Accessories	
Memory expansions	
• 2 GB DDR3 1600 DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 DIMM, ECC	**6ES7648-2AJ70-1MA0**
Hardware accessories	
Rack unit for low-profile removable drive bay For 3.5" hard drive (SATA/SAS) and 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0**
Filter mats for SIMATIC IPC847D (packing unit: 10 units)	**A5E01064980**
Adapter cable	
• DisplayPort to DVI-D for onboard graphics	**6ES7648-3AF00-0XA0**
• DisplayPort to VGA for onboard graphics	**6ES7648-3AG00-0XA0**
Power cable, straight, 3 m long	
• Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden	**6ES7900-0AA00-0XA0**
• United Kingdom	**6ES7900-0BA00-0XA0**
• Switzerland	**6ES7900-0CA00-0XA0**
• USA	**6ES7900-0DA00-0XA0**
• Italy	**6ES7900-0EA00-0XA0**
• China	**6ES7900-0FA00-0XA0**
Tower Kit for converting the computer into an industrial tower PC	**6ES7648-1AA00-0XD0**
USB retainer for interlocking the internal USB port	**6ES7648-1AA00-0XK0**
Expansion components	See catalog ST 80 / ST PC

Note:

Software Packages with SIMATIC WinCC flexible, WinCC RT Advanced, SIMATIC WinCC, and SIMATIC WinAC RTX (F) can be ordered together with the SIMATIC IPC at a price advantage. More information under "Embedded Bundles / Packages for industrial PCs".

More information

Additional information is available on the Internet at:

http://www.siemens.com/simatic-pc

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General data

Overview



SIMATIC Box PC family

SIMATIC Box PCs provide mechanical engineers, plant engineers and control cabinet makers with particularly rugged industrial PC systems for use in powerful yet compact applications.

The following device classes are available for various requirements:

- ***SIMATIC IPC227*** (Nanobox PC):
  The compact embedded IPC – maintenance-free and dust-proof with versatile mounting
- ***SIMATIC IPC427*** (Microbox PC):
  The powerful embedded IPC – maintenance-free with versatile configuration
- ***SIMATIC IPC627/IPC827*** (Box PC):
  The high-end IPC – with maximum performance, functional scope, and expansion capability

Shared industrial functionality:

- Extreme compactness
- Certification for global marketing
- System-tested with SIMATIC components
- High vibration/shock load during operation
- Wide operational temperature range
- Robust data storage with CompactFlash/CFast or Solid-State Drive (SSD)
- Integrated PROFIBUS or PROFIBUS/MPI interface (optional)
- Varied mounting possibilities for flexibility with installation
- Designed for 24-hour continuous operation
- Integrated parameterizable monitoring functions (temperature, fan, watchdog)
- High service friendliness
- Operating system preinstalled and activated for fast startup
- Motherboard developed and manufactured by Siemens
- Availability for 3 to 6 years
- Repairs and spare parts service for 5 years
- High component/design continuity
- Installation and software compatible with predecessor model
- Long-term availability of PC components from the Intel embedded line

SIMATIC IPC227 (Nanobox PC):
The compact embedded IPC – maintenance-free and dust-proof with versatile mounting

- Maximum compactness with approx. 1 liter enclosure volume with integrated industrial power supply for minimum space requirements in the control cabinet
- Maximum flexibility thanks four mounting options and interfaces on one side suitable for every installation situation
- Optimum variety of interfaces due to a large number of integrated interfaces such as selectable serial ports (RS 232/RS 485/CAN) and 2 x teaming-capable Gigabit Ethernet
- Maximum industrial functionality due to closed enclosure for optimum dust protection and non-volatile retentive memory
- Further device options for optimum adaptation to the application with additional PCIe slot or RS 232 interfaces or digital I/O

SIMATIC IPC427 (Microbox PC):
The powerful embedded IPC – maintenance-free with versatile configuration

- Fan-free operation
- High performance with maximum compactness and ruggedness for direct installation in the machine
- Optimized for embedded applications
- Flexibility expandable using one or two PCIe I/O cards (optional)
- Flexible installation options due to DIN rail/wall/front upright mounting, even outside a control cabinet
- NVRAM for retentive data storage (optional)

SIMATIC IPC627/IPC827 (Box PC):
The high-end IPC – with maximum performance, functional scope, and expansion capability

- Maximum system performance for complex measuring, control and visualization tasks
- High flexibility with expansion slots and integral interfaces
- Flexible, space-saving installation with mounting brackets or portrait assembly kits
- Rugged design for direct installation in the machine
- RAID1 controller onboard
- Maximum processor performance up to ambient temperature of 55 °C
- High system availability
- Battery-backed SRAM as memory for WinAC data
- 4 signaling LEDs

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Benefits

Compact dimensions

The SIMATIC IPC227D is a particularly compact and energy-efficient PC in the Nano format. The heart of the Nanobox PC with particularly many mounting options are high-performance Intel Atom processors of the latest generation.

The SIMATIC IPC427 (Microbox PC) is an ultra-compact and rugged device for DIN rail mounting, portrait or wall mounting, and for use in the machine: mounting depth from 47 mm.

With a maximum mounting depth of 100 mm (80 mm without DVD drive), the SIMATIC IPC627 (Box PC) can be used even in the smallest of spaces. In addition, space-saving portrait mounting is possible with the SIMATIC Box IPC627/IPC827.

Rugged design

All designs aim to achieve maximum safety in the case of vibration and shock loads. For example, a special vibration-absorbing suspension of the hard disk ensures operational reliability, even at very high mechanical loads. A flash drive slot, which is easily accessible from outside, or the solid-state drive (SSD) in the single level cell (SLC) architecture, which is particularly suitable for industrial applications, is available for setting up low-maintenance, fault-tolerant, diskless systems. Thanks to its fan-free design and use of CompactFlash cards, the Microbox PC and the new Nanobox PC are especially suitable for maintenance-free 24-hour continuous operation.

Service-friendly device design

The Box PC can simply be folded out for speedy component replacement. The inside of the device is easily accessible for future expansions.

Integrated interfaces

On Box PCs, all interfaces are located on one side. Box PCs can be interfaced with the control/cell level via onboard Ethernet interfaces and communicate in the field via an integrated PROFIBUS interface, which is available as an option. External monitors or displays can be connected via a VGA or DVI-I interface.

Flexibility

Especially the SIMATIC IPC827 with its 5 free PC slots offers many expansion options. All Box PCs have CE certification for use in industrial applications and domestic/commercial applications and can therefore be used in building automation or public installations in addition to industrial applications.

Continuity

Thanks to motherboards developed and manufactured in-house, the SIMATIC Box PCs offer very high continuity and security of investment. The SIMATIC Box PC models can normally be ordered for a period of three years and spare parts are obtainable for at least 5 years after active marketing is concluded.

System availability

SIMATIC Box PCs can be ordered in custom configurations and are supplied ready for use. The high system availability by design can be further extended by means of additional data backup options (e.g. RAID system, SIMATIC IPC Image & Partition Creator) and efficient software for self-diagnostics (SIMATIC IPC DiagMonitor).

Technical specifications

	SIMATIC IPC227D (Nanobox PC)	SIMATIC IPC427D (Microbox PC)	SIMATIC IPC627D (Box PC)	SIMATIC IPC827D (Box PC)
Design				
Rail or wall mounting	•	•	-	-
Wall or portrait mounting	• Also: Side mounting	•	•	•
General features				
Processor	• Intel Atom E620 600 MHz • Intel Atom E640 1.0 GHz • Intel Atom E660 1.3 GHz	• Intel Core i7-3517UE, 1.7 GHz, 4 MB SLC • Intel Core i3-3217UE, 1.6 GHz, 3 MB SLC • Intel Celeron 827E 1.4 GHz, 1.5 MB SLC	• Intel Xeon processor E3-1268L v3 (4 cores, 8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT) • Intel Core i3-4330TE processor (2 cores, 4 threads, 2.4 GHz, 4 MB cache, VT-x) • Intel Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache)	• Intel Xeon processor E3-1268L v3 (4 cores, 8 threads, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT) • Intel Core i3-4330TE (2 cores, 4 threads, 2.4 GHz, 4 MB cache, VT-x) • Intel Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache)
Main memory	512 MB, 1 GB, 2 GB	1 GB, 2 GB, 4 GB, 8 GB	2 GB, expandable up to 16 GB, optional ECC	2 GB, expandable up to 16 GB, optional ECC
Static RAM	512 KB	512 KB	2 MB	2 MB
Free slots for expansions	1 x PCIe with PCIe enclosure option	Up to 2 x PCIe (enclosure option)	2 x PCI or 1 x PCIe x16 / 1 x PCI 2 x PCIe (x16/x4)	2 x PCI (240 mm) 1 x PCI (185 mm) 2 x PCI-Express x16 / x4 (185 mm)
Graphics	Onboard	Onboard	Onboard	Onboard

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Technical specifications (continued)

	SIMATIC IPC227D (Nanobox PC)	SIMATIC IPC427D (Microbox PC)	SIMATIC IPC627D (Box PC)	SIMATIC IPC827D (Box PC)
Operating system				
without	•	•	•	•
Preinstalled and activated / supplied on restore CD	• Windows Embedded Standard 2009 (CF card ≥ 2 GB, SSD, hard disk) • Windows XP Professional MUI (SSD, hard disk) • Windows Embedded Standard 7, 32-bit (CF card ≥ 4 GB, SSD, hard disk) • Windows 7 Ultimate MUI, 32-bit (SSD, hard disk)	• Windows 7 Ultimate 32-bit MUI • Windows 7 Ultimate 64-bit MUI • Windows Embedded Standard 7, 32-bit (CFast >= 4 GB, SSD, hard disk) • Windows Embedded Standard 7 Professional, 32-bit, MUI (CFast >= 8 GB, SSD, hard disk)	• Windows 7 Ultimate 32-bit MUI • Windows 7 Ultimate 64-bit MUI	• Windows 7 Ultimate 32-bit MUI • Windows 7 Ultimate 64-bit MUI
Order separately	RMOS3 V3.50	RMOS3 V3.50	-	-
Project-specific on request	• Linux [1] • Other	• Linux [1] • Other	• Linux [1] • Other	• Linux [1] • Other
Interfaces				
PROFINET onboard	-	3 x RJ45 (CP 1616 compatible) onboard, optional	3 x RJ45 (CP 1616 compatible) onboard, optional	3 x RJ45 (CP 1616 compatible) onboard, optional
PROFIBUS/MPI	-	12 Mbps (CP 5622-compatible), optional	12 Mbps (CP 5622-compatible) onboard, optional	12 Mbps (CP 5622-compatible) onboard, optional
Ethernet	2 x 10/100/1000 Mbps	2 x 10/100/1000 Mbps	2 x 10/100/1000 Mbps	2 x 10/100/1000 Mbps
USB	4 x USB 2.0	-	4 x USB 3.0	4 x USB 3.0
Graphics	1 x DVI-D	• 1 x DVI-I (DVI and VGA) • 1 x DisplayPort	• 1 x DVI-I (DVI or VGA) • 1 x DisplayPort	• 1 x DVI-I (DVI and VGA) • 1 x DisplayPort
Drives				
Hard disks	1 x 2.5" (optional)	1 x 2.5" (optional)	• 1 x 3.5" • 2 x 2.5" • RAID1/2 x 2.5"	• 1 x 3.5" • 2 x 2.5" • RAID1/2 x 2.5"
Solid-state drive	1 x 2.5" SATA (optional)	1 x 2.5" SATA (optional)	1 x 2.5" SATA (optional)	1 x 2.5" SATA (optional)
FlashDrive	1 x CF externally accessible	• 1 x CFast externally accessible • 1 x CFast internal, in place of HDD, SSD (optional)	-	-
Optical drives	-	-	DVD R/W	DVD R/W
Ambient conditions				
Vibration/shock load during operation	1 g / 15 g (with FlashDrive)	1 g / 15 g (with FlashDrive)	1 g / 5 g	1 g / 5 g
Ambient temperature during operation	0 °C ... 50 °C (with FlashDrive) 0 °C ... 40 °C (with hard disk)	With maximum configuration: 0 ... 50/55 °C (with FlashDrive) 5 ... 40 °C (with hard disk)	With maximum configuration: 5 ... 45 °C 5 ... 50/55 °C (with 20/10 W load on USB, PCI(e) bus)	With maximum configuration: 5 ... 45 °C 5 ... 50/55 °C (with 20/10 W load on USB, PCI(e) bus)

• Available
- Not available

[1] Suitable for specific Linux versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for Linux", see www.siemens.com/simatic-pc/suited-for-linux
(Linux is a trademark of Linus Torvalds).

More information

Further information can be found on the Internet at:

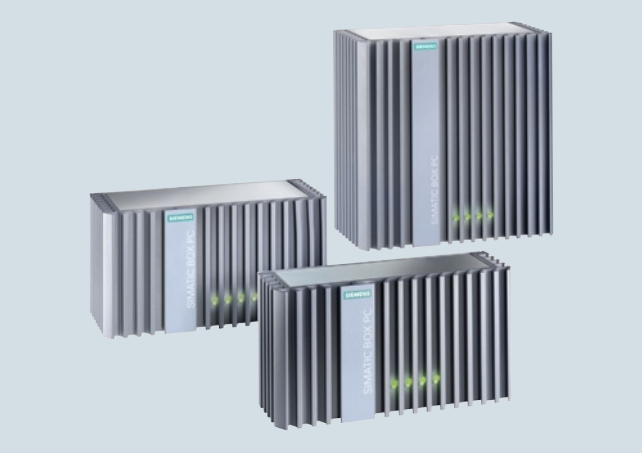
http://www.siemens.com/simatic-pc

Information material can be ordered or downloaded from the Internet:

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

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Overview



SIMATIC IPC227D (Nanobox PC):
The compact embedded IPC – maintenance-free and dust-proof with versatile mounting

- Maximum compactness with approx. 1 liter enclosure volume or more with integrated industrial power supply for minimum space requirements in the control cabinet
- Maximum flexibility thanks four mounting options and interfaces on one side suitable for every installation situation
- Optimum variety of interfaces due to a large number of integrated interfaces such as a selectable serial port (RS 232/RS 485/CAN) and 2 x teaming-capable Gigabit LAN
- Maximum industrial functionality due to closed enclosure for optimum dust protection and non-volatile retentive memory
- Further device options for optimum adaptation to the application with additional PCIe slot or RS 232 interfaces or digital I/O

Benefits

- Flexible installation (rail, wall, portrait, side mounting); all mounting positions are allowed
- Minimum space requirements (installation space of approx. 1 liter or more; all interfaces on one side, integrated industrial power supply)
- Up to 50 °C ambient temperature; dust protection due to closed enclosure
- LED for efficient self-diagnostics (e.g. using WinAC: Run/Stop, Error, Maintenance); optimized for headless operation
- Device options for optimum adaptation to the application (optional)
  - Simple expansion by means of a PCIe slot or
  - three additional RS232 interfaces or
  - four additional digital inputs and outputs each, 24 V DC

High-performance data processing at low power consumption

- Intel Atom technology of the Power-Optimized family E6xx
- Power consumption from 8 W (low waste heat in protective enclosure/control cabinet)
- Wake-on-LAN for remote-controlled switching between standby and active state
- Support of Sleep States/SpeedStep (dynamic power adaptation depending on the required computing performance)
- Intel VT-x technology for virtualization

High degree of industrial functionality and flexibility for implementing the embedded solution

- Flexible memory concepts: CompactFlash or more, Solid-State Drive, or hard drive
- 2 Gbit Ethernet (teaming-capable); PROFINET with RT functionality (via Standard Ethernet)
- 4 high-speed USB 2.0 ports
- 1 RS232; alternatively as: RS485 or CAN (optional)
- Ready-to-run embedded bundles with WinAC RTX2010 (F) and/or WinCC RT Advanced (optional)
- 512 KB retentive memory (MRAM), of which 128 KB can be written to within the buffer time (optional)
- Embedded and standard operating systems for selection: Windows Embedded Standard 2009 and Windows XP Prof. MUI; Windows Embedded Standard 7 32 bit and Windows 7 MUI 32 bit
- Suited for Linux certificate for simple, secure implementation of proprietary Linux-based solutions

High system availability in order to reduce the risk of potential failures and maintenance costs

- Maintenance-free since there are no rotating parts (fans, HDD)
- Battery-free operation even if retentive memory option is selected (with time-of-day synchronization over network)
- Comprehensive self-diagnostics thanks to pre-installed local diagnostics software SIMATIC IPC DiagBase

High investment security in order to reduce engineering costs

- Long-term availability: Service & Support period of 8 – 10 years after market launch

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Technical specifications

	6ES7647-8A...-....
Processor	
Processor	Intel Atom E6x0
Drives	
Hard disk	CF or SSD or HD
Memory	
Main memory	512 MB to 2 GB
Data areas and their retentivity	
retentive data area in total (incl. times, counters, flags), max.	512 kbyte
Interfaces	
USB port	4x USB 2.0 high speed/high current
free slots	1x PCIe x1 (optional)
Connection for keyboard/mouse	USB / USB
serial interface	COM1: 1 x RS232 or RS485 or CAN
Video interfaces	
• Graphics interface	DVI-D
Industrial Ethernet	
• Industrial Ethernet interface	2 x Fast Ethernet
- 100 Mbps	Yes
- 1000 Mbps	Yes
Monitoring functions	
Temperature	Yes
Watchdog	Yes
Status LEDs	Yes

	6ES7647-8A...-....
Degree and class of protection	
IP (at the front)	20
Standards, approvals, certificates	
Approval	CE (industry), UL, cULus
CE mark	Yes
KC approval	Yes
Marine approval	
• Germanischer Lloyd (GL)	Yes
• American Bureau of Shipping (ABS)	Yes
• Bureau Veritas (BV)	Yes
• Det Norske Veritas (DNV)	Yes
• Lloyds Register of Shipping (LRS)	Yes
Ambient conditions	
Operating temperature	
• Ambient temperature during operation	
- during operating phase, min.	0 °C
- during operating phase, max.	50 °C
Operating systems	
Pre-installed operating system	Yes
Windows XP Prof.	Yes
without operating system	Yes

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Ordering data

	Article No.
SIMATIC IPC227D	**6ES7647 - 8 A** ■ ■ ■ - ■ ■ ■ ■
Atom E620 (600 MHz), 512 MB RAM, without drive, with CF slot, COM1: RS232, without operating system, device version: Base, DIN rail, 1 x DVI-D graphics interface 2 x 10/100/1000 Mbps Ethernet RJ45 4 x USB V2.0 (high current) CompactFlash slot 24 V DC industrial power supply	
Processors / memory configuration / NVRAM	
• Atom E620 (600 MHz), 512 MB RAM	**A**
• Atom E620 (600 MHz), 512 MB RAM, NVRAM	**B**
• Atom E640 (1.0 GHz), 1 GB RAM	**E**
• Atom E640 (1.0 GHz), 1 GB RAM, NVRAM	**F**
• Atom E660 (1.3 GHz), 2 GB RAM	**G**
• Atom E660 (1.3 GHz), 2 GB RAM, NVRAM	**H**
Drives	
• Without drive, with CF slot	**0**
• 320 GB HDD SATA	**1**
• 160 GB Solid-State Drive SATA	**2**
• 80 GB Solid-State Drive SATA	**4**
• 2 GB SIMATIC IPC CompactFlash	**5**
• 4 GB SIMATIC IPC CompactFlash	**6**
• 8 GB SIMATIC IPC CompactFlash	**7**
• 16 GB SIMATIC IPC CompactFlash	**8**
COM interface	
• COM1: RS232	**0**
• COM1: RS485	**1**
• COM1: CAN	**2**
Operating system	
• Without operating system	**0**
• Windows Embedded Standard 2009 preinstalled (CF from 2 GB/SSD/HD)	**1**
• XP Prof. MUI preinstalled on SSD/HD	**2**
• Windows Embedded Standard 7 (32-bit) preinstalled (CF from 4 GB/SSD/HD)	**3**
• Windows 7 (32-bit) MUI preinstalled on SSD/HD	**4**

	Article No.
SIMATIC IPC227D	**6ES7647 - 8 A** ■ ■ ■ - ■ ■ ■ ■
Software bundles	
• Without RTX/HMI software	**A**
• RTX: WinAC RTX 2010	**B**
• RTX-F: WinAC RTX F 2010	**C**
• HMI: WinCC RT Advanced 128 PT	**F**
• HMI: WinCC RT Advanced 512 PT	**G**
• HMI: WinCC RT Advanced 2048 PT	**H**
• HMI/RTX: RT 128 PT	**M**
• HMI/RTX: RT 512 PT	**N**
• HMI/RTX: RT 2048 PT	**P**
• HMI/RTX-F: RT 128 PT	**R**
• HMI/RTX-F: RT 512 PT	**S**
• HMI/RTX-F: RT 2048 PT	**T**
Device versions	
• Device version: Base line	**A**
• Device version: PCIe (1 slot)	**B**
• Device version: COM (COM2-4: RS232)	**D**
• Device version: IO (4x dig. in/out each)	**E**
Mounting accessories	
• Standard mounting rail	**1**
• Wall mounting	**2**
• Portrait mounting	**3**
• Side mounting	**4**

Release for individual order variants:
See releases in the ordering procedure.

Accessories

Cable strain relief set for IPC227D Packing unit: 5 units	**6ES7648-1AA50-0XL0**
Dust protection set for IPC227D	**6ES7648-1AA50-0XG0**

More information

Further information can be found on the Internet at:

http://www.siemens.com/simatic-pc

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SIMATIC IPC427D

Overview



SIMATIC IPC427D (Microbox PC):
The powerful embedded IPC – maintenance-free with versatile configuration

Ready-to-run, complete solutions (software is already installed and preconfigured) for visualization and automation in connection with WinCC RT Advanced and/or WinAC RTX:

- Ultra-compact
- Maintenance-free
- Third generation Intel Core i technology

Benefits

High data processing speed for high productivity

- Up to Core I 7, fan-free
- DDR3 memory technology up to 8 GB

Maximum compactness and ruggedness for use directly on the machine

- Low mounting depth, ambient temperature up to 55 °C
- Upright mounting as second standard mounting position (ambient temperature 50 °C)
- Solid State Drive (SSD) (50 GB high endurance or 80 GB standard, optional), SATA hard disk, or up to 2 CFast cards with 16 GB

High degree of industrial functionality and flexibility for implementing embedded solutions

- Flexible memory concepts (e.g. 2 mass storage units possible)
- 2 x LAN 10/100/1 000 Mbit/s connections; teaming-capable
- Onboard PROFIBUS or PROFINET interface (optional)
- 4 x high-speed USB 3.0 ports; 2 serial interfaces (2nd interface is optional)
- Flexible installation with mounting options (rail, wall, front upright mounting)
- Simple expansion capability (up to 2 PCIe slots)
- On/off switch

High system availability in order to reduce the risk of potential failures and maintenance costs

- Maintenance-free since no rotating parts (fans, hard disks) and operation without battery possible
- 512 KB NVRAM can be written by WinAC RTX
- Front LED for efficient self-diagnostics; optimized for headless operation through special BIOS properties
- SIMATIC software system-tested

High investment security in order to reduce engineering costs

- Long-term availability: Service and support period of 8 to 10 years after market launch
- Installation and interface compatibility with predecessor versions as of 2004

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Technical specifications

	6AG4 140-.....-...0
Supply voltage	
Type of supply voltage	24 V DC
Supply voltage	24 V
Processor	
Processor	Intel® Celeron® Processor 827E (1.5MB Cache, 1.40 GHz); Intel® Core™ i3-3217UE Processor (3MB Cache, 1.60 GHz); Intel® Core™ i7-3517UE Processor (4MB Cache, up to 2.80 GHz)
Drives	
Hard disk	2.5" SATA hard disk, at least 250 GB
Memory	
Main memory	1 GB to 8 GB, ECC optional
Interfaces	
PROFIBUS/MPI	Onboard, isolated, max. 12 Mbit/s, CP5611-compatible
USB port	4x USB 3.0 high speed/high current
free slots	1xPCIe (x4), 1xPCIe (x1)
Connection for keyboard/mouse	USB / USB
serial interface	1 x RS232; 2 x RS232 (optional); CAN (optional)
Video interfaces	
• Graphics interface	1x DisplayPort and 1x DVI-I; 1x VGA via adapter cable (optional)
PROFINET IO	
• Number of PROFINET interfaces	1; 3 ports (incl. switch)
Industrial Ethernet	
• Industrial Ethernet interface	2 x Fast Ethernet
- 100 Mbps	Yes
- 1000 Mbps	Yes
Monitoring functions	
Temperature	Yes
Watchdog	Yes
Status LEDs	Yes
Degree and class of protection	
IP (at the front)	20

	6AG4 140-.....-...0
Standards, approvals, certificates	
Approval	CE, cULus (508), C-Tick
CE mark	Yes
KC approval	Yes
cULus	Yes
EMC	CE, EN 55022A, EN 61000-6-4, EN 61000-6-2
EN 61000-6-2	Yes
Marine approval	
• Germanischer Lloyd (GL)	Yes
• American Bureau of Shipping (ABS)	Yes
• Bureau Veritas (BV)	Yes
• Det Norske Veritas (DNV)	Yes
• Lloyds Register of Shipping (LRS)	Yes
Ambient conditions	
Operating temperature	
• Ambient temperature during operation	0 °C to +55 °C
- during operating phase, min.	0 °C
- during operating phase, max.	55 °C
Relative humidity	
• Relative humidity	Tested to DIN IEC 60068-2-3, DIN IEC 60068-2-30, DIN IEC 60068-2-56: 5% to 80% at 25 °C (no condensation)
Vibrations	
• Vibration load in operation	Tested to DIN IEC 60068-2-6: 10 Hz to 58 Hz: 0.075 mm, 58 Hz to 200 Hz: 9.8 m/s^2 (1 g)
Shock testing	
• Shock load during operation	Tested to DIN IEC 60068-2-29: 50 m/s^2 (5g), 30 ms, 100 shocks
Operating systems	
Operating system	Windows 7 Ultimate (Multi Language) 32-bit/64-bit, Windows Embedded Standard 7 32-bit/64-bit
Pre-installed operating system	Yes
Software	
SIMATIC Software	Optionally with pre-installed software bundle SIMATIC WinCC RT Advanced / WinAC RTX

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SIMATIC IPC427D

Ordering data

SIMATIC IPC427D (Box PC) [1] [2]	Article No. 6AG4140 -					-				
Processor and fieldbus:										
• Celeron U827E (1C/1T, 1.4 GHz, 1.5 MB cache); 2 x Gigabit Ethernet (IE/PN)		0								
• Celeron U827E (1C/1T, 1.4 GHz, 1.5 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		1								
• Celeron U827E (1C/1T, 1.4 GHz, 1.5 MB cache); 2 x Gigabit Ethernet (IE/PN); CAN interface		2								
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN)		3								
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		4								
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 1 x Gigabit Ethernet (IE/PN); 1 x PROFINET (IRT, 3 ports)		5								
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN) (optional ECC only here)		6								
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		7								
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 1 x Gigabit Ethernet (IE/PN); 1 x PROFINET (IRT, 3 ports)		8								
Mounting accessories:										
• without mounting accessories			A							
• DIN rail mounting			B							
• Wall mounting			D							
• Portrait mounting			E							
Work memory/NVRAM/ECC:										
• 1 GB				A						
• 2 GB				B						
• 4 GB				C						
• 8 GB				D						
• 4 GB with ECC (only with Core i7, 2 x Gigabit Ethernet (IE/PN))				G						
• 8 GB with ECC (only with Core i7, 2 x Gigabit Ethernet (IE/PN))				H						
• 1 GB and NVRAM				J						
• 2 GB and NVRAM				K						
• 4 GB and NVRAM				L						
• 8 GB and NVRAM				M						
• 4 GB with ECC and NVRAM (only with Core i7, 2 x Gigabit Ethernet (IE/PN))				N						
• 8 GB with ECC and NVRAM (only with Core i7, 2 x Gigabit Ethernet (IE/PN))				P						
Expansions/interface:										
• One RS 232, without PCIe					0					
• One RS 232 and one PCIe					1					
• One RS 232 and two PCIe					2					
• Second RS 232, without PCIe					3					
• Second RS 232 and one PCIe					4					
• Second RS 232 and second PCIe					5					
Operating system:										
• Without operating system						0				
• Windows Embedded Standard 7 Professional, 32-bit, MUI						3				
• Windows Embedded Standard 7 SP1, English, 32-bit						4				
• Windows Embedded Standard 7 SP1, English, 64-bit						5				
• Windows 7 Ultimate SP1, 32-bit, MUI (Eng, Ger, Fr, It, Sp)						6				
• Windows 7 Ultimate SP1, 64-bit, MUI (Eng, Ger, Fr, It, Sp)						7				

SIMATIC IPC427D (Box PC) [1] [2]	Article No. 6AG4140 -					-				
Mass storage, externally accessible:										
• Without external mass storage							0			
• CFast 2 GB Without operating system							1			
• CFast 4 GB (only optionally with operating system if no internal mass storage)							2			
• CFast 8 GB (only optionally with operating system if no internal mass storage)							3			
• CFast 16 GB (only optionally with operating system if no internal mass storage)							4			
Internal mass storage:										
• Without internal mass storage								A		
• CFast 2 GB, without software								B		
• CFast 4 GB, without software								C		
• CFast 8 GB, without software								D		
• CFast 16 GB, without software								E		
• SSD 50 GB High Endurance (SLC)								G		
• SSD 80 GB Standard								H		
• HDD 250 GB								K		
• SSD 160 GB Standard								P		
SIMATIC software preinstalled (bundles, only with Windows Embedded Standard 7):										
• Without SIMATIC software									A	
• WinAC RTX 2010 [3]									B	
• WinCC RT Advanced, 128 PT									C	
• WinCC RT Advanced, 512 PT									D	
• WinCC RT Advanced, 2 048 PT									E	
• WinCC RT Advanced, 4 096 PT									F	
• WinCC RT Advanced 128 PT, WinAC RTX 2010 [3]									J	
• WinCC RT Advanced 512 PT, WinAC RTX 2010 [3]									K	
• WinCC RT Advanced 2 048 PT, WinAC RTX 2010 [3]									L	
• WinCC RT Advanced 4 096 PT, WinAC RTX 2010 [3]									M	
• WinAC RTX F 2010 [3]									N	
• WinCC RT Advanced 128 PT, WinAC RTX F 2010 [3]									P	
• WinCC RT Advanced 512 PT, WinAC RTX F 2010 [3]									Q	
• WinCC RT Advanced 2 048 PT, WinAC RTX F 2010 [3]									R	
• WinCC RT Advanced 4 096 PT, WinAC RTX F 2010 [3]									S	
• WinCC RT Professional Client/ single-user station 128 PT									Y	
Power supply:										
• 24 V DC industrial power supply										0
• 24 V DC and TPM (not for China and Russia)										8

[1] "Built to order" – versions with a delivery time of max. 15 working days and with identified repair, if not preferred type.

[2] For an up-to-date overview, see the SIMATIC PC online configurator at: www.siemens.com/ipc-configurator

[3] Only with "main memory and NVRAM".

Note:

Bundles with SIMATIC software only with Windows Embedded Standard 7, main memory and NVRAM (with RTX and RTX F), and CFast mass storage of 4 GB or more / SSD.

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Overview



IPC627D with DVD drive

SIMATIC IPC627D (Box PC):
The high-end IPC – with maximum performance, functional scope and expansion capability

It offers:

- Maximum performance in the smallest space
- Intel Xeon technology

Benefits

Maximum system performance for complex measuring, control and visualization tasks

- Intel processors: Xeon, Core i3 or Celeron; in each case with 4 or 2 cores, with turbo-boost technology and AMT (Xeon) and hyper-threading (Xeon, i3)
- Intel DH82C226 PCH Platform Controller Hub (PCH)
- DDR3 1600 memory technology up to 16 GB RAM
- Intel HD 4600 (Xeon, i3) graphics for high graphics performance
- PCI Express x16 slot for x16 graphics card support
- SATA hard disks with up to 500 GB capacity and NCQ technology (Native Command Queuing) for larger data volumes

Highly compact design for space-saving and flexible installation

- Compact housing design (volume 6 liters)
- Flexible installation in many different positions with mounting brackets or portrait installation kits
- Free expansion slots: 2 x PCI or 2 x PCIe or 1 x PCIe and 1 x PCI
- 3 X PROFINET interfaces onboard (optional, IRT-capable, 3-port, switching-enabled, CP 1616-compatible)
- 1 x PROFIBUS interface onboard (optional, CP 5622-compatible)
- 2 x LAN 10/100/1000 Mbit/s connections (Gigabit Ethernet with teaming capability), PROFINET RT-compatible
- 4 x USB 3.0 (SuperSpeed)
- DisplayPort and DVI-I interface (for VGA or DVI-D monitors)

Rugged design for direct installation in the machine

- Maximum processor performance up to ambient temperature of 55 °C
- High shock/vibration resistance in all possible mounting positions
- High EMC for safe operation
- SATA Solid-State Drive (SSD) with 240 GB for high reliability and speed
- Strain relief for all cables/connectors

High system availability, fast startup, maintenance and servicing

- High degree of data security thanks to mirror disk system (RAID1, optional) or Solid State Drive (SSD, optional)
- ECC memory (optional, for 1-bit error correction)
- 2 MB battery-buffered SRAM, 128 KB of which can be used as memory for retentive WinAC RTX data
- Active Management Technology (Intel AMT) for Xeon versions (remote access to the device, also in shut-down state)
- CMOS buffer battery accessible from outside, replaceable during operation. Status can be scanned by software.
- 4 LEDs – 1 x power and 3 x applications (WinAC)
- Operating system preinstalled, ready to run, and already activated (eliminates need for usual product activation via the Internet or by telephone)
- Following system failure, fast restoration of hard disk contents to as-delivered status using supplied recovery and restore CD
- Worldwide service and support

Cost reductions through high investment security

- Platform with long-term stability and embedded Intel components
- Availability of 3 to 6 years, then guaranteed availability of spare parts for further 5 years
- Part of the scalable Box PC range with identical performance features and footprint
- System-tested with SIMATIC components
- Certification for worldwide marketing (e.g.: cULus)
- Installation compatible for all device generations, software compatible with predecessor model

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2

Technical specifications

	SIMATIC IPC627D
General features	
Processor	• Intel Xeon Processor E3-1268L v3 (4C, 2.3 (3.3) GHz, HT, 8 MB cache, HT, VT-d, AMT) • Intel Core i3-4330TE (2C, 2.4 GHz, 4 MB cache, HT, VT-x) • Intel Celeron G1820TE (2C, 2.2 GHz, 2 MB cache)
Main memory	2 GB; DDR3 1600, DIMM; expandable up to 16 GB (2 memory receptacles); ECC memory 8/16 GB optional
Free slots for expansions	• 1 x PCI (185 mm) and 1 x PCI (185 mm) or • 1 x PCI (185 mm) and 1 x PCIe x16 (185 mm) • 2 x PCI-Express (x16/x4, 185/185 mm)
Operating system	
Operating system	• Without • Windows 7 Ultimate Multi-Language – 32-bit or 64-bit variant, SP1
Supply voltage	100 V /230 V / 240 V AC (widerange) 50/60 Hz; optional 24 V DC
Drives	
Optical drives	SATA DVD±RW/DL Drive, optional (Depth increases from 80 mm to 100 mm)
SATA hard disks	None; 250 GB, 500 GB, RAID1 (2 x 250 GB)
Solid state drive	240 GB SATA 2.5"
Approvals	cULus508, cULus1950, FCC Class A
Ports	
DisplayPort	1 x DisplayPort
DVI-I	1 x (analog OR digital)
VGA	Via adapter cable, DVI-I to VGA adapter (available as accessory)
Dual Monitor	Via DisplayPort and DVI-I
Parallel interface	PC slot cover (available as accessory)
Serial interface	1 x COM1
PROFIBUS/MPI	12 Mbit/s (isolated, CP 5622-compatible, optional)
PROFINET	3 x RJ45 (CP 1616-compatible, optional) [1]
USB	4 x USB 3.0, SuperSpeed; 2 x USB 2.0 (optional)
Ethernet	2 x Gigabit Ethernet (IE, PN, RJ45, teaming-capable)

[1] Note:
The PROFINET and PROFIBUS options are supplied with 2 MB battery-backed SRAM

	SIMATIC IPC627D
Monitoring functions	
Temperature and Watchdog	Onboard
Status LEDs	4 LEDs
Ambient conditions	
Degree of protection	IP20 according to EN 60529 (front/rear)
Vibration load during operation [2]	• 10 ... 58 Hz: 0.75 mm, 58 ... 500 Hz: 9.8 m/s^2 (approx. 1 g) • with DVD operation: 10 ... 58 Hz: 0.018 mm, 58 ... 500 Hz: 2.5 m/s^2 (approx. 0.25 g)
Shock load during operation [3]	• Tested according to DIN IEC 68-2-29: 50 m/s^2 (5 g), • with DVD operation: 50 ms^2, 11 ms (5 g)
Relative humidity during operation	5 % to 80 % at 25°C (no condensation);
Relative humidity during transport / storage	5% to 95% at 25 °C (no condensation)
Electromagnetic compatibility (EMC)	
Emitted interference	EN 61000-6-3, EN 61000-3-2 Class D, EN 61000-3-3; FCC Class A
Immunity to interference	
• to conducted interference on the supply cables	± 2 kV (IEC 61000-4-4, burst), ± 1 kV (IEC 61000-4-5, surge symm.), ±2 kV (IEC 61000-4-5, surge asymm.)
• on signal cables	± 1 kV (IEC 61000-4-4, burst, length < 3 m), ± 2 kV (IEC 61000-4-4, burst, length > 3 m), ± 2 kV (IEC 61000-4-5, surge, length > 30 m)
• to discharge of static electricity	± 6 kV contact discharge (IEC 61000-4-2), ± 8 kV air discharge (IEC 61000-4-2)
• to high-frequency radiation	10 V/m 80% AM, 80-1000 MHz and 1.4 - 2 GHz (IEC 61000-4-3); 1 V/m 80% AM, 2.0-2.7 GHz (IEC 61000-4-3), 10 V, 10 kHz to 80 MHz (IEC 61000-4-6)
• to magnetic fields	100 A/m, 50/60 Hz (IEC 61000-4-8)
• Ambient temperature during operation	5 to 45 °C (maximum configuration); 5 to 50 °C (up to 20 W load on PCI bus), 5 to 55 °C (up to 10 W load on PCI bus)
Dimensions	
Device dimensions (W x H x D) in mm	312 x 301 (incl. mounting rail) x 105 without DVD drive: 312 x 301 (incl. mounting rail) x 80
Weight	approx. 7 kg

[2] No vibration permitted when burning DVDs;
[3] No shock permitted when burning DVDs

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Ordering data

	Article No.
SIMATIC IPC627D [1]	**6AG4131 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
HD graphics onboard (Xeon, i3: HD4600); 2 x Gigabit Ethernet (IE/PN) RJ45; 4 x USB V3.0; 1x serial (COM1); RAID controller onboard; watchdog, temp./fan monitoring;	
Processor:	
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x);	**D**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM;	**E**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM;	**F**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT);	**G**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM;	**H**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM;	**J**
Drives	
• 250 GB HDD SATA;	**A**
• 250 GB HDD SATA; DVD+/-RW;	**B**
• 500 GB HDD SATA;	**D**
• 500 GB HDD SATA; DVD+/-RW;	**E**
• RAID1 2 x 250 GB SATA (2.5");	**G**
• RAID1 2 x 250 GB SATA (2.5"); DVD+/-RW;	**H**
• Solid-state drive 240 GB;	**M**
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5");	**N**
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5"); DVD+/-RW;	**P**
Memory configuration	
• 2 GB DDR3 1600 DIMM;	**1**
• 4 GB DDR3 1600 DIMM;	**2**
• 8 GB DDR3 1600 DIMM;	**3**
• 16 GB DDR3 1600 DIMM;	**4**
• 8 GB DDR3 1600 DIMM; ECC;	**5**
• 16 GB DDR3 1600 DIMM; ECC;	**6**
Expansion 1 (HW)	
• 2 x PCI;	**0**
• 1 x PCIe (x16); 1 x PCI;	**1**
• 1 x PCIe (x16); 1 x PCIe (x4);	**2**
Expansion 2 (HW)	
• Without expansions (HW);	**0**
• 2 x USB in addition (1 slot occupied);	**1**
• COM2; LPT (1 slot occupied);	**2**
• 2 x USB in addition; COM2; LPT (2 slots occupied);	**3**

	Article No.
SIMATIC IPC627D [1]	**6AG4131 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
Operating system	
• Windows 7 Ultimate, 32-bit SP1, MUI (Eng, Ger, Fr, It, Sp);	**A**
• Windows 7 Ultimate, 64-bit SP1, MUI (Eng, Ger, Fr, It, Sp);	**B**
• Without	**X**
expansions (SW)	
• SIMATIC IPC DiagMonitor V4.x enclosed;	**A**
• SIMATIC IPC Image & Partition Creator V3.x enclosed;	**B**
• SIMATIC IPC DiagMonitor V4.x, Image & Partition Creator V3.x enclosed;	**C**
• Without	**X**
• TPM module (not for China and Russia);	**Y**
Country-specific version/ power supply	
• 110/230 V AC industrial power supply with NAMUR; European power cable;	**0**
• 110/230 V AC industrial power supply with NAMUR; UK power cable;	**1**
• 110/230 V AC industrial power supply with NAMUR; power cable for Switzerland;	**2**
• 110/230 V AC industrial power supply NAMUR; US power cable;	**3**
• 110/230 V AC industrial power supply NAMUR; power cable for Italy;	**4**
• 110/230 V AC industrial power supply with NAMUR; power cable for China	**5**
• 24 V DC industrial power supply;	**6**

[1] For an up-to-date overview, see the SIMATIC PC online configurator at: www.siemens.com/ipc-configurator

Accessories

Memory expansion	
• 2 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM, ECC	**6ES7648-2AJ70-1MA0**
Assembly kit for portrait mounting	
• Upward or downward interface outlet	**6ES7648-1AA10-1YA0**
• Interface outlet to the front	**6ES7648-1AA10-1YB0**
SIMATIC PC graphics adapter cable	**6ES7648-3AB00-0XA0**
DVI-I acc. to VGA, 250 mm long	
SIMATIC PC power cable	
for Box PC and Panel PC, 230 V AC, angled, 3 m	
• for Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria, Finland	**6ES7900-1AA00-0XA0**
• for United Kingdom	**6ES7900-1BA00-0XA0**
• For Switzerland	**6ES7900-1CA00-0XA0**
• For the USA	**6ES7900-1DA00-0XA0**
• For Italy	**6ES7900-1EA00-0XA0**
• For China	**6ES7900-1FA00-0XA0**

More information

Additional information is available on the Internet at:
http://www.siemens.com/simatic-pc

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SIMATIC IPC827D

Overview



SIMATIC IPC827D (Box PC):
The high-end IPC – with maximum performance, functional scope and expansion capability

It offers:

- Maximum performance and high expandability
- with Intel Xeon technology

Benefits

Maximum system performance for complex measuring, control and visualization tasks

- Intel processors: Xeon, Core i3 or Celeron; in each case with 2 cores, with turbo-boost technology and AMT (Xeon) and hyper-threading (Xeon, i3)
- Intel DH82C226 PCH Platform Controller Hub (PCH)
- DDR3 1600 memory technology up to 16 GB RAM
- Intel HD 4600 (Xeon, i3) graphics for high graphics performance
- PCI Express x16 slot for x16 graphics card support
- SATA hard disks with up to 500 GB capacity and NCQ technology (Native Command Queuing) for a larger data volume

High flexibility and expandability

- Flexible installation in many different positions with mounting brackets or portrait assembly kit
- Vacant expansion slots: 3 x PCI, 1 x PCIe Express (x16) and 1 x PCIe (x4)
- 3 x PROFINET interfaces onboard (optional, IRT-capable, 3-port, switching-enabled, CP1616-compatible)
- 1 x PROFIBUS interface onboard (optional, CP5622-compatible)
- RAID1 controller onboard (no occupation of a PC slot)
- 2 x LAN 10/100/1000 Mbit/s connections (Gigabit Ethernet with teaming capability), PROFINET RT-compatible
- 4 x USB-3.0 ports (SuperSpeed)
- DisplayPort and DVI-I interface (for VGA and/or DVI-D monitors)

Rugged design for direct installation in the machine

- Maximum processor performance up to an ambient temperature of 55 °C
- High shock/vibration resistance in all possible mounting positions
- High EMC for safe operation
- SATA Solid-State Drive (SSD) with 240 GB for high reliability and speed
- Strain relief for all cables/connectors

High system availability, fast startup, maintenance and servicing

- High degree of data security thanks to mirror disk system (RAID1, optional) or Solid State Drive (SSD, optional)
- ECC memory (optional, for 1-bit error correction)
- 2 MB battery-backed SRAM, of which 128 KB can be used as memory for retentive WinAC RTX data
- Active Management Technology (Intel AMT) for Xeon versions (remote access to the device, also in shut-down state)
- Externally accessible CMOS backup battery, replaceable during operation, status can be scanned by software
- 4 LEDs – 1 x power and 3 x applications (WinAC)
- Operating system preinstalled, ready to run, and already activated (eliminates need for usual product activation via the Internet or by telephone)
- Following system failure, fast restoration of hard disk contents to factory status using supplied recovery and restore DVD
- Worldwide service and support

Cost reductions through high investment security

- Long-term platform with Intel embedded components
- Availability of 3 to 6 years, then guaranteed availability of spare parts for further 5 years
- Part of the scalable Box PC range with identical performance features and footprint
- System-tested with SIMATIC hardware and software
- Certification for worldwide marketing (e.g.: cULus)
- Installation compatible for all device generations, software compatible with predecessor model

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Technical specifications

	SIMATIC IPC827D
General features	
Processor	• Intel Xeon Processor E3-1268L v3 (4C, 2.3 (3.3) GHz, HT, 8 MB cache, HT, VT-d, AMT) • Intel Core i3-4330TE (2C, 2.4 GHz, 4 MB cache, HT, VT-x) • Intel Celeron G1820TE (2C, 2.2 GHz, 2 MB cache)
Main memory	2 GB; DDR3 1600, DIMM; expandable up to 16 GB (2 memory receptacles); ECC memory 8/16 GB optional
Free slots for expansions	2 x PCI (240 mm) 1 x PCI (185 mm) 2 x PCI-Express (x16/x4, 185/185 mm)
Operating system	
Operating system	• Without • Windows 7 Ultimate Multi-Language – 32-bit or 64-bit variant, SP1
Supply voltage	100 V /230 V / 240 V AC (widerange) 50/60 Hz; optional 24 V DC
Drives	
Optical drives	DVD±RW/DL SATA, optional (depth increases from 155 mm to 179 mm)
SATA hard disks	None; 250 GB, 500 GB, RAID1 (2 x 250 GB)
Solid state drive	240 GB SATA 2.5"
Approvals	cULus508, cULus1950, FCC Class A
Ports	
DisplayPort	1 x DisplayPort
DVI-I	1 x (analog OR digital)
VGA	Via adapter cable, DVI-I to VGA adapter (available as accessory)
Dual Monitor	Via DisplayPort and DVI-I
Parallel interface	PC slot cover (available as accessory)
Serial interface	1 x COM1
PROFIBUS/MPI	12 Mbit/s (isolated, CP 5622-compatible, optional)
PROFINET	3 x RJ45 (CP 1616-compatible, optional) [1]
USB	4 x USB 3.0, SuperSpeed; 2 x USB 2.0 (optional)
Ethernet	2 x Gigabit Ethernet (IE, PN, RJ45, teaming-capable)
Monitoring functions	
Temperature and Watchdog	Onboard
Status LEDs	4 LEDs

	SIMATIC IPC827D
Ambient conditions	
Degree of protection	IP20 according to EN 60529 (front/rear)
Vibration load in operation [2]	• 10 ... 58 Hz: 0.75 mm, 58 ... 500 Hz: 9.8 m/s^2 (approx. 1 g) • with DVD operation: 10 ... 58 Hz: 0.018 mm, 58 ... 500 Hz: 2.5 m/s^2 (approx. 0.25 g)
Shock load during operation [3]	• Tested according to DIN IEC 68-2-29: 50 m/s^2 (5 g), • with DVD operation: 50 ms^2, 11 ms (5 g)
Relative humidity during operation	5 % to 80 % at 25°C (no condensation);
Relative humidity during transport / storage	5% to 95% at 25°C (no condensation)
Electromagnetic compatibility (EMC)	
Emitted interference	EN 61000-6-3, EN 61000-3-2 Class D, EN 61000-3-3; FCC Class A
Immunity to interference	
• to conducted interference on the supply cables	± 2 kV (IEC 61000-4-4, burst), ± 1 kV (IEC 61000-4-5, surge symm.), ±2 kV (IEC 61000-4-5, surge asymm.)
• on signal cables	± 1 kV (IEC 61000-4-4, burst, length < 3 m), ± 2 kV (IEC 61000-4-4, burst, length > 3 m), ± 2 kV (IEC 61000-4-5, surge, length > 30 m)
• to discharge of static electricity	± 6 kV contact discharge (IEC 61000-4-2), ± 8 kV air discharge (IEC 61000-4-2)
• to high-frequency radiation	10 V/m 80% AM, 80-1000 MHz and 1.4 - 2 GHz (IEC 61000-4-3); 1 V/m 80% AM, 2.0-2.7 GHz (IEC 61000-4-3), 10 V, 10 kHz to 80 MHz (IEC 61000-4-6)
• to magnetic fields	100 A/m, 50/60 Hz (IEC 61000-4-8)
• Ambient temperature during operation	5 to 45 °C maximum configuration); 5 to 50 °C (up to 20 W load on PCI bus), 5 to 55 °C (up to 10 W load on PCI bus)
Dimensions	
Device dimensions (W x H x D) in mm	312 x 301 (incl. mounting rail) x 179 without DVD drive: 312 x 301 (incl. mounting rail) x 155
Weight	approx. 8 kg

[1] Note: The PROFINET and PROFIBUS options are supplied with 2 MB battery-backed SRAM

[2] No vibration permitted when burning DVDs;

[3] No shock permitted when burning DVDs

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SIMATIC IPC827D

Ordering data

	Article No.
SIMATIC IPC827D [1]	**6AG4132 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
HD graphics onboard (Xeon, i3: HD4600); 2 x Gigabit Ethernet (IE/PN) RJ45; 4 x USB V3.0; 1x serial (COM1); RAID controller onboard; watchdog, temp./fan monitoring;	
Processor:	
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache)	**A**
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM [2]	**B**
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM	**C**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x)	**D**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM [2]	**E**
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM	**F**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT)	**G**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM [2]	**H**
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM	**J**
Drives	
• 250 GB HDD SATA;	**A**
• 250 GB HDD SATA; DVD+/-RW;	**B**
• 500 GB HDD SATA;	**D**
• 500 GB HDD SATA; DVD+/-RW;	**E**
• RAID1 2 x 250 GB SATA (2.5");	**G**
• RAID1 2 x 250 GB SATA (2.5"); DVD+/-RW	**H**
• Solid-state drive 240 GB;	**M**
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5");	**N**
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5"); DVD+/-RW;	**P**
Memory configuration	
• 2 GB DDR3 1600 DIMM;	**1**
• 4 GB DDR3 1600 DIMM;	**2**
• 8 GB DDR3 1600 DIMM;	**3**
• 16 GB DDR3 1600 DIMM;	**4**
• 8 GB DDR3 1600 DIMM; ECC;	**5**
• 16 GB DDR3 1600 DIMM; ECC;	**6**
Expansions (HW)	
• 1 x PCIe (x16); 1 x PCIe (x4); 3 x PCI	**0**
Expansion 2 (HW)	
• Without expansions (HW);	**0**
• 2 x USB in addition (1 slot occupied);	**1**
• COM2; LPT (1 slot occupied);	**2**
• 2 x USB in addition; COM2; LPT (2 slots occupied);	**3**

	Article No.
SIMATIC IPC827D [1]	**6AG4132 - 2** ■ ■ ■ ■ - ■ ■ ■ ■
Operating system	
• Windows 7 Ultimate, 32-bit SP1, MUI (Eng, Ger, Fr, It, Sp);	**A**
• Windows 7 Ultimate 64-bit SP1, MUI (Eng, Ger, Fr, It, Sp);	**B**
• Without	**X**
expansions (SW)	
• SIMATIC IPC DiagMonitor V4.x enclosed;	**A**
• SIMATIC IPC Image & Partition Creator V3.x enclosed;	**B**
• SIMATIC IPC DiagMonitor V4.x, Image & Partition Creator V3.x enclosed;	**C**
• Without	**X**
• TPM module (not for China and Russia);	**Y**
Country-specific version/ power supply	
• 110/230 V AC industrial power supply with NAMUR; European power cable;	**0**
• 110/230 V AC industrial power supply with NAMUR; UK power cable;	**1**
• 110/230 V AC industrial power supply with NAMUR; power cable for Switzerland;	**2**
• 110/230 V AC industrial power supply NAMUR; US power cable;	**3**
• 110/230 V AC industrial power supply NAMUR; power cable for Italy;	**4**
• 110/230 V AC industrial power supply with NAMUR; power cable for China	**5**
• 24 V DC industrial power supply;	**6**

[1] For an up-to-date overview, see the SIMATIC PC online configurator at: www.siemens.com/ipc-configurator

[2] Expected start of delivery: 2nd quarter 2014

Accessories

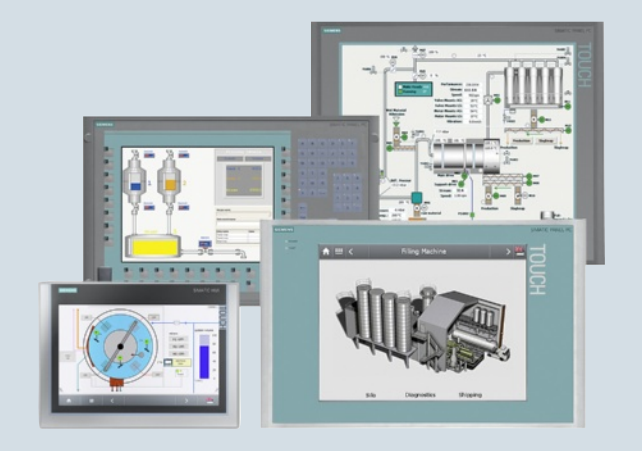
	Article No.
Memory expansion	
• 2 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM, ECC	**6ES7648-2AJ70-1MA0**
Assembly kit for portrait mounting	
• Upward or downward interface outlet	**6ES7648-1AA30-1YA0**
• Interface outlet to the front	**6ES7648-1AA30-1YB0**
SIMATIC PC graphics adapter cable DVI-I acc. to VGA, 250 mm long	**6ES7648-3AB00-0XA0**
SIMATIC PC power cable for Box PC and Panel PC, 230 V AC, angled, 3 m	
• for Germany, France, Spain, the Netherlands, Belgium, Sweden, Austria, Finland	**6ES7900-1AA00-0XA0**
• for the United Kingdom	**6ES7900-1BA00-0XA0**
• For Switzerland	**6ES7900-1CA00-0XA0**
• For the USA	**6ES7900-1DA00-0XA0**
• For Italy	**6ES7900-1EA00-0XA0**
• For China	**6ES7900-1FA00-0XA0**

More information

Additional information is available on the Internet at:
http://www.siemens.com/simatic-pc

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Overview



SIMATIC Panel PCs are suitable thanks to their high industrial compatibility for use in control cabinets, consoles and control panels, as well as directly on the machine. Typical areas of application can be found in both factory and process automation.

There is a broad range of robust, high-performance SIMATIC Panel PCs available for different requirements.

Shared industrial functionality

- High-quality components and modules with a high MTBF (mean time between failure), which also ensure 24-hour operation in the extended temperature range.
- High swing/shock capacity of the devices through special hard-disk suspensions, locked connectors and card retainers
- Rugged housing model with high electromagnetic compatibility (EMC) and integrated industrial power supplies (also as per NAMUR)
- Service-friendly device design
- Bright, brilliant displays in different sizes up to 19"
- Same front panel mounting dimensions and uniform front design across all device families
- Rugged fronts protected from dust, humidity and chemical substances (front-side IP65 / NEMA 4 degrees of protection)

SIMATIC IPC277:
The embedded Nanopanel PC – maintenance-free and compact with displays starting from 7"

- High degree of flexibility for selecting rugged widescreen fronts from 7" to 19" for a more freely configurable display area
- High resolution, large viewing angle, and up to 100% dimmable backlighting for a brilliant display with optimized power consumption
- Absolutely maintenance-free due to the use of CompactFlash or SSD as mass storage and fanless operation up to 50 °C ambient temperature
- Maximum industrial functionality due to non-volatile retentive memory (option)
- Ready-to-use embedded bundles with visualization and/or control software

SIMATIC IPC477D:
The powerful embedded Panel PC – maintenance-free with versatile configuration

- Compact design
- High performance with highly compact design and ruggedness
- Flexible expansion using a PCIe I/O card (optional)
- No rotating parts (without fan and hard disk)
- High security due to use of the operating system
- Windows Embedded Standard 7
- Ready-to-use devices with optionally preinstalled software
- HMI: Innovative HMI software WinCC RT Advanced
- (including logging and recipes)
- RTX: with real-time capable software PLC WinAC RTX
- Retentive memory on-board
- (NV-RAM, usable with WinAC RTX)

SIMATIC HMI IPC477C: The powerful embedded Panel PC – maintenance-free with versatile configuration

- Compact design
- High performance with highly compact design and ruggedness

(optional)

- Also available as PRO version (all-round IP65 degree of protection) with 15" and 19" Touch displays
- No rotating parts (without fan and hard disk)
- High security due to Microsoft Windows Embedded Standard 2009 or Windows Embedded Standard 7 operating systems
- Ready-to-use devices with optionally preinstalled software
  - HMI: Innovative HMI software WinCC flexible (incl. archives and recipes)
  - RTX: with real-time capable software PLC WinAC RTX
- Retentive memory on board (NV-RAM, usable with WinAC RTX)

SIMATIC HMI IPC577:
Industrial functionality and openness at an attractive price

- Full PC openness and performance boost with Intel Core2 Duo processors
- Rugged design for industrial use
- Can be expanded using a PCI slot and additional interfaces
- More rugged due to SSD (solid-state drive) or CompactFlash
- The configurator (best-fit for the customer) makes ordering more flexible
- Compact design

SIMATIC HMI IPC677: The high-end Panel PC – with maximum performance, functional scope and expansion capability

- Rugged, expandable industrial PC with different front panels
- Rugged design for industrial use
- Complete PC openness
- Optional PROFIBUS or PROFINET onboard
- All processors with dual core

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General data

2

Benefits

High degree of industrial capability

The entire construction is designed for purely industrial use. Thus, for example, a special vibration-absorbing suspension of the hard disk ensures operational reliability, even at high mechanical loads. This makes that the SIMATIC Panel PCs are designed for a vibration load of 1 g and a shock load of 5 g.

Performance

Thanks to the use of the latest Intel processors from ULV (Ultra Low Voltage) to Intel Core technology, SIMATIC Panel PCs are flexibly scalable for your application.

- Scalable computing power
- Highest computing power
- Latest Intel processor technology
- Core i, Dual Core, ULV, Atom

Investment security

High component continuity and guaranteed availability of spare parts for up to 5 years after product phase-out are ensured e.g. through the development and production of our own motherboards. This enables long-lasting machine concepts without renewed engineering effort.

Service-friendly device design

Upgrades and exchange of components are easy thanks to the device design.

Integrated interfaces

The different already-integrated interfaces allow for various communication and expansion options. Many models are already equipped with Gigabit Ethernet and PROFIBUS DP/MPI interface.

Expandability

Depending on the model, ISA, PCI, PCI Express, PC/104 Plus and PC/104 slots are available for individual expandability. This enables the further use of existing and new expansion cards.

Compact dimensions

Considering the desired expandability, SIMATIC Panel PCs have an extremely low mounting depth and can thus be used in very narrow installation locations.

Options

Various options enable an individual solution for your industrial application. Thus, the operator control unit can be operated separately from the computer unit by up to 30 m. The direct control key module increases the operating safety in that it can be used to run the process independently of the operating system and without delay directly on PROFIBUS DP/MPI.

Individually expandable system availability

- RAID1 configuration - high system stability through redundant data management
- SIMATIC IPC DiagMonitor – Monitoring of the operating states and early detection of problems locally and in the network
- SIMATIC IPC Image & Partition Creator – downtime minimization through preventive data backup
- SITOP and Masterguard power supply (UPS) – Bridging of voltage dips

Technical specifications

	SIMATIC IPC277D	SIMATIC IPC477D	SIMATIC HMI IPC477C	SIMATIC HMI IPC577C	SIMATIC HMI IPC677D [7]
Design					
Centralized configuration	•	•	•	•	•
Display					
Size	7"/9"/12"/15"/19" Widescreen TFT	12"/15"/19"/22" Widescreen TFT	12"/15"/19" TFT	12"/15"/19" TFT	22" Widescreen TFT
Resolution	800 x 480 / 800 x 480 / 1280 x 800 / 1280 x 800 / 1366 x 768	1280 x 800 / 1280 x 800 / 1366 x 768/ 1920 x 1080	800 x 600 / 1024 x 768 / 1280 x 1024	800 x 600 / 1 024 x 768 / 1 280 x 1 024	1 920 x 1 080
Operator controls					
Membrane keyboard	-	• [8]	• [1]	• [1]	-
Touch screen	•	•	•	•	•
General features					
Power supply 24 V DC / 110/240 V AC	•/-	•/-	•/-	•/•	•/•
Processor	• Intel Atom E640, 1.0 GHz; • Intel Atom E660, 1.3 GHz	• Intel Core i7-3517UE, 1.7 GHz, 4 MB SLC • Intel Core i3-3217UE, 1.6 GHz, 3 MB SLC • Intel Celeron 827E 1.4 GHz, 1.5 MB SLC	• Intel Celeron M 1.2 GHz • Intel Core2 Solo 1.2 GHz • Intel Core2 Duo 1.2 GHz	• Intel Celeron M 1.2 GHz • Intel Core2 Solo 1.2 GHz • Intel Core2 Duo 1.86 GHz	• Intel Xeon E3-1268L v3 (4C, 2.3 (3.3) GHz, HT, 8 MB cache, VT-d, AMT) • Intel Core i3-4330TE, (2C, 2.4 GHz, 4 MB cache, HT, VT-x) • Intel Celeron G1820TE (2C, 2.2 GHz, 2 MB cache)

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Techncal specifications (continued)

	SIMATIC IPC277D	SIMATIC IPC477D	SIMATIC HMI IPC477C	SIMATIC HMI IPC577C	SIMATIC HMI IPC677D [7]
Main memory	1 GB, 2 GB	1 GB, 2 GB, 4 GB, 8 GB	1 GB, 2 GB, 4 GB	1 GB, 2 GB, 4 GB	2 GB, expandable up to 16 GB, optional ECC
Expansion slots	1 x CF slot for CompactFlash card (externally accessible)	• 2 x CFast slot (externally accessible)	2 x CF slot for CompactFlash Card (internally and externally accessible)	• 1 x PCI [2] • 1 x CF slot for CompactFlash card (externally accessible)	• 2 x PCI or 1 x PCIe • 1 x PCI or • 2 x PCIe x16/x4
Operating system	• Windows Embedded Standard 2009 or XP Professional MUI • Windows Embedded Standard 7 (32-bit) or Windows 7 Ultimate MUI (32-bit)	• Without • Windows 7 Ultimate MUI (32-bit or 64-bit) • Windows Embedded Standard 7 (32-bit)	• Windows Embedded 2009 or XP Professional MUI • Windows 7 Ultimate MUI (32-bit) or Windows Embedded Standard 7 (32-bit)	• Without • Windows Embedded 2009 or XP Professional MUI	• Without • Windows 7 Ultimate 32-bit MUI • Windows 7 Ultimate 64-bit MUI
Interfaces					
PROFIBUS/MPI	-	•	•	•	•
PROFINET (RT/IRT)	• / -	• / •	• / •	• / •	• / •
Ethernet	2 x 10/100/1 000 Mbps	2 x 10/100/1 000 Mbps	2 x 10/100/1 000 Mbps	2 x 10/100/1 000 Mbps	2 x 10/100/1 000 Mbps
USB	•	•	•	•	•
Serial interface	•	•	•	•	•
Graphics interface	-	•	•	•	•
Ambient conditions					
Vibration load during operation	**1 g**	**1 g**	**1 g**	**1 g** [3]	**1 g** [3]
Shock loading during operation	**5 g**	**5 g**	**5 g**	**5 g** [3]	**5 g**
Permissible temperature during operation with maximum configuration	+0 °C … +50 °C [7]	+0 °C … +50 °C [7]	+0 °C … +50 °C [7]	+0 °C … +45 °C [7]	+5 °C … +45 °C [6] [8]
Power loss in maximum configuration					
7" display	27 W				
9" display	29 W				
12" display	34 W	55 W	40 W [4]	55 W [5]	
15" display	42 W	56 W	45 W [4]	57 W [5]	
19" display	45 W	65 W	60 W [4]	84 W [5]	
22" display		74 W			170 W [5]

• Available
- Not available

1) 12"/15" displays
2) All slots with card retainer
3) Valid with CF or SSD; with HDD: 5 g / 0.5 g;
4) 3 W taken into account for each PCI/PCIe slot
5) 15 W taken into account for each PCI/PCIe slot
6) +0 °C to +50 °C; max. +50 °C in installation space; max. 40 °C if at the front
7) +0 °C to +45 °C for 19"
8) 15" display optionally as Touch/Key version
9) With 12" and 15", vertical installation and use of CFast or SSD

More information

Additional information is available on the Internet at:

http://www.siemens.com/simatic-panel-pc

Note:

Do you need a specific modification or extension to the products described here? Then refer to "Customized Automation". There you will find information about additional and generally available sector-specific products as well as options for customer-specific modification and adaptation.

Examples are:

- Specific front panels for SIMATIC Panel PC, e.g. honing oil-resistant or with lateral function/movement keys
- SIMATIC HMI Net Panel with 46" large-scale display

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SIMATIC IPC277D

Overview



SIMATIC IPC277D:
The embedded Nanopanel PC – maintenance-free and compact with displays starting from 7"

- Offers great flexibility in the selection of rugged widescreen fronts
- From 7" to 19" for more freely configurable display area
- High resolution, large viewing angle, and up to 100% dimmable backlighting for a brilliant display with optimized power consumption
- Absolutely maintenance-free due to the use of CompactFlash and SSD as mass storage and fanless operation up to 50 °C ambient temperature
- Maximum industrial functionality due to non-volatile retentive memory
- Ready-to-use embedded bundles with visualization or/and control software

The following front installation versions are available:

- 7" Touch
- 9" Touch
- 12" Touch
- 15" Touch with USB interface on the front
- 19" Touch with USB interface on the front
- All fronts as widescreen version

Benefits

SIMATIC IPC277D Nanopanel PC

- Rugged, industry-standard widescreen displays (Touch) with 7" / 9" / 12" / 15"/ 19"
- High resolution, 16 million colors, large viewing angle, can be dimmed from 0 to 100% (this also optimizes the power consumption)
- Integrated front concept (Panel PC, Comfort Panels)
- Fanless up to 50 °C ambient temperature
- 15" / 19" with front USB interface available soon

High-performance data processing at low power consumption

- Intel Atom technology of the Power-Optimized family E6xx
- Wake-on-LAN for remote-controlled switching between standby and active state
- Support of Sleep States/SpeedStep -> (dynamic power adaptation depending on the required computing performance)
- Intel VT-x technology for virtualization

High degree of industrial functionality and flexibility for implementing the embedded solution

- Flexible memory concepts: CompactFlash or Solid-State Drive
- 2 Gbit Ethernet (teaming-capable); PROFINET with RT functionality (via Standard Ethernet)
- 3 high-speed USB 2.0 ports
- 1 RS232
- Ready-to-run embedded bundles with WinAC RTX2010 (F) and/or WinCC RT Advanced (optional)
- 512 KB retentive memory (MRAM), of which 128 KB can be written to within the buffer time (optional)

High system availability in order to reduce the risk of potential failures and maintenance costs

- Maintenance-free since there are no rotating parts (fans, HDD)
- Battery-free operation even if retentive memory option is selected (with time-of-day synchronization over network)
- Comprehensive self-diagnostics thanks to pre-installed local diagnostics software SIMATIC IPC DiagBase

High investment security in order to reduce engineering costs

- Long-term availability: Service & Support period of 8 – 10 years after market launch

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Technical specifications

	SIMATIC IPC277D
General features	
Processors	• Intel Atom E660 1.3 GHz, 2 GB RAM • Intel Atom E640 1.0 GHz, 1 GB RAM
Chipset	Intel Controller Hub EG20T
NVRAM optional	512 KB, of which 128 KB can be written within the buffer time
Operating system	• Windows Embedded Standard 2009 preinstalled, in combination with CF card of 2 GB or more, or solid-state drive, or hard drive (optional) • Windows XP Professional MUI (in connection with solid-state drive or hard drive; MUI: Multi Language User Interface (optional) • Windows Embedded Standard 7 32-bit, preinstalled, in combination with CF card or solid-state drive (optional) • Windows 7 Ultimate MUI 32-bit (in combination with solid-state drive; MUI: Multi Language User Interface (optional) • Linux [1] (project-specific, on request) Others on request project-specifically
Power supply	• 24 V DC (20.4 V ... 28.8 V) • Isolated • With buffering of temporary power failures: max. 10 ms • Line side switch • With power failure indication by means of Power Fail signal
Drives	
FlashDrive	Optional; replaceable, accessible, diagnosable • 2 GB • 4 GB • 8 GB • 16 GB
Solid-state drive (SSD)	Optional • 80 GB SATA, 2.5" • 160 GB SATA, 2.5"
CD/DVD/Floppy	Via USB (not included in scope of delivery)
Ports	
PROFINET	PROFINET RT via Standard Ethernet controller
Ethernet	• 2 x 10/100/1000 Mbps (RJ 45) • Two independent Intel Controllers: Intel 82574L / Intel Controller Hub EG20T With teaming function
USB	V2.0, 3 x
Serial	COM1 (V.24)
Keyboard	Via USB (not included in scope of delivery)
Mouse	Via USB (not included in scope of delivery)

	SIMATIC IPC277D
Monitoring functions	
Temperature	• Processor temperature • Motherboard Messages can be evaluated by the application program
Watchdog	• Monitoring of program execution • Monitoring time can be parameterized in software • Can be parameterized for a fault or restart Messages can be evaluated by the application program
Monitoring functions via the network	• DiagBase • SIMATIC IPC DiagMonitor Remote monitoring capability for: • Watchdog • Temperature • Mass memory monitoring (SMART) • System/Ethernet monitoring (Heart Beat) • Runtime meter Communication: • Ethernet interface (SNMP protocol) • OPC for integration in SIMATIC software • Configuration of client/server architectures • Structure of log files
Supply voltage	
Supply voltage	24 V DC
Monitoring functions	
Temperature	Yes
Watchdog	Yes
Mass storage	Yes
Ambient conditions	
Vibration load during operation	Requirements according to: IEC 61131-2, tested according to: IEC 60068-2-6, Test Fc 10-58: 0.0375 mm, 58-200: 9.8 m/s2, 10x /axis
Shock loading during operation	Requirements according to: IEC 61131-2, tested according to: IEC 60068-2-27, Test Ea, 50 m/s^2
Relative humidity	Tested in accordance with DIN IEC 68-78, DIN IEC 60068-2-30: 5% to 80% at 25 °C (no condensation)
Maximum permissible installation angle +/-	45° over vertical
Ambient temperature during operation	0 °C … +50° C in maximum configuration; no fan (19": 0 °C … +45 °C)
Certifications & standards	
Approvals	CE, cULus (508), marine approval available for 7"/9"/12" (GL, LRS, BV, DNV, ABS, ClassNK)
EMC	CE, FFC A, 55022A, EN 61000-6-4, EN 61000-6-2

[1] for specific LINUX versions in accordance with the specifications of the Siemens manufacturer's declaration "Suitable for LINUX", see http://www.siemens.com/simatic-pc/suited-for-linux
(LINUX is a trademark of Linus Torvald)

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Technical specifications (continued)

	SIMATIC IPC277D				
Front panel	**7" TFT Touch, widescreen**	**9" TFT Touch, widescreen**	**12" TFT Touch, widescreen**	**15" TFT Touch, widescreen**	**19" TFT Touch, widescreen**
Display					
Resolution (W x H in pixels)	800 x 480	800 x 480	1 280 x 800	1 280 x 800	1 366 x 768
General features					
Accessories	Touch pen, touch protective films	Touch pen, touch protective films	Touch pen, touch protective films	Touch pen, touch protective films	Touch pen, touch protective films
Type of operation					
Function keys	No	No	No	No	No
Alphanumeric keyboard	No	No	No	No	No
Touch screen (analog/resistive)	Yes	Yes	Yes	Yes	Yes
USB port on the front	No	No	No	Yes	Yes
Design					
Centralized configuration	Yes	Yes	Yes	Yes	Yes
Distributed configuration	No	No	No	No	No
Dimensions					
Mounting dimensions in centralized configuration (W x H x D) in mm	197 x 141 x 71	251 x 166 x 71	310 x 221 x 66	396 x 291 x 73	465 x 319 x 73
Operator control unit (W x H) in mm	214 x 158	274 x 190	330 x 241	415 x 310	483 x 337
Weight	1500 g	1950 g	2750 g	4000 g	5700 g
Max. power loss in maximum configuration	27 W	29 W	37 W	42 W	45 W

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Ordering data

	Article No.
SIMATIC IPC277D Nanopanel PC	**6AV7881- - A 0 0 -**
Interfaces: 2 x Gbit LAN (RJ45), 1 x serial (COM1), 3 x USB	
Operating unit	
• Touch 7" TFT	**1**
• Touch 9" TFT	**2**
• Touch 12" TFT	**3**
• Touch 15" TFT, front USB interface	**4**
• Touch 19" TFT, front USB interface	**5**
Processors / memory configuration / NVRAM	
• Atom E640 (1.0 GHz), 1 GB RAM	**A**
• Atom E640 (1.0 GHz), 1 GB RAM, NVRAM	**B**
• Atom E660 (1.3 GHz), 2 GB RAM	**E**
• Atom E660 (1.3 GHz), 2 GB RAM, NVRAM	**F**
Drives	
• Without drive, with CF slot	**0**
• 2 GB SIMATIC PC CompactFlash	**1**
• 4 GB SIMATIC PC CompactFlash	**2**
• 8 GB SIMATIC PC CompactFlash	**3**
• 16 GB SIMATIC PC CompactFlash	**4**
• 160 GB Solid-State Drive SATA	**6**
• 80 GB Solid-State Drive SATA	**8**
Operating system	
• Without operating system	**A**
• WES 2009 preinstalled (CF from 2 GB/SSD)	**B**
• XP-Prof. MUI preinstalled on SSD	**C**
• WES 7 32 bit preinstalled (CF from 4 GB/SSD)	**D**
• Windows 7 MUI 32 bit preinstalled on SSD	**E**
Software bundles	
• Without RTX/HMI software	**A**
• RTX: WinAC RTX 2010	**B**
• RTX-F: WinAC RTX F 2010	**C**
• HMI: WinCC RT Advanced 128 PT	**F**
• HMI: WinCC RT Advanced 512 PT	**G**
• HMI: WinCC RT Advanced 2048 PT	**H**
• HMI/RTX: RT 128 PT	**M**
• HMI/RTX: RT 512 PT	**N**
• HMI/RTX: RT 2048 PT	**P**
• HMI/RTX-F: RT 128 PT	**R**
• HMI/RTX-F: RT 512 PT	**S**
• HMI/RTX-F: RT 2048 PT	**T**

	Article No.
Accessories	
Touch protective films 7" [1]	**6AV2124-6GJ00-0AX0**
Touch protective films 9" [1]	**6AV2124-6JJ00-0AX0**
Touch protective films 12" [1]	**6AV2124-6MJ00-0AX0**
Touch protective films 15" [1]	**6AV2124-6QJ00-0AX1**
Touch protective films 19" [1]	**6AV2124-6UJ00-0AX1**
Bracket clamp, long for 15", 19" and 22" widescreen, Comfort Panels, IPC, Flat Panel monitors and Thin Client (except SCD1900 19" widescreen)	**6AV6671-8XK00-0AX4**
Touch pen Captive pen for operation of the touch devices, mounting of the support on the control cabinet or directly on the PRO unit	**6AV7672-1JB00-0AA0**

[1] 10 units per packing unit

Please be sure to note:

The IPC277D with bundled software is always supplied with inserted CF card.
The licenses are on the supplied USB flash drive.

More information

Further information can be found on the Internet at:

http://www.siemens.com/simatic-panel-pc

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SIMATIC IPC477D

2

Overview



SIMATIC IPC477D:
The powerful embedded Panel PC – maintenance-free with versatile configuration

- 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 even the harshest mechanical stress and is extremely reliable in operation
- Compact design
- Battery-independent retentive memory onboard
- High degree of investment security
- Fast integration capability

The following front versions are available:

- Built-in versions
  - 12" TFT Touch
  - 15" TFT Touch
  - 15" TFT Touch/Key
  - 19" TFT Touch
  - 22" TFT Touch
  - 19" TFT Multi-Touch
  - 22" TFT Multi-Touch

Benefits

- Excellent industrial compatibility due to rugged construction, even when subjected to extreme vibration and shock
- High degree of investment protection thanks to assured availability of spare parts for a period of 5 years following the end of active marketing
- Excellent continuity of components for machine concepts with a long service life without any new engineering costs
- Cost and time savings due to service-friendly device design:
  - Front and rear USB 2.0 ports for quick and easy connection of additional hardware components
- High degree of industrial functionality thanks to integral PROFIBUS DP/MPI and PROFINET interfaces
- Maintenance-free due to lack of rotating components (fan and hard disk)
- High flexibility thanks to expansions (optional) such as PCIe, second RS 232, DVD (not with 12" TFT Touch)
- Minimization of downtimes thanks to high system availability
  - Efficient self-diagnostics (DiagBase and SIMATIC IPC DiagMonitor)
  - High reliability and security of an embedded platform
- An integral component of Totally Integrated Automation (TIA):
  - Enhanced productivity, minimization of engineering costs, reduction of lifecycle costs
- Supply of ready-to-run complete solutions (the software is preinstalled and preconfigured) for visualization and automation in combination with WinCC flexible, WinCC RT Advanced and/or WinAC RTX and WinCC.

Technical specifications

	SIMATIC IPC477D
General features	
Supply voltage[1]	• 24 V DC (-20 % / +20 %) [1] • 100 - 240 V AC (-15 % / +20 %); 50 - 60 Hz
Brief voltage interruption in accordance with NAMUR	• Min. 20 ms (DC) • Min. 20 ms (AC); max. 10 events per hour; min. 1 s recovery time
Power consumption (DC) of devices (without expansions):	
• 12" display	55 W
• 15" display	56 W
• 19" display	65 W
• 22" display	74 W
Additional power consumption of devices with expansions:	
• DVD drive	1 W
• PCIe card	5 W

	SIMATIC IPC477D
Processor	• Intel Celeron 827E 1.4 GHz; 1.5 MB SLC or • Intel Core i3-3217UE 1.6 GHz; 3 MB SLC or • Intel Core i7-3517UE 1.7 GHz; 4 MB SLC
Main memory	• SO-DIMM module; 1024 MB DDR3-SDRAM or • SO-DIMM module; 2048 MB DDR3-SDRAM or • SO-DIMM module; 4096 MB DDR3-SDRAM or • SO-DIMM module; 8192 MB DDR3-SDRAM
Buffer memory [2]	512 KB MRAM

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Technical specifications (continued)

	SIMATIC IPC477D
Drive and storage media	
SATA drive	1 slot
Solid-state drive	• 1 x ≥ 80 GB; 2.5" SATA-SSD, standard or • 1 x ≥ 160 GB; 2.5" SATA-SSD, standard
Hard disk drive (HDD)	• 1 x ≥ 250 GB, 2.5"-SATA-HD
CFast card	• 2 GB or • 4 GB or • 8 GB or • 16 GB
DVD drive, RW	1 slot for devices with expansion
Graphics	
Display, resolution	• 12" screen diagonal with LED backlighting, resolution 1 280 x 800 pixels, WXGA (Wide XGA) • 15" screen diagonal with LED backlighting, resolution 1 280 x 800 pixels, WXGA (Wide XGA) • 19" screen diagonal with LED backlighting, resolution 1 366 x 768 pixels • 22" screen diagonal with LED backlighting, resolution 1 920 x 1 080 pixels
Touch controller	Analog-resistive or capacitive touch
Backlighting (MTBF)	LED
Half brightness life time, typical	Min. 50 000 h at 50 °C, 50 % brightness
Graphics controller	• Intel HD 2000 or • Intel HD 4000
Graphics memory	• 32 … 512 MB shared memory
Resolutions, frequency, colors	• DVI-I: 640 x 480 … 1 920 x 1 200, 60 Hz • DP display port: 1 920 x 1 200, 60 Hz
Interfaces	
COM 1 and COM 2	RS 232, max. 115 kbps, 9-pin, sub-D connector
DVI	Connection of VDUs with DVI connection
Display port (DPP)	Connection of VDUs with DPP connection
Keyboard	Connection via USB port
Mouse	Connection via USB port
USB	• Rear of device: 4 x USB 3.0, max. 2 high-current at the same time • Front of device (only with IPC477D with 15", 19" or 22" display): 1 x USB 2.0, high-current
PROFIBUS/MPI	9-pole, 2 rows, electrically isolated, Sub-D socket, compatible with CP 5622
• Transmission rate	9.6 Kbps … 12 Mbps
• Operating modes	DP master: DP-V0, DP-V1 with SOFTNET-DP DP slave: DP-V0, DP-V1 with SOFTNET-DP slave
PROFINET	3 x RJ45 interface, CP 1616 compatible onboard interface based on ERTEC 400 10/100 Mbps, electrically isolated

	SIMATIC IPC477D
Ethernet [3]	• 2 x RJ45 connection, Intel 82579LM and Intel 82574L 10/100/1000 Mbps, electrically isolated, teaming-capable [4] or • For PROFINET versions: 1 x Ethernet
Slot for PCIe expansion cards	Only for device with expansions: 1 x PCIe-x4 expansion card can be used, max. permissible power loss: 5 W
Degree of protection	
Degree of protection	• IP 20 to IEC 60529 (enclosure) • IP 65 (front)
Quality assurance	In accordance with ISO 9001
Electromagnetic compatibility	
Emitted interference S	EN 61000-6-4; CISPR 22 Class A; FCC Class A
Immunity with regard to conducted interference on the supply lines	• ± 2 kV to IEC 61000-4-4; burst • ± 1 kV to IEC 61000-4-5; surge symmetrical • ± 2 kV to IEC 61000-4-5; surge asymmetrical
Noise immunity on signal lines	• ± 2 kV to IEC 61000-4-4; burst, length > 3 m • ± 1 kV to IEC 61000-4-4; burst, length < 3 m • ± 2 kV to IEC 61000-4-5; symmetrical surge, length > 30 m
Immunity to static discharge	• ± 6 kV, contact discharge at the front to IEC 61000-4-2 • ± 4 kV contact discharge at the rear to IEC 61000-4-2 • ± 8 kV air discharge to IEC 61000-4-2
Immunity to high radio frequency interference	• 10 V/m, 80 … 1000 MHz 80 % AM to IEC 61000-4-3 • 1 V/m, 2 … 2.7 GHz • 3 V/m, 2 … 2.7 GHz • 10 V, 10 kHz … 80 MHz to IEC 61000-4-6
Immunity to magnetic fields	• 100 A/m, 50/60 Hz to IEC 61000-4-8
Weight	
• IPC477D, touch device, 12" display	approx. 3 200 g
• IPC477D, touch device, 15" display	approx. 4 920 g
• IPC477D, touch/key device (without expansions), 15" display	approx. 5 750 g
• IPC477D, touch device, 19" display	approx. 6 400 g
• IPC477D, touch device, 22" display	approx. 7 000 g

1) The generation of the supply voltage by the line-side power supply must be realized as safety extra-low voltage with safe electrical isolation, isolated according to IEC 60364 4 41, or as SELV according to IEC/UL/EN/DIN-EN 60950-1.

2) For devices with retentivity

3) For unambiguous labeling, the Ethernet ports are numbered on the enclosure. The numbering by the operating system can differ.

4) Teaming can be set and initiated in the configuration interface. In teaming operation, jumbo frames, e.g. for the camera application, are not supported

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SIMATIC IPC477D

Ordering data

SIMATIC IPC477D [1]	Article No. 6AV7240 -						-				
Processor and fieldbus:											
• Celeron U827E (1C/1T, 1.4 GHz, 1.5 MB cache); 2 x Gigabit Ethernet (IE/PN)		**0**									
• Celeron U827E (1C/1T, 1.4 GHz, 1.5 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		**1**									
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN)		**3**									
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		**4**									
• Core i3-3217UE (2C/4T, 1.6 GHz, 3 MB cache); 1 x Gigabit Ethernet (IE/PN); 1 x PROFINET (IRT, 3 ports)		**5**									
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN)		**6**									
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 2 x Gigabit Ethernet (IE/PN); PROFIBUS DP12		**7**									
• Core i7-3517UE (2C/4T, 1.7 (2.8) GHz, 3 MB cache); 1 x Gigabit Ethernet (IE/PN); 1 x PROFINET (IRT, 3 ports)		**8**									
Operator control unit:											
• 12" Touch (1 280 x 800) (caution, restrictions regarding options: HDD, PCI, AC, DVD)			**A**								
• 15" Touch (1 280 x 800) with front USB			**B**								
• 15" Touch/Key (1 280 x 800) with front USB			**C**								
• 19" Touch (1 366 x 768) with front USB			**D**								
• 22" Touch (1 920 x 1 080) with front USB			**E**								
• 19" Multi-Touch (1 366 x 768) without front USB			**K**								
• 22" Multi-Touch (1 920 x 1 080) without front USB			**L**								
Main memory/NVRAM											
• 1 GB				**A**							
• 2 GB				**B**							
• 4 GB				**C**							
• 8 GB				**D**							
• 1 GB and NVRAM				**J**							
• 2 GB and NVRAM				**K**							
• 4 GB and NVRAM				**L**							
• 8 GB and NVRAM				**M**							
Expansions/interface:											
• 1 x RS 232, without PCIe					**0**						
• 1 x RS 232 and 1 x PCIe					**1**						
• Second RS 232, without PCIe					**3**						
• Second RS 232 and 1 x PCIe					**4**						
Operating system:											
• Without operating system						**0**					
• Windows Embedded Standard 7 Professional, 32-bit, MUI						**3**					
• Windows Embedded Standard 7 SP1, English, 32-bit						**4**					
• Windows Embedded Standard 7 SP1, English, 64-bit						**5**					
• Windows 7 Ultimate SP1, 32-bit, MUI (Eng, Ger, Fr, It, Sp)						**6**					
• Windows 7 Ultimate SP1, 64-bit, MUI (Eng, Ger, Fr, It, Sp)						**7**					

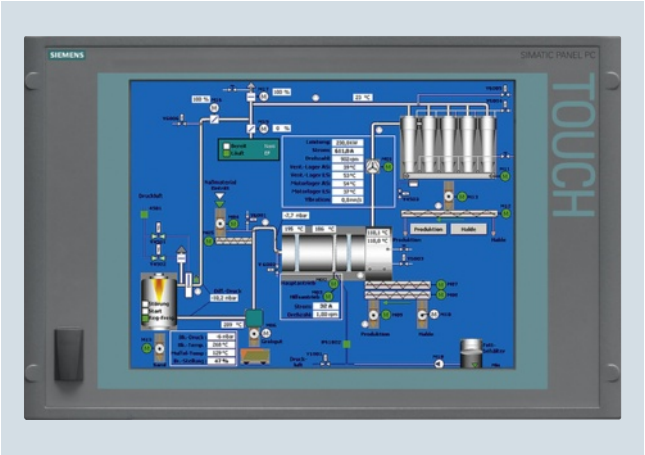
SIMATIC IPC477D [1]	Article No. 6AV7240 -						-				
Externally accessible mass storage (without operating system):											
• Without external mass storage							**0**				
• CFAST 2 GB, without software							**1**				
• CFAST 4 GB							**2**				
• CFAST 8 GB							**3**				
• CFAST 16 GB							**4**				
• DVD							**6**				
Internal mass storage:											
• Without internal mass storage								**A**			
• CFAST 2 GB								**B**			
• CFAST 4 GB								**C**			
• CFAST 8 GB								**D**			
• CFAST 16 GB								**E**			
• SSD 80 GB Standard								**H**			
• HDD 250 GB								**K**			
• DVD								**L**			
• SSD 80 GB standard with DVD								**N**			
• SSD 160 GB standard without DVD								**P**			
• HDD min. 250 GB with DVD								**Q**			
SIMATIC software preinstalled (bundles):											
• Without SIMATIC software									**A**		
• WinAC RTX 2010 [2]									**B**		
• WinCC RT Advanced 128 PT									**C**		
• WinCC RT Advanced 512 PT									**D**		
• WinCC RT Advanced 2 048 PT									**E**		
• WinCC RT Advanced 4 096 PT									**F**		
• WinCC RT Advanced 128 PT, WinAC RTX [2]									**J**		
• WinCC RT Advanced 512 PT, WinAC RTX [2]									**K**		
• WinCC RT Advanced 2 048 PT, WinAC RTX [2]									**L**		
• WinCC RT Advanced 4 096 PT, WinAC RTX [2]									**M**		
• WinAC RTX 2010 F [2]									**N**		
• WinCC RT Advanced 128 PT, WinAC RTX F [2]									**P**		
• WinCC RT Advanced 512 PT, WinAC RTX F [2]									**Q**		
• WinCC RT Advanced 2 048 PT, WinAC RTX F [2]									**R**		
• WinCC RT Advanced 4 096 PT, WinAC RTX F [2]									**S**		
• WinCC RT Professional Client/single-user station 128 PT									**Y**		
Power supply:											
• 24 V DC industrial power supply										**0**	
• 110/230 V AC industrial power supply with Namur; no power cable										**1**	
• 110/230 V AC industrial power supply with Namur; European power cable										**2**	
• 110/230 V AC industrial power supply with Namur; US power cable										**3**	
• 110/230 V AC industrial power supply with Namur; Chinese power cable										**4**	
• 110/230 V AC industrial power supply with Namur; Italian power cable										**5**	
• 110/230 V AC industrial power supply with Namur; Swiss power cable										**6**	
• 110/230 V AC industrial power supply with Namur; UK power cable										**7**	
• 24 V DC industrial power supply and TPM (not for China and Russia)										**8**	

[1] Built to order versions with a delivery time of max. 15 working days and with identified repair.

[2] Only with main memory and NVRAM.

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Overview



Rugged, expandable industry PC for demanding tasks in the area of PC-based automation with various control units (front panels):

- Rugged and compact design for industrial use
- Full PC openness
  - Windows Embedded Standard or Windows XP Professional, or without operating system
  - CF card, HDD, SSD
  - DVD drive
- Expandable using a PCI slot
- Optionally with PROFIBUS or PROFINET (RT/IRT) onboard
- Installation-compatible with Panel PC 577B
  - Touch screen control units with 12", 15" and 19" TFT display
  - 12" and 15" TFT Key
- High degree of investment protection

Benefits

- High performance due to powerful processor
- Low-cost entry-level industry PC with full PC openness.
- Ideal for applications in industrial environments due to
  - Excellent operational reliability – even when subjected to extreme vibration and shock
  - High degree of chemical resistance to oils and grease
  - Smooth front, therefore no dirt can accumulate
  - Brilliant displays for good clearness of display, even when lighting conditions and viewing angles change.
- High degree of investment protection due to
  - A long marketing period (4-6 years) and high continuity of components for long-term machine concepts
  - Assured availability of spare parts (for a period of 5 years following the end of active marketing)
  - Simple migration from the predecessor product with minimum engineering overhead
  - Same installation dimensions as predecessor
  - Early detection of faults and minimized downtimes due to self-diagnostics (DiagBase)
- High level of flexibility due to
  - Expandable by the customer thanks to diverse interfaces (PCI, CompactFlash, Gbit Ethernet, and others)
  - USB interfaces on the front and rear for quick and easy connection of additional hardware components
  - User-friendly and easy integration in the fieldbus level, thanks to integrated PROFIBUS DP/MPI and 2 Gigabit Ethernet interfaces (onboard)

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Technical specifications

	6AV7885-0....-.... SIMATIC HMI IPC577C	6AV7885-1....-.... SIMATIC HMI IPC577C	6AV7885-2....-.... SIMATIC HMI IPC577C	6AV7885-3....-.... SIMATIC HMI IPC577C	6AV7885-5....-.... SIMATIC HMI IPC577C
Operator control and monitoring					
Accessory components	Touch protective foil	Slide-in keyboard labels	Touch protective foil	Slide-in keyboard labels	Touch protective foil
Display					
Screen diagonal	12 in	12 in	15 in	15 in	19 in
Resolution (pixels)					
• Resolution (WxH in pixel)	800 x 600	800 x 600	1024 x 768	1024 x 768	1280 x 1024
General features					
• Front panel	12" TFT touch display	12" TFT Key	15" TFT touch display	15" TFT Key	19" TFT Touch
Backlighting					
• MTBF backlighting (at 25 °C)	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours	about 50,000 hours
Control elements					
Function keys	No	36	No	36	No
Mouse, at front	No	Yes	No	Yes	No
Keyboard fonts					
• alphanumeric keyboard	No	Yes	No	Yes	No
Touch operation					
• Design as touch screen	Yes	No	Yes	No	Yes
Installation type/mounting					
central design	Yes	Yes	Yes	Yes	Yes
distributed design	No	No	No	No	No
Power loss					
Power loss in full configuration	24V DC: Max. 80 W (incl. USB interfaces)	24V DC: Max. 80 W (incl. USB interfaces)	24V DC: Max. 80 W (incl. USB interfaces)	24V DC: Max. 80 W (incl. USB interfaces)	24V DC: Max. 80 W (incl. USB interfaces)
Dimensions					
Mounting cutout/device depth (W x H x D)	368 mm x 290 mm x 115 mm	450 mm x 290 mm x 115 mm	450 mm x 290 mm x 120 mm	450 mm x 321 mm x 115 mm	450 mm x 380 mm x 125 mm
additional mounting depth (optical drive)	23 mm	23 mm	23 mm	23 mm	23 mm
Weights					
Panel PC in central design, approx.	8.1 kg	8.6 kg	9 kg	9.3 kg	11.6 kg

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Ordering data

SIMATIC HMI IPC577C	Article No. 6AV7885 -						-				
Front Panels											
• 12" TFT Touch		0									
• 12" TFT Key		1									
• 15" TFT Touch		2									
• 15" TFT Key		3									
• 19" TFT Touch		5									
Mainboards (processor with fieldbus interfaces)											
• Celeron M 1.2 GHz, 1 MB cache, 800 MHz FSB											
- with PROFINET (Industrial Ethernet); 2x LAN 1 Gbps			A	A							
• Core2 Solo 1.2 GHz, 3 MB cache, 800 MHz FSB											
- with PROFINET (Industrial Ethernet), 2x LAN 1 Gbps			A	D							
- with PROFIBUS DP12/MPI (CP5611-compatible), 2x LAN 1 Gbps			A	E							
- with PROFINET (RT/IRT) 3 ports, 1x LAN 1 Gbps			A	F							
• Core2 Duo 1.86 GHz, 6 MB cache, 1 066 MHz FSB											
- with PROFINET (Industrial Ethernet), 2x LAN 1 Gbps			A	K							
- with PROFIBUS DP12/MPI (CP5611-compatible), 2x LAN 1 Gbps			A	L							
- with PROFINET (RT/IRT) 3 ports, 1x LAN 1 Gbps			A	M							
RAM											
• 1 GB RAM, DDR3					1						
• 2 GB RAM, DDR3					2						
• 4 GB RAM, DDR3					3						
Second mass storage and/or drive (formatted without operating system)											
• No second mass storage/drive						0					
• DVD-RW drive						1					
• HDD + DVD-RW drive						2					
• SSD 50 GB High Endurance+ DVD-RW drive						3					
• SSD 80 GB Standard+ DVD-RW drive						4					
• SSD 50 GB High Endurance						6					
• SSD 80 GB Standard						7					
• HDD min. 250 GB						8					
First mass storage (formatted, optionally with operating system)											
• without							0				
• HDD min. 250 GB (not if 2nd mass storage HDD or SSD)							1				
• 2 GB CompactFlash							2				
• 4 GB CompactFlash							3				
• 8 GB CompactFlash							4				
• 16 GB CompactFlash							5				
• SSD 50 GB High Endurance (not if 2nd mass storage HDD or SSD)							6				
• SSD 80 GB Standard (not if 2nd mass storage HDD or SSD)							7				

SIMATIC HMI IPC577C	Article No. 6AV7885 -						-				
Operating system (pre-installed on first mass storage)									A		
• Without operating system									A		
• Windows Embedded Standard									B		
• Windows XP Professional Multi-Language [1]									D		
• Windows Embedded Standard 7									E		
• Windows 7 Ultimate Multi-Language [1]									G		
Expansion (software)										A	
• Without expansion										A	
• IPC DiagMonitor V4.3 enclosed										B	
• IPC Image & Partition Creator										C	
• IPC DiagMonitor V4.3 and Image & Partition Creator V3.2 enclosed										D	
Power supply											
• 100/240 V AC industrial power supply with Namur											1
• 100/240 V AC industrial power supply with Namur; power cable for Europe											2
• 100/240 V AC industrial power supply with Namur; power cable for the USA											3
• 100/240 V AC industrial power supply with Namur; CN power cable											4
• 100/240 V AC industrial power supply with Namur; IT power cable											5
• 100/240 V AC industrial power supply with Namur; CH cable											6
• 100/240 V AC industrial power supply with Namur; UK cable											7
• 24 V DC industrial power supply											8

[1] Multi-Language means: D/E/F/I/SP/CHIN traditional/CHIN simplified/ Korean/Japanese

Note:

Software Packages with SIMATIC WinCC flexible, SIMATIC WinCC and SIMATIC WinAC RTX (F) can be ordered together with the SIMATIC IPC with a price advantage.

More information under "Embedded Bundles / Packages for industrial PCs".

Accessories

Protective film for SIMATIC HMI IPC577C For protecting the touch screen against dirt/scratches, set of 10	
• for 12" Touch	**6AV7671-2BA00-0AA0**
• for 15" Touch	**6AV7671-4BA00-0AA0**
• for 19" Touch	**6AV7672-1CE00-0AA0**
Labeling strips for Key devices For labeling soft keys and function keys, blank, supplied in sets of 10	**6AV7672-0DA00-0AA0**
Touch pen Captive pen for operation of the touch devices, mounting of the support on the control cabinet	**6AV7672-1JB00-0AA0**
Expansion components	See catalog ST 80 / ST PC

More information

Additional information is available in the Internet under:
http://www.siemens.com/simatic-panel-pc

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SIMATIC IPC677D

Overview



IPC 677D front view

SIMATIC IPC677D: The high-end Panel PC – with maximum performance, functional scope and expansion capability

Rugged construction: The PC is resistant to even the harshest mechanical stress and is reliable in operation.

- Compact design
- High degree of investment protection
- Fast integration capability
- Widescreen front panel versions:
  - 22" Touch (other front panels available soon: 15", 19" Touch and 15", 19" and 22" Multi-Touch)

Benefits

- Excellent industrial compatibility due to rugged construction, even when subjected to extreme vibration and shock
- High degree of investment protection thanks to assured availability of spare parts (for a period of 5 years following the end of active marketing)
- Excellent continuity of components for machine concepts with a long service life without any new engineering costs
- Savings in time and costs due to service-friendly equipment construction:
  - Operator control unit and computer unit are easy to separate for speedy component replacement
  - Front and rear USB 3.0 interfaces for quick and easy connection of additional hardware components
- High degree of industrial functionality thanks to integrated PROFIBUS DP/MPI or PROFINET (CP 1616-compatible) and 2 Gigabit Ethernet interfaces
- 2 x ≥ 250 GB SATA hard disk system (configured as single-disk system or RAID1)
- 240 GB SSD as rugged and high-speed hard disk substitute
- Reduction in downtimes through high system availability
- Minimized energy consumption thanks to support for Wake-On-LAN, shutdown or dimming of the display during operation, and use of Notebook components
- Efficient self-diagnostics (SIMATIC IPC DiagMonitor or DiagBase):
  Solutions for preventive data backup
- Integral component of Totally Integrated Automation (TIA): increases productivity, minimizes the engineering outlay, reduces the lifecycle costs

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Technical specifications

	6AV7260-…
General features	
Processor	• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT) • Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x) • Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache)
Main memory	2 GB, optionally 4, 8 or 16 GB, or 8 or 16 GB with ECC
Free slots for expansions	• 2 x PCI (slot with card retainer) or • 1 x PCI and 1 x PCIe x16 or • 1 x PCIe x16 and 1 x PCIe x4
Operating system	Windows 7 Ultimate 32-bit or 64-bit
Power supply	24 V DC or 110/240 V AC (autorange), 50/60 Hz
MTBF backlighting	Typ. 80 000 h (at 24 h continuous operation, temperature-dependent)
Drives	
Optical drives	Optional DVD±RW±R combo drive, at the rear, operable from the side
Hard disk/mass storage	• 3.5" SATA hard disk ≥ 250 GB; • optional 3.5" SATA hard disk ≥ 500 GB, • Dual hard disk module 2 x ≥ 250 GB SATA as single disk configuration or RAID1 preconfigured, • 240 GB SSD (solid-state drive)
Interfaces	
Graphics interface	DVI-I and DisplayPort
Connection for keyboard/mouse	USB / USB
Serial interface	COM1: 1 x V.24 (RS232)
PROFIBUS DP/MPI	Onboard (optional), isolated, max. 12 Mbit/s, compatible with CPC5622, not upgradeable
PROFINET (IRT)	Onboard (optional), 3 x RJ 45, CPC1616-compatible, not upgradeable
PROFINET (IE), Ethernet	Onboard, 2 x 10/100/1000 Mbit
USB	1 x on front, 4 x on rear, USB 3.0 (500 mA)
Audio	Possible via USB (external)
Multimedia	No

	6AV7260-…
Monitoring functions	
Temperature	Yes
Watchdog	Yes
Ambient conditions	
Degree of protection	Front: IP65, Rear: IP20
Vibration load during operation	Tested according to DIN IEC 60068-2-6: 10 - 58 Hz: 0.075 mm, 58 to 500 Hz: 10 m/s² (1 g) [1]
Shock loading during operation	Tested to DIN IEC 60068-2-27, IEC 60068-2-29: 50 m/s² (5 g), 30 ms, 100 shocks
EMC	CE, FCC A, EN 61000-6-4, EN 61000-6-3, CISPR22
Ambient temperature during operation	• 5 °C … +45 °C in maximum configuration
Relative humidity	Tested according to DIN IEC 60068-78, DIN IEC 60068-2-30: 5% to 80% at 25 °C (no condensation)
Maximum permissible installation angle +/-	20° over vertical
Certifications & standards	
Approvals	CE, cULus(508), FCC, KC, C-Tick
Expansion components	Uninterruptible power supply (UPS), SIMATIC NET communication modules, SIMATIC IPC DiagMonitor, SIMATIC IPC Image & Partition Creator, SIMATIC IPC USB FlashDrive

[1] Valid with SSD; with HDD: 5 g/0.5 g

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SIMATIC IPC677D

Ordering data — Article No.

SIMATIC IPC677D
(Production and delivery as per order)

SIMATIC IPC677D	6AV7260 -						- 0			
HD graphics onboard; 2 x Gigabit Ethernet (IE/PN) RJ45; 4 x USB V3.0; 1x serial (COM1); RAID controller onboard; watchdog, temp./fan monitoring										
Operating unit										
• 22" Touch (1 920 x 1 080)		2								
Processor										
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache);			A							
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM;			B							
• Celeron G1820TE (2C/2T, 2.2 GHz, 2 MB cache); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM;			C							
• Core i3-4330TE(2C/4T, 2.4 GHz, 4 MB cache, VT-x);			D							
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM;			E							
• Core i3-4330TE (2C/4T, 2.4 GHz, 4 MB cache, VT-x); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM;			F							
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT);			G							
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFIBUS/MPI (CP 5622-compatible); 2 MB battery-backed SRAM;			H							
• Xeon E3-1268Lv3 (4C/8T, 2.3 (3.3) GHz, 8 MB cache, VT-d, AMT); PROFINET (IRT, 3 ports, CP 1616-compatible); 2 MB battery-backed SRAM.			J							
Drives										
• 250 GB HDD SATA;				A						
• 250 GB HDD SATA; DVD+/-RW;				B						
• 500 GB HDD SATA;				D						
• 500 GB HDD SATA; DVD+/-RW;				E						
• RAID1 2 x 250 GB SATA (2.5");				G						
• RAID1 2 x 250 GB SATA (2.5"); DVD+/-RW;				H						
• Solid-state drive 240 GB;				M						
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5")				N						
• Solid-state drive 240 GB; 250 GB HDD SATA (2.5"); DVD+/-RW;				P						
• Solid-state drive 160 GB.				Y						

SIMATIC IPC677D	6AV7260 -						- 0			
Memory configuration										
• 2 GB DDR3 1600 DIMM;					1					
• 4 GB DDR3 1600 DIMM;					2					
• 8 GB DDR3 1600 DIMM;					3					
• 16 GB DDR3 1600 DIMM;					4					
• 8 GB DDR3 1600 DIMM; ECC;					5					
• 16 GB DDR3 1600 DIMM; ECC.					6					
Expansions (HW)										
• 2 x PCI;						0				
• 1 x PCIe (x16); 1 x PCI;						1				
• 1 x PCIe (x16); 1 x PCIe (x4).						2				
2. Expansions (HW)										
• Without expansion (HW)							0			
• 2 x USB in addition (1 slot occupied)							1			
• COM2; LPT (1 slot occupied)							2			
• 2 x USB in addition (1 slot occupied); COM2; LPT (2 slots occupied).							3			
Operating system										
• Windows 7 Ultimate, 32-bit SP1, MUI (Eng, Ger, Fr, It, Sp);								A		
• Windows 7 Ultimate, 64-bit SP1, MUI (Eng, Ger, Fr, It, Sp);								B		
• without.								X		
expansions (SW)										
• SIMATIC IPC DiagMonitor V4.x enclosed;									A	
• SIMATIC IPC Image & Partition Creator V3.x enclosed;									B	
• SIMATIC IPC DiagMonitor V4.x, Image & Partition Creator V3.x enclosed;									C	
• without;									X	
• TPM module; (not for China and Russia).									Y	
Country-specific version/ power supply										
• 110/230 V AC industrial power supply with NAMUR; European power cable;										0
• 110/230 V AC industrial power supply with NAMUR; UK power cable;										1
• 110/230 V AC industrial power supply with NAMUR; power cable for Switzerland;										2
• 110/230 V AC industrial power supply NAMUR; US power cable;										3
• 110/230 V AC industrial power supply NAMUR; power cable for Italy;										4
• 110/230 V AC industrial power supply with NAMUR; power cable for China;										5
• 24 V DC industrial power supply.										6

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Ordering data

	Article No.
Accessories	
Memory expansion	
• 2 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM	**6ES7648-2AJ70-0MA0**
• 8 GB DDR3 1600 SDRAM, DIMM, ECC	**6ES7648-2AJ70-1MA0**
Non-heating apparatus cable for SIMATIC Box and Panel PC	
SIMATIC PC power cable, 230 V AC, angled, 3 m, for:	
• Germany	**6ES7900-1AA00-0XA0**
• United Kingdom	**6ES7900-1BA00-0XA0**
• Switzerland	**6ES7900-1CA00-0XA0**
• USA	**6ES7900-1DA00-0XA0**
• Italy	**6ES7900-1EA00-0XA0**
• China	**6ES7900-1FA00-0XA0**
Touch pen	**6AV7672-1JB00-0AA0**
Captive pen for operation of the touch devices, mounting of the support on the control cabinet	
Expansion components	See catalog ST 80 / ST PC

More information

Additional information is available on the Internet at:

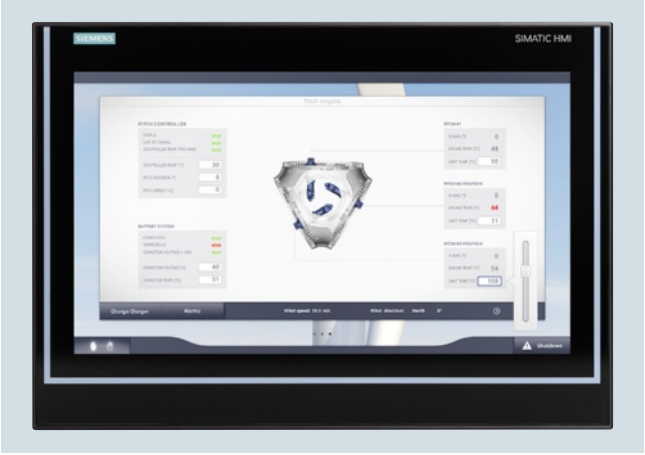
http://www.siemens.com/simatic-panel-pc

Note

Do you need a specific modification or option for the products described here? Under "Customized products", you will find information about additional sector-specific products that can be ordered as well as about options for customer-specific modification and adaptation.

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Overview



SIMATIC IFP1900 MT Flat Panel Monitor – industrial monitors with innovative multi-touch operation and brilliant display for the next generation of operating concepts.

- Installation:
  - Equally suited to installation in machines, control cabinets, consoles, and gantries or in 19" racks
- Operator input options:
  - Innovative projected capacitive touch technology (PCT)
  - Optimized touch technology for industrial requirements with multi-touch operation
  - High protection against incorrect operation thanks to detection and filtering out of ball of hand, drops of water, and cleaning operations

Benefits

- Detection of 5 fingers simultaneously with high touch resolution for exact operation
- Can also be used as a single touch device
- Intelligent detection of operator errors (e.g. detection of ball of hand, detection of drops, contamination, etc.)
- Touch operation without pressure
- Pleasing tactile feedback during operation
- Anti-glare surface for good readability from large viewing angle
- Operation possible with appropriate work gloves
- High-quality and modern front design
- Widescreen display for clear GUI design
- Sharp and high-contrast displays, LED backlighting for uniform brightness improves readability
- High shock and vibration resistance as well as high electro-magnetic compatibility ensure failure safety and a long service life
- All-round metal frame protects glass edge from mechanical damage
- Software support
  - Individual programming using the tablet functions of Windows 7/8
  - SIMATIC WinCC V7.2 with Windows 7
  - SIMATIC WinCC Version 12.5 or higher
- Long service life

Technical specifications

	6AV7 466-7TB01-0AA0 **IFP1900 MT**
General information	
Short designation	Flat Panel 19" Multitouch ext.
Display	
Screen diagonal	18.5 in
Screen diagonal (cm)	47 cm
Display width	409.8 mm
Display height	230.4 mm
visible area (HxV) in mm	230 x 410
Viewing angle	170° x 170°
Type	TFT widescreen display, LED backlighting
On Screen Display (OSD) configuration	No, can be set with the software
Number of colors (bit levels)	24 bit
Number of colors	16 777 200
Resolution (pixels)	
• Horizontal image resolution	1 366
• Vertical image resolution	768
• Resolution (WxH in pixel)	1366 x 768
General features	
• Detachable from computer unit	30 m
• Brightness/contrast	300cd/m² / 1000:1
• Brightness, max.	300 cd/m²
Backlighting	
• Backlighting (type)	LED
• MTBF backlighting (up to 50%, at 25 °C)	50 000 h; At 25°C
• Dimmable backlight	Yes; 0-100 %
Control elements	
Function keys	No
Mouse/cursor control	
• external mouse	USB
Touch operation	
• Touch keyboard	Yes
Installation type/mounting	
Built-in unit	Yes
• Permissible angle to the vertical backward (console)	35°
• Permissible angle to the vertical forward (ceiling mounting)	35°
Supply voltage	
Type of supply voltage	AC, DC
Rated value (DC)	24 V
permissible range, lower limit (DC)	19.2 V
permissible range, upper limit (DC)	28.8 V
Rated value (AC)	0 V; 100 - 240V, 50/60Hz
permissible range, lower limit (AC)	85 V
permissible range, upper limit (AC)	265 V
Power losses	
Power loss AC	
• Typical	40 W
• Maximum	60 W
Power loss DC	
• Typical	40 W
• Maximum	65 W

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Technical specifications (continued)

	6AV7 466-7TB01-0AA0 IFP1900 MT
Interfaces	
USB on the rear	2
Video interfaces	
• DVI-D	Yes
• Display port	Yes; Display port V1.1
Touch interfaces	
• USB	Yes
Degree and class of protection	
IP65 at front	Yes
Enclosure Type 4 at the front	Yes
NEMA4 at the front	No
NEMA4X at the front	No
IP20 rear	Yes
Standards, approvals, certificates	
UL approval	
• UL 508	Yes
EN 50081-1	Yes
EN 50081-2	Yes
EN 50082-1	Yes
EN 50082-2	Yes
Ambient conditions	
Min. ambient temperature	0 °C
Max. ambient temperature	45 °C
Relative humidity	
• Relative humidity during operation	95 %
Vibrations	
• Vibration load in operation	g (m/s^2)
• Vibration load during transport/storage	g (m/s^2)
Shock testing	
• Shock loading in operation	g (m/s^2)
• Shock load during transport/storage	g (m/s^2)
Connection method	
Connector for cooling devices	Yes
Mechanics/material	
Type of housing (front)	aluminum
• Aluminum	Yes
Dimensions	
Width of the housing front	483 mm
Height of housing front	337 mm
Mounting cutout/device depth (W x H x D)	
• Mounting cutout, width	465 mm
• Mounting cutout, height	319 mm
Device depth	62.5 mm
Weights	
Weight without packaging	6.34 kg
Weight incl. packaging	9.52 kg

Ordering data

	Article No.
SIMATIC IFP1900 MT Flat Panel, 19" display (16:9), operation using multitouch gestures, extended version up to 30 m, 1366 x 768 pixels, for 24 V DC and 100-240 V AC, display port/DVI interface, incl. 1.8 m DVI/USB cable	**6AV7466-7TB01-0AA0**

2

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2

Overview



The Industrial Flat Panels are rugged industry-standard LCD monitors in a wide screen design.

- Installation:
  - Equally suited for installation in the machine, in control cabinets, in consoles, to gantries, or in 19" racks.
- Type of operator control:
  - Simple display devices without operator functionality
  - Optional devices with touch control
  - Optional devices with multi-touch control
  - Rear-mounted connection of I/O devices (optional).

Benefits

- Rugged industrial design:
  - High shock and vibration resistance as well as extremely high electromagnetic compatibility ensure failure safety and a long service life
  - Enclosure front in IP65/NEMA4 degree of protection, resistant to dust and humidity
  - Scratch-resistant, anti-glare mineral glass screen, providing high mechanical protection against pressure and scratching
  - Meets CE standard "Industry"
- Variety of versions
- Lower energy requirement
- Fatigue-proof operation:
  - Wide reading angle of up to 170° horizontal and vertical
  - Sharp and high-contrast graphic display
  - No flickering, uniform brightness
  - Automatic display adjustment (Auto Adjust)
- Configuration using On-Screen Display (OSD)
- Minimal space requirement and low weight
- Long service life

Technical specifications

	6AV7863-2AA00-0AA0 IFP1500	6AV7863-2AB10-0AA0 IFP1500	6AV7863-2BB10-0AA0 IFP1500	6AV7863-2TA00-0AA0 IFP1500	6AV7863-2TB10-0AA0 IFP1500
General information					
Short designation	Flat Panel 15" display	Flat Panel 15" display ext.	Flat Panel 15" Touch/keys	Flat Panel 15" Touch	Flat Panel 15" Touch ext.
Display					
Screen diagonal	15.4 in	15.4 in	15.4 in	15.4 in	15.4 in
Screen diagonal (cm)	40 cm	40 cm	40 cm	40 cm	40 cm
Display width	331.2 mm	331.2 mm	331.2 mm	331.2 mm	331.2 mm
Display height	207 mm	207 mm	207 mm	207 mm	207 mm
Viewing angle	170° x 170°	170° x 170°	170° x 170°	170° x 170°	170° x 170°
Type	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting
On Screen Display (OSD) configuration	No, can be set with the software	No, can be set with the software	No, can be set with the software	No, can be set with the software	No, can be set with the software
Number of colors (bit levels)	24 bit	24 bit	24 bit	24 bit	24 bit
Number of colors	16 777 200	16 777 200	16 777 200	16 777 200	16 777 200
Resolution (pixels)					
• Horizontal image resolution	1 280	1 280	1 280	1 280	1 280
• Vertical image resolution	800	800	800	800	800
• Resolution (WxH in pixel)	1280 x 800	1280 x 800	1280 x 800	1280 x 800	1280 x 800
• Pixel size, horizontal	0.259 mm	0.259 mm	0.259 mm	0.259 mm	0.259 mm
• Pixel size, vertical	0.259 mm	0.259 mm	0.259 mm	0.259 mm	0.259 mm
General features					
• Non-reflective and tempered mineral glass screen	Yes	Yes	Yes		
• Detachable from computer unit	5 m	30 m	5 m	5 m	5 m
• Brightness/contrast	400 cd/m² / 1000:1	400 cd/m² / 1000:1	400 cd/m² / 1000:1	400 cd/m² / 1000:1	400 cd/m² / 1000:1
• Brightness, max.	400 cd/m²	400 cd/m²	400 cd/m²	400 cd/m²	400 cd/m²
Backlighting					
• Backlighting (type)	LED	LED	LED	LED	LED
• MTBF backlighting (up to 50%, at 25 °C)	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C
• Dimmable backlight	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %

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Technical specifications (continued)

	6AV7863-2AA00-0AA0 IFP1500	6AV7863-2AB10-0AA0 IFP1500	6AV7863-2BB10-0AA0 IFP1500	6AV7863-2TA00-0AA0 IFP1500	6AV7863-2TB10-0AA0 IFP1500
Control elements					
Function keys	No	No	36	No	No
Mouse/cursor control					
• external mouse		USB	USB		USB
Keyboard fonts					
• Alphanumeric and numeric block		Yes			
Touch operation					
• Touch keyboard			Yes	Yes	Yes
Installation type/mounting					
Built-in unit	Yes; Portrait mode possible	Yes; Portrait mode possible	Yes	Yes; Portrait mode possible	Yes; Portrait mode possible
• Permissible angle to the vertical backward (console)	35°	35°	35°	35°	35°
• Permissible angle to the vertical forward (ceiling mounting)	35°	35°	35°	35°	35°
Supply voltage					
Type of supply voltage	DC	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V	24 V
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
Rated value (AC)		100 V; Up to 240V 50/60Hz	100 V; Up to 240V 50/60Hz		
permissible range, lower limit (AC)		90 V	90 V		90 V
permissible range, upper limit (AC)		264 V	264 V		264 V
Power losses					
Power loss AC					
• Typical		40 W	40 W		40 W
• Maximum		60 W	60 W		60 W
Power loss DC					
• Typical	40 W	40 W	40 W	40 W	40 W
• Maximum	65 W	65 W	65 W	65 W	65 W
Interfaces					
USB on the rear		2	1		2
USB at the front			1		
Video interfaces					
• DVI-D	Yes	Yes	Yes	Yes	Yes
• Display port	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1
Touch interfaces					
• USB	No	No	Yes	Yes	Yes
Degree and class of protection					
IP65 at front	Yes	Yes	Yes	Yes	Yes
Enclosure Type 4 at the front	Yes	Yes	Yes	Yes	Yes
NEMA4 at the front	No	No	No	No	No
NEMA4X at the front	No	No	No	No	No
IP20 rear	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates					
CE mark	Yes	Yes	Yes	Yes	Yes
KC approval	Yes	Yes	Yes	Yes	Yes
cULus	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508
RCM (former C-TICK)	Yes	Yes	Yes	Yes	Yes
Use in hazardous areas					
• FM Class I Division 2	Yes	No	No	Yes	No

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Technical specifications (continued)

	6AV7863-2AA00-0AA0 IFP1500	6AV7863-2AB10-0AA0 IFP1500	6AV7863-2BB10-0AA0 IFP1500	6AV7863-2TA00-0AA0 IFP1500	6AV7863-2TB10-0AA0 IFP1500
Ambient conditions					
Min. ambient temperature	0 °C	0 °C	0 °C	0 °C	0 °C
Max. ambient temperature	50 °C; Vertical installation (horizontal)	50 °C; Vertical installation (horizontal)	50 °C; Vertical installation (horizontal)	50 °C; Vertical installation (horizontal)	50 °C; Vertical installation (horizontal)
Storage/transport temperature					
• Min.	-20 °C	-20 °C	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C	60 °C	60 °C
Relative humidity					
• Relative humidity during operation	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing
Vibrations					
• Vibration load in operation	1 g	1 g	1 g	1 g	1 g
• Vibration load during transport/storage	1 g	1 g	1 g	1 g	1 g
Shock testing					
• Shock loading in operation	15 g	15 g	15 g	15 g	15 g
• Shock load during transport/storage	15 g	15 g	15 g	15 g	15 g
Connection method					
Connector for cooling devices		Yes	Yes		
Mechanics/material					
Type of housing (front)	aluminum	aluminum	aluminum	aluminum	aluminum
• Aluminum	Yes	Yes	Yes	Yes	Yes
Dimensions					
Width of the housing front	415 mm	415 mm	483 mm	415 mm	415 mm
Height of housing front	310 mm	310 mm	310 mm	310 mm	310 mm
Mounting cutout/device depth (W x H x D)					
• Mounting cutout, width	396 mm; Tolerance: +1 mm	396 mm; Tolerance: +1 mm	450 mm; Tolerance: +1 mm	396 mm; Tolerance: +1 mm	396 mm; Tolerance: +1 mm
• Mounting cutout, height	291 mm; Tolerance: +1 mm	291 mm; Tolerance: +1 mm	291 mm; Tolerance: +1 mm	291 mm; Tolerance: +1 mm	291 mm; Tolerance: +1 mm
Device depth	62.5 mm	62.5 mm	62.5 mm	62.5 mm	62.5 mm
Weights					
Weight without packaging	3.9 kg	3.9 kg	4.3 kg	3.9 kg	3.9 kg
Weight incl. packaging	5 kg	5 kg	5.4 kg	5 kg	5 kg

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Technical specifications (continued)

	6AV7 863-3AA00-0AA0 IFP1900	6AV7 863-3AB10-0AA0 IFP1900	6AV7 863-3TA00-0AA0 IFP1900	6AV7 863-3TB10-0AA0 IFP1900
General information				
Short designation	Flat Panel 19" display	Flat Panel 19" display ext.	Flat Panel 19" Touch	Flat Panel 19" Touch ext.
Display				
Screen diagonal	18.5 in	18.5 in	18.5 in	18.5 in
Screen diagonal (cm)	47 cm	47 cm	47 cm	47 cm
Display width	409.8 mm	409.8 mm	409.8 mm	409.8 mm
Display height	230.4 mm	230.4 mm	230.4 mm	230.4 mm
Viewing angle	170° x 160°	170° x 160°	170° x 160°	170° x 160°
Type	TFT	TFT	TFT	TFT
On Screen Display (OSD) configuration	No, can be set with the software	No, can be set with the software	No, can be set with the software	No, can be set with the software
Number of colors (bit levels)	24 bit	24 bit	24 bit	24 bit
Number of colors	16 777 200	16 777 200	16 777 200	16 777 200
Resolution (pixels)				
• Horizontal image resolution	1 366	1 366	1 366	1 366
• Vertical image resolution	768	768	768	768
• Resolution (WxH in pixel)	1366 x 768	1366 x 768	1366 x 768	1366 x 768
• Pixel size, horizontal	0.3 mm	0.3 mm	0.3 mm	0.3 mm
• Pixel size, vertical	0.3 mm	0.3 mm	0.3 mm	0.3 mm
General features				
• Non-reflective and tempered mineral glass screen	Yes	Yes		
• Detachable from computer unit	5 m	30 m	5 m	30 m
• Brightness/contrast	300cd/m² / 1000:1	300cd/m² / 1000:1	300cd/m² / 1000:1	300cd/m² / 1000:1
• Brightness, max.	300 cd/m²	300 cd/m²	300 cd/m²	300 cd/m²
Backlighting				
• Backlighting (type)	LED	LED	LED	LED
• MTBF backlighting (up to 50%, at 25 °C)	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C
• Dimmable backlight	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %
Control elements				
Function keys	No	No	No	No
Mouse/cursor control				
• external mouse		USB		USB
Touch operation				
• Touch keyboard			Yes	Yes
Installation type/mounting				
Built-in unit	Yes; Portrait mode possible	Yes; Portrait mode possible	Yes; Portrait mode possible	Yes; Portrait mode possible
• Permissible angle to the vertical backward (console)	35°	35°	35°	35°
• Permissible angle to the vertical forward (ceiling mounting)	35°	35°	35°	35°
Supply voltage				
Type of supply voltage	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Rated value (AC)		100 V; Up to 240V 50/60Hz		100 V; Up to 240V 50/60Hz
permissible range, lower limit (AC)		90 V		90 V
permissible range, upper limit (AC)		264 V		264 V
Power losses				
Power loss AC				
• Typical		40 W		40 W
• Maximum		60 W		60 W
Power loss DC				
• Typical	40 W	40 W	40 W	40 W
• Maximum	65 W	65 W	65 W	65 W

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Technical specifications (continued)

	6AV7 863-3AA00-0AA0 IFP1900	6AV7 863-3AB10-0AA0 IFP1900	6AV7 863-3TA00-0AA0 IFP1900	6AV7 863-3TB10-0AA0 IFP1900
Interfaces				
USB on the rear		2		2
Video interfaces				
• DVI-D	Yes	Yes	Yes	Yes
• Display port	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1
Touch interfaces				
• USB	No	No	Yes	Yes
Degree and class of protection				
IP65 at front	Yes	Yes	Yes	Yes
Enclosure Type 4 at the front	Yes	Yes	Yes	Yes
NEMA4 at the front	No	No	No	No
NEMA4X at the front	No	No	No	No
IP20 rear	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
KC approval	Yes	Yes	Yes	Yes
cULus	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508
RCM (former C-TICK)	Yes	Yes	Yes	Yes
Use in hazardous areas				
• FM Class I Division 2	Yes	No	Yes	Yes
Ambient conditions				
Min. ambient temperature	0 °C	0 °C	0 °C	0 °C
Max. ambient temperature	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)
Storage/transport temperature				
• Min.	-20 °C	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C	60 °C
Relative humidity				
• Relative humidity during operation	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing
Vibrations				
• Vibration load in operation	1 g	1 g	1 g	1 g
• Vibration load during transport/storage	1 g	1 g	1 g	1 g
Shock testing				
• Shock loading in operation	15 g	15 g	15 g	15 g
• Shock load during transport/storage	15 g	15 g	15 g	15 g
Connection method				
Connector for cooling devices		Yes		Yes
Mechanics/material				
Type of housing (front)	aluminum	aluminum	aluminum	aluminum
• Aluminum	Yes	Yes	Yes	Yes
Dimensions				
Width of the housing front	483 mm	483 mm	483 mm	483 mm
Height of housing front	337 mm	337 mm	337 mm	337 mm
Mounting cutout/device depth (W x H x D)				
• Mounting cutout, width	465 mm; Tolerance: +1 mm	465 mm; Tolerance: +1 mm	465 mm; Tolerance: +1 mm	465 mm; Tolerance: +1 mm
• Mounting cutout, height	319 mm; Tolerance: +1 mm	319 mm; Tolerance: +1 mm	319 mm; Tolerance: +1 mm	319 mm; Tolerance: +1 mm
Device depth	62.5 mm	62.5 mm	62.5 mm	62.5 mm
Weights				
Weight without packaging	5.5 kg	5.5 kg	5.5 kg	5.5 kg
Weight incl. packaging	6.5 kg	6.5 kg	6.5 kg	6.5 kg

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Technical specifications (continued)

	6AV7 863-4AA00-0AA0 IFP2200	6AV7 863-4AB10-0AA0 IFP2200	6AV7 863-4TA00-0AA0 IFP2200	6AV7 863-4TB10-0AA0 IFP2200
General information				
Short designation	Flat Panel 22" display	Flat Panel 22" display ext.	Flat Panel 22" Touch	Flat Panel 22" Touch ext.
Display				
Screen diagonal	21.5 in	21.5 in	21.5 in	21.5 in
Screen diagonal (cm)	56 cm	56 cm	56 cm	56 cm
Display width	476 mm	476 mm	476 mm	476 mm
Display height	268 mm	268 mm	268 mm	268 mm
Viewing angle	170° x 170°	170° x 170°	170° x 170°	170° x 170°
Type	TFT	TFT	TFT	TFT
On Screen Display (OSD) configuration	No, can be set with the software	No, can be set with the software	No, can be set with the software	No, can be set with the software
Number of colors (bit levels)	24 bit	24 bit	24 bit	24 bit
Number of colors	16 777 200	16 777 200	16 777 200	16 777 200
Resolution (pixels)				
• Horizontal image resolution	1 920	1 920	1 920	1 920
• Vertical image resolution	1 080	1 080	1 080	1 080
• Resolution (WxH in pixel)	1920 x 1080	1920 x 1080	1920 x 1080	1920 x 1080
• Pixel size, horizontal	0.2475 mm	0.2475 mm	0.2475 mm	0.2475 mm
• Pixel size, vertical	0.2475 mm	0.2475 mm	0.2475 mm	0.2475 mm
General features				
• Non-reflective and tempered mineral glass screen	Yes	Yes		
• Detachable from computer unit	5 m	30 m	5 m	30 m
• Brightness/contrast	250 cd/m² / 1000:1	250 cd/m² / 1000:1	250 cd/m² / 1000:1	250 cd/m² / 1000:1
• Brightness, max.	250 cd/m²	250 cd/m²	250 cd/m²	250 cd/m²
Backlighting				
• Backlighting (type)	LED	LED	LED	LED
• MTBF backlighting (up to 50%, at 25 °C)	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C	50 000 h; At 25°C
• Dimmable backlight	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %	Yes; 0-100 %
Control elements				
Function keys	No	No	No	No
Mouse/cursor control				
• external mouse		USB		USB
Touch operation				
• Touch keyboard			Yes	Yes
Installation type/mounting				
Built-in unit	Yes; Portrait mode possible	Yes; Portrait mode possible	Yes; Portrait mode possible	Yes; Portrait mode possible
• Permissible angle to the vertical backward (console)	35°	35°	35°	35°
• Permissible angle to the vertical forward (ceiling mounting)	35°	35°	35°	35°
Supply voltage				
Type of supply voltage	DC	DC	DC	DC
Rated value (DC)	24 V	24 V	24 V	24 V
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Rated value (AC)		100 V; Up to 240V 50/60Hz		100 V; Up to 240V 50/60Hz
permissible range, lower limit (AC)		90 V		90 V
permissible range, upper limit (AC)		264 V		264 V
Power losses				
Power loss AC				
• Typical		40 W		40 W
• Maximum		60 W		60 W
Power loss DC				
• Typical	40 W	40 W	40 W	40 W
• Maximum	65 W	65 W	65 W	65 W

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Technical specifications (continued)

	6AV7 863-4AA00-0AA0 IFP2200	6AV7 863-4AB10-0AA0 IFP2200	6AV7 863-4TA00-0AA0 IFP2200	6AV7 863-4TB10-0AA0 IFP2200
Interfaces				
USB on the rear		2		2
Video interfaces				
• DVI-D	Yes	Yes	Yes	Yes
• Display port	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1	Yes; Display port V1.1
Touch interfaces				
• USB	No	No	Yes	Yes
Degree and class of protection				
IP65 at front	Yes	Yes	Yes	Yes
Enclosure Type 4 at the front	Yes	Yes	Yes	Yes
NEMA4 at the front	No	No	No	No
NEMA4X at the front	No	No	No	No
IP20 rear	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
KC approval	Yes	Yes	Yes	Yes
cULus	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508	Yes; Corresponds to UL 508
RCM (former C-TICK)	Yes	Yes	Yes	Yes
Use in hazardous areas				
• FM Class I Division 2	Yes	No	Yes	No
Ambient conditions				
Min. ambient temperature	0 °C	0 °C	0 °C	0 °C
Max. ambient temperature	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)	45 °C; Vertical installation (horizontal)
Storage/transport temperature				
• Min.	-20 °C	-20 °C	-20 °C	-20 °C
• max.	60 °C	60 °C	60 °C	60 °C
Relative humidity				
• Relative humidity during operation	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing	95 %; Non-condensing
Vibrations				
• Vibration load in operation	1 g	1 g	1 g	1 g
• Vibration load during transport/storage	1 g	1 g	1 g	1 g
Shock testing				
• Shock loading in operation	15 g	15 g	15 g	15 g
• Shock load during transport/storage	15 g	15 g	15 g	15 g
Connection method				
Connector for cooling devices		Yes		Yes
Mechanics/material				
Type of housing (front)	aluminum	aluminum	aluminum	aluminum
• Aluminum	Yes	Yes	Yes	Yes
Dimensions				
Width of the housing front	560 mm	560 mm	560 mm	560 mm
Height of housing front	380 mm	380 mm	380 mm	380 mm
Mounting cutout/device depth (W x H x D)				
• Mounting cutout, width	542 mm; Tolerance: +1 mm	542 mm; Tolerance: +1 mm	542 mm; Tolerance: +1 mm	542 mm; Tolerance: +1 mm
• Mounting cutout, height	362 mm; Tolerance: +1 mm	362 mm; Tolerance: +1 mm	362 mm; Tolerance: +1 mm	362 mm; Tolerance: +1 mm
Device depth	62.5 mm	62.5 mm	62.5 mm	62.5 mm
Weights				
Weight without packaging	6.5 kg	6.5 kg	6.5 kg	6.5 kg
Weight incl. packaging	7.6 kg	7.6 kg	7.6 kg	7.6 kg

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Ordering data

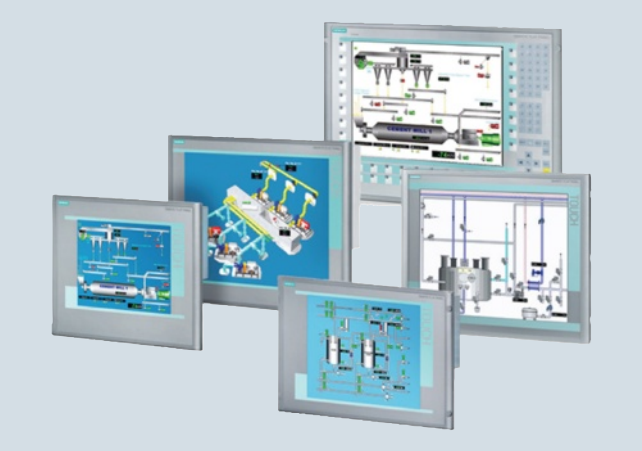
	Article No.
Industrial Flat Panel Monitor	**6AV7863 - ■ ■ ■ ■ 0 - 0 A A 0**
Display size	
• 15" (multi-touch available soon)	**2**
• 19"	**3**
• 22"	**4**
Operator functionality	
• Display devices without operator functionality	**A**
• Touch screen (capacitive) multi-touch	**M**
• Touch screen (analog/resistive)	**T**
• Touch screen + function keys, 15" only and extended special functions	**B B 1**
Special functions	
• Standard, can be located up to 5 m away	**A 0**
• Extended, for positioning at a distance of up to 30 m, 100 ... 230 V AC (without supply cable) + special functions	**B 1**

	Article No.
Accessories	
Set of protective films for ITC/IFP/TP1500	**6AV2124-6QJ00-0AX1**
Set of protective films for ITC/IFP/TP1900	**6AV2124-6UJ00-0AX1**
Set of protective films for ITC/IFP/TP2200	**6AV2124-6XJ00-0AX1**
Touch pen Undetachable pen for operation of the touch devices, mounting of the support on the control cabinet or directly on the PRO unit	**6AV7672-1JB00-0AA0**
Accessories for standard variants up to 5 m (6AV7863-..A0.-0AA0)	
DisplayPort cable (industrial quality)	
• 3 m	**6AV7860-0DH30-0AA0**
• 5 m	**6AV7860-0DH50-0AA0**
DVI-D cable (industrial quality)	
• 3 m	**6AV7860-0BH30-0AA0**
• 5 m	**6AV7860-0BH50-0AA0**
USB cable (industrial quality)	
• 3 m	**6AV7860-0CH30-0AA0**
• 5 m	**6AV7860-0CH50-0AA0**
Accessories for extended variants up to 30 m (6AV7863-..B1.-0AA0)	
Cable set (USB/Cat5; sender module, DVI)	
• 10 m	**6AV7860-1EX21-0AA1**
• 15 m	**6AV7860-1EX21-5AA1**
• 20 m	**6AV7860-1EX22-0AA1**
• 30 m	**6AV7860-1EX23-0AA1**
Cable set 90° USB/Cat5; sender module, DVI 90° angle, 20 m	**6AV7860-1EX22-0BA1**
USB host extender incl. 20 cm USB cable (USB to Cat5)	**6AV7671-1EX02-0AA0**

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Overview



The Flat Panels are rugged industry-standard LCD monitors.

- Installation:
  - They are equally suited to installation in the machine, in control cabinets, consoles and gantries or in 19" racks.
  - As a device with all-round IP65 protection for mounting on a supporting arm/stand
- Type of operator control:
  - Simple display devices without operator functionality
  - Optional devices with touch control
  - Rear connection of I/O devices (optional)

Benefits

- Rugged industrial design:
  - High shock and vibration resistance as well as extremely high electromagnetic compatibility make for a fail-safe and long-lasting design
  - Enclosure front in degree or protection IP65/NEMA4, resistant against dust and humidity
  - Enclosure version complete in degree of protection IP65 for mounting on supporting arm
  - Scratch-resistant, anti-glare mineral glass screen, providing high mechanical protection against pressure and scratching
  - Meets CE standard "Industry"
- Variety of versions
- No X-rays
- Lower energy requirement
- Fatigue-proof operation:
  - Wide reading angle of up to 170° horizontal and vertical
  - Sharp and high-contrast graphic display
  - No flickering, uniform brightness
  - Automatic display adjustment (Auto Adjust)
- Configuration using on-screen display (OSD)
- Small space requirement and low weight
- Long service life

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Technical specifications

	6AV7861-1AA00-1AA0	6AV7861-1AB00-1AA0	6AV7861-1AB10-1AA0	6AV7861-1KB10-1AA0	6AV7861-1TA00-1AA0	6AV7861-1TB00-1AA0	6AV7861-1TB10-1AA0
Display							
Screen diagonal	12 in	12 in	12 in	12 in	12 in	12 in	12 in
visible area (HxV) in mm	246 x 184,5	246 x 184,5	246 x 184,5	246 x 184,5	246 x 184,5	246 x 184,5	246 x 184,5
Viewing angle	140° x 120°	140° x 120°	140° x 120°	140° x 120°	140° x 120°	140° x 120°	140° x 120°
On Screen Display (OSD) configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of colors (bit levels)	262k	262k	262k	262k	262k	262k	262k
Number of colors	262 000; 262k	262 000; 262k	262 000; 262k	262 000; 262k	262 000; 262k	262 000; 262k	262 000; 262k
Resolution (pixels)							
• Horizontal image resolution	800	800	800	800	800	800	800
• Vertical image resolution	600	600	600	600	600	600	600
• Resolution (WxH in pixel)	800 x 600	800 x 600	800 x 600	800 x 600	800 x 600	800 x 600	800 x 600
General features							
• Brightness/contrast	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1	> 350 cd/m² / 450:1
Control elements							
Function keys	No	No	No	No	No	No	No
Operating mode							
• integrated mouse cursor control	No	No	No	No	No	No	No
Installation type/mounting							
Rack mounting possible	No	No	No	No	No	No	No
Desktop device	No	No	No	No	No	No	No
VESA mounting	No	No	No	No	No	No	No
Supply voltage							
Type of supply voltage	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
permissible range, lower limit (AC)	90 V	90 V	90 V	90 V	90 V	90 V	90 V
permissible range, upper limit (AC)	264 V	264 V	264 V	264 V	264 V	264 V	264 V
Interfaces							
Video interfaces							
• analog video signal (VGA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Degree and class of protection							
IP54 at front	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack
IP65 at front	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners
IP20 rear	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates							
UL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EAC (former Gost-R)	No	No	No	No	No	No	No
Marine approval							
• Germanischer Lloyd (GL)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• American Bureau of Shipping (ABS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Bureau Veritas (BV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Det Norske Veritas (DNV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Lloyds Register of Shipping (LRS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Polski Rejestr Statkow (PRS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
Ambient conditions							
Max. ambient temperature	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Dimensions							
Width of the housing front	400 mm	400 mm	400 mm	483 mm	400 mm	400 mm	400 mm
Height of housing front	310 mm	310 mm	310 mm	310 mm	310 mm	310 mm	310 mm
Mounting cutout/device depth (W x H x D)	368 x 290 x 51	368 x 290 x 51	368 x 290 x 51	368 x 290 x 51	368 x 290 x 51	368 x 290 x 51	368 x 290 x 51
Device depth	51 mm	51 mm	51 mm	49 mm	50 mm	51 mm	51 mm

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Technical specifications (continued)

	6AV7861-2AA00-1AA0	6AV7861-2AB00-1AA0	6AV7861-2AB10-1AA0	6AV7861-2KB10-1AA0	6AV7861-2TA00-1AA0	6AV7861-2TB00-1AA0	6AV7861-2TB10-1AA0
Display							
Screen diagonal	15 in	15 in	15 in	15 in	15 in	15 in	15 in
visible area (HxV) in mm	304 x 228	304 x 228	304 x 228	304 x 228	304 x 228	304 x 228	304 x 228
Viewing angle	100° x 90° (min)	100° x 90° (min)	100° x 90° (min)	100° x 90° (min)	100° x 90° (min)	100° x 90° (min)	100° x 90° (min)
On Screen Display (OSD) configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of colors (bit levels)	16.2 million	16.2 million	16.2 million	16.2 million	16.2 million	16.2 million	16.2 million
Number of colors	16 000 000; 16.2 million	16 000 000; 16.2 million	16 000 000; 16.2 million	16 000 000; 16.2 million	16 000 000; 16.2 million	16 000 000; 16.2 million	16 000 000; 16.2 million
Resolution (pixels)							
• Horizontal image resolution	1 024	1 024	1 024	1 024	1 024	1 024	1 024
• Vertical image resolution	768	768	768	768	768	768	768
• Resolution (WxH in pixel)	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768
General features							
• Brightness/contrast	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1	> 260 cd/m² / 350:1
Control elements							
Function keys	No	No	No	No	No	No	No
Operating mode							
• integrated mouse cursor control	No	No	No	No	No	No	No
Installation type/mounting							
Rack mounting possible	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Desktop device	No	No	No	No	No	No	No
VESA mounting	No	No	No	No	No	No	No
Supply voltage							
Type of supply voltage	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
permissible range, lower limit (AC)	90 V	90 V	90 V	90 V	90 V	90 V	90 V
permissible range, upper limit (AC)	264 V	264 V	264 V	264 V	264 V	264 V	264 V
Interfaces							
Video interfaces							
• analog video signal (VGA)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Degree and class of protection							
IP54 at front	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack
IP65 at front	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners
Standards, approvals, certificates							
UL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EAC (former Gost-R)	No	No	No	No	No	No	No
Marine approval							
• Germanischer Lloyd (GL)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• American Bureau of Shipping (ABS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Bureau Veritas (BV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Det Norske Veritas (DNV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Lloyds Register of Shipping (LRS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
Ambient conditions							
Max. ambient temperature	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C	50 °C
Dimensions							
Width of the housing front	483 mm	483 mm	483 mm	483 mm	483 mm	483 mm	483 mm
Height of housing front	310 mm	310 mm	310 mm	355 mm	310 mm	310 mm	310 mm
Mounting cutout/device depth (W x H x D)	450x290x54	450x290x54	450x290x54	450x290x54	450x290x54	450x290x54	450x290x54
Device depth	55 mm	55 mm	55 mm	49 mm	55 mm	55 mm	55 mm

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Technical specifications (continued)

	6AV7861-3AA00-1AA0	6AV7861-3AB00-1AA0	6AV7861-3AB10-1AA0	6AV7861-3TA00-1AA0	6AV7861-3TB00-1AA0	6AV7861-3TB10-1AA0
Display						
Screen diagonal	19 in	19 in	19 in	19 in	19 in	19 in
visible area (HxV) in mm	376 x 301	376 x 301	376 x 301	376 x 301	376 x 301	376 x 301
Viewing angle	170° x 170°	170° x 170°	170° x 170°	170° x 170°	170° x 170°	170° x 170°
On Screen Display (OSD) configuration	Yes	Yes	Yes	Yes	Yes	Yes
Number of colors (bit levels)	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million	16.7 million
Number of colors	16 000 000; 16.7 million	16 000 000; 16.7 million	16 000 000; 16.7 million	16 000 000; 16.7 million	16 000 000; 16.7 million	16 000 000; 16.7 million
Resolution (pixels)						
• Horizontal image resolution	1 280	1 280	1 280	1 280	1 280	1 280
• Vertical image resolution	1 024	1 024	1 024	1 024	1 024	1 024
• Resolution (WxH in pixel)	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024	1280 x 1024
General features						
• Brightness/contrast	> 300 cd/m² / 300:1	> 300 cd/m² / 300:1	> 300 cd/m² / 300:1	> 300 cd/m² / 300:1	> 300 cd/m² / 300:1	> 300 cd/m² / 300:1
Control elements						
Function keys	No	No	No	No	No	No
Operating mode						
• integrated mouse cursor control	No	No	No	No	No	No
Installation type/mounting						
Rack mounting possible	Yes	Yes	Yes	Yes	Yes	Yes
Desktop device	No	No	No	No	No	No
VESA mounting	No	No	No	No	No	No
Supply voltage						
Type of supply voltage	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC	AC, DC
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V	28.8 V
permissible range, lower limit (AC)	90 V	90 V	90 V	90 V	90 V	90 V
permissible range, upper limit (AC)	264 V	264 V	264 V	264 V	264 V	264 V
Interfaces						
Video interfaces						
• analog video signal (VGA)	Yes	Yes	Yes	Yes	Yes	Yes
Degree and class of protection						
IP54 at front	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack	Yes; For screw mounting in 19" rack
IP65 at front	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners	Yes; if mounted with the supplied latch fasteners
IP20 rear	Yes	Yes	Yes	Yes	Yes	Yes
Standards, approvals, certificates						
UL	Yes	Yes	Yes	Yes	Yes	Yes
EAC (former Gost-R)	No	No	No	No	No	No
Marine approval						
• Germanischer Lloyd (GL)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• American Bureau of Shipping (ABS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Bureau Veritas (BV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Det Norske Veritas (DNV)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
• Lloyds Register of Shipping (LRS)	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional	Yes; Optional
Ambient conditions						
Max. ambient temperature	45 °C	45 °C	45 °C	45 °C	45 °C	45 °C
Dimensions						
Width of the housing front	483 mm	483 mm	483 mm	483 mm	483 mm	483 mm
Height of housing front	400 mm	400 mm	400 mm	400 mm	400 mm	400 mm
Mounting cutout/device depth (W x H x D)	449 x 380 x 56	449 x 380 x 56	449 x 380 x 56	449 x 380 x 56	449 x 380 x 56	449 x 380 x 56
Device depth	57 mm	57 mm	57 mm	57 mm	57 mm	57 mm

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Ordering data

	Article No.										
Flat Panel Monitor	**6AV7861**	**-**					**0**	**-**	**1**	**A**	**A** **0**
Display size											
• 12"			**1**								
• 15"			**2**								
• 19"			**3**								
Operator functionality:											
• Display devices without operator functionality				**A**							
• Touch screen (analog/resistive)				**T**							
Power supply											
• 24 VDC (not for Extended versions since these always have AC and DC)					**A**						
• 100 to 230 V AC (incl. Euro power supply cable) and 24 V DC					**B**						
Version											
• Standard, can be located up to 5 m away						**0**					
• Extended, can be located up to 30 m away, marine approvals Dimmable background illumination Ex22						**1**					

Special versions

Flat Panel Monitor	
• 12" Key	**6AV7861-1KB10-1AA0**
• 15" Key	**6AV7861-2KB10-1AA0**
• PRO 15" Touch	**6AV7861-5TB10-1BA0**
• PRO 19" Touch	**6AV7861-6TB10-1BA0**

Accessories

Protective films	
For protecting the touch screen against dirt and scratches Pack with 10 units	
• for 12" Touch	**6AV7671-2BA00-0AA0**
• for 15" Touch	**6AV7671-4BA00-0AA0**
• for 19" Touch	**6AV7672-1CE00-0AA0**
Touch pen	
Undetachable pen for operation of the touch devices, mounting of the support on the control cabinet or directly on the PRO unit	**6AV7672-1JB00-0AA0**
Connection cables for Standard, Extended and PRO versions	
Video (VGA)	
• 3.0 m	**6AV7860-0AH30-0AA0**
• 5.0 m	**6AV7860-0AH50-0AA0**
Video (DVI-D)	
• 3.0 m	**6AV7860-0BH30-0AA0**
• 5.0 m	**6AV7860-0BH50-0AA0**
USB for optional touch screen	
• 3.0 m	**6AV7860-0CH30-0AA0**
• 5.0 m	**6AV7860-0CH50-0AA0**
Connection cables for Extended and PRO versions	
• Cable set 10 m (DVI-D, CAT5 cable (USB), USB transmitter module)	**6AV7860-1EX21-0AA1**
• Cable set 15 m (DVI-D, CAT5 cable (USB), USB transmitter module)	**6AV7860-1EX21-5AA1**
• Cable set 20 m (DVI-D, CAT5 cable (USB), USB transmitter module)	**6AV7860-1EX22-0AA1**
• Cable set 30 m (DVI-D, CAT5 cable (USB), USB transmitter module)	**6AV7860-1EX23-0AA1**

More information

Additional information is available on the Internet at:

http://www.siemens.com/industrial-lcd

Note:

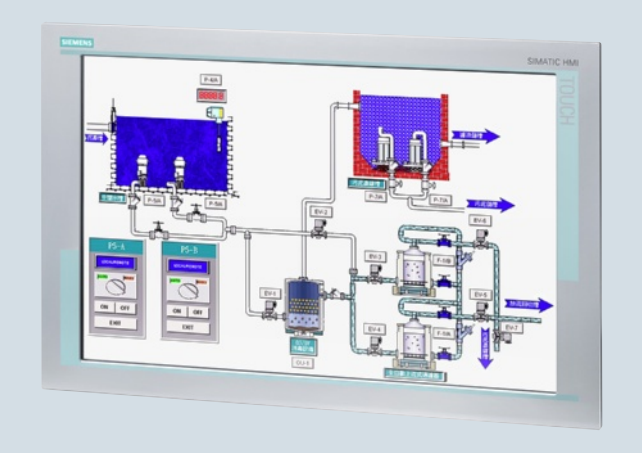
Do you need a specific modification or extension to the products described here? Then refer to "Customized Automation". There you will find information about additional and generally available sector-specific products as well as options for customer-specific modification and adaptation.

Examples are:

- SIMATIC SCD monitor 1900 for portrait operation
- SIMATIC Flat Panels with 6" and 10" Touch

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Overview



The SIMATIC HMI SCD 1900 is a rugged, industry-standard PC monitor.

It is used as an operator control unit in all types of industrial and standard PC, including for portrait mounting. Standard interfaces permit a wide range of possible applications.

Built-in versions:

- Built-in unit (for control cabinets, control desks, and gantries)
- Built-in portrait for portrait mounting (for control cabinets, control desks and gantries)
- 19" built-in units (for 19" racks)

Type of operator control:

- Panels with touch control

Benefits

- Rugged industrial design, also designed for portrait operation:
  - High shock and vibration resistance as well as extremely high electromagnetic compatibility ensure failure safety and a long service life
  - Enclosure with IP65 degree of protection at the front, resistant against dust and humidity
  - Meets CE standard "Industry"
- No X-rays
- Lower energy requirement
- Fatigue-proof operation:
  - Large reading angle
  - Sharp and high-contrast graphic display
  - No flickering, uniform brightness
  - Automatic display adjustment (Auto Adjust)
- Configuration using on-screen display (OSD)
- Minimal space requirement and low weight
- Long service life

Technical specifications

	6AV7862-2TA00-1AA0 **SCD 1900**
General information	
Short designation	Flat Panel 19" Touch
Display	
Screen diagonal	19 in
visible area (HxV) in mm	255 x 408
Viewing angle	160° x 170°
Type	TFT widescreen display, LED backlighting
On Screen Display (OSD) configuration	Yes
Number of colors (bit levels)	24 bit
Number of colors	16 777 200; 16.7 million
Resolution (pixels)	
• Horizontal image resolution	1 440
• Vertical image resolution	900
• Resolution (WxH in pixel)	1440 x 900
General features	
• Brightness/contrast	300cd/m² / 1000:1
• Brightness, max.	300 cd/m²
Backlighting	
• MTBF backlighting (up to 50%, at 25 °C)	50 000 h
Installation type/mounting	
Rack mounting possible	Yes
Built-in unit	Yes
VESA mounting	No
Supply voltage	
Type of supply voltage	DC
permissible range, lower limit (DC)	21.6 V
permissible range, upper limit (DC)	26.4 V
Interfaces	
Video interfaces	
• analog video signal (VGA)	Yes
• DVI-D	Yes
Touch interfaces	
• USB	Yes
Degree and class of protection	
IP65 at front	Yes
IP20 rear	Yes
Standards, approvals, certificates	
CE mark	Yes; Industry
CSA approval	No
UL	Yes
cULus	Yes
Ambient conditions	
Storage/transport temperature	
• Min.	-20 °C
• max.	60 °C
Shock testing	
• Shock loading in operation	10 g
• Shock load during transport/storage	10 g
Mechanics/material	
Type of housing (front)	
• Aluminum	Yes
Weights	
Weight without packaging	6 kg

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Ordering data

	Article No.
SCD monitor 1900	**6AV7862-2TA00-1AA0**
Portrait SCD monitor 1900	**6AV7466-2TA17-1AA0**
Accessories	
Cable for connecting to the graphics interface of the PC	
• VGA cable, 3.0 m	**6AV7860-0AH30-0AA0**
• VGA cable, 5.0 m	**6AV7860-0AH50-0AA0**
• DVI-D cable, 3.0 m	**6AV7860-0BH30-0AA0**
• DVI-D cable, 5.0 m	**6AV7860-0BH50-0AA0**
USB cable for connecting the touch screen	
• 3.0 m	**6AV7860-0CH30-0AA0**
• 5.0 m	**6AV7860-0CH50-0AA0**
External power supply for SCD 1900 100-230 V AC, 50-60 Hz; incl. mounting accessories for optional installation at the device.	**6AV7860-2AD06-0AA0**

More information

Additional information is available in the Internet under:
http://www.siemens.com/industrial-lcd

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Overview



SIMATIC ITC Industrial Thin Clients are powerful operating units for flexible use in distributed visualization applications. All devices are equipped with high-resolution, brilliant widescreen displays, and due to the diverse communication protocols they can be used both for challenging machine-level operator control & monitoring and for the connection to control systems, e.g. in the SCADA environment. They can be used as (additional) operator stations on a SIMATIC Industrial PC, Panel PC, or server, and on a SIMATIC Panel.

The following installation versions are available:

- SIMATIC ITC1200 – 12" Touch
- SIMATIC ITC1500 – 15" Touch
- SIMATIC ITC1900 – 19" Touch
- SIMATIC ITC2200 – 22" Touch

The SIMATIC HMI Thin Client Ex is available for hazardous areas. This device differs technically from the devices mentioned above. For more details, refer to catalog ST 80/ST PC, chapter 3.

Benefits

SIMATIC Industrial Thin Clients offer a wide range of possible applications, whether as additional operator stations for plant visualization on a Multi Panel or Comfort Panel, or as classical "client" which communicates with a server (e.g. SIMATIC IPC) using standard protocols such as RDP or VNC. The web browser functionality permits simple and fast access to any available web server in the network (e.g. S7 controller, intranet).

Very cost-effective client-server architectures can be implemented with SIMATIC ITCs. A further advantage of SIMATIC ITCs: They communicate exclusively via Ethernet, thus permitting extremely simple and cost-effective coverage of even large distances to the server.

The possibility of using SCADA and Office functionalities (e.g. WinCC, SAP, MS Excel) directly on-site on the machine supports the vertical integration of the data flow from higher-level systems all the way down to the machine level (e.g. warehouse utilization).

With Multisession is it possible to switch between several servers connected to a SIMATIC ITC any time. On the other hand, of course, it is possible to connect several thin clients to a server to implement multi-user solutions. The SIMATIC ITC itself requires no installations, licenses, and additional software.

The following communication options are supported

- Sm@rtServer for plant visualization
  with SIMATIC WinCC / SIMATIC WinCC flexible
- RDP (Remote Desktop Protocol) for SCADA and Office functionalities
- VNC (Virtual Network Computing) for remote operation of a PC
- Web browser functionality for operator control and monitoring of web-based applications
- As a Thin Client Unit on a SINUMERIK PCU/NCU

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Technical specifications

	6AV6646-1AA22-0AX0	6AV6646-1AB22-0AX0	6AV6646-1AC22-0AX0	6AV6646-1AD22-0AX0
Display				
Screen diagonal	12.1 in	15.4 in	18.5 in	21.5 in
Display width	261.1 mm	331.2 mm	409.8 mm	495.6 mm
Display height	163.2 mm	207 mm	230.4 mm	292.2 mm
Type	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting	TFT widescreen display, LED backlighting
Number of colors	16 777 200	16 777 200	16 777 200	16 777 200
Resolution (pixels)				
• Horizontal image resolution	1 280	1 280	1 366	1 920
• Vertical image resolution	800	800	768	1 080
General features				
• PDF reader	Yes	Yes	Yes	Yes
Backlighting				
• Backlighting (type)	LED, dimmable	LED, dimmable	LED, dimmable	LED, dimmable
• Dimmable backlight	Yes; 5-100 %	Yes; 5-100 %	Yes; 5-100 %	Yes; 5-100 %
Control elements				
Mouse/cursor control				
• external mouse				
- USB	Yes	Yes	Yes	Yes
Keyboard fonts				
• external keyboard				
- USB	Yes	Yes	Yes	Yes
Touch operation				
• Design as touch screen	Yes	Yes	Yes	Yes
- Touch screen (analog/resistive)	Yes	Yes	Yes	Yes
• Touch keyboard	Yes	Yes	Yes	Yes
Installation type/mounting				
Built-in unit	Yes	Yes	Yes	Yes
Supply voltage				
Type of supply voltage	24 V DC	24 V DC	24 V DC	24 V DC
permissible range, lower limit (DC)	19.2 V	19.2 V	19.2 V	19.2 V
permissible range, upper limit (DC)	28.8 V	28.8 V	28.8 V	28.8 V
Input current				
Current consumption, max.	1.2 A	1.5 A	1.3 A	2.2 A
Inrush current A^2s	0.5 $A^2 \cdot s$	0.5 $A^2 \cdot s$	0.5 $A^2 \cdot s$	0.5 $A^2 \cdot s$
Interfaces				
USB on the rear	2	2	2	2
USB at the front	0	0	0	0
Industrial Ethernet				
• Transmission rate, max.	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s	1 000 Mbit/s
• Number of industrial Ethernet interfaces	1	1	1	1
Protocols				
Protocols (Ethernet)				
• TCP/IP	Yes	Yes	Yes	Yes
• DHCP	Yes	Yes	Yes	Yes
• SNMP	Yes	Yes	Yes	Yes
• DCP	Yes	Yes	Yes	Yes
• LLDP	Yes	Yes	Yes	Yes
WEB characteristics				
• HTTP	Yes	Yes	Yes	Yes
• HTML	Yes; HTML5	Yes; HTML5	Yes; HTML5	Yes; HTML5
• XML	Yes	Yes	Yes	Yes
• CSS	Yes	Yes	Yes	Yes
• JavaScript	Yes	Yes	Yes	Yes
Protocols (terminal link)				
• Sm@rtService	Yes	Yes	Yes	Yes
• RDP	Yes	Yes	Yes	Yes
• VNC viewer	Yes	Yes	Yes	Yes
• Citrix	No	No	No	No
• SINUMERIK	Yes	Yes	Yes	No

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Technical specifications (continued)

	6AV6646-1AA22-0AX0	6AV6646-1AB22-0AX0	6AV6646-1AC22-0AX0	6AV6646-1AD22-0AX0
Protocols				
PROFINET IO Device				
• Services				
- PROFIenergy	No	No	No	No
Degree and class of protection				
IP65 at front	Yes	Yes	Yes	Yes
IP20 rear	Yes	Yes	Yes	Yes
Standards, approvals, certificates				
CE mark	Yes	Yes	Yes	Yes
KC approval	Yes	Yes	Yes	Yes
cULus	Yes	Yes	Yes	Yes
RCM (former C-TICK)	Yes	Yes	Yes	Yes
Use in hazardous areas				
• cULus Class I Zone 1	No	No	No	No
• cULus Class I Zone 2, Division 2	Yes; Available soon	Yes; Available soon	Yes; Available soon	Yes; Available soon
• FM Class I Division 2	Yes; Available soon	Yes; Available soon	Yes; Available soon	Yes; Available soon
Ambient conditions				
Min. ambient temperature	0 °C	0 °C	0 °C	0 °C
Max. ambient temperature	50 °C	50 °C	45 °C	45 °C
Storage/transport temperature				
• [Fehlender Merkmalstext PMD_ACE481_001_000]	-20 °C	-20 °C	-20 °C	-20 °C
• [Fehlender Merkmalstext PMD_ACE483_001_000]	60 °C	60 °C	60 °C	60 °C
Relative humidity				
• Relative humidity during operation	90 %	90 %	90 %	90 %
Software				
Web browser	Yes	Yes	Yes	Yes
Configuration				
Configuration				
• On-board	Yes	Yes	Yes	Yes
• Remote administration	Yes; With Remote Configuration Center (RCC) as of V2.0	Yes; With Remote Configuration Center (RCC) as of V2.0	Yes; With Remote Configuration Center (RCC) as of V2.0	Yes; With Remote Configuration Center (RCC) as of V2.0
Languages				
Online languages				
• German	Yes	Yes	Yes	Yes
• English	Yes	Yes	Yes	Yes
I/O/Options				
I/O devices				
• USB memory	Yes; USB storage medium can be connected	Yes; USB storage medium can be connected	Yes; USB storage medium can be connected	Yes; USB storage medium can be connected
Mechanics/material				
Type of housing (front)				
• Aluminum	Yes	Yes	Yes	Yes
Dimensions				
Housing diameter/depth (mm)				
• Width	330 mm	415 mm	483 mm	560 mm
• Height	241 mm	310 mm	337 mm	380 mm
Mounting cutout (W x H x D)				
• Mounting cutout, width	310 mm	396 mm	465 mm	542 mm
• Mounting cutout, height	221 mm	291 mm	319 mm	362 mm
• Mounting cutout, depth	82 mm	75 mm	75 mm	75 mm
Weights				
Weight without packaging	3.4 kg	5.2 kg	6.5 kg	7.1 kg
Weight incl. packaging	4.1 kg	5.7 kg	7.1 kg	7.8 kg

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SIMATIC Industrial Thin Client

Ordering data

	Article No.
Industrial Thin Client	
• SIMATIC ITC1200 12" Touch device	**6AV6646-1AA22-0AX0**
• SIMATIC ITC1500 15" Touch device	**6AV6646-1AB22-0AX0**
• SIMATIC ITC1900 19" Touch device	**6AV6646-1AC22-0AX0**
• SIMATIC ITC2200 22" Touch device	**6AV6646-1AD22-0AX0**
Accessories	See HMI accessories

More information

Additional information is available on the Internet at:
http://www.siemens.com/simatic-itc

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Overview



SIMATIC RF640R is a powerful UHF reader with integral antenna that is suitable for applications at single recording stations, in conveyor systems or production plants. Due to its high maximum transmission power of up to 2 W ERP (ETSI) / 4 W EIRP (FCC), longer ranges can also be achieved. The high degree of protection of the overall system is a guarantee for problem-free use, even under the most difficult environmental conditions. Instead of the integral antenna, an external antenna of the RF600 series (SIMATIC RF620A, RF640A, RF642A, RF660A) can be used. The reader offers 2 digital inputs (24 V) and 2 digital outputs (typ. 24 V/0.5 A) that have protection circuits for industrial use.

The integrated processing logic of the reader enables numerous functions to be executed in the device itself. For example, the reader offers extensive, intelligent filter functions, a parameterizable state machine for forwarding the data, the automatic control of the digital outputs for signaling functions, and the extensive configuration of response message frames. The advantage: Thanks to its intelligence, this considerably reduces the cost for additional software modules (RFID middleware). The reader is configured by means of the easy-to-use SIMATIC RF-MANAGER Basic software, which is provided on a free CD supplied with each reader.

Data communication takes place via an XML protocol with TCP/IP; the reader provides an Ethernet interface for this purpose. The protocol is compatible with the SIMATIC RF670R.

Application

The stationary SIMATIC RF640R UHF reader with its integral antenna is suitable for applications in production (with PC/IT interface), production-level logistics, distribution, supply chain management, asset management, service processes or material flow control.

The digital inputs and outputs (DI/DO) are used for simple process interfacing (sensors, actuators).

The SIMATIC RF640R supports the established EPCglobal Class 1, Gen 2 standard and is offered in three versions: compliant with ETSI for Europe, compliant with FCC for USA/ Canada, and compliant with CMIIT for China.

Technical specifications

Article No.	**6GT2811-3BA00-0AA0**	**6GT2811-3BA00-1AA0**	**6GT2 811-3BA00-2AA0**
Product-type designation	**RF640R ETSI reader**	**RF640R FCC reader**	**RF640R reader CMIIT**
Suitability for installation	RF600 transponder, for connecting to Ethernet networks	RF600 transponder, for connecting to Ethernet networks	RF600 transponder, for connecting to Ethernet networks
Wireless frequencies			
Operating frequency	865 … 868 MHz	902 … 928 MHz	920 … 925 MHz
Transmit power	50 … 1 000 mW	50 … 1 250 mW	50 … 1 000 mW
Effective radiant power for each external antenna maximum	2 000 mW	-	2 000 mW
Equivalent isotropic radiant power for each external antenna maximum	-	4 000 mW	-
Electrical data			
Range maximum	8 m	8 m	8 m
Range note	Refer to RF600 system manual, overrange is possible	Refer to RF600 system manual, overrange is possible	Refer to RF600 system manual, overrange is possible
Protocol for radio transmission	EPCglobal Class 1 Gen 2 / ISO 18000-6C	EPCglobal Class 1 Gen 2 / ISO 18000-6C	EPCglobal Class 1 Gen 2 / ISO 18000-6C
Transfer rate with radio transmission maximum	320 kbit/s	320 kbit/s	320 kbit/s
Product property multitag-capable	Yes	Yes	Yes
Polarization	Internal: circular, external: according to antenna	Internal: circular, external: according to antenna	Internal: circular, external: according to antenna
Transmission time for user data			
• for write access per byte typical	6.3 ms	6.3 ms	6.3 ms
• for read access per byte typical	1 ms	1 ms	1 ms

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Technical specifications (continued)

Article No.	6GT2811-3BA00-0AA0	6GT2811-3BA00-1AA0	6GT2 811-3BA00-2AA0
Product-type designation	**RF640R ETSI reader**	**RF640R FCC reader**	**RF640R reader CMIIT**
Interfaces			
Number of external antennas	1	1	1
Design of electrical connection	-	-	-
• for external antenna(s)			
• for supply voltage	M12, 4-pin, female connector	M12, 4-pin, female connector	M12, 4-pin, female connector
Standard for interfaces for communication	Ethernet	Ethernet	Ethernet
Design of electrical connection			
• for communications interface	Push-pull RJ45	Push-pull RJ45	Push-pull RJ45
• at the digital inputs/outputs	M12, 8-pin, female connector	M12, 8-pin, female connector	M12, 8-pin, female connector
Number of digital inputs	2	2	2
Number of digital outputs	2	2	2
Mechanical data			
Material	Aluminum, ABS (GF20)	Aluminum, ABS (GF20)	Aluminum, ABS (GF20)
Color	Silver/anthracite	Silver/anthracite	Silver/anthracite
Mounting distance for metal surfaces recommended minimum	0 mm	0 mm	0 mm
Supply voltage, current consumption, power loss			
Supply voltage for DC			
• rated value	24 V	24 V	24 V
• minimum	20 V	20 V	20 V
• maximum	30 V	30 V	30 V
Consumed current at 24 V DC			
• typical	0.45 A	0.45 A	0.45 A
• maximum	1.5 A	1.5 A	1.5 A
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +55 °C	-25 … +55 °C	-25 … +55 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Ambient condition for (standard) operation mode	With operating temperature below -20 °C: Warming-up time at least 10 minutes	With operating temperature below -20 °C: Warming-up time at least 10 minutes	With operating temperature below -20 °C: Warming-up time at least 10 minutes
Protection class IP	IP65	IP65	IP65
Resistance against shock	EN 60068-2-27, EN 60068-2-6	EN 60068-2-27, EN 60068-2-6	EN 60068-2-27, EN 60068-2-6
Resistance against shock	500 m/s^2	500 m/s^2	500 m/s^2
Resistance against vibration	200 m/s^2	200 m/s^2	200 m/s^2
Design, dimensions and weight			
Width	193 mm	193 mm	193 mm
Height	252 mm	252 mm	252 mm
Depth	52 mm	52 mm	52 mm
Net weight	2.02 kg	2.01 kg	1.99 kg
Mounting type	4 x M6 screws, Vesa 100 with 4 x M4 screws	4 x M6 screws, Vesa 100 with 4 x M4 screws	4 x M6 screws, Vesa 100 with 4 x M4 screws
Cable length of antenna cable			
• minimum	3 m	3 m	3 m
• maximum	20 m	20 m	20 m
Product properties, functions, components general			
Type of display	3-color LED	3-color LED	3-color LED
Product feature silicon-free	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability	Wireless acc. to R&TTE guideline, CE, IEC 60950	Wireless according to FCC, IC (Canada), cULus	Wireless according to CMIIT
Accessories	optional: External antenna	optional: External antenna	optional: External antenna

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Ordering data

	Article No.
SIMATIC RF640R reader (ETSI) UHF RFID reader for frequencies from 865 to 868 MHz with integrated antenna, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-3BA00-0AA0**
SIMATIC RF640R reader (FCC) UHF RFID reader for frequencies from 902 to 928 MHz with integrated antenna, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-3BA00-1AA0**
SIMATIC RF640R reader (CMIIT) UHF RFID reader for frequencies from 920 to 925 MHz with integrated antenna, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-3BA00-2AA0**
Accessories	
DI/DO cable For the connection of digital sensors and actuators to SIMATIC RF640R. M12 connector on reader side, open stranded wires on the sensor side. DI/DO cable, PUR material, black, shielded, M12, 8 x 0.14 mm², length 5 m.	**6GT2891-0DH50**
Set of protective caps For achieving IP65 degree of protection if not all connections on the reader are assigned. Content: 3x protective caps for antenna connection, 1x protective cap for DI/DO connection; design: Metal.	**6GT2898-4AA00**
Wide-range power supply Primary side: 100 … 240 V AC, 120 … 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection and continuous short-circuit protection.	
• EU connector version	**6GT2898-0AA00**
• UK connector version	**6GT2898-0AA10**
• US connector version	**6GT2898-0AA20**
Cable for wide-range power supply 24 V DC, material: PUR, length 5 m NOTICE: This cable is not suitable for SIMATIC RF660R.	**6GT2891-0NH50**
Ethernet connection	
• Twisted connecting cable, IP65 on reader side, length 10 m.	**6GT2891-1HN10**
• Push-pull cable connector for RJ45, not pre-assembled.	**6GK1901-1BB10-6AA0**
• Covers for push-pull sockets, RJ45, 5 units per pack. Price per pack.	**6ES7194-4JD50-0AA0**

More information

All current approvals can be found on the Internet at:

http://www.siemens.com/rfid-approvals

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2

Overview



SIMATIC RF670R is a high-performance RFID reader with four antenna connections which can be configured as required for individual read stations, detecting at conveyor systems, or as gates. The high transmit power of up to 2 W ERP / 4 W EIRP (dependent on antenna and cable) permits large ranges of up to 10 m in gate applications. The high degree of protection of the overall system is a guarantee for problem-free use, even under the most difficult environmental conditions.

Due to the monostatic antenna principle, as many as four independent read stations can be implemented. All antennas of the RF600 series are supported (SIMATIC RF620A, RF640A, RF642A, RF660A). The reader offers 4 digital inputs (24 V) and 4 digital outputs (typ. 24 V/0.5 A) that have protection circuits for industrial use.

The integrated processing logic of the reader enables numerous functions of the higher-level software layers to be executed in the device itself. For example, the reader offers extensive, intelligent filter functions, a parameterizable state machine for forwarding the data, the automatic control of the digital outputs for signaling functions, and the extensive configuration of response message frames. The advantage: Thanks to its intelligence, this considerably reduces the cost for additional software modules (RFID middleware). The reader is configured by means of the easy-to-use SIMATIC RF-MANAGER Basic software, which is provided on a free CD supplied with each reader.

Data communication for the RF670R is performed by means of an XML protocol with TCP/IP; the reader provides an Ethernet interface for this purpose.

Application

With up to four antennas, the stationary SIMATIC RF670R UHF portal reader is suitable for applications in production (with PC/IT interface), production-level logistics, distribution, supply chain management, asset management, service processes, or material flow control.

The digital inputs and outputs (DI/DO) are used for simple process interfacing (sensors, actuators).

The SIMATIC RF670R supports the established EPCglobal Class 1, Gen 2 standard and is offered in three versions: compliant with ETSI for Europe, compliant with FCC for USA/ Canada, and compliant with CMIIT for China.

Technical specifications

Article No.	**6GT2811-0AB00-0AA0**	**6GT2811-0AB00-1AA0**	**6GT2811-0AB00-2AA0**
Product-type designation	**RF670R ETSI reader**	**RF670R FCC reader**	**RF670R CMIIT reader**
Suitability for installation	RF600 transponder, for connecting to Ethernet networks	RF600 transponder, for connecting to Ethernet networks	RF600 transponder, for connecting to Ethernet networks
Wireless frequencies			
Operating frequency	865 … 868 MHz	902 … 928 MHz	920 … 925 MHz
Transmit power	50 … 1000 mW	50 … 1250 mW	50 … 1000 mW
Effective radiant power for each external antenna maximum	2000 mW	-	2000 mW
Equivalent isotropic radiant power for each external antenna maximum	-	4000 mW	-
Electrical data			
Range maximum	8 m	8 m	8 m
Range note	Refer to RF600 system manual, overrange is possible	Refer to RF600 system manual, overrange is possible	Refer to RF600 system manual, overrange is possible
Protocol for radio transmission	EPCglobal Class 1 Gen 2 / ISO 18000-6C	EPCglobal Class 1 Gen 2 / ISO 18000-6C	EPCglobal Class 1 Gen 2 / ISO 18000-6C
Transfer rate with radio transmission maximum	320 kbit/s	320 kbit/s	320 kbit/s
Product property multitag-capable	Yes	Yes	Yes
Transmission time for user data			
• for write access per byte typical	6.3 ms	6.3 ms	6.3 ms
• for read access per byte typical	1 ms	1 ms	1 ms

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Technical specifications (continued)

Article No.	6GT2811-0AB00-0AA0	6GT2811-0AB00-1AA0	6GT2811-0AB00-2AA0
Product-type designation	**RF670R ETSI reader**	**RF670R FCC reader**	**RF670R CMIIT reader**
Interfaces			
Design of the electrical connection for external antenna(s)	RP-TNC	RP-TNC	RP-TNC
Number of external antennas	4	4	4
Design of electrical connection			
• for supply voltage	M12, 4-pin, female connector	M12, 4-pin, female connector	M12, 4-pin, female connector
Standard for interfaces for communication	Ethernet	Ethernet	Ethernet
• for communications interface	Push-pull RJ45	Push-pull RJ45	Push-pull RJ45
• at the digital inputs/outputs	M12, 12-pin, female connector	M12, 12-pin, female connector	M12, 12-pin, female connector
Number of digital inputs	4	4	4
Number of digital outputs	4	4	4
Mechanical data			
Material	Aluminum, ABS (GF20)	Aluminum, ABS (GF20)	Aluminum, ABS (GF20)
Color	Silver/anthracite	Silver/anthracite	Silver/anthracite
Supply voltage, current consumption, power loss			
Supply voltage for DC			
• rated value	24 V	24 V	24 V
• minimum	20 V	20 V	20 V
• maximum	30 V	30 V	30 V
Consumed current at 24 V with DC			
• typical	0.45 A	0.45 A	0.45 A
• maximum	2 A	2 A	2 A
Permitted ambient conditions			
Ambient temperature			
• during operating	-25 … +55 °C	-25 … +55 °C	-25 … +55 °C
• during storage	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
• during transport	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Protection class IP	IP65	IP65	IP65
Resistance against shock	EN 60068-2-27, EN 60068-2-6	EN 60068-2-27, EN 60068-2-6	EN 60068-2-27, EN 60068-2-6
Resistance against shock	500 m/s²	500 m/s²	500 m/s²
Resistance against vibration	200 m/s²	200 m/s²	200 m/s²
Design, dimensions and weight			
Width	193 mm	193 mm	193 mm
Height	252 mm	252 mm	252 mm
Depth	52 mm	52 mm	52 mm
Net weight	1.8 kg	1.8 kg	1.8 kg
Mounting type	4 x M6 screws, Vesa 100 with 4 x M4 screws	4 x M6 screws, Vesa 100 with 4 x M4 screws	4 x M6 screws, Vesa 100 with 4 x M4 screws
Cable length of antenna cable			
• minimum	3 m	3 m	3 m
• maximum	20 m	20 m	20 m
Product properties, functions, components general			
Type of display	3-color LED	3-color LED	3-color LED
Product feature silicon-free	Yes	Yes	Yes
Standards, specifications, approvals			
Verification of suitability	Wireless acc. to R&TTE guideline, CE, IEC 60950	Wireless according to FCC, IC (Canada), cULus	Wireless according to CMIIT
Accessories			
Accessories	One or 4 external antennas	One or 4 external antennas	One or 4 external antennas

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Ordering data

	Article No.
SIMATIC RF670R reader (ETSI) UHF RFID reader for frequencies from 865 to 868 MHz for connecting up to four external antennas, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-0AB00-0AA0**
SIMATIC RF670R reader (FCC) UHF RFID reader for frequencies from 902 to 928 MHz for connecting up to four external antennas, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-0AB00-1AA0**
SIMATIC RF670R reader (CMIIT) UHF RFID reader for frequencies from 920 to 925 MHz for connecting up to four external antennas, suitable for inclusion in PC systems via Ethernet with TCP/IP and XML protocol.	**6GT2811-0AB00-2AA0**
Accessories	
Note: For proper functioning of the SIMATIC RF670R reader, we recommend using the SIMATIC RF620A / 640A / 642A / 660A antennas.	
DI/DO cable For the connection of digital sensors and actuators to SIMATIC RF670R. M12 connector on reader side, open stranded wires on the sensor side. DI/DO cable, PUR material, black, shielded, M12, 12 x 0.14 mm^2, length 5 m.	**6GT2891-0CH50**
Wide-range power supply Primary side: 100 … 240 V AC, 120 … 353 V DC, secondary side: 24 V DC, 3 A, with no-load protection, with continuous short-circuit protection	
• EU connector version	**6GT2898-0AA00**
• UK connector version	**6GT2898-0AA10**
• US connector version	**6GT2898-0AA20**
Cable for wide-range power supply 24 V DC, PUR material, length 5 m. NOTICE: This cable is not suitable for SIMATIC RF660R.	**6GT2891-0NH50**
Ethernet connection	
• Twisted connecting cable, IP65 on reader side, length 10 m.	**6GT2891-1HN10**
• Push-pull cable connector for RJ45, not pre-assembled.	**6GK1901-1BB10-6AA0**
• Covers for push-pull sockets, RJ45, 5 units per pack. Price per pack.	**6ES7194-4JD50-0AA0**
Set of protective caps For achieving IP65 degree of protection if not all connections on the reader are assigned. Content: 3x protective caps for antenna connection, 1x protective cap for DI/DO connection; design: Metal.	**6GT2898-4AA00**

More information

All current approvals can be found on the Internet at:

http://www.siemens.com/rfid-approvals

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Overview



SIMATIC RF180C / RF182C and RFID 181EIP are communication modules for direct connection of SIMATIC identification systems to PROFINET IO/Ethernet and Ethernet/IP. The readers (SLGs) of the RFID systems MOBY D/U, SIMATIC RF200 / RF300 / RF600 as well as the MV400 code reading systems (RF180C and RFID 181EIP only) can be operated on the communication modules.

Due to their high degree of protection and ruggedness, the SIMATIC RF180C / RF182C and RFID 181EIP are ideally suitable for use at the machine level. The uniform plug-in connection system ensures rapid commissioning.

Benefits

get Designed for Industry

- Two parallel reader channels ensure real-time mode at dynamic read points.
- Reader connection using an 8-pin M12 connector for fast installation 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 and 24 V 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 set up quickly and inexpensively.
- Powerful hardware ensures rapid data communication with the reader (SLG). Consequently, data is available for the application even faster.
- Simple firmware downloading in the case of function expansions and error rectification ensures high availability of the identification system.
- Adjustable and parameterizable identification-system-specific diagnostics facilitate easy 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 assures better quality.

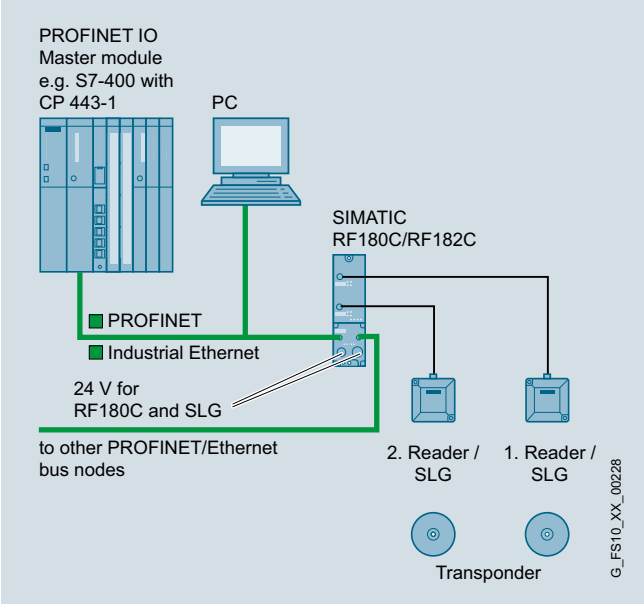
Application

The Ethernet-based communication modules have been specially designed for a wide range of applications in industrial automation and logistics. Due to their high IP67 degree of protection, the SIMATIC RF180C/RF182C and RFID 181EIP can be installed in the process outside the control cabinet.

Main applications for SIMATIC RF180C/RF182C and RFID 181EIP:

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automotive industry / suppliers
- Small assembly lines

Design



RFID integration into PROFINET/Ethernet network

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Function

The SIMATIC RF180C / RF182C and RFID 181EIP communication modules consist of 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; not recommended for RF180C):
  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 as follows:
Direct addressing via absolute addresses.

Error messages and operating states (transponder in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

SIMATIC RF180C/RF182C and RFID 181EIP have two reader interfaces from which the readers are also supplied with voltage. In the communication module , the power supply of the readers has an electronic fuse. The maximum permissible current per communication module for the readers is 1 A. It is of no importance here whether the current is drawn by 1 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/Data Matrix Code 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 from

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

RFID 181EIP

The communication module RFID 181EIP is for use in Ethernet/IP networks. A DHCP server automatically assigns an IP address to the RDID 181EIP. Alternatively, the user can assign issue static IP addresses on the DHCP server. The standard tool for assigning IP addresses is called the BOOTP/DHCP server and is included in the RSLinx software package.

The RFID 181EIP communicates with the reader by means of implicit and explicit messages. Commands and results are transferred with explicit messages. The user sets up the commands directly in the application program.

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Technical specifications

Article No.	**6GT2002-0JD00**	**6GT2002-0JD10**	**6GT2002-0JD20**
Product-type designation	**RF180C communication module**	**RF182C communication module**	**RFID 181EIP communication module**
Suitability for installation	PROFINET in conjunction with RF200/300/600, MOBY D/E/I/U, MV	Industrial Ethernet in conjunction with RF200/300/600, MOBY D/U	Ethernet/IP in conjunction with RF200/300/600, MOBY D/E/I/U, MV
Transmission rate			
• with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
• at point-to-point connection serial maximum	115.2 kbit/s	115.2 kbit/s	115.2 kbit/s
Interfaces			
Design of interface for point-to-point connection	RS422	RS422	RS422
Number of readers connectable	2	2	2
Design of the electrical connection the Industrial Ethernet Interface	(according to the connection block)	(according to the connection block)	(according to the connection block)
Design of electrical connection for supply voltage	(according to the connection block)	(according to the connection block)	(according to the connection block)
Version of the interface to the reader for communication	M12, 8-pin	M12, 8-pin	M12, 8-pin
Mechanical data			
Material	Thermoplastic (Valox 467, fiberglass reinforced)	Thermoplastic (Valox 467, fiberglass reinforced)	Thermoplastic (Valox 467, fiberglass reinforced)
Color	IP Basic 714	IP Basic 714	IP Basic 714
Tightening torque of screw for mounting the equipment maximum	3 N·m	3 N·m	3 N·m
Supply voltage, current consumption, power loss			
Supply voltage for DC			
• rated value	24 V	24 V	24 V
• minimum	20 V	20 V	20 V
• maximum	30 V	30 V	30 V
Current consumed at 24 V DC			
• without connected devices typical	0.1 A	0.1 A	0.1 A
• including connected devices maximum	1.1 A	1.1 A	1.1 A
Permitted ambient conditions			
Ambient temperature			
• during operating	0 … 60 °C	0 … 60 °C	0 … 60 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Protection class IP	IP 67	IP 67	IP 67
Resistance against shock	According to IEC 61131-2	According to IEC 61131-2	According to IEC 61131-2
Resistance against shock	300 m/s^2	300 m/s^2	300 m/s^2
Resistance against vibration	100 m/s^2	100 m/s^2	100 m/s^2

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Technical specifications (continued)

Article No.	6GT2002-0JD00	6GT2002-0JD10	6GT2002-0JD20
Product-type designation	**RF180C communication module**	**RF182C communication module**	**RFID 181EIP communication module**
Design, dimensions and weight			
Width	60 mm	60 mm	60 mm
Height	30 mm	30 mm	30 mm
Depth	210 mm	210 mm	210 mm
Net weight	0.21 kg	0.21 kg	0.21 kg
Mounting type	2 x M5 screws	2 x M5 screws	2 x M5 screws
Cable length for RS 422 interface maximum	1000 m	1000 m	1000 m
Product properties, functions, components general			
Type of display	4 LEDs per reader connection, 4 LEDs for device status	4 LEDs per reader connection, 4 LEDs for device status	4 LEDs per reader connection, 4 LEDs for device status
Product function			
• Media Redundancy Protocol (MRP)	No	No	No
• transponder file handler can be addressed	Yes	No	Yes
Protocol			
• is supported			
- LLDP	Yes	No	No
- PROFINET IO protocol	Yes	No	No
- TCP/IP	No	Yes	No
EtherNet/IP protocol	No	No	Yes
Product functions management, configuration			
Type of parameterization	GSDML	XML	EDS file
Type of programming	FB 45, FB 55, Ident profile (PIB)	XML commands	Data records via implicit/explicit messages
Type of computer-mediated communication	acyclic communication	XML	Implicit/explicit messaging
Standards, specifications, approvals			
Verification of suitability	CE, FCC, cULus, PNO: Conformance Class B	CE, FCC, cULus	CE, FCC, cULus
Accessories			
Accessories	Connection block M12 d-coded, 7/8" 5-pin or push-pull	Connection block M12 d-coded, 7/8" 5-pin or push-pull or M12 d-coded, 7/8" 4-pin	Connection block M12 d-coded, 7/8" 5-pin or push-pull or M12 d-coded, 7/8" 4-pin

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Technical specifications (continued)

Article No.	6GT2002-1JD00	6GT2002-2JD00	6GT2002-4JD00
Product-type designation	**Connection block for RF18xC, M12, 7/8" 5-pin**	**Connection block for RF18xC, push-pull**	**Connection block for RF18xC, M12, 7/8" 4-pin**
Suitability for installation	Connection block for RF180C, RF182C, RFID 181EIP	Connection block for RF180C, RF182C, RFID 181EIP	Connection block for RF180C, RF182C, RFID 181EIP
Transmission rate with Industrial Ethernet	10 … 100 Mbit/s	10 … 100 Mbit/s	10 … 100 Mbit/s
Interfaces			
Design of the electrical connection the Industrial Ethernet Interface	M12, d-coded	push-pull, RJ 45	M12, d-coded
Design of electrical connection for supply voltage	7/8" 5-pin	push-pull, 5-pin	7/8" 4-pin
Mechanical data			
Material	Die-cast zinc	Thermoplastic (Valox 467, fiberglass reinforced)	Die-cast zinc
Color	Silver	IP Basic 714	Silver
Tightening torque of screw for mounting the equipment maximum	1.3 N·m	1 N·m	1.3 N·m
Supply voltage, current consumption, power loss			
Supply voltage for DC			
• rated value	24 V	24 V	24 V
• minimum	20 V	20 V	20 V
• maximum	30 V	30 V	30 V
Continuous current for loop-through to further bus nodes with DC, maximum	8 A	12 A	8 A
Permitted ambient conditions			
Ambient temperature			
• during operating	0 … 60 °C	0 … 60 °C	0 … 60 °C
• during storage	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
• during transport	-40 … +70 °C	-40 … +70 °C	-40 … +70 °C
Protection class IP	IP 67	IP 67	IP 67
Resistance against shock	According to IEC 61131-2	According to IEC 61131-2	According to IEC 61131-2
Resistance against shock	300 m/s²	300 m/s²	300 m/s²
Resistance against vibration	100 m/s²	100 m/s²	100 m/s²
Design, dimensions and weight			
Width	60 mm	60 mm	60 mm
Height	24 mm	70 mm	24 mm
Depth	79 mm	85 mm	79 mm
Net weight	0.23 kg	0.12 kg	0.23 kg
Mounting type	4 screws included	4 screws included	4 screws included
Product properties, functions, components general			
Type of display	4 LEDs for Ethernet status	4 LEDs for Ethernet status	4 LEDs for Ethernet status
Accessories			
Accessories	-	-	-

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Ordering data	Article No.
SIMATIC RF180C communication module For PROFINET, for connecting 2 readers, without a connection block.	**6GT2002-0JD00**
SIMATIC RF182C communication module For Ethernet, for connecting 2 readers, without a connection block.	**6GT2002-0JD10**
Communication module SIMATIC RFID 181EIP For Ethernet/IP, for connecting 2 readers, without a connection block.	**6GT2002-0JD20**
PROFINET connection block For SIMATIC RF180C/RF182C, M12 d-coded, 7/8" (5-pole).	**6GT2002-1JD00**
PROFINET connection block For SIMATIC RF180C/RF182C, push-pull RJ45.	**6GT2002-2JD00**
PROFINET connection block For SIMATIC RF182C, RFID 181EIP, M12 d-coded, 7/8" (4-pole).	**6GT2002-4JD00**
Accessories for network connection M12, 7/8" (5-pole)	
IE M12-180/M12-180 connecting cable Pre-assembled IE FC TP trailing cable GP 2x2 (PROFINET Type C), with two 4-pin M12 plugs (D-coded), maximum length 85 m, IP65/IP67 degree of protection. Lengths:	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2 m	**6XV1870-8AH20**
3 m	**6XV1870-8AH30**
5 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**
7/8" connecting cable to power supply Pre-assembled with two 5-pin 7/8" male and female connectors. Lengths:	
0.3 m	**6XV1822-5BE30**
0.5 m	**6XV1822-5BE50**
1 m	**6XV1822-5BH10**
1.5 m	**6XV1822-5BH15**
2 m	**6XV1822-5BH20**
3 m	**6XV1822-5BH30**
5 m	**6XV1822-5BH50**
10 m	**6XV1822-5BN10**
15 m	**6XV1822-5BN15**
PROFINET M12 plug-in connectors Rugged metal housing; axial cable outlet; D-coded.	**6GK1901-0DB20-6AA0**
7/8" cable connector, for voltage Pack with 5 units, minimum ordering quantity 1 pack.	
• With male insert	**6GK1905-0FA00**
• With female insert	**6GK1905-0FB00**

	Article No.
IE M12 control cabinet bushing For conversion from M12 (D-coded) to RJ45, pack with 5 units, minimum ordering quantity 1 pack.	**6GK1901-0DM20-2AA5**
IE Connecting Cable M12-180/IE FC RJ45 Plug 145 Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection, length 2 m.	**6XV1871-5TH20**
IE FC RJ45 PLUG 180 RJ45 plug With rugged metal housing and FC connection system, straight cable outlet.	**6GK1901-1BB10-2AA0**
Sealing caps 7/8" Pack with 10 units, minimum ordering quantity 1 pack.	**6ES7194-3JA00-0AA0**
Accessories for push pull RJ45 network connection	
Push-pull cable connector for 1L+/2L+ Unassembled.	**6GK1907-0AB10-6AA0**
Push-pull cable connector for RJ45 Unassembled.	**6GK1901-1BB10-6AA0**
Cover caps for push-pull female connectors (1L+/ 2L+), pack of 5.	**6ES7194-4JA50-0AA0**
Cover caps for push-pull female connectors RJ45, pack of 5.	**6ES7194-4JD50-0AA0**
Accessories for network connection M12, 7/8" (4-pole)	
Network wiring with M12	Accessories as for M12, 7/8" (5-pole)
Power supply with 7/8" (4-pole)	No cables and connectors from Siemens
Accessories for PROFINET bus components	
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnostics, and PROFINET diagnostics for configuring line, star and ring topologies, with integrated redundancy manager (exception: SCALANCE X208PRO), including operating instructions, Industrial Ethernet network manual, and configuration software on CD-ROM. With electrical and optical ports for glass multi-mode fiber-optic cable up to 5 km: four 10/100 Mbit/s RJ45 ports and two fiber-optic ports.	**6GK5204-2BB10-2AA3**
SCALANCE X204IRT PRO Industrial Ethernet switch Managed Industrial Ethernet switch, 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. Four 10/100 Mbit/s RJ45 push-pull ports	**6GK5204-0JA00-2BA6**

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Ordering data

	Article No.
Accessories for PROFINET bus components	
IE FC TP standard cable GP 2x2 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. delivery unit 1000 m, minimum ordering quantity 20 m.	**6XV1840-2AH10**
Power line 5-core, 5 x 1.5 mm^2, trailing type, sold by the meter, minimum ordering quantity 20 m, maximum ordering quantity 1000 m.	**6XV1830-8AH10**
General accessories	
Stainless steel screws for connection blocks Optional screws made of V4A steel for securing the connection blocks on the basic module. For use in wet areas. Pack with 40 units is sufficient for 10 connection blocks.	**6GT2090-0VB00**

	Article No.
Accessories for RFID	
MOBY U reader cable PUR material, CMG approval, suitable for cable carriers. Lengths:	
2 m	**6GT2091-4FH20**
5 m	**6GT2091-4FH50**
MOBY D reader cable PUR material, CMG approval, suitable for cable carriers, 2 m.	**6GT2691-4FH20**
Reader cable for SIMATIC RF200 / RF300 / RF600 / MV420 / MV440 Or extension cable MOBY U/D and SIMATIC RF200 / RF300 / RF600 / MV400, PUR material, CMG approval, suitable for cable carriers, straight connector. Lengths:	
2 m	**6GT2891-4FH20**
5 m	**6GT2891-4FH50**
10 m	**6GT2891-4FN10**
20 m	**6GT2891-4FN20**
50 m	**6GT2891-4FN50**
2 m, plug angled at reader	**6GT2891-4JH20**
5 m, plug angled at reader	**6GT2891-4JH50**
Sealing caps M12 for unused reader connections Minimum ordering quantity 10 units.	**3RX9802-0AA00**
DVD "RFID Systems Software & Documentation"	**6GT2080-2AA20**

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SIMATIC MV420

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Overview



The SIMATIC MV420 is a particularly compact code reading system suitable for close-up to mid-range reading distances (approx. 10 mm to 400 mm).

SIMATIC MV420 has been specifically designed for detecting and evaluating a variety of machine readable codes in the packaging industry (e.g. F&B, pharmaceuticals, and tobacco) and industrial production (e.g. automotive, electronics, and solar). The list of readable codes includes all standard matrix codes and bar codes which can be reliably detected - mostly independent of the printing technology applied and carrier medium used. One key feature of the unit is its ability to read data matrix codes (DMC). The SIMATIC MV420 device family is flexible, reliable and easy to use.

Highlights at a glance:

- Compact design with IP67 degree of protection.
- Variety of lenses with variable reading distances.
- Integrated high-performance lighting.
- Web server technology: Parameterizable with regular Web browser.
- Interfaces: Ethernet, PROFINET, RS232, DI/DO, and direct connection to RFID communication modules (ASM).
- Exceptionally high reading speeds, depending on the model.

Further important product characteristics are:

- Excellent read algorithms based on the SIMATIC MV440 and VS130-2 code reading systems and many years of experience in industrial applications.
- No special knowledge required for reliable parameterization of reading features. Parameterization usually unnecessary, and is only required for difficult to read codes. "Setup" is performed automatically by presenting a readable code pattern.
- Code quality evaluation: displays the key quality parameters of the code to be read.
- Customized user interface can be easily generated with SIMATIC WinCC flexible/WinCC.
- Web-based user interface; can run on a variety of platforms meeting the following requirements: Internet browser (IE 6.0 or higher), JAVA-VM (MS, SUN).
- Password protected user interface with integrated access rights administration.
- Web-based user interface available for easy integration with an HMI device. The browser and JAVA VM requirements previously mentioned also apply in this case.
- 6 language versions (operator interface, manual and online help are each available in German, English, French, Spanish, Italian, and Chinese).

In addition, SIMATIC MV420 SR-P offers the following highlights:

- Autotrigger mode: Automatic detection of a code without an external trigger signal
  - Saving of sensor technology and cabling
  - Reduced potential for error as there are fewer components
  - Solution for applications where proximity switches and light barriers cannot be used
- Open web API interface for comfortable creation of customized applications and PC based camera remote control
- Multicode: reads multiple codes in one step within the same field of view.
  - ID-Genius: a high-performance code reading algorithm for poorly legible directly marked data matrix codes (DPM: Direct Part Marking)

Application

Key features of the SIMATIC MV420:

- Code reading
- Comparing the read result with a preset value
- Formatting of read results for further use

The range of application for the SIMATIC MV420 product family extends to practically all areas of industrial production. The possibilities for use range from identification of stationary parts to fast moving parts on conveyor systems. The high-performance integrated lighting allows for an extremely compact design. The unit is protected from environmental influences with a degree of protection IP67. The SIMATIC MV420 code readers are therefore suitable for all industrial applications, also for direct marking (Direct Part Marking - DPM). In addition to industrial production, thanks to its small size and flexibility, the SIMATIC MV420 code reader is also ideally suited to the packaging industry (e.g. F&B, pharmaceuticals and tobacco).

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Application (continued)

The MV420 code readers include all common communication interfaces, such as Ethernet or PROFINET, and can therefore be connected to a wide variety of systems. An integrated RS422 interface makes it possible to use all of the RFID communication modules, such those required for the PROFIBUS connection. In this case, the combination of code reader and RFID reader is also possible on one communication module.

The reading devices are particularly easy to use and commission despite the wide variety of options for use. Parameters are automatically configured for most applications. If reconfiguration is required, however, parameterization can be carried out without the need for pre-installed software via the integrated Web server using an Internet browser.

Due to the properties and functions described, the emphasis for MV420 is on the following sectors and applications:

- Automobile industry:
  - Needle markings on various drive components (DPM), e.g. cylinder heads, cylinder blocks, manifolds.
  - Laser markings on various power train components (DPM), e.g. camshafts, crankshafts, cylinder piston, connecting rods, gearbox components.
  - Laser markings on electronic components, printed circuit boards, or enclosures.
- Pharmaceutical industry, food industry (F&B), tobacco industry:
  - Print or laser markings on medicines (DPM, OCR).
  - Recording the contents of cartons (up to 150 codes).
  - Read portal by linking several cameras.
- Aerospace industry:
  - Needle or laser markings on gas turbine blades (DPM).
  - Needle or laser markings on jet engine components (DPM).
- Medical equipment:
  - Laser markings on heart pacemakers and other implants (DPM).
  - Laser markings on medical devices (DPM).
- Electronics:
  - Needle or laser markings on hard disk components.
  - Lasered or etched markings on hard disk components (DPM).
- Semiconductors:
  - Laser markings on rigid and flexible circuit boards (DPM).
  - Laser markings on enclosed semiconductor components, heat sinks or heat exchangers (DPM).

More information is available in the accompanying manual.

Design

SIMATIC MV420 is a particularly compact code reading system. The device can be assembled from individual components or ordered as a ready-assembled unit. The MV420 is available in two versions:

- Basic model: SIMATIC MV420 SR-B
- Performance model: SIMATIC MV420 SR-P

For the individually configurable models the following individual components are available in addition to the basic units (body):

- Lenses
- Ring lights

The basic units include the protective barrel for the lens.

The preconfigured models include an integrated lens (6 mm, aperture 5.6) and a red ring light including protective barrel.

The following accessories are available for the connection and installation:

- Flexible mounting angle
- Power DIO RS232 cable (M16 connector on open end)
- M12 Ethernet cable (varying lengths)
- Ethernet cable (M12 to RJ45) for commissioning/lab operation; 2 m in length
- Special communication module cable for M16 connector (M16 to M12) for connecting to RFID communication modules (ASM). Can be expanded using standard communication module cables, if required.
- Plug-in power supply for demonstration and lab operation (for office environment only)
- CD with installation/operating instructions (supplied with unit)

Further information can be found in the supplied manual.

Function

Key features of the SIMATIC MV420:

- Code reading (refer to "Overview" and "Range of application")
- Formatting of read results for further use and/or comparison
- Comparing the read result with a preset value
  - Specification of a comparison string via one of the serial ports (PROFINET (ASM and onboard), PROFIBUS (ASM), RS232)
  - Comparison of the formatted read results with the comparison string

The functions can be used individually or they can be combined.

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Function (continued)

The SIMATIC MV420 reads the following codes:

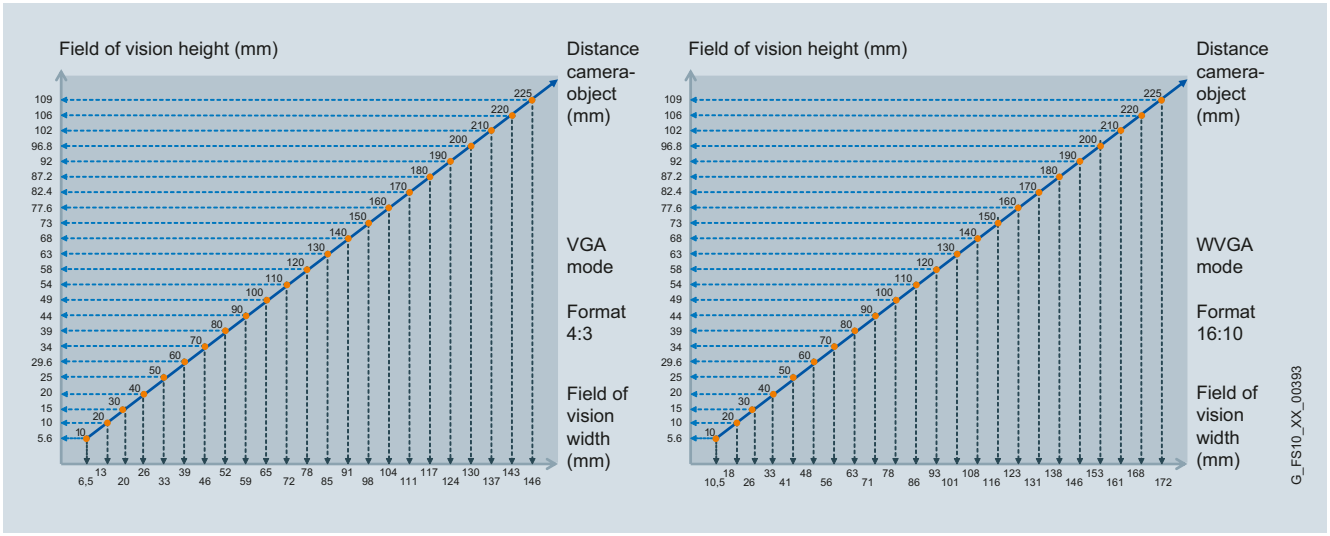
- 1D codes (barcodes):
  - Int. 2/5 (no checksum)
  - Int. 2/5+CS (checksum included)
  - Code 128
  - Code 39 (no checksum)
  - Code 39+CS (checksum included)
  - EAN 13
  - EAN 8
  - UPC-A
  - UPC-E
  - GS1 Databar 14
  - GS1 Databar Stacked
  - GS1 Databar Limited
  - GS1 Databar Expanded
- 2D codes:
  - DMC
  - PDF417
  - QR
  - DotCode
  - Vericode

The SIMATIC MV420 reads the codes found on a wide variety of components and surfaces, including:

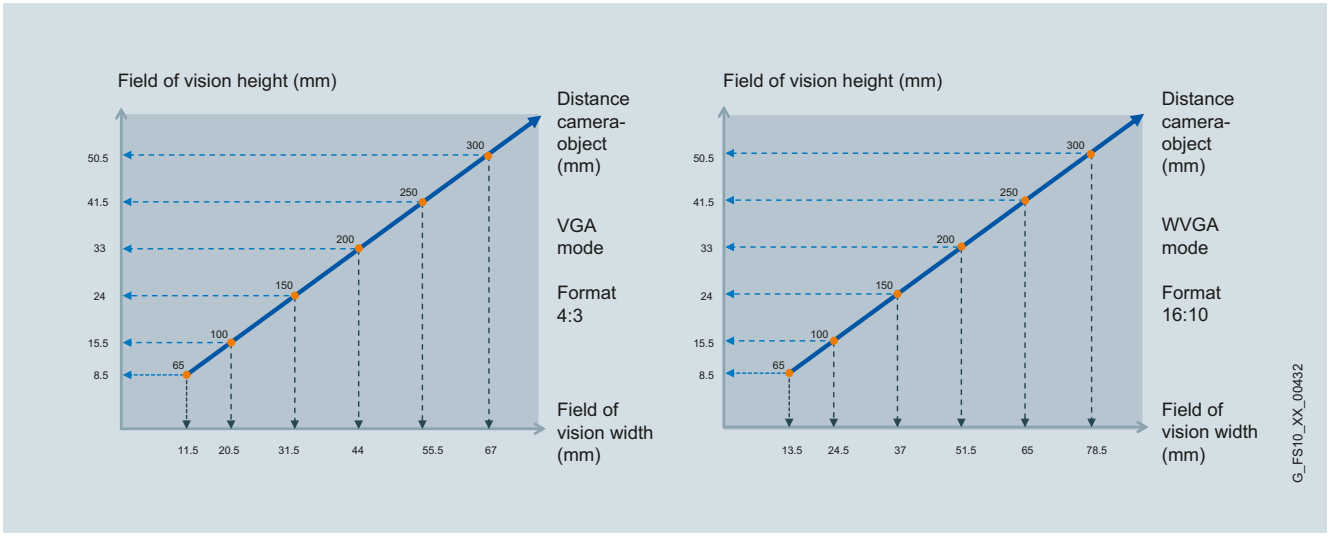
- Paper or plastic labels
- Plastic parts
- Circuit boards
- Metallic objects

The SIMATIC MV420 reads codes of a wide variety of marking types, such as:

- Printed
- Dot peened
- Laser
- Stamped
- Bored



SIMATIC MV420 field of view dimensions for the 6 mm lens



SIMATIC MV420 field of view dimensions for the 16 mm lens

Further information can be found in the supplied manual.

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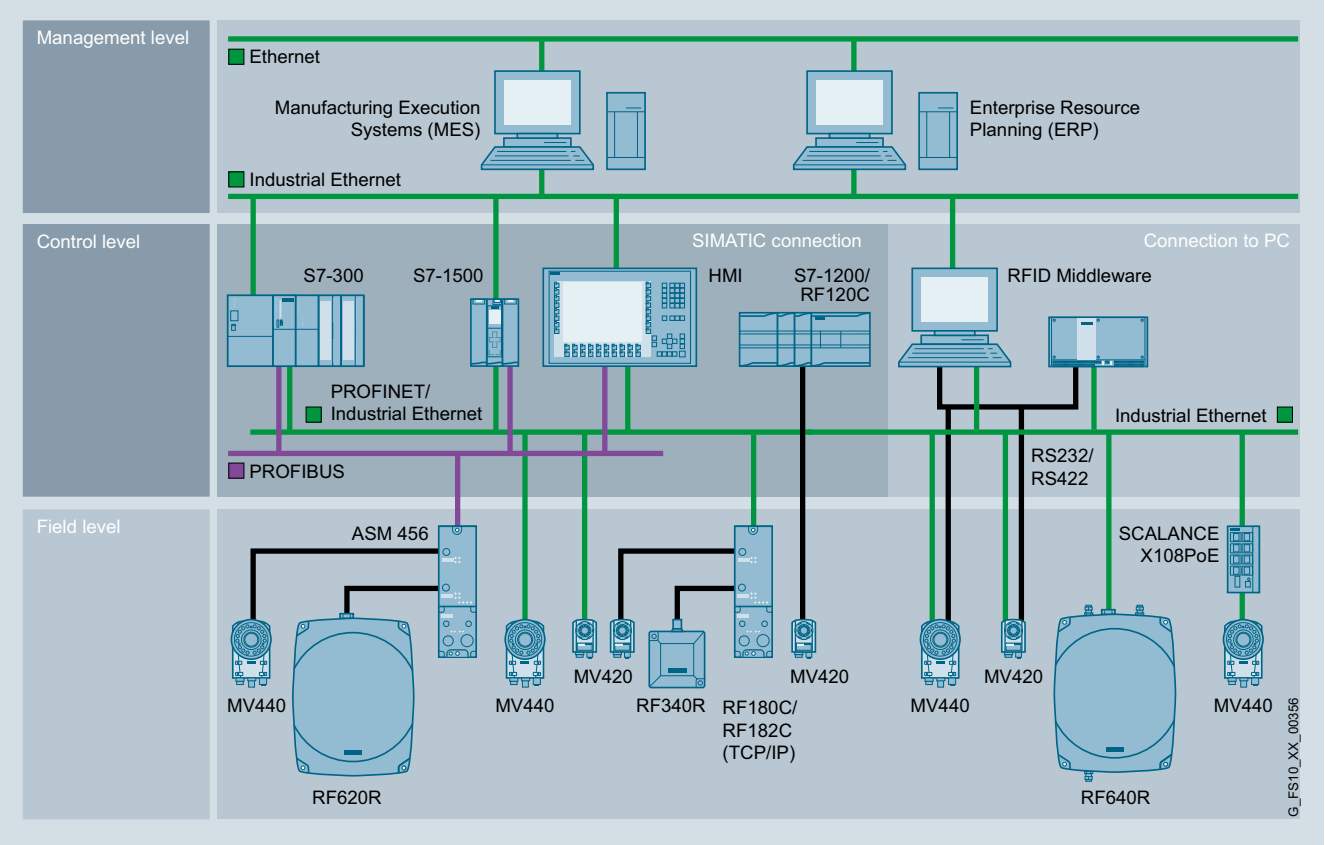
Integration

Various onboard connection options and convenient function blocks are available for the integration into the automation level.

In the case of SIMATIC MV420, direct connection via PROFINET, Ethernet or RS232 is possible.

In addition, communication modules are available for connection to other bus systems or the shared interface with RFID readers.

For further details on the communication modules, see the section "Communication modules".



Integration of the SIMATIC MV420 in the automation environment

Technical specifications

Article No.	**6GF3420-0AA20**	**6GF3420-0AA40**
Product-type designation	**MV420 SR-B code reader**	**MV420 SR-P code reader**
Suitability for installation	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1, 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1, 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode
Interfaces		
Design of the electrical connection the Industrial Ethernet Interface	M12, d-coded	M12, d-coded
Design of the electrical connection of the PROFIBUS interface	-	-
Design of electrical connection of RS 422 interface	M16, 12-pin	M16, 12-pin
Design of electrical connection of RS 232 interface	M16, 12-pin	M16, 12-pin
Design of electrical connection for supply voltage	M16, 12-pin	M16, 12-pin
Design of electrical connection at the digital inputs/outputs	M16, 12-pin	M16, 12-pin
Number of digital inputs	1	1
Number of digital outputs	3	3
Design of digital inputs	One high-speed trigger input	One high-speed trigger input
Design of digital outputs	2 isolated outputs 50 mA, 1 high-speed trigger input for external lighting	2 isolated outputs 50 mA, 1 high-speed trigger input for external lighting

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Technical specifications (continued)

Article No.	6GF3420-0AA20	6GF3420-0AA40
Product-type designation	**MV420 SR-B code reader**	**MV420 SR-P code reader**
Optical data		
Design of image sensor of camera	CMOS chip, VGA (640 x 480), WVGA (752 x 480)	CMOS chip, VGA (640 x 480), WVGA (752 x 480)
Type of image capture	Global shutter	Global shutter
Range	10 … 400 mm	10 … 400 mm
• note	Adjustable within the range	Adjustable within the range
Mounting type of lens	Fixed (M12)	Fixed (M12)
Nature of fluorescent material	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list
Image acquisition frequency maximum	50 Hz	80 Hz
Code reading rate maximum	29 1/s	50 1/s
Type of focusing	Manual adjustment on the lens cover	Manual adjustment on the lens cover
Supply voltage, current consumption, power loss		
Supply voltage for DC rated value	24 V	24 V
Supply voltage		
• for DC	19.2 … 28.8 V	19.2 … 28.8 V
Consumed current At 24 V with DC		
• typical	0.17 A	0.17 A
• maximum	2 A	2 A
Stored energy time supply voltage failure minimum	0.01 s	0.01 s
Mechanical data		
Material	Die-cast aluminum	Die-cast aluminum
Color	petrol blue	petrol blue
Permitted ambient conditions		
Ambient temperature		
• during operating	0 … 50 °C	0 … 50 °C
• during storage	-30 … +70 °C	-30 … +70 °C
• during transport	-30 … +70 °C	-30 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %
Protection class IP	IP67	IP67
Resistance against shock	According to IEC 60068-2	According to IEC 60068-2
Resistance against shock	150 m/s^2	150 m/s^2
Resistance against vibration	10 m/s^2	10 m/s^2
Design, dimensions and weight		
Width	52.5 mm	52.5 mm
Height	70.7 mm	70.7 mm
Depth	39.5 mm	39.5 mm
Net weight	0.25 kg	0.25 kg
Mounting type	2 x M4 screws	2 x M4 screws
Product properties, functions, components general		
Product feature silicon-free	Yes	Yes
Type of display	4 LEDs	4 LEDs
Standards, specifications, approvals		
Verification of suitability	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL
Accessories		
Accessories	Mounting brackets, built-in ring lamps, M12 lenses	Mounting brackets, built-in ring lamps, M12 lenses

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Ordering data

	Article No.
SIMATIC MV420 SR-B Pre-configured basic model: Including lens (6 mm, aperture 5.6) and a red ring light, without multicode and ID-Genius algorithm	**6GF3420-0AA20**
SIMATIC MV420 SR-P Preconfigured performance model Including lens (6 mm, aperture 5.6) and a red ring light, for very fast read rates, with multicode and ID-Genius algorithm	**6GF3420-0AA40**
SIMATIC MV420 SR-B Basic model body: Does not include multicode or the ID-Genius algorithm	**6GF3420-0AX20**
SIMATIC MV420 SR-P Performance model body: For very high read rates; includes multicode reading and the ID-Genius algorithm	**6GF3420-0AX40**
Lens accessories	
Lens kit 6 mm Lens 6 mm, aperture 5.6, including protective barrel	**6GF3420-0AC00-0LK0**
Lens kit 16 mm Lens 16 mm, aperture 4, including protective barrel	**6GF3420-0AC00-1LK0**
Protective barrels for lenses	
Protective barrel replacement set Contains: 2x protective barrel, 3x O-rings, 8x mounting screws, offset screwdriver	**6GF3420-0AC00-2AA0**
Built-in ring lights	
Built-in ring lamp, red	**6GF3420-0AC00-1LT0**
Built-in ring lamp, white	**6GF3420-0AC00-2LT0**
Built-in ring lamp, infrared	**6GF3420-0AC00-3LT0**

	Article No.
Cables	
IE connecting cable M12-180/IE FC RJ45 plug-145 for commissioning, service and installation Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection, length: 2 m	**6XV1871-5TH20**
IE Connecting Cable M12-180/M12-180 Pre-assembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (D-coded) up to 85 m, IP65/IP67 degree of protection. Lengths:	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2 m	**6XV1870-8AH20**
3 m	**6XV1870-8AH30**
5 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**
Industrial Ethernet FastConnect plug connector, 2x2, 180° cable outlet RJ45 plug connector (10/100 Mbit/s) with rugged metal enclosure and FastConnect technology, for Industrial Ethernet FastConnect cable 2x2. For further cables, see under "Passive network components".	**6GK1901-1BB10-2AA0**
Cable 24 V power supply Power cable, M16 pre-assembled, push-pull. Various lengths:	
1.5 m	**6GF3400-0BH15**
2 m	**6GF3400-1BH20**
Power supply cable DIO-RS232 Power IO RS232 cable, M16 assembled on one end, open on other end Various lengths:	
10 m	**6GF3440-8BA2**
30 m	**6GF3440-8BA4**
Adapter cable for RFID communication modules (ASM): M16 connector (MV420) to M12 connector (communication module); length: 2 m; expandable to any length with standard communication module cables.	**6GF3420-0AC00-2CB0**
Cable for communication module interface Standard communication module cable for installation, pre-assembled connecting cable for ASM 456, RF160C, RF170C, RF180C, and RF182C. Various lengths:	
2 m	**6GT2891-4FH20**
5 m	**6GT2891-4FH50**
10 m	**6GT2891-4FN10**
20 m	**6GT2891-4FN20**
50 m	**6GT2891-4FN50**

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Ordering data

	Article No.
Supports	
Mounting bracket for SIMATIC MV420	**6GF3420-0AC00-1AA0**



	Article No.
Additional accessories	
SCALANCE X204-2 Industrial Ethernet Switch Industrial Ethernet switches with integral SNMP access, Web diagnostics, copper cable diagnostics, and PROFINET diagnostics for configuring line, star and ring topologies; with integrated redundancy manager (Exception: SCALANCE X208PRO); including operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM. With electrical and optical ports for glass multimode FOC up to max. 5 km: Four 10/100 Mbit/s RJ45 ports and two fiber-optic cable ports	**6GK5204-2BB10-2AA3**
Plug-in power supply (EU, US) For demo and lab operation (for office environment only)	**6GF3420-0AC00-1PS0**

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Overview



SIMATIC MV440 with built-in ring light and D65 protective barrel and with external ring light and D65 protective barrel

The SIMATIC MV440 readers have been specially developed for use in industrial production. The devices offer professional decoding algorithms for machine-readable codes and text recognition in one device for production and logistics. The SIMATIC MV440 device family is characterized by flexibility, reliability and ease of use.

The list of readable codes includes all common matrix and barcodes which, regardless of the printing technology and the carrier medium used, are recognized reliably. A special feature of this device is its ability to read data matrix code (DMC) which is frequently used, especially in production, for direct part marking (DPM) and places the highest demands on the readers.

The operating range of the devices extends from close range 70 mm to distant range 3000 mm. Due to the freely selectable lenses and lighting, the working range as well as implementation in applications with special requirements is almost unrestricted. Integration in industrial automation environments is via standardized fieldbus technology, but open interfaces are also supported.

Benefits

get Designed for Industry

Highlights at a glance:

- Compact design with IP67 degree of protection.
- Very high reading reliability and read rates thanks to Siemens decoding algorithms.
- Different screen resolutions can be selected specific to the application.
- Flexible adaptation to the application by means of freely selectable lenses and lighting.
- Option of integrated or external high-performance lighting
- Variety of interfaces: Ethernet (PoE), PROFINET (PoE), RS232, DI/DO, communication module interface.
- Wide range of connector technology can be used by means of communication modules.
- Function block for PROFINET/PROFIBUS can be used with SIMATIC and SIMOTION.
- Web-based user interface can be used for parameter assignment and monitoring, without the need for installation.

Further important product characteristics are:

- No special knowledge required for reliable parameterization of reading features. Automatic "setup" by presenting a readable code pattern.
- Autotrigger mode: automatic detection of a code without an external trigger signal
  - Savings in sensor technology and cabling.
  - Reduced potential for error as there are fewer components.
  - Solution for applications in which proximity switches and light barriers cannot be used.
- Multicode: Reads multiple codes in one step within the same field of view.
- ID-Genius: a high-performance code reading algorithm for poorly legible directly marked data matrix codes (DPM: Direct Part Marking).
- Code quality evaluation: Displays the key quality parameters of the code to be read.
- Customized user interface can be generated with SIMATIC WinCC flexible/WinCC.
- Open web API interface for comfortable creation of customized applications and PC based camera remote control
- Web-based user interface; can run on a variety of platforms meeting the following requirements: Internet browser (IE 6.0 or higher), JAVA-VM (MS, SUN).
- Extensive diagnostics functions ensure operation at the maximum read rate.
- User/password-protected operator interface with integrated management of access rights.
- 6 language versions (operator interface, manual and online help are each available in English, German, French, Spanish, Italian and Chinese).

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SIMATIC MV440

Application

The main functions of SIMATIC MV440 are:

- Reading 1D and 2D codes.
- Optical character recognition (OCR).
- Object detection.
- Verification (measuring the code quality).
- Comparing the read result with a preset value.
- Formatting of read results for further use.

The application range of the SIMATIC MV440 product family covers all sectors and areas of industrial production and logistics. The possible applications include the identification of stationary parts through to extremely fast moving parts on a conveyor belt. The powerful integrated lighting allows a very compact design. The device has IP67 degree of protection and is therefore equipped for harsh industrial environments.

Due to its particularly powerful lighting, lenses and sensor technology, MV440 specializes in direct part marking (DPM) applications. Due to the high picture quality, MV440 recommends itself for measuring the marking quality (verification) in the area of DPM.

Due to the properties and functions described, the emphasis for MV440 is on the following sectors and applications:

- Automobile industry:
  - Needle markings on various drive components (DPM), e.g. cylinder heads, cylinder blocks, manifolds.
  - Laser markings on various power train components (DPM), e.g. camshafts, crankshafts, cylinder piston, connecting rods, gearbox components.
  - Laser markings on electronic components, printed circuit boards, or enclosures.
- Pharmaceutical industry, food industry (F&B), tobacco industry:
  - Print or laser markings on medicines (DPM, OCR).
  - Recording the contents of cartons (up to 150 codes).
  - Read portal by linking several cameras.
- Aerospace industry:
  - Needle or laser markings on gas turbine blades (DPM).
  - Needle or laser markings on jet engine components (DPM).
- Medical equipment:
  - Laser markings on heart pacemakers and other implants (DPM).
  - Laser markings on medical devices (DPM).
- Electronics:
  - Needle or laser markings on hard disk components.
  - Lasered or etched markings on hard disk components (DPM).
- Semiconductors:
  - Laser markings on rigid and flexible circuit boards (DPM).
  - Laser markings on enclosed semiconductor components, heat sinks or heat exchangers (DPM).

Further information can be found in the supplied manual.

Design

SIMATIC MV440 is a compact, stationary code reading system. It consists of one basic unit, which can be configured with other individual components (lens, ring light and protective barrel). This allows the MV440 to be optimally adapted to the application conditions.

The SIMATIC MV440 basic unit is available in three versions that differ only with regard to the resolution of the CCD sensor and the associated recording speed mode and read rate. All three versions of the basic unit have identical functionality:

- SIMATIC MV440 SR
  640 pixels x 480 pixels, 50 full screens/s
- SIMATIC MV440 HR
  1024 pixels x 768 pixels, 20 full screens/s
- SIMATIC MV440 UR
  1600 pixels x 1200 pixels, 15 full screens/s

Using the following accessories, the SIMATIC MV440 basic units can be tailored to the requirements of the application. For a detailed listing of the individual accessories, please refer to the section entitled "Accessories":

- Lenses
- Protective barrel for lens
- Ring lights

The following accessories are available for the connection and installation:

- Flexible mounting plate
- Power DIO RS232 cable (M16 connector on open end)
- M12 Ethernet cable (varying lengths)
- Ethernet cable (M12 to RJ45) for commissioning/lab operation; 2 m in length
- Special communication module cable for M16 connector (M16 to M12) for connecting to RFID communication modules (ASM). Can be expanded using standard communication module cables if required.
- Plug-in power supply for demonstration and lab operation (for office environment only)
- CD with installation/operating instructions (supplied with unit)

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Design (continued)

The following configurations are recommended for the close or distant ranges:

Configuration for close range	Lenses	Ring lights	Protective barrel for lens
	Mini lens 8.5 mm	The built-in ring light cannot be used (alternative: external mounting of a ring light).	D65 protective barrels for lenses can be used.
	Mini lens 6 mm	Built-in ring lights can be used.	
	Mini lens 12 mm		
	Mini lens 16 mm		
	Mini lens 25 mm		
	Mini lens 35 mm		
	Mini lens 50 mm		
	Mini lens 75 mm		Use of the protective barrel extender required (on request).

Configuration for distant range	Lenses	Ring lights	Protective barrel for lens
	Mini lens 6 mm	External ring lights can be used.	D65 protective barrels for lenses can be used.
	Mini lens 8.5 mm		
	Mini lens 12 mm		
	Mini lens 16 mm		
	Mini lens 25 mm		
	Mini lens 35 mm		
	Mini lens 50 mm		
	Mini lens 75 mm		

Function

The main functions of SIMATIC MV440 are:

- **Reading** 1D and 2D codes
- **Verification** (required license "Veri-Genius")
- **Text recognition** (required license "Text-Genius")
- **Comparison** of the read result with a default value
- **Object recognition** (required license "Pat-Genius")
- **Formatting** the read result for forwarding

The functions can be used individually or they can be combined.

Read

The SIMATIC MV440 reads the following 1D and 2D codes (detailed information can be found in the manual):

- 1D codes (barcodes):
  - Int. 2/5 (with/without checksum)
  - Code 128
  - Code 93
  - Code 39 (with/without checksum)
  - Code 32
  - EAN 13
  - EAN 8
  - UPC-A
  - UPC-E
  - CodaBar
  - GS1 DataBar (Omnidirectional, Stacked, Limited, Expanded)
  - Pharmacode (0° and 180°)
  - Postnet
- 2D codes:
  - Data Matrix Code (ECC 0 - 200)
  - PDF417 (without: Truncated, Micro and Macro)
  - QR (without: Micro and Macro)
  - DotCode
  - Vericode (demo mode/VeriCode license)

Verification

Code verification is the term used for measuring the marking quality of 1D and 2D codes. This additional functionality is subject to license and is available for every SIMATIC MV440 by installing the "Veri-Genius license". The following verification methods are supported:

- ISO/IEC TR29158 (previously AIM DPM-1-2006)
- Siemens DPM
- ISO/IEC 15415
- AS9132 Rev. A (previously IAQG)
- ISO/IEC 15416 (previously ANSI X3.182-1990)

For more detailed information, refer to the chapter "Verification systems".

Optical character recognition

Text recognition is used to detect plain text (Optical Character Recognition: OCR). This additional functionality is subject to license and is available for every SIMATIC MV440 by installing the "Text-Genius license" or the "Text-Genius-Plus License". Text recognition with the "Text-Genius-Plus license" is able to recognize many fonts without training immediately after installation. Particularly suitable fonts are:

- OCR-A
- Semifont M13
- and similar fonts

With training ("Text-Genius-Plus license"), text recognition is able to recognize just about all fonts even with distortion and other influences resulting in varied representation. By contrast, this version requires training overhead but offers almost unlimited potential in expanding the characters to be recognized. For more detailed information, refer to the chapter "Text recognition".

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Function (continued)

Object detection

Object recognitiong is used for finding and recognizing trained patterns in the picture. This functionality can be used in stand-along mode or in combination with all the other named functions, and therefore has different application areas. Shape recognition offers the following functionality:

- Object recognition (classification) ·
- Position detection (position, orientation, scaling) ·
- Presence check (object recognition and position check with setpoint specification)·
- Completeness check (multiple presence check with setpoint specification) ·
- Text recognition (based on the contour of any character or symbol. However, shape recognition can also be used in combination with text recognition, for example. In this case, the text recognition read area can track the current position of an object or label.

For more detailed information, refer to the chapter "Shape recognition".

Note:

In demo mode, the full functionality of the devices is available. Testing of a licensed function is therefore possible at any time. However, the output result is unusable, because one or more characters of the result will be randomly replaced by the character '?'. Binary results are completely suppressed.

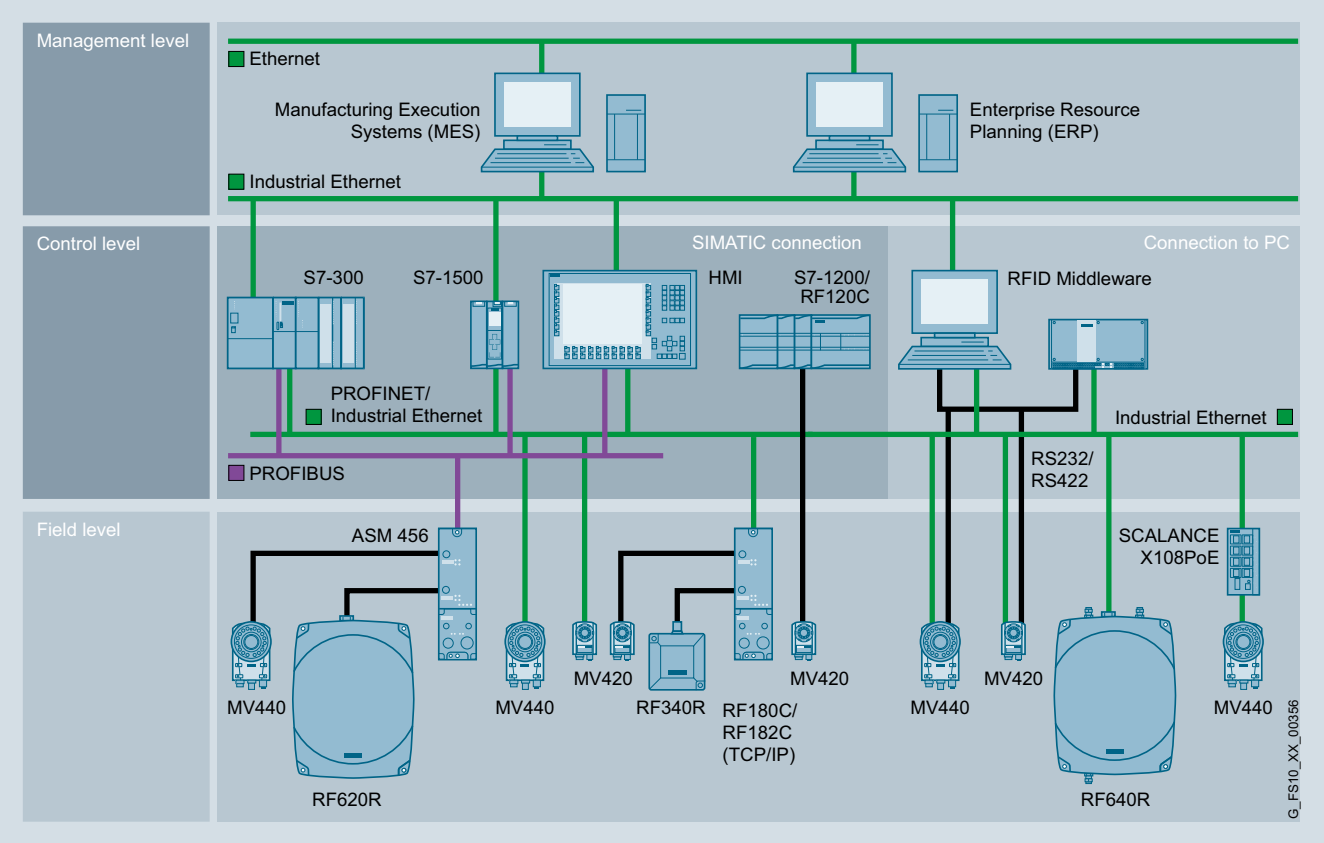
Integration

Various onboard connection options and convenient function blocks are available for the integration into the automation level.

In the case of SIMATIC MV440, for example, direct connection via PROFINET, Ethernet or RS232 is possible.

In addition, communication modules are available for connection to other bus systems or the shared interface with RFID readers.

Further information can be found in the section "Communication modules".



RFID integration into PROFINET/Ethernet network

Configuration tool for SIMATIC MV440

You will find a compact configuration tool here for assembling the SIMATIC MV440.

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Technical specifications

Article No.	**6GF3440-1CD10**	**6GF3440-1GE10**	**6GF3440-1LE10**
Product-type designation	**Code reader MV440 SR**	**MV440 HR code reader**	**Code reader MV440 UR**
Suitability for installation	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet, 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode, text recognition: OCR-A, Semifont M13, similar fonts, code verification: AIM DPM-1-2006, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet, 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode, text recognition: OCR-A, Semifont M13, similar fonts, code verification: AIM DPM-1-2006, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet, 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode, text recognition: OCR-A, Semifont M13, similar fonts, code verification: AIM DPM-1-2006, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416
Interfaces			
Design of the electrical connection the Industrial Ethernet Interface	M12, d-coded, PoE	M12, d-coded, PoE	M12, d-coded, PoE
Design of the electrical connection of the PROFIBUS interface	-	-	-
Design of electrical connection of RS 422 interface	M12, 8-pin	M12, 8-pin	M12, 8-pin
Design of electrical connection of RS 232 interface	M16, 12-pin	M16, 12-pin	M16, 12-pin
Design of electrical connection for supply voltage	M16, 12-pin	M16, 12-pin	M16, 12-pin
Design of electrical connection at the digital inputs/outputs	M16, 12-pin	M16, 12-pin	M16, 12-pin
Number of digital inputs	5	5	5
Number of digital outputs	5	5	5
Design of digital inputs	4 opto isolated inputs (NPN, PNP capability) optionally as output, one high-speed trigger input	4 opto isolated inputs (NPN, PNP capability) optionally as output, one high-speed trigger input	4 opto isolated inputs (NPN, PNP capability) optionally as output, one high-speed trigger input
Design of digital outputs	4 isolated outputs optionally as input, short-circuit-proof, max. 50 mA, 1 high-speed trigger input for external lighting	4 isolated outputs optionally as input, short-circuit-proof, max. 50 mA, 1 high-speed trigger input for external lighting	4 isolated outputs optionally as input, short-circuit-proof, max. 50 mA, 1 high-speed trigger input for external lighting
Optical data			
Design of image sensor of camera	CCD chip 1/3", 640 x 480	CCD chip 1/3", 1024 x 769	CCD chip 1/1.8", 1600 x 1200
Type of image capture	Global shutter with manual or automatic exposure time	Global shutter with manual or automatic exposure time	Global shutter with manual or automatic exposure time
Range	0.07 … 3 m	0.07 … 3 m	0.07 … 3 m
Range note	Using C-mount lenses and lens accessories, the range can be exactly matched to the application	Using C-mount lenses and lens accessories, the range can be exactly matched to the application	Using C-mount lenses and lens accessories, the range can be exactly matched to the application
Mounting type of lens	C mount lens connection with Plexiglas lens protection, 65 mm diameter	C mount lens connection with Plexiglas lens protection, 65 mm diameter	C mount lens connection with Plexiglas lens protection, 65 mm diameter
Nature of fluorescent material	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list
Image acquisition frequency maximum	80 Hz	30 Hz	25 Hz
Code reading rate maximum	80 1/s	30 1/s	25 1/s
Type of focusing	Manual adjustment on the lens	Manual adjustment on the lens	Manual adjustment on the lens

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Technical specifications (continued)

Article No.	6GF3440-1CD10	6GF3440-1GE10	6GF3440-1LE10
Product-type designation	**Code reader MV440 SR**	**MV440 HR code reader**	**Code reader MV440 UR**
Supply voltage, current consumption, power loss			
Supply voltage for DC rated value	24 V	24 V	24 V
Supply voltage			
• for DC	19.2 … 28.8 V	19.2 … 28.8 V	19.2 … 28.8 V
Consumed current At 24 V with DC			
• typical	0.27 A	0.27 A	0.27 A
• maximum	2 A	2 A	2 A
Stored energy time supply voltage failure minimum	0.01 s	0.01 s	0.01 s
Mechanical data			
Material	Die-cast aluminum	Die-cast aluminum	Die-cast aluminum
Color	petrol blue	petrol blue	petrol blue
Permitted ambient conditions			
Ambient temperature			
• during operating	0 … 50 °C	0 … 50 °C	0 … 50 °C
• during storage	-30 … +70 °C	-30 … +70 °C	-30 … +70 °C
• during transport	-30 … +70 °C	-30 … +70 °C	-30 … +70 °C
Relative humidity at 25 °C without condensation during operating maximum	95 %	95 %	95 %
Protection class IP	IP67	IP67	IP67
Resistance against shock	According to IEC 60068-2	According to IEC 60068-2	According to IEC 60068-2
Resistance against shock	100 m/s^2	100 m/s^2	100 m/s^2
Resistance against vibration	10 m/s^2	10 m/s^2	10 m/s^2
Design, dimensions and weight			
Width	68 mm	68 mm	68 mm
Height	122 mm	122 mm	122 mm
Depth	45 mm	45 mm	45 mm
Net weight	0.55 kg	0.55 kg	0.55 kg
Mounting type	4 x M4 screws	4 x M4 screws	4 x M4 screws
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Type of display	5 LEDs	5 LEDs	5 LEDs
Standards, specifications, approvals			
Verification of suitability	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL
Accessories			
Accessories	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses

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Ordering data

	Article No.
SIMATIC MV440 SR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 640 x 480 pixels. PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1CD10**
SIMATIC MV440 HR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 1024 x 768 pixels. PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1GE10**
SIMATIC MV440 UR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 1600 x 1200 pixels PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1LE10**

	Article No.
Optional software modules	
Text recognition module "Text-Genius" License for the module "Text-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V3.0 and higher (MV440 not included in the scope of supply). Description see Catalog ID 10.	**6GF3400-0SL01**
Text recognition module "Text-Genius Plus" License for the module "Text-Genius Plus", supplied on USB flash drive; executable on SIMATIC MV440 firmware V5.0 and higher (MV440 not included in the scope of supply). Description see Catalog ID 10.	**6GF3400-1SL01**
Verification module "Veri-Genius" License for the module "Veri-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V4.0 and higher (MV440 not included in the scope of supply). Description see Catalog ID 10.	**6GF3400-0SL02**
Shape recognition module "Pat-Genius" License for the module "Pat-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V6.0 and higher (MV440 not included in the scope of supply). Description see Catalog ID 10.	**6GF3400-0SL03**

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Ordering data

	Article No.
Accessories	
Lens accessories	
Mini lenses with fixed focal length, adjustable aperture and focus (see also "Lenses" section in Catalog ID 10).	
	
• Mini lens 6 mm, 1: 1,4 D = 32 mm, L = 37.5 mm	**6GF9001-1BB01**
• Mini lens 8.5 mm, 1:1.5 D = 42 mm, L = 47 mm, not suitable in combination with built-in ring lights	**6GF9001-1BE01**
• Mini lens 12 mm, 1:1.4 D = 29.5 mm, L = 35.7 mm	**6GF9001-1BL01**
• Mini lens 16 mm, 1:1.4 D = 29.5 mm, L = 37.2 mm	**6GF9001-1BF01**
• Mini lens 25 mm, 1:1.4 D = 29.5 mm, L = 38.9 mm	**6GF9001-1BG01**
• Mini lens 35 mm, 1:1.6 D = 29.5 mm, L = 41.4 mm	**6GF9001-1BH01**
• Mini lens 50 mm, 1:2.8 D = 29.5 mm, L = 38 mm	**6GF9001-1BJ01**
• Mini lens 75 mm, 1:2.8 D = 34 mm, L = 63.6 mm, an extension piece is required when using the D65 lens protective barrel (on request)	**6GF9001-1BK01**
Accessories for utilizing mini lenses at close range	
Set of intermediate rings with 0.5 mm, 1.0 mm, 5.0 mm, 10.0 mm, 20.0 mm and 40 mm rings with 31 mm diameter C thread, to be screwed in between the lens and the camera body for image capture in the macro range.	**6GF9001-1BU**
Set of intermediate rings with 0.5 mm and 2 x 1.0 mm rings with 31 mm diameter C thread, to be screwed in between the lens and the camera body for image capture in the close range.	**6GF9001-1BU01**

	Article No.
Protective barrels for lenses	
Protective barrel for lens D65 made of metal, for built-in ring lights, internal diameter 57 mm, max. lens length 57 mm, IP67 degree of protection.	
• Glass front pane	**6GF3440-8AC11**
• Plastic front pane	**6GF3440-8AC21**
	
Protective barrel for lens D65 made of plastic; to achieve IP67 degree of protection; suitable for all variants of MV440 and for use with built-in ring lights; max. internal diameter 55 mm, max. lens length 48 mm.	**6GF3440-8AC12**
	
Built-in ring lights	
• Built-in ring light, red Light source: LED red (630 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA11**
• Built-in white ring light Light source: White LED (440 nm to 650 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA21**
• Built-in ring light, green Light source: Green LED (500 nm to 570 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA31**
• Built-in ring lamp, infrared Light source: Infrared LED (850 nm to 880 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA41**

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Ordering data

	Article No.
External ring lights	
 SIMATIC MV400 ring light	
• **Ring light, metal, infrared, clear** light source LED infrared, light source 850 nm, light source 500 mm to 23 000 mm, suitable for D65 lens protective barrel, supply voltage: 24 V (18 V ... 30 V), dimensions B x H x T (mm): 142 x 142 x 42.4, degree of protection IP67.	**6GF3400-0LT01-7BA1**
• **Ring light, metal, red, clear** light source LED infrared, light source 500 mm to 3 000 mm, suitable for D65 lens protective barrel, supply voltage: 24 V (18 V ... 30 V) dimensions W x H x D (mm) 142 x 142 x 42.4, degree of protection IP67.	**6GF3400-0LT01-8DA1**
Cables	
IE connecting cable M12-180/IE FC RJ45 plug-145 for commissioning, service and installation Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection. Length: 2 m	**6XV1871-5TH20**
IE M12-180/M12-180 connecting cable Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two 4-pin M12 connectors (D-coded) up to max. 85 m, IP65/IP67 degree of protection, RJ45 assembly possible with plug-in connector 6GK1901-1BB10-2AA0 (see below). length:	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2 m	**6XV1870-8AH20**
3 m	**6XV1870-8AH30**
5 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**

	Article No.
Cables *(continued)*	
Industrial Ethernet FastConnect plug connector, 2x2, 180° cable outlet RJ45 plug connector (10/100 Mbit/s) with rugged metal enclosure and FastConnect connection method. For Industrial Ethernet FastConnect cable 2x2. For further cables, see under "Passive network components".	**6GK1901-1BB10-2AA0**
Cable for communication module interface Communication module cable for connection to communication modules, e.g. ASM 456, RF160C, RF170C, RF180C, and RF182C. Plug-in cable pre-assembled for SIMATIC MV440. Available in the following lengths:	
2 m	**6GT2891-4FH20**
5 m	**6GT2891-4FH50**
10 m	**6GT2891-4FN10**
20 m	**6GT2891-4FN20**
50 m	**6GT2891-4FN50**
Cable 24 V power supply Power cable, M16 pre-assembled, push-pull. Various lengths:	
1.5 m	**6GF3400-0BH15**
2 m	**6GF3400-1BH20**
Cable power supply DIO RS232 Power IO RS232 cable, M16 pre-assembled at one end, other end unconnected. Various lengths:	
Length 10 m	**6GF3440-8BA2**
Length 30 m	**6GF3440-8BA4**
Cable for external ring lights suitable for 6GF3400-0LT0-7DA1, 6GF3400-0LT0-8DA1, M12, open end, 4-pole, not suitable for drag cables, cable connects external ring lights with the control cabinet (24 V, Gnd, strobe), length 10 m.	**6GF3440-8BC4**
Adapter cable for external ring lights Suitable for 6GF3400-0LT0-7DA1, 6GF3400-0LT0-8DA1 enables direct connection of external ring lights to MV420 and MV440 when using the power supply cable DIO-RS232 (see above) M16, 12-pole socket; M16, 12-pole connector; M12, 4-pole socket, length 25 cm.	**6GF3440-8BD1**

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Ordering data

	Article No.
Mounting accessories	
Reader mounting plate Dimensions W x H x D (mm) 80 x 80 x 60, plate thickness: 4 mm 	**6GF3440-8CA**
Mounting plate for external ring lights Dimensions W x H x D (mm) 96 x 76 x 46, plate thickness: 4 mm. 	**6GF3440-8CD01**
Support system, tri-plate Dimensions W x H x D (mm) 80 x 80 x 60, plate thickness: 4 mm 	**6GF9002-7AD**

	Article No.
Further accessories	
SCALANCE X108PoE Industrial Ethernet Switch Industrial Ethernet Switch for 10/100 Mbit/s, including operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM; 6 x 10/100 Mbit/s RJ45 ports, electrical 2 x 10/100 Mbit/s RJ45 PoE ports, electrical.	**6GK5108-0PA00-2AA3**

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Overview



3RW44 soft starter with PROFINET communication module

The solid-state SIRIUS 3RW44 soft starters are suitable for the torque-controlled soft starting and ramp-down as well as braking of three-phase asynchronous motors.

Optionally, SIRIUS 3RW44 soft starters can be upgraded with a PROFIBUS DP or PROFINET module. Thanks to their communication capability and their programmable control inputs and relay outputs the SIRIUS 3RW44 soft starters can be very easily and quickly integrated in higher-level controllers.

In addition to soft starting and soft ramp-down, the 3RW44 soft starters provide numerous functions for higher-level requirements. They cover a performance range up to 710 kW (at 400 V) in the inline circuit and up to 1 200 kW (at 400 V) in the inside-delta circuit.

The 3RW44 soft starters are characterized by a compact design for space-saving and clearly arranged control cabinet layouts. For optimized motor starting and stopping the innovative SIRIUS 3RW44 soft starters are an attractive alternative with considerable savings potential compared to applications with a frequency converter. The new torque control and adjustable current limiting enable the High-Feature soft starters to be used in nearly every conceivable task. They guarantee the reliable avoidance of sudden torque applications and current peaks during motor starting and stopping. This creates savings potential when calculating the size of the switchgear and when servicing the machinery installed. Be it for inline circuits or inside-delta circuits – the SIRIUS 3RW44 soft starter offers savings especially in terms of size and equipment costs.

The bypass contacts already integrated in the soft starter bypass the thyristors after a motor ramp-up is detected.
This results in a further great reduction in the heat loss occurring during operation of the soft starter at rated value.

Combinations of various starting, operating and ramp-down possibilities ensure an optimum adaptation to the application-specific requirements. Operation and commissioning can be performed with the user-friendly keypad and a menu-prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected quickly, easily and reliably by means of just a few settings with a previously selected language. Four-key operation and plain-text displays for each menu option guarantee full clarity at every moment of the parameterization and operation.

Applicable standards

- IEC 60947-4-2
- UL/CSA

Functionality

Equipped with modern, ergonomic user prompting the 3RW44 soft starters can be commissioned quickly and easily using a keypad and a menu-prompted, multi-line graphic display with background lighting. The optimized motor ramp-up and ramp-down can be effected quickly, easily and reliably by means of just a few settings with a selectable language. Four-key operation and plain-text displays for each menu option guarantee full clarity at every moment of the parameterization and operation. During operation and when control voltage is applied, the display field continuously presents measured values and operating values as well as warnings and fault messages. An external display and operator module can be connected by means of a connection cable to the soft starter, thus enabling active indications and the like to be read directly from the control cabinet door.

The SIRIUS 3RW44 soft starters are equipped with optimum functionality. An integral bypass contact system reduces the power loss of the soft starter during operation. This reliably prevents heating of the switchgear environment.
The SIRIUS 3RW44 soft starters have internal device overload protection. This prevents thermal overloading of the power section's thyristors, e.g. due to unacceptably high closing operations.

Wiring outlay for installing an additional motor overload relay is no longer needed as the SIRIUS 3RW44 soft starters perform this function too. In addition they offer adjustable trip classes and a thermistor motor protection function. As an option the thyristors can also be protected by SITOR semiconductor fuses from short-circuiting so that the soft starter is still functional after a short circuit (type of coordination "2"). And even inrush current peaks are reliably avoided thanks to adjustable current limiting.

In addition a creep speed function is available for positioning and setting jobs. With this function the motor can be controlled in both directions of rotation with reduced torque and an adjustable low speed.

On the other hand the SIRIUS 3RW44 soft starters offer a new, combined DC braking function for the fast stopping of driving loads.

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3RW44 soft starters for High-Feature applications

Overview (continued)

Highlights

- Soft starting with breakaway pulse, torque control or voltage ramp, adjustable torque or current limiting as well as any combination of these, depending on load type
- Integrated bypass contact system to minimize power loss
- Various setting options for the starting parameters such as starting torque, starting voltage, ramp-up and ramp-down time, and much more in three separate parameter sets
- Start-up detection
- Inside-delta circuit for savings in terms of size and equipment costs
- Various ramp-down modes selectable: free ramp-down, torque-controlled pump stop, combined DC braking
- Solid-state motor overload and intrinsic device protection
- Thermistor motor protection
- Keypad with a menu-prompted, multi-line graphic display with background lighting
- Interface for communication with the PC for more accurate setting of the parameters as well as for control and monitoring
- Simple integration into the motor feeder
- Simple mounting and commissioning
- Display of operating states and fault messages
- Connection to PROFIBUS and PROFINET with optional PROFIBUS DP or PROFINET module
- External display and operator module
- Mains voltages from 200 to 690 V, 50 to 60 Hz
- Can be used up to 60 °C (derating from 40 °C)

Ordering data

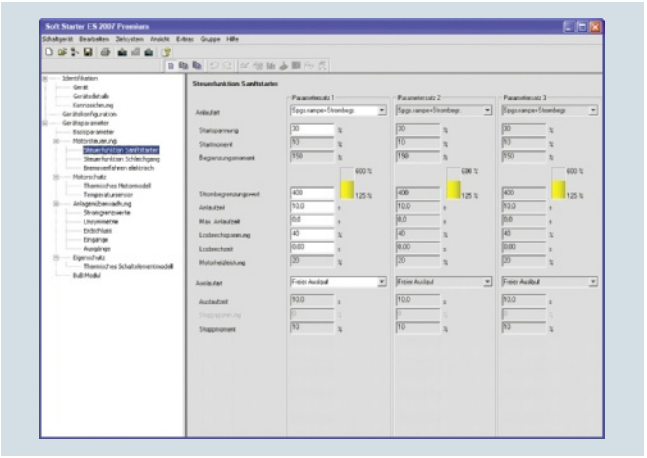
	Version	Article No.
 3RW4900-0NC00	**PROFINET communication module** For 3RW44 soft starter integration in the PROFINET network, suitable for devices with firmware version E12 or higher	**3RW4900-0NC00**

More information

For more information, refer to Catalog IC 10, Chapter 6 "Switching Devices – Soft Starters and Solid-State Switching Devices", Industry Mall or Interactive Catalog CA 01.

Soft starters – Soft Starter ES software

Overview



Easy and clearly arranged parameter setting of the 3RW44 soft starter with Soft Starter ES 2007

The Soft Starter ES software permits the quick and easy parameterization, monitoring and diagnostics of SIRIUS 3RW44 High-Feature soft starters for service purposes. The device parameters can be configured directly on the PC and transferred to the soft starter through a serial cable or an optional PROFIBUS/PROFINET interface.

More information

For more information, refer to Chapter 3 "PROFIBUS", Catalog IC 10, Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS", Industry Mall or Interactive Catalog CA 01.

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Overview

The intelligent, highly flexible M200D PROFIBUS/PROFINET motor starters are the most functional motor starters of the SIRIUS motor starter family in the high degree of protection IP65 for PROFIBUS/PROFINET communication.

They start and protect motors and loads up to 5.5 kW. Direct-online and reversing starter variants are available in a mechanical version and also an electronic version (the latter with soft start function).

The particularly robust M200D PROFIBUS/PROFINET motor starters are characterized by numerous functions which can be flexibly parameterized. Their modular design comprises a motor starter module and a communication module.

The M200D PROFINET motor starters enable TIA-integrated parameterization through PROFINET from STEP 7 – in familiar, user-friendly manner with the same look-and-feel as PROFIBUS.

Functionality

- Basic functionality see Chapter 4 "AS-Interface" ⇒ "M200D Motor Starters" ⇒ "General Data" ⇒ "Overview"
- Electronic version also with soft start function
- Robust and widely used M12 connection method for the digital inputs and outputs and the PROFIBUS/PROFINET bus connection
- All four digital inputs and two digital outputs also exist in the cyclic process image. This provides complete transparency of the process on the control level
- Full TIA integration: All digital inputs and outputs exist in the cyclic process image and are visible through the bus, providing maximum flexibility and excellent adaptability to the application
- Flexible assignment of the digital inputs and outputs with all available assignable input actions
- Extensive diagnostics concept using LEDs and through the bus with the TIA-compatible mechanisms
- Expanded diagnostics using data records
- Complete plant monitoring using statistics data record and current value monitoring by means of data records
- Parameterization through PROFIBUS/PROFINET bus with the help of data records from the user program
- Control of the motor starter using a command data record from the user program
- Removable modular control unit – quicker device replacement and therefore lower costs when device outages occur – since existing wiring is on the control unit and only one device needs to be replaced
- Parameterization in STEP 7 HW Config using Motor Starter ES (ordering option for start-up software)
- Start-up and diagnostics with the help of Motor Starter ES (ordering option for start-up software)
- Trace function through Motor Starter ES for optimized start-up and tracking of process and device values

Only with PROFINET:

- Just one bus system from the MES level to the devices – no routers
- More stations on the bus and possible configuration of flexible bus structures
- Automatic re-parameterization in case of device replacement thanks to proximity detection
- Wireless integration of plant segments in difficult environments using WLAN
- Easier expansion of the system thanks to a higher number of stations on the bus and elimination of terminating resistors



M200D motor starter modules for PROFIBUS/PROFINET (without communication module)



M200D communication module for PROFINET

Mounting and installation

The M200D PROFINET/PROFINET motor starter is comprised of a communication module and a motor starter module. Only the motor starter module has to be replaced therefore when replacing devices. This saves time and money. The communication module remains as an active station on the bus and all other system components continue running. This prevents downtimes.

The integrated plug-in technology enables far lower wiring outlay: Connecting cables can be plugged directly onto the motor starter module. The PROFINET bus is connected cost-effectively using an M12 connection on the device.
All versions have identical enclosure dimensions for easier system design and conversion.

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Overview (continued)

Parameterization and configuration

All motor protection functions, limit values and reactions can be defined by parameterization.

The user has several user-friendly options for the parameterization. In addition to parameterization directly from STEP 7, which also permits automatic re-parameterization in case of device replacement, it is possible to use the user-friendly Motor Starter ES start-up software. By connecting a programming device directly to PROFIBUS/PROFINET and the Motor Starter ES start-up software, the devices can also be conveniently programmed from a central point through the bus. Also, parameters can be changed during operation from the user program using the data record mechanism so that the function of the motor starter is adapted to the process when required. With the help of a PC and the Motor Starter ES software it is also possible to perform the parameterization through the local point-to-point interface on-site.

Functions can be flexibly assigned to the digital inputs and outputs, adapting them to all possible conveyor applications. All digital inputs and outputs exist in the cyclic process image. All limit values for monitoring functions and their reactions are parameterizable and therefore adaptable to the application. Consistency with other products of the SIRIUS M200D motor starter range and with the frequency converter and ET 200pro I/O system is assured.

Only with the M200D PROFINET motor starter

Thanks to the integrated proximity detection, the device name does not need to be issued manually when a device is replaced. The name is issued automatically by the neighboring devices which note the "names" of the devices in their proximity.
No additional start-up measures are required therefore when replacing a device.

The new motor starter generation is characterized by high functionality, maximum flexibility and the highest level of automation. The PROFINET is recommended in particular for expansive and highly automated system components because the possibility of monitoring devices and systems with data records (statistical data, measured values and device diagnostics) guarantees an in-depth view of the plant from the control room and therefore increases plant availability.

Operation

The motor starters record the actual current flow. Evaluating the current of the parameterizable solid-state overload protection increases the availability of the drives, as do reliable signals concerning the overshooting or undershooting of setpoint values.

Diagnostics and maintenance

Diagnostics is provided through numerous mechanisms – and can be used as the customer prefers.

The motor starter is TIA-diagnostics compatible, which means that when a fault is identified, a diagnostics alarm is distributed, which invokes the diagnostics-OB with a SIMATIC control. The fault can be evaluated as usual in the user program.

The M200D motor starter offers a large variety of diagnostics data through data records. Its functionality is without equal on the market. There are extensive options for reading out data from the motor starter for monitoring devices, systems or processes.

The motor starter is equipped internally with 3 logbooks for device faults, motor starter trips and events, which are issued with a time stamp. These logbooks can be read out of the motor starter at any time in the form of data records and provide the plant operator with plenty of information about the state of his plant and process which he can use to carry out improvements.

With the slave pointer and statistical data functions it is possible to read out, for example, the maximum internal current values or the number of motor starter connection operations for plant monitoring purposes. This allows deviations in the process to be monitored, but also optimum initial commissioning to take place. The user can draw conclusions about the actual load conditions of the devices in his process and on this basis can optimize his plant maintenance intervals.

The device diagnostics data record contains details of all the states of the motor starter, the device configuration and the communication status as a basis for central device and plant monitoring.

With installation and maintenance functions (I&M), information (I&M) on modules employed is stored in the motor starter on the one hand, and on the other, data (I&M), which can be specified by the user during configuration, such as location designations. I&M functions serve for troubleshooting faults and localizing changes in hardware at a plant or checking the system configuration. Reordering a device is particularly easy as the result.

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

Another new feature is the integrated TRACE function with the Motor Starter ES software. It can be used to record measured values as a function of time following a trigger event. This enables process flows to be recorded and their timing optimized.

Local control of a drive is possible using the ordering option with integrated manual operation. This is yet another new development which distinguishes the M200D PROFIBUS/PROFINET motor starter from the rest of the market and adds innovative technology, maximum availability and transparency to the system.

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Overview (continued)

M200D PROFINET motor starters with PROFIenergy

Increasing energy prices, far-reaching ecological problems worldwide and the threat of climate change make it necessary for you to be more conscious about your use of energy.

Active and effective energy management is possible with PROFIenergy.

PROFIenergy is a manufacturer-independent profile on PROFINET, which can be used by all manufacturers, has been standardized by PNO[1)] and supports the switching off of electrical devices during dead time and the measurement of energy flow.

Switching off during dead times

PROFIenergy supports the targeted switching-off of loads during dead time.

These can be planned short breaks of a few minutes (such as lunch breaks), longer periods of dead time (such as nights) or unplanned dead time. Energy is always saved when no power is required.

1) In the PNO (PROFIBUS Nutzerorganisation e. V. - PROFIBUS User Organization), manufacturers and users have come together to agree on the standardized communication technologies PROFIBUS and PROFINET.

Measuring and visualizing the energy flow as a basis of energy management

The objective of energy management is to optimize the use of energy in a company – from the purchasing of energy through to the consumption of energy – economically and ecologically.

Analyses of energy consumption over time can be used to control energy flows, avoid energy peaks, improve ratings and thus save costs.

PROFIenergy enables consumption data to be read off from the devices in a unified form. This is recorded during operation and can be displayed on a control panel, for example, or on higher-level energy management software packages. This ensures that these measured variables are in a uniform manufacturer-independent form and structure that is available to the user for further processing. These PROFIenergy functions thus provide the basis for active load and energy management during operation.

PROFIenergy in the M200D PROFINET motor starter

The M200D PROFINET motor starter supports "switching during dead time" and "current measurement values" of the motor current using PROFIenergy. These are called commands, because they trigger a reaction in the M200D motor starter.

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Overview (continued)

	 SIRIUS M200D PROFIBUS	 SIRIUS M200D PROFINET
Device functions (firmware features)		
Slave on the bus		
Fieldbus	✓ PROFIBUS to M12	✓ PROFINET to M12
Adjustable number of stations	✓ 1 ... 125	✓ 1 ... 128 with CPU 315, CPU 317 1 ... 1256 with CPU 319
Parameterization		
DIP switches	✓ For address setting and terminating resistor	--
Motor Starter ES	✓ Through bus, optical interface	
PROFIBUS/PROFINET data records	✓	
From STEP 7 / HW Config	✓	
Diagnostics		
Acyclic through data records	✓	
Diagnostic interrupt support	✓	
Process image		
Process image	✓ 2Byte PII/ 2Byte PIQ	
Data channels		
Local optical interface (manual local)	✓	
Through Motor Starter ES local interface	✓	
Using Motor Starter ES through bus	✓	
Data records (acyclic)		
Parameterization	✓ Using DS 131 (DS = data record)	
Diagnostics	✓ Device-specific DS 92	
Measured values	✓ Measured values DS 94	
Statistics	✓ Statistical data DS 95	
Commands	✓ Using DS 93	
Slave pointer	✓ Slave pointer DS 96	
Logbook	✓ Using Motor Starter ES and data records: Device faults DS 72, tripping operations DS 73, events DS 75	
Device identification	✓ Using DS 100	
I&M data	✓ Using DS 231 ... 234	✓ Using data records 0xAFF0 ... 0xAFF3
Inputs		
Number	✓ 4	
• Of which in the process image	✓ 4	
Input action	✓ Parameterizable: flexibly assignable action, see manual	
Quick stop	✓ Parameterizable: latching, non-latching	

✓ Function available
-- Function not available

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Overview (continued)

	 SIRIUS M200D PROFIBUS	 SIRIUS M200D PROFINET
Device functions (firmware features)		
Outputs		
Number	✓ 2	
• Of which in the process image	✓ 2	
Output action	✓ Parameterizable: flexibly assignable action, see manual	
Brake output		
180 V DC / 230/400 V AC / none	✓	
Motor protection		
Overload protection	✓ Electronic, wide range 1:10	
Short-circuit protection	✓	
Full motor protection	✓	
Temperature sensor	✓ Parameterizable using Motor Starter ES, data record: PTC or Thermoclick or deactivated	
Device function		
Repair switch	✓	
Lower current limit monitoring	✓ Parameterizable	
Upper current limit monitoring	✓ Parameterizable	
Zero current detection	✓ Parameterizable: tripping, warning	
Blocking current	✓ Parameterizable	
Unbalance	✓ Parameterizable	
Load type	✓ Parameterizable: 1 and 3-phase	
Tripping class	✓ Parameterizable using Motor Starter ES, data record: CLASS 5, 10, 15, 20	
Protection against voltage failure	✓ Parameterizable: activated/deactivated	
Support for PROFIenergy profile		
Switching during dead times	--	✓
Measured motor current values	--	✓
Soft starter control function		
Soft start function	✓	
Bypass function	✓ Only solid-state version	

✓ Function available
-- Function not available

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Benefits

M200D PROFINET motor starters with PROFIenergy

Both standards and laws are making environmental protection and energy management increasingly important, as is the desire to cut energy costs in production facilities and thus ensure a sustainable competitive advantage.

It is thus an objective within the industry to save energy and actively reduce CO_2 emissions. By the careful use of valuable resources, the manufacturer-independent PROFIenergy profile on PROFINET can make an active contribution to environmental protection.

Application

The M200D PROFIBUS/PROFINET motor starters are particularly suitable for fully TIA-integrated, highly automated conveyor applications which meet all needs with regard to the monitoring of devices and systems and preventative maintenance.

Adaptability of the motor starter functions and maximum flexibility of the device enable a broad range of applications without any limits. The PROFINET-specific expansions are the best assurance of a future-proof investment.

Ordering data



M200D PROFIBUS/PROFINET motor starter module (without communication module)



M200D PROFINET motor starter

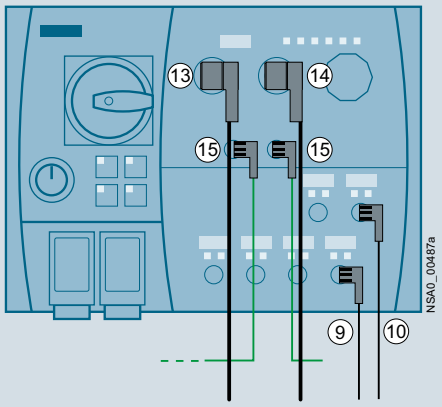
Version	Article No.
M200D communication module for PROFINET	
Communication module for PROFINET M12 termination 7/8"	**3RK1335-0AS01-0AA0**
M200D PROFIBUS/PROFINET motor starter modules	
Electromechanical starters (with integrated contactor)	**3RK1395-6 ■ S41- ■ AD ■**
Setting range for rated operational current / A	
• 0.15 ... 2	**K**
• 1.5 ... 12	**L**
Direct-on-line starters/reversing starters	
• Direct-on-line starters	**0**
• Reversing starters	**1**
• Direct-on-line starters with manual local operation	**2**
• Reversing starters with manual local operation	**3**
Brake actuation	
• Without brake actuation	**0**
• Brake actuation (230/400 V AC)	**3**
• Brake actuation (180 V DC)	**5**
Electronic starters (with thyristors)	**3RK1395-6 ■ S71- ■ AD ■**
• 0.15 ... 2	**K**
• 1.5 ... 12	**L**
Direct-on-line starters/reversing starters	
• Direct-on-line starters	**0**
• Reversing starters	**1**
• Direct-on-line starters with manual local operation	**2**
• Reversing starters with manual local operation	**3**
Brake actuation	
• Without brake actuation	**0**
• Brake actuation (230/400 V AC)	**3**
• Brake actuation (180 V DC)	**5**

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Overview

Note:

For accessories for all SIRIUS M200D motor starters (irrespective of the communication connection) see Chapter 4 "AS-Interface" ⇒ "SIRIUS M200D Motor Starters" ⇒ "Accessories"



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

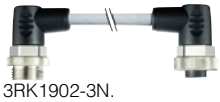
Communication connection using PROFINET and digital inputs and outputs

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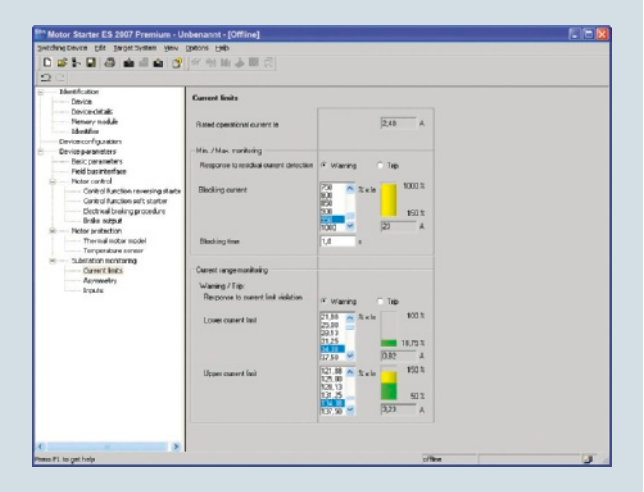
Overview (continued)

	Version	Article No.
	Motor control with PROFINET	
	⑮ **M12 plugs, angular** Screw fixing, 4-pole screw terminals, max. 0.75 mm², angular, D-coded,	
	• 4 male contacts	**3RK1902-2DA00**
 3RK1902-2H.	⑮ **Control cables, assembled at one end** M12, screw fixing, angular, 4-pole, D coded,	
	• 4 male contacts, 3 m	**3RK1902-2HB30**
	• 4 male contacts, 5 m	**3RK1902-2HB50**
	• 4 male contacts, 10 m	**3RK1902-2HC10**
 3RK1902-2N.	⑮ **Control cables, assembled at both ends** M12, screw fixing, angular at both ends, 4-pole, D coded, male contacts at both ends	
	• 3 m	**3RK1902-2NB30**
	• 5 m	**3RK1902-2NB50**
	• 10 m	**3RK1902-2NC10**
	Further accessories	
	PROFINET IE FC TP standard cable GP 2 x 2 sold by the meter	**6XV1840-2AH10**
	PROFINET IE FC TP trailing cable 2 x 2 sold by the meter	**6XV1840-3AH10**
	PROFINET IE FC TP trailing cable GP 2 x 2 sold by the meter	**6XV1870-2D**
	PROFINET IE FC TP torsion cable 2 x 2 sold by the meter	**6XV1870-2F**
	PROFINET IE FC TP marine cable, 4-core sold by the meter	**6XV1840-4AH10**
	Power cables 5-core, 5 x 1.5 mm², trailing, sold by the meter, minimum order quantity 20 m, maximum order quantity 1 000 m	**6XV1830-8AH10**

	Version	Article No.
	Connection for 24 V power supply of the M200D PROFIBUS/PROFINET	
 3RK1902-3DA00	**Plugs** On M200D, 7/8" for screw fixing, angular, screw terminal, 1.5 mm²	
	• ⑬ 5 female contacts	**3RK1902-3DA00**
 3RK1902-3BA00	• ⑭ 5 male contacts	**3RK1902-3BA00**
 3RK1902-3G.	⑬ **Supply lines, assembled at one end** 7/8" for screw fixing, angular, 1.5 mm²	
	• 5 female contacts, 3 m	**3RK1902-3GB30**
	• 5 female contacts, 5 m	**3RK1902-3GB50**
	• 5 female contacts, 10 m	**3RK1902-3GC10**
 3RK1902-3N.	⑬ ⑭ **Supply lines, assembled at both ends** 7/8" for screw fixing, angular at both ends, 5-pole pin/socket, 1.5 mm²	
	• 3 m	**3RK1902-3NB30**
	• 5 m	**3RK1902-3NB50**
	• 10 m	**3RK1902-3NC10**
 6ES7194-3JA00-0AA0	**7/8" sealing caps** 1 pack = 10 units	**6ES7194-3JA00-0AA0**

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Overview



Motor Starter ES for parameterization, monitoring, diagnostics and testing of motor starters

Motor Starter ES is used for start-up, parameterization, diagnostics, documentation and the preventative maintenance of the motor starters in the SIMATIC ET 200S, ET 200pro, ECOFAST and M200D product families.

Interfacing is performed

- Through the local interface on the device
- With PROFIBUS DP V1 capable motor starters from any point in PROFIBUS or in PROFINET
  (applies to ET 200S DP V1/ET 200pro/ECOFAST/M200D)
- With PROFINET-capable motor starters from any point in PROFINET or in PROFIBUS
  (applies to ET 200S DP V1, ET 200pro/M200D)

Using Motor Starter ES, the communication-capable motor starters are easily parameterized during start-up, monitored during normal operation and successfully diagnosed for service purposes. Preventative maintenance is supported by a function for reading out diverse statistical data (e. g. operating hours, operating cycles, cut-off currents, etc.). The user is supported during these procedures with comprehensive Help functions and plain text displays.

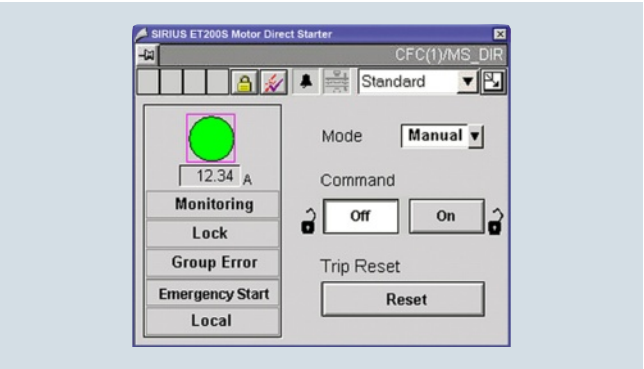
Motor Starter ES can either be used as a stand-alone program or it can be integrated into STEP 7 via an Object Manager.

More information

For more information, refer to Chapter 3 "PROFIBUS", Catalog IC 10, Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS", Industry Mall or Interactive Catalog CA 01.

SIRIUS motor starter block library for SIMATIC PCS 7

Overview



Faceplate of the motor block

With the SIRIUS motor starter PCS 7 block library, SIRIUS ET 200S and ET 200pro motor starters can be easily and simply integrated into the SIMATIC PCS 7 process control system. The SIRIUS motor starter PCS 7 block library contains the diagnostics and driver blocks corresponding to the SIMATIC PCS 7 diagnostics and driver concept as well as the elements (symbols and faceplates) required for operator control and process monitoring.

More information

For more information, refer to Chapter 3 "PROFIBUS", Catalog IC 10, Chapter 14 "Parameterization, Configuration and Visualization with SIRIUS", Industry Mall or Interactive Catalog CA 01.

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SITOP UPS1600

Overview



By combining one DC UPS module SITOP UPS1600 with at least one UPS1100 battery module and a SITOP power supply unit, longer power failures can be bridged without any interruption. The intelligent battery management automatically detects the UPS1100 energy storage unit, ensures optimized temperature-specific charging and continuous monitoring. The compact DC UPS modules have overload capability, for example, to supply the inrush current of industrial PCs. In stand-alone mode, they support starting from the battery.

The DC UPS communicates openly over a USB or Ethernet/PROFINET port. It is easily integrated into the PC or PLC environment over the two Ethernet/PROFINET ports. Total integration in TIA provides user-friendly engineering in the TIA Portal and is supported with ready-to-use function blocks for S7 user programs and WinCC faceplates for fast visualization.

SITOP UPS Manager supports easy monitoring and configuration in PC systems, e.g. shutdown of several PCs in accordance with the master-slave principle. The integrated web server supports remote monitoring of the DC UPS.

Benefits

- 24 V buffering for a few hours for the purpose of continuing processes
- Open communication over USB or two Ethernet/PROFINET ports
- High-performance DC UPS modules in space-saving, slim design
- High overload capability for mains and buffering operation
- Starting from the battery module supports stand-alone mode, e.g. for starting generators
- Easy configuration thanks to automatic detection of battery modules
- High reliability and availability due to monitoring of the operational readiness, battery feeder, aging and charging status
- Battery protecting charging due to temperature-specific charging characteristic
- Defined shutdown of several PCs or controllers on one UPS (versions with Ethernet/PROFINET)
- Remote monitoring via integrated web server (versions with Ethernet/PROFINET)
- Time-saving engineering in PC-based systems via SITOP UPS Manager (versions with USB or Ethernet/PROFINET)
- Full integration in TIA saves time and costs during the planning stage and in operation (versions with Ethernet/PROFINET)
- User-friendly engineering in the TIA Portal
- SIMATIC S7 function blocks for easy integration in STEP 7 user programs
- Fast integration in operator control and monitoring with WinCC faceplates

Application

The battery modules that can be connected in parallel bridge power failures for a few hours. This supports the continued operation of processes or parts of them. The function "Starting from the battery" means that the UPS1600 can also be used in stand-alone mode without connection to the supply.

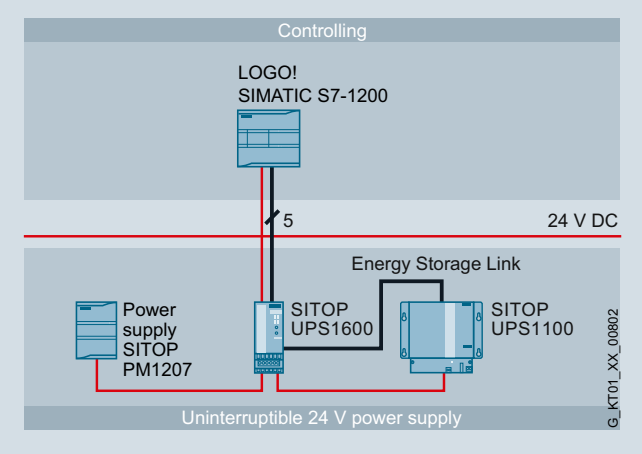
Depending on the communication requirements between the DC UPS and the automation components to be protected against power failure, the version of UPS1600 can be selected accordingly.

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Application (continued)

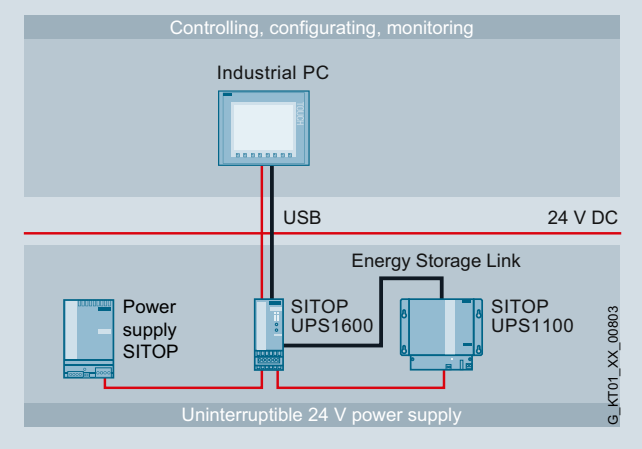
Buffering of simple automation applications

In simple applications with mini PLCs (e.g. obstruction lights, stand-alone hydro-electric plants), 24 V buffering is performed by the UPS1600 without a communications interface. The status messages are transferred to the PLC via the digital outputs (isolated).



Buffering of applications with automation computer

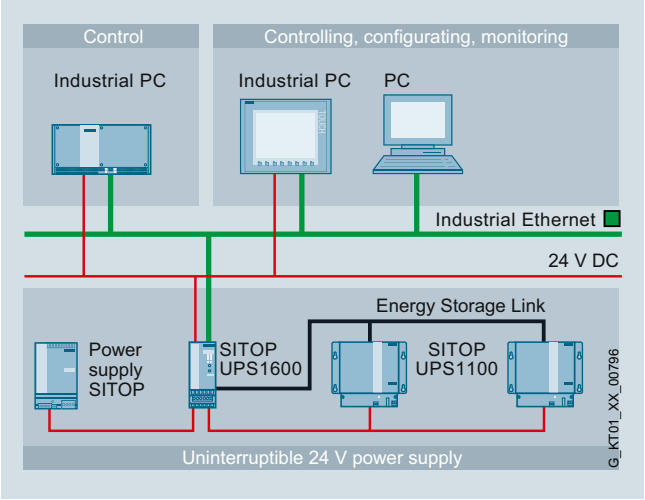
The UPS1600 with a USB interface is used to buffer automation solutions that are controlled by an industrial PC. All operating and configuring data is communicated over the PC interface.



Communication over Ethernet/PROFINET offers the most comprehensive possibilities for diagnostics and system integration. The UPS1600 can be directly integrated into the LAN infrastructure over its two ports.

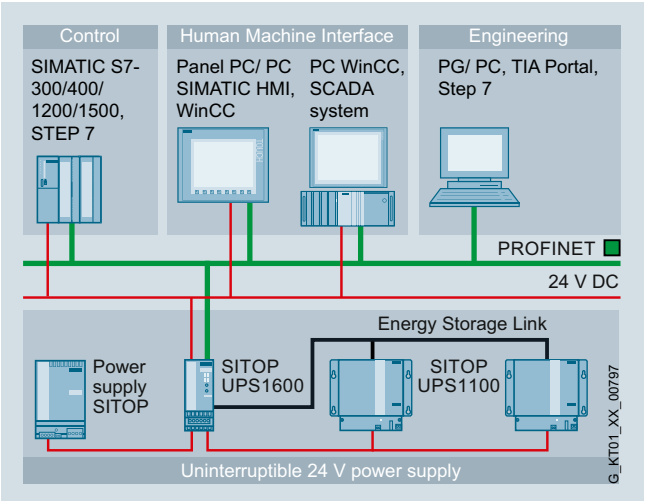
Buffering of applications with networked (Industrial Ethernet) automation computers

The UPS1600 with Industrial Ethernet interface protects complex PC-based applications from power failure. Configuration and monitoring is performed using the PC software SITOP UPS Manager. It also supports defined shutdown of several PCs in accordance with the master-slave principle.



Buffering of applications with networked (PROFINET) automation components

For buffering sensitive plant components (e.g. a pumping station with telecontrol) or complete controller solutions (e.g. machine tools) that are integrated into a networked automation solution, the UPS1600 with PROFINET is the perfect choice. Total integration in TIA offers unique advantages for engineering and operation (e.g. diagnostics or visualization). For example, in buffer mode, several controllers can be brought to a defined independently of each other.



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Design



- Compact DC UPS modules UPS1600 24 V/10 A, 20 A with digital inputs and outputs, optionally with USB interface or two Ethernet/PROFINET ports
- UPS1100 battery modules 1.2 Ah, 3.2 Ah, 7 Ah with lead rechargeable batteries of corrosion-resistant lead-calcium high-performance grid plates and glass fiber

Function

SITOP UPS1600 web server

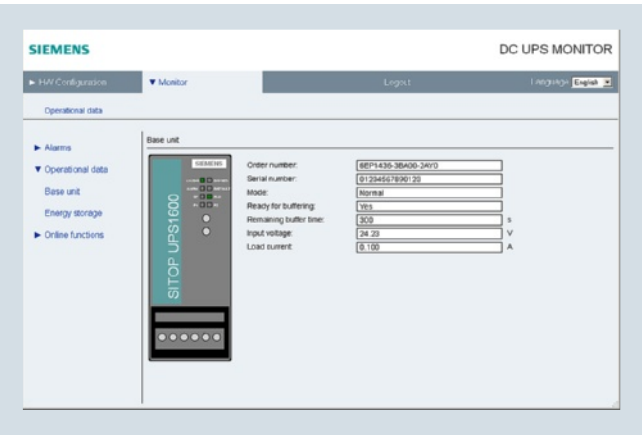
The SITOP UPS1600 with Ethernet/PROFINET has an integrated web server that supports remote monitoring of the uninterruptible power supply.

Remote monitoring of

- Hardware configuration data
- Operating data of the UPS1600 basic unit and the connected UPS1100 battery module
- Alarm messages

Remote access via

- Firefox or Internet Explorer 9 (IE 8 with charging of SVG player)
- IP address
- Password



The password-protected web server supports viewing of the configuring and operating data.

SITOP UPS1600 software

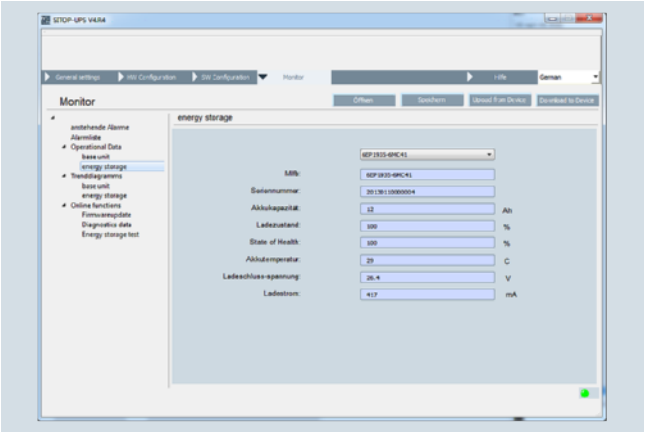
Software tools support convenient integration of the SITOP UPS1600 in both PC-based and PLC-based systems. They make configuring and visualizing the DC UPS easier and the user benefits from the high performance of the SITOP UPS1600.

Software for open, PC-based automation systems

SITOP UPS Manager

Configuration and monitoring is performed easily using the free PC software SITOP UPS Manager. It enables the reactions of the PC to the operating states of the DC UPS to be freely selected and offers comprehensive diagnostic options:

- Configuration
  - Connection via USB or Ethernet
  - All the relevant parameters can be configured in UPS Manager and transferred to the UPS1600
  - Configuration of "non-coded" rechargeable batteries is possible
  - The reactions of the PC to the operating states of the UPS can be freely selected, e.g. termination of software applications
  - Support for reliable downloading of several PCs according to the master-slave principle
  - The configurations can be saved locally
  - Integrated OPC server (available soon)
  - Updating of the UPS1600 firmware is possible
  - Executable on Windows XP, Windows 7 and Windows 8 operating systems
- Monitoring
  - Readout and display of alarms, statuses and operating variables of the UPS1600 and the connected energy storage unit
  - Tracing of history in trend diagrams



Monitor window for battery status in SITOP UPS Manager



Trend diagram for load current in SITOP UPS Manager

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Function (continued)

Software for TIA-based automation systems

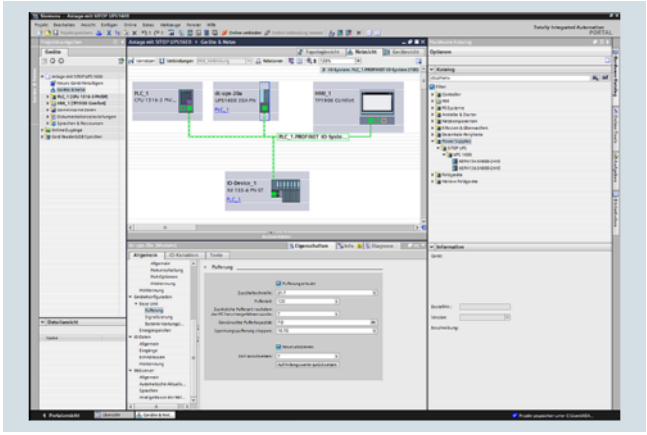
For convenient integration of the DC UPS in the TIA environment, different software modules are available.

Engineering is simple via the TIA Portal. The data for UPS1600 is stored in the hardware catalog version V14 and higher. Special function blocks for SIMATIC S7-300, S7-400, S7-1200 and S7-1500 also support integration in the STEP 7 user program.

The comprehensive diagnostics data of the UPS1600 power supply can be visualized using prepared UPS faceplates for WinCC.

TIA Portal

- Convenient and fail-safe integration of SITOP UPS1600 in the PROFINET network by means of drag-and-drop
- Convenient configuration of SITOP UPS1600 basic units with Ethernet/PROFINET and the UPS1100 battery module simply by selecting from the TIA Portal hardware catalog
- Free download of HSP (Hardware Support Package) for TIA Portal version V12 SP1 available at http://support.automation.siemens.com/WW/view/en/75854606
- Free download of GSD file (generic station description) for STEP 7 V 5.5 available from http://support.automation.siemens.com/WW/view/en/75854605



Establishing the PROFINET connection between the SITOP UPS1600 and the controller is easy and fail-safe in the TIA Portal

STEP 7 function blocks

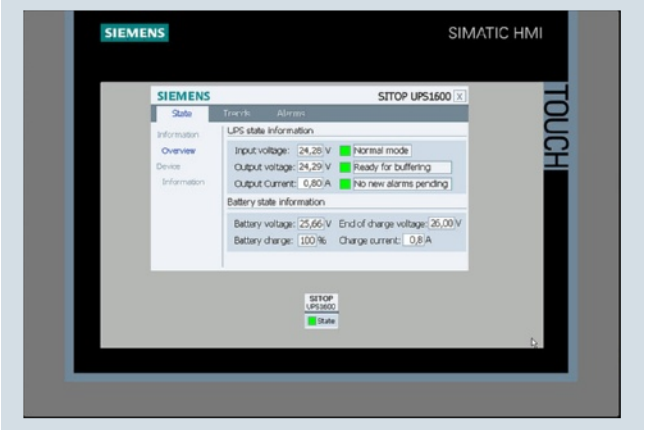
Function blocks are available for STEP 7 user programs on SIMATIC S7-300/400/1200/1500. They allow further processing of the DC UPS operating data. Free download at: http://support.automation.siemens.com/WW/view/en/75854608

Faceplates for WinCC

Ready-to-use faceplates save programming time for visualization of the uninterruptible power supply. The faceplates show all relevant statuses and values of the DC UPS. They are available for the following systems:

- WinCC V7.2 + STEP 7 Professional 2010
- WinCC flexible 2008 SP3 + STEP 7 Professional 2010
- WinCC Comfort/Advanced/ Professional V11 SP2 + STEP 7 Professional V11 SP2
- WinCC V12 + STEP 7 V12

Free download at: http://support.automation.siemens.com/WW/view/en/75854608



The pre-compiled WinCC faceplates show all the relevant UPS data in a clearly comprehensible display. An icon with color coding for the operating status is also available

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Technical specifications

The table shows the maximum buffering times for the SITOP UPS1100 battery modules for different load currents: The SITOP Selection Tool offers detailed selection guidance according to criteria such as the required backup time, nominal current, peak current and battery connection threshold:
http://www.siemens.com/sitop-selection-tool

SITOP	UPS1100 24 V, 1.2 Ah (6EP4131-0GB00-0AY0)	UPS1100 24 V, 3.2 Ah (6EP4133-0GB00-0AY0)	UPS1100 24 V, 7 Ah (6EP4134-0GB00-0AY0)
Load current	**Buffer times**		
1 A	34.5 min	2.6 h	5.4 h
2 A	15.5 min	1 h	2.6 h
3 A	9 min	39.3 min	1.6 h
4 A	6.5 min	27.1 min	1.2 h
6 A	3.5 min	17.5 min	41 min
8 A	2 min	12.1 min	28.6 min
10 A	1 min	9 min	21.8 min
12 A	-	7 min	17.3 min
14 A	-	5 min	15.1 min
16 A	-	4 min	12.5 min
20 A	-	1 min	9.1 min

Important information for selecting the battery capacity:

Determination of the mains buffering times is based on the discharge period of new or non-aged, completely charged battery modules at a battery temperature not below +25 °C to the shutdown of the DC UPS.

Battery aging reduces the still available battery capacity up until the end of the service life to typically around 50% of the original capacity value when new (1.2 Ah/3.2 Ah/7 Ah, etc.) and the internal resistance increases. When the message "Battery charge > 85%" appears, only around 50% x 85% = approx. 43% of the originally available capacity can be assumed at the end of the battery service life.

At battery temperatures below +25 °C, the available capacity drops approximately by another 30% at +5 °C battery temperature, to approximately 70% of the approximately remaining 43%. There is then only around 30% of the original capacity available.

A significantly larger battery capacity must therefore be selected when configuring the plant: A drop to approx. 50% is compensated for by selecting 1 / approx. 0.5 = approx. double the battery capacity (required as per the table for the relevant load current and the relevant buffering time). Available capacity of approx. 43% is compensated for by selecting 1 / approx. 0.43 = approx. 2.33 times the battery capacity. Available capacity of approx. 30% is compensated for by selecting 1 / approx. 0.3 = approx. 3.33 times the battery capacity.

Recommendation:

Instead of installing double the battery capacity, regular battery replacement halfway through the expected service life (reduction of capacity to approx. 50%) can be more advisable for the following reasons: Capacity does not drop below 100% until the halfway point of the expected battery life (or slightly beyond). With regular replacement after this point, only the single battery capacity (instead of double capacity) must be installed due to aging (-> neutral in price with regard to battery module costs, but only requires half the space).

Replacing the battery after half its service life dispenses above all with the large scatter range of the residual capacity at the end of the service life, which is not accurately defined by battery manufacturers (after the full time, many batteries are above, but many are also below the average 50% residual capacity, that is to say, even if double the capacity is installed, the influence of aging at the end of service life is not reliably compensated for, rather only typically) -> When replacing after half the expected service life, the configured buffering time is maintained with considerably greater reliability.

In the case of batteries stored in cool conditions (not above +25 °C) and for not longer than approximately 4 months, the following service life can be assumed, strongly dependent on battery temperature:

Battery temperature	Drop to approx. 50% of residual capacity	Recommendation: Replace (at 100% of residual capacity) all	Alternative recommendation
+20 °C	4 years	2 years	
+30 °C	2 years	1 year	
+40 °C	1 year	0.5 years	Install double capacity and replace (1 x per year)

In normal cases (installation in the coolest location in the control cabinet at approx. +30 °C), the battery should be replaced with single installed battery capacity in accordance with the selection table after 1 year of operation!

After a power failure, the battery module is disconnected from the loads at the end of the selected buffering time either automatically or electronically by opening the On/Off control circuit, and as soon as the 24 V input voltage is available again, it is quickly re-charged with the charge current of the relevant DC UPS module (with I-U charge characteristic: First constant current I for fast charging, and changeover to constant voltage U to maintain the charge when the battery is almost full).

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Technical specifications (continued)

DC UPS modules	SITOP UPS1600 24 V/ 10 A	SITOP UPS1600 24 V/ 20 A
Article No.	6EP4134-3AB00-0AY0 6EP4134-3AB00-1AY0 (with USB interface) 6EP4134-3AB00-2AY0 (with 2 Ethernet/ PROFINET interfaces)	6EP4136-3AB00-0AY0 6EP4136-3AB00-1AY0 (with USB interface) 6EP4136-3AB00-2AY0 (with 2 Ethernet/ PROFINET interfaces)
Input data		
Input voltage $V_{in\ rated}$/ range [1]	24 V DC/ 21 ... 29 V	24 V DC/ 21 ... 29 V
Connection threshold for buffering	22.5 V DC ± 3% (factory setting), adjustable: 21 V, 21.5 V, 22 V, 22.5 V, 23 V, 24 V, 25 V DC or via software.	22.5 V DC ± 3% (factory setting), adjustable: 21 V, 21.5 V, 22 V, 22.5 V, 23 V, 24 V, 25 V DC or via software.
Input current $I_{out\ rated}$	Approx. 14 A for max. charging current (3 A)	Approx. 25 A for max. charging current (4 A)
Mains buffering		
Adjustable range using rotary coding switch	0.5 min, 1 min, 2 min, 5 min, 10 min, 20 min, max. buffering time or via software	0.5 min, 1 min, 2 min, 5 min, 10 min, 20 min, max. buffering time or via software
Behavior on restoration of input voltage after buffering time	Interruption of U_{out} for 5 s for the automatic restart of PCs or optionally no interruption	Interruption of U_{out} for 5 s for the automatic restart of PCs or optionally no interruption
On/off control circuit (via external isolated NO contact)	by opening the circuit the buffer mode is terminated	by opening the circuit the buffer mode is terminated
Starting from battery with input voltage missing (over external isolated NO contact)	by closing the circuit the buffer mode is started	by closing the circuit the buffer mode is started
Energy storage units		
Connectable batteries	– coded Siemens types SITOP UPS1100 (max. 6 via Energy Storage Link) – non-coded Siemens types 6EP1935-6M... – other manufacturers	– coded Siemens types SITOP UPS1100 (max. 6 via Energy Storage Link) – non-coded Siemens types 6EP1935-6M... – other manufacturers
Output data		
Output voltage in normal operation	Input voltage V_{in} minus approx. 0.2 V	Input voltage V_{in} minus approx. 0.2 V
Output voltage in buffering mode	27 V DC (no load); 24 V (50% battery rated current); 22 V (100% battery rated current); 18.5 V (exhaustive discharge protection)	27 V DC (no load); 24 V (50% battery rated current); 22 V (100% battery rated current); 18.5 V (exhaustive discharge protection)
Output +Bat/-Bat in normal operation	I-U charging characteristic (first rapid charging current, then charge retention)	I-U charging characteristic (first rapid charging current, then charge retention)
End-of-charge voltage	Automatic temperature-specific setting with SITOP UPS1100 battery modules	Automatic temperature-specific setting with SITOP UPS1100 battery modules
Rated output current	**0 ... 10 A**	**0 ... 20 A**
• Power boost for 30 ms	30 A	60 A
• Extra power for 5 s/min	15 A	30 A
Charging current	Max. 3 A automatic adjustment with UPS1100; otherwise selectable 0.3 A, 0.8 A, 3 A	Max. 4 A automatic adjustment with UPS1100; otherwise selectable 0.8 A, 1.75 A, 4 A
Efficiency for normal operation and charged battery	>97%	>98%
Protection and monitoring		
Reverse polarity protection	against input voltage U_{in} and against batteries	against input voltage U_{in} and against batteries
Overload / short-circuit protection	Yes, restart in normal operation	Yes, restart in normal operation
Signaling		
Normal operation/buffer mode	LED 1 (OK/BAT) green/yellow and isolated changeover switch 1	LED 1 (OK/BAT) green/yellow and isolated changeover switch 1
Charging status (over 85% charged)	LED 2 (BAT>85%) green and isolated changeover switch 3	LED 2 (BAT>85%) green and isolated changeover switch 3
Alarm (not ready for buffering)	LED 3 (Alarm) red and isolated changeover switch 2	LED 3 (Alarm) red and isolated changeover switch 2
Battery status	LED 4 (BAT.FAULT) red and isolated changeover switch 2: Battery defective, yellow: selected buffering time not assured, yellow flashing: Overtemperature	LED 4 (BAT.FAULT) red and isolated changeover switch 2: Battery defective, yellow: selected buffering time not assured, yellow flashing: Overtemperature
PROFINET interface	LED 5 (SF) green and LED 6 (RUN)	LED 5 (SF) green and LED 6 (RUN)
Ethernet	LED 7 (P1) green/yellow and LED 8 (P2) green/yellow, link and activity	LED 7 (P1) green/yellow and LED 8 (P2) green/yellow, link and activity

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Ordering data Article No. Article No. (continued)

DC UPS modules	SITOP UPS1600 24 V/ 10 A	SITOP UPS1600 24 V/ 20 A
General data		
Radio interference level (EN 55022) / noise immunity	Class B / Noise immunity to EN 61000-6-2	Class B / Noise immunity to EN 61000-6-2
Safety class	Class III (ext. circuit and power supply unit: SELV in accordance with EN 60950 required)	Class III (ext. circuit and power supply unit: SELV in accordance with EN 60950 required)
Degree of protection (EN 60529)	IP20	IP20
Ambient temperature during operation with natural convection	-25 ... +70 °C (derating from 60 °C)	-25 ... +70 °C (derating from 60 °C)
Transport/storage temperature	-40 ... +85 °C	-40 ... +85 °C
Dimensions (W x H x D) in mm	50 x 125 x 125	50 x 125 x 125
Weight, approx.	0.4 kg without interface, 0.42 kg with USB, 0.45 kg with Ethernet/PROFINET interfaces	0.4 kg without interface, 0.42 kg with USB, 0.45 kg with Ethernet/PROFINET interfaces
Installation	Snaps onto DIN rail EN 50022-35x15/7.5	Snaps onto DIN rail EN 50022-35x15/7.5
Approvals	CE, cULus, C-Tick; KCC; GL, ABS, ATEX	CE, cULus, C-Tick; KCC; GL, ABS, ATEX

1) All SITOP 24 V DC power supplies are permissible without restriction

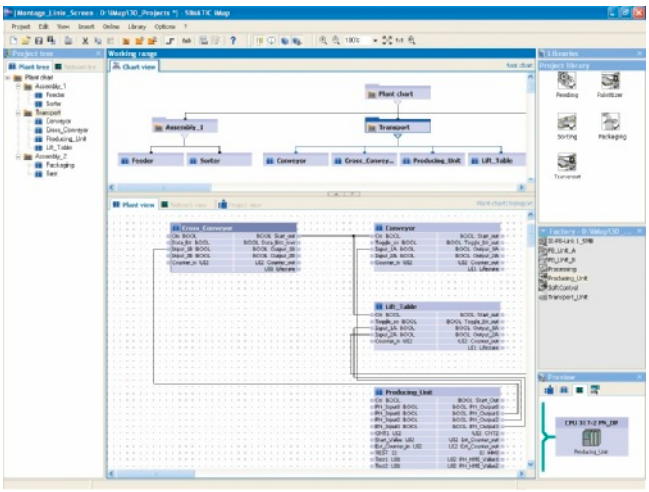
Product	SITOP UPS1100 battery module 24 V, 1.2 Ah	SITOP UPS1100 battery module 24 V, 3.2 Ah	SITOP UPS1100 battery module 24 V, 7 Ah
For SITOP UPS1600	**10 A**	**10 A**	**10 A and 20 A**
Article No.	**6EP4131-0GB00-0AY0**	**6EP4133-0GB00-0AY0**	**6EP4134-0GB00-0AY0**
Recommended end of charge voltage (set automatically by SITOP UPS1600):	26.4 … 27.3 V DC (> +20 °C), 27.3 … 29.0 V DC (< +20 °C)	26.4 … 27.3 V DC (> +20 °C), 27.3 … 29.0 V DC (< +20 °C)	26.4 … 27.3 V DC (> +20 °C), 27.3 … 29.0 V DC (< +20 °C)
Charging current	max. 0.3 A	max. 0.8 A	max. 1.75 A
Rated output voltage	24 V DC, 22 ... 27.0 V DC (no load)	24 V DC, 22 ... 27.0 V DC (no load)	24 V DC, 22 ... 27.0 V DC (no load)
Rated output current	10 A	15 A	30 A
Integral battery fuse	15 A/32 V	15 A/32 V	30 A/32 V
Signaling	LED green: Battery OK, flashing green: Error or warning, OFF: No communication	LED green: Battery OK, flashing green: Error or warning, OFF: No communication	LED green: Battery OK, flashing green: Error or warning, OFF: No communication
Degree of protection (EN 60529)	IP00	IP00	IP00
Ambient temperature	0 … +40 °C	0 … +40 °C	0 … +40 °C
Transport/storage temperature	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Service life (when capacity falls to 50% of original capacity), depending on battery temperature, approx.	+20 °C: 4 years, +30 °C: 2 years, +40 °C: 1 year, +50 °C: 0.5 years	+20 °C: 4 years, +30 °C: 2 years, +40 °C: 1 year, +50 °C: 0.5 years	+20 °C: 4 years, +30 °C: 2 years, +40 °C: 1 year, +50 °C: 0.5 years
Installation	DIN rail or wall mounting	DIN rail or wall mounting	Wall mounting
Dimensions (W x H x D) in mm	89 x 130 x 107	190 x 169 x 79	186 x 186 x 110
Weight, approx.	1.9 kg	3.8 kg	6.1 kg
Certification	CE, cURus-recognized, C-Tick; KCC; GL, ABS, ATEX	CE, cURus-recognized, C-Tick; KCC; GL, ABS, ATEX	CE, cURus-recognized, C-Tick; KCC; GL, ABS, ATEX

Ordering data

	Article No.
SITOP UPS1600 24 V/ 10 A	**6EP4134-3AB00-0AY0**
• With USB interface	**6EP4134-3AB00-1AY0**
• With 2 Ethernet/ Profinet interfaces	**6EP4134-3AB00-2AY0**
SITOP UPS1600 24 V/ 20 A	**6EP4136-3AB00-0AY0**
• With USB interface	**6EP4136-3AB00-1AY0**
• With 2 Ethernet/ Profinet interfaces	**6EP4136-3AB00-2AY0**
SITOP UPS1100 battery module 24 V, 1.2 Ah For SITOP UPS1600 10 A	**6EP4131-0GB00-0AY0**
SITOP UPS1100 battery module 24 V, 3.2 Ah For SITOP UPS1600 10 A	**6EP4133-0GB00-0AY0**
SITOP UPS1100 battery module 24 V, 7 Ah For SITOP UPS1600 10 A and 20 A	**6EP4134-0GB00-0AY0**
SITOP UPS1600 starter kit Consisting of: SITOP UPS1600 DC UPS, 24 V DC/10 A with Ethernet/PROFINET interface; SITOP UPS1100 battery module 3.2 Ah; Industrial Ethernet cable; software tools and documentation on CD	**6EP4134-3AB00-2AP0**

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Overview



- Component-based software tool for configuring the communication in distributed automation solutions
- For easy graphical configuration of the communication between subsystems and machine-to-machine communication in the production line
- Based on the PROFINET standard
- Open for PROFINET devices from various manufacturers on Industrial Ethernet
- Runs under Windows XP Professional and Windows 7 Ultimate/Professional

Benefits

The clear advantage of SIMATIC iMap over programmed communication lies in the simple programming of the communication (graphically using lines interconnecting the technology interfaces of the devices).

Technical specifications

Engineering tool	**SIMATIC iMap**
Current version	V3.0
Software class	A
Application areas	
Keyword	SIMATIC iMap is an engineering tool for configuring communication between automation and field devices in distributed automation solutions.
Marketing message	"Time and cost savings in modular machine and plant construction with Component based Automation." "Modularization and machine-to-machine communication along the production line."
Advantages	• Open component-based engineering tool to the PROFINET standard. • Simple communication between intelligent automation and field devices on PROFIBUS DP and on Ethernet. • Graphical configuration of communication on PROFIBUS DP and on Ethernet • Extremely high reusability of software components (technology modules) • Graphical structuring of the plant using "chart-in-chart" function • Convenient navigation through the project tree • Easy creation and structuring of technology libraries • PROFIBUS and Ethernet in the overview of the network view • Fast start-up thanks to downloading and testing directly on Ethernet (also of PROFIBUS slaves) • Online display of values of the technology modules on the interfaces and in the variable table • Diagnosis of communication in the diagnostics window
Sectors	• Automotive industry (especially in assembly, conveyor systems and in the paint shop) • Complex food and packaging machines • Conveyor systems based on PROFIBUS DP • Production lines with several interlinked machines

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Technical specifications (continued)

Engineering tool	SIMATIC iMap
Target systems	• SIMATIC S7 CPU 31x-2 PN/DP and SIMATIC S7 CPU 319-3 PN/DP (with integrated PROFINET interface. This can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only) • SIMATIC WinAC PN (can be used as a proxy function for the devices of a complete PROFIBUS segment, one line only) • SIMATIC NET IE/PB Link (can be used as a proxy function for the devices of a complete PROFIBUS segment) • SIMATIC NET CP 343-1 and CP 343-1 Advanced (for connecting SIMATIC S7-300 to Ethernet), CP443-1 Advanced (for connecting SIMATIC S7-400 to Ethernet) • Distributed I/O stations with separate CPU (all intelligent field devices on PROFIBUS such as SIMATIC CPU 313C-2DP, CPU 314C-2DP, CPU 315-2DP, CPU 316-2DP, ET 200 IM 151 CPU, ET 200S BM 147 CPU), • PROFINET CBA OPC Server (for access from PC applications to data in PROFINET devices) • Devices on Industrial Ethernet based on the PROFINET CBA standard • SIMATIC OPs (within the components) • SIMATIC ProTool/Pro, WinCC or any other visualization system with OPC client function
System prerequisites	
Operating system	Windows XP Prof. with Service Pack 2 or Windows 7 Ultimate/Professional; PC administration rights are required for installation
PG/PC hardware	Pentium processor, 1 GHz or higher
Recommended expansion of main memory in PG/PC	RAM: 512 MB or more
Hard disk space required in PG/PC	Approx. 200 MB
Software required	• STEP 7 V5.3 Service Pack 3 or higher • PN OPC-Server V6.3 or higher The following software must be installed before iMap (included in the iMap package): • MS Internet Explorer V6.0 Service Pack 1 and higher • Adobe Acrobat Reader V5.0
Delivery format	
Languages	English, German, French, Italian and Spanish
Single License (SL)	Yes
Upgrade License (UL)	Yes, from V2.0 to V3.0
Paper manuals	Electronically on CD
Authorization/licenses	
Authorization	Yes
Single License (SL)	Yes
Upgrade License (UL)	Yes
Software Update Service	Yes
Unlock Copy License	No

Ordering data

	Article No.
SIMATIC iMap V3.0 Target system: CPU 31x-2 PN/DP, CPU 319-3 PN/DP, SIMATIC WinAC PN, SIMATIC NET IE/PB Link, SIMATIC NET CP 343-1, SIMATIC NET CP 343-1 Advanced, SIMATIC NET CP 443-1 Advanced, distributed I/O devices with own CPU, PROFINET CBA OPC server, devices on the Industrial Ethernet based on the PROFINET CBA standard, SIMATIC OPs, SIMATIC ProTool/Pro Requirements: Windows XP Prof. with Service Pack 2 or Windows 7 Ultimate/Professional; on PG or PC with Pentium processor, min. 1 GHz; STEP 7 V5.3 or higher with Service Pack 3, PN OPC Server V6.3 or higher Type of delivery: German, English, with electronic documentation	
Floating License	**6ES7820-0CC04-0YA5**
Software Update Service (requires current software version)[1]	**6ES7820-0CC01-0YX2**
Upgrade to V3.0, floating license	**6ES7820-0CC04-0YE5**

[1] For more information on the software update service, see Catalog ST 70.

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Overview



SINEMA Server is a web-based network monitoring software that significantly reduces the response time to communications problems in industrial networks, and thus avoids downtimes and saves costs.

- Simple operator input even for plant operators or service personnel, to enable autonomous detection and correction of communications problems
- Graphical representation of industrial networks (automatic topology detection and layout)
- Standardized network documentation (reports for inventory, availability and utilization)
- Simple operation via web browser or via an HMI/SCADA application, without special IT knowledge
- Network data such as network topology and device information automatically saved to a database
- Low installation and maintenance costs, especially thanks to the use of pre-installed industrial PCs (Microbox PC)
- High degree of flexibility for graphical representation thanks to automatic and customizable topology views
- Monitoring can be adapted to devices and users

Benefits

get Designed for Industry

- Reporting and analysis of changes and faults in the network
  - Alarm messages
  - Clear visualization
  - Prevention of downtimes
  - Error localization
- Cost savings
  - Reduced standstill costs
  - Low procurement costs
  - Low installation costs
  - No consequential costs
  - Scalable licenses
- Monitoring functionality can be adapted to the application, devices and users
  - Application-specific structuring and visualization
  - Intuitive operation via Web browser
  - Can be integrated into HMI
  - No specialist IT know-how/IT personnel required
- Automatic documentation of networks
  - Increased understanding
  - Continuous logging/documentation
  - Any time period selectable
  - Verification of availability

Design

Product versions

The number of Ethernet devices (IP nodes) to be monitored must be taken into account when selecting the software license. The licenses can be combined in any way to increase the number of monitored devices up to a maximum of 500 IP nodes per installation.

SINEMA SERVER 50

- Supports the diagnosis of up to 50 IP devices

SINEMA SERVER 100

- Supports the diagnosis of up to 100 IP devices

SINEMA SERVER 250

- Supports the diagnosis of up to 250 IP devices

SINEMA SERVER 500

- Supports the diagnosis of up to 500 IP devices

SINEMA Server Upgrade (V12)

- Upgrade SINEMA Server V11 to V12

Note:

Each SINEMA Server can display the status of up to 100 other SINEMA Servers. Up to 50,000 devices can thus be monitored.

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Function

Intuitive operation

SINEMA Server is network management for industry. Attention was paid here to the most important functions for the industrial environment, and implementation is with a clear interface for intuitive operation. Users can monitor their networks in the shortest time possible. Costly and time-intensive IT training is not necessary.

Automatic device detection and generation of network topologies

With the help of DCP and SNMP, SINEMA Server automatically detects PROFINET and Ethernet devices on the network and represents them graphically in a Web browser. This means the maintenance personnel in process and production plants can monitor the current status of the devices and their connections (topology) at all times without time-consuming configuring.

User-specific topology display

As well as automatic display of the topology, SINEMA Server also gives users the option of representing the network nodes in any arrangement. These user-specific topologies can also be supplemented with background images (e.g. building or plant diagrams). In the case of faults, this means the relevant network components can be found and, if required, replaced or repaired more quickly.

Event-triggered alarms

For gap-free and instantaneous monitoring of the network, network messages must be detected immediately and the user must be informed. For this purpose, SINEMA Server offers event handling with which all network event messages are acquired and processed. Users of SINEMA Server are thus supplied with all the important event information concerning the network.

User-defined display

Different personnel with different roles (e.g. administrators, maintenance personnel, etc.) can use SINEMA Server in their daily work.
The administrator defines different groups to whom the appropriate rights and views are assigned. Up to 10 people with different tasks can work simultaneously with SINEMA Server.

Comprehensible network reports

Network diagnostics encompasses not only the current status of the network, but also the analysis of historical values. SINEMA Server saves to a database all values read out from the network components. Time-based filtering and evaluation with comprehensible reports can then take place. In this way, all past events can also be analyzed and used to prevent future failures.

Diagnostics via Web browser

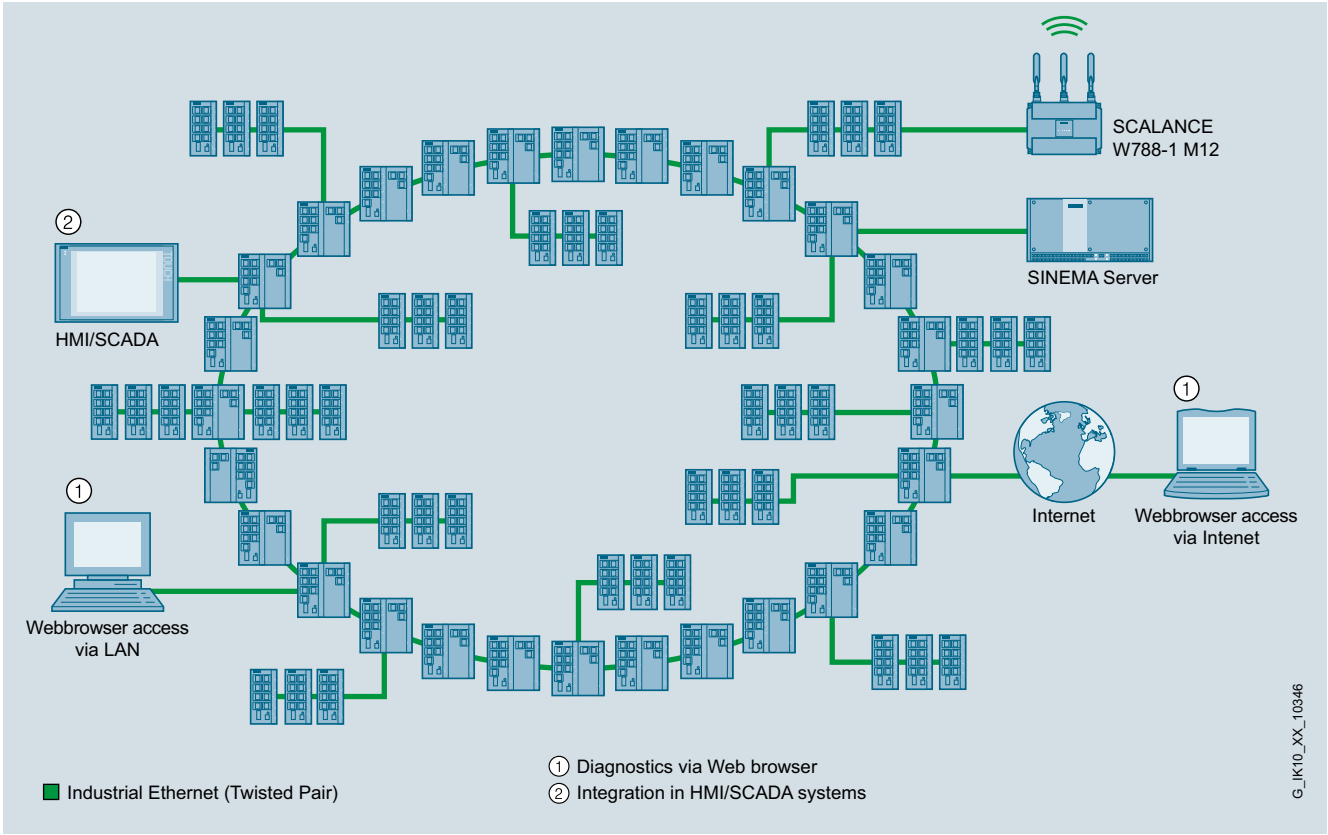
Access to network diagnostics should not be locally restricted, particularly in the case of large networks. That's why SINEMA Server has been developed on the basis of a server architecture. This enables access to the network management software via commonly used Web browsers. In this way, the network to be checked can also be diagnosed from any location. This enables the network diagnostics tasks of several plant sections to be bundled in one control room.

Integration into HMI/SCADA systems

To have everything in view, network diagnostics should be integrated in the HMI/SCADA plant solution. SINEMA Server offers full integration of the topology via the Web browser. In addition, all parameters such as warnings and faults can be transferred via the integrated OPC interface. This enables users to integrate network diagnostics into HMI/SCADA systems without a high engineering outlay.

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Function (continued)



The network information prepared by SINEMA Server can be called up by any clients via a Web browser or OPC interface.

Adaptable device profiles

Users have the option of optimizing the device display by means of the profile concept, particularly for non-Siemens network components represented by SINEMA Server via standard SNMP information. Scanning of device-specific data via SNMP can also be set via the profile. This means that an industrial network comprising devices from different manufacturers can be optimally monitored with SINEMA Server.

Adaptable quantity structure with up to 50,000 network nodes

Different SINEMA Server licenses can be selected depending on the size of the network. SINEMA Server thus monitors large networks with up to 500 stations with one installation. With extremely large production networks, SINEMA Server is able to display up to 100 further SINEMA Servers. In this way, individual production cells can be monitored centrally from a single SINEMA Server station.

Ordering data

	Article No.
SINEMA Server V12 Network monitoring software for industrial Ethernet and PROFINET networks, runtime software, software and electronic manual on DVD (not with download), license key on USB flash memory (not with download); software for installation on PC hardware with Win7 Professional and Windows Server 2008 R2+SP1, Windows XP/SP3 (32-bit), Windows 7 Professional/Ultimate/ Enterprise SP1 (32/64-bit), and Windows Server 2008 R2 + SP1 (64-bit) English/German/French/Chinese. Other languages possible on request.	
For 50 devices that can be identified via IP address	
• On DVD	**6GK1781-1BA12-0AA0**
• Download [1]	**6GK1781-1BA12-0AK0**
For 100 devices that can be identified via IP address	
• On DVD	**6GK1781-1DA12-0AA0**
• Download [1]	**6GK1781-1DA12-0AK0**
For 250 devices that can be identified via IP address	
• On DVD	**6GK1781-1JA12-0AA0**
• Download [1]	**6GK1781-1JA12-0AK0**
For 500 devices that can be identified via IP address	
• On DVD	**6GK1781-1TA12-0AA0**
• Download [1]	**6GK1781-1TA12-0AK0**
Upgrade SINEMA Server V11 to V12	
• On DVD	**6GK1781-2AA12-0AA0**
• Download [1]	**6GK1781-2AA12-0AK0**

[1] For more details of online software delivery, visit: www.siemens.com/tia-online-software-delivery under Ordering Data

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PN IO Bus Analyzer

Overview



- Network analysis with the bus analyzer
- Comprising hardware and software components
- USB memory expansion possible
- Frame recording with 10 ns resolution
- Automatic PROFINET analysis
- Online value tracking
- Packet generator with feedback analysis
- Control interface using script or TCP commands

Benefits

- Direct and immediate online analysis in real time and precise statement of the quality of the network.
- Recording at all speeds without losses and exact time stamping by hardware-based processing.
- When analyzing and monitoring PROFINET components, it is possible to match and verify the frame structure, the frame times and the frame synchronization.
- Fast error analyses and improved performance in plant operation, in particular in networks in which products of different vendors are being used.
- Active measurements on the network with a packet generator: Feed in of frame sequences, delay time measurements, network reactions.
- Simple reproduction or automation of test scenarios / measurements controlled by scripts.

Application

Bus Analyzer is the analysis tool for Ethernet / PROFINET. It is made up of a hardware component and a Windows application that communicate with each other over Ethernet. The hardware is controlled and has parameters assigned by the application (triggers, filters, start. stop etc.), the application also downloads the recorded data and statistics to the analysis computer where they are interpreted, displayed and saved.

The many functions of the bus analyzer are implemented in individual modules. The modular structure allows target-oriented localization of error sources and the detection of weak points long before problems occur. The following modules are available:

- **Frame recording** allows the precise recording of frames on Ethernet / PROFINET.
- **PROFINET analysis** automatically detects all relevant bus parameters (number of frames, bus cycles, etc.) online in real time and displays them in tables and graphically.
- **Online value tracking** allows the user to extract and record any sizes and values of the communication partners from the frame traffic.
- With the **packet generator**, recorded or self-generated frame sequences can be fed into the Ethernet network and the reaction of the network measured automatically.
- Control of all functions by script or a remote interface (Ethernet, TCP) is possible.

Design

- Module in housing without fan (with bracket for mounting on a DIN rail)
- Power supply 24 V (does not ship with product)
- Four independent RJ45 analysis interfaces for connection to Ethernet
- One RJ45 interface for Ethernet connection of the module to the host PC
- Internal memory with 2 GB (can be set as a ring buffer)
- Binary hardware inputs and outputs (can be used as trigger inputs and outputs)
- USB Interface for connection of external storage media

Product versions

Standard version:
Includes the frame recording and PROFINET analysis modules.

Premium version:
Includes the frame recording, PROFINET analysis, online value tracking and packet generator modules.

The option of controlling with a script or by applications is available with both variants.

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Function

All bus analyzer functions are controlled by the Bus Analyzer Scope program that ships with the product. This Windows application is connected to the bus analyzer sys module via an Ethernet connection. This is possible via a direct connection, via a network or via a VPN tunnel.

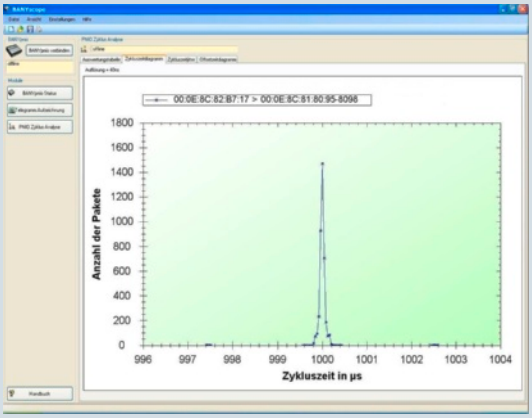
The four analysis ports can be used by all function modules but not at the same time. They need to be enabled and assigned to the module being used.

On completion of the parameter assignment and after starting the relevant analysis function, the connection between Bus Analyzer and Bus Analyzer Scope can be terminated, in other words, the module then works alone.

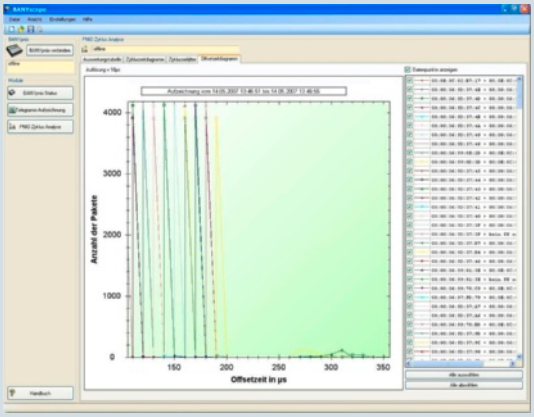
The **frame recording** provides a comfortable option of recording communication on Ethernet connections at speeds from Fast Ethernet to gigabit Ethernet.
The FPGA technology design of the Bus Analyzer throughout allows error-free, gapless recording of all data with 10 ns time stamping. Even bad frames are not automatically discarded but can be saved and evaluated.
The four recording ports can be used independently for recording. If a Test Access Point (TAP) is used to decouple the frames instead of a hub or a switch mirror port, it is possible to interconnect ports; in other words, to bundle their data streams and to save and evaluate them together.
To allow the recording to be controlled effectively, freely programmable filters and triggers are available. Apart from standards such as addresses, protocols and patterns, there are also special functions that can trigger on frame timeouts and bad frames (CRC error, undersize error etc.). The integrated hardware inputs can also be used to fire triggers using external binary signals.
The data is saved in the internal RAM (2 GB capacity) that can also be set as a ring buffer. At the end of the recording, the data is loaded and saved either on the PC via the Ethernet host connection or on an external storage medium connected via USB.
If it is necessary to record larger volumes of data, the data can also be streamed to the PC during the recording and saved there.
All frames are saved in a file in "pcap" format that can, for example, be read by Wireshark.

PROFINET analysis automatically detects all important parameters of a PROFINET system. The Bus Analyzer analyzes the frame traffic in real time in terms of frame type, cycle times and many other important characteristics of the network.
During the analysis, all PROFINET nodes are listed in table.
The following information is displayed and updated cyclically for each node:
PROFINET class, number of sent/received packets, desired cycle time, min/max cycle time, min/max cycle time deviation.

The number of frames sent by each node per time unit can be visualized in a cycle time diagram. These are displayed graphically in a distribution curve. At a glance, it is possible to see how well the PROFINET component keeps to the cycle.



During the analysis of PROFINET IRT, not only the degree to which individual components adhere to the cycle is important, but also the offset of the time of sending within the cycle; in other words, its behavior in conjunction with the other communications partners in the network. The offset diagram can display the distribution curves of all nodes in the cycle to allow a statement to be made regarding the quality within the entire network and the time slice distribution of its nodes.



Based on intuitively structured filter menus, the **online value tracking** provides a simple and uncomplicated means of extracting data from the frame traffic. In contrast to the frame recording, complete frames are not saved here but rather individual values of the relevant communications partners transferred via PROFINET.
This means, for example, that the setpoint of a controller, the speed of a motor etc. can be read directly from PROFINET and saved with a time stamp (resolution 10 ns). This is displayed in a table or graphically in the form of a curve that represents the values over time online and in real time.

To be able to select the values, the address of the node, the byte position of the value within the frame and the number of bytes to be read must be specified in the filter. The size of the values is limited to 8 bytes. All available formats can be interpreted (binary, integer, analog, ...).
Up to four values can be recorded simultaneously. There is no limit to the recording time.

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Function (continued)

The **packet generator** allows any Ethernet frames to be injected into the network. To allow this, all four analysis ports are available and are independent of each other. As an alternative, the ports can also be coupled together in pairs as sender/receiver to be able to read in sent frames and to verify the read frames with the sent frames.
The frames to be sent are transferred to the module as input in the form of "pcap" files. These inputs can either be generated by recording or can be created as new frames using the integrated pcap editor.
Each port has its own menu for setting the relevant send options. Among other things, the packets can be sent as follows:

- Cyclically (with breaks)
- As a fixed percentage of bus load
- With a specified number of repetitions
- For a specified time etc.

At the end of the action, all important parameters (bus load, duration etc.) are output as statistics.

The packet generator only executes with the Bus Analyzer without TAP.

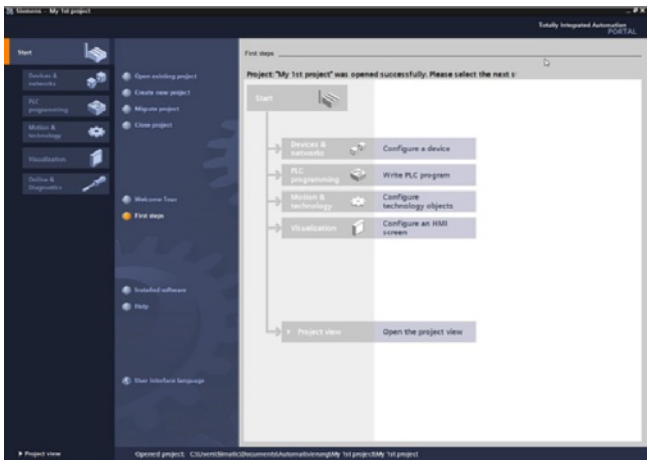
All the modules listed above can also be remotely controlled by a **script**. To allow this, each action taken by the user is logged in the integrated script window. The log can be saved, edited and transferred later to Bus Analyzer Scope when this is called. All the instructions in the script are then executed. This allows automated test sequences, for example for setting up test automats. The manual contains an overview of all the script commands that can be used.
As an alternative, the script commands can also be transferred using a remote interface (via TCP/IP) from another application to Bus Analyzer Scope. When TCP is used as the transfer interface, the application does not need to be located on the same computer as Bus Analyzer Scope, only in the same network.
A sample program in C# ships with the product.

Ordering data

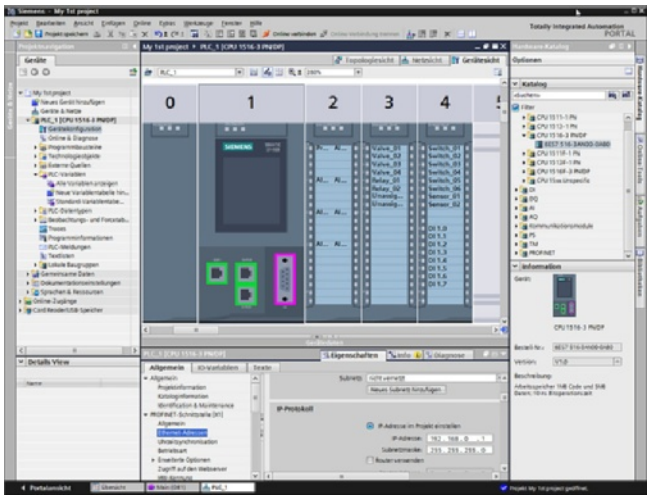
	Article No.
Bus analyzer hardware agent for 2 channels without TAP For PROFINET diagnosis (100 Mbit) of 2 fieldbuses or Ethernet diagnosis (up to 1 Gbit) of 2 network segments	**9AE4140-1BA00**
Bus analyzer hardware agent with 2-channel TAP For reaction-free PROFINET diagnosis of 2 fieldbuses	**9AE4140-1BA01**

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Overview



STEP 7 V13 (TIA Portal), portal view



STEP 7 V13 (TIA Portal), device view: configuring and parameterizing in photographically realistic representation

Intuitive, efficient and future-oriented – the engineering software for programming the SIMATIC controllers

SIMATIC STEP 7 Professional V13 is the engineering system for the SIMATIC controllers S7-1200, S7-300, S7-400, WinAC, and also optimally supports the new SIMATIC S7-1500 controllers.

SIMATIC STEP 7 Basic V13 is the engineering system for the S7-1200.

STEP 7 V13 is based on the central engineering framework Totally Integrated Automation Portal (TIA Portal), which offers the user a uniform, efficient and intuitive solution to all automation tasks.

Benefits

- Powerful programming editors for efficient engineering
- Scalability across all series of controllers
- Optimum interaction between the controller, HMI and drive in a working environment
- Shared data management and uniform symbols
- System diagnostics as an integral component
- Variables trace for effective commissioning
- Scalable and flexible motion control functionality
- Comprehensive library concept
- Security Integrated
- Migration support for existing hardware and software products

Application

SIMATIC STEP 7 Professional V13 is the easy-to-use, integrated engineering system for the current SIMATIC controllers S7-1200, S7-1500, S7-300, S7-400, WinAC, and ET 200 CPU. PLCSIM for simulating the S7-1500 CPU and WinCC Basic for the configuration of Basic Panels are included in the scope of delivery.

SIMATIC STEP 7 Basic V13, the easy-to-use engineering system for the modular SIMATIC S7-1200 micro PLC, as well as the associated I/O. It contains SIMATIC WinCC Basic for the configuration of the SIMATIC Basic Panels.

STEP 7 V13 thus provides support in all phases of the automation project:

- Configuring and parameterizing the hardware
- Specifying the communication
- Programming in IEC programming editors
- Configuration of the visualization
- Test, commissioning and service

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Function

Excellent integration of the new SIMATIC S7-1500 controller

With its many innovations, the new SIMATIC S7-1500 controller from the SIMATIC S7 controller family sets new standards for maximum productivity. The SIMATIC S7-1500 is perfectly integrated into SIMATIC STEP 7 V13 Professional for maximum engineering efficiency. With its unique system performance and PROFINET as standard interface, the SIMATIC S7-1500 is the new benchmark for performance.

Powerful programming editors for efficient engineering

STEP 7 V13 provides powerful programming editors with optimized compilers for the programming of the S7 controllers.

For all controllers:

- Ladder diagram (LAD)
- Function block diagram (FBD)
- Structured text (SCL)

Additionally for SIMATIC S7-1500, S7-300, S7-400, and WinAC:

- Statement list (STL)

New functions such as

- Instructions for the Variant Pointer, for the programming of flexible library functions
- Reflexion instructions for reading out program information during runtime (e.g. instance names),
- local constants
- etc.

enable users to create their applications efficiently. Even complex technological functions, such as controllers or positioning controllers can easily be implemented in the engineering software.

Variables trace for effective commissioning

The Trace Editor provides the ability to record signals in chronological order from the user program of an S7-1500 CPU.
The graphical evaluation of the signals simplifies, for example, the commissioning of drives and helps search for sporadic errors in the application or user program.

Scalable and flexible motion functionality

Motion Control applications with SIMATIC STEP 7 V13 and S7-1500 become child's play, even for beginners. The intuitive graphical user interfaces of the technology objects in STEP 7 V13 offer the best support in the configuration and commissioning of analog and PROFIdrive-capable drives as well as in troubleshooting. The instructions for controlling the motion sequence are standardized according to PLCopen Motion Control. The following functions are supported in STEP 7 V13:

- Positioning (absolute and relative)
- Speed specification (e.g. jogging)
- Homing (active, on-the-fly, etc.)
- Support of incremental and absolute encoders

Comprehensive library concept

For the reuse and simple standardization of frequently used program sections, the system has a comprehensive library concept.

Elements such as blocks, tags, alarms, HMI graphics, graphic objects, individual modules or entire stations can be stored along with their parameter assignment in local or global libraries. This means they are available for further programming tasks.

Security Integrated

STEP 7 V13 has password-based know-how protection against unauthorized reading and changing the contents of program blocks.

Copy protection offers greater protection against unauthorized copying of program blocks. These can be tied to the serial number of a memory card so that the block can only run if the configured memory card is inserted into the CPU.

In addition, multiple user groups with different access rights can be assigned to the controller by means of four different authorization levels.

Improved manipulation protection offers a greater degree of security against unauthorized changes to the data transferred between STEP 7 and the controller.

Migration support for existing hardware and software products

A migration tool integrated in SIMATIC STEP 7 Professional V13 provides support in switching from the S7-300/S7-400 to the S7-1500 controller and converts the program code automatically. Program code that cannot be converted automatically is logged and can be adapted manually. STEP 7 V12 SP1 projects can continue to be used with STEP 7 V13 in compatibility mode.

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Technical specifications

	STEP 7 Professional / Basic V13 (TIA Portal)
Type of license	Floating license
Software class	A
Current version	V13
Target system	SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC
Operating system	Windows 7 (64-bit) • Windows 7 Professional SP1 • Windows 7 Enterprise SP1 • Windows 7 Ultimate SP1 Windows 8.1 (64-bit) • Windows 8.1 • Windows 8.1 Professional • Windows 8.1 Enterprise Windows Server (64-bit) • Windows Server 2008 R2 StdE SP1 (full installation) • Windows Server 2012 R2 StdE (full installation)
Computer	SIMATIC Field PG M4 PREMIUM or higher (or comparable PC)
Processor	Intel Core i5-3320M 3.3GHz or higher
RAM	min. 8 GB
Hard disk	300 GB SSD
Screen	15.6" widescreen display (1920 x 1080)
Note	Includes the IEC programming languages SCL, LAD, FBD, STL and GRAPH

Compatibility with other SIMATIC products

STEP 7 Professional / Basic V13 (incl. WinCC Basic V13) can be installed on a PC in parallel with other versions of STEP 7 V12, V5.4 or V5.5, STEP 7 Micro/WIN, WinCC flexible (from 2008) and WinCC (V7.0 SP2 or higher).

Ordering data

	Article No.
STEP 7 Professional / Basic V13 *Target system:* SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows 7 Professional SP1 (64 bit), Windows 7 Enterprise SP1 (64 bit), Windows 7 Ultimate SP1 (64 bit), Windows 8.1 (64 bit), Windows 8.1 Professional (64 bit), Windows 8.1 Enterprise (64 bit), Windows Server 2008 R2 StdE (full installation), Windows Server 2012 StdE (full installation) *Form of delivery:* German, English, Chinese, Italian, French, Spanish	
STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YA5**
STEP 7 Professional V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0YA5**
STEP 7 Professional V13, Trial License	**6ES7822-1AA03-0YA7**

	Article No.
STEP 7 Professional V13 promotional package Only valid if ordered together with a Software Update Service 6ES7810-5CC04-0YE2 (STEP 7 Professional and STEP 7 Professional in TIA Portal).	
• PowerPack & upgrade from STEP 7 V5.5 to STEP 7 Professional 2010/V13, Floating License. Prerequisite is an existing STEP 7 Software Update Service.	**6ES7822-1AA03-0XC2**
• PowerPack & upgrade from STEP 7 V5.5 to STEP 7 Professional 2010/V13, Floating License. Prerequisite is an existing STEP 7 Software Update Service. Software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0XC2**
• PowerPack & upgrade from STEP 7 V5.4/V5.5, ... to STEP 7 Professional 2010/V13, Floating License. Prerequisite is an existing STEP 7 Standard/Professional installation.	**6ES7822-1AA03-0XC3**
• PowerPack & upgrade from STEP 7 V5.4/V5.5, ... to STEP 7 Professional 2010/V13, Floating License. Prerequisite is an existing STEP 7 Standard/Professional. Software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0XC3**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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STEP 7 (TIA Portal)

Ordering data

	Article No.
Upgrade STEP 7 Professional V12 to STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YE5**
Upgrade from STEP 7 Prof. V12 to STEP 7 Professional V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0YE5**
Upgrade from STEP 7 Prof. 2006/2010 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AA03-0XE5**
Upgrade from STEP 7 Prof. 2006/2010 to STEP 7 Professional 2010/V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0XE5**
PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/V13, Floating License	**6ES7822-1AA03-0XC5**
PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional 2010/V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0XC5**
PowerPack STEP 7 Basic V13 to STEP 7 Professional V13, Floating License	**6ES7822-1AA03-0YC5**
PowerPack STEP 7 Basic V13 to STEP 7 Professional V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-1AE03-0YC5**
STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YA5**
STEP 7 Basic V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-0AE03-0YA5**
STEP 7 Basic V13, Trial License	**6ES7822-0AA03-0YA7**
Upgrade STEP 7 Basic V12 to STEP 7 Basic V13, Floating License	**6ES7822-0AA03-0YE5**
Upgrade STEP 7 Basic V12 to STEP 7 Basic V13, Floating License, software download incl. license key [1] E-mail address required for delivery	**6ES7822-0AE03-0YE5**

	Article No.
Software Update Service	
For a period of 12 months and for a fixed price, the customer is automatically provided with all upgrades and service packs for each installed software package. The contract is automatically extended by a further year unless canceled at least 12 weeks prior to expiration. Requires the current software version	
Software Update Service (Standard Edition) [2]	
The delivery is implemented according to the number of ordered SUS products (e.g. 10 upgrade packages with 10 DVDs, 10 USB flash drives, etc.)	
• STEP 7 Professional V1x	**6ES7822-1AA00-0YL5**
• STEP 7 Professional and STEP 7 Professional in the TIA Portal	**6ES7810-5CC04-0YE2**
• STEP 7 Basic	**6ES7822-0AA00-0YL0**
Software Update Service (Compact Edition) [2]	
The delivery items are combined. For several contracts, only 1 package with 1 data medium set, 1 USB flash drive with the corresponding number of licenses and the corresponding number of COLs will be supplied.	
Delivery items to be combined must be ordered as one item.	
• STEP 7 Professional V1x	**6ES7822-1AA00-0YM5**
• STEP 7 Professional and STEP 7 Professional in the TIA Portal	**6ES7810-5CC00-0YM2**
• STEP 7 Basic	**6ES7822-0AA00-0YM0**
Software Update Service (download) [2]	
The upgrades and service packs are available for downloading.	
E-mail address required for delivery	
• STEP 7 Professional V1x	**6ES7822-1AE00-0YY0**
• STEP 7 Professional and STEP 7 Professional in the TIA Portal	**6ES7810-5CC04-0YY2**
• STEP 7 Basic	**6ES7822-0AE00-0YY0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

[2] For more information on the Software Update Service, see Catalog ST 70.

More information

Brochures

Informative material for downloading can be found on the Internet:

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

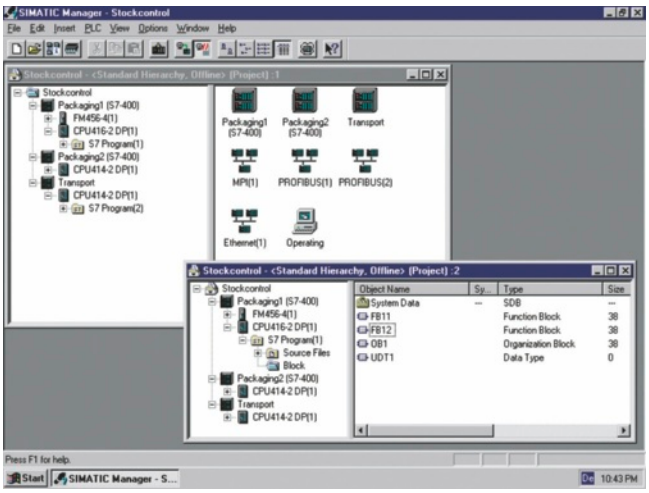
Software download

For up-to-date information and download availability, see:

http://www.siemens.com/tia-online-software-delivery

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Overview



- STEP 7 basic software:
  The standard tool for the SIMATIC S7, SIMATIC C7 and SIMATIC WinAC automation systems.
- Makes use of the full performance capabilities of the systems
- User-friendly functions for all phases of an automation project:
  - Configuring and parameterizing the hardware
  - Definition of communication
  - Programming
  - Testing, commissioning and service
  - Documentation, archiving
  - Operating, diagnostics functions

Application

STEP 7 basic software is the standard tool for the SIMATIC S7, SIMATIC C7 and SIMATIC WinAC automation systems. It enables the user to use the performance capability of these systems easily and conveniently.

STEP 7 contains convenient functions for all phases of an automation project:

- Configuring and parameterizing the hardware.
- Specifying the communication.
- Programming.
- Test, start-up and service.
- Documentation, archiving.
- Operating/diagnostics functions.

All functions are supported by the extensive online help.

STEP 7 is installed as standard on the Field PG M programming device. It is also available as a software package for a PC installation. For use with a PC, a PC module or PC adapter is required. STEP 7 allows several users to work on a project simultaneously. Write access from more than one user is prevented.

STEP 7 trial license

If the customer wishes to test that STEP 7 can run on the intended system before it is implemented, the STEP 7 trial license is available for a token fee.

STEP 7 Professional

STEP 7 Professional provides a software package that, in addition to STEP 7, includes the options of S7-SCL, S7-GRAPH and S7-PLCSIM. STEP 7 Professional is available as an upgrade package for STEP 7. If a common software update package is used, all the languages in the current version can be maintained.

Note:

Screenshots for the individual tools can be found in the form of a PDF in the detailed information.

Design

STEP 7 basic software provides users with different tools for carrying out their automation projects:

- SIMATIC Manager:
  For the common and orderly management of all tools and data for the SIMATIC S7, SIMATIC C7 and SIMATIC WinAC
- Symbol editor:
  For defining symbolic designations, data types and comments of global tags
- Hardware configuration:
  For configuration of the automation system and for parameterization of all settable modules
- Communication:
  For configuring connections. Cyclic data transmission between automation components via MPI or for event-driven data transmission by means of either MPI, via PROFIBUS or Industrial Ethernet
- Information functions:
  For a fast overview of CPU data and the causes of trouble during execution of a user program

For the creation of a user-written program, STEP 7 offers the following field-proven, standardized PLC programming languages:

- Statement list (STL)
- Ladder diagram (LAD)
- Function Block Diagram (FBD)

Furthermore, for special tasks, additional programming languages or technology-oriented configurations can be employed.

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Function

STEP 7 blocks

STEP 7 files all user-written programs and all the data required by those programs in blocks. The possibility of calling other blocks within one block, as though they were subroutines, enables the structuring of the user program. This increases considerably the organizational clarity, the comprehensibility and the ease of maintenance of PLC programs. The following types of blocks are available:

- Organization blocks (OBs) control program execution.
  - OBs are divided into classes (e.g., time-driven, alarm-driven), independently of the triggering event. These classes have levels of priority. Depending on their respective priority levels, one can interrupt another.
  - When an OB is started, detailed information about the event initiating the start is provided. This information can be evaluated in the user-written program.
- Function blocks (FBs) contain the actual user program.
  - Function blocks can be supplied with different data each time they are called (he so-called instance). These data, as well as internal variables (e.g., for intermediate values) and results are stored in the assigned instance-data block and are automatically managed by the system.
- When an FB/SFB is called, instance data blocks (instance DBs) are assigned to the block. They are automatically generated when these blocks are compiled.
  - The user can access these instance data (symbolically as well, of course) from any point in his user program or from an HMI system.
- Functions (FCs) contain program routines for frequently used functions.
  - Every function has a fixed function value (a number of initial parameters are possible, in addition to the IEC standard). The output parameters must be processed immediately after the call. Thus functions do not require any instance-data blocks.
- Data blocks (DBs) are data areas for storing user data.
  - In addition to the data that is assigned in each case to a function block (instance data), global data can be defined and can be used by any of the software modules (e.g., for recipes).
  - An elementary or structured data type can be assigned to the components of a data block. Elementary data types are, for example, BOOL, REAL or INTEGER. Structured data types (fields and structures) comprise elementary data types (e.g. a recipe). The data in a data block can be addressed symbolically. This facilitates the programming and the readability of the program.
- System function blocks (SFBs); function blocks (see above) that are integrated in the CPU's operating system, e.g. SEND, RECEIVE, controller. The variables of the SFBs are also filed in IDBs.
- System functions (SFCs); functions (see above) that are integrated in the CPU's operating system, e.g., time functions, block transfer.
- System data blocks (SDBs) are data for the CPU's operating system containing the system settings, e.g., module parameters.

Tools

SIMATIC Manager

The SIMATIC Manager manages all data belonging to an automation project, regardless of the target system (SIMATIC S7, SIMATIC C7 or SIMATIC WinAC) on which they are implemented.

It provides a common entry point for all SIMATIC S7, C7 or WinAC tools. The SIMATIC software tools that are necessary for processing the selected data are automatically started by SIMATIC Manager.

Symbol Editor

With the tool Symbol Editor all global variables (in contrast to the local formal parameters that are declared when the blocks are programmed) are managed. The following functions are available:

- Definition of symbolic designations and comments for the process signals (inputs/outputs), flags and blocks
- Sorting functions
- Data exchange with other Windows programs.

The symbol charts that are generated when this tool is used are available to all applications. Changes to a symbol parameter are therefore automatically recognized by all tools.

Hardware configuration

The tool Hardware Configuration is used for configuring and parameterizing the hardware used for an automation project. The following functions are available:

- Configuration of the automation system
  Racks are selected from an electronic catalog and the selected modules are assigned to the required slots in the racks.
- The configuration of the distributed I/Os is done in the same way as the configuration of the non-distributed I/Os; channel-granular I/O modules are also supported.
- CPU parameter assignment:
  Properties such as restart characteristics and cycle-time monitoring can be set menu-driven. multicomputing is supported. The entered data are filed in system data blocks in the CPU.
- Module parameter assignment:
  The user can specify all the adjustable parameters of the modules in input screen forms. Adjustments via DIP switches become unnecessary. Parameterization of hardware modules occurs automatically during the CPU's acceleration. Thus, a change of a module can be made without another parameterization.
- Function module (FM) and communications processor (CP) parameter assignment:
  This parameterization also occurs within the hardware configuration in the same way as the parameterization of the other modules. For this parameterization hardware-module-specific screen forms and rules are provided for each FM and CP (is included in the FM/CP functions package). The system prevents faulty inputs by offering only allowed entry options on the parameter assignment screen forms.

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Function (continued)

System diagnostics

System diagnostics offer the user an overview of the status of the automation system. The display can be in two different forms:

- Display of text messages, which can be output directly and quickly
- Pixel-graphics display within the Hardware Config display, offering the following options:
  - Display of general module information (e.g., order number, version, designation) and module status (e.g., faulty)
  - Display of module faults (e.g., channel faults) of the central I/O and DP slaves
  - Display of alarms from the diagnostics buffer

For CPUs, additional information is displayed:

- Causes of malfunction during user program execution
- Display of cycle duration (longest, shortest and last cycle)
- Display of the reserved and free memory
- Capabilities and usage of MPI communication
- Display of the performance data (number of possible inputs/outputs, flags, counters, timers and blocks)

Communication configuration

- Configuring and display of communication links
- Time-driven cyclic data transmission via MPI
  - Selection of communication partners
  - Entering of data source and data destination in a table. Generation of all system data blocks (SDBs) to be loaded and their complete transmission to all CPUs take place automatically.
- Event-driven data transmission:
  - Definition of the communication links
  - Selection of the communication function blocks (CFBs) from the integrated block library
  - Parameterization of the selected communication blocks in the customary programming language (e.g., LAD).

Programming languages

The well-proven programming languages Ladder (LAD), Function Block Diagram (FBD) and Instruction List (IL) are available for programming. Programs that comply with DIN EN 6.1131-3 can be created in the classical PLC programming languages Ladder Diagram (LAD) and Function Block Diagram (FBD) .

The user-friendly, pixel-graphics LAD and FBD editors support the programmer with:

- Uncomplicated and intuitive operation:
  The creation of ladder diagrams/function block diagrams is characterized by the user-friendliness familiar from PCs, such as drag and drop, cut and paste.
- Library of predefined complex functions (such as PID controllers) or user-specific standard solutions

The Statement List (STL) textual programming language makes it possible for the user to create programs in which operating time and memory location are optimized and which are “close to the hardware.” When creating these programs, the programmer is supported by the following user-friendly editing functions:

- Entry option in incremental mode and free text mode:
  the user can either have each input immediately checked “incrementally” for correctness, or create the complete program using only symbols in a text editor and subsequently have it translated by means of the appropriate symbol chart.

Operation set

The STEP 7 programming languages have a comprehensive set of instructions, similar to STEP 5. This allows even complex functions to be programmed easily (i.e., without having great programming knowledge) and quickly

The following functions are provided:

- Binary logic (incl. edge evaluation)
- Word operation
- Timers/counters
- Comparison functions
- Conversion functions
- Shift/rotate
- Mathematical functions (incl. trigonometry, exponents, logarithms)
- Program control (branches, branch distribution, calls, Master Control Relays).

In addition, improved testing and service functions make programming easier:

- Setting breakpoints (only S7-400)
- Forcing of inputs/outputs (only S7-400)
- Rewiring
- Display of cross-references

STEP 7 supports multicomputing with the S7-400

Status functions:

- Download and testing of blocks directly from the editor
- Status of several blocks at the same time
- Search functions:
  Specific locations within the program can be found quickly using search criteria (such as symbolic name, operand) (XRef).

Online Help (F1) is available for all functions and blocks.

Note:

Screenshot views are available for the individual tools.

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Integration

Components for connecting a PC to MPI and PROFIBUS

The components described below are used to connect programming devices and PCs (incl. notebooks) to PROFIBUS and to the multipoint SIMATIC S7 MPI interface in conjunction with STEP 7.

PC adapter USB

- To connect a PC to the SIMATIC S7 programmable controller via the USB port.
- For connection to USB 1.1 and 2.0 interfaces.
- Can be used for SIMATIC S7-200, S7-300, S7-400 and C7.
- Supports routing.
- Automatic transmission rate and profile search.
- Noticeably improved performance (up to three times faster than the PC adapter via RS 232).
- Including subsequently updatable firmware (e.g. for function expansions or troubleshooting).
- Can be used under Windows XP, Windows Vista, Windows 7 (32/64-bit).
- Scope of delivery:
  - PC adapter USB.
  - CD "SIMATIC Software PC Adapter USB" including software and documentation.
  - USB cable, 5 m.
  - MPI cable, 0.3 m.

CP 5512

- For programming devices/ PCs/notebooks with PCMCIA slot.
- PCMCIA slot Type II (32 bit cardbus).
- Incl. adapter with 9-pin sub-D socket for connection to PROFIBUS.

CP 5611/CP 5611-MPI

- For programming devices/PCs with PCI slot
- Short PCI card (32 bit).
- CP 5611-MPI including MPI cable.

Components for connecting the PC to Industrial Ethernet

The PC modules described below are used to connect programming devices and AT-compatible PCs/notebooks to Industrial Ethernet in conjunction with STEP 7 and SOFTNET-PG (as of V6.0).

CP 1512

- For programming devices/ PCs/notebooks with PCMCIA slot.
- PCMCIA slot Type II (32 bit cardbus); 10/100 Mbit/s.
- Incl. adapter with RJ45 socket for connection to Industrial Ethernet.

CP 1612

- For programming devices/PCs with PCI slot
- Short PCI card (32 bit); 10/100 Mbit/s
- Incl. RJ45 socket for connection to Industrial Ethernet.

Please refer to the respective product catalog for technical information regarding product versions and supported operating systems.

You will find additional information about the online connection of PCs and SIMATIC S7/C7 controllers under "SIMATIC NET Communication Systems".

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Technical specifications

	6ES7972-0CB20-0XA0
Supply voltage	
24 V DC	Yes
Input current	
Current consumption, typ.	100 mA
Power	
Power consumption, typ.	max. 2.5 W
EMC	
Interference immunity against discharge of static electricity	
• Interference immunity against discharge of static electricity acc. to IEC 61000-4-2	Yes
Interference immunity to cable-borne interference	
• on the supply lines acc. to IEC 61000-4-4	Yes
• Interference immunity on signal lines acc. to IEC 61000-4-4	Yes
Surge immunity	
• on the supply lines acc. to IEC 61000-4-5	Yes; 1 kV (to IEC 61000-4-5; surge symm.); 2 kV (to IEC 61000-4-5; surge asymm.)
Immunity against high-frequency electromagnetic fields	
• Interference immunity against high-frequency radiation acc. to IEC 61000-4-3	Yes; 10 V/m, 80 to 1000 MHz (to IEC 61000-4-3); 10 V/m, 900 MHz, 1.89 GHz, 50% ED (to IEC 61000-4-3)
Immunity against conducted interference induced by high-frequency fields	
• Interference immunity against high frequency current feed acc. to IEC 61000-4-6	Yes; 10 V, 9 kHz to 80 MHz (to IEC 61000-4-6)
Immunity to magnetic field interference	
• Interference immunity to magnetic fields at 50 Hz	30 A/m; to IEC 61000-4-8
Emission of radio interference acc. to EN 55 022	
• Interference emission acc. to EN 55022, class B	Yes

	6ES7972-0CB20-0XA0
Ambient conditions	
Operating temperature	
• Min.	5 °C
• max.	40 °C
• Permissible temperature change	10 °C/h; Operation: 10 K/h; storage/transport: 20 K/h
Storage/transport temperature	
• Min.	-20 °C
• max.	60 °C
Relative humidity	
• Operation, min.	5 %
• max. relative humidity	80 %
• Storage/transport, min.	5 %
• Storage/transport, max.	95 %; At 25 °C (no condensation)
Vibrations	
• Operation, checked according to IEC 60068-2-6	Yes; 10 to 58 Hz: Amplitude 0.075 mm; 58 to 500 Hz: Acceleration 9.8 m/s^2
• Transport tested checked to IEC 60068-2-6	Yes; (packed) 5 to 9 Hz, amplitude 3.5 mm; 9 to 500 Hz, acceleration 9.8 m/s^2
Shock test	
• Shock test	Tested to DIN IEC 60068-2-2; Operation: 950 m/s^2 (10 g), 30 ms, 100 Shocks; Transport (packaged): 250 m/s^2 (25 g), 6 ms, 1000 shocks
Dimensions	
Width	105 mm
Height	58 mm
Depth	26 mm
Weights	
Weight, approx.	100 g

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Ordering data	Article No.
STEP 7 Version 5.5	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC ***Requirements:*** Windows XP Prof., Windows 7 Professional / Ultimate *Delivery package:* German, English, French, Spanish, Italian; incl. license key on USB stick, with electronic documentation	
Floating license on DVD	**6ES7810-4CC10-0YA5**
Floating License, license key download without software and documentation[1]; email address required for delivery	**6ES7810-4CE10-0YB5**
Rental license for 50 hours	**6ES7810-4CC10-0YA6**
Rental License for 50 hours, license key download without software and documentation[1]; email address required for delivery	**6ES7810-4CE10-0YB6**
Upgrade Floating License 3.x/4.x/5.x to V5.5; on DVD	**6ES7810-4CC10-0YE5**
Trial License STEP 7 V5.5; on DVD, 14 day trial	**6ES7810-4CC10-0YA7**
STEP 7 Version 5.5 Japanese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional Japanese *Delivery package:* English, Japanese; incl. license key on USB stick, with electronic documentation	
Floating License Japanese on DVD	**6ES7810-4CC10-0JA5**
Upgrade Floating License Japanese 3.x/4.x/5.x to V5.5; on DVD	**6ES7810-4CC10-0JE5**
STEP 7 Version 5.5, Chinese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional Chinese *Delivery package:* English, Chinese; incl. license key on USB stick, with electronic documentation	
Floating License Chinese on DVD	**6ES7810-4CC10-0KA5**
Upgrade Floating License Chinese 3.x/4.x/5.x to V5.5; on DVD	**6ES7810-4CC10-0KE5**
Documentation package STEP 7 basic information	
Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
German	**6ES7810-4CA10-8AW0**
English	**6ES7810-4CA10-8BW0**
French	**6ES7810-4CA10-8CW0**
Spanish	**6ES7810-4CA10-8DW0**
Italian	**6ES7810-4CA10-8EW0**

	Article No.
STEP 7 reference manuals	
Consisting of STL, LAD and FBD manuals as well as a reference manual for standard and system functions for SIMATIC S7-300/400	
German	**6ES7810-4CA10-8AW1**
English	**6ES7810-4CA10-8BW1**
French	**6ES7810-4CA10-8CW1**
Spanish	**6ES7810-4CA10-8DW1**
Italian	**6ES7810-4CA10-8EW1**
SIMATIC Manual Collection	**6ES7998-8XC01-8YE0**
Electronic manuals on DVD, multilingual: LOGO!, SIMADYN, SIMATIC bus components, SIMATIC C7, SIMATIC distributed I/O, SIMATIC HMI, SIMATIC Sensors, SIMATIC NET, SIMATIC PC Based Automation, SIMATIC PCS 7, SIMATIC PG/PC, SIMATIC S7, SIMATIC Software, SIMATIC TDC	
SIMATIC Manual Collection update service for 1 year	**6ES7998-8XC01-8YE2**
Current "Manual Collection" DVD and the three subsequent updates	
EPROM programming device, USB prommer	**6ES7792-0AA00-0XA0**
For programming SIMATIC memory cards and EPROM modules	
MPI cable	**6ES7901-0BF00-0AA0**
For linking SIMATIC S7 and PG through MPI (5 m)	
Components for connecting a PC to MPI and PROFIBUS	
For PCs with a free PCI slot:	
• **CP 5612**	**6GK1561-2AA00**
• **CP 5612 MPI** incl. MPI cable (5 m)	**6GK1561-2AM00**
For PCs with a free PCMCIA slot:	
• **CP 5512** For Windows XP Professional	**6GK1551-2AA00**
For PCs without a free PCI slot:	
• **USB A2 PC adapter** for connecting a PG/PC or Notebook to PROFIBUS or MPI; USB cable included in scope of delivery	**6GK1571-0BA00-0AA0**
Components for connecting the PC to Industrial Ethernet	
For PCs with a free PCI slot:	
• **Layer 2 Ethernet cards**	
For PCs with a free PCMCIA slot:	
• **SOFTNET-IE RNA V7.1 (Win XP/Vista/Server2003)**	**6GK1704-1PW71-3AA0**
• **SOFTNET-IE RNA V8.1 (Win 7/server2008)**	**6GK1704-1PW08-1AA0**

[1] For up-to-date information and download availability, see: http://www.siemens.com/tia-online-software-delivery

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More information

Brochures

Informative material for downloading can be found on the Internet:

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

Software download

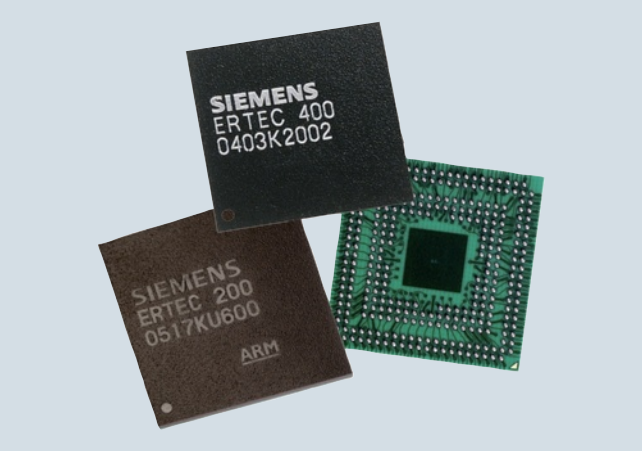
For up-to-date information and download availability, see:

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Enhanced Real-Time Ethernet Controller ERTEC

Overview



With the Industrial Ethernet ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controller), devices and systems can be connected to PROFINET without great effort. The high-performance Ethernet controllers with 32-bit microprocessor as well as integral real-time switch for Real Time Ethernet have been specially developed for industrial use.

These Ethernet controllers handle all the data transmission for PROFINET with Real-Time (RT) and Isochronous Real-Time (IRT) and thus offload the application processor. Thanks to the integral 2-port switch (ERTEC 200 and ERTEC 200P) or 4-port switch (ERTEC 400), there are no costs for external switches. Flexible topologies such as star, tree and linear topologies can be implemented without any other external network components.

- ***ERTEC 200P***
  with integral 2-port switch and maximum performance for compact and modular PROFINET field devices. The ERTEC 200P is designed for cycle times up to 31.25 µs. In conjunction with a high-speed ARM 926 CPU, it meets all the requirements for powerful PROFINET implementation.
- ***ERTEC 200***
  with an integral 2-port switch for developing compact or modular PROFINET field devices.
- ***ERTEC 400***
  with 4 integral ports and one integral PCI interface for developing network components and field devices with specific requirements regarding communication capabilities.

The EK-ERTEC 200P PN IO, DK-ERTEC 200 PN IO and DK-ERTEC 400 PN IO development kits enable the uncomplicated development of PROFINET field devices thanks to fast and simple integration of the PROFINET IO functionalities based on the ERTEC.

Benefits

- Full support for the PROFINET functionalities Real-Time (RT) and Isochronous Real-Time (IRT)
- Space-saving implementation thanks to the high degree of integration
- Complete communication processing for cyclic data transmission
- Wide application range thanks to extensive interfaces
- Openness due to compatibility with IEEE 802
- Industry-compatible environmental characteristics (RoHS compatibility)
- Unlimited support for IT communication and real-time data communication on the same medium.
- Powerful, integral ARM microprocessor
- No external network components necessary due to integration of switch in the device
- Integrated PHYs (for ERTEC200P and ERTEC 200)
- Technology benefits over standard Ethernet controllers due to the support for time-critical applications such as IRT
- Development support from the Siemens Competence Centers in Europe and the USA.

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Technical specifications

	ERTEC 400	ERTEC 200	ERTEC 200P
Transmission rate	10/100 Mbit/s	10/100 Mbit/s	100 Mbit/s
Interfaces			
• Ethernet / PHY interface	4 x PHY interface	2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs)	2 x Ethernet interface (PHY integrated) or alternatively 2 x PHY interface (for connection of optical PHYs)
	• Half/full duplex	• Half/full duplex	Half/full duplex
- In connection with the corresponding PHY types:	Support for copper and fiber-optic cables; autosensing; autocrossover	Support for copper and fiber-optic cables (PHY for copper integrated); autosensing; autocrossover	Support for copper and fiber-optic cables (PHY for copper integrated); autosensing; autocrossover
• Local Bus Unit (LBU)	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width	Local bus master interface for connecting an external host with access to internal areas of the ERTEC; 16 bit data bit width	XHIG (external host interface); 16/32 bit data bit width
• External memory interface (EMIF)			
- SDRAM controller	128 MB/16 bit or 256 MB/32 bit	64 MB/16 bit or 128 MB/32 bit	128 MB/16 bit or 256 MB/32 bit
- SRAM controller	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)	4 x 16 MB for asynchronous blocks (SRAM, flash, I/O 8/16/32 bit)
- Chip-select support	yes	yes	yes
• IO interfaces	32 parameterizable I/O (GPIO); multifunctional outputs	45 parameterizable I/O (GPIO); multifunctional outputs	up to 96 parameterizable I/O (GPIO); multifunctional outputs
• Intelligent switching and PROFINET IRT prioritization/timing	yes	yes	yes
ARM processor			
• Integral ARM946 processor	32-bit ARM system	32-bit ARM system	32-bit ARM system
- Adjustable operating frequency	50/100/150 MHz	50/100/150 MHz	125/250 MHz
Supply voltage			
• Core (VDD Core)	1.5 V +/- 10 %	1.5 V +/- 10 %	1.2 V +5 %/-0.1 V
• I/Os (VDD IO)	3.3 V +/- 10 %	3.3 V +/- 10 %	3.3 V +5 %/-10 %
• External host interface (XHIF)	-	-	1.8 V +5 %/-10 %
• PHY	-	-	1.5 V +5 %/-10 %
• External host interface (XHIF)	-	-	1.8 V/3.3 V +5 %/-10 %
Perm. ambient conditions			
• Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
• Transport/storage temperature	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
• Relative humidity	Max. 95 % at +25 °C	Max. 95 % at +25 °C	Max. 95 % at +25 °C
Constructional design			
• Housing	Plastic FBGA 304 Pin	Plastic FBGA 304 Pin	Plastic FBGA 400 Pin
• Pinning Ball Pitch	0.8 mm	0.8 mm	0.8 mm
Dimensions (W x H x D) in mm - ERTEC	19 x 1 x 19	19 x 1 x 19	17 x 1 x 17
Supported communications protocols			
• General Ethernet protocols	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller	In accordance with the respective software implementation that uses the ERTEC as Ethernet controller
• PROFINET in combination with a PROFINET Software Stack	Real-Time communication (RT); Isochronous Real-Time communication (IRT)	Real-Time communication (RT); Isochronous Real-Time communication (IRT)	Real-Time communication (RT); Isochronous Real-Time communication (IRT)

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Enhanced Real-Time Ethernet Controller ERTEC

Ordering data

	Article No.
ERTEC 200P	
ASIC for connection to Switched Ethernet 100 Mbit/s, Ethernet controller with integral 2-port switch, ARM 926 processor and integral PHYs	
• 10 units (Evaluation Pack)	**6ES7195-0BH00-0XA0**
• 90 units (individual tray)	**6ES7195-0BH10-0XA0**
• 450 units (drypack, 5 trays)	**6ES7195-0BH20-0XA0**
Evaluation Kit EK-ERTEC 200P PN IO	**6ES7195-3BE00-0YA0**
ERTEC 200	
ASIC ERTEC 200 for connection to Switched Ethernet 10/100 Mbit/s, Ethernet controller with integral 2-port switch, ARM 946 processor and integral PHYs	
• 70 units (individual tray),	**6GK1182-0BB01-0AA1**
• 350 units (drypack, 5 trays),	**6GK1182-0BB01-0AA2**
• 3500 units (package, 10 drypacks)	**6GK1182-0BB01-0AA3**
Development Kit DK-ERTEC 200 PN IO	**6GK1953-0BA00**
ERTEC 200 PN IO Starter Kit	**6ES7195-3BD00-0YA0**
ERTEC 400	
ASIC ERTEC 400 for connection to switched Ethernet 10/100 Mbit/s, Ethernet controller with integrated 4-port switch, ARM 946 RISC and PCI interface (V2.2), data preparation for real-time and isochrone real-time for PROFINET IO	
• 70 units (individual tray),	**6GK1184-0BB01-0AA1**
• 350 units (drypack, 5 trays),	**6GK1184-0BB01-0AA2**
Development kit DK-ERTEC 400 PN IO	**6GK1953-0CA00**

More information

You can find further information, technical data and manuals on the Enhanced Real-Time Ethernet Controller ERTEC on the Internet:

http://www.siemens.com/ertec

You can find more information on the Internet at:

http://support.automation.siemens.com/WW/view/en/18977720/133300

Support

The competent and experienced staff at the PROFINET Competence Centers in Europe and the U.S. offer free telephone advice as well as individual and agreed development and support on-site – from the initial information all the way to conclusion of the development with certification.

If you have any questions, your contact partner will be pleased to help:

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Overview



With the development packages for PROFINET, compact or modular PROFINET field devices can be developed quickly and with little effort. Depending on the application, different development packages are available.

The development packages for the ASICs of the ERTEC family (Enhanced Real-Time Ethernet Controller) are suitable for the development of field devices with an integrated IRT switch (Isochronous Real-Time). The demand for real-time capability, linear topology capability, and for IT integration is therefore met perfectly.

With the help of the development package for standard Ethernet controllers, PROFINET devices can be developed on the basis of a standard Ethernet controller. Devices with RT (Real-Time) can be implemented in the field device without special hardware.

The PROFIsafe StarterKit permits the implementation of fail-safe devices. In so doing, the PROFIsafe Stack applicatively builds on the PROFINET stack.

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Benefits

- Easy development of PROFINET field devices with Real-Time (RT) and Isochronous Real-Time (IRT).
- Perfectly matched hardware and software components.
- A quick start of the development thanks to the supplied software examples, documentation, and circuit diagrams.
- Easy creation of a specific GSD file thanks to the supplied example GSD file.
- Development boards as PN IO device test environment (only with ERTEC).
- Complete development environment contained in the scope of delivery, including a run-capable example application.
- Easy portability to any Ethernet controllers and real-time operating systems.

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Development kits

2

Ordering data	Article No.
ERTEC development kits	
Evaluation Kit EK-ERTEC 200P PN IO	**6ES7195-3BE00-0YA0**
Development kit DK-ERTEC 200 PN IO	**6GK1953-0BA00**
Development kit DK-ERTEC 400 PN IO	**6GK1953-0CA00**
ERTEC 200 PN IO Starter Kit	**6ES7195-3BD00-0YA0**
Development kit for standard Ethernet controller	**6ES7195-3BC00-0YA0**
PROFIsafe starter kit V3.4	**6ES7195-3BF02-0YA0**
ERTEC ASICs	
ERTEC 200P	
ASIC for connection to Switched Ethernet 100 Mbit/s, Ethernet controller with integral 2-port switch, ARM 926 processor and integral PHYs	
• 10 units (Evaluation Pack)	**6ES7195-0BH00-0XA0**
• 90 units (individual tray)	**6ES7195-0BH10-0XA0**
• 450 units (drypack, 5 trays)	**6ES7195-0BH20-0XA0**
ERTEC 200	
ASIC ERTEC 200 for connection to Switched Ethernet 10/100 Mbit/s, Ethernet controller with integral 2-port switch, ARM 946 processor and integral PHYs	
• 70 units (individual trays),	**6GK1182-0BB01-0AA1**
• 350 units (drypack, 5 trays),	**6GK1182-0BB01-0AA2**
• 3500 units (package, 10 drypacks)	**6GK1182-0BB01-0AA3**
ERTEC 400	
ASIC ERTEC 400 for connection to Switched Ethernet 10/100 Mbit/s, Ethernet controller with integral 4-port switch, ARM 946 processor and PCI interface (V2.2)	
• 70 units (individual trays),	**6GK1184-0BB01-0AA1**
• 350 units (drypack, 5 trays),	**6GK1184-0BB01-0AA2**
Accessories	
PROFINET IO product line license for one product line	**6ES7195-3BC10-0YA0**

More information

You can find more detailed information, technical data, and manuals for ERTEC 200P, ERTEC 200, ERTEC 400, EK-ERTEC 200P, DK/SK-ERTEC 200 PN IO, DK-ERTEC 400 PN IO and DK Standard Ethernet Controller on the Internet:

http://www.siemens.com/ertec

You can find more information on the Internet at:

http://support.automation.siemens.com/WW/view/en/18977720/133300

ERTEC 200 PN IO starter kit expansion option

The supplied controller test partner SOFTNET PN IO is suitable for developing PROFINET IO Devices with RT thanks to its communication connection via a standard Ethernet interface on the developer PC.

For testing the IRT functionality, the controller test partner CP1616 is needed, article number: 6GK1161-6AA01.

When using the CP1616, the same evaluation options are available as on the DK-ERTEC 200 PN IO.

The necessary and released test software of the CP1616 must be received for successful evaluation with the CP1616. The necessary software components and documentation expansions are available free when you return the completed registration form of the ERTEC 200 PN IO starter kit as well as the delivery notes of the ERTEC 200 PN IO starter kit and CP1616.

The software is supplied by the Support Center ComDeC via via a secure download connection following successful registration.

Licensing

All of the development packages contain a development license which authorizes the user to develop and test PROFINET devices on the basis of the stack provided.

For the production of series devices, one product line license must also be obtained for each product line under the Article No. 6ES7195-3BC10-0YA0.

For detailed information on the currently applicable licensing rules, contact our Competence Centers ComDeC and PIC.

Support

The competent and experienced staff at the PROFINET Competence Centers in Europe and the U.S. offer free telephone advice as well as individual and agreed development and support on-site – from the initial information all the way to conclusion of the development with certification.

If you have any questions, your contact partner will be pleased to help:

Germany and Europe

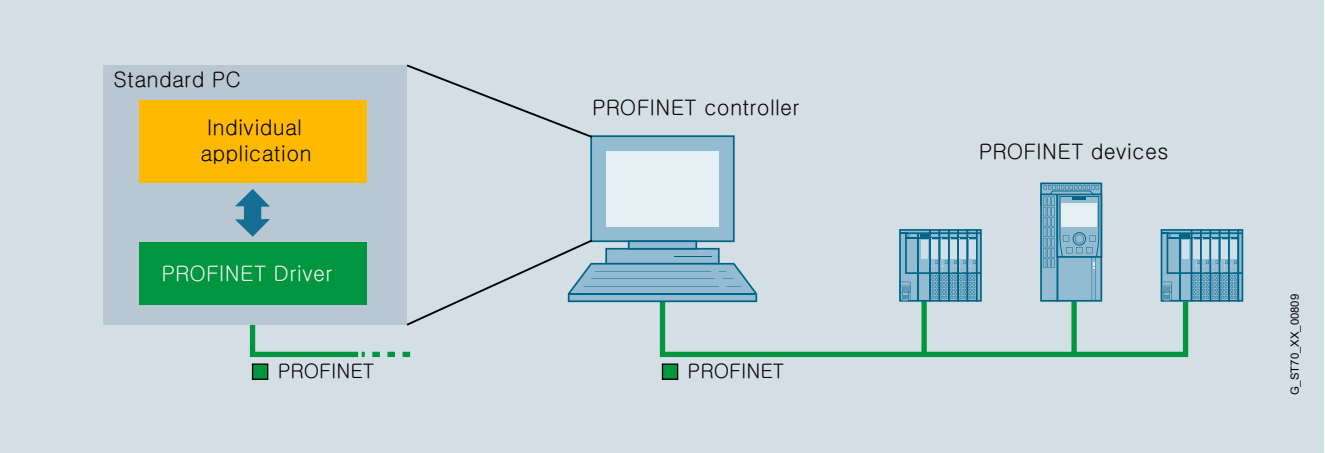
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Overview



- For connecting distributed I/O and drives to user-specific control applications via PROFINET
- Operation of the control software on a standard PC using the standard Ethernet interface of the PC;
- Supplied as portable source code and can therefore be used with any operating system
- Sample application for Windows included in the scope of delivery; uses SIMATIC IPCs as example hardware

Benefits

- Configuration via open XML interface, no engineering tool required (TIA Portal, STEP 7, etc.).
- Simplified handling when using the TIA Portal
- Operation on a standard PC using the standard Ethernet interface reduces costs and offers flexibility and performance benefits
- Delivery as portable source code enables use with different operating systems. This enables connection to a host of user-specific control programs.
- Supports PROFINET with Real-Time (RT)
- Cycle times up to 1 ms when using a real-time operating system

Ordering data

	Article No.
PROFINET Driver	
For connecting distributed I/O and drives to user-specific control applications via PROFINET	
Development license	**6ES7195-3AA00-0YA0**
Runtime licenses	
• 10 units	**6ES7195-3AA10-0XA0**
• 50 units	**6ES7195-3AA20-0XA0**
• 200 units	**6ES7195-3AA30-0XA0**
• 500 units	**6ES7195-3AA40-0XA0**

More information

Support

The competent and experienced staff at the PROFINET Competence Centers in Europe and the U.S. offer free telephone advice as well as individual and agreed development and support on-site – from the initial information all the way to conclusion of the development with certification.

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IE/PB Link PN IO

Overview



PN	DP-M	DP-S	ASi-M		
●	●				

- Compact network transition between Industrial Ethernet and PROFIBUS
- Connection to Industrial Ethernet
  with 10/100 Mbit/s full/half duplex connection with autosensing for automatic switchover
- Connection to PROFIBUS
  with 9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s for PROFIBUS PA
- PROFINET IO proxy;
  connection of PROFIBUS DP slaves to PROFINET IO controller according to PROFINET standard:
  - From the viewpoint of the IO controller, all DP slaves are handled like I/O devices with Ethernet interface, i.e. the IE/PB Link PN IO is their proxy.
- Cross-network programming device/operator panel communication by S7 routing,
  i.e. all S7 stations can be remotely programmed by the programming device on the Industrial Ethernet or PROFIBUS.
- Cross-network access to data of S7 stations for visualization by means of S7 OPC server and S7 routing;
  - Via the IE/PB Link PN IO access can be made from the PC on the Industrial Ethernet (e.g. for HMI applications with OPC Client interface) by means of S7 OPC server, to all data of the S7 stations on the PROFIBUS.
- Module replacement without the need for a programming device, using the C-PLUG swap media for backing up the configuration data

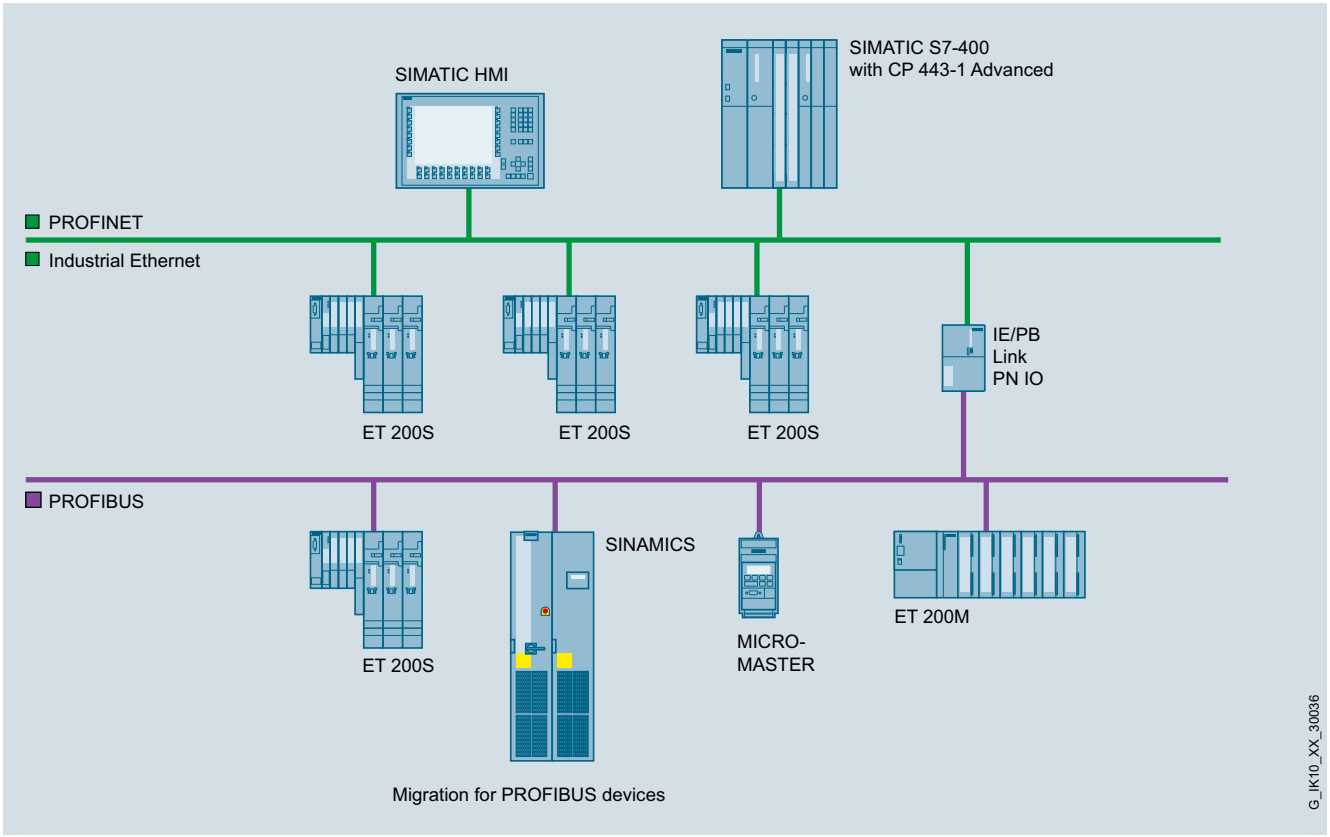
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Benefits

get Designed for Industry

PROFINET applications

- Protection of investment due to simple connection of PROFIBUS DP slaves to PROFINET IO controller
- Enables the use also in plants with PROFIsafe applications
- Independence from individual vendors through support of the PROFINET standard for distributed field devices



Configuration example of PROFIBUS and PROFINET:
PROFIBUS devices can be seamlessly integrated into PROFINET over the IE/PB Link PN IO as proxy.

Applications in the case of vertical integration

- Worldwide access to data of the PROFIBUS stations via Industrial Ethernet and Internet for vertical integration
- Optimization of a plant from a central location
- Access to process data from all enterprise levels
- Loading of STEP 7 programs from a central location

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IE/PB Link PN IO

Application

As an autonomous component, the IE/PB Link PN IO provides a seamless transition between Industrial Ethernet and PROFIBUS.

Using the IE/PB Link PN IO as a proxy, you can continue to use existing PROFIBUS devices (also with PROFIsafe functionality, V2.0 or higher) and integrate them into a PROFINET application.

The IE/PB Link PN IO also offers the following functions:

- S7 routing
  - permits cross-network PG/OP communication, in other words, all S7 stations on Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device
  - Access can be made to visualization data of the S7 stations on the PROFIBUS from HMI stations on the Industrial Ethernet.
- Data record routing (PROFIBUS DP)
  - It is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to parameterize and diagnose a PROFIBUS field device via the IE/PB Link PN IO.

Design

The IE/PB Link PN IO exhibits all the advantages of the SIMATIC design:

- Compact design;
  the rugged plastic casing features on the front:
  - one RJ45 port for connection to Industrial Ethernet.
  - one 9-pin Sub-D socket for connection to PROFIBUS
  - one 2-pin terminal strip for connecting the external supply voltage of 24 V DC.
  - Diagnostic LEDs
- Connection is by means of the IE FC RJ45 Plug 180 with 180° cable exit or by means of a standard patch cable
- Simple mounting;
  the IE/PB Link PN IO is mounted on an S7-300 DIN rail.
- Can be operated without a fan
- Fast device replacement in the event of a fault by using the optional C-PLUG swap medium (not included in scope of supply)

Function

PROFINET

- PROFINET IO proxy;
  connection of PROFIBUS DP slaves to PROFINET IO controller with real-time property, according to PROFINET standard

Additional functionality for vertical integration

- S7 routing
  - permits cross-network PG communication, in other words, all S7 stations on Industrial Ethernet or PROFIBUS can be programmed remotely using the programming device.
  - Access can be made to visualization data of S7 stations on the PROFIBUS from HMI stations on the Industrial Ethernet.
- Data record routing (PROFIBUS DP)
  - Using this option, the IE/PB Link PN IO can be used as a router for data records that are forwarded to field devices (DP slaves). SIMATIC PDM (Process Device Manager) is a tool that creates data sets of this type for parameterizing and diagnosing field devices.
    Application:
    It is possible, for example, to use SIMATIC PDM (on the PC) on Industrial Ethernet to set parameters and run diagnostics for PROFIBUS PA field device over the IE/PB Link PN IO and DP/PA coupler.

The additional functions for vertical integration can also be used in an existing PROFIBUS application without PROFINET for connection to a higher-level Industrial Ethernet.

In this case, the IE/PB Link PN IO is used as an additional DP-Master Class 2 on a PROFIBUS segment for linking to the Industrial Ethernet and offers the above functions.

Diagnosis

Extensive diagnostic options are available via STEP 7 or SNMP, including:

- Diagnosis of the assigned PROFIBUS field devices;
  using the IE/PB Link PN IO as a proxy, the connected DP slaves can be diagnosed in the same manner as PROFINET IO devices (even in the user program of the PROFINET IO controller)
- General diagnostics and statistics functions
- Connection diagnostics
- Diagnostic buffer
- Integration into network management systems through the support of SNMP V1 MIB-II

Configuration

STEP 7 V5.4 or higher or the TIA Portal V11.0 is required for configuring the full functional scope of the IE/PB Link PN IO.

For the IE/PB Link PN IO, STEP 7 automatically generates the necessary parameters, e.g. the ones that assign addresses, and all necessary routing information.

The configuration data for PROFINET IO created with STEP 7 is saved on the IO controller. Attention must however be paid to the memory capacity. The initialization data for the Ethernet interface is backed up on the C-PLUG (Configuration Plug) swap media. The IE/PB Link PN IO can be swapped in the event of failure without a programming device, because the relevant user and configuration data is saved on the IO controller or on the C-PLUG.

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Technical specifications

Article No.	**6GK1411-5AB00**
Product-type designation	**IE/PB Link PN IO**
Data transmission rates	
• Industrial Ethernet	10/100 Mbit/s autosensing
• PROFIBUS	9.6 kbit/s to 12 Mbit/s incl. 45.45 kbit/s (PROFIBUS PA)
Interfaces	
• Connection to Industrial Ethernet	
- 10BaseT/100BaseT	RJ45
• Connection to PROFIBUS	9-pin Sub-D socket
• Connection for power supply	2-pin terminal block
Voltage supply	24 V DC (+/-5 %)
Current consumption (at rated voltage)	
• external from 24 V DC, max.	600 mA
Power loss	approx. 10 W
Perm. ambient conditions	
• Operating temperature	0 °C … + 60 °C
• Transport/storage temperature	- 40 °C … + 70 °C
• Relative humidity, max.	95 % at +25 °C
Design	
• Module format	S7-300 construction
• Dimensions (W x H x D) in mm	80 x 125 x 120
• Weight	approx. 600 g
Degree of protection	IP20
Configuration	
Configuration software for PROFINET and additional functions	STEP 7/NCM S7, V5.3 SP1 or higher
Performance data	
PROFINET communication	
PROFINET IO performance data	
• Number of DP slaves on the IE/PB Link PN IO (PROFINET IO-Devices for PROFINET IO)	64
• Number of DP inputs, max.	2048 byte
• Number of DP outputs, max.	2048 byte
Additional functionality	
• Number of S7 connections	max. 32
• Number of DSGW connections	max. 32

Ordering data

	Article No.
IE/PB Link PN IO Network transition between Industrial Ethernet and PROFIBUS with PROFINET IO functionality, TCP/IP, S7 routing and data record routing, 10/100 Mbit/s Fast Ethernet, 9.6 to 12 Mbit/s PROFIBUS; including electronic manual on CD-ROM German, English, French, Spanish, Italian	**6GK1411-5AB00**
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-compliant; with UL approval Sold by the meter max. length 1 000 m minimum order 20 m	**6XV1840-2AH10**
IE FC RJ45 Plug 180 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	
• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
CSM 377 Compact Switch Module Unmanaged switch for connection of a SIMATIC S7-300-CPU, ET 200M and up to three further nodes to Industrial Ethernet operating at 10/100 Mbit/s; 4 x RJ45 ports; external 24 V DC power supply, LED diagnostics, S7-300 module including electronic manual on CD-ROM	**6GK7377-1AA00-0AA0**
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

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Ordering data	Article No.
PROFIBUS FC Standard Cable GP Standard type with special design for fast mounting, 2-core, shielded	**6XV1830-0EH10**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With insulation displacement terminals, with 180° cable outlet, for industrial PC, SIMATIC HMI OP, OLM; max. transmission rate 12 Mbit/s	**6GK1500-0FC10**
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1905-6AA00**
S7-300 mounting rail	**6ES7390-1AB60-0AA0**
S7-300 PS 307 load power supply 24 V DC	**6ES7307-1BA01-0AA0**
STEP 7 Version 5.5 *Target system:* SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Prof., Windows 7 Professional/Ultimate *Type of delivery:* German, English, French, Spanish, Italian Including license key on USB stick, with electronic documentation	
for CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced, CP 443-1 RNA	
• Floating License on DVD	**6ES7810-4CC10-0YA5**
• Rental License for 50 hours	**6ES7810-4CC10-0YA6**
• Software Update Service on DVD (requires current software version)	**6ES7810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.5; on DVD	**6ES7810-4CC10-0YE5**
• Trial License STEP 7 V5.5; on DVD, 14 day trial	**6ES7810-4CC10-0YA7**

Ordering data	Article No.
STEP 7 Professional V12 Engineering Software *Target system:* SIMATIC S7-1200, S7-1500, S7-300, S7-400, WinAC *Requirement:* Windows XP Home SP3 (STEP 7 Basic only), Windows XP Professional SP3 (32 bit), Windows 7 Home Premium SP1 (STEP 7 Basic only), Windows 7 Professional SP1 (32/64 bit), Windows 7 Enterprise SP1 (32/64 bit), Windows 7 Ultimate SP1 (32/64 bit), Microsoft Server 2003 R2 Std. SP2 (32 bit), Microsoft Server 2008 Std. SP2 (32/64 bit) *Form of delivery:* German, English, Chinese, Italian, French, Spanish	
for CP 1543-1, CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced	
• STEP 7 Professional V12, Floating License	**6ES7822-1AA02-0YA5**
• STEP 7 Professional V12, Trial License	**6ES7822-1AA02-0YA7**
• Upgrade STEP 7 Professional V11 to STEP 7 Professional V12, Floating License	**6ES7822-1AA02-0YE5**
• Upgrade STEP 7 Professional 2006/2010 to STEP 7 Professional V12, Floating License	**6ES7822-1AA02-0XE5**
• PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional V12, Floating License	**6ES7822-1AA02-0XC5**
• PowerPack STEP 7 Basic V12 to STEP 7 Professional V12, Floating License	**6ES7822-1AA02-0YC5**

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Ordering data

	Article No.
STEP 7 Professional Engineering Software V12; software download incl. license key 2	
E-mail address required for the delivery	
• STEP 7 Professional V12, Floating License	**6ES7822-1AE02-0YA5**
• STEP 7 Professional V12, Trial License;	**6ES7822-1AE02-0YA7**
• Upgrade STEP 7 Professional V11 to STEP 7 Professional V12, Floating License	**6ES7822-1AE02-0YE5**
• Upgrade STEP 7 Professional 2006/2010 to STEP 7 Professional V12, Floating License	**6ES7822-1AE02-0XE5**
• PowerPack & upgrade from STEP 7 V5.4/V5.5 to STEP 7 Professional V12, Floating License	**6ES7822-1AE02-0XC5**
• PowerPack STEP 7 Basic V12 to STEP 7 Professional V12, Floating License	**6ES7822-1AE02-0YC**

	Article No.
STEP 7 Professional Engineering Software V13	
Target system: SIMATIC S7-300/-400, SIMATIC S7-1200/1500, SIMATIC C7, SIMATIC WinAC	
Requirement: Windows 7 Professional (32 bit) Windows 7 Enterprise (32 bit) Windows 7 Ultimate (32 bit) Microsoft Server 2003 R2 Std. SP2 (32 bit) Microsoft Server 2008 Std. SP2 (32 bit)	
Form of delivery: German, English, Chinese, Italian, French, Spanish	
for CP 1243-1, CP 1543-1, CM 1542-1, CP 343-1 Lean, CP 343-1, CP 343-1 Advanced, CP 343-1 ERPC, CP 443-1, CP 443-1 Advanced	
• STEP 7 Professional V13, Floating License	**6ES7822-…**
• STEP 7 Professional V13, Trial License	**6ES7822-…**
• Upgrade STEP 7 Professional 2006/2010 to STEP 7 Professional V13, Floating License	**6ES7822-…**
• PowerPack & upgrade STEP 7 V5.4/V5.5 to STEP 7 Professional V13, Floating License	**6ES7822-…**
• PowerPack STEP 7 Basic V13 to STEP 7 Professional V13, Floating License	**6ES7822-…**
• STEP 7 Professional V13, Software Update Service, 1 year; current software version required	**6ES7822-…**
• STEP 7 Professional V13, Software Update Service Compact, 1 year; current software version required	**6ES7822-…**
• STEP 7 Professional Software Update Service; 1 year; for STEP 7 Professional and STEP 7 Professional in the TIA Portal, requires current software version	**6ES7810-…**
• STEP 7 Professional Software Update Service Compact; 1 year; for STEP 7 Professional and STEP 7 Professional in the TIA Portal, requires current software version	**6ES7810-…**

More information

http://www.siemens.com/profinet

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Overview

Network validation and monitoring

Siemens Industry Services offers network validation and network monitoring services based on reaction-free hardware and the corresponding software for validation, continuous monitoring and diagnosis of the network status.

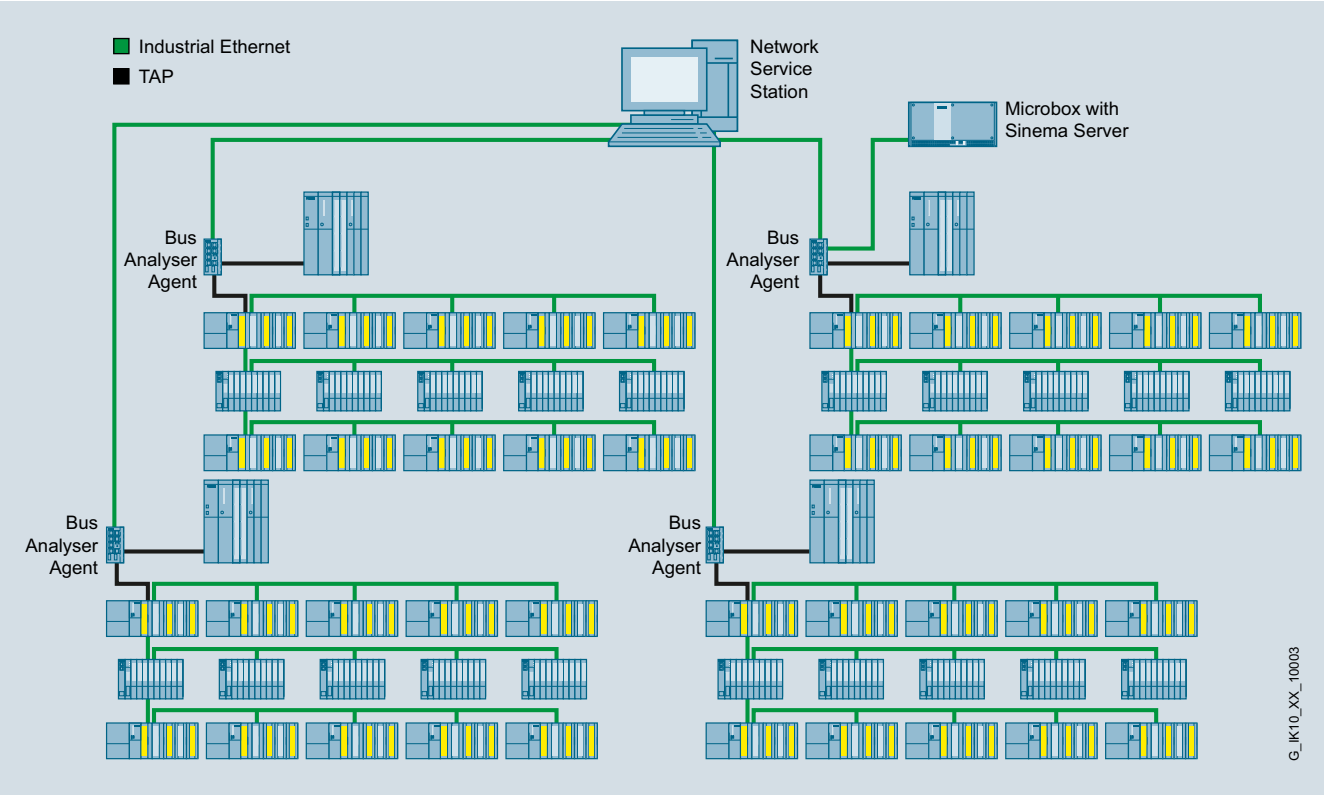
Network validation

Validation ensures the operational reliability of the fieldbus systems by checking all of the relevant parameters in great detail. Siemens Industry Services offers a service for testing plant networks for compliance with network standards and for increasing the availability and reliability of the plant through regular validation. This is done on site, after setting up the plant on the end customer's premises. On request, also in close collaboration with the OEM.

Scope of services:

- Creation of an overview of networks and components
- Checking the components used and the engineering against the specifications of the PI, requirement specification and customer references
- Visual and mechanical checks on the hardware
- Checking the physical network structure
- PROFINET compatibility of the network structure (offline and online)
- Checking the data communication (failures, cycle times, CRC errors, etc.)
- PROFIsafe compatibility (optional)
- Measurements of the PROFINET copper / FOC (optional) cabling
- Checking the MRP functionality (Media Redundancy Protocol)
- Report complete with the optimization potential discovered for the network under investigation

Network monitoring



Network monitoring with bus analyzer

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Overview (continued)

Siemens Industry Services offers you the bus analyzer agent analysis hardware for your existing network. Using the associated software, you can monitor your system at the message frame level, scan data in real time and integrate it into pre-existing software. In order to allow the administration and data analysis of several agents distributed throughout the network, the "Network Service Station" platform solution is additionally available. This allows you to clearly process your data, output alarms in the event of errors, and integrate them into your process visualization system (e.g. WinCC, PCS 7). The integrated, fully programmable Reporting function guarantees that a summary of the key parameters is presented to you in a clear form. An open and scalable module system allows individual adaptation of the service station to all network sizes and topological forms. If necessary, Siemens Industry Service experts will support you in assembling the right combination for you, and in designing your own reports and the analysis of error messages.

Scope of services:

- Monitoring of PROFINET (status, events, cycle time, jitter, sporadic errors, etc.)
- Monitoring of Industrial Ethernet (port status, load, etc.)
- Data acquisition in real time with the bus analyzer agent (hardware)
- Network diagnostics in real time
- Network monitoring
- Backup and restoring of switch configurations
- Firmware update for selected network components
- WinCC / PCS 7 integration
- Reporting
- Remote access and support (optional extra, on request)
- Implementation and installation support (optional extra, on request)

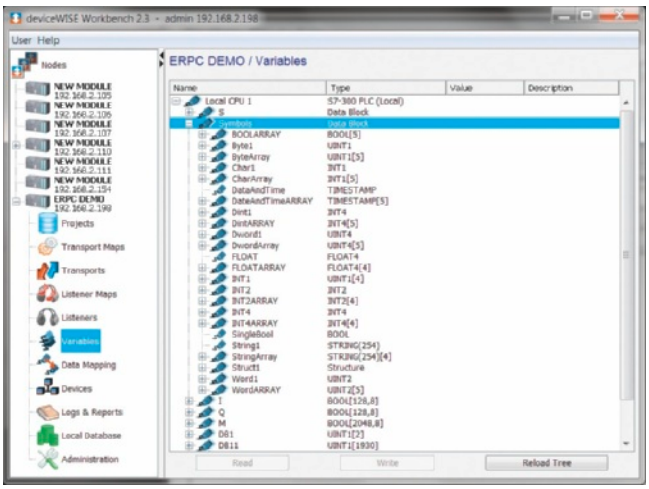
Ordering data

	Article No.
PROFINET validation package, basic For a maximum of 2 networks	**9AE4100-4BD30**
PROFINET validation package, standard For a maximum of 5 networks	**9AE4100-4BD40**
PROFINET validation package, extended For a maximum of 10 networks	**9AE4100-4BD50**
PROFINET validation package, maximum For a maximum of 20 networks	**9AE4100-4BD60**
Bus analyzer hardware agent for 2 channels without TAP For PROFINET diagnosis (100 Mbit) of 2 fieldbuses or Ethernet diagnosis (up to 1 Gbit) of 2 network segments	**9AE4140-1BA00**
Bus analyzer hardware agent for 2 channels with TAP For reaction-free PROFINET diagnosis of 2 fieldbuses	**9AE4140-1BA01**
Network Service Station – STANDARD NSS standard software for continuous monitoring and reporting of PROFINET fieldbuses (BANY Agent required). Includes license for 50 devices and connection of an operating client.	**9AE4110-1SA00**
Network Service Station – ADVANCED Standard functional scope plus the monitoring of Ethernet networks, switch management, port monitoring and long-term archive. Includes license for 50 nodes and connection of an operating client.	**9AE4110-1SB00**
Network Service Station – ADVANCED + Bus Analyzer Hardware agent with 2-channel TAP incl. NSS, for reaction-free PROFINET diagnosis of 2 fieldbuses, only available within the framework of service contracts	**9AE4140-1BA10**
Network Service Station – OPERATING CLIENT Expansion license for connecting an additional operating client to the Network Service Station	**9AE4110-1SY00**
Network Service Station – POWERPACK Expansion license for connecting an additional 50 devices to the Network Service Station	**9AE4110-1SX00**

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deviceWISE Embedded Edition for SIMATIC S7

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 CP 343-1 ERPC to various ERP or MES systems for 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.

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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)
- PostgreSQL Database
- Bea Weblogic
- 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.

More information

The software is available at:

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

You can find further information in the Internet at:
http://www.ilstechnology.com/erpc

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