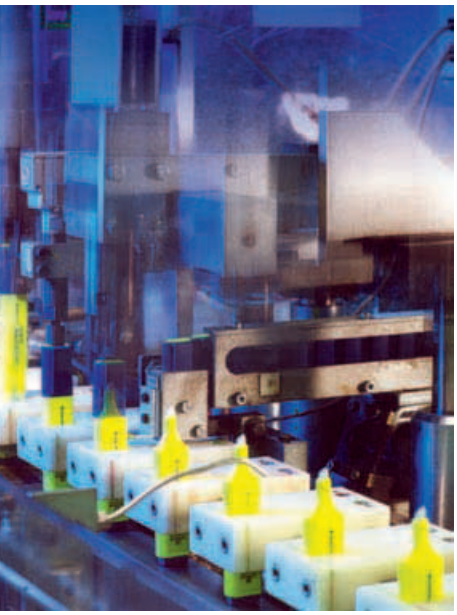
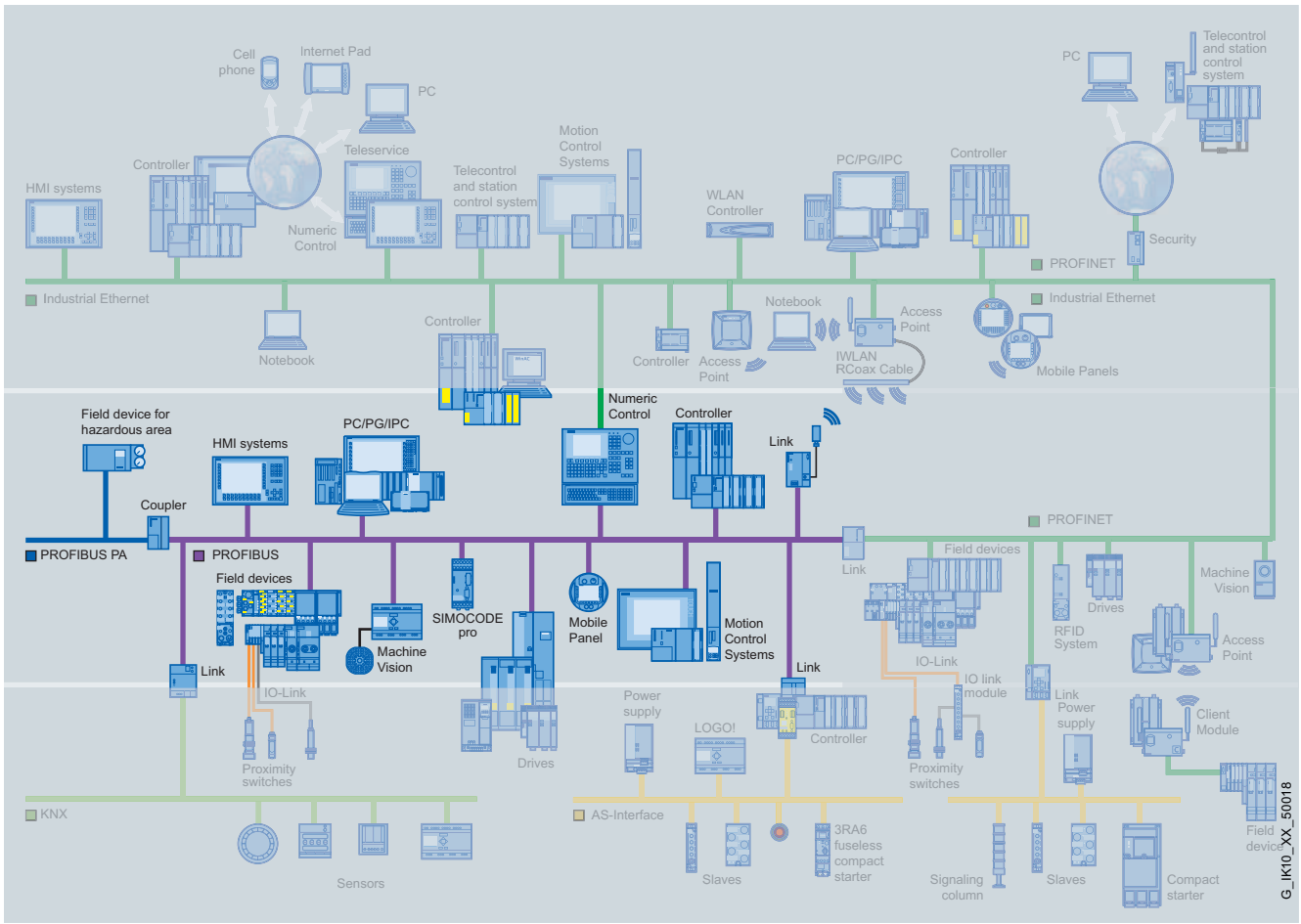
PROFIBUS



Introduction

Overview

- Bus system
  - For process and field communication in cell networks with a small number of stations and with field devices
  - and for data communication acc. to IEC 61158/61784
- PROFIBUS – the fieldbus standard in production and process engineering comprises:
  - Specification of the standards for the physical characteristics of the bus and the access procedure
  - Specification of the user protocol and the user interface
- Offers openness for interfacing to standardized non-Siemens components
- Process or field communication
  - PROFIBUS DP for fast, cyclic data exchange with field devices
  - PROFIBUS PA for applications in process automation and in the intrinsically safe area
- Data communication
  - PROFIBUS FMS for data communication between programmable controllers of different manufacturers



PROFIBUS in the communication landscape

Benefits

- PROFIBUS is a powerful, open, and rugged bus system that ensures trouble-free communication.
- The system is fully standardized, which enables trouble-free connection of standardized components from a variety of manufacturers.
- Configuration, commissioning, and troubleshooting can be carried out from any location. This results in user-defined communication relationships that are very versatile, simple to implement, and easy to change.
- Fast assembly and commissioning on site with the help of the FastConnect wiring system.
- Continuous monitoring of network components through a simple and effective signaling concept.
- High security of investment since existing networks can be extended without any adverse effects.
- High availability through ring redundancy with OLM.

Ordering data

	Order No.
Manual for PROFIBUS networks[1]	
Paper version	
Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**

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

More information

It is important to note the restrictions for use of the specified SIMATIC NET products (Order Nos. 6GK..., 6XV1) which you can view in the Internet.

Additional information can be found in the Internet under:

http://www.siemens.com/simatic-net/ik-info

Process or field communication

Overview

Communication functions

Process or field communication (PROFIBUS DP, PROFIBUS PA) is used to link field devices to a programmable controller, HMI system or control system.

Interfacing is performed over integrated interfaces on the CPU or through interface modules (IMs) and communications processors (CPs).

With modern high-performance automation systems, it is often more effective to link more than one PROFIBUS DP line to one system, not just to increase the number of I/O devices that can be connected, but also to enable individual production areas to be handled independently of one another (segmentation).

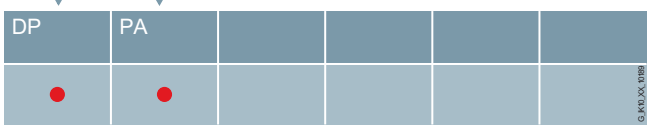
PROFIBUS standardized to IEC 61158/61784 is a high-performance, open, rugged fieldbus system with short response times and the following protocols:

PROFIBUS DP

(Distributed I/O) is used to connect distributed I/O stations, such as SIMATIC ET 200 with extremely fast response times in accordance with the IEC 61158/EN 50170 standard.

PROFIBUS PA

(Process Automation) extends PROFIBUS DP with failsafe transmission technology in accordance with the international standard IEC 61158-2.



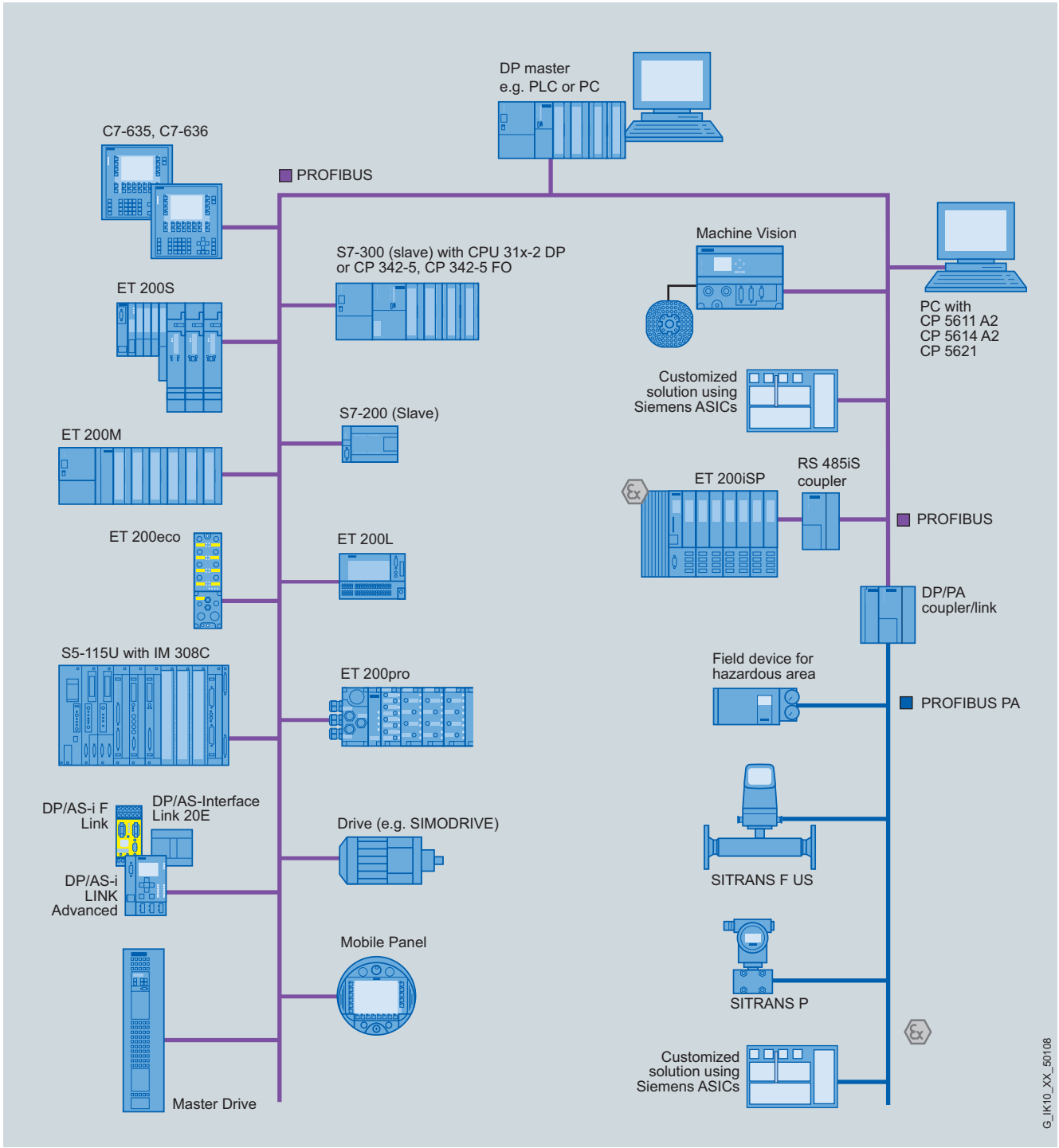
Overview (continued)

PROFIBUS DP/PA is used to link field devices such as distributed I/O stations or drives with automation systems such as SIMATIC S7 or PCs.

PROFIBUS DP/PA is used when I/O devices are widely distributed on the machine or in the plant (e.g. at the field level) and can be combined into one station (e.g. ET 200), typically more than 16 inputs/outputs.

The actuators and sensors are connected to field devices. The field devices are supplied with output data in accordance with the master/slave technique and transfer input data to the programmable controller or PC.

High-performance tools such as STEP 7 are available for configuring and parameterizing the I/O devices. Testing and start-up is possible over PROFIBUS DP from any connection point using these tools.



PROFIBUS DP slaves

Overview (continued)

DP device types

PROFIBUS DP distinguishes between two different master classes and different DP functions:

DP-Master Class 1

The DP-Master Class 1 is the central component on PROFIBUS DP. The central controller or PC exchanges information with distributed stations (DP-Slaves) in a fixed, repeated message cycle.

DP-Master Class 2

Devices of this type are used (programming, configuration or control devices) during start-up, for configuring the DP system or for controlling the plant during normal operation (diagnostics). A DP-Master Class 2 can be used, for example, to read the input, output, diagnostics and configuration data of the slaves.

DP-Slave

A DP-Slave is an I/O device that reads in input data and forwards output data to the I/O. The volume of input and output data depends on the device and can be up to 244 bytes.

The functional scope can differ between DP-Masters of Class 1 and 2 or DP-Slaves. This determines the performance and availability of a communications processor.

DP-V0

The DP-Master functions (DP-V0) comprise configuration, parameterization, read input data and write outputs in cycles, read diagnostics data.

DP-V1

The additional DP function expansions (DP-V 1) make it possible to perform non-isochronous read and write functions as well as acknowledgement of alarms at the same time as processing cyclic data communication. These extended DP functions comprise acyclic access to the parameters and measured values of a slave (e.g. field devices of process automation and intelligent HMI devices). This type of slave must be supplied with extensive parameter data during start-up and during normal operation. Data transferred in acyclic mode (e.g. parameterization data) are only rarely changed, in comparison to the cyclic measured values, and are transferred at lower priority in parallel with the cyclic high-speed useful data transfer. Alarm acknowledgement by the master ensures reliable transfer of the alarms from DP-Slaves.

DP-V2

The DP-Master functions (DP-V2) comprise functions for isochronous mode and direct data communication between DP-Slaves.

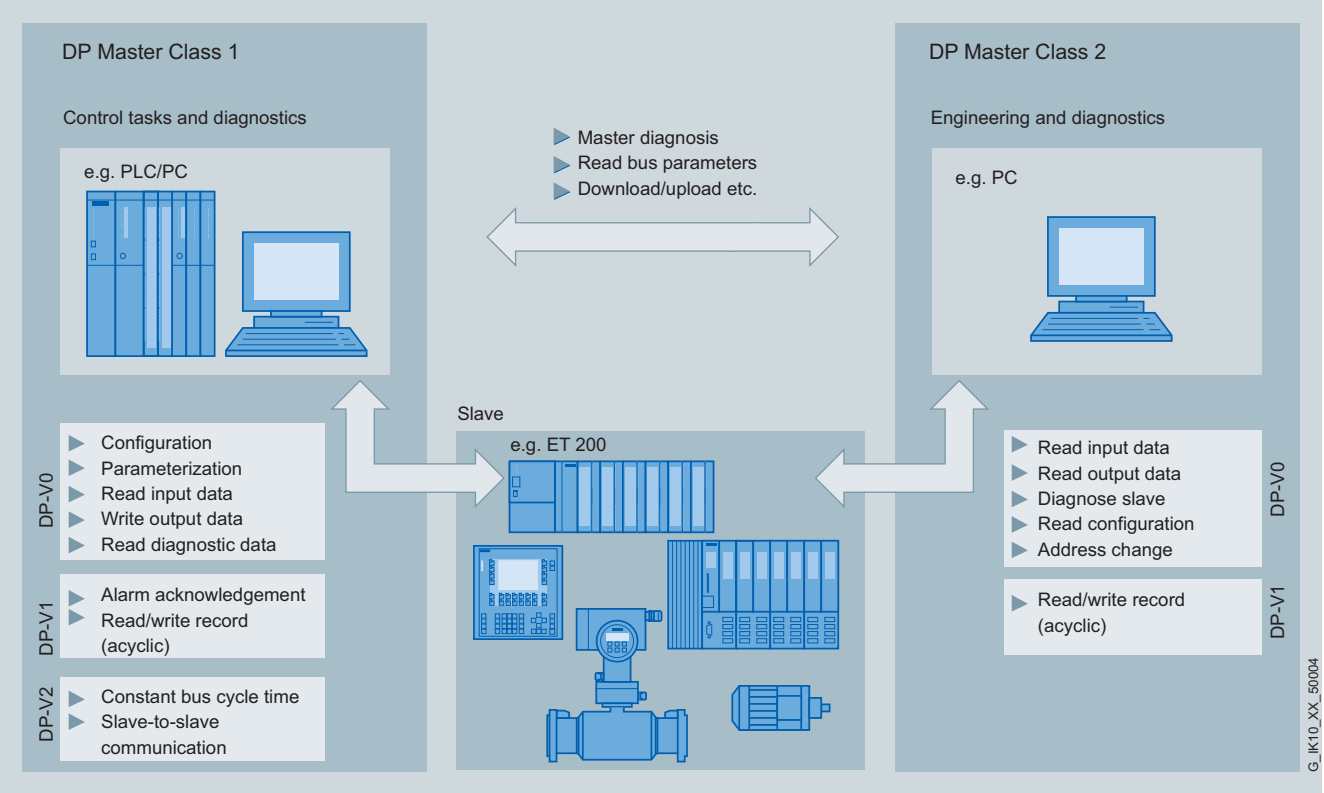
Isochronous mode

Isochronous mode is implemented by means of a signal with a constant bus cycle for the bus system. This isochronous, constant cycle is sent by the master to all bus stations in the form of a global control message. The master and slave can then synchronize their applications with this signal. The jitter of this signal from cycle to cycle must be less than 1 µs for typical drive applications.

Direct data communication between DP-Slaves

The publisher/subscriber model is used to implement the direct data communication between slaves. Slaves declared as publishers make their input data (corresponds to response message to their own master) available to other slaves, the subscribers, for reading. Direct slave-to-slave communication is performed cyclically.

Integration



DP-Master Classes

Data communication

Overview

Communication functions

Data communication (e.g. PROFIBUS FMS) serves to exchange data between programmable controllers or between a programmable controller and intelligent partners (PC, computers, etc.).

The following communication functions are available for this purpose:

Standard Communication

This comprises standardized protocols for data communication .

- PROFIBUS FMS (Fieldbus Message Specification)

This is ideally suited to communication from different automation systems (e.g. PLCs, PCs) from different manufacturers at the cell level with only a few stations (max. 16). Communication with field devices using the FMS interface is also possible.

With the FMS services READ, WRITE and INFORMATION REPORT, read or write access to variables of the communication partner is possible from the user program by means of a variable index or variable name, or the user program can transfer its own variable values to a communications partner. Partial access to variables is supported. The communication is processed over acyclic connections (master-to-master, master-to-slave), over acyclic connections with a slave initiative or with cyclic connections (master-to-slave). The INFORMATION REPORT is can also be used to send a message to all stations on the network using a broadcast service. The FMS service IDENTIFY (request for identification characteristics of the partner) and STATUS (request partner status) can also be activated.

OPC-Server

The basic principle of OPC (Openness, Productivity & Collaboration) is that OPC client applications communicate with the OPC server over a standardized, open and manufacturer-independent interface.

The appropriate OPC servers are included in the scope of supply of the respective communication software.

PG/OP communication

Comprises integral communication functions that are used by the SIMATIC programmable controllers to perform data communication with HMI devices (e.g. TD/OP) and SIMATIC PG (STEP 7). PG/OP communication is supported by MPI, PROFIBUS and Industrial Ethernet networks.

S7 routing

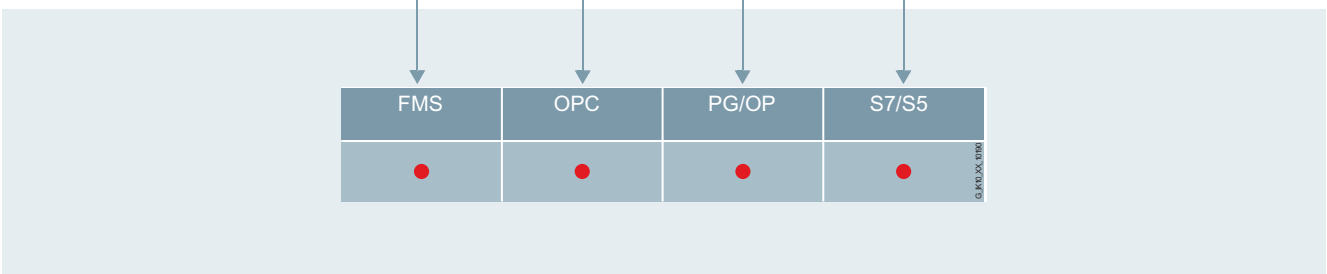
With the aid of S7 routing it is possible to use the programming device communication across networks.

S7 communication

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

Open communication

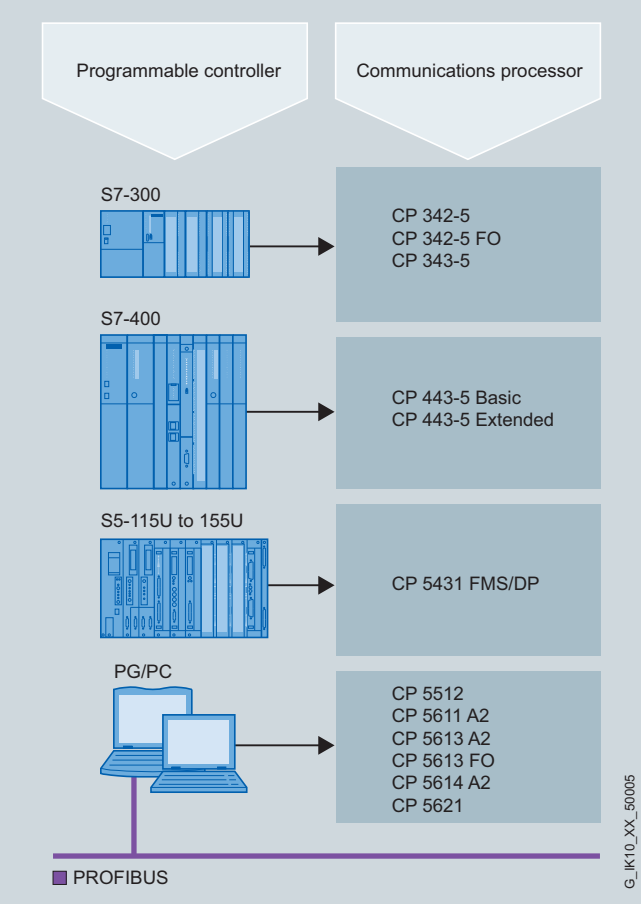
The open communication (SEND/RECEIVE) allows the SIMATIC S7 controllers to communicate with other SIMATIC S7 and SIMATIC S5 controllers (S5-compatible communication), PCs and third-party systems.



Overview (continued)

System connections

For many data terminals, communications processors (CPs) are available that already have the communications functions implemented in the firmware and that therefore relieve the data terminal of communications tasks (e.g. flow control, blocking, etc.).



Data communication for SIMATIC and the PC

Communications overview

Function

	Hardware	PROFIBUS DP			PROFIBUS FMS			PG/OP	S7 communication		Open communication	Time	
		DP master Class 1	DP master Class 2	DP slave	Read	Write	Info. / Report		Standard system	High-availability communication	Send/Receive 1)	Sending stations	Receiving stations
SIMATIC S7-300	CP 342-5/ CP 342-5 FO	● 2)		● 2)				●	●		●		
	CP 343-5				●	●	●	●	● 3)		●		
SIMATIC S7-400	CP 443-5 Extended	●	●					●	●	●	●	●	●
	CP 443-5 Basic				●	●	●	●	●		●	●	●

1) SDA and SDN services of PROFIBUS Layer 2 (FDL)
2) DP master or DP slave
3) S7 server only

● suitable
not applicable

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Communications overview for SIMATIC

Hardware	Software	Operation system (32 Bit)				OPC 6)	PROFIBUS DP			PROFIBUS FMS			PG/ OP	S7 communication	Open communic. 8)
		Windows XP Pro	Windows 2003 Server / 2003 R2 Server	Windows Vista Business / Ultimate	other operating systems		DP Master Class 1	DP Master Class 2	DP slave	Read	Write	Info/Report			
CP 5613 A2	CP with DP Base 1) 4)	●	●	●		●	●	●	● 5)				●		●
CP 5613 FO	DP-5613 4)	●	●	●		●	●	●					●		●
CP 5614 A2 (PCI 32 Bit)	S7-5613	●	●	●		●							●		●
	FMS-5613	●	●	●		●				●	●	●	●	●	●
	DK-5613	● 7)	● 7)	● 7)	● 7)		●		● 5)						
CP 5611 A2 (PCI 32 Bit)	SOFTNET-DP	●	●	●		●	● 2)3)	● 2)3)							●
CP 5621 (PCIe x1)	SOFTNET-DP Slave	●	●	●		●			● 2)						
CP 5512 (CardBus 32 Bit)	SOFTNET-S7	●	●	●		●							●	●	●
	STEP 7	●	●	●									●		

You can find more information on the Internet
http://www.siemens.com.simatic-net/ik-info
If you have questions on LINUX projects
please contact I&S
E-mail: it4industry@siemens.com

1) Included in scope of supply of the CP 5613/A2/CP 5613FO/CP 5614 A2
2) DP master and DP slaves cannot be operated simultaneously
3) Master Class 1 and Master Class 2 cannot be operated simultaneously on one CP
4) DP-Base and DP-5613 cannot be operated simultaneously
5) only with CP 5614
6) incl. XML DA interface for data access
7) with porting via DK-5613
8) SEND/RECEIVE based on the FDL interface

on SIMATIC NET-CD Edition 2007

● suitable
not applicable

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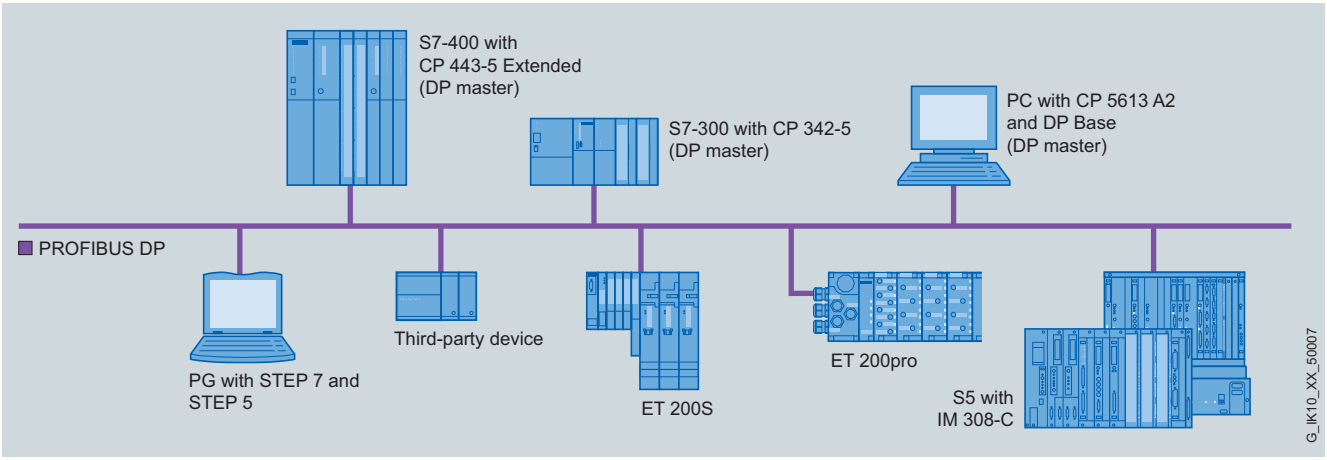
Communications overview for PG/PC

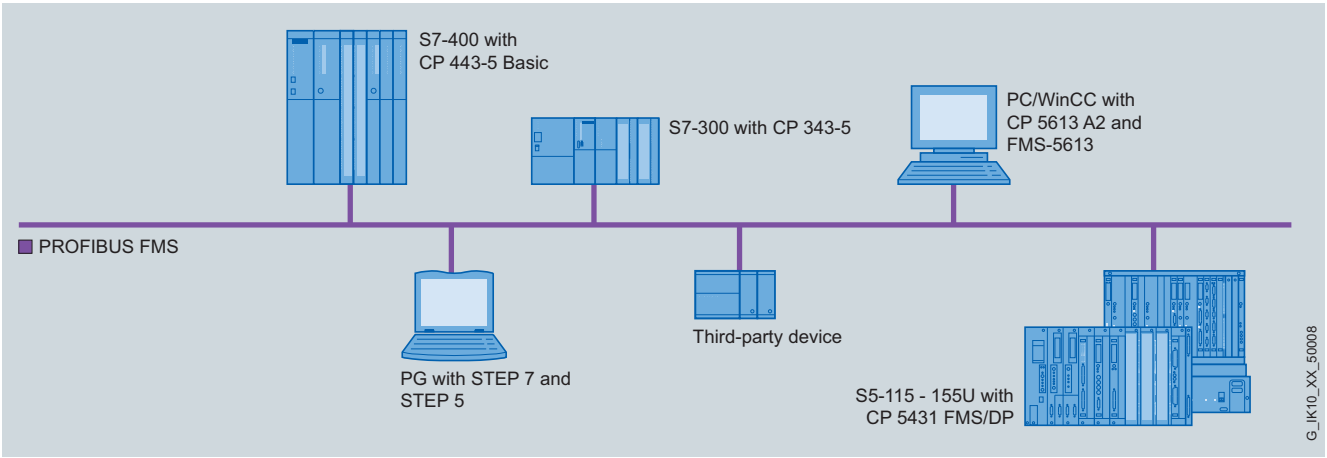
Integration

Configuration example for process or field communication



PROFIBUS DP configuration for SIMATIC S5/S7 and PG/PC

Configuration example for data communication

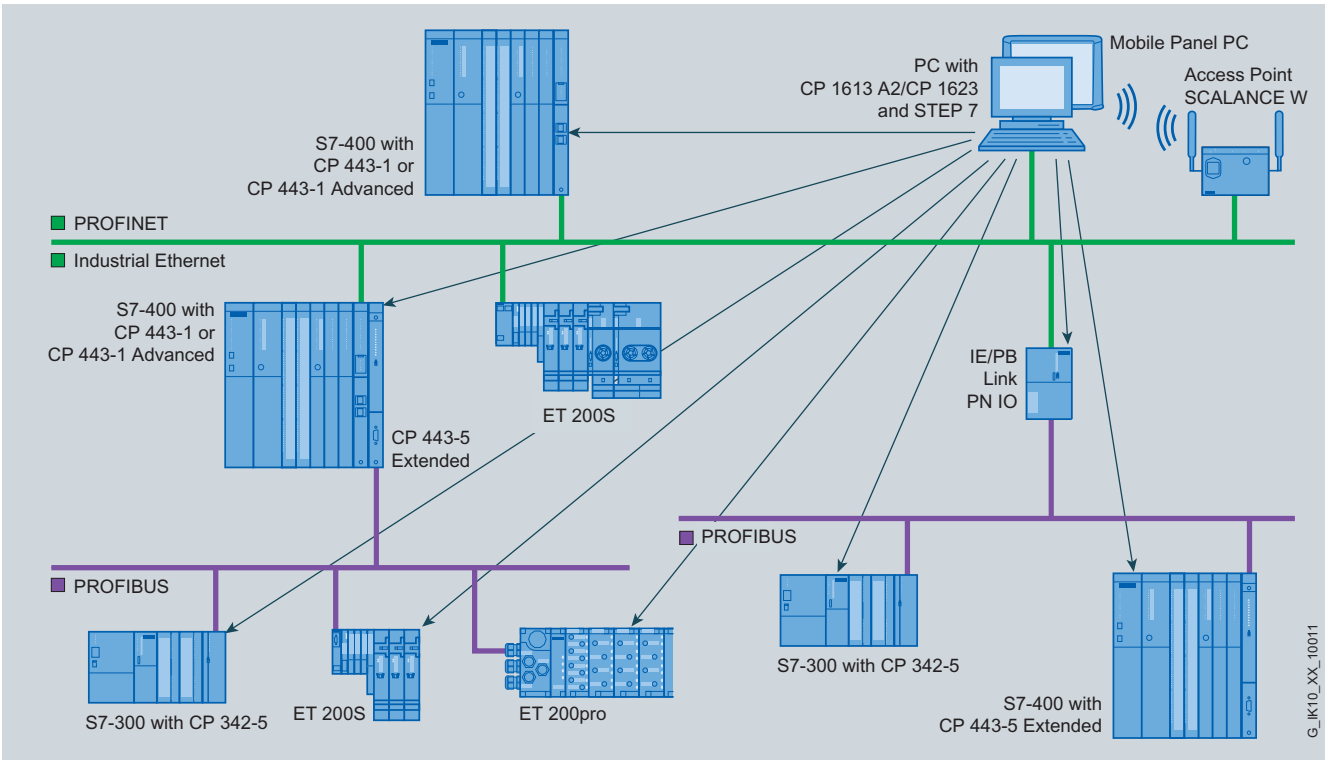


PROFIBUS FMS configuration for SIMATIC S5/S7 and PG/PC

Configuration examples

Integration (continued)

Configuration example for PG/OP communication



PG/OP communication for transparent access to configuration and diagnostics data of the connected PROFIBUS nodes by means of S7 routing

Overview

Siemens offers a comprehensive range of PROFIBUS network components for electrical and optical transmission technology.

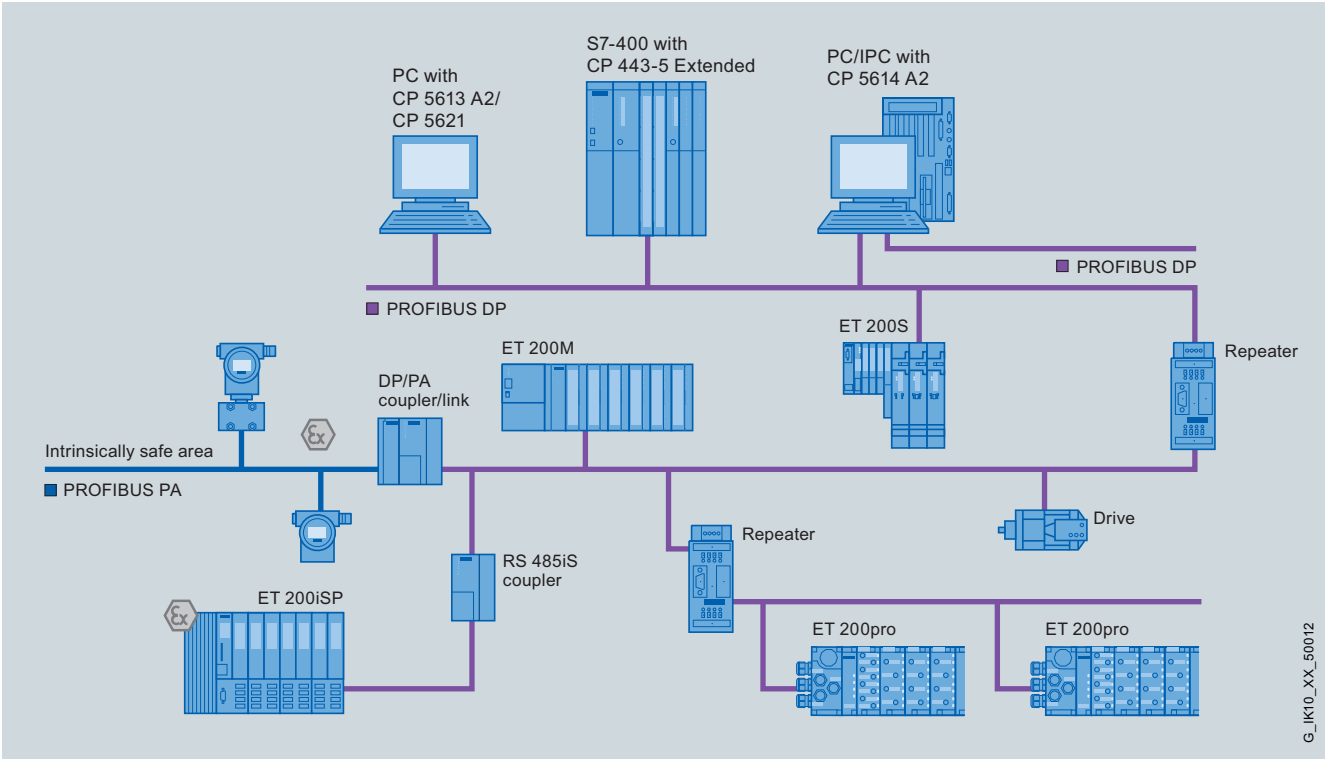
PROFIBUS is standardized in accordance with IEC 61158/ EN 50170 for universal automation (PROFIBUS FMS and PROFIBUS DP), and in accordance with IEC 61158-2 for process automation (PROFIBUS PA).

Electrical network

- The electrical network uses a shielded twisted pair cable. The RS 485 interface works with voltage differences. It is therefore less sensitive to interference than a voltage or current interface. With PROFIBUS, the stations are connected to the bus via a bus terminal or a bus connector (max. 32 stations per segment).
- The individual segments are connected via repeaters.
- The transmission rate can be set in steps from 9.6 Kbit/s to 12 Mbit/s.
- The maximum segment length depends on the transmission rate.
- The electrical network can be configured as a bus or tree structure
- For applications in the intrinsically-safe area, the transmission technology compliant with IEC 61158-2 is used with PROFIBUS PA. The transmission rate in this case is 31.25 Kbit/s.

Characteristics

- High-grade bus cable
- Transmission method: RS 485 (acc. to EIA)
- Bus topology with bus terminals and bus connectors for connecting PROFIBUS stations
- Transmission method in accordance with IEC 61158/EN 50170 for universal automation (PROFIBUS FMS/DP), and in accordance with IEC61158-2 for the intrinsically-safe area (PROFIBUS PA)
- The DP transmission system of RS 485 (bit coding by means of differential voltage signals) is converted to IEC 61158-2 (bit coding by means of current signals) using the network components (DP/PA coupler or DP/PA link)
- Simple, universal installation and grounding concept
- Easy installation



Electrical PROFIBUS network configuration

4

Overview (continued)

Optical network

The fiber-optic cable variant of PROFIBUS has the following characteristics:

- Transmission link is insensitive to electromagnetic influences
- Suitable for long ranges
- Galvanic isolation
- Uses either plastic, PCF or glass fiber-optic cables
- Avoidance of overvoltage and equipotential bonding problems

Optical PROFIBUS with OLMs

Using optical link modules (OLMs) it is possible to construct an optical network in a linear, ring, or star topology. The maximum distance between two OLMs is 15 km. The transmission rate can be set in steps from 9.6 Kbit/s to 12 Mbit/s.

Optical PROFIBUS with integral interface and OBT

The optical PROFIBUS with integral interface and OBT is constructed in a linear topology. A cost-optimized solution is available for this in the form of devices with integral optical interface. Terminal equipment with an RS 485 interface can be connected via an Optical Bus Terminal (OBT). The maximum distance between two nodes is 50 m in the case of plastic fiber-optic cables.

Special fiber-optic cables are available to cover distances of up to 400 m.

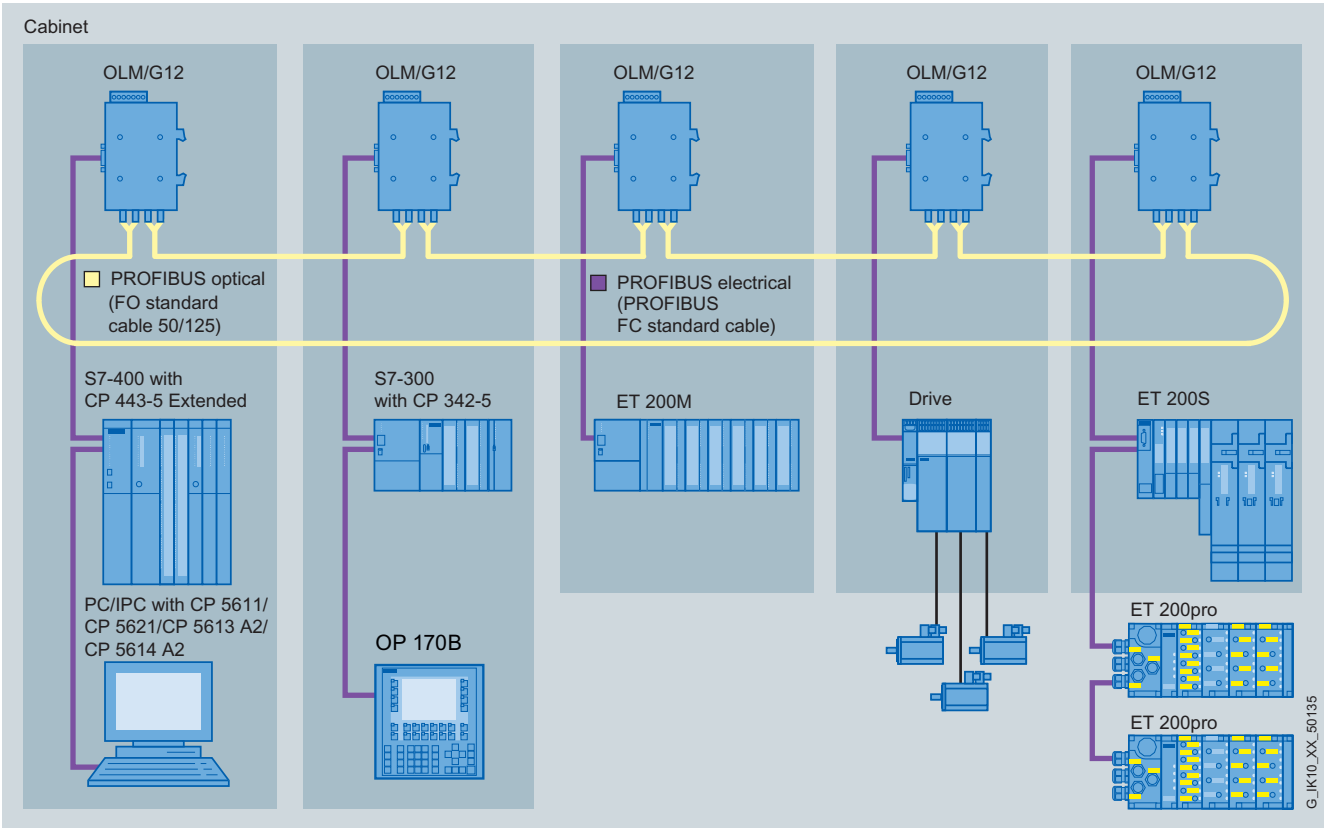
Hybrid network

Hybrid electrical and optical networks are possible. The transition between both media is implemented by the OLM.

In station-to-station communication on the bus, there is no difference between two-wire technology and fiber-optic technology. A maximum of 127 stations can be connected to one PROFIBUS network.

The optical transmission technology offers the following advantages:

- Fiber-optic cables made of plastic or glass are not susceptible to electromagnetic interference and therefore render the EMC measures required for electrical networks unnecessary
- No additional lightning protection concept is required in the outdoor area
- The potentials on the modules are automatically separated thanks to the characteristics of the conductor
- With fiber-optic cables, long distances to field devices can be bridged.



Network configuration combined from electrical and optical PROFIBUS

More information

Further language variants and manuals can be found for the respective products at:

http://www.siemens.com/automation/csi/net

Please always note the supplementary conditions for the specified SIMATIC NET products (order number 6GK..., 6XV1...) that you can view on the Internet pages shown below:

http://www.siemens.com/simatic-net/ik-info

Overview

PROFIBUS	Maximum cable length for PROFIBUS connections							
	Type of fiber	0 - 60 m	0 - 80 m	0 - 100 m	0 - 200 m	0 - 400 m	0 - 3,000 m	0 - 10,000 m
PB FC Bus Cables								
PB FC Standard Cable GP / PB FC Standard Cable GP IS				● 4)	● 5)			
PB FC Robust Cable				● 4)	● 5)			
PB FC Food Cable				● 4)	● 5)			
PB FC Ground Cable				● 4)	● 5)			
PB FC Flexible Cable				● 4)	● 5)			
PB FC Trailing Cable				● 4)	● 5)			
PB FC FRNC Cable GP				● 4)	● 5)			
PB Festoon Cable GP				● 4)	● 5)			
PB Torsion Cable		● 4)			● 5)			
PYR FR Marine Cable				● 4)	● 5)			
PB Hybrid Standard Cable GP 1)								
PB Hybrid Robust Cable 1)								
PB FC Process Cable 1)								
PB Cable for ET200X 1)								
PB ECOFAST Bus Cables								
PB ECOFAST Hybrid Cable 1)								
PB ECOFAST Hybrid Cable GP 1)								
PB Glass FOC with PB OLM								
FO Standard Cable GP	Multimode (50/125)						● 2)	● 3)
FO Ground Cable	Multimode (50/125)						● 2)	● 3)
FO Trailing Cable	Multimode (50/125)						● 2)	● 3)
FO Trailing Cable GP	Multimode (50/125)						● 2)	● 3)
Indoor Cable	Multimode (62.5/125)						● 2)	● 3)
FO Standard Cable	Multimode (62.5/125)						● 2)	● 3)
Flexible FO Trailing Cable	Multimode (62.5/125)						● 2)	● 3)
PB Plastic/POF/PCF FOC with PB OLM								
PB Plastic FO Standard Cable	Step index (980/1000)		●					
PB PCF FO Standard Cable	Step index (200/230)					●		
PCF Standard Cable GP	Step index (200/230)					●		
PCF Trailing Cable	Step index (200/230)					●		
PCF Trailing Cable GP	Step index (200/230)					●		

1) Dependent on current load 2) at 860 nm 3) at 1310 nm 4) at 12 Mbit/s 5) at 1.5 Mbit/s
Longer cables possible if data rate is reduced; see PROFIBUS Manual for further information

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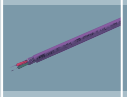
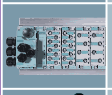
Overview of network components

Overview (continued)

		Options for connecting PROFIBUS cables with plugs, terminals or devices												
		Electrical								Optical				
		PROFIBUS FC bus cables	PROFIBUS bus cables	Connecting	ECOFAST cable	Hybrid cable	Power cable	PROFIBUS FC Bus cable (PROFIBUS PA)	Bus terminal	Fiber-optic cable 50/125 µm	Fiber-optic cable 62.5/125 µm	PCF fiber optic cable	POF-FOC 980/1000 µm	Fiber-optic cable with BFOC connector	Fiber-optic cable with Simplex connector
															
		PROFIBUS FC Standard Cable PROFIBUS FC Standard Cable IS GP PROFIBUS FC Robust Cable PROFIBUS FC Food Cable PROFIBUS FC Ground Cable PROFIBUS FC FRNC Cable PROFIBUS FC Trailing Cable	PROFIBUS Festoon Cable PROFIBUS Flexible Cable	Connecting cable 830-2 Connecting cable 830-1T PROFIBUS M12 plug-in cable	ECOFAST Hybrid Cable ECOFAST Hybrid Cable GP	PROFIBUS Hybrid Standard Cable GP PROFIBUS Hybrid Robust Cable	Power Cable 5 x 1.5	PB FC Process Cable	12M bus terminal	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-optic cable	PCF Standard Cable GP PCF Trailing Cable PCF Trailing Cable GP	Plastic fiber optic standard cable	Preassembled FOC with BFOC connector	Preassembled FOC with simplex connector
Electrical	 PB FastConnect connector	●	●												
	 PB bus connector	●	●												
	 ECOFAST connector				●										
	 PB M12 plug / socket (B-coded)	●	●												
	 7/8" Power connector						●								
	PB devices with Sub-D / M12 connector			●					●						
	 ET 200pro	●	●			●									
	 Bus terminal 12M	●	●												
	 SpliTConnect system							●							
Optical	 BFOC connector									●	●	●			
	PB devices with BFOC connection													●	
	 Simplex connector											●	●		
	PB devices with simplex connection														●

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Overview

Criteria	Electrical network		Optical network		
	RS 485 conforming to IEC 61158/ 61784	IEC 61158-2 (PA)	Plastic	PCF	Glass
EMC	●●●○	●●●○	●●●●	●●●●	●●●●
Inter-building networking	●●○○ 1)	●●○○	●○○○	●●●○ 5)	●●●●
Operating distance	●●○○ 2)	●●○○	●○○○	●●○○	●●●●
Suitability for high transmission rate	●●●○ 4)	–	●●●●	●●●●	●●●●
Simple plug fitting	●●●●	●●●●	●●●○	●●○○ 3)	●○○○ 3)
Simple cable laying	●●●○	●●●○	●●○○	●●○○	●●○○
Equipotential bonding measures required.	Yes	Yes	No	No	No
Performance spectrum for special applications	●●●●	●○○○	●○○○	●○○○	●●○○
Used for moving nodes	●●○○	–	○○○○	○○○○	●●○○
Use in intrinsically safe area	–	●●●●	–	–	–

1) Lightning protection measures required
2) Depending on transmission rate
3) Trained personnel and special tools necessary
4) Careful cable laying necessary
5) Outdoor cable required (on request)

●●● suitable
●●○ / ●○○ / ○○○ partly suitable
– not applicable

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Summary of network selection criteria for transmission media

Network selection criteria

Overview (continued)

Criteria		Electrical network	Optical network	
		Electrical PROFIBUS	with OLM	with integr. interface/ OBT
Transition media	Plastic [1]	–	●	●
	PCF	–	●	●
	Glass	–	●	–
	Shielded two-core cable	●	–	–
Distances	max. network size	9.6 km [5]	90 km	9.6 km
	between two nodes	up to 1 km [3]	up to 15 km [2]	up to 300 m [2]
Topology	Bus	●	–	–
	Line	–	●	●
	Tree	●	●	–
	Ring	–	●	–
Transmission protocols		all	all	DP
Connection of nodes via	OLM	–	●	–
	Integrated interfaces	●	–	● [4]
	Bus terminal	●	–	●
	Bus connector	●	–	–
Electr. network segments connectable		●	●	–

1) Plastic optical fiber is also referred to as polymer optical fiber (POF)
2) Depending on type of cable used
3) Depending on data rate used and performance
4) Integrated interfaces (ET 200M, ET 200X)
5) for PROFIBUS PA 1.9 km

● suitable
– Irrelevant to this application

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Selection criteria for electrical and optical networks

Overview (continued)

	Electrical network		Optical network	
	RS 485in accordance with IEC 61158/EN 50170	IEC 61158-2 (PA)	withOLM	with integral interface/ OBT
Network topology Patch cable	Bus,tree	Bus,tree	Linear bus, star, ring	Linear bus
Transmission media	Shielded twisted-pair cable	Shielded twisted-pair cable for intrinsically-safe and non-intrinsically-safe areas	Plastic fiber optic cable PCF optic cable Glass fiber optic cable	Plastic fiber optic cable PCF optic cable
Tools and accessories	FastConnect stripping tool	FastConnect stripping tool	Tools for preparing BFOC connectors for plastic fiber optic cables	Tools for preparing Simplex connectors for plastic fiber optic cables
Connectors	Bus connector	SpliTConnect system	BFOC connector	Simplex connector
Connection components	Bus terminal	SpliTConnect system	OLM	OBT
Prepared cables	830-1T connecting cable 830-2 connecting cable	–	INDOOR cable with BFOC Standard glass cable with BFOC Trailing cable with BFOC Standard PCF cable with BFOC Standard plastic cable with BFOC	Standard PCF cable with Simplex connectors and pull cord feature
Lightning protection	Priomary protection Secondary protection	to be implemented through design measures	Not required	Not required
Electrical network segment can be connected via	repeater	–	Optical Link Module (OLM)	Optical Bus Terminal (OBT)
Diagnostics tool	BT 200 hardware test device	Not available	Signal contact and integral measuring sockets; level measuring device on request	Level measuring device on request
Documentation	Manual for PROFIBUS networks	Manual for PROFIBUS networks	Manual for PROFIBUS networks	Manual for PROFIBUS networks

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PROFIBUS network components and accessories

	Electrical PROFIBUS	Optical PROFIBUS/OLM	Optical PROFIBUS/int./OLM
Electrical PROFIBUS	Repeater	OLM	OBT
Optical PROFIBUS/OLM	OLM	OLM	OBT + OLM
Optical PROFIBUS/int./OBT	OBT	OBT + OLM	OBT, integr. optics

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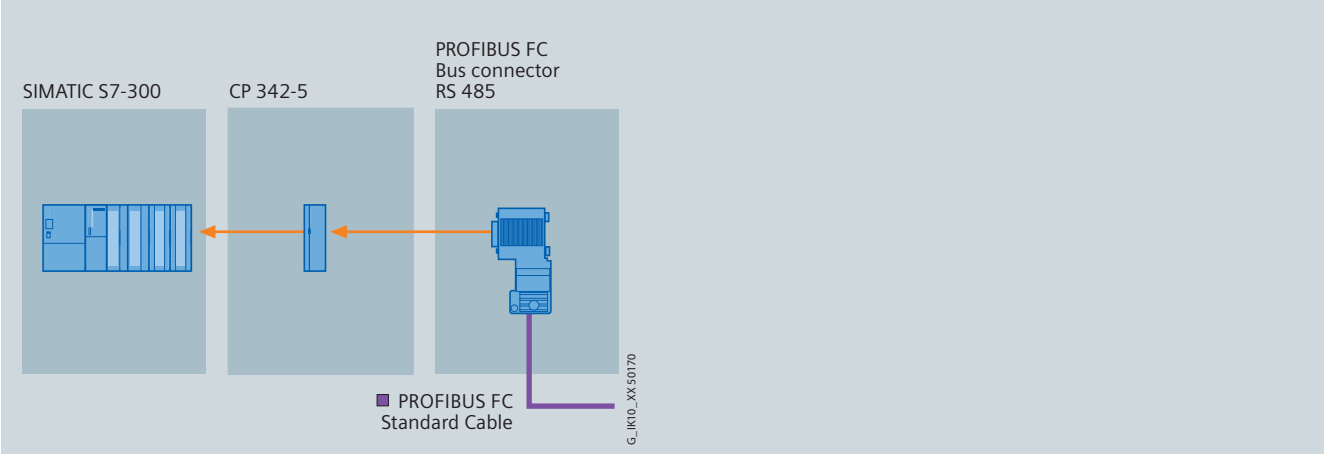
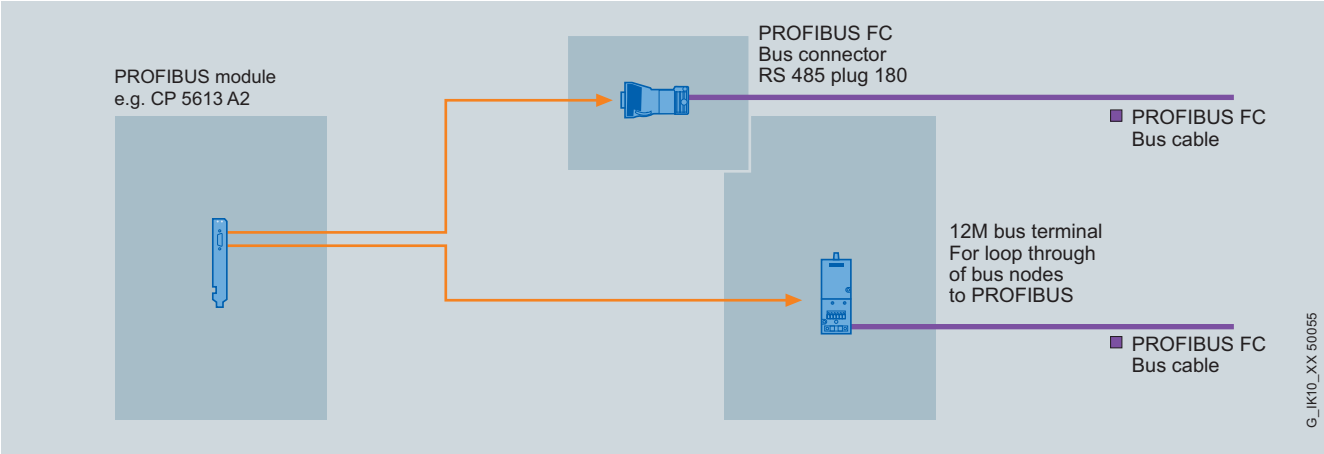
Transitions between the transmission media

Connection examples

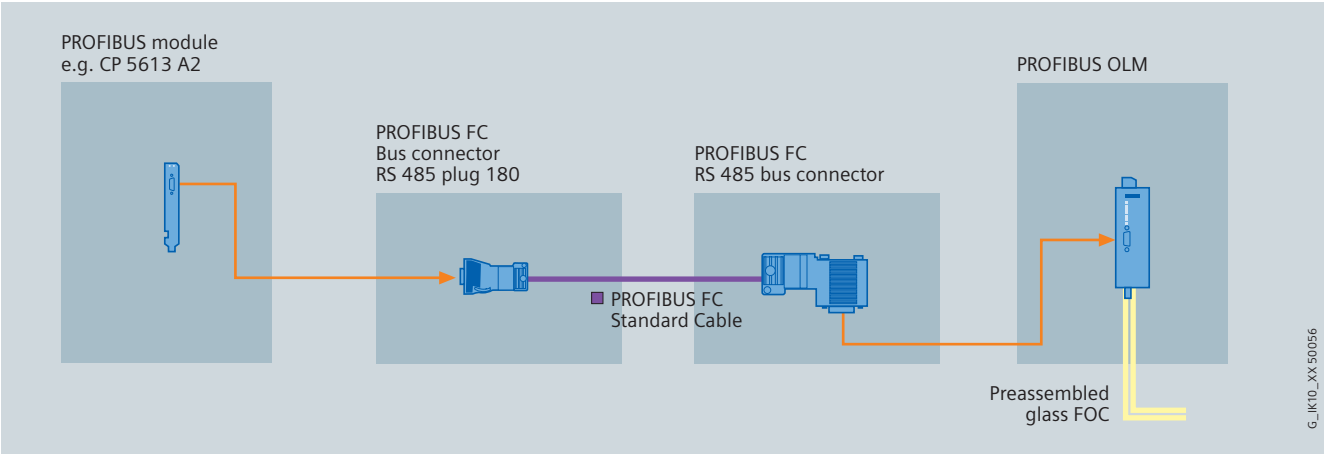
Integration



Typical connection for electrical networking with PROFIBUS FastConnect RS485 bus connector

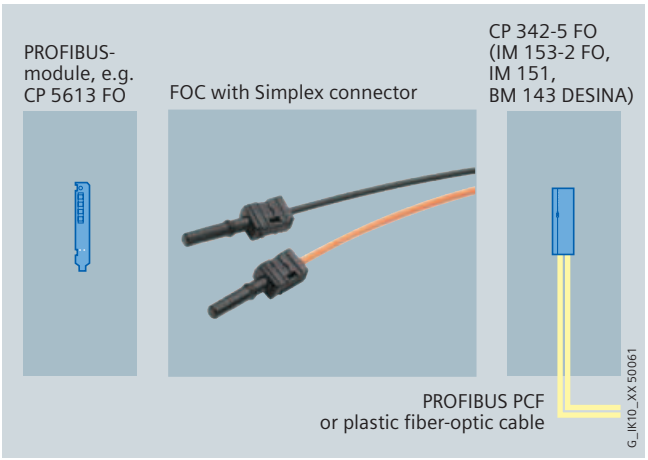


Typical connection for electrical networking with PROFIBUS FastConnect RS485 bus connector or bus terminal

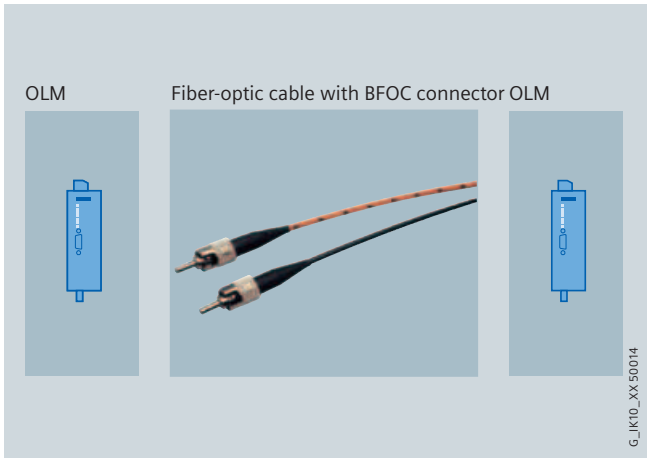


Connection example of optical networking

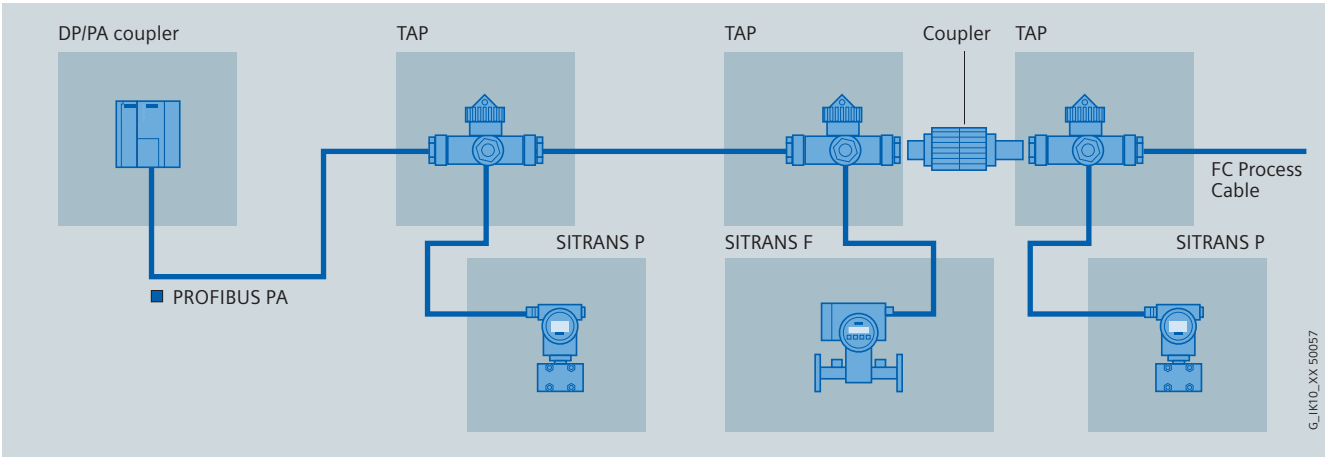
Integration (continued)



Connection example of optical networking with fiber-optic cables and Simplex connectors



Connection example of optical networking with fiber-optic cables and BFOC connectors



Connection example of an intrinsically-safe network with PROFIBUS PA

PROFIBUS FastConnect

Overview

- Quick and easy assembly of PROFIBUS copper cables
- Assembly mistakes such as short-circuits between the shield and core are excluded

Benefits

get Designed for Industry

- Shorter connection times for terminals by stripping of the outer cladding and woven shield in one step
- Installation faults, such as short-circuits between the shield and cores, are excluded
- Easy assembly due to preset insulation stripping tool (FC stripping tool)
- Termination can be checked in the assembled state through the transparent cover for the insulation piercing terminals thanks to color coding.

Design

The system comprises 3 compatible components:

- FastConnect bus cables for rapid installation
- FastConnect stripping tool
- FastConnect bus connector for PROFIBUS

The PROFIBUS FastConnect bus cables can also be connected to conventional bus connectors.

Function

The FastConnect stripping method enables fast and easy connection of PROFIBUS connectors to the PROFIBUS cables.

The special structure of the FastConnect bus cables enables the use of the FastConnect stripping tool with which the outer casing and the woven shield can be stripped in one operation with perfect precision. The cable prepared in this way is connected in the FastConnect bus connector using the insulation displacement method.

Application

① Hold the cable stripping tool (FCS) in the right hand

② Measure the cable length by placing the cable against the measurement template. End stop with the index finger of the left hand.

③ Insert the measured cable end into the tool as far as the index finger of the left hand.

④ Insert end of cable in FCS as far as end stop and clamp tight.

⑤ Turn FCS four times in direction of arrow.

⑥ Pull FCS off end of cable while still closed.

⑦ Cable offcuts remain in the FCS. After releasing the FCS, the cable offcuts can be removed.

⑧ Insert wires into the connector according to color coding, press the interlock down and tighten the strain relief screw.

⑨ Finished!

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PROFIBUS FastConnect is a system for fast and easy assembly of PROFIBUS copper cables.

PROFIBUS bus cables

Overview

- Different variants for different application areas (e.g. underground cables, trailing cables, hazardous area (zone 1 and zone 2))
- High interference immunity thanks to double shielding
- Flame-retardant bus cable (halogen-free)
- Easy length measurement thanks to printed meter markings
- UL approvals

Benefits

get Designed for Industry

- Flexible application possibilities thanks to special bus cables
- Network is immune to interference thanks to double shielded cables and a uniform grounding concept
- Time saving due to simple and fast connector assembly with FastConnect cables
- Silicon-free, therefore particularly suitable for use in the automotive industry (e.g. on paint shop conveyors)

Application

For the construction of PROFIBUS DP networks, different cable types are offered to suit the different types of applications. The listed bus cables should always be used. For further information on network configuration, see the PROFIBUS network manual.

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" (General Purpose) added to their name.

Ex approval

Cables for intrinsically safe PROFIBUS DP applications have "IS" (intrinsically safe) added to their names

Design

Shielded, twisted-pair cable with circular cross-section

The following applies for all PROFIBUS bus cables:

- The double shield makes it especially suitable for routing through industrial areas with strong electro-magnetic fields
- System-wide grounding concept can be implemented using the external shield of the bus cable and the grounding terminals on the bus terminal
- Printed meter marks

Cable types

The shape of the FastConnect (FC) bus cables is radially symmetric and allows an insulation stripping tool to be used. This means that bus connectors can be assembled quickly and easily.

- PROFIBUS FC Standard Cable GP:
  Standard bus cable specially designed for fast installation
- PROFIBUS FC Standard Cable IS GP:
  Standard bus cable with special design for quick installation for intrinsically safe distributed I/O systems
- PROFIBUS FC Robust Cable:
  Special cable for use in corrosive atmospheres and under severe mechanical loading
- PROFIBUS FC Food Cable:
  The PE casing of the cable makes this cable suitable for use in the food and tobacco industry
- PROFIBUS FC Ground Cable:
  Special cable for laying underground. It differs from the PROFIBUS bus cable in that it has an additional sheath
- PROFIBUS FC Flexible Cable
  Flexible (stranded conductors), halogen-free bus cable with PUR sheath for occasional moving
- PROFIBUS FC Trailing Cable:
  Bus cable specially designed for forced motion control in a trailing cable, e.g. with continuously moving machine parts (stranded core)
- PROFIBUS FC FRNC Cable GP:
  Two-core, shielded, flame-retardant, halogen-free bus cable with Copolymer outer sheath FRNC (Flame Retardant Non Corrosive)

Bus cables without FastConnect technology
(due to type of construction)

- PROFIBUS Festoon Cable GP:
  Flexible bus cable (stranded cores) specially designed for festoon suspension.
  For round cables, cable-carrying trolleys are recommended
- PROFIBUS Torsion Cable
  Bus cable for highly flexible applications:
  Special cable (stranded cores) for use on moving parts of machines
  (5 million torsion movements on 1 m length of cable, ± 180°)
- PROFIBUS Hybrid Cable GP:
  Rugged hybrid cable suitable for trailing with two copper conductors for data transmission and two copper conductors for the power supply of ET 200pro
- SIENOPYR FR marine cable
  Halogen-free, non-crush, flame-retardant, marine-approved cable for permanent installation on ships and offshore platforms indoors and on open deck. Sold by the meter.

Technical specifications

Order No.	6XV1 830-0EH10	6XV1 831-2A	6XV1 830-0JH10	6XV1 830-0GH10
Product type description	**PROFIBUS FC Standard Cable**	**PROFIBUS FC Standard Cable IS GP**	**PROFIBUS FC Robust Cable**	**PROFIBUS FC Food Cable**
Suitability for use	All-purpose	Universal use for intrinsically safe distributed I/O systems	In corrosive atmospheres and under severe mechanical stress	Food, beverages and tobacco industries
Cable name	02YSY (ST) CY 1 × 2 × 0.64/2.55-150 KF 40 FR VI	02YSY (ST) CY 1 × 2 × 0.65/2.56 BL KF40 FR	02YSY (ST) CY 1 × 2 × 0.64/2.55-150 KF 40 FR VI	02YSY (ST) C2Y 1 × 2 × 0.64/2.55-150 KF 40
Electrical data				
Attenuation measurement per length				
• at 16 MHz max.	42 dB/km	42 dB/km	42 dB/km	42 dB/km
• at 4 MHz max.	22 dB/km	22 dB/km	22 dB/km	22 dB/km
• at 38.4 kHz max.	4 dB/km	4 dB/km	4 dB/km	4 dB/km
• at 9.6 kHz max.	2.5 dB/km	2.5 dB/km	2.5 dB/km	2.5 dB/km
Characteristic impedance at 9.6 kHz	270 Ω	270 Ω	270 Ω	270 Ω
• Relative symmetrical tolerance of characteristic impedance at 9.6 kHz	± 10%	± 10%	± 10%	± 10%
Characteristic impedance at 38.4 kHz	185 Ω	185 Ω	185 Ω	185 Ω
• Relative symmetrical tolerance of characteristic impedance at 38.4 kHz	± 10%	± 10%	± 10%	± 10%
Characteristic impedance at 3 MHz ... 20 MHz	150 Ω	150 Ω	150 Ω	150 Ω
• Relative symmetrical tolerance of characteristic impedance at 3 MHz ... 20 MHz	± 10%	± 10%	± 10%	± 10%
Nominal characteristic impedance	150 Ω	150 Ω	150 Ω	150 Ω
Loop resistance per length, max.	110 Ohm/km	110 Ohm/km	110 Ohm/km	110 Ohm/km
Screen resistance per length, max.	9.5 Ohm/km	9.5 Ohm/km	9.5 Ohm/km	9.5 Ohm/km
Capacitance per length at 1 kHz	28.5 nF/km	28.5 nF/km	28.5 nF/km	28.5 nF/km
Operating voltage (rms value)	100 V	100 V	100 V	100 V
Mechanical data				
Jacket				
• Material of the cable sheath	PVC	PVC	PUR	PE
• Outer diameter of the cable sheath	8 mm	8 mm	8 mm	8 mm
• Symmetrical tolerance of the outer diameter of the cable sheath	0.4 mm	0.4 mm	0.4 mm	0.4 mm
• Color of the cable sheath	Violet	blue	Violet	black
Ambient temperature				
• during operation	-40 … +75 °C	-40 … +75 °C	-40 … +60 °C	-40 … +60 °C
• during transport	-40 … +75 °C	-40 … +75 °C	-40 … +60 °C	-40 … +60 °C
• during storage	-40 … +75 °C	-40 … +75 °C	-40 … +60 °C	-40 … +60 °C
• during installation	-40 … +75 °C	-40 … +75 °C	-40 … +60 °C	-40 … +60 °C
Bending radius				
• for one-off bending, minimum permissible	75 mm	75 mm	75 mm	75 mm
• for repeated bending, minimum permissible	150 mm	120 mm	150 mm	150 mm
Tensile load, max.	100 N	100 N	100 N	100 N
Weight per length	76 kg/km	80 kg/km	73 kg/km	67 kg/km

Technical specifications (continued)

Order No.	6XV1 830-0EH10	6XV1 831-2A	6XV1 830-0JH10	6XV1 830-0GH10
Product type description	**PROFIBUS FC Standard Cable**	**PROFIBUS FC Standard Cable IS GP**	**PROFIBUS FC Robust Cable**	**PROFIBUS FC Food Cable**
Fire behavior	Flame retardant to IEC 60332-3-24 Category C	Flame retardant to IEC 60332-3-24 Category C	Flame retardant to IEC 60332-1	Flammable
Chemical resistance				
• to mineral oil	conditional resistance	conditional resistance	resistant	conditional resistance
• to grease	conditional resistance	conditional resistance	conditional resistance	conditional resistance
Radiological resistance to UV radiation	resistant	resistant	resistant	resistant
Product property				
• halogen-free	No	No	No	No
• Silicone-free	Yes	Yes	Yes	Yes
FastConnect electrical connection version	Yes	Yes	Yes	Yes
UL listing at 300 V rating	Yes/CMG/CL3/Sun Res	Yes/CMG/CL3/Sun Res	Yes / CMX	No
UL style at 600 V rating	Yes	Yes	No	No

Order No.	6XV1 830-3FH10	6XV1 831-2K	6XV1 830-3EH10	6XV1 830-0LH10
Product type description	**PROFIBUS FC Ground Cable**	**PROFIBUS FC Flexible Cable**	**PROFIBUS FC Trailing Cable**	**PROFIBUS FC FRNC Cable GP**
Suitability for use	Underground	Occasionally moved machine parts	In cable carriers	Halogen-free and Flame retardant applications
Cable name	02YSY (ST) CY2Y 1 × 2 × 0.64/2.55-150 KF 40 SW	02YH (ST) C11Y 1 × 2 × 0.64/2.56-150 LI KF 40 FRNC FC VI	02YY (ST) C11Y 1 × 2 × 0.64/2.55-150 LI KF 40 FR petrol	02YSH (ST) CH 1 × 2 × 0.64/2.55-150 VI KF 25 FRNC
Electrical data				
Attenuation measurement per length				
• at 16 MHz max.	42 dB/km	49 dB/km	49 dB/km	42 dB/km
• at 4 MHz max.	22 dB/km	25 dB/km	25 dB/km	22 dB/km
• at 38.4 kHz max.	4 dB/km	4 dB/km	4 dB/km	4 dB/km
• at 9.6 kHz max.	2.5 dB/km	3 dB/km	3 dB/km	2,5 dB/km
Characteristic impedance at 9.6 kHz	270 Ω	270 Ω	270 Ω	270 Ω
• Relative symmetrical tolerance of characteristic impedance at 9.6 kHz	± 10%	± 10%	± 10%	± 10%
Characteristic impedance at 38.4 kHz	185 Ω	185 Ω	185 Ω	185 Ω
• Relative symmetrical tolerance of characteristic impedance at 38.4 kHz	± 10%	± 10%	± 10%	± 10%
Characteristic impedance at 3 MHz ... 20 MHz	150 Ω	150 Ω	150 Ω	150 Ω
• Relative symmetrical tolerance of the characteristic impedance at 3 MHz ... 20 MHz	± 10%	± 10%	± 10%	± 10%
Nominal characteristic impedance	150 Ω	150 Ω	150 Ω	150 Ω
Loop resistance per length, max.	110 Ohm/km	133 Ohm/km	133 Ohm/km	110 Ohm/km
Screen resistance per length, max.	9.5 Ohm/km	14 Ohm/km	14 Ohm/km	9.5 Ohm/km
Capacitance per length at 1 kHz	28.5 nF/km	28 nF/km	28 nF/km	29 nF/km
Operating voltage (rms value)	100 V	100 V	100 V	100 V

Technical specifications (continued)

Order No.	6XV1 830-3FH10	6XV1 831-2K	6XV1 830-3EH10	6XV1 830-0LH10
Product type description	**PROFIBUS FC Ground Cable**	**PROFIBUS FC Flexible Cable**	**PROFIBUS FC Trailing Cable**	**PROFIBUS FC FRNC Cable GP**
Mechanical data				
Jacket				
• Material of the cable sheath	PE/PVC	PUR	PUR	FRNC
• Outer diameter of the cable sheath	10.8 mm	8 mm	8 mm	8 mm
• Symmetrical tolerance of the outer diameter of the cable sheath	0.5 mm	0.4 mm	0.4 mm	0.4 mm
• Color of the cable sheath	black	Violet	petrol	Light violet
Ambient temperature				
• during operation	-40 … +60 °C	-20 … +60 °C	-40 … +60 °C	-25 … +80 °C
• during transport	-40 … +60 °C	-40 … +60 °C	-40 … +60 °C	-25 … +80 °C
• during storage	-40 … +60 °C	-40 … +60 °C	-40 … +60 °C	-25 … +80 °C
• during installation	-40 … +60 °C	-40 … +60 °C	-40 … +60 °C	-25 … +80 °C
Bending radius				
• for one-off bending, minimum permissible	80 mm	40 mm	40 mm	60 mm
• for repeated bending, minimum permissible	160 mm	120 mm	120 mm	80 mm
Number of bending cycles	-	-	3 000 000	-
Tensile load, max.	100 N	100 N	100 N	100 N
Weight per length	117 kg/km	70 kg/km	70 kg/km	72 kg/km
Fire behavior	Flammable	Flame retardant acc.to IEC 60332-1-2	Flame retardant acc. to IEC 60332-1-2	Flame retardant to IEC 60332-3-24 Category C, IEC 60332-3-22 Category A
Chemical resistance				
• to mineral oil	conditional resistance	conditional resistance	resistant	conditional resistance
• to grease	conditional resistance	conditional resistance	resistant	conditional resistance
Radiological resistance to UV radiation	resistant	resistant	resistant	resistant
Product property				
• halogen-free	No	Yes	No	Yes
• Silicone-free	Yes	Yes	Yes	Yes
FastConnect electrical connection version	Yes	Yes	Yes	Yes
UL listing at 300 V rating	No	Yes / CMX	Yes / CMX	Yes/CM/CL3/Sun Res
UL style at 600 V rating	No	No	No	Yes

Technical specifications (continued)

Order No.	6XV1 830-3GH10	6XV1 830-0PH10	6XV1 830-0MH10
Product type description	**PROFIBUS Festoon Cable**	**PROFIBUS Torsion Cable**	**SIENOPYR FR Marine Cable**
Suitability for use	Festoon attachment	Moving machine parts	Shipbuilding
Cable name	02YS (ST) CY 1 x 2 x 0.65/2.56 LI petrol FR	02Y (ST) C 11Y 1 x 2 x 0.65/2.56-150 LI FR VI	M-02Y (ST) CH X 1 x 2 x 0.35 100 V
Electrical data			
Attenuation measurement per length			
• at 16 MHz	49 dB/km	49 dB/km	45 dB/km
• at 4 MHz	25 dB/km	25 dB/km	22 dB/km
• at 38.4 kHz	4 dB/km	3 dB/km	5 dB/km
• at 9.6 kHz	3 dB/km	2.5 dB/km	3 dB/km
Characteristic impedance at 9.6 kHz	270 Ω	270 Ω	250 Ω
• Relative symmetrical tolerance of characteristic impedance at 9.6 kHz	± 10%	± 10%	± 10%
Characteristic impedance at 38.4 kHz	185 Ω	185 Ω	185 Ω
• Relative symmetrical tolerance of characteristic impedance at 38.4 kHz	± 10%	± 10%	± 10%
Characteristic impedance at 3 MHz ... 20 MHz	150 Ω	150 Ω	150 Ω
• Relative symmetrical tolerance of characteristic impedance at 3 MHz ... 20 MHz	± 10%	± 10%	± 10%
Nominal characteristic impedance	150 Ω	150 Ω	150 Ω
Loop resistance per length, max.	133 Ohm/km	98 Ohm/km	110 Ohm/km
Screen resistance per length, max.	19 Ohm/km	14 Ohm/km	-
Capacitance per length at 1 kHz	28 nF/km	29 nF/km	-
Operating voltage (rms value)	100 V	100 V	100 V
Mechanical data			
Jacket			
• Material of the cable sheath	PVC	PUR	Polymer
• Outer diameter of the cable sheath	8 mm	8 mm	10.3 mm
• Symmetrical tolerance of the outer diameter of the cable sheath	0.3 mm	0.4 mm	0.5 mm
• Color of the cable sheath	petrol	Violet	black
Ambient temperature			
• during operation	-40 … +80 °C	-25 … +75 °C	-40 … +80 °C
• during transport	-40 … +80 °C	-40 … +80 °C	-40 … +80 °C
• during storage	-40 … +80 °C	-40 … +80 °C	-40 … +80 °C
• during installation	-40 … +80 °C	-25 … +75 °C	-10 … +50 °C
Bending radius			
• for one-off bending, minimum permissible	30 mm	30 mm	108 mm
• for repeated bending, minimum permissible	70 mm	60 mm	216 mm
Tensile load, max.	80 N	100 N	100 N
Weight per length	64 kg/km	65 kg/km	109 kg/km

Technical specifications (continued)

Order No.	6XV1 830-3GH10	6XV1 830-0PH10	6XV1 830-0MH10
Product type description	**PROFIBUS Festoon Cable**	**PROFIBUS Torsion Cable**	**SIENOPYR FR Marine Cable**
Fire behavior	Flame retardant to IEC 60332-1	Flame retardant to IEC 60332-1-2	Flame retardant to IEC 60332-3-24
Chemical resistance			
• to mineral oil	conditional resistance	resistant	resistant
• to grease	conditional resistance	resistant	resistant
Radiological resistance to UV radiation	resistant	resistant	resistant
Product property			
• halogen-free	No	No	Yes
• Silicone-free	Yes	Yes	Yes
FastConnect electrical connection version	No	No	No
UL listing at 300 V rating	Yes/CM/CMG/PLTC/SunRes/OilRes	Yes / CMX	No
UL style at 600 V rating	Yes	No	No
Marine classification association	-	-	Lloyds Register of Shipping, Germanischer Lloyd

Order No.	6XV1 860-2R	6XV1 860-2S
Product type description	**PROFIBUS Hybrid Standard Cable**	**PROFIBUS Hybrid Robust Cable**
Suitability for use	ET 200pro	ET 200pro, Cable resistance to weld spatter according to HD22.2 S3 / 5
Cable name	02Y(ST)C 1x2x0.65/2.56-150LI LIY-Z Y 2 x 1 x 1.5 VI	02Y(ST)C 1 x 2 x 0.65/2.56-150LI LIH-Z 11Y 2 x 1 x 1.5 VI FRNC
Electrical data		
Attenuation measurement per length		
• at 16 MHz	49 dB/km	49 dB/km
• at 4 MHz	25 dB/km	25 dB/km
• at 9.6 MHz	3 dB/km	3 dB/km
Characteristic impedance		
• at 9.6 kHz	270 Ω	270 Ω
• at 38.4 kHz	185 Ω	185 Ω
• at 3 MHz ... 20 MHz	150 Ω	150 Ω
• Rated value	150 Ω	150 Ω
Symmetrical tolerance of the characteristic impedance		
• at 3 MHz ... 20 MHz	± 15 Ω	± 15 Ω
• at 38.4 kHz	± 18.5 Ω	± 18.5 Ω
• at 9.6 MHz	± 27 Ω	± 27 Ω
Loop resistance per length, max.	138 Ohm/km	138 Ohm/km
Screen resistance per length, max.	10 Ohm/km	10 Ohm/km
Capacitance per length at 1 kHz	30 nF/m	30 nF/m
Operating voltage (rms value)	300 V	300 V
Continuous current of the power wires at 25 °C	7.5 A	7.5 A

Technical specifications (continued)

Order No.	6XV1 860-2R	6XV1 860-2S
Product type description	**PROFIBUS Hybrid Standard Cable**	**PROFIBUS Hybrid Robust Cable**
Mechanical data		
Cable sheath		
• Material	PVC	PUR
• Outer diameter	11 mm	11 mm
• Color	Violet	Violet
• Lower dimension	10.5 mm	10.5 mm
• Upper dimension	11.5 mm	11.5 mm
Power wires		
• Conductor cross-section	1.5 mm^2	1.5 mm^2
• Color of the wire insulation	black	black
Ambient temperature		
• during installation	-40 … +75 °C	-40 … +75 °C
• during operation	-40 … +75 °C	-40 … +75 °C
• during storage	-40 … +75 °C	-40 … +75 °C
• during transport	-40 … +75 °C	-40 … +75 °C
Bending radius		
• for one-off bending	44 mm	44 mm
• for repeated bending	125 mm	125 mm
Bending cycles	-	3 000 000
Tensile load, max.	450 N	450 N
Weight per length	140 kg/km	135 kg/km
Fire behavior	Flame retardant to IEC 60332-1-2	Flame retardant to IEC 60332-1-2
Chemical resistance		
• to mineral oil	conditional resistance	resistant
• to grease	conditional resistance	resistant
Radiological resistance to UV radiation	No	No
Product property		
• halogen-free	No	Yes
• Silicone-free	Yes	Yes
FastConnect electrical connection version	No	No
UL listing at 300 V rating	Yes / CMG	Yes / CMX
UL style at 600 V rating	No	No

Ordering data	Order No.
PROFIBUS FC Standard Cable GP Standard type with special design for fast mounting, 2-core, shielded, Sold by the meter; delivery unit max. 1000 m, minimum order quantity 20 m Preferred lengths	**6XV1 830-0EH10**
• 20 m	**6XV1 830-0EN20**
• 50 m	**6XV1 830-0EN50**
• 100 m	**6XV1 830-0ET10**
• 200 m	**6XV1 830-0ET20**
• 500 m	**6XV1 830-0ET50**
• 1000 m	**6XV1 830-0EU10**
In spool box	
• 50 m	**6XV1 830-1EN50**
• 100 m	**6XV1 830-1ET10**
PROFIBUS FC Standard Cable IS GP Standard type with special design for quick assembly, 2-core, shielded, for intrinsically safe distributed I/O systems Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 831-2A**
PROFIBUS FC Robust Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-0JH10**
PROFIBUS FC Food Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-0GH10**
PROFIBUS FC Ground Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-3FH10**
PROFIBUS FC Flexible Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 831-2K**
PROFIBUS FC Trailing Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-3EH10**

	Order No.
PROFIBUS Festoon Cable GP 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-3GH10**
PROFIBUS FC FRNC Cable GP 2-core, shielded, nonflammable, with copolymer outer sheath FRNC Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-0LH10**
PROFIBUS Torsion Cable 2-core, shielded Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-0PH10**
PROFIBUS cable for ET 200X	
• 5-core, sold by the meter, for bus signals, power supply: oil-resistant, partially weld-esistent, can be trailed, PUR material, minimum order quamtity 10 m	**6ES7 194-1LY10-0AA0** Length (specify in m)
• 5-core, sold by the meter, for bus signals, power supply: Standard, PVC material	**6ES7 194-1LY00-0AA0-Z,** Z = Length (specify in m)
PROFIBUS Hybrid Standard Cable GP Standard PROFIBUS hybrid cable with 2 power conductors (1.5 mm^2) for supply of data and power to ET 200pro	**6XV1 860-2R**
PROFIBUS Hybrid Robust Cable Rugged PROFIBUS hybrid cable suitable as trailing cable and resistant to welding spatter, with 2 power conductors (1.5 mm^2) for supply of data and power to ET 200pro	**6XV1 860-2S**
Special bus cables	
SIENOPYR PROFIBUS shipboard cable Copper cable for ships and offshore units Sold by the meter; max. length 1000 m, minimum order 20 m	**6XV1 830-0MH10**

PROFIBUS bus cables

Ordering data	Order No.
Additional components	
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1 905-6AA00**
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for PROFIBUS FastConnect stripping tool, 5 units	**6GK1 905-6AB00**
PROFIBUS FastConnect bus connector RS485 with 90° cable outlet Insulation displacement	
• Without PG interface	**6ES7 972-0BA51-0XA0**
• With PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS FastConnect bus connector RS485 Plug 180 With 180° cable outlet, insulation displacement	**6GK1 500-0FC10**
Accessories	
Manual for PROFIBUS networks [1] Network architecture, project management, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
Lightning protection modules for reliable transmission between buildings with overvoltage protection [2]	
Basic protection	
• Basic section	**919506**
• Protection module Type B	**919510**
• Protective housing	**906055**
• Terminal element	**919508**
Low-voltage protection	
• Basic section	**919506**
• Protection module	**919570**
• Terminal element	**919508**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

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

[2] Order from:
DEHN & Söhne
Hans-Dehn-Str.1
92318 Neumarkt/Opf, Germany

More information

Installation instructions

The bus cables are supplied by the meter. If a bus segment must be assembled using two sections (e.g. > 1000 m segment length), bushings can be used for this purpose (low-impedance connection between cores with clamps, connect shields over a wide area).

FastConnect

The FastConnect stripping tool can be used to strip the outer sheath and shield of the new FastConnect bus cables to the right length in one step.
In this way, the bus connectors (except 6ES7 972-0BA30-0XA0) can be connected easily and quickly to the bus cable.

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!

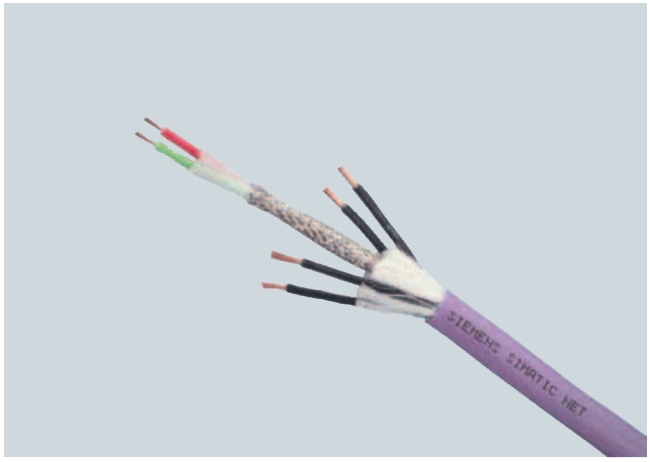
An underground cable must be used if cables are laid outside buildings e.g. directly in the ground, in sand or in concrete building blocks or when routed through protective pipes made of steel or plastic above or below ground.

Overvoltage protection guidelines for underground laying must be complied with.

Note:
Additional components of the SIMATIC NET wiring range can be ordered from your local contact person.
For technical advice contact:

J. Hertlein, A&D SE PS
Tel.: +49 (0)911/750 44 65
Fax.: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview



In the ECOFAST system, all operational devices are connected to PROFIBUS DP using the bus cables.

The bus cable is implemented as a hybrid cable and contains:

- PROFIBUS DP in copper RS 485;
- Four additional copper cores for carrying 24 V DC:
  - 24 V DC, not switched (for electronics and inputs)
  - 24 V DC, switched (for outputs, disconnectable e.g. for EMERGENCY OFF)

The ECOFAST hybrid cables are sold by the meter or in fixed lengths preassembled with ECOFAST connector (Han Brid) and socket.

Benefits

- Savings in wiring, installation, commissioning and operation as result of standardized connection system (copper or fiber-optic) with high degree of protection (IP65)
- With ECOFAST, the turnaround times for offers, planning and engineering of machines and plants can be reduced
- ECOFAST permits fast and problem-free startup of automation and drive systems
- Minimization of sources of error by means of standardized interfaces and plug connectors.
- With ECOFAST plants remain highly available: No interruption of power and fieldbus when replacing equipment.

ECOFAST bus cables

Technical specifications

Order No.	6XV1 830-7AH10	6XV1 860-2P
Product type description	**PROFIBUS ECOFAST Hybrid Cable**	**PROFIBUS ECOFAST Hybrid Cable GP**
Suitability for use	Connection for ECOFAST stations	Connection for ECOFAST stations
Cable name	02Y (ST)C 1 x 2 x 0.65/2.56- 150 LI LIH-Z 11Y 4 x 1 x 1.5 VI FRNC	02Y (ST)C 1 x 2 x 0.65/2.56 -150 LI LIY-Z Y 4 x 1 x 1.5 VI
Electrical data		
Attenuation measurement per length		
• at 16 MHz	49 dB/km	49 dB/km
• at 4 MHz	25 dB/km	25 dB/km
• at 9.6 MHz	3 dB/km	3 dB/km
Characteristic impedance		
• at 9.6 kHz	270 Ω	270 Ω
• at 38.4 kHz	185 Ω	185 Ω
• at 3 MHz ... 20 MHz	150 Ω	150 Ω
• Rated value	150 Ω	150 Ω
Symmetrical tolerance of the characteristic impedance		
• at 3 MHz ... 20 MHz	+/- 15 Ω	+/- 15 Ω
• at 38.4 kHz	+/- 18.5 Ω	+/- 18.5 Ω
• at 9.6 MHz	+/- 27 Ω	+/- 27 Ω
Loop resistance per length, max.	138 Ohm/km	138 Ohm/km
Screen resistance per length, max.	15 Ohm/km	15 Ohm/km
Capacitance per length at 1 kHz	30 nF/km	30 nF/km
Operating voltage (rms value)	100 V	100 V
Continuous current of the power wires	12 A	12 A

Order No.	6XV1 830-7AH10	6XV1 860-2P
Product type description	**PROFIBUS ECOFAST Hybrid Cable**	**PROFIBUS ECOFAST Hybrid Cable GP**
Mechanical data		
Cable sheath		
• Material	PUR	PVC
• Outer diameter	11 mm	11 mm
• Color	Violet	Violet
Power wires		
• Conductor cross-section	1.5 mm^2	1.5 mm^2
• Color of the wire insulation	black	black
Ambient temperature		
• during installation	-40 … +60 °C	-30 … +80 °C
• during operation	-40 … +60 °C	-30 … +80 °C
• during storage	-40 … +60 °C	-30 … +80 °C
• during transport	-40 … +60 °C	-30 … +80 °C
Bending radius		
• for one-off bending	38 mm	77 mm
• for repeated bending	85 mm	110 mm
Number of bending cycles	5000000	1000000 [1]
Weight per length	150 kg/km	154 kg/km
Fire behavior	IEC 60332-1	IEC 60332-3-24 Category C
Chemical resistance		
• to mineral oil	conditional resistance	conditional resistance
• to grease	conditional resistance	conditional resistance
Radiological resistance to UV radiation	No	Yes
Product property		
• halogen-free	Yes	No
• Silicone-free	Yes	Yes
UL listing at 300 V rating	No	Yes/CMG/CL3/Sun Res/OilRes
UL style at 600 V rating	No	Yes

[1] for bending radius 15 x D

Ordering data

	Order No.
PROFIBUS ECOFAST Hybrid Cable - Cu	
Trailing cable (PUR sheath), with two shielded Cu wires for PROFIBUS DP plus four Cu wires of 1.5 mm²	
Sold by the meter; max. quantity 1000 m; minimum order 20 m;	**6XV1 830-7AH10**
Not pre-assembled	
• 20 m	**6XV1 830-7AN20**
• 50 m	**6XV1 830-7AN50**
• 100 m	**6XV1 830-7AT10**
Pre-assembled with ECOFAST male and female connectors, fixed length	
• 0,5 m	**6XV1 830-7BH05**
• 1,0 m	**6XV1 830-7BH10**
• 1,5 m	**6XV1 830-7BH15**
• 3 m	**6XV1 830-7BH30**
• 5 m	**6XV1 830-7BH50**
• 10 m	**6XV1 830-7BN10**
• 15 m	**6XV1 830-7BN15**
• 20 m	**6XV1 830-7BN20**
• 25 m	**6XV1 830-7BN25**
• 30 m	**6XV1 830-7BN30**
• 35 m	**6XV1 830-7BN35**
• 40 m	**6XV1 830-7BN40**
• 45 m	**6XV1 830-7BN45**
• 50 m	**6XV1 830-7BN50**
Pre-assembled with two ECOFAST connectors, variable length	
PROFIBUS ECOFAST Hybrid Cable GP	
Trailing cable with 4 x Cu and 2 x Cu, shielded, with UL approval	
Sold by the meter; max. quantity 1000 m; minimum order 20 m;	**6XV1 860-2P**
Not pre-assembled	
• 20 m	**6XV1 860-4PN20**
• 50 m	**6XV1 860-4PN50**
• 100 m	**6XV1 860-4PT10**

	Order No.
PROFIBUS ECOFAST Hybrid Cable GP (continued)	
Pre-assembled with ECOFAST male and female connectors	
• 0,5 m	**6XV1 860-3PH05**
• 1 m	**6XV1 860-3PH10**
• 1,5 m	**6XV1 860-3PH15**
• 3 m	**6XV1 860-3PH30**
• 5 m	**6XV1 860-3PH50**
• 10 m	**6XV1 860-3PN10**
• 15 m	**6XV1 860-3PN15**
• 20 m	**6XV1 860-3PN20**
• 25 m	**6XV1 860-3PN25**
• 30 m	**6XV1 860-3PN30**
• 35 m	**6XV1 860-3PN35**
• 40 m	**6XV1 860-3PN40**
• 45 m	**6XV1 860-3PN45**
• 50 m	**6XV1 860-3PN50**
Additional components	
PROFIBUS Cu bus connector	
with 2 x Cu shielded and 4 x Cu 1.5 mm²; type of contact: POF, Han D for 24 V; tool: crimping tool, polishing set; 5 units; with assembly instructions	
• with pin insert	**6GK1 905-0CA00**
• with socket insert	**6GK1 905-0CB00**
PROFIBUS ECOFAST Hybrid Plug angled;	
with 2 x Cu shielded and 4 x Cu 1.5 mm²; 5 units; with installation instructions	
• Male pins	**6GK1 905-0CC00**
• Female pins;	**6GK1 905-0CD00**
ECOFAST Terminating Plug	
Bus termination plug-in connector for PROFIBUS DP; with 2 x Cu and 4 x Cu 1.5 mm²; male pins, integrated termination resistors	
• Pack of 1	**6GK1 905-0DA10**
• Pack of 5	**6GK1 905-0DA00**
Data T piece	
For 2 x 24 V auxiliary voltage (switched and non-switched) and PROFIBUS DP	
• for Cu RS 485	**3RK1 911-2AG00**
• for fiber-optic cable	**3RK1 911-2AH00**
Addressing plug	
For setting the PROFIBUS DP addresses	**6ES7 194-1KB00-0XA0**

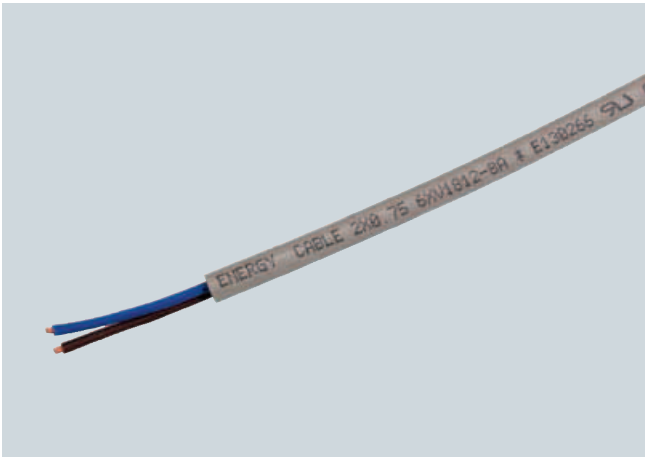
More information

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
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Power cables

Overview



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

Benefits

- 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

For the construction of PROFINET/PROFIBUS networks, different cable types are offered to suit the different types of application. The listed power cables should always be used. They are used for devices with degree of protection IP65/67 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).

UL approvals

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

Design

Rugged 2-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

Technical specifications

Order No.	6XV1 812-8A	6XV1 830-8AH10
Product type description	**Energy Cable**	**Energy Cable**
Suitability for use	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 name	L-YY-2x1x0.75 GR	L-Y11Y-JZ 5x1x1.5 GR
Power wires		
Operating voltage (rms value)	600 V	600 V
Conductor cross-section of power wire	0.75 mm^2	1.5 mm^2
Continuous current of the power wires	6 A	16 A
Mechanical data		
Jacket		
• Outer diameter	7.4 mm	10.5 mm
• Symmetrical tolerance of the outer diameter	0.3 mm	0.3 mm
• Material	PVC	PUR
• Color	gray	gray
Ambient temperature		
• during operation	-20 … +80 °C	-40 … +80 °C
• during transport	-20 … +80 °C	-40 … +80 °C
• during storage	-20 … +80 °C	-40 … +80 °C
• during installation	-20 … +80 °C	-40 … +80 °C
Bending radius		
• for one-off bending	19 mm	26 mm
• for repeated bending	44 mm	63 mm
Number of bending cycles	-	-
Tensile load, max.	100 N	500 N
Weight per length	70 kg/km	149 kg/km
Fire behavior	Flame retardant to IEC 60332-1	Flame retardant to IEC 60332-1
Chemical resistance		
• to mineral oil	conditional resistance	resistant
• to grease	conditional resistance	resistant
Radiological resistance to UV radiation	resistant	resistant
Product property		
• halogen-free	No	No
• Silicone-free	Yes	Yes
FastConnect electrical connection version	No	No
UL listing at 300 V rating	Yes/CL3	No
UL style at 600 V rating	Yes	Yes

Ordering data

	Order 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. 1000 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. 1000 m; minimum order quantity 20 m	**6XV1 830-8AH10**
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	**6GK1 905-0FA00**
• Socket insert	**6GK1 905-0FB00**
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	**6GK1 905-0FC00**
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	**6GK1 907-0DC10-6AA3**
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	**6GK1 907-0DB10-6AA3**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD, German/English	**6GK1 975-1AA00-3AA0**

More information

Cable routing:

During storage, transportation and cable laying, keep both ends sealed with a shrink-on cap.
Comply with the permissible bending radii and tensile load!

Note:
Additional components of the SIMATIC NET wiring range can be ordered from your local contact person.
For technical advice contact:

J. Hertlein, A&D SE PS
Tel.: +49(0)911/750 44 65
Fax +49(0)911/750 99 91
E-Mail: juergen.hertlein@siemens.com

RS 485 bus connector

Overview

- Used for connecting PROFIBUS nodes to the PROFIBUS bus cable
- Easy installation
- FastConnect plugs ensure extremely short assembly times due to their insulation-displacement technology
- Integrated terminating resistors
  (not in the case of 6ES7 972-0BA30-0XA0)
- PG connection with special bus connector possible without additional installation of network nodes.

Application

The RS485 bus connectors for PROFIBUS are used for connecting a PROFIBUS node or a PROFIBUS network component to the bus cable for PROFIBUS.

Design

Different versions of the bus connector, optimized for the connected devices, are available:

- Bus connectors with axial cable outlet (180 °C) e.g. for PCs and SIMATIC HMI OPs, for transmission rates up to 12 Mbit/s with integrated bus terminating resistor
- Bus connector with vertical cable outlet (90 °C)

This connector enables a vertical cable outlet (with and without PG interface) for transmission rates up to 12 Mbit/s with integrated bus terminating resistor. With transmission rates of 3, 6 or 12 Mbit/s, the SIMATIC S5/S7 connecting cable is required for the connection between the bus connector with additional PG interface and a programming device.

- Bus connector with 30° cable outlet (low-cost version) without PG interface for transmission rates up to 1.5 Mbit/s and without integrated bus terminating resistor.
- PROFIBUS FastConnect RS 485 bus connector (90° or 180° cable outlet) with transmission rates up to 12 Mbit/s for fast, easy mounting with insulation displacement method (for rigid and flexible wires).

Function

The bus connector is plugged directly to the PROFIBUS interface (9-pin Sub-D connector) of the PROFIBUS node or a PROFIBUS network component.

The incoming and outgoing PROFIBUS bus cable is connected through four terminals in the connector.

The line termination integrated in the bus connector can be connected through an externally accessible switch (not with 6ES7 972-0BA30-0XA0). Here, incoming and outgoing bus cables are separated in the connector (isolating function).

This is mandatory at both ends of a PROFIBUS segment.

Technical specifications

Bus connector	6ES7 972-0BA12-0XA0 6ES7 972-0BB12-0XA0 6AG1 972-0BB12-2XA0 [1] 6AG1 972-0BA12-2XA0 [1]	6ES7 972-0BA41-0XA0 6ES7 972-0BB41-0XA0 6AG1 972-0BB41-2XA0 [1] 6AG1 972-0BA41-2XA0 [1]	6ES7 972-0BA30-0XA0 [2]
Cable outlet	**90°** cable outlet	**35**° cable outlet	**30**° cable outlet
Transfer rate	9.6 Kbit/s to 12 Mbit/s	9.6 Kbit/s to 12 Mbit/s	9.6 Kbit/s to 1500 Kbit/s
Terminating resistor	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated	No terminating resistor, **cannot be used for first and last device in the bus segment**
Interfaces			
• PROFIBUS station	9-pin Sub-D socket	9-pin Sub-D socket	9-pin Sub-D socket
• PROFIBUS bus cable	4 terminal blocks for wires up to 1.5 mm^2	4 terminal blocks for wires up to 1.5 mm^2	4 insulation displacement terminals for wires 0.644 ± 0.040 mm^2
FastConnect insulation displacement method	No	No	Yes
Supply voltage (must come from data terminal equipment)	4.75 to 5.25 VDC	4.75 to 5.25 VDC	–
Current consumption	max. 5 mA	max. 5 mA	–
Permissible ambient conditions			
• Operating temperature	0 °C to +60 °C	0 °C to +60 °C	0 °C to +60 °C
• Transport/storage temperature	–25 °C to +80 °C	–25 °C to +80 °C	–25 °C to +80 °C
• Relative humidity	Max. 75% at +25 °C	Max. 75% at +25 °C	Max. 75% at +25 °C
Design			
• Dimensions (W x H x D) in mm	15.8 x 64 x 35.6	15.8 x 54 x 39.5	15 x 57.6 x 39.45
• Weight	Approx. 40 g	Approx. 40 g	Approx. 30 g
PG connection socket	**0BA12: no; 0BB12: Yes**	**0BA41: No; 0BB41: Yes**	**No**
Degree of protection	IP20	IP20	IP20
UL listing	Yes	Yes	Yes
Use in PLC			
S7-200/-300/-400®	● [3]	●	●
C7-633 DP, C7-634 DP, C7-635, C7-636	●	●	●
S5-115U to S5-155U	●	●	●
I/O station			
ET 200M/ET 200B/ET 200L/ET 200S	●	●	●
Programming device			
PG 720/720C/PG 740/PG 760		●	●
Interface			
IM 308-C	●	●	●
CP 5431 FMS/DP	●	●	●
CP 342-5	●	●	
CP 343-5	●	●	
CP 443-5	●	●	
CP 5511/CP 5512/CP 5611 A2/ CP 5621/CP 5613 A2/CP 5614 A2	●	●	
SIMATIC OP			
OLM/OBT	●	●	
Repeater RS485	●	●	●

● Suitable for the application

[1] SIPLUS module for extended temperature range (-25 °C to +60 °C) and exceptional media stress (conformal coating)

[2] Flexible bus cables cannot be used with this connector

[3] S7-400:
Cannot be used with MPI/DP interface when DP interface is assigned; cannot be used with IFM1 interface when IFM2 interface is assigned

Bus connector RS485

Technical specifications (continued)

Bus connector	6ES7 972-0BA51-0XA0 6ES7 972-0BB51-0XA0	6ES7 972-0BA60-0XA0 6ES7 972-0BB60-0XA0	6GK1 500-0FC10	6GK1 500-0EA02 6AG1 500-0EA02-2AA0 [1]
Cable outlet	**90**° cable outlet	**35**° cable outlet	**180**° cable outlet	**180**° cable outlet
Transfer rate	9.6 Kbit/s to 12 Mbit/s	9.6 Kbit/s to 12 Mbit/s	9.6 Kbit/s to 12 Mbit/s	9.6 Kbit/s to 12 Mbit/s
Terminating resistor	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated. Connected with insulation displacement terminals for the FastConnect system	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated. Connected with insulation displacement terminals for the FastConnect system	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated. Connection with insulation displacement terminals for the FastConnect system	Integrated resistor combination and isolating function that can be selected with slide switch: When the resistor is connected, the outgoing bus is isolated
Interfaces				
• PROFIBUS station	9-pin Sub-D socket	9-pin Sub-D socket	9-pin Sub-D socket	9-pin Sub-D socket
• PROFIBUS bus cable	4 insulation displacement terminals for all FastConnect PROFIBUS cables (except for FC Process Cable)	4 insulation displacement terminals for all FastConnect PROFIBUS cables (except for FC Process Cable)	4 insulation displacement terminals for all FastConnect PROFIBUS cables (except for FC Process Cable)	4 terminal blocks for wires up to 1.5 mm^2
FastConnect insulation displacement method	Yes	Yes	Yes	No
Supply voltage (must come from data terminal equipment)	4.75 to 5.25 V DC	4.75 to 5.25 V DC	4.75 to 5.25 V C	4.75 to 5.25 V DC
Current consumption	max. 5 mA	max. 5 mA	max. 5 mA	max. 5 mA
Permissible ambient conditions				
• Operating temperature	0 °C to +60 °C	0 °C to +60 °C	0 °C to +60 °C	0 °C to +60 °C
• Transport/storage temperature	–25 °C to +80 °C	–25 °C to +80 °C	–25 °C to +80 °C	–25 °C to +80 °C
• Relative humidity	Max. 75% at +25 °C	Max. 75% at +25 °C	Max. 75% at +25 °C	Max. 75% at +25 °C
Design				
• Dimensions (W x H x D) in mm	15.8 x 59 x 35.6	15.8 x 54 x 39.5	16 x 67 x 34.3	15 x 57 x 39
• Weight	Approx. 50 g	Approx. 50 g	Approx. 40 g	Approx. 100 g
PG connection socket	**0BA51: no; 0BB51: Yes**	**0BA60: No; 0BB60: Yes**	No	No
Degree of protection	IP20	IP20	IP20	IP20
UL listing	Yes	Yes	Yes	No
Use in PLC				
S7-200/-300/-400	●	●		
C7-633 DP, C7-634 DP, C7-635, C7-636	●	●		
S5-115U to S5-155U	●	●		
I/O station				
ET 200M/ ET 200B/ ET 200L/ ET 200S	●	●		
Programming device				
PG 720/720C/PG 740/PG 760			●	●
Interface				
IM 308-C	●	●		
CP 5431® FMS/DP	●	●		
CP 342-5/ CP 343-5/ CP 443-5	●	●		
CP 5511/CP 5512/CP CP 5611 A2/ CP 5621/CP 5613 A2/CP 5614 A2			●	●
SIMATIC OP			●	●
OLM/OBT	●	●	●	●
Repeater RS485	●	●		

● Suitable for the application

[1] SIPLUS module for extended temperature range (-25 °C to +60 °C) and exceptional media stress (conformal coating)

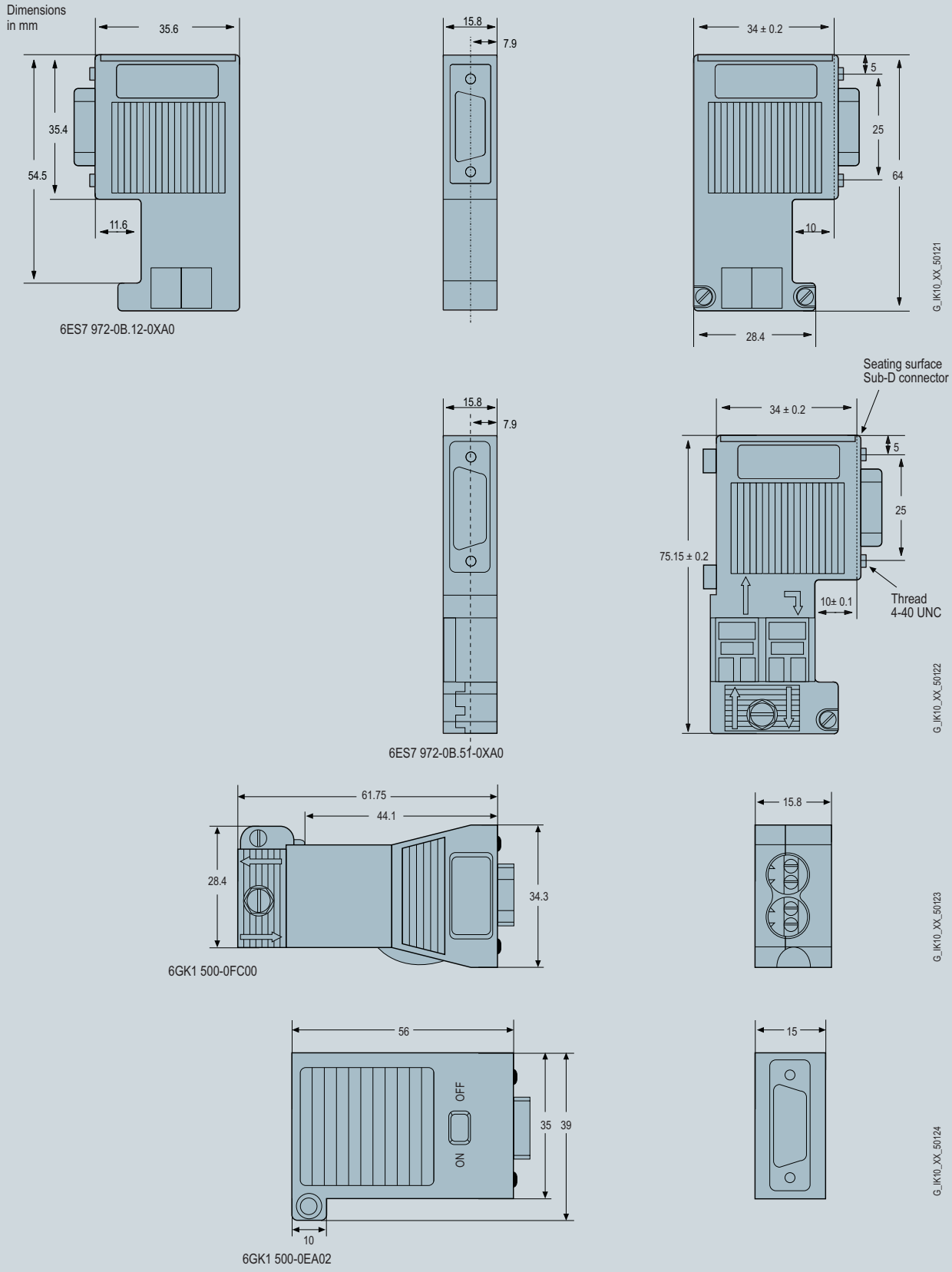
Ordering data	Order No.
RS485 bus connector with axial cable outlet (180°) For industrial PC, SIMATIC HMI OP, OLM; max. transmission rate 12 Mbit/s	**6GK1 500-0EA02**
SIPLUS DP PB RS485 connector with axial cable outlet (180°) for medial stress; Based-on 6GK1 500-0EA02	**6AG1 500-0EA02-2AA0**
RS485 bus connector with cable outlet (90°) With screw-terminals, max. transmission rate 12 Mbit/s	
• without programmer port	**6ES7 972-0BA12-0XA0**
• with programmer port	**6ES7 972-0BB12-0XA0**
SIPLUS DP PB RS485 connector with 90° cable outlet for extended temperature range -25 … + 60 °C	
• without PG interface Based on 6ES7 972-0BA12-0XA0	**6AG1 972-0BA12-2XA0**
• with PG interface Based on 6ES7 972-0BB12-0XA0	**6AG1 972-0BB12-2XA0**
RS485 bus connector with angled cable outlet (35°) With screw-terminals, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA41-0XA0**
• with PG interface	**6ES7 972-0BB41-0XA0**
SIPLUS DP PB RS485 connector with inclined cable outlet (35°) for extended temperature range -25 … + 60 °C	**6AG1 972-0BA41-2XA0**
• without PG interface Based on 6ES7 972-0BA41-0XA0	**6AG1 972-0BA41-2XA0**
• with PG interface Based on 6ES7 972-0BB41-0XA0	**6AG1 972-0BB41-2XA0**
RS485 bus connector with cable outlet (30°) With screw-terminals, low-cost variant, max. transmission rate 1.5 Mbit/s	**6ES7 972-0BA30-0XA0**

	Order No.
PROFIBUS bus connector RS485 with FastConnect technology	
PROFIBUS FastConnect bus connector RS485 with 90° cable outlet With insulation displacement terminals, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA51-0XA0**
• with PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS FastConnect RS485 bus connector with angled cable outlet (35°) With insulation displacement terminals, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA60-0XA0**
• with PG interface	**6ES7 972-0BB60-0XA0**
PROFIBUS FastConnect bus connector RS485 Plug 180 With insulation displacement terminals, with 180° cable outlet, for industrial PC, SIMATIC HMI OP, OLM; max. transmission rate 12 Mbit/s	**6GK1 500-0FC10**
SIMATIC S5/S7 plug-in cable for PROFIBUS Preassembled with two 9-pin Sub-D connectors; max. transmission rate 12 Mbit/s; 3 m	**6ES7 901-4BD00-0XA0**
Manual for PROFIBUS networks Paper version Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

4

Bus connector RS485

Dimensions



Overview

- Prefabricated cable for fast and cost-effective connection of PROFIBUS nodes to OLM and OBT
- Flexible PROFIBUS connecting cable

Benefits

get Designed for Industry

- Trouble-free connection of end stations through preassembled connecting leads
- Reliable data transmission to the end station in EMC-exposed environment through direct cable shielding and termination.

Design

The 830-1T connecting cable consists of a twisted-pair cable (wires made of stranded copper) with a woven shield.

It has a 9-pin Sub-D plug at both ends.

Both cable ends are terminated by a resistor combination (cannot be switched off).

Function

The PROFIBUS 830-1T connecting cable is used for connecting the electrical PROFIBUS interface to the PROFIBUS nodes (OLM, OBT and data terminals) for data transmission rates of up to 12 Mbit/s.

Ordering data	Order No.
830-1T PROFIBUS connecting cable	
for terminal connection, preassembled, with two Sub-D plugs, 9-pin terminated at both ends	
• 1.5 m long	**6XV1 830-1CH15**
• 3 m long	**6XV1 830-1CH30**

830-2 connecting cable

Overview

- Prefabricated cable for connection of PROFIBUS nodes (e.g. HMI) to PLCs
- Flexible PROFIBUS connection cable for up to 12 Mbit/s

Benefits

get Designed for Industry

- Trouble-free connection of end stations through preassembled connecting leads
- Direct connection of a PG through the PG interface without interrupting the connection between the stations.

Design

The 830-2 connecting cable comprises a standard PROFIBUS bus cable. It is preassembled with two 9-pin connectors (6GK1 500-0EA02 and 6ES7 972-0BB11-0XA0). One plug of the preassembled connecting cable is equipped with a PG interface.

Function

The 830-2 connecting cable is used to connect PROFIBUS nodes (e.g. HMI) to automation devices for transmission rates up to 12 Mbit/s.

Ordering data	Order No.
830-2 PROFIBUS connecting cable	
Preassembled, with two 9-pin connectors	
• 3 m long	**6XV1 830-2AH30**
• 5 m long	**6XV1 830-2AH50**
• 10 m long	**6XV1 830-2AN10**

Overview

Flexible connecting cables and FastConnect (FC) plug-in connectors that can be assembled in the field for transmission of data (up to 12 Mbit/s) or for power supply between PROFIBUS nodes with degree of protection IP65

PROFIBUS M12 plug-in cable

- Preassembled plug-in cable (PROFIBUS FC Trailing Cable) for connecting PROFIBUS nodes (e.g. SIMATIC ET 200) to degree of protection IP65
- For transmission rates up to 12 Mbit/s

7/8" connecting cable

- Preassembled plug-in cable for supplying power to PROFIBUS nodes (e.g. SIMATIC ET 200) to degree of protection IP65

PROFIBUS FC M12 Plug PRO (D-coded) and 7/8" plug-in connector

- For establishing direct connections between devices on PROFIBUS installation and power cables with M12 or 7/8" connections
- Excellent EMC shielding and deflection (metal housing)
- Easy assembly due to integrated FastConnect technology (FC M12 Plug)
- Viewable contact area prevents errors

Benefits

get Designed for Industry

- Time-saving and fault-free connection of terminal stations by means of prefabricated connection cables
- Easy assembly on site for application-specific M12 and 7/8“ plug-in cables by means of FC M12 and 7/8“ plug-in connectors that can be assembled in the field

Design

M12 plug-in cable

- Comprises the PROFIBUS Trailing Cable
- Pre-assembled with two 5-pole M12 male/female connectors; B-coded

7/8" plug-in cable

- Comprises the Energy Cable 5 x 1.5 mm^2
- Pre-assembled with two 5-pole 7/8" male/female connectors

Technical specifications

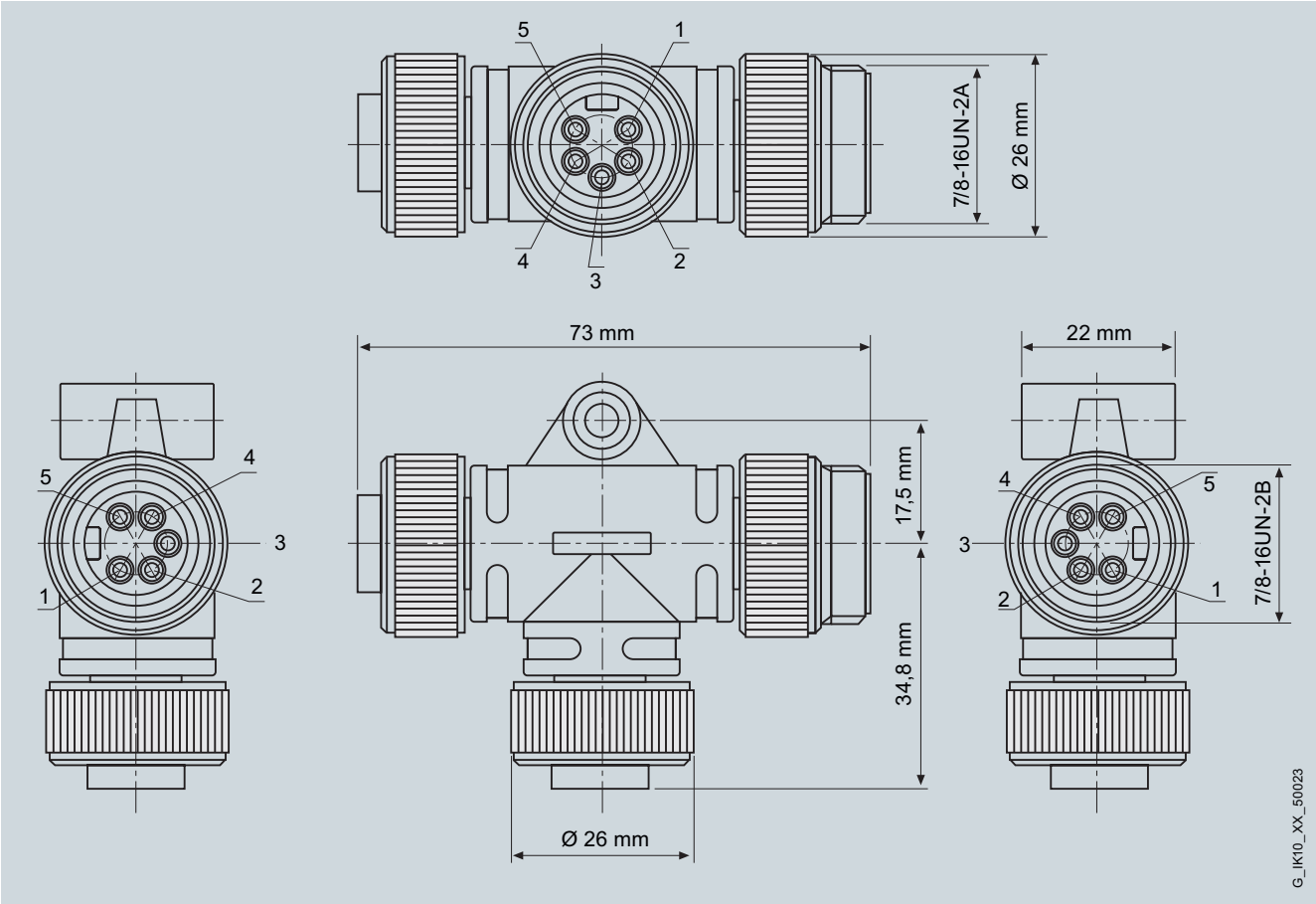
Order No.	**6GK1905-0EA10 / 6GK1905-0EB10**
Product type description	**PB FC M12 Plug PRO / PB FC M12 Cable Connector PRO**
Number of electrical connections	
• for PROFIBUS cables	2
• for network components or terminals	1
Electrical connection version	
• FastConnect	Yes
• for PROFIBUS FC TP cables	integrated insulation displacement contacts
• for network components or terminal	M12 plug (B-coded) or M12 socket (B-coded)
Transfer rate	9,6 kbit/s … 12 Mbit/s
Ambient temperature	
• during operating phase	-40 … +85 °C
• during storage	-40 … +85 °C
• during transport	-40 … +85 °C
Width	19 mm
Height	19 mm
Depth	73 mm
Net weight	40 g
Degree of protection	IP65/67

PROFIBUS M12 and 7/8" connecting cable/plug-in connector

Ordering data	Order No.
PROFIBUS M12 plug-in cable	
Pre-assembled with two 5-pole M12 male/female connectors up to 100 m max.; length:	
• 0.3 m	**6XV1 830-3DE30**
• 0.5 m	**6XV1 830-3DE50**
• 1.0 m	**6XV1 830-3DH10**
• 1.5 m	**6XV1 830-3DH15**
• 2.0 m	**6XV1 830-3DH20**
• 3.0 m	**6Xv1 830-3DH30**
• 5.0 m	**6XV1 830-3DH50**
• 10 m	**6XV1 830-3DN10**
• 15 m	**6XV1 830-3DN15**
Further special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294
7/8" plug-in cable	
For power supply; pre-assembled with two 5-pole 7/8" male/female connectors up to 50 m max.; length:	
• 0.3 m	**6XV1 822-5BE30**
• 0.5 m	**6XV1 822-5BE50**
• 1.0 m	**6XV1 822-5BH10**
• 1.5 m	**6XV1 822-5BH15**
• 2.0 m	**6XV1 822-5BH20**
• 3.0 m	**6XV1 822-5BH30**
• 5.0 m	**6XV1 822-5BH50**
• 10 m	**6XV1 822-5BN10**
• 15 m	**6XV1 822-5BN15**
Additional special lengths with 90° or 180° cable outlet	See http://support.automation.siemens.com/WW/view/en/26999294

	Order No.
Plug-in connector for assembly in the field	
PROFIBUS M12 connectors	
5-pole, B-coded, metal casing, 1 pack = 5 pieces	
• Male pins	**6GK1 905-0EA00**
• Socket insert	**6GK1 905-0EB00**
PROFIBUS FC M12 Plug PRO	
M12 plug-in connector (B-coded) that can be assembled in the field, 5-pin, metal enclosure, FastConnect technology, pin insert;	
• 1 pack = 5 units	**6GK1 905-0EA10**
PROFIBUS FC M12 Cable Connector PRO	
M12 plug-in connector (B-coded) that can be assembled in the field, 5-pin, metal enclosure, FastConnect technology, socket insert;	
• 1 pack = 5 units	**6GK1 905-0EB10**
7/8" plug-in connector	
5-pole, plastic casing, 1 pack = 5 pieces	
• Male pins	**6GK1 905-0FA00**
• Socket insert	**6GK1 905-0FB00**
Power cables	
Energy Cable (5 x 1.5 mm^2)	
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. 1000 m; minimum order quantity 20 m	**6XV1 830-8AH10**
7/8" Power T-Tap PRO	**6GK1 905-0FC00**
Power T-piece for ET 200 with two 7/8" socket inserts and one 7/8" pin insert 1 pack = 5 units	

Dimensions



7/8“ Power T-Tap PRO

More information

Special lengths with 90° or 180° cable outlet

Additional information can be found in the Internet under:

http://support.automation.siemens.com/WW/view/en/26999294

Bus terminals

Overview

- For connecting PROFIBUS nodes with an RS485 interface to a segment
- Versions with transmission rates from 9.6 kbit/s to 12 Mbit/s
- Clear and easy mounting (can be snapped onto DIN rail)
- Clear location of faulty bus termination when bus terminal 12M is used
- PG connection with special bus terminal and PG connecting cable possible without additional installation of network nodes for bus terminal RS485.

Benefits

get Designed for Industry

- Easy and clearly comprehensible connection of PROFIBUS stations thanks to preassembled, integrated connecting cable
- Simple cabinet pre-wiring by connecting the PROFIBUS connecting cable with integrated interfaces

Application

The PROFIBUS bus terminals enable a bus station to be connected to a PROFIBUS network.

- Pre-wired device connection for PROFIBUS node
- Easy connection of stations to PROFIBUS networks through insertion of the radial line with Sub-D plug
- Implementation of multipoint connections by directly interconnecting several bus terminals (up to 32 stations per segment) with the 12M bus terminal.

Design

Different versions are available:

- Up to 1.5 Mbit/s
  Bus terminal RS485
- Up to 12 Mbit/s
  Bus terminal 12M

Applicable to all versions:

- IP20 enclosure.
- Wall mounting or mounting on deep standard DIN rail possible.
- External 6-pin terminal block for connection of inoming and outgoing bus cable and equipotential bonding conductors.
- Integrated connecting cable with Sub-D plug for connection of nodes.
- Combination of terminating resistors can be connected by means of rotary switch.

The following additionally applies to the bus terminal 12M:

- Ranges for transmission rates can be adjusted by means of rotary switches.
- Supply to the bus terminal 12M by the connected PROFIBUS node (5 V DC/90 mA) via 9-pin Sub-D socket.
- For maximum segment lengths, see Technical Specifications.
- Incoming and outgoing bus cables are disconnected when inserting the terminating resistors.

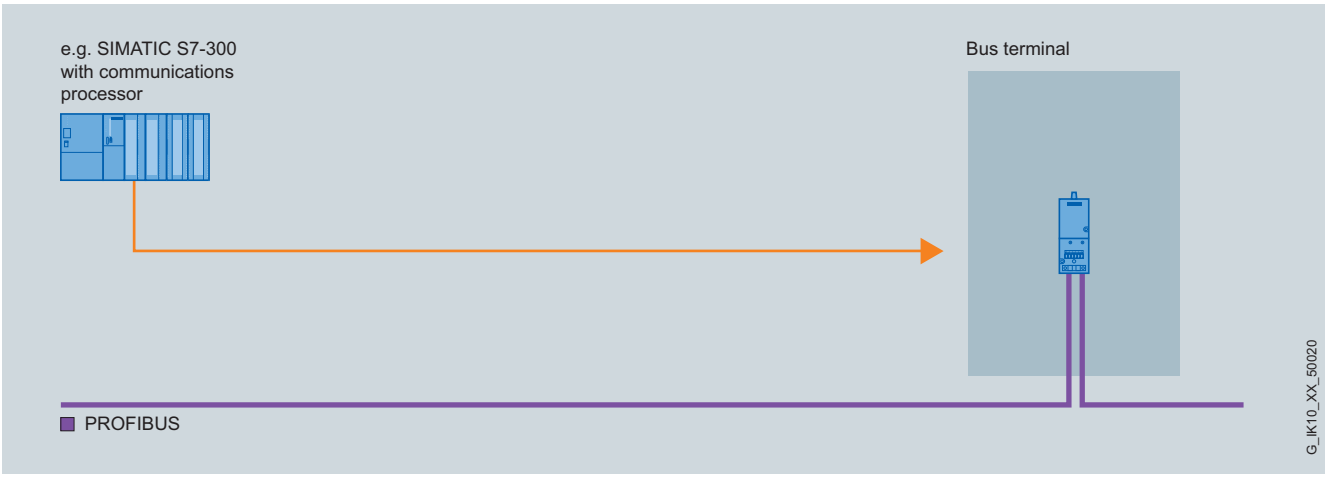
Function

- Connection of stations over flexible connecting cable with Sub-D connector
- Easy connection of the bus cable over the terminal block
- No bus interruption in response to a missing terminal
- Bus termination is possible over integral termination resistor combinations.

The following also applies to the 12M bus terminal

- Unique localization of faulty termination within a segment (the incoming and outgoing bus cables are cut for inserting the resistor combinations)
- When the 12M bus terminal is used in a segment with RS 485 bus terminals, the configuration rules for the RS 485 bus terminal apply (see manual for PROFIBUS networks).

Function (continued)



System connection with PROFIBUS bus terminals e.g. for SIMATIC S7

Technical specifications

Order No.	6GK1 500-0AA10
Product type description	**PROFIBUS bus terminal 12M**
Number of electrical connections for Industrial Ethernet FC TP cables	2
Version of electrical connection for DP station or RS485 segment	Sub-D 9
Transfer rate	
• Maximum	12 Mbit/s
• Minimum	9.6 kbit/s
Cable length	
• at max. 1.5 Mbit/s	200 m
• at max. 12 Mbit/s	100 m
• at max. 500 kbit/s	400 m
• at max. transmission rate 9.5 kbit/s ... 187.5 kbit/s	1000 m
Width	50 mm
Height	135 mm
Depth	47 mm
Suitability for use	
• for interface module	
- IM 308-C	Yes
- SIMATIC 505 FIM	Yes
• for PLC	
- SIMATIC 505	-
- SIMATIC S5-95U/DP	Yes
• for Central Processing Unit	
- CPU 215	Yes
- CPU 313	Yes
- CPU 314	Yes
- CPU 315	Yes
- CPU 315-2 DP	Yes
- CPU 316	Yes
- CPU 317	Yes
- CPU 319	Yes
- CPU 412	Yes
- CPU 416	Yes
- CPU 417	Yes

Order No.	6GK1 500-0AA10
Product type description	**PROFIBUS bus terminal 12M**
Suitability for use (continued)	
• for communications processor	
- CP 342-5	Yes
- CP 343-5	Yes
- CP 443-5 Basic	Yes
- CP 443-5 Extended	Yes
- CP 5431 FMS/DP	Yes
- CP 5511	-
- CP 5512	-
- CP 5611A2	Yes
- CP 5613 A2	Yes
- CP 5614 A2	Yes
- CP 5621	Yes
• for network component	
- DP/AS-Interface Link 20E	Yes
- DP/RS232 Link	Yes
- PROFIBUS DP RBC	Yes
- Repeater RS485	Yes
• for IO device	
- ET 200B	Yes
- ET 200eco	-
- ET 200L	-
- ET 200M	-
- ET 200M with IM 153	Yes
- ET 200S	-
- ET 200X	-
- ET200U with IM 318-C	Yes

Bus terminals

Ordering data	Order No.
Bus terminal RS485 for PROFIBUS Transmission rate 9.6 Kbit/s to 1500 Kbit/s with plug-in cable 3.0 m long	**6GK1 500-0AB00**
Bus terminal RS485 for PROFIBUS With installed programmer port and plug-in cable 1.5 m long	**6GK1 500-0DA00**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable 1.5 m long	**6GK1 500-0AA10**
Manual for PROFIBUS networks, paper version Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

Overview

- Terminates bus segments at data transmission rates of 9.6 kbit/s to 12 Mbit/s
- Power supply independent of bus stations.

Designed for Industry

- Terminal-independent bus termination through onboard power supply

Technical specifications

Order No.	6ES7 972-0DA00-0AA0 6AG1972-0DA00-2AA0[1)]
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, typ.	30 mA
Connection point	
Bus cables	Screw terminal block
Voltage supply	Screw terminal block
PROFIBUS DP	
Transmission speed, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95%; at +25 °C
Degree and class of protection	
• IP 20	Yes
Dimensions	
Dimensions	
• Width	60 mm
• Height	70 mm
• Depth	43 mm
Weights	
• Weight, approx.	95 g

1) SIPLUS module for expanded temperature temperature range (-25 °C to +60 °C) and exceptional medial load.

Ordering data

	Order No.
Active RS 485 terminating element for PROFIBUS For terminating bus segments for data transmission rates of 9.6 kbit/s to 12 Mbit/s	**6ES7 972-0DA00-0AA0**
SIPLUS RS 485 terminating element PROFIBUS for expanded temperature range -25 °C ... + 60 °C based on 6ES7 972-0DA00-0AA0	**6AG1972-0DA00-2AA0**

RS 485 repeater for PROFIBUS

Overview

- Automatic data transmission rate search
- Data transmission rate of 45.45 Kbit/s possible
- 24 V DC voltage display
- Display bus activity segment 1 and 2
- Isolation of segment 1 and 2 possible by switch
- Isolation of the right segment part when terminating resistor is inserted
- Decoupling of segment 1 and segment 2 in the event of static interference.

Designed for Industry

- To increase the number of stations and the expansion
- Galvanic isolation of segments
- Startup assistance
  - switch for disconnecting segments
  - display of bus activity
  - isolation of segment with incorrectly inserted terminating resistor

Please also have a look at the diagnostics repeater which in addition to the normal repeater functionality also has comprehensive diagnostics functions for physical line diagnosis. It is described under "Distributed I/O/Diagnostics/Diagnostics repeater for PROFIBUS DP".

Technical specifications

Order No.	6ES7 972-0AA01-0XA0
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Current consumption	
Current consumption, max.	200 mA; (200 mA without loads at PG/OP socket; 230 mA load at PG/OP socket (5 V/90 mA); 300 mA load at PG/OP socket (24 V/90 mA))
Connection point	
Bus cables	2 terminal blocks
Voltage supply	Terminal block
PROFIBUS DP	
Transmission speed, max.	12 Mbit/s; 9.6 Kbit/s to 12 Mbit/s
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95%; at 25 °C
Degree and class of protection	
• IP 20	Yes
Dimensions	
Dimensions	
• Width	45 mm
• Height	128 mm
• Depth	67 mm
Weights	
• Weight, approx.	350 g

Ordering data

	Order No.
Repeater RS 485 for PROFIBUS	**6ES7 972-0AA01-0XA0**
Data transmission rate up to 12 Mbit/s 24 V DC, housing to IP20	

Overview

- RS 485 repeater with online line diagnostics for PROFIBUS DP
- DP standard PROFIBUS slave (DP-V1)
- Automatic determination of fault types and locations
- Data transmission rate 9.6 kbit/s to 12 Mbit/s
- Connection through FastConnect using the insulation displacement method

Technical specifications

Order No.	6ES7 972-0AB01-0XA0
Supply voltages	
Rated value	
• DC 24 V	Yes
• permissible range, lower limit (DC)	20.4 V
• permissible range, upper limit (DC)	28.8 V
Connection point	
Bus cables	FastConnect insulation displacement, 10 clamping cycles possible
Voltage supply	Terminal block
PROFIBUS DP	
Transmission speed, max.	12 Mbit/s; 9.6 Kbit/s to 12 Mbit/s
Environmental requirements	
Operating termperature	
• min.	0 °C
• max.	60 °C
Storage/transport temperature	
• min.	-40 °C
• max.	70 °C
Relative humidity	
• Operation, max.	95%; at 25 °C
Degree and class of protection	
• IP 20	Yes
Dimensions	
Dimensions	
• Width	80 mm
• Height	125 mm
• Depth	67.5 mm
Weights	
• Weight, approx.	300 g

Diagnostics repeater for PROFIBUS DP

Ordering data	Order No.
RS 485 Diagnostic Repeater For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostics functions for monitoring the bus cables	**6ES7 972-0AB01-0XA0**
Accessories	
RS 485 bus connector with 90° cable outlet With screw terminals Max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS FastConnect bus connector RS 485 with 90° cable outlet With insulation displacement terminals Max. data transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA51-0XA0**
• With PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With insulation displacement terminals, with 180° cable outlet For industrial PC, SIMATIC HMI OP, OLM; Max. transfer rate 12 Mbit/s	**6GK1 500-0FC00**
RS 485 bus connector with angled cable outlet (35°) With screw terminals, max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA41-0XA0**
• With PG interface	**6ES7 972-0BB41-0XA0**
PROFIBUS FastConnect RS 485 bus connector with angular cable outlet (35°) With insulation displacement terminals, max. transfer rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA60-0XA0**
• With PG interface	**6ES7 972-0BB60-0XA0**

	Order No.
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	**6GK1 905-6AA00**
PROFIBUS FC Standard Cable Standard type with special design for quick mounting, 2-core, shielded, sold by the meter, max. delivery unit 1000 m, minimum order quantity 20 m	**6XV1 830-0EH10**
S7 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)	**6ES7 998-8XC01-8YE0**
S7 Manual Collection update service for 1 year Scope of delivery: Current DVD "S7 Manual Collection" and the three subsequent updates	**6ES7 998-8XC01-8YE2**
Manual for PROFIBUS networks [1] Network architecture, configuration, network components, installation	
German	**6GK1 970-5CA20-0AA0**
BT 200 Hardware Tester with point-to-point cable for station testing, with test connector for wiring test, without charging unit, with operating instructions in German/English/French	**6ES7 181-0AA01-0AA0**
Connecting cable for PROFIBUS 12 Mbit/s, for PG connection to PROFIBUS DP, pre-assembled with 2 x 9-pin Sub-D connector, 3.0 m	**6ES7 901-4BD00-0XA0**

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

Overview

- Interconnecting two PROFIBUS DP networks
- The interchange of data between both DP networks takes place by internal copying in the coupler.

Technical specifications

PROFIBUS transmission rate	max. 12 Mbit/s
Interfaces	
• PROFIBUS DP	9-pin Sub-D connector
Supply voltage	24 V DC
Current consumption typ.	150 mA
Mounting	Upright (DIP switches above)
Perm. environmental conditions	
• Operating temperature	
- horizontal mounting	0°C … +60°C
- all other mounting positions	0°C … +40°C
• Transport/storage temperature	-40 °C … +70 °C
• Relative humidity	10-95 % at +25 °C
Design	
• Dimensions (W x H x D) in mm	40 x 127 x 117
• Weight	approx. 250 g
Degree of protection	IP20

Ordering data

	Order No.
DP/DP coupler	**6ES7 158-0AD01-0XA0**

Note:
The manual is available on the Internet free of charge.

Power Rail Booster

Overview

- The device for low-cost PROFIBUS DP transfer over contact conductors and slip rings to degree of protection IP20
- Permissible baud rates from 9600 bit/s to 500 kbit/s, self-optimizing
- Permissible busbar length:
  From 25 m at 500 kbit/s to 1200 m at 9600 bit/s
- Configuring with PRB Checker software
- Up to 125 nodes per segment
- Transparent for data communication:
  The power rail booster does not reserve DP addresses
- Easy to install due to connection without terminating resistor and filter element
- Diagnostics LED for power supply, bus activity and group errors
- Isolated electronic changeover contact for external group error display or diagnostic alarm
- Uninterruptible communication beyond segment limits using the "PRB segment controller"

Technical specifications

Degree of protection	IP20
Dimensions (W x H x D, with connector) in mm	90 x 132 x 75
Supply voltage	24 V DC
Power consumption	max. 20 W
Data transmission rate, max.	500 kbit/s, self-adjusting
Cable length (depends on baud rate), max.	1200 m
Shock-hazard protected voltage	Yes, to EN 61131-2
Stations per PRB segment, max.	125
Operation without terminating resistance	Yes
Operation without filter	Yes
Wiring options: Line / star	Yes / Yes

Ordering data

	Order No.
Power Rail Booster Signal amplifier for PROFIBUS DP transmission over contact cables, max. 500 kbit/s	**6ES7 972-4AA02-0XA0**
PRB segment controller Automatic change-over switch between PRB segments	**6ES7 972-4AA50-0XA0**

Overview

- For checking the bus cable, RS 485 interfaces and accessibility of slaves
- Compact and very easy to operate
- Choice of 6 languages
- For installers, start-up engineers and service personnel
- Optional logging kit for generating acceptance reports/documentation

Optional adapters for IP65/67 systems

- Connecting adapter, bus tester BT200 on M12
- Connecting adapter, bus tester BT200 on ECOFAST
- Connecting adapter for 24 V DC ECOFAST for supplying the station with 24 V DC for the station test

These connecting adapters can be purchased from

KnorrTec
Kapellenbergstraße 34
D-93176 Beratzhausen
Germany
Tel: +49 (0) 94 93/ 9 51 96 90
Fax: +49 (0) 94 93/ 9 51 96 79
E-Mail: info@knorrtec.de

Additional information can be found in the Internet under:
http://www.knorrtec.de/de/produkte/I_3a.asp

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- Minimizing errors during installation and commissioning
- Shorter service and plant standstill times

Technical specifications

Order No.	6ES7 181-0AA01-0AA0
Product type description	**BT 200 hardware test device**
Supply voltages	
Description	via integral NC battery
Connection point	
PROFIBUS DP	9-pin Sub-D socket
PROFIBUS DP	
Transmission speed, max.	12 Mbit/s; 9.6 kbit/s to 12 Mbit/s

Technical specifications (continued)

Order No.	6ES7 181-0AA01-0AA0
Product type description	**BT 200 hardware test device**
Environmental requirements	
Operating termperature	
• min.	5 °C
• max.	45 °C
Storage/transport temperature	
• min.	-20 °C
• max.	60 °C
Relative humidity	
• Operation, max.	95%
Degree and class of protection	
• IP 20	Yes
Online languages	
adjustable	Yes
Languages	
Configuration languages	
• German	Yes
• English	Yes
• French	Yes
• Italian	Yes
• Portuguese	Yes
• Spanish	Yes
Dimensions	
Dimensions	
• Width	210 mm
• Height	100 mm
• Depth	55 mm
Weights	
• Weight, approx.	350 g

Ordering data

	Order No.
BT 200 hardware test device with point-to-point cable for station testing, with test connector for wiring test, without charging unit, with operating instructions German/English/French	**6ES7 181-0AA01-0AA0**
Accessories	
Charging unit for the rechargeable batteries:	
Chargers	
230 V AC/2.4 … 10 V DC	**6ES7 193-8LA00-0AA0**
110 V AC/2.4 … 10 V AC	**6ES7 193-8LB00-0AA0**
Logging Kit BT 200 comprising data transmission cable BT 200/PC and logging software for PC German/English/French	**6ES7 193-8MA00-0AA0**
Test connector Spare part	**6EP8 106-0AC20**
NiCd battery pack Spare part	**6EP8 106-0HA01**
Point-to-point cable for station test Spare part	**6EP8 106-0HC01**

ADI 4 Analog Drive Interface for 4 axes

Overview

The ADI 4 Analog Drive Interface for 4 axes can be used to operate up to 4 drives with analog setpoint interface.

Benefits

- Connection via PROFIBUS DP
- Motion Control functionality (isochronous mode)

Design

- 4 inputs for incremental encoders (TTL signals) or optionally 4 inputs[1] for absolute encoders (SSI interface)
- 4 analog outputs ± 10 V for the setpoint
- 4 relay contacts for drive enable of axes 1 to 4
- 10 digital outputs[2]
  (4 general, 6 drive-specific)
- 10 digital drive-specific inputs[2]
- On-board status display on 4 diagnostics LEDs

To supply the module and digital outputs with power, an external voltage source (+24 V DC) is needed.

[1] Cannot be used with SINUMERIK 802D sl.

[2] Only 9 can be used with SINUMERIK 802D sl.

Integration

The ADI 4 interface module can be used with the following controls:

- SINUMERIK 802D sl
- SINUMERIK 840Di sl
- SINUMERIK 840Di
- SINUMERIK 840D sl

SINUMERIK 802D sl

Two ADI 4 modules can be connected to the SINUMERIK 802D sl, permitting analog control of all its axes.

Encoder connection

With SINUMERIK 802D sl (in accordance with the existing number of axes), the following configurations are available as standard for each ADI 4:

- 4 x TTL signal inputs with S/R[3]
  - 3 x 2 500, 1 x 1 024
  - 1 x 9 000, 1 x 18 000, 1 x 1 024, 1 x 2 500
    or
  - 3 x 2 048, 1 x 1 024
  - 1 x 9 000, 1 x 18 000, 1 x 1 024, 1 x 2 048

Other configurations can be implemented on request.

SINUMERIK 840Di/840Di sl/840D sl

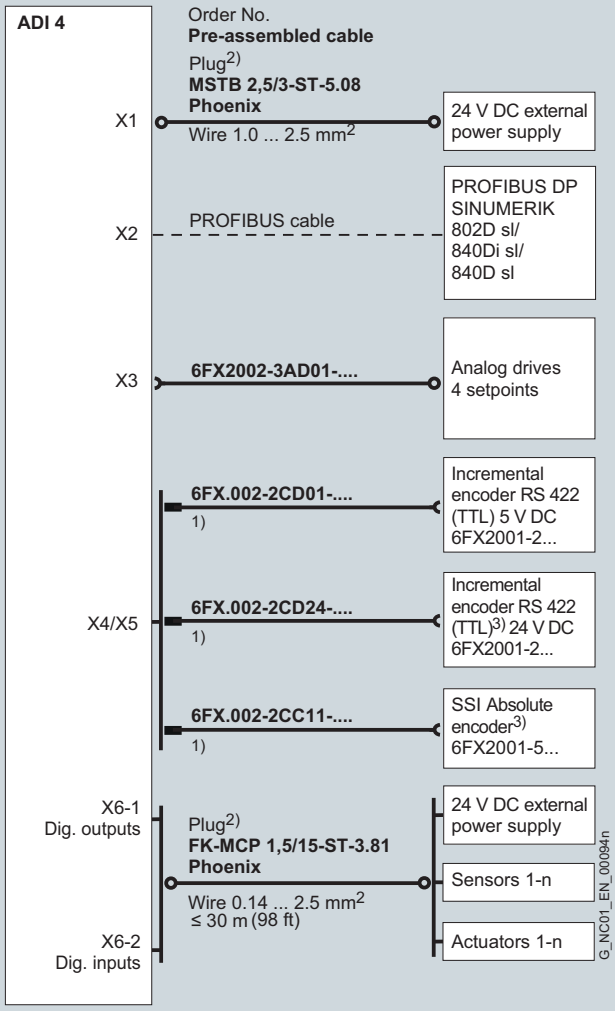
Several ADI 4 modules can be connected to the SINUMERIK 840Di sl/840D sl, permitting analog control of all axes of the SINUMERIK 840Di sl and up to 20 axes of the SINUMERIK 840D sl. Mixed operation of digital drives and ADI 4 modules is possible; the axes can interpolate with one another.

Encoder connection

- Incremental encoder (TTL) with differential transfer
  - Track A and inverted signal A
  - Track B and inverted signal B
  - Zero signal and inverted zero signal
  - Output frequency max. 1.5 MHz
  - Phase shift of Track A to Track B: 90° ± 30°
  - Power consumption max. 300 mA
- Absolute encoder with SSI signal
  - True and inverted output signal
  - Shift clock as true and inverted signal
  - Transmission frequency max. 750 kbaud
  - Power consumption max. 300 mA
    Only multi-turn encoders are approved for this purpose.
- Linear encoder with distance-coded zero marks/reference marks
  - LS 476 C
  - LS 186 C, in conjunction with external pulse-shaper electronics EXE
- Encoder with sin/cos signals can be connected via external pulse-shaper electronics EXE.

[3] S/R = Signals/Revolution

Integration (continued)



1) The max. cable lengths depend on the current consumption, power supply and frequency of the encoders (see Manual ADI 4).
2) Included in scope of supply.
3) Only for SINUMERIK 840Di sl.

Connection overview for ADI 4

Information about application, configuration and cable extensions can be found under Connection system MOTION-CONNECT in Catalog NC 61 and in the interactive Catalog CA 01 under "Automation systems/CNC SINUMERIK Automation systems"

Technical specifications

Order No.	6FC5211-0BA01-0AA3
Product type description	**SINUMERIK Analog Drive Interface for 4 Axes ADI 4**
Input voltage	24 V DC
Power consumption, max.	30.2 W
Degree of protection to EN 60529 (IEC 60529)	IP20
Humidity rating in accordance with EN 60721-3-3	Class 3K5 condensation and icing excluded. Low air temperature 0 °C (32 °F).
Relative humidity	
• Storage	5 ... 95 %
• Transport	5 ... 95 %
• Operation	5 ... 95 %
Ambient temperature	
• Storage	-20 … +55 °C (-4 ... +131 °F)
• Transport	-40 … +70 °C (-40 ... +158 °F)
• Operation	0 … 55 °C (32 ... 131 °F)
Dimensions	
• Width	48.5 mm (1.91 in)
• Height	325 mm (12.8 in)
• Depth	154.4 mm (6.08 in)
Weight, approx.	1.5 kg (3.31 lb)

Ordering data

	Order No.
SINUMERIK Analog Drive Interface for 4 axes, ADI 4	**6FC5211-0BA01-0AA3**

4

SpliTConnect

Overview

- Used for constructing fieldbus segments as per IEC 61 158-2 (e.g. PROFIBUS PA) with field device interface points.
- Easy assembly of the bus cable thanks to the FastConnect system (FastConnect stripping tool, FC process cable compliant with IEC 61 158-2).
- The terminal devices can be connected using the FC Process Cable in accordance with IEC 61 158-2 or the SpliTConnect M12 Outlet/M12 Jack.
- Combination of terminating resistors can be integrated (SpliTConnect terminator)

Benefits

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- Easy connection of terminals due to use of the FastConnect system
- Wide variety of applications thanks to modular SpliTConnect system
- Reduction in number of types and parts thanks to uniform connection system for PROFIBUS PA

Application

- The SpliTConnect Tap supports the installation of fieldbus segments according to IEC 61 158-2 (e.g. PROFIBUS PA) with terminal unit connection points.
- Using the SpliTConnect Coupler, a PROFIBUS PA distributor can be constructed by cascading SpliTConnect Taps.
- By replacing the contact screw with the SpliTConnect Terminator, the SpliTConnect Tap can be used as a bus termination element.

① Strip end of cable with FastConnect

② Fit heavy gauge threaded joint, seal, screen contact and strand holder to end of cable.

③ Insert prepared end of cable into SpliTConnect Tap and fix by tightening the heavy gauge threaded joint.

④ Insert insulation displacement contacts in the SpliTConnect Tap

⑤ By screwing in the insulation displacement contacts, the cable ends make contact

G_IK10_XX_50011

Design

- Rugged plastic casing made of PBT in IP67 design
- Resistant to ultraviolet rays, thus suitable for outdoor use
- Full shielding through integrated metal housing
- Easy cable connection through use of FC Process Cable
- Contacting and connection of the FC Process Cable through insulation displacement contacts using contacting screw
- The SpliTConnect taps can be grounded through a contacting screw
- For DIN rail mounting or wall mounting

Function

- The SpliTConnect tap enables configuration of fieldbus segments according to IEC 61158-2 (e.g. PROFIBUS PA) and connection of terminals
- Easy pre-assembly of the SpliTConnect taps through the FastConnect connection system (FastConnect stripping tool, FC Process Cable)
- Connection of the terminals directly through FC Process Cable or SpliTConnect M12 outlet

Technical specifications

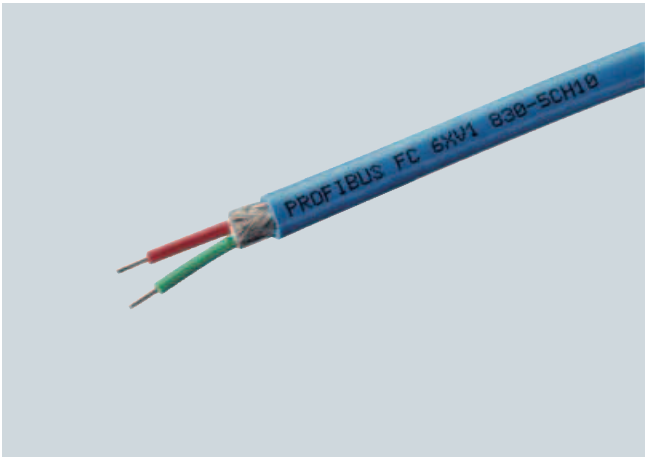
Order No.	**6GK1 905-0AA00**
Product type description	**SpliTConnect**
Electrical connection version	Insulation displacement
Transfer rate	31.25 kbit/s
Ambient temperature	
• during operation	-40 … +85 °C
• during storage	-40 … +85 °C
• during transport	-40 … +85 °C
Width	84 mm
Height	54 mm
Depth	49 mm
Type of thread of the cable bushing	M22
Net weight	170 g
Enclosure material	PBT (polybutyleneterephthalate)
Degree of protection	IP67
Certificate of suitability UL approval	Yes
Explosion protection code according to Directive 94/9/EC	II 1G EEx ia IIC T6
Radiological resistance to UV radiation	Yes

Ordering data

	Order No.
SpliTConnect Tap For assembling PROFIBUS PA segments and connecting PA field devices, insulation displacement method, IP67 Type of delivery: 1 package = 10 items	**6GK1 905-0AA00**
SpliTConnect M12 outlet Element for direct connection of PROFIBUS PA field devices to the SpliTConnect tap through M12 connection Type of delivery: 1 package = 5 items	**6GK1 905-0AB10**
SpliTConnect coupler Coupling element for connecting SpliTConnect taps in series to configure star points Type of delivery: 1 package = 10 items	**6GK1 905-0AC00**
SpliTConnect terminator (Ex version) For terminating PROFIBUS PA segments, can be used in hazardous areas Type of delivery: 1 package = 5 items	**6GK1 905-0AD00**
SpliTConnect terminator (non-Ex version) For terminating PROFIBUS PA segments, cannot be used in hazardous area Type of delivery: 1 package = 5 items	**6GK1 905-0AE00**
SpliTConnect M12 jack Connector element for direct connection of PROFIBUS PA field devices to the PROFIBUS PA segment through M12 connection Type of delivery: 1 package = 5 items	**6GK1 905-0AF00**

Bus cables

Overview



- Bus cable for fieldbus systems according to IEC 61158-2, e.g. PROFIBUS PA
- High interference immunity thanks to double shielding
- Different variants for different applications (hazardous areas, non-hazardous areas)
- Easy length measurement thanks to printed meter markings

Benefits

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- Length can easily be determined due to meter length markings printed on the cable
- Complete range of cables for hazardous and non-hazardous areas
- Reduction of types and parts thanks to a uniform connection system for PROFIBUS PA

Application

Color coded wires are available for assembling fieldbus networks according to IEC 61 158-2 (e.g. PROFIBUS PA) for different areas of applications (hazardous, non-hazardous areas).

UL approvals

Different cable variants with the appropriate UL approvals for installation in cable bundles and cable racks, according to the NEC guidelines (National Electrical Code) Article 800/725.

Design

- Shielded, twisted-pair cable with circular cross-section
- System-wide grounding concept can be implemented using the external shield of the bus cable and the grounding terminals of the SpliTConnect system.
- Printed meter marks.

Cable types

- FC Process Cable:
  Special bus cable compliant with IEC 61158-2 for use in hazardous (Ex) and non-hazardous (non-Ex) areas.
- Bus segments with RS485 and IEC 61158-2 transmission procedures are linked by means of the segment coupler/link.

Technical specifications

Order No.	**6XV1 830-5FH10**[1] **6XV1 830-5EH10**[2]
Product type description	**FC Process Cable GP**
Cable name	02 Y SY (ST) CY 1 x 2 x 1.0/2.55-100 SW OE FR[1]; 02 Y SY (ST) CY 1 x 2 x 1.0/2.55-100 BL OE FR[2]
Electrical data	
Attenuation measurement per length	
• at 16 MHz max.	-
• at 4 MHz max.	-
• at 38.4 kHz max.	3 dB/km
• at 9.6 kHz max.	-
Inductance per length	650 µH/m
Characteristic impedance at 31.25 kHz	100 Ω
• Symmetrical tolerance of the characteristic impedance at 31.25 kHz	± 20 Ω
• Nominal characteristic impedance	100 Ω
Loop resistance per length, max.	44 Ohm/km
Screen resistance per length, max.	-
Capacitance per length at 1 kHz	90 nF/km
Operating voltage (rms value)	100 V
Mechanical data	
Jacket	
• Material of the cable sheath	PVC
• Outer diameter of the cable sheath	8 mm
• Symmetrical tolerance of the outer diameter of the cable sheath	0.4 mm
• Color of the cable sheath	black[1]; blue[2]
Ambient temperature	
• during operation	-40 … +80 °C
• during transport	-40 … +80 °C
• during storage	-40 … +80 °C
• during installation	-20 … +80 °C
Bending radius	
• for one-off bending, minimum permissible	40 mm
• for repeated bending, minimum permissible	80 mm
Tensile load, max.	150 N
Weight per length	103 kg/km
Fire behavior	IEC 60332-3-24 Category C
Chemical resistance	
• to mineral oil	Conditionally resistant
• to grease	Conditionally resistant
Radiological resistance to UV radiation	Yes
Product property	
• halogen-free	No
• Silicone-free	Yes
FastConnect electrical connection version	-
UL listing at 300 V rating	Yes/CMG/CL3/Sun Res
UL style at 600 V rating	Yes

[1] Not suitable for Ex applications
[2] Suitable for Ex applications

Ordering data	Order No.
PROFIBUS FC Process Cable	
2-core, shielded	
• Blue for Ex applications	**6XV1 830-5EH10**
• Black for non-Ex applications	**6XV1 830-5FH10**
Sold by the meter: Max. quantity 1,000 m; minimum order 20 m	
PROFIBUS FastConnect Stripping Tool	**6GK1 905-6AA00**
Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	
PROFIBUS FastConnect Blade Cassettes	**6GK1 905-6AB00**
Spare blade cassettes for PROFIBUS FastConnect stripping tool, 5 units	
Manual for PROFIBUS networks	
Paper version	
Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection	**6GK1 975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

More information

Mounting instructions

FastConnect

The FastConnect stripping tool can be used to strip the sheath and shield of the FC Process Cable for PROFIBUS PA to the correct length.

Use of the FastConnect stripping tool and SpliTConnect tap makes, for example, connecting field devices to the PROFIBUS PA bus system easy.

Cable routing

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

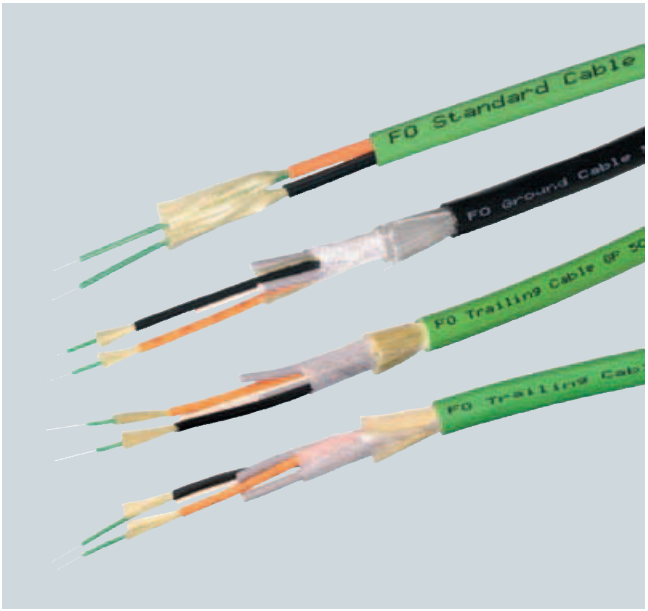
Comply with the permissible bending radii and tensile load!

Note:
Additional components of the SIMATIC NET wiring range can be ordered from your local contact person.
For technical advice contact:

J. Hertlein, A&D SE V22
Tel.: +49(0)911/750 44 65
Fax: +49(0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Glass fiber optic cables

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 electromagnetic fields
- Available preassembled
- Extensive approvals (UL)

Benefits

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- Easy to lay with
  - preassembled cables
  - no grounding problems
  - very light fiber optic cable.
- Tap-proof,
  no radiation from the cable
- Silicon-free,
  therefore suitable for use in the automotive industry (e.g. in paintshops)
- Avoidance of overvoltage and equipotential bonding problems

Application

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 4 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 4 BFOC 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 4 BFOC connectors.

Fiber-optic outdoor cable

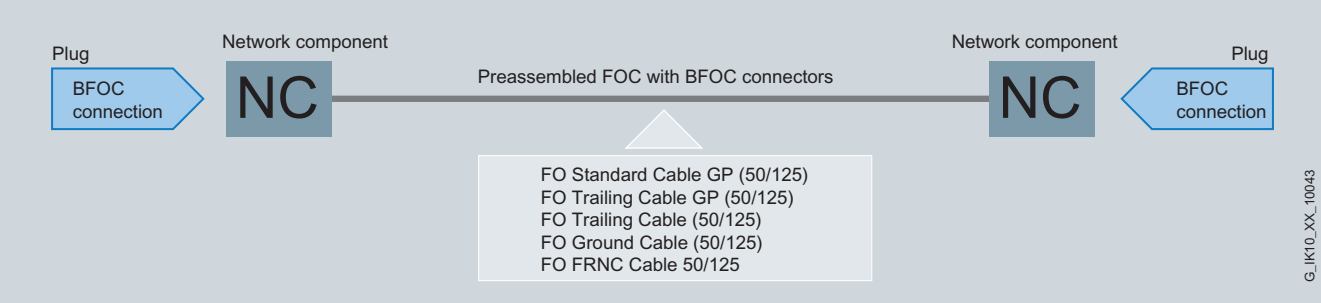
Waterproof cable (lengthwise and sideways) for use outdoors with non-metallic protection against rodents for laying into the ground.

Sold by the meter and in fixed lengths, pre-assembled with 4 BFOC connectors.

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

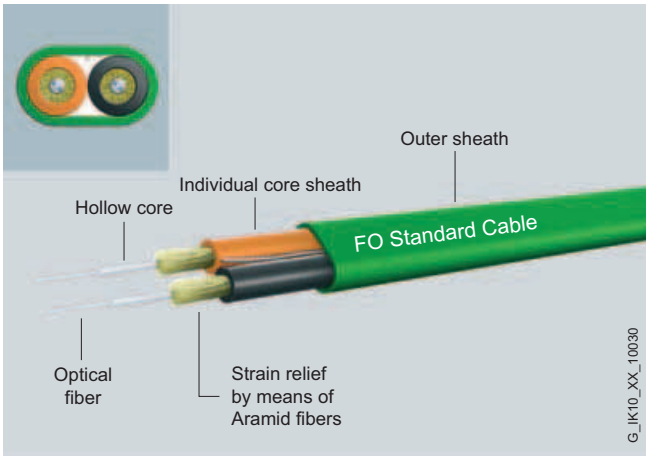
Application (continued)

Application Examples



Use of pre-assembled fiber-optic cables with BFOC connectors (12 Mbit/s)

Design



Cable types	50/125 µm	62.5/125 µm
FO Standard Cable GP	●	–
FO FRNC Cable	●	–
FO Trailing Cable	●	–
FO Trailing Cable GP	●	–
FO Ground Cable	●	–
FIBER OPTIC standard cable	–	●
INDOOR Fiber Optic indoor cable	–	●
Flexible Fiber Optic trailing cable	–	●

In the respective applications, the maximum cable lengths must be taken into account.

Passive connection of different fiber types is not permissible.

Glass fiber-optic cables

Technical specifications

Order No.	6XV1 873-2A	6XV1 873-2B	6XV1 873-2G
Product type description	**FO Standard Cable GP**	**FO FRNC Cable**	**FO Ground Cable**
Suitability for use	Universal cable for installation indoors and outdoors	Halogen-free cable for installation indoors and outdoors	Waterproof cable (lengthwise and sideways) for use outdoors with non-metallic protection against rodents for laying into the ground.
Type of assembled fiber-optic cable	Sold by the meter; pre-assembled with 4 BFOC or SC connectors	Sold by the meter	Sold by the meter; pre-assembled with 4 BFOC or SC connectors
Designation of fiber-optic cable	AT-W(ZN)YY 2x1G50/125	AT-W(ZN)HH 2G50/125 UV	AT-WQ(ZN)Y(ZN)B2Y 2G50/125
Electrical data			
Attenuation measurement per length			
• at 850 nm	2,7 dB/km	2.7 dB/km	2.7 dB/km
• at 1300 nm	0.7 dB/km	0.7 dB/km	0.7 dB/km
Bandwidth length product			
• at 850 nm	600 Mhz*km	600 Mhz*km	600 Mhz*km
• at 1300 nm	1200 Mhz*km	1200 Mhz*km	1200 Mhz*km
Mechanical data			
Number of fibers per fiber-optic cable	2	2	2
Design of optical fibers	Multi-mode gradient fiber 50/125 µm	Multi-mode gradient fiber 50/125 µm	Multi-mode gradient fiber 50/125 µm
Design of optical fiber core	Hollow core, filled, diameter 1400 µm	Hollow core, filled, diameter 1400 µm	Hollow core, filled, diameter 1400 µm
Type of fiber-optic cable	Segmentable	Segmentable	Segmentable
Material			
• of the FOC core sheath	PVC	FRNC	PVC
• of the fiber-optic cable sheath	PVC	FRNC	PE
• of the strain relief	Aramid fibers	Aramid fibers	Aramid fibers
Color			
• of the FOC core sheath	orange/black	orange/black	orange/black
• of the fiber-optic cable sheath	green	green	black
Outer diameter			
• of the FOC core sheath	2,9 mm	2,9 mm	2,9 mm
• of the cable	-	9.2 mm	10.5 mm
Thickness of the cable	4.5 mm	-	-
Width of the cable	7.4 mm	-	-
Weight per length	40 kg/km	85 kg/km	90 kg/km
Tensile load, max.	500 N	1200 N	800 N
Lateral force per length	300 N/cm	500 N/cm	300 N/cm
Bending radius			
• for one-off bending	65 mm	90 mm	105 mm
• for repeated bending	-	135 mm	155 mm
Impact strength test			
• Impact energy	-	-	-
• Number of impacts	-	-	-
• Hammer wheel diameter	-	-	-
Ambient temperature			
• during installation	-5 … +50 °C	-5 … +50 °C	-5 … +50 °C
• during operation	-25 … +80 °C	-40 … +70 °C	-40 … +75 °C
• during storage	-25 … +80 °C	-40 … +70 °C	-40 … +75 °C
• during transport	-25 … +80 °C	-40 ... +70 °C	-40 … +75 °C

Technical specifications (continued)

Order No.	6XV1 873-2A	6XV1 873-2B	6XV1 873-2G
Product type description	**FO Standard Cable GP**	**FO FRNC Cable**	**FO Ground Cable**
Transmission link			
• for 1000BaseLX	2000 m	2000 m	2000 m
• for 1000BaseSX	750 m	750 m	750 m
Fire behavior	Flame retardant acc. to IEC 60332-1	Flame retardant to IEC 60332-1 and IEC 60332-3 Category A/F	-
Chemical resistance			
• to mineral oil	conditional resistance	conditional resistance	resistant
• to grease	conditional resistance	conditional resistance	resistant
Radiological resistance to UV radiation	Yes	Yes	Yes
Product property			
• halogen-free	-	Yes	-
• impact-resistant	-	-	-
• Silicone-free	Yes	Yes	Yes
Certificate of suitability			
• UL Approval	Yes/OFN (NEC Article 770, UL 1651)	Yes/OFN (NEC Article 770, UL 1651)	-
• CSA approval	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)	Yes/ OFN, (CSA-Standard C22.2 No232)	-
Product component, rodent protection	-	-	Yes

Order No.	6XV1 873-2C	6XV1 873-2D
Product type description	**FO Trailing Cable**	**FO Trailing Cable GP**
Suitability for use	Cable for use in cable carriers for high mechanical loading, PUR outer sheath, no UL approval	Cable for use in cable carriers for low mechanical loading, PVC outer sheath, UL approval
Type of assembled fiber-optic cable	Sold by the meter; pre-assembled with 4 BFOC or SC connectors	Sold by the meter; pre-assembled with 4 BFOC or SC connectors
Designation of fiber-optic cable	AT-W(ZN)Y(ZN)11Y 2G50/125	AT-W(ZN)Y(ZN)Y 2G50/125
Electrical data		
Attenuation measurement per length		
• at 850 nm	2,7 dB/km	2,7 dB/km
• at 1300 nm	0,7 dB/km	0,7 dB/km
Bandwidth length product		
• at 850 nm	600 Mhz*km	600 Mhz*km
• at 1300 nm	1200 Mhz*km	1200 Mhz*km
Mechanical data		
Number of fibers per fiber-optic cable	2	2
Design of optical fibers	Multi-mode gradient fiber 50/125 µm	Multi-mode gradient fiber 50/125 µm
Design of optical fiber core	Hollow core, filled, diameter 1400 µm	Hollow core, filled, diameter 14 µm
Type of fiber-optic cable	Segmentable	Segmentable
Material		
• of the FOC core sheath	PVC	PVC
• of the fiber-optic cable sheath	PUR	PVC
• of the strain relief	Aramid fibers	Aramid fibers
Color		
• of the FOC core sheath	orange/black	orange/black
• of the fiber-optic cable sheath	green	green

Technical specifications (continued)

Order No.	6XV1 873-2C	6XV1 873-2D
Product type description	**FO Trailing Cable**	**FO Trailing Cable GP**
Outer diameter		
• of the FOC core sheath	2,9 mm	2,9 mm
• of the cable	10,5 mm	10,5 mm
Weight per length	90 kg/km	90 kg/km
Tensile load, max.	800 N	800 N
Lateral force per length	400 N/cm	400 N/cm
Bending radius		
• for one-off bending	200 mm	200 mm
• for repeated bending	200 mm	200 mm
Number of bending cycles	5000000	3500000
Impact strength test		
• Impact energy	-	-
• Number of impacts	-	-
• Hammer wheel diameter	-	-
Ambient temperature		
• during installation	-5 … +50 °C	-5 … +50 °C
• during operation	-40 … +80 °C	-25 … +80 °C
• during storage	-40 … +80 °C	-25 … +80 °C
• during transport	-40 … +80 °C	-25 … +80 °C
Transmission link		
• for 1000BaseLX	2000 m	2000 m
• for 1000BaseSX	750 m	750 m
Fire behavior	-	Flame retardant acc. to IEC 60332-1
Chemical resistance		
• to mineral oil	resistant	conditional resistance
• to grease	resistant	conditional resistance
Radiological resistance to UV radiation	Yes	Yes
Product property		
• Silicone-free	Yes	Yes
Certificate of suitability		
• UL Approval	-	Yes/OFN(NEC Article 770, UL 1651)
• CSA approval	-	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)
Product component, rodent protection	-	-

Order No.	6XV1 820-7AH10	6XV1 820-5AH10
Product type description	**INDOOR Fiber Optic indoor cable**	**FIBER OPTIC standard cable**
Suitability for use	Non-crush, halogen-free and fire-retardant cable for indoor installation	Universal cable for installation indoors and outdoors
Type of assembled fiber-optic cable	Sold by the meter, pre-assembled with 4 BFOC connectors	Sold by the meter, pre-assembled with 4 BFOC connectors
Designation of fiber optic cable	T-VHH 2G62.5/125 3.2B200 + 0.9F600 F TB3 OR FRNC	AT-VYY 2G62.5/125 3.1B200 + 0.8F600 F
Electrical data		
Attenuation measurement per length		
• at 850 nm	3,1 dB/km	3,1 dB/km
• at 1300 nm	0,8 dB/km	0,8 dB/km
Bandwidth length product		
• at 850 nm	200 Mhz*km	200 Mhz*km
• at 1300 nm	600 Mhz*km	600 Mhz*km

Technical specifications (continued)

Order No.	6XV1 820-7AH10	6XV1 820-5AH10
Product type description	**INDOOR Fiber Optic indoor cable**	**FIBER OPTIC standard cable**
Mechanical data		
Number of fibers per fiber-optic cable	2	2
Number of fibers per fiber-optic cable	-	-
Number of fibers per fiber optic cable	-	-
Number of conductors in fiber-optic cable	-	-
Design of optical fibers	Multi-mode gradient fiber 62.5/125 mm	Multi-mode gradient fiber 62.5/125 mm
Design of optical fiber core	Fixed core	Compact core
Type of fiber-optic cable	Segmentable inner conductor	Segmentable outer conductor
Material		
• of the FOC core sheath	Copolymer (FRNC)	PVC
• of the fiber-optic cable sheath	Copolymer (FRNC)	PVC
• of the strain relief	Aramid fibers	Kevlar fiber and impregnated glass fiber
Color		
• of the FOC core sheath	gray	gray
• of the fiber-optic cable sheath	light orange	black
Outer diameter	2.9 mm	3.5 mm
• Lower dimension	2.8 mm	3.3 mm
• Upper dimension	3 mm	3.7 mm
Width of the cable	6.8 mm	9.8 mm
Thickness of the cable	3.9 mm	6.3 mm
Weight per length	30 kg/km	74 kg/km
Maximum permissible short-time tensile load	800 N	-
Maximum permissible continuous tensile load	-	-
Momentary lateral force per length	1000 N/cm	2000 N/cm
Continuous lateral force per length	200 N/cm	-
Bending radius when bending over the flat side		
• with cable laid	50 mm	145 mm
• during installation	60 mm	125 mm
Impact strength test		
• Impact energy	1.5 J	-
• Number of impacts	20	-
• Hammer wheel diameter	12,5 mm	-
Ambient temperature		
• during installation	-5 … +50 °C	-5 … +50 °C
• during operation	-20 … +60 °C	-20 … +60 °C
• during storage	-25 … +70 °C	-25 … +70 °C
• during transport	-25 … +70 °C	-25 … +70 °C
Fire behavior	Flame retardant to IEC 60332-3	Flame retardant to IEC 60332-3 (Cat. C)
Chemical resistance		
• to mineral oil	-	-
• to grease	-	-
Radiological resistance to UV radiation	-	Yes
Product property		
• halogen-free	Yes	-
• impact-resistant	Yes	-
• Silicone-free	Yes	Yes

Technical specifications (continued)

Order No.	6XV1 820-6AH10
Product type description	**Flexible Fiber Optic trailing cable**
Suitability for use	Flexible cable for routing in cable carriers indoors and outdoors
Type of assembled fiber-optic cable	Sold by the meter, pre-assembled with 4 BFOC connectors
Designation of fiber optic cable	AT-W11Y (ZN) 11Y 2G62.5/125 3.1B200 + 0.8F600 F
Electrical data	
Attenuation measurement per length	
• at 850 nm	3,1 dB/km
• at 1300 nm	0,8 dB/km
Bandwidth length product	
• at 850 nm	200 Mhz*km
• at 1300 nm	600 Mhz*km
Mechanical data	
Number of fibers per fiber-optic cable	2
Number of fibers per fiber-optic cable	1
Number of fibers per fiber optic cable	2
Number of conductors in fiber-optic cable	2
Design of optical fibers	Multi-mode gradient fiber 62.5/125 mm
Design of optical fiber core	Hollow core, filled
Type of fiber-optic cable	Segmentable outer conductor
Material	
• of the FOC core sheath	PUR
• of the fiber-optic cable sheath	PUR
• of the strain relief	Aramid fibers, also GFK central element
Color	
• of the FOC core sheath	black
• of the fiber-optic cable sheath	black

Order No.	6XV1 820-6AH10
Product type description	**Flexible Fiber Optic trailing cable**
Outer diameter of the FOC core sheath	3,5 mm
• Lower dimension	3,3 mm
• Upper dimension	3,7 mm
Outer diameter of the cable	12,9 mm
• Lower dimension	-
• Upper dimension	-
Weight per length	136 kg/km
Maximum permissible short-time tensile load	2 000 N
Maximum permissible continuous tensile load	1 000 N
Momentary lateral force per length	-
Continuous lateral force per length	-
Bending radius (one-off), minimum permissible	150 mm
Bending radius for repeated bending, minimum permissible	150 mm
Bending radius for continuous bending	-
Number of bending cycles	100 000
Ambient temperature	
• during installation	-30 … +60 °C
• during operation	-30 … +60 °C
• during storage	-30 … +70 °C
• during transport	-30 … +70 °C
Transmission link for 1000BaseLX	-
Transmission link for 1000BaseSX	-
Fire behavior	-
Radiological resistance to UV radiation	Yes
Product property	
• halogen-free	Yes
• impact-resistant	No
• Silicone-free	Yes
Marine classification association	-

Ordering data	Order No.
FO Standard Cable GP 50/125 [2]	
Sold by the meter; max. length 1000 m; minimum order 20 m;	**6XV1 873-2A**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 0.5 m	**6XV1 873-3AH05**
• 1 m	**6XV1 873-3AH10**
• 2 m	**6XV1 873-3AH20**
• 3 m	**6XV1 873-3AH30**
• 5 m	**6XV1 873-3AH50**
• 10 m	**6XV1 873-3AN10**
• 15 m	**6XV1 873-3AN15**
• 20 m	**6XV1 873-3AN20**
• 30 m	**6XV1 873-3AN30**
• 40 m	**6XV1 873-3AN40**
• 50 m	**6XV1 873-3AN50**
• 80 m	**6XV1 873-3AN80**
• 100 m	**6XV1 873-3AT10**
• 150 m	**6XV1 873-3AT15**
• 200 m	**6XV1 873-3AT20**
• 300 m	**6XV1 873-3AT30**
FO FRNC Cable 50/125 [2]	
Sold by the meter; max. length 1000 m; minimum order 20 m;	**6XV1 873-2B**
FO Trailing Cable 50/125 [2]	
Sold by the meter; max. length 1000 m; minimum order 20 m;	**6XV1 873-2C**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 3 m	**6XV1 873-3CH30**
• 5 m	**6XV1 873-3CH50**
• 10 m	**6XV1 873-3CN10**
• 20 m	**6XV1 873-3CN20**
• 50 m	**6XV1 873-3CN50**
• 100 m	**6XV1 873-3CT10**
FO Trailing Cable GP50/125 [2]	
Sold by the meter; max. length 1000 m; minimum order 20 m;	**6XV1 873-2D**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 3 m	**6XV1 873-3DH30**
• 5 m	**6XV1 873-3DH50**
• 10 m	**6XV1 873-3DN10**
• 20 m	**6XV1 873-3DN20**
• 50 m	**6XV1 873-3DN50**
• 100 m	**6XV1 873-3DT10**

	Order No.
FO Ground Cable 50/125 [2]	
Sold by the meter; max. length 2000 m; minimum order 20 m;	**6XV1 873-2G**
Preferred lengths [1] pre-assembled with 4 BFOC connectors	
• 100 m	**6XV1 873-3GT10**
• 200 m	**6XV1 873-3G T20**
• 300 m	**6XV1 873-3G T30**
Standard FIBER OPTIC CABLE (62.5/125), segmentable [2]	
Sold by the meter; max. length 2000 m; minimum order 20 m	**6XV1 820-5AH10**
Preferred lengths [1] pre-assembled with 4 BFOC plugs	
• 1 m	**6XV1 820-5BH10**
• 2 m	**6XV1 820-5BH20**
• 3 m	**6XV1 820-5BH30**
• 4 m	**6XV1 820-5BH40**
• 5 m	**6XV1 820-5BH50**
• 10 m	**6XV1 820-5BN10**
• 15 m	**6XV1 820-5BN15**
• 20 m	**6XV1 820-5BN20**
• 30 m	**6XV1 820-5BN30**
• 40 m	**6XV1 820-5BN40**
• 50 m	**6XV1 820-5BN50**
• 55 m	**6XV1 820-5BN55**
• 60 m	**6XV1 820-5BN60**
• 65 m	**6XV1 820-5BN65**
• 70 m	**6XV1 820-5BN70**
• 75 m	**6XV1 820-5BN75**
• 80 m	**6XV1 820-5BN80**
• 100 m	**6XV1 820-5BT10**
• 120 m	**6XV1 820-5BT12**
• 130 m	**6XV1 820-5BT13**
• 150 m	**6XV1 820-5BT15**
• 200 m	**6XV1 820-5BT20**
• 250 m	**6XV1 820-5BT25**
• 300 m	**6XV1 820-5BT30**

[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

Glass fiber-optic cables

Ordering data	Order No.
INDOOR FIBER OPTIC CABLE (62.5/125), segmentable [2]	
Sold by the meter; max. length 2000 m; minimum order 20 m	**6XV1 820-7AH10**
Preferred lengths; pre-assembled with 4 BFOC connectors	
• 0.5 m	**6XV1 820-7BH05**
• 1 m	**6XV1 820-7BH10**
• 2 m	**6XV1 820-7BH20**
• 3 m	**6XV1 820-7BH30**
• 5 m	**6XV1 820-7BH50**
• 10 m	**6XV1 820-7BN10**
• 15 m	**6XV1 820-7BN15**
• 20 m	**6XV1 820-7BN20**
• 25 m	**6XV1 820-7BN25**
• 50 m	**6XV1 820-7BN50**
• 75 m	**6XV1 820-7BN75**
• 100 m	**6XV1 820-7BT10**
FLEXIBLE FIBER OPTIC CABLE trailing cable (62.5/125), segmentable [2]	
Sold by the meter; max. length 2000 m; minimum order 20 m	**6XV1 820-6AH10**
Preferred lengths; pre-assembled with 4 BFOC connectors	
• 1 m	**6XV1 820-6BH10**
• 2 m	**6XV1 820-6BH20**
• 3 m	**6XV1 820-6BH30**
• 5 m	**6XV1 820-6BH50**
• 10 m	**6XV1 820-6BN10**
• 15 m	**6XV1 820-6BN15**
• 20 m	**6XV1 820-6BN20**
• 30 m	**6XV1 820-6BN30**
• 50 m	**6XV1 820-6BN50**
• 75 m	**6XV1 820-6BN75**
• 100 m	**6XV1 820-6BT10**

	Order No.
Accessories	
BFOC connector set for FIBER OPTIC CABLE, standard, ground, trailing cable, indoor cable as well as SIENOPYR marine duplex fiber-optic cable, 20 units	**6GK1 901-0DA20-0AA0**
Manual for TP and fiber-optic networks [3] Paper version; Network architecture, components, configurations, installation guidelines	
• German	**6GK1 970-1BA10-0AA0**
• English	**6GK1 970-1BA10-0AA1**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

[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

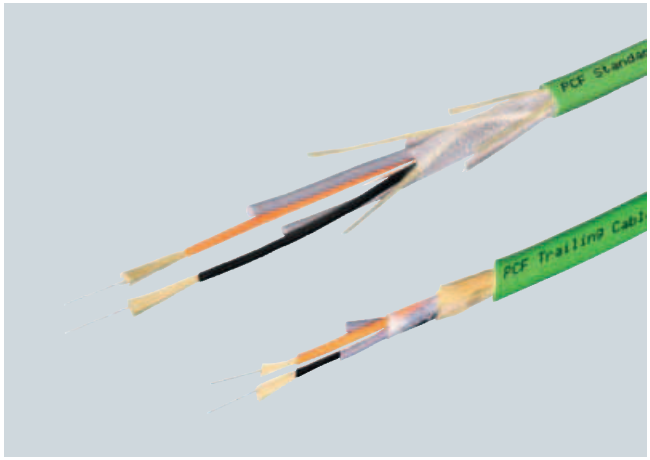
[3] Further language variants and manuals can be found for the respective products at: http://www.siemens.de/automation/csi/net

More information

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

Technical advice on this subject is available from:
J. Hertlein, A&D SE PS
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview



- Electrical isolation of PROFIBUS devices and PROFIBUS segments
- Protection of the transmission path against electromagnetic interference
- Up to 80 m cable length with plastic fiber-optic cables and up to 400 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
- Time savings when commissioning thanks to pre-assembled cables
- Protection of the transmission route against electromagnetic interference
- Tap-proof, as the cable does not emit radiation
- Avoidance of overvoltage and equipotential bonding problems

Application

SIMATIC NET plastic and PCF fiber-optic cables are used in combination with OLM/P11 and OLM/P12 for constructing optical PROFIBUS networks or for the optical connection of segments in RS 485 technology in indoor applications.

Plastic fiber-optic cables and segmented PCF fiber-optic cables can be assembled on site with 2 x 2 BFOC connectors. The maximum cable length between two OLM/P11 or OLM/P12 is 80 m.

Longer cable lengths up to 400 m can be achieved using PCF fiber-optic cables. These cables are also available preassembled with 4 BFOC connectors.

Design

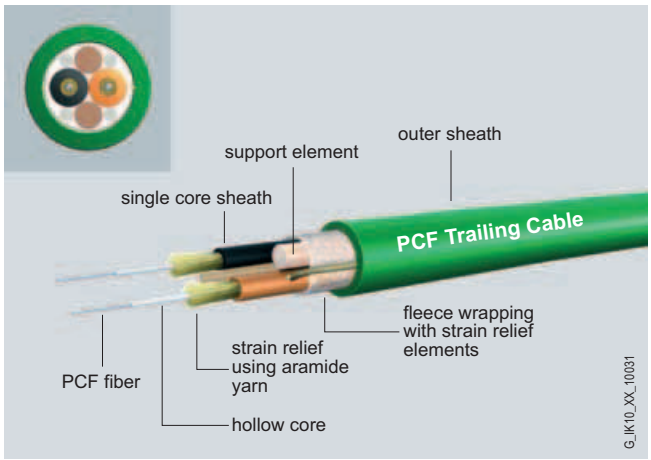
Different types of plastic and PCF fiber-optic cables are offered:

Plastic fiber-optic cables

- **Plastic FOC, standard cable**;
  rugged round cable with violet PVC outer sheath and Kevlar tension components as well as two plastic fibers with a rugged polyamide inner sheath. For indoor applications; cable lengths up to 80 m.
- **Plastic FOC, duplex core**;
  two flat cores with PVC inner sheath and without outer sheath for indoor applications with low mechanical stress such as laboratory setups or inside cabinets; cable length to 50 m.

PCF fiber optic cables

- **PCF fiber-optic cable, standard cables**:
  Rugged round cables with violet/green PVC outer sheath and Kevlar strain relief elements for applications indoor/outdoors; cable lengths up to 400 m;
  the following cable versions are available:
  - PCF fiber optic standard cable;
    with violet PVC outer sheath for indoor applications.
    The cable is not suitable for assembly in the field;
    (only available pre-assembled with an insertion tool)
  - PCF Standard Cable GP (general purpose);
    with green PVC outer sheath for indoor and outdoor applications.
    The cable is suitable for assembly in the field.
- **PCF fiber optic trailing cable;**
  rugged round cable with green outer sheath and Kevlar tension elements for trailing cable applications; cable lengths of up to 400 m.
  The cables are 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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Plastic and PCF fiber-optic cables

Technical specifications

Order No.	6XV1 821-2AN50	6XV1 821-0AH10	6XV1 821-1BN75
Product type description	**PROFIBUS Plastic Fiber Optic Duplex Core**	**PROFIBUS Plastic Fiber Optic standard cable**	**PROFIBUS PCF Fiber Optic Standard Cable**
Suitability for use	Indoor applications with low mechanical loads such as laboratory set-ups or inside cabinets and with cable lengths up to 50 m	Preassembled cable for indoor applications with cable lengths of up to 300 m, not suitable for plug-in assembly in the field.	Preassembled cable for indoor applications with cable lengths of up to 300 m, not suitable for plug-in assembly in the field.
Type of assembled fiber-optic cable	Sold by the meter; for assembly on site with 2 × 2 simplex connectors	Sold by the meter; for assembly on site with 2 x 2 simplex connectors	only preassembled with 2 × 2 BFOC connectors
Designation of fiber optic cable	I-VY2P 980/1000 150A	I-VY4Y2P 980/1000 160A	I-VY2K 200/230 10A17+8B20
Electrical data			
Attenuation per length for 660 nm maximum	230 dB/km	230 dB/km	10 dB/km
Bandwidth length product at 650 nm	-	-	-
Mechanical data			
Number of fibers per fiber-optic cable	2	2	2
Number of fibers per fiber-optic cable	-	-	-
Number of fibers per fiber optic cable	-	-	2
Design of optical fibers	Step-index fiber	Step-index fiber	Step-index fiber
Material			
• of the fiber-optic cable core	Polymethyl methacrylate (PMMA)	Polymethyl methacrylate (PMMA)	Fused silica
• of optical fibers	-	-	-
• of the optical fiber sheath	Fluoridated special polymer	Fluoridated special polymer	Fluoridated special polymer
• of the fiber-optic cable sheath	PVC	PVC	PVC
• of the strain relief	-	Kevlar fibers	Kevlar fibers
• of the FOC core sheath	-	PA	-
Color			
• of optical fibers	-	-	-
• of the fiber-optic cable sheath	-	Purple	Purple
• of the FOC core sheath	gray	black or orange	-
Outer diameter			
• of the fiber-optic cable core	980 µm	980 µm	200 µm
• of the optical fiber sheath	1 000 µm	1 000 µm	230 µm
• of the FOC core sheath	2,2 mm	2,2 mm	-
- Upper dimension	2.21 mm	2.21 mm	-
- Lower dimension	2.19 mm	2.19 mm	-
• of the cable	-	7.8 mm	4.7 mm
- Upper dimension	-	8.1 mm	5 mm
- Lower dimension	-	7.5 mm	4.4 mm
Thickness of the cable	2.2 mm	-	-
Width of the cable	4.4 mm	-	-
Weight per length	7.8 kg/km	65 kg/km	22 kg/km

Technical specifications (continued)

Order No.	6XV1 821-2AN50	6XV1 821-0AH10	6XV1 821-1BN75
Product type description	**PROFIBUS Plastic Fiber Optic Duplex Core**	**PROFIBUS Plastic Fiber Optic standard cable**	**PROFIBUS PCF Fiber Optic Standard Cable**
Tensile load, max.	-	-	-
Maximum permissible continuous tensile load	-	-	100 N
Maximum permissible short-time tensile load	50 N	100 N	500 N
Maximum permissible continuous tensile load on connector	-	-	50 N
Maximum permissible continuous tensile load at the strain relief	-	-	100 N
Maximum permissible continuous tensile load at fiber-optic cable	-	-	-
Continuous lateral force per length	-	-	-
Momentary lateral force per length	3.5 N/cm	10 N/cm	75 N/cm
Bending radius			
• for repeated bending, with strain relief			
- minimum permissible bending radius when bending over the flat side	50 mm	150 mm	-
• for one-off bending, minimum permissible	30 mm	100 mm	75 mm
• when bending over the flat side for one-off bending	-	-	-
Number of bending cycles	-	-	-
Ambient temperature			
• during installation	0 … 50 °C	0 … 50 °C	-5 … +50 °C
• during operation	-30 … +70 °C	-30 … +70 °C	-20 … +70 °C
• during storage	-35 … +85 °C	-30 … +70 °C	-30 … +70 °C
• during transport	-35 … +85 °C	-30 … +70 °C	-30 … +70 °C
Fire behavior	Flame retardant in accordance with the VW-1 flame test to UL 1581	IEC 60332-1	Flame retardant in accordance with the VW-1 flame test to UL 1581
Chemical resistance			
• to ASTM oil 2	conditional resistance	conditional resistance	conditional resistance
• to mineral oil	conditional resistance	conditional resistance	conditional resistance
• to water	conditional resistance	conditional resistance	conditional resistance
Radiological resistance to UV radiation	-	conditional resistance	-
Product property			
• halogen-free	-	-	-
• Silicone-free	contains small quantities of a non-migrating silicone elastomer	Yes	Yes
Certificate of suitability			
• UL Approval	-	Yes/OFN (NEC Article 770, UL 1651)	-
• CSA approval	-	Yes/OFN (CSA C22.2 No. 232)	-

Technical specifications (continued)

Order No.	6XV1 861-2A	6XV1 861-2C	6XV1 861-2D
Product type description	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Suitability for use	For permanent indoor and outdoor installation	For moving applications	For moving applications
Type of assembled fiber-optic cable	Sold by the meter	Sold by the meter	Sold by the meter
Designation of fiber optic cable	ATI-V(ZN)YY 2K200/230	AT-V(ZN)Y(ZN)11Y 2K200/230	AT-V(ZN)Y(ZN)Y 2K200/230
Electrical data			
Attenuation per length for 660 nm maximum	10 dB/km	10 dB/km	10 dB/km
Bandwidth length product at 650 nm	17 Mhz*km	17 Mhz*km	17 Mhz*km
Mechanical data			
Number of fibers per fiber-optic cable	2	2	2
Number of fibers per fiber-optic cable	1	1	1
Number of fibers per fiber optic cable	2	2	2
Design of optical fibers	Step Index 200/230	Step Index 200/230	Step Index 200/230
Material			
• of the fiber-optic cable core	Fused silica	Fused silica	Fused silica
• of the optical fiber sheath	Special polymer	Special polymer	Special polymer
• of the fiber-optic cable sheath	PVC	PUR	PVC
• of the strain relief	Aramid fibers	Aramid fibers	Aramid fibers
• of the FOC core sheath	PVC	PVC	PVC
Color			
• of the fiber-optic cable sheath	green	green	green
• of the FOC core sheath	orange/black	orange/black	orange/black
Outer diameter			
• of the fiber-optic cable core	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
- Upper dimension	2.21 mm	2.21 mm	2.21 mm
- Lower dimension	2.19 mm	2.19 mm	2.19 mm
• of the cable	7.2 mm	8.8 mm	8.8 mm
- Upper dimension	7.7 mm	9.3 mm	9.3 mm
- Lower dimension	6.7 mm	8.3 mm	8.3 mm
Weight per length	45 kg/km	85 kg/km	85 kg/km
Tensile load, max.	100 N	800 N	800 N
Continuous lateral force per length	300 N/cm	300 N/cm	300 N/cm
Momentary lateral force per length	500 N/cm	500 N/cm	500 N/cm
Bending radius			
• for repeated bending, minimum permissible	105 mm	175 mm	175 mm
• for one-off bending, minimum permissible	70 mm	130 mm	130 mm
Number of bending cycles	-	5 000 000	3 500 000
Ambient temperature			
• during installation	-5 … +50 °C	-5 … +50 °C	-5 … +50 °C
• during operation	-25 … +75 °C	-25 … +75 °C	-25 … +75 °C
• during storage	-25 … +75 °C	-30 … +75 °C	-30 … +75 °C
• during transport	-25 … +75 °C	-30 … +75 °C	-30 … +75 °C

Technical specifications (continued)

Order No.	6XV1 861-2A	6XV1 861-2C	6XV1 861-2D
Product type description	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Fire behavior	Flame retardant to IEC 60332-1	-	Flame retardant to IEC 60332-1
Chemical resistance			
• to ASTM oil 2	conditional resistance	resistant	conditional resistance
• to mineral oil	conditional resistance	resistant	conditional resistance
• to water	-	-	-
Radiological resistance to UV radiation	Yes	Yes	Yes
Product property			
• halogen-free	-	-	-
• Silicone-free	Yes	Yes	Yes
Certificate of suitability			
• UL Approval	Yes/OFN (NEC Article 770, UL 1651)	-	Yes/OFN (NEC Article 770, UL 1651)
• CSA approval	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)	-	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)

Ordering data

	Order No.
PROFIBUS Plastic Fiber Optic, standard cable	
Rugged round cable with 2 plastic fiber-optic cores, PVC outer sheath and PA inner sheath, for indoor use	
Without connector	
• Sold by the meter	**6XV1 821-0AH10**
• 50 m ring	**6XV1 821-0AN50**
• 100 m ring	**6XV1 821-0AT10**
Preferred lengths pre-assembled with 2 x 2 BFOC plugs, lash length 20 cm each, for connecting OLM/P..	
• 1 m	**6XV1 821-0BH10**
• 2 m	**6XV1 821-0BH20**
• 5 m	**6XV1 821-0BH50**
• 10 m	**6XV1 821-0BN10**
• 15 m	**6XV1 821-0BN15**
• 20 m	**6XV1 821-0BN20**
• 25 m	**6XV1 821-0BN25**
• 30 m	**6XV1 821-0BN30**
• 50 m	**6XV1 821-0BN50**
• 65 m	**6XV1 821-0BN65**
• 80 m	**6XV1 821-0BN80**

	Order No.
PROFIBUS Plastic Fiber Optic, duplex core	
Plastic fiber-optic cable with 2 cores, PVC outer sheath, for use in environments with low mechanical stress, without connector	
• 50 m ring	**6XV1 821-2AN50**
PROFIBUS Plastic Fiber Optic, stripping tool set	**6GK1 905-6PA10**
Tools for removing the outer sheath or core sheath of PROFIBUS Plastic Fiber Optic cables	
PROFIBUS Plastic Fiber Optic, BFOC connector set	**6GK1 905-1PA00**
20 BFOC plugs for assembly of PROFIBUS Plastic Fiber Optic cables for OLM/P..	
PROFIBUS Plastic Fiber Optic, BFOC crimping tool	**6GK1 905-6PB00**
For assembly of BFOC plug on PROFIBUS Plastic Fiber Optic cables	
PROFIBUS Plastic Fiber Optic, BFOC polishing set	**6GK1 905-6PS00**
Polishing set for grinding and polishing the BFOC plug face for PROFIBUS Plastic Fiber Optic cables with OLM/P..	

Plastic and PCF fiber-optic cables

Ordering data	Order No.
PROFIBUS PCF Fiber Optic standard cable	
PCF fiber-optic cable with 2 cores, PVC outer sheath, for bridging large distances up to 400 m,	
Preferred lengths pre-assembled with 2 x 2 BFOC plugs, lash length 20 cm each, with insertion tool mounted on one end for connecting OLM/P..	
• 75 m	**6XV1 821-1BN75**
• 100 m	**6XV1 821-1BT10**
• 150 m	**6XV1 821-1BT15**
• 200 m	**6XV1 821-1BT20**
• 250 m	**6XV1 821-1BT25**
• 300 m	**6XV1 821-1BT30**
• 400 m	**6XV1 821-1BT40**
PROFIBUS PCF Standard Cable GP 200/230	
Standard cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2A**
Preferred lengths pre-assembled with 4 BFOC connectors	
• 75 m	**6XV1 861-3AN75**
• 100 m	**6XV1 861-3AT10**
• 150 m	**6XV1 861-3AT15**
• 200 m	**6XV1 861-3AT20**
• 250 m	**6XV1 861-3AT25**
• 300 m	**6XV1 861-3AT30**
• 400 m	**6XV1 861-3AT40**

	Order No.
PROFIBUS PCF Trailing Cable 200/230	
Trailing cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2C**
Preferred lengths pre-assembled with 4 BFOC connectors	
• 75 m	**6XV1 861-3CN75**
• 100 m	**6XV1 861-3CT10**
• 150 m	**6XV1 861-3CT15**
• 200 m	**6XV1 861-3CT20**
• 250 m	**6XV1 861-3CT25**
• 300 m	**6XV1 861-3CT30**
• 400 m	**6XV1 861-3CT40**
PROFIBUS PCF Trailing Cable GP 200/230	
Trailing cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2D**
Preferred lengths pre-assembled with 4 BFOC connectors	
• 75 m	**6XV1 861-3DN75**
• 100 m	**6XV1 861-3DT10**
• 150 m	**6XV1 861-3DT15**
• 200 m	**6XV1 861-3DT20**
• 250 m	**6XV1 861-3DT25**
• 300 m	**6XV1 861-3DT30**
• 400 m	**6XV1 861-3DT40**
Manual for PROFIBUS networks	
Paper version Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection	**6GK1 975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

More information

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

Technical advice on this subject is available from:
J. Hertlein, A&D SE PS
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview

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

Benefits

get Designed for Industry

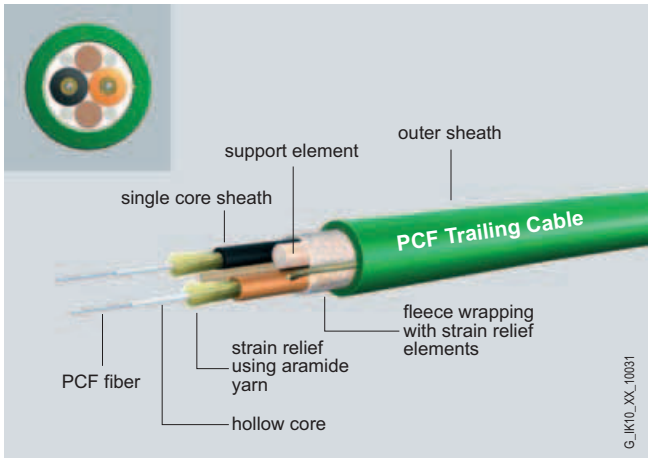
- Easy installation of the unassembled cables in industrial plants
- Flexible assembly of connectors on PCF fiber-optic cables on site (HP Simplex, BFOC connectors)
- Mistakes are avoided with easy visual inspection of the assembled connector on site using a microscope
- PCF fiber-optic cables are easily repaired on site by installing a new PCF cable

Application

SIMATIC NET PCF fiber-optic conductors are used to construct optical indoor and outdoor PROFIBUS DP networks. They are easy to assemble on site with 2 x 2 Simplex connectors or 2 x 2 BFOC connectors. The maximum cable length between two DP devices is 300 m and between two OLMs 400 m.

PROFIBUS DP devices with integrated optical interface (Simplex connection technology) include, for example, OBT, CP 342-5 FO, CP 5613 FO, IM 153-2 FO, IM 467 FO.

Design



Two versions of the assembly case are available for PCF fiber-optic cables:

- Assembly case for HP Simplex connectors; for on-site pre-assembly of HP Simplex connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, crimping tool and microscope
- Assembly case for BFOC connectors; for on-site pre-assembly of BFOC connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool and microscope

Ordering data

Ordering data	Order No.
Termination Kit for Simplex connectors Assembly case for local assembly of PCF Simplex connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, crimping tool and microscope	**6GK1 900-0KL00-0AA0**
Termination Kit for BFOC connectors Assembly case for local assembly of BFOC connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, and microscope	**6GK1 900-0HL00-0AA0**
Connector	
Simplex connector with cleaning materials; 50 crimp connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0KB00-0AC0**
BFOC connector with cleaning materials; 20 screw connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0HB00-0AC0**

More information

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

For technical support, please contact:
J. Hertlein, A&D SE V22
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Optical Link Module OLM

Overview

- Construction of optical PROFIBUS networks (line, star, ring) with glass, PCF and plastic fiber optic cables
- High availability can be achieved using a redundant power supply and redundant cable routing
- Function monitoring by means of signaling contact
- All PROFIBUS data transmission rates from 9.6 Kbit/s to 12 Mbit/s inclusive 45.45 Kbit/s for PROFIBUS PA
- Monitoring of the fiber optic cable routes on LEDs for channel monitoring or using a voltmeter across measurement terminals

Benefits

get Designed for Industry

- High availability of the network thanks to redundant optical ring
- Fast fault localization due to signaling contact, LED, channel monitoring LED and measurement terminals
- Large range due to use of glass fiber optic cables in lengths of up to 15 km
- OLM/G12-EEC for outdoor use down to –25 °C

Application

With the PROFIBUS OLM (Optical Link Modules) Version 4, optical PROFIBUS networks can be established in linear bus, star and redundant ring topologies.

The data transmission rate of a fiber optic line is independent of the distance and can be up to 12 Mbit/s.

Possible applications for OLMs include:

- System buses based on PROFIBUS
- Networking between buildings using glass fiber optic cable
- Mixed networks with electrical and optical segments
- Networks covering a wide area (road tunnels, traffic control systems)
- Networks with high availability requirements (redundant ring networks)

Design

The OLMs have a compact metal housing. It is suitable for mounting on a standard rail or for wall mounting with a mounting plate.

The 24 V power supply is fed in through a terminal block and can be redundantly connected.

The signaling contact allows a digital signal to be transferred to PLCs or HMI systems for evaluation.

OLMs can be combined with each other and individual stations or complete electrical segments can be integrated into the optical PROFIBUS network through an electrical interface.

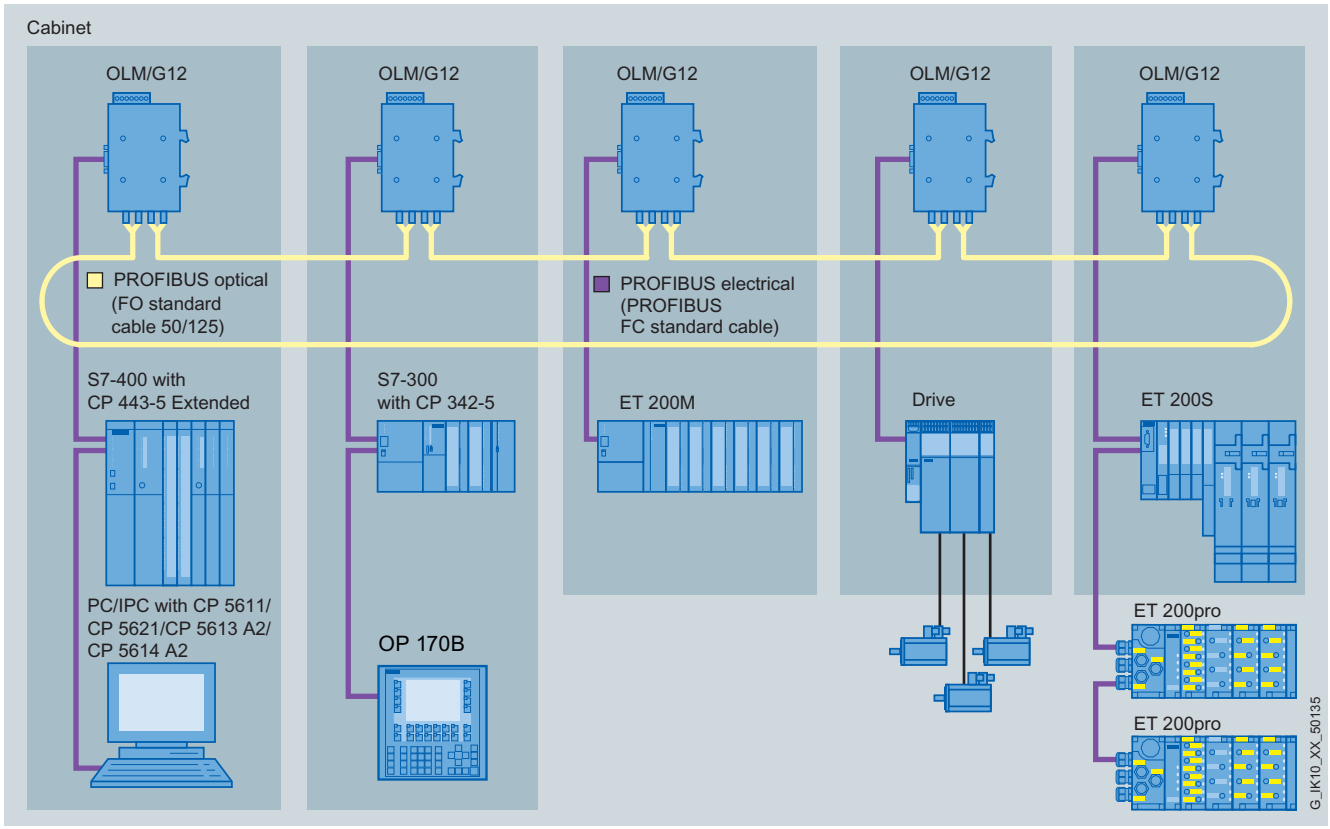
OLMs are available with one or two fiber optic interfaces with BFOC connectors for different types of fiber optic cables:

- Plastic fiber optic cables (980/1000 µm) can be used for single lengths of up to 80 m. They can also be assembled with BFOC cable connectors on site.
- PCF fiber optic cables (200/230 µm) can be used for single lengths of up to 400 m. They are offered preassembled with four BFOC plugs and an insertion tool.
- Glass fiber multimode fiber-optic cables (62.5/125 µm) such as the SIMATIC NET Fiber Optic cables can be used for long distances of up to 3000 m. They must be ordered preassembled with 4 BFOC plugs.
- Single mode fiber optic cables (10/125 µm or 9/125 µm fibers) can be used for extremely long distances up to 15 km. They are available on request.

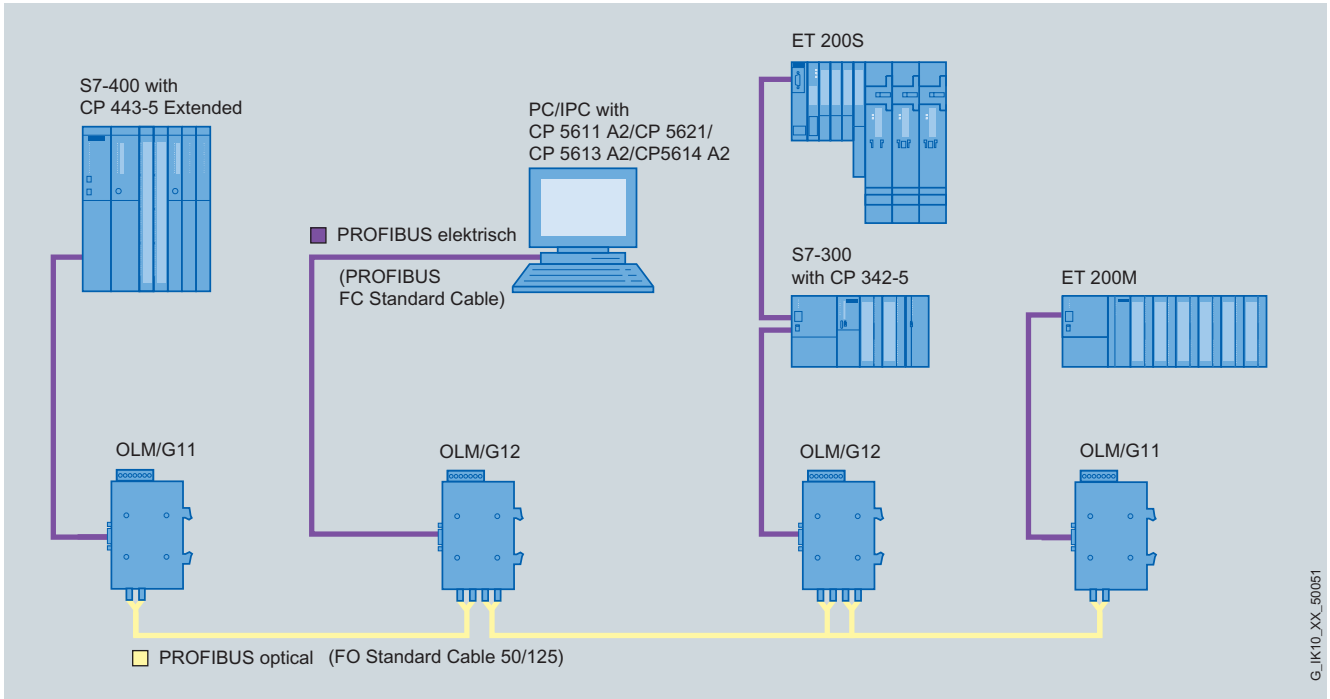
Function

- Automatic detection of all PROFIBUS data transmission rates 9.6 Kbit/s to 12 Mbit/s inclusive 45.45 Kbit/s (PROFIBUS PA)
- Construction of the following network topologies: Line, star, redundant ring
- High availability due to media redundancy. The distance between two OLMs in the redundant ring is only limited by the optical range of the modules
- RS485 interface with segment capability (Sub-D female connector)
- Unrestricted multimaster operation: Expanded segmentation functions for localization of faults to fiber optic and RS485 segments
- Fast localization of faults:
  - Indication of module status through floating signaling contact
  - Checking the fiber optic cable route quality on LEDs
  - Checking the fiber optic cable route quality Measurement output for optical receiver for logging and plausibility checking of the fiber optic path attenuation with a voltmeter
- High cascading depth: Line and redundant ring up to 124 OLM (only limited by monitoring times)

Integration



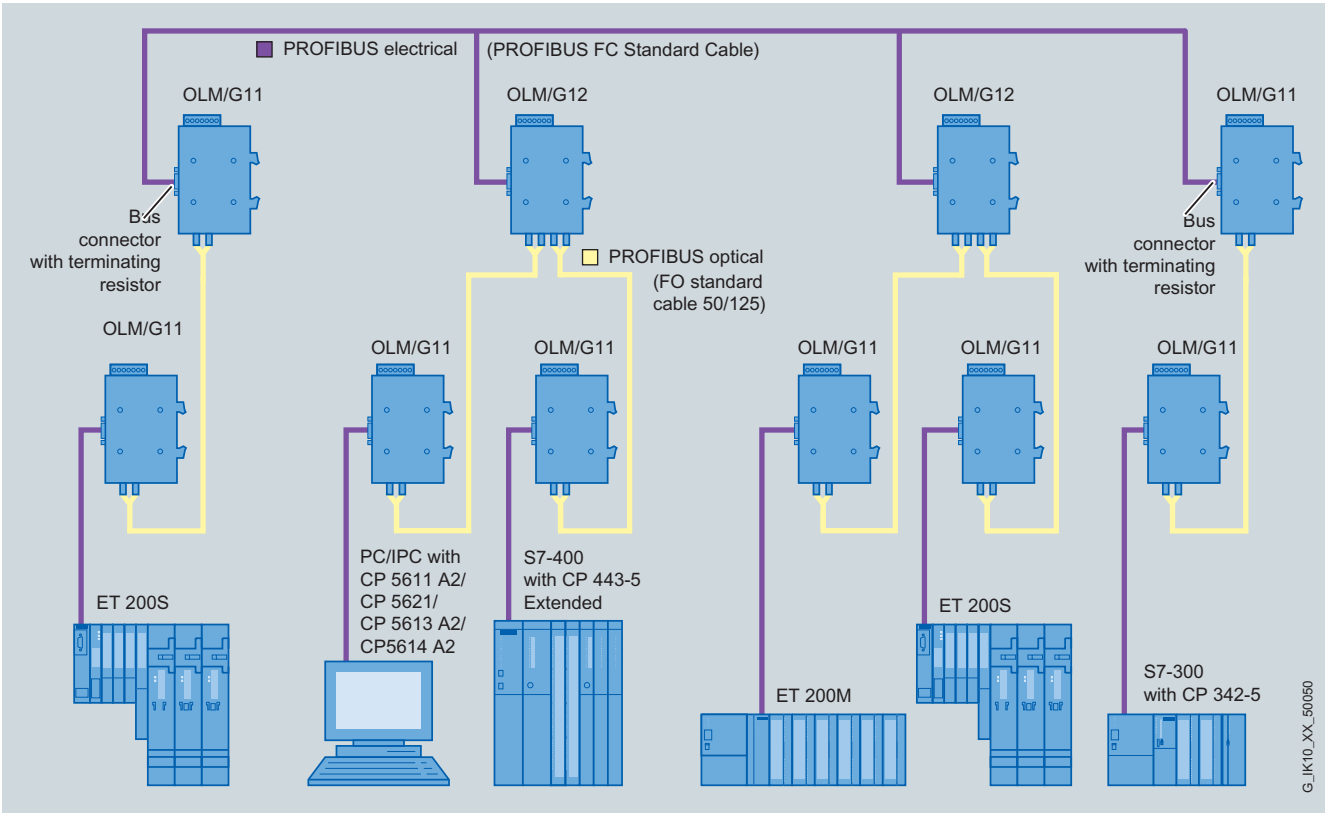
Example of a system configuration with OLM for PROFIBUS



Optical line topology with PROFIBUS OLM G11/G12

Optical Link Module OLM

Integration (continued)



Optical star topology with PROFIBUS OLM G11/G12

Technical specifications

Order No.	6GK1 503-2CA00/ 6GK1 503-3CA00	6GK1 503-2CB00/ 6GK1 503-3CB00/ 6GK1 503-3CD00	6GK1 503-2CC00/ 6GK1 503-3CC00
Product type description	**PROFIBUS OLM/P11 PROFIBUS OLM/P12**	**PROFIBUS OLM/G11 PROFIBUS OLM/G12 PROFIBUS OLM/G12-EEC**	**PROFIBUS OLM/G11-1300 PROFIBUS OLM/G12-1300**
Electrical connection version	9-pin Sub-D socket	9-pin Sub-D socket	9-pin Sub-D socket
• for measuring device	2-pin plug-in terminal block with latching	2-pin plug-in terminal block with latching	2-pin plug-in terminal block with latching
• for power supply and signaling contact	5-pin plug-in terminal block with latching	5-pin plug-in terminal block with latching	5-pin plug-in terminal block with latching
Version of optical port for fiber-optic cables	2 or 4 BFOC sockets	2 or 4 BFOC sockets	2 or 4 BFOC sockets
Active power consumption, max.	6 W	6 W	6 W
Current consumed at rated value of supply voltage, max.	200 mA	200 mA	200 mA
Attenuation of the fiber-optic cable segment with glass optical fiber			
• with 10/125 µm or 9/125 µm at 0.5 dB/km max.	-	-	8 dB
• at 50/125 µm at 3 dB/km max.	-	10 dB	-
• at 62.5/125 µm at 1 dB/km max.	-	-	10 dB
• at 62.5/125 µm at 3.5 dB/km max.	-	12 dB	-
Attenuation of the fiber-optic cable segment with POF optical fiber			
• at 980/1000 µm at 230 dB/km	13 dB	-	-
Attenuation of the fiber-optic cable segment with PCF optical fiber			
• at 200/230 µm at 10 dB/km	-	-	-
Throughput delay per bit time	6.5 bit	6.5 bit	6.5 bit
Connectable optical power relative to 1 mW for glass optical fiber			
• with 10/125 µm or 9/125 µm at 0.5 dB/km	-	-	-19 dB
• at 50/125 µm at 3 dB/km	-	-15 dB	-
• at 62.5/125 µm at 1 dB/km	-	-	-17 dB
• at 62.5/125 µm at 3.5 dB/km	-	-13 dB	-
Connectable optical power relative to 1 mW of the fiber optic segment for POF optical fiber			
• at 980/1000 µm at 230 dB/km	-5 dB	-	-
Connectable optical power relative to 1 mW of the fiber optic segment for PCF optical fiber			
• at 200/230 µm at 10 dB/km	-17 dB	-	-

Optical Link Module OLM

Technical specifications (continued)

Order No.	6GK1 503-2CA00/ 6GK1 503-3CA00	6GK1 503-2CB00/ 6GK1 503-3CB00/ 6GK1 503-3CD00	6GK1 503-2CC00/ 6GK1 503-3CC00
Product type description	**PROFIBUS OLM/P11 PROFIBUS OLM/P12**	**PROFIBUS OLM/G11 PROFIBUS OLM/G12 PROFIBUS OLM/G12-EEC**	**PROFIBUS OLM/G11-1300 PROFIBUS OLM/G12-1300**
Optical sensitivity relative to 1 mW for glass optical fiber			
• with 10/125 µm or 9/125 µm at 0.5 dB/km	-	-	-29 dB
• at 50/125 µm at 3 dB/km	-	-28 dB	-
• at 62.5/125 µm at 1 dB/km	-	-	-29 dB
• at 62.5/125 µm at 3.5 dB/km	-	-28 dB	-
Optical sensitivity relative to 1 mW of the fiber optic segment for POF optical fiber			
• at 980/1000 µm at 230 dB/km	-25 dB	-	-
Optical sensitivity relative to 1 mW of the fiber optic segment for PCF optical fiber			
• at 200/230 µm at 10 dB/km	-25 dB	-	-
Wavelength for Glass FOC			
• with 10/125 µm or 9/125 µm compatible with interface at 0.5 dB/km	-	-	1310 nm
• at 50/125 µm compatible with interface at 3 dB/km	-	860 nm	-
• at 62.5/125 µm compatible with interface at 1 dB/km	-	-	1310 nm
• at 62.5/125 µm compatible with interface at 3.5 dB/km	-	860 nm	-
Wavelength of the fiber-optic cable segment with POF optical fiber			
• at 980/1000 µm at 230 dB/km	660 nm	-	-
Wavelength of the fiber-optic cable segment with PCF optical fiber			
• at 200/230 µm at 10 dB/km	660 nm	-	-
Transfer rate			
• for PROFIBUS PA	45.45 kbit/s	45.45 kbit/s	45.45 kbit/s
• Maximum	12 Mbit/s	12 Mbit/s	12 Mbit/s
• Minimum	9.6 kbit/s	9.6 kbit/s	9.6 kbit/s
Cable length			
• for glass FOC with 10/125 µm at 0.5 dB/km max.	-	-	-
• for glass FOC with 10/125 µm or 9/125 µm at 0.5 dB/km max.	-	-	15 km
• for glass FOC with 50/125 µm at 3 dB/km max.	-	3 km	-
• for glass FOC with 62.5/125 µm			
- at 1 dB/km max.	-	-	10 km
- at 3.5 dB/km max.	-	3 km	-
• for PCF FOC with 200/230 µm at 10 dB/km max.	400 m	-	-
• for POF FOC with 980/1000 µm at 230 dB/km max.	80 m	-	-

Technical specifications (continued)

Order No.	6GK1 503-2CA00/ 6GK1 503-3CA00	6GK1 503-2CB00/ 6GK1 503-3CB00/ 6GK1 503-3CD00	6GK1 503-2CC00/ 6GK1 503-3CC00
Product type description	**PROFIBUS OLM/P11 PROFIBUS OLM/P12**	**PROFIBUS OLM/G11 PROFIBUS OLM/G12 PROFIBUS OLM/G12-EEC**	**PROFIBUS OLM/G11-1300 PROFIBUS OLM/G12-1300**
Supply voltage for DC			
• Maximum	30 V	30 V	30 V
• Minimum	18 V	18 V	18 V
• Rated value	24 V	24 V	24 V
Width	39.5 mm	39.5 mm	39.5 mm
Height	110 mm	110 mm	110 mm
Depth	73,2 mm	73,2 mm	73,2 mm
Net weight	300 g	300 g	300 g
Degree of protection	IP40	IP40	IP40
Ambient temperature			
• during operation	0 … +60 °C	0 … +60 °C[1)]	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
Maximum relative humidity at 25 °C during operation	95%	95%	95%
Type of fixing			
• Rail mounting	Yes	Yes	Yes
• Screw mounting	Yes	Yes	Yes
MTBF (at +40 °C)	138.6 years	138.6 years	138.6 years
MTBF (at +85 °C)	25.1 years	25.1 years	25.1 years

[1)] OLM/G12-EEC: -25 ... +60 °C

Ordering data

	Order No.
PROFIBUS OLM/P11 Optical link module with 1 x RS 485 and 1 x plastic fiber-optic interface (2 BFOC sockets), with signaling contact and measuring output incl. 2 BFOC plugs for plastic fiber-optic cables	**6GK1 503-2CA00**
PROFIBUS OLM/P12 Optical link module with 1 x RS 485 and 2 x plastic fiber-optic interface (4 BFOC sockets), with signaling contact and measuring output incl. 4 BFOC plugs for plastic fiber-optic cables	**6GK1 503-3CA00**
PROFIBUS OLM/G11 Optical link module with 1 x RS 485 and 1 x glass fiber-optic interface (2 BFOC sockets), for standard distances, with signaling contact and measuring output	**6GK1 503-2CB00**
PROFIBUS OLM/G12 Optical link module with 1 x RS 485 and 2 x glass fiber-optic interface (4 BFOC sockets), for standard distances up to 3000 m, with signaling contact and measuring output	**6GK1 503-3CB00**
PROFIBUS OLM/G12 EEC Optical link module with 1 x RS 485 and 2 x glass fiber-optic interface (4 BFOC sockets), for standard distances up to 3000 m, for extended temperature range –25 °C to +60 °C, with signaling contact and measuring output	**6GK1 503-3CD00**

	Order No.
PROFIBUS OLM/G11-1300 Optical link module with 1 x RS 485 and 1 x glass fiber-optic interface (2 BFOC sockets), 1300 nm wavelength for large distances up to 15 km, with signaling contact and measuring output	**6GK1 503-2CC00**
PROFIBUS OLM/G12-1300 Optical link module with 1 x RS 485 and 2 x glass fiber-optic interface (4 BFOC sockets), 1300 nm wavelength for large distances up to 15 km, with signaling contact and measuring output	**6GK1 503-3CC00**
PROFIBUS OLM mounting plate For wall mounting of PROFIBUS OLM V4	**6GK1 503-8AA00**
Manual for PROFIBUS networks Paper version Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

SIPLUS Optical Link Module OLM

Overview

- Construction of optical PROFIBUS networks (line, star, ring) with glass, PCF and plastic fiber-optic cables
- High availability can be achieved using a redundant power supply and redundant cable routing
- Function monitoring by means of signaling contact
- All PROFIBUS data transmission rates from 9.6 Kbit/s to 12 Mbit/s including 45.45 Kbit/s for PROFIBUS PA
- Monitoring of the fiber-optic cable routes on LEDs for channel monitoring or using a voltmeter across measurement terminals

SIPLUS Optical Link Module	OLM/P11	OLM/P12
Order No.	**6AG1 503-2CA00-2AA0**	**6AG1 503-3CA00-2AA0**
Order No. based on	**6GK1 503-2CA00**	**6GK1 503-3CA00**
Ambient temperature range	**-25 to +60 °C; condensation permissible**	
Environmental conditions	Suited for exceptional medial load (e.g. by chlorine sulfur atmosphere)	
Technical specifications	The technical specifications are identical with those of the based-on modules.	

Additional information can be found in the Internet under:
http://www.siemens.com/siplus-techdocu

Ordering data

Ordering data	Order No.
SIPLUS OLM/P11 (extended temperature range) Optical link module with 1 x RS 485 and 1 x plastic fiber-optic interface (2 BFOC sockets), with signaling contact and measuring output incl. 2 BFOC plugs for plastic fiber-optic cables	**6AG1 503-2CA00-2AA0**
SIPLUS OLM/P12 (extended temperature range) Optical link module with 1 x RS 485 and 2 x plastic fiber-optic interface (4 BFOC sockets), with signaling contact and measuring output incl. 4 BFOC plugs for plastic fiber-optic cables	**6AG1 503-3CA00-2AA0**
Accessories	see Ordering data Optical Link Module OLM

Overview

- Electrical isolation of DP devices
- Protection of the transmission path against electromagnetic interference
- Up to 50 m cable length with plastic fiber-optic cables and up to 300 m with PCF fiber-optic cables
- Rugged fiber-optic standard cables, designed for industrial applications
- Hybrid cable for the shared transmission of data and power supply
- Extensive approvals (UL)

Benefits

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- 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
- A cable for the shared transmission of data and power

Application

SIMATIC NET plastic and PCF fiber-optic conductors are used to construct optical indoor PROFIBUS DP networks.

Plastic fiber-optic cables and segmented PCF fiber-optic cables can be assembled easily on site with 2 x 2 simplex plugs. The maximum cable length between two DP devices is 50 m.

Longer cable lengths up to 300 m can be achieved using PCF fiber-optic cables. These cables are also available preassembled with 4 simplex plugs.

Devices with integrated optical interface (Simplex connection technology) include, for example, OBT, CP 342-5 FO, CP 5613 FO, IM 153-2 FO, IM 467 FO.

Design

Different types of plastic and PCF fiber-optic cables are offered:

- **Plastic FOC, duplex core;**
  Two flat cores with PVC inner sheath and without outer sheath for indoor applications with low mechanical stress such as laboratory setups or inside cabinets. Cable lengths up to 50 m.
- **Plastic FOC, standard cable;**
  Rugged round cable with violet PVC outer sheath and Kevlar tension components as well as two plastic fibers with a rugged polyamide inner sheath. For indoor applications with cable lengths up to 50 m.
- **PCF fiber-optic cable, standard cables:**
  - PCF Fiber Optic standard cable;
    rugged round cable with violet PVC outer sheath and Kevlar tension components for indoor applications with cable lengths of up to 300 m.
    The cable is not suitable for assembly in the field (only available pre-assembled with an insertion tool)
  - PCF Standard Cable GP (general purpose);
    rugged round cable with green PVC outer sheath and Kevlar tension elements for indoor and outdoor applications with cable lengths of up to 300 m;
    the cable is suitable for assembly in the field.
- **PCF fiber-optic trailing cable;**
  Rugged round cable with green outer sheath and Kevlar tension elements for trailing cable applications with cable lengths of up to 300 m. The cable is suitable for assembly in the field.
  Two cable variants are available for this application:
  - 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

Plastic and PCF fiber-optic cables

Technical specifications

Order No.	6XV1 821-2AN50	6XV1 821-0AH10	6XV1 821-1BN75
Product type description	**PROFIBUS Plastic Fiber Optic Duplex Core**	**PROFIBUS Plastic Fiber Optic standard cable**	**PROFIBUS PCF Fiber Optic standard cable**
Suitability for use	Indoor applications with low mechanical loads such as laboratory set-ups or inside cabinets and with cable lengths up to 50 m	Preassembled cable for indoor applications with cable lengths of up to 300 m, not suitable for plug-in assembly in the field.	Preassembled cable for indoor applications with cable lengths of up to 300 m, not suitable for plug-in assembly in the field.
Type of assembled fiber-optic cable	Sold by the meter; for assembly on site with 2 × 2 simplex connectors	Sold by the meter; for assembly on site with 2 x 2 simplex connectors	only preassembled with 2 × 2 BFOC connectors
Designation of fiber optic cable	I-VY2P 980/1000 150A	I-VY4Y2P 980/1000 160A	I-VY2K 200/230 10A17+8B20
Electrical data			
Attenuation per length for 660 nm maximum	230 dB/km	230 dB/km	10 dB/km
Bandwidth length product at 650 nm	-	-	-
Mechanical data			
Number of fibers per fiber-optic cable	2	2	2
Number of fibers per fiber-optic cable	-	-	-
Number of fibers per fiber optic cable	-	-	2
Design of optical fibers	Step-index fiber	Step-index fiber	Step-index fiber
Material			
• of the fiber-optic cable core	Polymethyl methacrylate (PMMA)	Polymethyl methacrylate (PMMA)	Fused silica
• of optical fibers	-	-	-
• of the optical fiber sheath	Fluoridated special polymer	Fluoridated special polymer	Fluoridated special polymer
• of the fiber-optic cable sheath	PVC	PVC	PVC
• of the strain relief	-	Kevlar fibers	Kevlar fibers
• of the FOC core sheath	-	PA	-
Color			
• of optical fibers	-	-	-
• of the fiber-optic cable sheath	-	Purple	Purple
• of the FOC core sheath	gray	black or orange	-
Outer diameter			
• of the fiber-optic cable core	980 µm	980 µm	200 µm
• of the optical fiber sheath	1 000 µm	1 000 µm	230 µm
• of the FOC core sheath	2.2 mm	2.2 mm	-
- Upper dimension	2.21 mm	2.21 mm	-
- Lower dimension	2.19 mm	2.19 mm	-
• of the cable	-	7.8 mm	4.7 mm
- Upper dimension	-	8.1 mm	5 mm
- Lower dimension	-	7.5 mm	4.4 mm
Thickness of the cable	2.2 mm	-	-
Width of the cable	4.4 mm	-	-
Weight per length	7.8 kg/km	65 kg/km	22 kg/km

Technical specifications (continued)

Order No.	6XV1 821-2AN50	6XV1 821-0AH10	6XV1 821-1BN75
Product type description	**PROFIBUS Plastic Fiber Optic Duplex Core**	**PROFIBUS Plastic Fiber Optic standard cable**	**PROFIBUS PCF Fiber Optic standard cable**
Tensile load, max.	-	-	-
• Maximum permissible continuous tensile load	-	-	100 N
• Maximum permissible short-time tensile load	50 N	100 N	500 N
Maximum permissible continuous tensile load on connector	-	-	50 N
Maximum permissible continuous tensile load at the strain relief	-	-	100 N
Maximum permissible continuous tensile load at fiber-optic cable	-	-	-
Continuous lateral force per length	-	-	-
Momentary lateral force per length	3,5 N/cm	10 N/cm	75 N/cm
Bending radius			
• for repeated bending, with strain relief			
- Bending radius when bending over the flat side	50 mm	150 mm	-
- minimum permissible	-	-	-
• for one-off bending, minimum permissible	30 mm	100 mm	75 mm
• when bending over the flat side for one-off bending	-	-	-
Number of bending cycles	-	-	-
Ambient temperature			
• during installation	0 … 50 °C	0 … 50 °C	-5 … +50 °C
• during operation	-30 … +70 °C	-30 … +70 °C	-20 … +70 °C
• during storage	-35 … +85 °C	-30 … +70 °C	-30 … +70 °C
• during transport	-35 … +85 °C	-30 … +70 °C	-30 … +70 °C
Fire behavior	Flame retardant in accordance with the VW-1 flame test to UL 1581	IEC 60332-1	Flame retardant in accordance with the VW-1 flame test to UL 1581
Chemical resistance			
• to ASTM oil 2	conditional resistance	conditional resistance	conditional resistance
• to mineral oil	conditional resistance	conditional resistance	conditional resistance
• to water	conditional resistance	conditional resistance	conditional resistance
Radiological resistance to UV radiation	-	conditional resistance	-
Product property			
• halogen-free	-	-	-
• Silicone-free	contains small quantities of a non-migrating silicone elastomer	Yes	Yes
Certificate of suitability			
• UL Approval	-	Yes/OFN (NEC Article 770, UL 1651)	-
• CSA approval	-	Yes/OFN (CSA C22.2 No. 232)	-

Technical specifications (continued)

Order No.	6XV1 861-2A	6XV1 861-2C	6XV1 861-2D
Product type description	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Suitability for use	For permanent indoor and outdoor installation	For moving applications	For moving applications
Type of assembled fiber-optic cable	Sold by the meter	Sold by the meter	Sold by the meter
Designation of fiber optic cable	AT-V(ZN)YY 2K200/230	AT-V(ZN)Y(ZN)11Y 2K200/230	AT-V(ZN)Y(ZN)Y 2K200/230
Electrical data			
Attenuation per length for 660 nm maximum	10 dB/km	10 dB/km	10 dB/km
Bandwidth length product at 650 nm	17 Mhz*km	17 Mhz*km	17 Mhz*km
Mechanical data			
Number of fibers per fiber-optic cable	2	2	2
Number of fibers per fiber-optic cable	1	1	1
Number of fibers per fiber optic cable	2	2	2
Design of optical fibers	Step Index 200/230	Step Index 200/230	Step Index 200/230
Material			
• of the fiber-optic cable core	Fused silica	Fused silica	Fused silica
• of the optical fiber sheath	Special polymer	Special polymer	Special polymer
• of the fiber-optic cable sheath	PVC	PUR	PVC
• of the strain relief	Aramid fibers	Aramid fibers	Aramid fibers
• of the FOC core sheath	PVC	PVC	PVC
Color			
• of the fiber-optic cable sheath	green	green	green
• of the FOC core sheath	orange/black	orange/black	orange/black
Outer diameter			
• of the fiber-optic cable core	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
- Upper dimension	2.21 mm	2.21 mm	2.21 mm
- Lower dimension	2.19 mm	2.19 mm	2.19 mm
• of the cable	7.2 mm	8.8 mm	8.8 mm
- Upper dimension	7.7 mm	9.3 mm	9.3 mm
- Lower dimension	6.7 mm	8.3 mm	8.3 mm
Weight per length	45 kg/km	85 kg/km	85 kg/km
Tensile load, max.	100 N	800 N	800 N
Continuous lateral force per length	300 N/cm	300 N/cm	300 N/cm
Momentary lateral force per length	500 N/cm	500 N/cm	500 N/cm
Bending radius			
• for repeated bending, minimum permissible	105 mm	175 mm	175 mm
• for one-off bending, minimum permissible	70 mm	130 mm	130 mm
Number of bending cycles	-	5 000 000	3 500 000

Technical specifications (continued)

Order No.	6XV1 861-2A	6XV1 861-2C	6XV1 861-2D
Product type description	**PCF Standard Cable GP**	**PCF Trailing Cable**	**PCF Trailing Cable GP**
Ambient temperature			
• during installation	-5 … +50 °C	-5 … +50 °C	-5 … +50 °C
• during operation	-25 … +75 °C	-25 … +75 °C	-25 … +75 °C
• during storage	-25 … +75 °C	-30 … +75 °C	-30 … +75 °C
• during transport	-25 … +75 °C	-30 … +75 °C	-30 … +75 °C
Fire behavior	Flame retardant to IEC 60332-1	-	Flame retardant to IEC 60332-1
Chemical resistance			
• to ASTM oil 2	conditional resistance	resistant	conditional resistance
• to mineral oil	conditional resistance	resistant	conditional resistance
• to water	-	-	-
Radiological resistance to UV radiation	Yes	Yes	Yes
Product property			
• halogen-free	-	-	-
• Silicone-free	Yes	Yes	Yes
Certificate of suitability			
• UL Approval	Yes/OFN (NEC Article 770, UL 1651)	-	Yes/OFN (NEC Article 770, UL 1651)
• CSA approval	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)	-	Yes/ OFN, 90°C, FT1, FT4 (CSA-Standard C22.2 No232-M1988)

Ordering data

	Order No.
PROFIBUS Plastic Fiber Optic standard cable	
Rugged round cable with 2 plastic fiber-optic cores, PVC outer sheath and PA inner sheath, for indoor use; without connector	
• Sold by the meter	**6XV1 821-0AH10**
• 50 m ring	**6XV1 821-0AN50**
• 100 m ring	**6XV1 821-0AT10**
PROFIBUS Plastic Fiber Optic duplex core	
Plastic fiber-optic cable with 2 cores, PVC outer sheath, for use in environments with low mechanical stress; without connector	
• 50 m ring	**6XV1 821-2AN50**
PROFIBUS Plastic Fiber Optic simplex plug/polishing set	**6GK1 901-0FB00-0AA0**
100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	

	Order No.
PROFIBUS Plastic Fiber Optic stripping tool set	**6GK1 905-6PA10**
Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	
PROFIBUS PCF Fiber Optic standard cable	
PCF fiber-optic cable with 2 cores, PVC outer sheath, for covering larger distances up to 300 m, for connecting devices to the optical PROFIBUS DP	
Preferred lengths Precut/preassembled with 2 × 2 Simplex connectors, arm length 30 cm each, with aid for pulling in at one end	
• 50 m	**6XV1 821-1CN50**
• 75 m	**6XV1 821-1CN75**
• 100 m	**6XV1 821-1CT10**
• 150 m	**6XV1 821-1CT15**
• 200 m	**6XV1 821-1CT20**
• 250 m	**6XV1 821-1CT25**
• 300 m	**6XV1 821-1CT30**

Plastic and PCF fiber-optic cables

Ordering data

Ordering data	Order No.
PROFIBUS PCF Standard Cable GP 200/230	
Standard cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2A**
Preferred lengths; pre-assembled with 4 Simplex connectors	
• 50 m	**6XV1 861-7AN50**
• 75 m	**6XV1 861-7AN75**
• 100 m	**6XV1 861-7AT10**
• 150 m	**6XV1 861-7AT15**
• 200 m	**6XV1 861-7AT20**
• 250 m	**6XV1 861-7AT25**
• 300 m	**6XV1 861-7AT30**
PROFIBUS PCF Trailing Cable 200/230	
Trailing cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2C**
Preferred lengths; pre-assembled with 4 Simplex connectors	
• 50 m	**6XV1 861-7CN50**
• 75 m	**6XV1 861-7CN75**
• 100 m	**6XV1 861-7CT10**
• 150 m	**6XV1 861-7CT15**
• 200 m	**6XV1 861-7CT20**
• 250 m	**6XV1 861-7CT25**
• 300 m	**6XV1 861-7CT30**
PROFIBUS PCF Trailing Cable GP 200/230	
Trailing cable, segmentable, sold by the meter; max. quantity 2000 m; minimum order 20 m;	**6XV1 861-2D**
Preferred lengths; pre-assembled with 4 Simplex connectors	
• 50 m	**6XV1 861-7DN50**
• 75 m	**6XV1 861-7DN75**
• 100 m	**6XV1 861-7DT10**
• 150 m	**6XV1 861-7DT15**
• 200 m	**6XV1 861-7DT20**
• 250 m	**6XV1 861-7DT25**
• 300 m	**6XV1 861-7DT30**

	Order No.
Plug-in adapter For assembling the plastic Simplex connector in combination with IM 467 FO, CP 342-5 FO, IM 151 FO and IM 153-2 FO, 50 units	**6ES7 195-1BE00-0XA0**
Termination Kit for Simplex Plug Assembly case for local assembly of PCF Simplex connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, crimping tool and microscope	**6GK1 900-0KL00-0AA0**
Termination Kit for BFOC Plug Assembly case for local assembly of BFOC connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, and microscope	**6GK1 900-0HL00-0AA0**
Simplex Plug Crimp connector with cleaning materials; 50 connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0KB00-0AC0**
BFOC Plug Screw connector with cleaning materials; 20 connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0HB00-0AC0**
Manual for PROFIBUS networks	
Paper version: Network architecture, project management, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	**6GK1 975-1AA00-3AA0**

More information

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

Technical advice on this subject is available from:
J. Hertlein, IA SE IP S
Tel.: +49 (0)911/750 44 65
Fax: +49 (0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview

- Electrical isolation of DP devices
- Protection of the transmission path against electromagnetic interference
- Up to 50 m cable length with plastic fiber-optic cable
- Rugged fiber-optic cables, designed for industrial applications
- Hybrid cable for the shared transmission of data and power supply

Benefits

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- Savings in wiring, installation, commissioning and operation as result of standardized connection system (copper or fiber-optic) with high degree of protection (IP65)
- With ECOFAST, the turnaround times for offers, planning and engineering of machines and plants can be reduced:
- ECOFAST permits fast and problem-free startup of automation and drive systems
- Minimization of sources of error by means of standardized interfaces and plug connectors.
- With ECOFAST plants remain highly available: No interruption of power and field bus when replacing equipment.

Application

The ECOFAST Fiber Optic Hybrid Cable of SIMATIC NET is used to construct optical PROFIBUS DP networks indoors. It is particularly suitable for connecting DESINA components installed at machine level, and is easy to assemble on site. The maximum cable length between two DP devices is 50 m.

Design

The rugged, hybrid trailing cable contains two plastic fiber-optic cables for data transmission and four copper wires (1.5 mm^2) for supplying power to DESINA[1] stations.

[1] DESINA is the trademark for **DE**centralized and **S**tandardized **IN**stall**A**tion technology for machine tools.

Technical specifications

Order No.	**6XV1 830-6CH10**
Product type description	**ECOFAST fiber optic hybrid cable (DESINA-compatible)**
Suitability for use	DESINA-compliant devices, e.g. for ET 200X
Designation of the ECOFAST hybrid cable:	I-(ZN) J-V4Y 11Y2S 980/1000+4x1.5
Type of assembled fiber-optic cable	Sold by meter; can be assembled on site using DESINA connectors or preassembled with two DESINA connectors
Electrical data	
Attenuation per length for 660 nm maximum	280 dB/km
Rated operating voltage	300 V
Continuous current of the power wires	10 A
Mechanical data	
Number of electrical wires	4
Number of conductors in fiber-optic cable	2
Design of optical fibers	Step-index fiber
Material	
• of the fiber-optic cable core	Polymethyl methacrylate (PMMA)
• of the optical fiber sheath	Fluoridated special polymer
• of the fiber-optic cable sheath	PUR
• of the FOC core sheath	PA
Color	
• of the FOC core sheath	black, orange
• of the wire insualtion of the power wire	black
• of the hybrid cable sheath	Violet

ECOFAST Fiber Optic Hybrid Cable

Technical specifications (continued)

Order No.	6XV1 830-6CH10
Product type description	**ECOFAST fiber optic hybrid cable (DESINA-compatible)**
Diameter of the fiber-optic cable core	980 µm
Conductor cross-section of power wire	1.5 mm²
Outer diameter	
• of the optical fiber sheath	1000 µm
• of the cable sheath	10,6 mm
• of the FOC core sheath	2.2 mm
- Lower dimension	2.19 mm
- Upper dimension	2.21 mm
Weight per length	146 kg/km
Maximum permissible short-time tensile load	60 N
Momentary lateral force per length	1000 N/m
Bending radius for repeated bending with strain relief, minimum permissible	110 mm
Ambient temperature	
• during operation	-20 … +60 °C
• during storage	-20 … +60 °C
• during transport	-20 … +60 °C
• during installation	-5 … +50 °C
• In short-circuit on conductor	+160 °C (max. 5 s)
Chemical resistance	
• to ASTM oil 2	conditional resistance
• to grease	conditional resistance
• to water	conditional resistance
Radiological resistance to UV radiation	No
Fire behavior	IEC 60332-1
Certificate of suitability UL approval	No
Product property	
• halogen-free	No
• Silicone-free	Yes

Ordering data

	Order No.
ECOFAST fiber optic hybrid cable (DESINA-compatible)	
Trailing cable with 2 plastic fiber-optic conductors and 4 copper cores, 1.5 mm² for use in DESINA-compatible devices only	
Sold by the meter; max. quantity 1000 m, minimum order 20 m	**6XV1 830-6CH10**
Not pre-assembled	
• 20 m	**6XV1 830-6CN20**
• 50 m	**6XV1 830-6CN50**
• 100 m	**6XV1 830-6CT10**
Preassembled with 2 DESINA connectors	
• 1.5 m	**6XV1 830-6DH15**
• 3 m	**6XV1 830-6DH30**
• 5 m	**6XV1 830-6DH50**
• 10 m	**6XV1 830-6DN10**
• 15 m	**6XV1 830-6DN15**
ECOFAST Fiber Optic Hybrid Plug 180, DESINA-compatible (ECOFAST FOC)	
2 x FO; 4 x 1.5 mm² Cu	
• With male pins (Hanbrid connector)	**6GK1 905-0BA00**
• With female pins (Hanbrid connector)	**6GK1 905-0BB00**
Manual for PROFIBUS networks	
Paper version: Network architecture, project management, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection	**6GK1 975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

More information

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For technical support, please contact:
J. Hertlein, IA SE IP S
Tel.: +49(0)911/750 44 65
Fax: +49(0)911/750 99 91
E-mail: juergen.hertlein@siemens.com

Overview

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

Benefits

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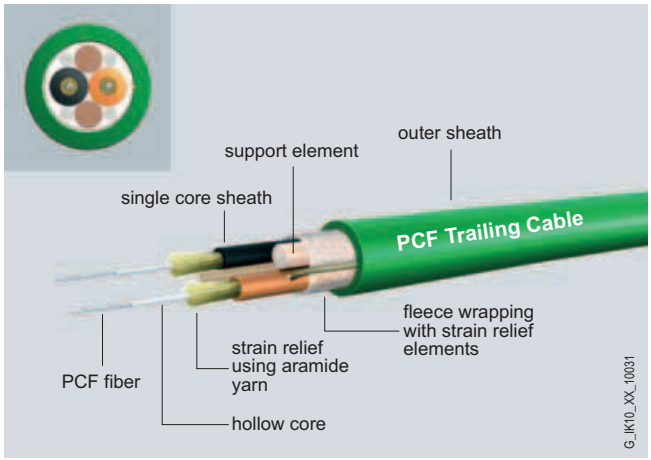
- Easy installation of the unassembled cables in industrial plants
- Flexible assembly of connectors on PCF fiber-optic cables on site (HP Simplex, BFOC connectors)
- Mistakes are avoided with easy visual inspection of the assembled connector on site using a microscope
- PCF fiber-optic cables are easily repaired on site by installing a new PCF cable

Application

SIMATIC NET PCF fiber-optic conductors are used to construct optical indoor and outdoor PROFIBUS DP networks. They are easy to assemble on site with 2 x 2 Simplex connectors or 2 x 2 BFOC connectors. The maximum cable length between two DP devices is 300 m and between two OLMs 400 m.

PROFIBUS DP devices with integrated optical interface (Simplex connection technology) include, for example, OBT, CP 342-5 FO, CP 5613 FO, IM 153-2 FO, IM 467 FO.

Design



Two versions of the assembly case are available for PCF fiber-optic cables:

- Assembly case for HP Simplex connectors; for on-site pre-assembly of HP Simplex connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, crimping tool and microscope
- Assembly case for BFOC connectors; for on-site pre-assembly of BFOC connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool and microscope

Ordering data

	Order No.
Termination Kit for Simplex connectors Assembly case for local assembly of PCF Simplex connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, crimping tool and microscope	**6GK1 900-0KL00-0AA0**
Termination Kit for BFOC connectors Assembly case for local assembly of BFOC connectors; comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool, and microscope	**6GK1 900-0HL00-0AA0**
Connector	
Simplex connector with cleaning materials; 50 crimp connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0KB00-0AC0**
BFOC connector with cleaning materials; 20 screw connectors for assembly on PCF fiber-optic cables on site	**6GK1 900-0HB00-0AC0**

More information

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Optical networks with integral interface and OBT

Optical Bus Terminal OBT

Overview

- For connecting a PROFIBUS station without an integrated fiber-optic cable interface or an RS 485 segment to an optical line
- Quick and easy installation of the plastic fiber-optic cable without the need for special tools

Benefits

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- Option of connecting existing devices or an RS 485 segment with electrical interface to the optical PROFIBUS
- "Socket outlet" for connecting mobile devices (e.g. programming devices) without interruption of the bus
- Time saved through simple and fast connector mounting without special tools

Application

The OBT (Optical Bus Terminal) is used to connect a PROFIBUS station without integral optical interface or a PROFIBUS DP RS485 segment to an optical line. Existing DP devices are then provided with the advantages of optical data transmission.

The PROFIBUS station is connected to the RS 485 interface of the OBT via a cable terminated at both ends, e.g. connecting cable 830-1T. The OBT is integrated into the optical line using two optical interfaces.

The following optical transmission media can be connected to the OBT:

- Plastic fiber-optic cables can be used up to an individual segment length of 50 m. They can be configured very easily on site with 2 x 2 Simplex connectors.
- PCF[1)] fiber-optic cables can be used for an individual segment length up to 300 m. These cables are preassembled. The OBT supports all PROFIBUS data transmission rates up to 12 Mbit/s.

[1)] Also known as HCS® fiber-optic cable:
HCS® is a registered trademark of Lucent Technologies.

Design

The OBT has a compact plastic housing. It is suitable for mounting on a DIN rail or for wall mounting with a mounting plate with the aid of two holes drilled right through.

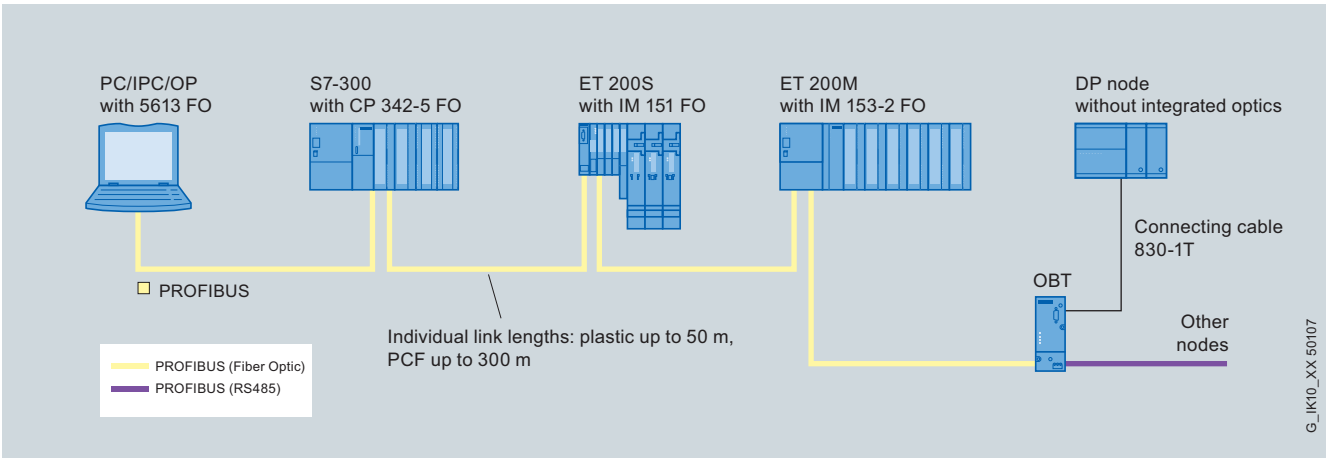
The OBT has the following connections:

- 9-pin Sub-D socket for connecting the PROFIBUS DP node such as programming device (PG), PC, operator panel (OP), S7-300 or nodes without integral optics, e.g. ET 200S or PROFIBUS DP components from other suppliers or a PROFIBUS DP-RS 485 segment.
- Two optical interfaces for the connection of plastic and PCF fiber-optic cables with Simplex connectors (connection to CP 342-5 FO, CP 5613 FO, IM 153-2 FO, IM 467 FO or to ET 200 with integrated optics)
- 24 V DC infeed for power supply

Function

- Connection of a station with RS 485 interface via connecting cable 830-1T or PROFIBUS cable with bus connectors (terminated at both ends) or an RS 485 segment
- Provision of an electrical connection point on the optical line (e.g. PG connection for startup and diagnostics).
- Support for all PROFIBUS data rates from 9.6 kbit/s to 12 Mbit/s including 45.45 kbit/s for PROFIBUS PA
- Regeneration of the signals in amplitude and time
- Cascade depth when using user-defined bus parameters up to 126 stations
- Galvanic isolation of the station via fiber optic cable
- Simple diagnostics via LED display for operating voltage as well as for receipt of data CH1, CH2 and CH3.

Integration



System configuration of optical PROFIBUS DP with PROFIBUS OBT

OBT optical bus terminal

Technical specifications

Order No.	6GK1 500-3AA00
Product type description	**PROFIBUS OBT**
Electrical connection version	9-pin Sub-D socket
• for voltage supply	2-pin terminal
Version of optical port for fiber-optic cables	2 Duplex sockets
Active power consumption, max.	6 W
Current consumed at rated value of supply voltage, max.	200 mA
Attenuation of the fiber-optic cable transmission link	
• for POF FOC with 980/1000 µm at 230 dB/km	13 dB
• for PCF FOC with 200/230 µm at 10 dB/km	3 dB
Connectable optical power relative to 1 mW / of the fiber-optic cable transmission link	
• for POF FOC with 980/1000 µm at 230 dB/km	-5.9 dB
• for PCF FOC with 200/230 µm at 10 dB/km	-16 dB
Optical sensitivity relative to 1 mW / of the fiber-optic cable transmission link	
• for POF FOC with 980/1000 µm at 230 dB/km	-20 dB
• for PCF FOC with 200/230 µm at 10 dB/km	-22 dB
Wavelength / of the fiber-optic cable transmission link	
• for POF FOC with 980/1000 µm at 230 dB/km	640 - 660 nm
• for PCF FOC with 200/230 µm at 10 dB/km	640 - 660 nm

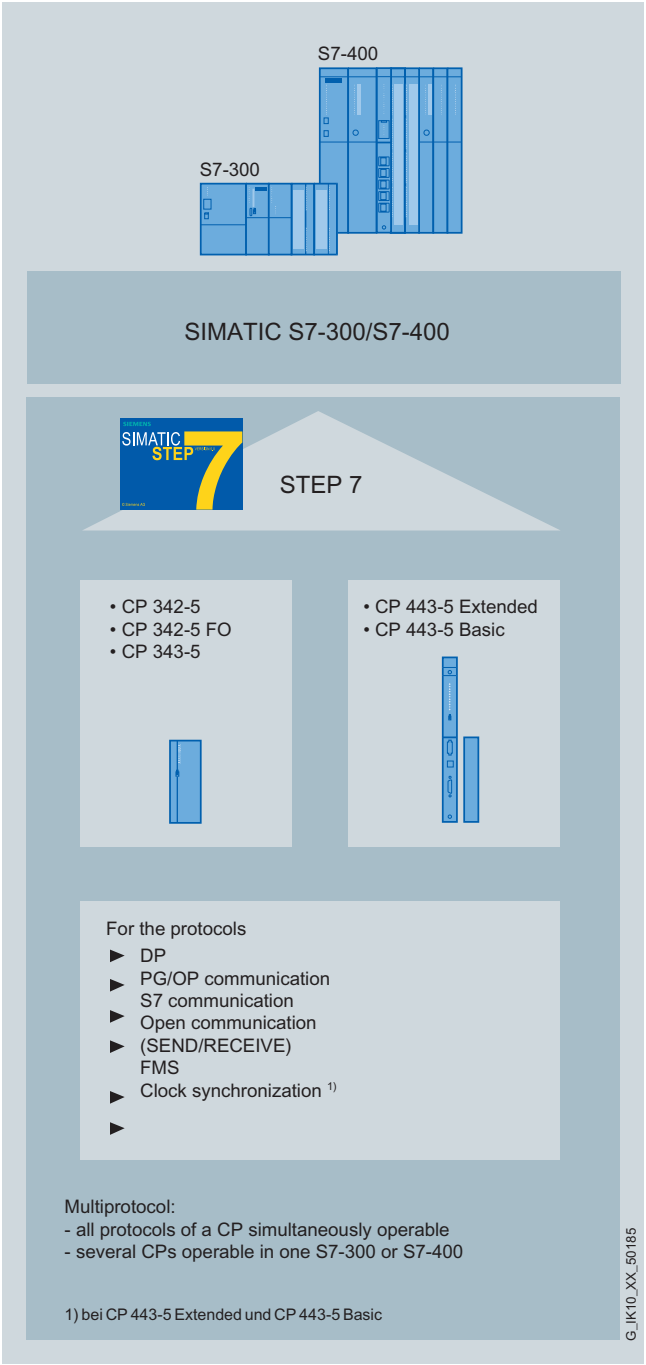
Order No.	6GK1 500-3AA00
Product type description	**PROFIBUS OBT**
Transfer rate	
• for PROFIBUS PA	45.45 kbit/s
- Maximum	12 Mbit/s
- Minimum	9.6 kbit/s
Cable length	
• for PCF FOC with 200/230 µm at 10 dB/km max.	400 m
• for POF FOC with 980/1000 µm at 230 dB/km max.	80 m
Supply voltage for DC	
• Maximum	30 V
• Minimum	18 V
• Rated value	24 V
Width	50,5 mm
Height	138 mm
Depth	78 mm
Net weight	400 g
Degree of protection	IP30
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Type of fixing	
• Rail mounting	Yes
• Screw mounting	Yes
MTBF (at +70 °C)	75.1 years

Ordering data

	Order No.
PROFIBUS OBT	**6GK1 500-3AA00**
Optical bus terminal for connecting a PROFIBUS node or an RS485 segment without an integrated optical interface to the optical PROFIBUS; without a Simplex connector	
PROFIBUS plug-in cable 830-1T	
For connecting a data terminal, completely pre-assembled with two Sub-D connectors, 9-pin	
• 1.5 m	**6XV1 830-1CH15**
• 3 m	**6XV1 830-1CH30**

	Order No.
Manual for PROFIBUS networks	
Paper version	
Network architecture, configuration, network components, installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
SIMATIC NET Manual Collection	**6GK1 975-1AA00-3AA0**
Electronic manuals for communication systems, communication protocols, and communication products; on DVD; German/English	

Overview



System connections for SIMATIC

CPs with standard functions

- CP 342-5 and CP 343-5 for SIMATIC S7-300 for connection to PROFIBUS DP and PROFIBUS FMS
- CP 443-5 Extended and CP 443-5 Basic for the connection to PROFIBUS DP and PROFIBUS FMS
- Designed for use in harsh industrial environments
- Shipbuilding certification for use on ships and offshore units
- High-speed data transfer due to transmission rates of up to 12 Mbit/s

CPs with function expansions

- CP 342-5 FO with integral optical interface for connecting the SIMATIC S7-300 to the optical PROFIBUS DP
- IM 467 FO with integral optical interface for connecting the SIMATIC S7-400 to the optical PROFIBUS DP

CP 342-5

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Benefits

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- Expansion of the process I/O at SIMATIC S7-300 by several PROFIBUS DP interfaces
- Flexible utilization of the process I/O through dynamic activation of DP-Slaves
- Subprocess-oriented configuration of an automation solution by implementing several CPs
- Optimization of applications and many application options through sending of data with S7 communication
- Comprehensive control and monitoring through multiplex function with OP communication
- Suitable for closed loop control tasks due to SYNC and FREEZE.

Application

The CP 342-5 communications processor is the communications module of SIMATIC S7-300, and SIMATIC C7 for the bus system PROFIBUS DP.

The CP 342-5 relieves the CPU from communication tasks.

Communication possibilities of the S7-300 using communication modules:

- As DP-Master or Slave for PROFIBUS DP according to IEC 61158/EN 50170
- Communication with programming devices and HMI devices
- Communication with other SIMATIC S7 systems
- Communication with SIMATIC S5 programmable controllers

The number of CPs that can be used is dependent on the performance range of the CPU and on the communications services used.

Design

The CP 342-5 offers all the advantages of SIMATIC S7-300 system design:

- Compact design;
  single standard width of the SM modules of the SIMATIC S7-300
- 9-pin Sub-D socket for connection to PROFIBUS
- 4-pin terminal block for connecting the external supply voltage of 24 V DC
- Simple assembly;
  The CP 342-5 is mounted on the S7-300 DIN rail and connected to adjacent modules by means of the bus connectors. Slots 4 to 11 in subracks 0 to 3 (coupled through the IM 360/361) can be used for the CP 342-5
- In combination with IM 360/361, the CP 342-5 can also be used in an expansion rack (ER)
- User-friendly wiring;
  Sub-D socket and the terminal block are easily accessible.
- The CP 324-5 can be operated without a fan;
  a back-up battery or a memory module is not required

Function

The CP 342-5 provides access to different communication services of the PROFIBUS bus system:

- PROFIBUS DP
  (according to IEC 61158/61784, master or slave)
- PG/OP communication
- S7 communication (client, server)
- Open communication (SEND/RECEIVE)

PROFIBUS DP master

The CP 342-5 operates as a DP-V0 Master according to IEC 61158/EN 61784 Volume 2 and processes the data transfer completely independently. It supports the services of the Master Classes 1 and 2.

The data areas of the distributed I/Os are transferred consistently between CP and CPU. This applies to the use of the CP as DP-Master and as DP-Slave. As DP-Master, it permits connections to:

- SIMATIC S7-300, such as CP 342-5 as DP-Slave
- DP-Slaves of the distributed I/O system ET 200
  (integrate as DP-V0 slave)
- PCs, e.g. with CP 5512, CP 5611 A2, CP 5621, CP 5614 A2 and SOFTNET-DP-Slave or DP-Base

The CP 342-5 also offers the SYNC, FREEZE and shared input/output functions, as well as the activation/deactivation of slaves.

PROFIBUS DP slave

The CP 342-5 as a DP-V0 slave permits the SIMATIC S7-300 to exchange data with other PROFIBUS masters, which allows a hybrid setup between SIMATIC S5/S7, PCs, ET 200 and other field devices to PROFIBUS DP. Function calls are required for the DP communication. These (DP-SEND/DP-RECV) must be integrated in the STEP 7 user program.

PG/OP communication

PG/OP communication allows all S7 stations connected to the network to be remotely programmed.

- S7 routing
  With the aid of S7 routing it is possible to use programming device communication across networks.
  Via the CP 342-5 as many as 16 TD/OPs can be merged into one S7-300 station. This requires only one connection resource in the S7-CPU (multiplex channel). The multiplex channel supports the acyclic HMI services.

S7 communication

S7 communication is used for the coupling:

- between SIMATIC S7 automation systems
- to HMI devices (OPs).
- to PCs, e.g. with CP 5512, CP 5611 A2, CP 5621 and SOFTNET-S7 or CP 5613 A2, CP 5613 FO, CP 5614 A2 and S7-5613.

Communication with PG and OP takes place without further configuration. In addition, the central controller can also be programmed and configured on a distributed basis via the CP 342-5.

The client functionality is provided by means of loadable communication blocks.

Open communication (SEND/RECEIVE)

Based on Layer 2 (FDL) of PROFIBUS, the CP 342-5 offers a simple, optimized interface for process or field communication.

This interface offers integrated, high-performance communication between SIMATIC S5, SIMATIC S7, SIMATIC 505 and PC. SEND/RECEIVE provides not only the SDA service (PLC/PLC connections) but also the SDN service (broadcast, multicast).

The communication partners are the automation systems:

- SIMATIC S7
  with CP 342-5, CP 343-5, CP 443-5 Extended and Basic
- SIMATIC S5
  with S5-95U with PROFIBUS interface, S5-115U/H, S5-135U, S5-155U/H with CP 5431 FMS/DP
- SIMATIC 505
  with CP 5434-FMS
- PCs
  with CP 5512, CP 5611 A2, CP 5621, CP 5613 A2, CP 5613 FO, CP 5614 A2
- Systems of other makes that are equipped with an FDL interface.

To use SEND/RECEIVE, function calls are required (PLC-SEND/PLC-RECEIVE), which must be linked into the STEP 7 user program.

Diagnostics data

Extensive diagnostic options are available via STEP 7, including:

- Status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- Bus statistics
- Message buffer

STEP 7 V5.1 SP2 or higher is required for configuring the full functional scope of the CP 342-5. In Version V5 or higher of STEP 7, the configuration data of the CP can also optionally be stored on the CPU and is retained even if there is a power failure. A module can therefore be replaced without having to reload the configuration data from a programming device. The CPU transfers the configuration data to the CP during start-up. Attention should therefore be paid to the memory capacity of the S7-CPU. The configuration data of the CP can be saved on the CPU. Modules can be swapped without using a programming device.

Configuration and programming of all SIMATIC S7 controllers connected to the network is possible over the network.

The function blocks for PROFIBUS DP are included in the standard library of STEP 7. The function blocks for using the open communication (SEND/RECEIVE) and S7 communication (S7 client) can be found in the SIMATIC NET library following installation of STEP 7.

CP 342-5

Technical specifications

Order No.	6GK7 342-5DA02-0XE0
Product type description	**CP 342-5**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
• for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA
Effective power loss	
Effective power loss	6.75 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4

Order No.	6GK7 342-5DA02-0XE0
Product type description	**CP 342-5**
Performance data	
PROFIBUS DP	
Service as DP-Master DPV0	Yes
Number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	2 160 bytes
• of the address area of the outputs as DP-Master overall	2 160 bytes
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave DPV0	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	240 bytes
• of the address area of the outputs as DP-Slave overall	240 bytes
S7 communication	
Number of possible connections for S7 communication, max.	16
PG/OP communication	
Number of operable OP connections (acyclic services)	16
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. [1]	16
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol	
Number of active connections in multi-protocol operation	
• without DP, max.	32
• with DP, max.	28
Data volume of the address area of the diagnostic data per DP-Slave	240 bytes

[1] also S5-compatible communication

Ordering data

	Order No.
CP 342-5 communications processor Communications processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbit/s, with electronic manual on CD-ROM	**6GK7 342-5DA02-0XE0**
STEP 7 Version 5.4 *Target system*: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement*: Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating license on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**

	Order No.
PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• Without PG interface	**6ES7 972-0BA51-0XA0**
• With PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• Without PG interface	**6ES7 972-0BA12-0XA0**
• With PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC S7-300 DM 370 Dummy module; used for module replacement	**6ES7 370-0AA01-0AA0**

CP 342-5 FO

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- PROFIBUS DP master or slave with optical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)
- Direct connection to the optical PROFIBUS network over the integrated fiber-optic interface for plastic and PCF fiber-optic cables
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - Open communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Benefits

get Designed for Industry

- The fiber-optic technology is used when
  - the environment is subject to strong EMC interference,
  - strong potential differences exist and
  - high transmission rates are required.
- The CP 342-5 FO is connected directly to the optical PROFIBUS and is therefore specially suited to harsh industrial environments
- Expansion of the process I/O at SIMATIC S7-300 by several PROFIBUS DP interfaces
- Optimization of applications and many application options through sending of data with S7 communication
- Comprehensive control and monitoring through multiplex function with OP communication
- Suitable for closed loop control tasks due to SYNC and FREEZE.

Application

The CP 342-5 FO communications processor is the communications module of SIMATIC S7-300 and SIMATIC C7 for the optical PROFIBUS DP bus system.

The CP 342-5 FO has a fiber optic interface that facilitates interference-immune connections even in environments with severe levels of radio interference.

It relieves the CPU of communications tasks.

Communication of the SIMATIC S7-300 and SIMATIC C7 with:

- the distributed I/O system ET 200 with integral optical interface
- SIMATIC S7-400 with IM 467 FO and CP 342-5 FO
- PC with CP 5613 FO
- Remaining PROFIBUS nodes via the optical bus terminal (OBT)

The number of CPs that can be used is dependent on the performance range of the CPU and on the communications services used.

Design

The CP 342-5 FO offers all the advantages of SIMATIC S7-300 system design:

- Compact design;
  single standard width of the SM modules of the SIMATIC S7-300
- Integrated fiber-optic cable interface;
  2 female duplex connectors for direct connection to the optical PROFIBUS over 2 x 2 male simplex connectors and 2 plug-in adapters
- 4-pin terminal block for connecting the external supply voltage of 24 V DC
- Easy installation;
  the CP 342-5 FO is snap-mounted on the S7-300 DIN rail and connected to adjacent modules through the bus connectors. There are no slot rules.
- In combination with IM 360/361, the CP 342-5 FO can also be used in an expansion rack (ER).
- User-friendly wiring;
  female FOC connector and the terminal block are easily accessible.
- The CP 342-5 FO can be operated without a fan;
  a back-up battery or a memory module are not required.

Function

The CP 342-5 FO provides access to different communication services of the PROFIBUS bus system:

- PROFIBUS DP
  (according to IEC 61 158/61784, master or slave)
- PG/OP communication
- S7 communication
- Open communication (SEND/RECEIVE)

PROFIBUS DP master

The CP342-5FO operates as a DP-V0 Master according to IEC 61 158/EN 50 170 Volume 2 and processes the data transfer completely independently. It supports the services of the Master Classes 1 and 2.

The data areas of the distributed I/Os are transferred consistently between CP and CPU. This applies to the use of the CP as DP-Master and as DP-Slave. As DP-Master, it permits connections to:

- The distributed IO system ET 200 with integral optical interface (incorporate as DP-V0 Slave)
- SIMATIC S7-300 with CP 342-5 FO as slave
- The remaining DP-V0 slaves via the optical bus terminal (OBT).

The CP 342-5 FO also offers the SYNC, FREEZE and shared input/output functions, as well as the activation/deactivation of slaves.

PROFIBUS DP slave

The CP 342-5 FO as a DP-V0 Slave allows the SIMATIC S7-300 to exchange data with the SIMATIC S7-400 and the other DP-Masters via the OBT, which allows a hybrid setup between SIMATIC S5/S7, PCs, ET 200 and other field devices to PROFIBUS DP. Function calls are required for DP communication, both as master and as slave. These (DP-SEND/DP-RECV) are shipped with STEP 7 and must be integrated in the user program.

PG/OP communication

PG/OP communication allows all S7 stations connected to the network to be remotely programmed.

- S7 routing:
  With the aid of S7 routing it is possible to use PG communication across networks.
  Via the CP 342-5 FO as many as 16 TD/OPs can be merged into one S7-300 station. This requires only one connection resource in the S7-CPU (multiplex channel). The multiplex channel supports the acyclic HMI services.

S7 communication

S7 communication is used for the coupling

- between SIMATIC S7 automation systems
- to HMI devices (OPs).
- to PCs, e.g. with CP 5512, CP 5611 A2, CP 5621 and SOFTNET-S7 or CP 5613 A2, CP 5613 FO, CP 5614 A2 and S7-5613

Communication with PG and OP takes place without further configuration. In addition, the central controller can also be programmed and configured on a distributed basis via the CP 342-5 FO.

The client functionality is provided by means of loadable communication blocks.

Open communication (SEND/RECEIVE)

Based on Layer 2 (FDL) of PROFIBUS (IEC 61158/EN 50170), the CP 342-5 FO offers a simple, optimized interface for process or field communication. This interface offers integrated, high-performance communication between SIMATIC S5, SIMATIC S7, SIMATIC 505 and PC.
SEND/RECEIVE provides not only the SDA service (PLC/PLC connections) but also the SDN service (broadcast, multicast).

The communication partners are the automation systems:

- SIMATIC S7
  with CP 342-5, CP 343-5, CP 443-5 Extended and Basic
- SIMATIC S5
  with S5-95U with PROFIBUS interface, S5-115U/H, S5-135U, S5-155U/H with CP 5431 FMS/DP
- SIMATIC 505
  with CP 5434-FMS
- PCs
  CP 5512, CP 5611 A2, CP 5621, CP 5613 A2, CP 5613 FO, CP 5614 A2
- Systems of other makes that are equipped with an FDL interface.

To use SEND/RECEIVE, function calls are required (PLC-SEND/PLC-RECEIVE), which must be linked into the STEP 7 user program.

Diagnostics data

Extensive diagnostic options are available via STEP 7, including:

- Status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- Bus statistics
- Message buffer

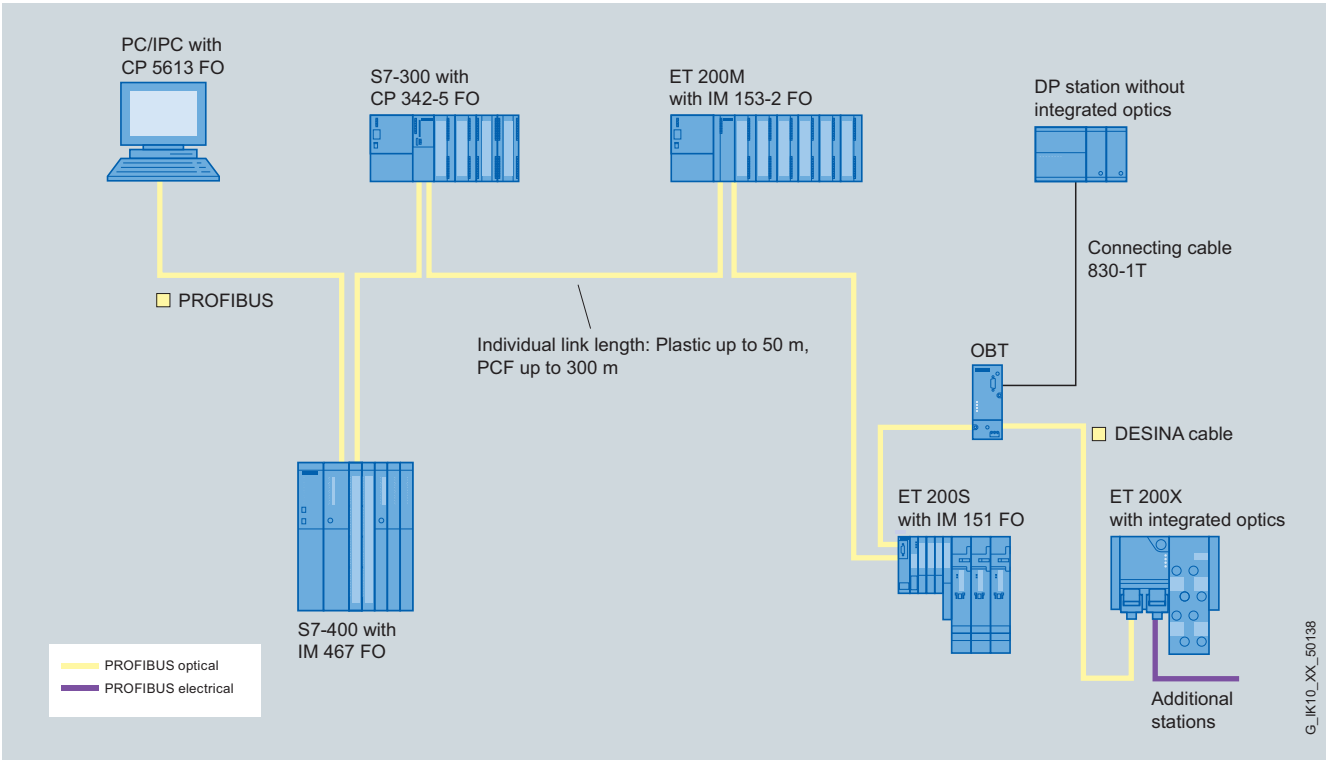
STEP 7 V5.1 SP2 or higher is required for configuring the full functional scope of the CP 342-5 FO. In Version V5 or higher of STEP 7, the configuration data of the CP can also optionally be stored on the CPU and is retained even if there is a power failure. A module can therefore be replaced without having to reload the configuration data from a programming device. The CPU transfers the configuration data to the CP during start-up. Attention should therefore be paid to the memory capacity of the S7-CPU. The configuration data of the CP can be saved on the CPU. Modules can be swapped without using a programming device.

Configuration and programming of all SIMATIC S7 controllers connected to the network is possible over the network.

The function blocks for PROFIBUS DP are included in the standard library of STEP 7. The function blocks for using the open communication (SEND/RECEIVE) and the S7 communication (S7 client) can be found in the SIMATIC NET library following installation of STEP 7.

CP 342-5 FO

Function (continued)



System configuration of optical PROFIBUS DP with CP 342-5 FO

Technical specifications

Order No.	6GK7 342-5DF00-0XE0
Product type description	**CP 342-5 FO**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of optical connection of the PROFIBUS interface	2 x duplex socket
Electrical connection version for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA

Order No.	6GK7 342-5DF00-0XE0
Product type description	**CP 342-5 FO**
Effective power loss	
Effective power loss	6.75 W
Transmission link	
• for PCF plastic optical fiber, max.	300 m
• for POF FOC, max.	50 m
Permitted ambient conditions	
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	Compact module
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4

Technical specifications (continued)

Order No.	6GK7 342-5DF00-0XE0
Product type description	**CP 342-5 FO**
Performance data	
PROFIBUS DP	
Service as DP-Master DPV0	Yes
Max. number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	2 160 bytes
• of the address area of the outputs as DP-Master overall	2 160 bytes
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
• of the address area of the diagnostic data per DP-Slave	240 bytes
Service as DP-Slave DPV0	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	240 bytes
• of the address area of the outputs as DP-Slave overall	240 bytes
S7 communication	
Number of possible connections for S7 communication, max.	16
PG/OP communication	
Number of operable OP connections (acyclic services)	16
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. [1]	16
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol	
Number of active connections in multi-protocol operation	
• without DP, max.	32
• with DP, max.	28

[1] also S5-compatible communication

Ordering data

	Order No.
CP 342-5 FO communications processor Communication processor for optical connection of SIMATIC S7-300 to PROFIBUS to 12 Mbit/s with electronic manual on CD-ROM	**6GK7 342-5DF00-0XE0**
STEP 7 Version 5.4 *Target system*: SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement*: Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating license on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**
Manual for PROFIBUS networks Paper version Network architecture, components (OLM (V3), OBT, ILM), configuring and installation	
• German	**6GK1 970-5CA20-0AA0**
• English	**6GK1 970-5CA20-0AA1**
PROFIBUS Plastic Fiber Optic, Simplex Connector/ Polishing Set 100 simplex connectors and 5 polishing sets for assembling PROFIBUS plastic fiber optic cables for the optical PROFIBUS DP	**6GK1 901-0FB00-0AA0**
PROFIBUS Plastic Fiber Optic, Stripping Tool Set Tools for removing the outer sheath or core sheath of Plastic Fiber Optic cables	**6GK1 905-6PA10**
Plug-in adapter For assembling the plastic Simplex connector in combination with CP 342-5 FO, IM 467 FO, IM 153-2 FO and IM 151 FO 50 units	**6ES7 195-1BE00-0XA0**

SIPLUS CP 342-5

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●	●		●	●	

- PROFIBUS DP master or slave with electrical interface for connecting the SIMATIC S7-300 and the SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 Kbit/s)
- Communication services:
  - PROFIBUS DP-V0
  - PG/OP communication (OP multiplexing)
  - S7 communication (client, server)
  - S5-compatible communication (SEND/RECEIVE)
- Easy configuration and programming over PROFIBUS
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

	SIPLUS CP 443-5-Extended	
Order No.	6AG1 342-5DA02-2XE0	6AG1 342-5DA02-4XE0
Order No. based on	6GK7 342-5DA02-0XE0	6GK7 342-5DA02-0XE0
Ambient temperature range	-25 ... +60 °C; condensation permitted	0 ... +60 °C; condensation permitted
Environmental conditions	Suited for exceptional medial load (e.g. by chlorine sulfur atmosphere)	
Technical specifications	The technical specifications are identical with those of the based-on modules.	

Additional information can be found in the Internet under:
http://www.siemens.com/siplus-techdocu

Ordering data

	Order No.
SIPLUS CP 342-5 communications processor	
Communications processor for electrical connection of SIMATIC S7-300 to PROFIBUS at up to 12 Mbit/s, with electronic manual on CD-ROM	
• -25 ... +60 °C	**6AG1 342-5DA02-2XE0**
• 0 ... +60 °C	**6AG1 342-5DA02-4XE0**
Accessories	see CP 443-5 Extended ordering data

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

Connection of SIMATIC S7-300 and SIMATIC C7 to PROFIBUS at up to 12 Mbit/s (including 45.45 kbit/s)

- Communication services:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
  - PROFIBUS FMS
- Easy configuration and programming over PROFIBUS
- Can be easily integrated into the S7-300 system
- Cross-network programming device communication through S7 routing
- Modules can be replaced without the need for a PG

Benefits

get Designed for Industry

- Simple integration of the SIMATIC S7 into a multi-vendor automation group by means of PROFIBUS FMS
- Extensive reduction of workload for the user of PROFIBUS FMS specification due to simple configuration and independent data conversion of data on the CP
- Sub-process-oriented design of an automation solution through the use of several CPs
- Integration of the SIMATIC S7-300 into existing systems by means of open communication
- Universal application of the CP due to the parallel use of different communication services on one CP

Application

The CP 343-5 communications processor is the module required for SIMATIC S7-300 and SIMATIC C7 for the PROFIBUS bus system.

It offloads communication tasks from the CPU.

S7-300 communication options using communication modules:

- FMS communication with PROFIBUS FMS stations through PROFIBUS
- Communication with programming devices, human machine interface devices
- Communication with other SIMATIC S7 systems
- Communication with SIMATIC S5 PLCs
- The number of CPs that can be operated depends on the performance range of the CPU and the communication services used.

Design

The CP 343-5 offers all the advantages of the SIMATIC S7-300 system design:

- Compact design;
  single standard width of the SM modules of the SIMATIC S7-300
- If the adjacent modules do not join correctly when predecessor modules are exchanged, a space holder module must be installed
- 9-pin Sub-D connector for bus connection to PROFIBUS
- 4-pin terminal block for connecting the external supply voltage of 24 V DC
- Simple connection;
  the CP 343-5 is snap-mounted on the S7-300 DIN rail and connected to adjacent modules through the bus connectors. The slots 4 to 11 in the subracks 0 to 3 (coupled through IM 360/361) are permissible for the CP 343-5.
- In conjunction with the IM 360/361, the CP 343-5 can also be operated in the expansion rack (ER)
- User-friendly wiring;
  Sub-D connector and terminal are easily accessible
- The CP 323-5 can be operated without a fan. Neither a backup battery nor a memory module are required

CP 343-5

Function

The CP 343-5 provides the user with various communication services of the PROFIBUS bus system:

- PG/OP communication
- S7 communication (PG, OP, S7 controllers)
- Open communication (SEND/RECEIVE)
- PROFIBUS FMS (to IEC 61158/61784)

PG/OP communication

PG/OP communication allows all S7 stations connected to the network to be remotely programmed.

- S7 routing
  With the aid of routing it is possible to use programming device communication across networks.

S7 communication

S7 communication is used for the coupling

- between SIMATIC S7 automation systems (CP 343-5 server only)
- to HMI devices (OPs).
- to SIMATIC 505
- to PCs, e.g. with CP 5512, CP 5611 A2, CP 5621 and SOFTNET-S7 or CP 5613 A2, CP 5613 FO, CP 5614 A2 and S7-5613.

Communication with PG and OP takes place without further configuration. In addition, the central controller can also be programmed and configured on a distributed basis via the CP 343-5.

Open communication (SEND/RECEIVE)

Based on Layer 2 (FDL) of PROFIBUS (IEC 61158/61784), the CP 343-5 offers a simple, optimized interface for process or field communication.

This interface offers integrated, high-performance communication between SIMATIC S5, SIMATIC S7, SIMATIC 505 and PC. SEND/RECEIVE provides not only the SDA service (PLC/PLC connections) but also the SDN service (broadcast, multicast).

The communication partners are the automation systems:

- SIMATIC S7
  with CP 342-5, CP 343-5, CP 443-5 Extended and Basic
- SIMATIC S5
  with S5-95U with PROFIBUS interface, S5-115U/H, S5-135U, S5-155U/H with CP 5431 FMS/DP,
- SIMATIC 505 with CP 5434-FMS
- PCs with CP 5512, CP 5611 A2, CP 5621, CP 5613 A2, CP 5613 FO, CP 5614 A2
- Systems of other makes that are equipped with an FDL interface.

To use SEND/RECEIVE, function calls are required (PLC-SEND/PLC-RECEIVE), which must be linked into the STEP 7 user program.

PROFIBUS FMS

PROFIBUS FMS, according to PROFIBUS IEC 61158/61784, permits the transmission of messages via various FMS services:

- READ, WRITE;
  for read or write access to variables of the communication partner from the user program (by means of a variable index or variable name),
  for the transfer of its own variable values to the communication partner. Partial access to variable values is supported.
  The communication is processed over acyclic connections (master/master, master/slave), over acyclic connections with a slave initiative and cyclic connections.
- INFORMATION REPORT;
  (Report) permits unconfirmed transmission of variables by an FMS server. This job type is used particularly for transmission on broadcast FMS connections.
- IDENTIFY;
  for requesting the identification features of the communication partner
- STATUS;
  for requesting the partner status

Diagnostics data

Extensive diagnostic options are available via STEP S7, including:

- Status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- Bus statistics
- Message buffer

Configuration

STEP 7 V5.1 SP2 or higher is required for configuring the full functional scope of the CP 343-5. In Version V5 or higher of STEP 7, the configuration data of the CP can also optionally be stored on the CPU and is retained even if there is a power failure. A module can therefore be replaced without having to reload the configuration data from a programming device. The CPU transfers the configuration data to the CP during start-up. Attention should therefore be paid to the memory capacity of the S7-CPU. The configuration data of the CP can be saved on the CPU. Modules can be swapped without using a programming device.

Configuration and programming of all SIMATIC S7 controllers connected to the network is possible over the network.

The function blocks for using the open communication (SEND/RECEIVE) and FMS can be found in the SIMATIC NET library following installation of STEP 7.

Technical specifications

Order No.	6GK7 343-5FA01-0XE0
Product type description	**CP 343-5**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
• for voltage supply	4-pin terminal strip
Supply voltage	
Type of supply voltage	DC
Supply voltage	24 V
Current consumption	
Current consumed	
• from backplane bus at 24 V DC typical	150 mA
• from external supply voltage at 24 V DC typical	250 mA
Effective power loss	
Effective power loss	6.75 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-300 compact module, single width
• Width	40 mm
• Height	125 mm
• Depth	120 mm
Net weight	300 g
Max. number of modules per CPU	4

Order No.	6GK7 343-5FA01-0XE0
Product type description	**CP 343-5**
Performance data	
FMS function	
Number of possible connections in the case of FMS connection, max.	16
Data volume of the variables	
• for READ job, max.	237 bytes
• for WRITE and REPORT job, max.	233 bytes
Number of variables	
• Configurable from server to FMS partner	256
• Loadable from server to FMS partner	256
S7 communication	
Number of possible connections for S7 communication, max.	16 [1]
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. [2]	16
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol	
Number of active connections in multi-protocol operation	48

[1] depending on the CPU type
[2] also S5-compatible communication

CP 343-5

Ordering data	Order No.
CP 343-5 communications processor Communications processor for connection of S7-300 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7 343-5FA01-0XE0**
STEP 7 Version 5.4 *Target system:* SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating license on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**

	Order No.
PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA51-0XA0**
• with PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• without PG interface	**6ES7 972-0BA12-0XA0**
• with PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**
SIMATIC S7-300 DM 370 Dummy module; used for module replacement	**6ES7 370-0AA01-0AA0**

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
		●	●	●	

- Connection of the S7-400 to PROFIBUS
- Communication services:
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
  - PROFIBUS FMS
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Modules can be replaced without the need for a PG
- SIMATIC H system operation for redundant S7 communication

Benefits

get Designed for Industry

- Simple integration of the SIMATIC S7 into a multi-vendor automation group by means of PROFIBUS FMS
- Application in fault-tolerant systems due to redundant S7 communication
- Extensive reduction of workload for the user of PROFIBUS FMS specification due to simple configuration and independent data conversion of data on the CP
- Plant-wide clock time thanks to clock synchronization
- Integration of the SIMATIC S7-400 into existing systems by means of open communication
- Universal application of the CP due to the parallel use of different communication services on one CP

Application

The CP 443-5 Basic communications processor is the module required for SIMATIC S7-400 for the PROFIBUS bus system.

It offloads communication tasks from the CPU.

Communications options of the S7-400 through communications modules:

- FMS communication with PROFIBUS stations through PROFIBUS
- Communication with programming devices, human machine interface devices
- Communication with other SIMATIC S7 systems
- Communication with SIMATIC S5 PLCs

The number of CPs that can be operated depends on the performance range of the CPU and the communication services used.

Design

The CP 443-5 communications processor features all the advantages of the SIMATIC S7-400 design:

- Compact construction;
  9-pin Sub-D socket for connection to PROFIBUS
- Single-width module
- Easy installation;
  the CP 443-5 is mounted on the S7-400 rack and connected to the other modules of the S7-400 by means of the backplane bus. No slot rules apply in this case.
- User-friendly wiring;
  the Sub-D socket is easily accessible and simple to operate.
- The CP 443-5 Basic can be operated without a fan. A backup battery or memory module is not required
- When using SEND/RECEIVE, the number of operable modules depends on the S7-400 CPU used.

CP 443-5 Basic

Function

The CP 443-5 Basic provides access to different communication services of the PROFIBUS bus system:

- PG/OP communication
- S7 communication (S7 controllers)
- Open communication (SEND/RECEIVE)
- PROFIBUS FMS (to IEC 61158/61784)
- Time synchronization

PG/OP communication

PG/OP communication allows all S7 stations connected to the network to be remotely programmed.

- S7 routing
  With the aid of routing it is possible to use programming device communication across networks.

S7 communication

S7 communication is used for the coupling

- between SIMATIC S7 automation systems
- to programming devices (PG/OP communication)
- to PCs,
  e.g. with CP 5512, CP 5611 A2, CP 5621 and SOFTNET-S7 or CP 5613 A2, CP 5613 FO, CP 5614 A2 and S7-5613
- to HMI devices (OPs).
- for redundant S7 communication, the CP 443-5 Basic can also be used in SIMATIC H systems.

Open communication (SEND/RECEIVE)

Based on Layer 2 (FDL) of PROFIBUS, the CP 443-5 Basic offers a simple, optimized interface for data communication. This interface offers integrated, high-performance communication between SIMATIC S5, SIMATIC S7 and the PC. It provides the services SDA (PLC/PLC connections) and SDN (Broadcast/Multicast).

The communication partners are the automation systems:

- SIMATIC S7
  with CP 342-5, CP 343-5, CP 443-5 Extended and Basic
- SIMATIC S5
  with S5-95U with PROFIBUS interface, S5-115U/H, S5-135U, S5-155U/H with CP 5431 FMS/DP
- SIMATIC 505
  with CP 5434-FMS
- PCs
  with CP 5512, CP 5611 A2, CP 5621, CP 5613 A2, CP 5613 FO, CP 5614 A2
- Systems of other makes that are equipped with an FDL interface.

To use SEND/RECEIVE, function calls are required (PLC-SEND/PLC-RECEIVE), which must be linked into the STEP 7 user program.

PROFIBUS FMS

PROFIBUS FMS, according to IEC 61158/61784, permits the transmission of messages via various FMS services:

- READ, WRITE;
  for read or write access to variables of the communication partner from the user program (by means of a variable index or variable name), for the transfer of its own variable values to the communication partner.
  Partial access to variables is supported. The communication takes place over acyclic connections (master/master, master/slave), over acyclic connections with a slave initiative and cyclic connections (master/slave).
- INFORMATION REPORT;
  (Report) permits unconfirmed transmission of variables by an FMS server. This job type is used particularly for transmission on broadcast FMS connections.
- IDENTIFY;
  for requesting the identification features of the communication partner
- STATUS;
  for requesting the partner status

Time synchronization

The CP 443-5 Basic is capable of forwarding the time of day of the S7-400 CPU to PROFIBUS. Conversely, the CP 443-5 Basic of the S7-400 CPU can make an existing time of day available on the PROFIBUS.

Diagnostics data

Extensive diagnostic options are available via STEP S7, including:

- Status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- Bus statistics
- Message buffer

Configuration

STEP 7 V5.1 SP2 or higher is required for configuring the full functional scope of the CP 443-5 Basic. In Version V5 or higher of STEP 7, the configuration data of the CP can also optionally be stored on the CPU and is retained even if there is a power failure. A module can therefore be replaced without having to reload the configuration data from a programming device. The CPU transfers the configuration data to the CP during start-up. The configuration data of the CP can be saved on the CPU. Modules can be swapped without using a programming device.

Configuration and programming of all SIMATIC S7 controllers connected to the network is possible over the network.

The function blocks for using the open communication (SEND/RECEIVE) can be found in the SIMATIC NET library following installation of STEP 7.

Technical specifications

Order No.	6GK7 443-5FX02-0XE0
Product type description	**CP 443-5 BASIC**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of electrical connection of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.2 A
Effective power loss	
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Net weight	700 g

Order No.	6GK7 443-5FX02-0XE0
Product type description	**CP 443-5 BASIC**
Performance data	
FMS function	
Number of possible connections in the case of FMS connection, max.	48
Data volume of the variables	
• for READ job, max.	237 bytes
• for WRITE job, max.	233 bytes
Number of variables	
• Configurable from server to FMS partner	512
• Loadable from server to FMS partner	2640
S7 communication	
Number of possible connections for S7 communication, max. [1]	48
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. [2]	32
Data volume as useful data for open communication (SEND/RECEIVE) per connection, max.	240 bytes
Multi-protocol operation	
Number of possible connections, of which 2 reserved for PG/OP communication in the case of multi-protocol operation, max.	59

[1] depending on the CPU type

[2] also S5-compatible communication

CP 443-5 Basic

Ordering data	Order No.
CP 443-5 communications processor Communications processor for connection of S7-400 to PROFIBUS, FMS, open communication, PG/OP and S7 communication; with electronic manual on CD-ROM	**6GK7 443-5FX02-0XE0**
STEP 7 Version 5.4 *Target system:* SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating license on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**

	Order No.
PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA51-0XA0**
• with PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• without PG interface	**6ES7 972-0BA12-0XA0**
• with PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	**6GK1 500-0AA10**

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- DP-V1 master connection of the S7-400 to PROFIBUS
- For setting up additional PROFIBUS DP lines
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE)
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication or DP-Master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

Benefits

get Designed for Industry

- Increased plant availability thanks to redundant connection of the process I/O (e.g. ET 200M) in the SIMATIC S7-400 H system.
- Particularly suitable for closed-loop control tasks thanks to SYNC/FREEZE and equidistant bus cycle
- Sub-process-oriented design of an automation solution through the use of several CPs
- Plant-wide clock time thanks to clock synchronization
- Integration of the SIMATIC S7-400 into existing systems by means of open communication
- Universal application of the CP due to the parallel use of different communication services on one CP
- Lower costs due to flexible and reaction-free commissioning by means of CiR (Configuration in RUN)

Application

The CP 443-5 Extended communications processor is the module required for SIMATIC S7-400 for the PROFIBUS bus system.

It offloads the CPU of communications tasks and enables further connections.

Communications options of the S7-400 through communications modules:

- As a master for PROFIBUS DP according to IEC 61158/ EN 50170
- Communication with programming devices, human machine interface devices
- Communication with other SIMATIC S7 systems
- Communication with SIMATIC S5 PLCs
- The number of CPs that can be operated depends on the performance range of the CPU and the communication services used.

Design

The CP 443-6 Extended communications processor features all the advantages of the SIMATIC S7-400 design:

- Compact construction;
  9-pin Sub-D socket for connection to PROFIBUS DP
- Single-width module
- Easy installation;
  the CP 443-5 is mounted on the S7-400 rack and connected to the other modules of the S7-400 by means of the backplane bus.
- User-friendly wiring;
  the Sub-D socket is easily accessible and simple to operate.
- The CP 443-5 Extended can be operated without a fan. A backup battery or memory module is not required
- A maximum of 14 CPs can be operated.

If the CP 443-5 Extended is used as a DP-Master, at least four and as many as 10 additional PROFIBUS DP lines can be set up in the central rack. The number of possible PROFIBUS DP lines depends on the SIMATIC S7-400 CPU that is used.

When using S7-communication, no slot allocation rules apply. The number of operable S7 connections depends on the S7-400 CPU.

When using SEND/RECEIVE, the number of operable modules also depends on the S7-400 CPU.

CP 443-5 Extended

Function

The CP 443-5 Extended provides access to different communication services of the PROFIBUS bus system:

- PROFIBUS DP (according to IEC 61158/61784)
- PG/OP communication
- S7 communication (S7 controllers)
- Open communication (SEND/RECEIVE)
- Time synchronization

Master for PROFIBUS DP

The CP 443-5 Extended operates as DP-V1 master. It processes data transfer autonomously and allows slaves to be connected, such as CP 342-5 as DP-Slave, DP-Slaves of the ET 200 distributed I/O system, etc. This means that the CP 443-5 Extended is able to connect the S7-400 station to PROFIBUS DP and is the ideal expansion to the integral DP-Master interfaces of the S7-400 CPUs for establishing additional PROFIBUS DP lines.

The CP 443-5 Extended can also be used in the SIMATIC S7 H system as a redundant DP-Master.

The CP 443-5 Extended is a DP-V1 master, i.e. it also supports the acyclic standard services incl. interrupt handling.

The CP 443-5 Extended also supports the SYNC and FREEZE functions, constant bus cycle time, direct slave-to-slave traffic, data set routing and changes to the configuration of the assigned distributed I/O during normal operation.

During normal operation, it is also possible to activate or deactivate DP-Slaves. This supports the step-by-step start-up of subprocesses, for example.

A diagnostic repeater allows the line to be diagnosed during operation, enabling line faults to be detected at an early stage. The CP 443-5 Extended supports operation with diagnostic repeater (including activation of topology identification in the diagnostic repeater).

The distributed I/Os are handled like central I/Os from the user's point of view. This means that there are no differences between the CP 443-5 Extended and the integral DP-Master interface of the S7-400 CPU with regard to configuration and parameterization. Depending on the scale of the system, the CP 443-5 Extended has extremely short response times.

PG/OP communication

PG/OP communication allows all S7 stations connected to the network to be remotely programmed.

- S7 routing
  With the aid of routing it is possible to use programming device communication across networks.

S7 communication

S7 communication is used for the coupling

- between SIMATIC S7 programmable controllers
- to programming devices (PG/OP communication)
- To PCs,
  e.g. with CP 5512, CP 5611 A2, CP 5621 and SOFTNET-S7 or CP 5613 A2, CP 5613 FO, CP 5614 A2 and S7-5613
- to HMI devices (OPs).

For redundant S7 communication, the CP 443-5 Extended can also be used in SIMATIC H systems.

Open communication (SEND/RECEIVE)

Based on Layer 2 (FDL) of PROFIBUS, the CP 443-5 Extended offers a simple, optimized interface for process or field communication. This interface offers uniform, high-performance communication between SIMATIC S5, SIMATIC S7 and the PC. It provides the services SDA (PLC/PLC connections) and SDN (Broadcast, Multicast).

The communication partners are the programmable controllers

- SIMATIC S7
  with CP 342-5, CP 343-5, CP 443-5 Extended and Basic
- SIMATIC S5
  with S5-95U with PROFIBUS interface, S5-115U/H, S5-135U, S5-155U/H with CP 5431 FMS/DP
- SIMATIC 505
  with CP 5434-FMS
- PCs
  with CP 5512, CP 5611 A2, CP 5621, CP 5613 A2, CP 5613 FO, CP 5614 A2
- Non-Siemens systems that are equipped with an FDL interface.

To use SEND/RECEIVE, function calls are required (PLC-SEND/PLC-RECEIVE), which must be linked into the STEP 7 user program.

Time synchronization

The CP 443-5 Extended is capable of forwarding the time of day of the S7-400 CPU to PROFIBUS. Conversely, the CP of the S7-400 CPU can make an existing time of day available on PROFIBUS

The CP 443-5 Extended supports

- The time-stamping of distributed process signals in combination with IM 153
- Time status value, daylight-saving time changeover, synchronization status

Data set routing

The CP 443-5 Extended supports the data set routing function. With this option, the CP can be used as a router for data sets that have to be sent 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) to set parameters and perform diagnostics for a PA field device over Industrial Ethernet, S7-400 (CP 443-1, CP 443-5 Extended) and DP/PA Coupler/Link.

Function (continued)

Diagnostics data

Extensive diagnostic options are available via STEP S7, including:

- Status of the CP
- General diagnostics and statistics functions
- Connection diagnostics
- Bus statistics
- Message buffer
- Support of operation with diagnostic repeater

CiR – Configuration in RUN

With CiR, it is possible to add or modify distributed I/O devices during normal operation.

- Adding PROFIBUS DP/PA slaves
- Adding/removing modules (e.g. I/O modules) in a modular DP-Slave (e.g. ET 200M and DP/PA Link)

Configuration

STEP 7 V5.1 SP2 or higher is required for configuring the full functional scope of the CP 443-5 Extended.

DP configuration/programming is performed for the CP 443-5 Extended in the same manner as for DP configuration/ programming of the integrated DP interfaces of the SIMATIC S7-400 CPUs with STEP 7.

The configuring data of the CPs are always saved on the CPU and are retained even after a PLC failure. A module can therefore by replaced without having to reload the configuration data from a programming device. The CPU transfers the configuration data to the CP during start-up. The configuration data of the CP can be saved on the CPU. Modules can be swapped without using a programming device.

Configuration and programming of all SIMATIC S7 controllers connected to the network is possible over the network.

The function blocks for using the open communication (SEND/RECEIVE) can be found in the SIMATIC NET library following installation of STEP 7.

Technical specifications

Order No.	6GK7 443-5DX04-0XE0
Product type description	**CP 443-5 Extended**
Transfer rate	
Transmission rate at Interface 1	
• Minimum	9.6 kbit/s
• Maximum	12 Mbit/s
Interfaces	
Version of electrical connection of the PROFIBUS interface	9-pin Sub-D socket (RS 485)
Supply voltage	
Type of supply voltage	DC
Supply voltage	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current consumed from backplane bus at 5 V DC, typical	1.3 A
Effective power loss	
Effective power loss	6.5 W
Permitted ambient conditions	
Ambient temperature	
• during operation	0 … +60 °C
• during storage	-40 … +70 °C
• during transport	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	S7-400 compact module, single width
• Width	25 mm
• Height	290 mm
• Depth	210 mm
Net weight	700 g
Max. number of modules per CPU	14
Number of external DP lines per central rack, max.	10

Order No.	6GK7 443-5DX04-0XE0
Product type description	**CP 443-5 Extended**
Performance data	
PROFIBUS DP	
Service as DP-Master DPV1	Yes
Number of DP-Slaves operable on DP-Master	125
Data volume	
• of the address area of the inputs as DP-Master overall	4 KB
• of the address area of the outputs as DP-Master overall	4 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
S7 communication	
Number of possible connections for S7 communication, max.	48 [1]
Open communication	
Number of possible connections for open communication by means of SEND/RECEIVE blocks, max. [2]	32
Data volume as useful data for open communication (SEND/ RECEIVE) per connection, max.	240 bytes
Multi-protocol operation	
Number of active connections in multi-protocol operation	
• without DP, max.	59
• with DP, max.	55

[1] depending on the CPU type

[2] also S5-compatible communication

CP 443-5 Extended

Ordering data	Order No.
CP 443-5 Extended communications processor for connection of the SIMATIC S7-400 to PROFIBUS, Extended version for PROFIBUS DP; with electronic manual on CD-ROM	**6GK7 443-5DX04-0XE0**
STEP 7 Version 5.4 *Target system:* SIMATIC S7-300/-400, SIMATIC C7, SIMATIC WinAC *Requirement:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating license on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**

	Order No.
PROFIBUS FastConnect bus connector RS485 With 90° cable outlet; insulation displacement technology, max. transmission rate 12 Mbit/s	
• without PG interface	**6ES7 972-0BA51-0XA0**
• with PG interface	**6ES7 972-0BB51-0XA0**
PROFIBUS bus connector IP20 With connection to PPI, MPI, PROFIBUS	
• without PG interface	**6ES7 972-0BA12-0XA0**
• with PG interface	**6ES7 972-0BB12-0XA0**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS nodes at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**

SIPLUS CP 443-5 Extended

Overview

DP-M	DP-S	FMS	PG/OP	S7/S5	
●			●	●	

- DP-V1 master connection of the S7-400 to PROFIBUS
- For setting up additional PROFIBUS DP lines
- Communication services:
  - PROFIBUS DP
  - PG/OP communication
  - S7 communication
  - S5-compatible communication (SEND/RECEIVE)
- Time synchronization
- Easy programming and configuration over PROFIBUS
- Cross-network programming device communication through S7 routing
- Can be easily integrated into the SIMATIC S7-400 system
- Module replacement without PG
- SIMATIC H system operation for redundant S7 communication or DP-Master communication
- Data record routing (PROFIBUS DP)
- Adding or modifying distributed I/O during operation

	SIPLUS CP 443-5-Extended
Order No.	6AG1 443-5DX04-4XE0
Order No. based on	6GK7 443-5DX04-0XE0
Environmental conditions	Suited for exceptional medial load (e.g. by chlorine sulfur atmosphere)
Technical specifications	The technical specifications are identical with those of the based-on modules.

Additional information can be found in the Internet under:
http://www.siemens.com/siplus-techdocu

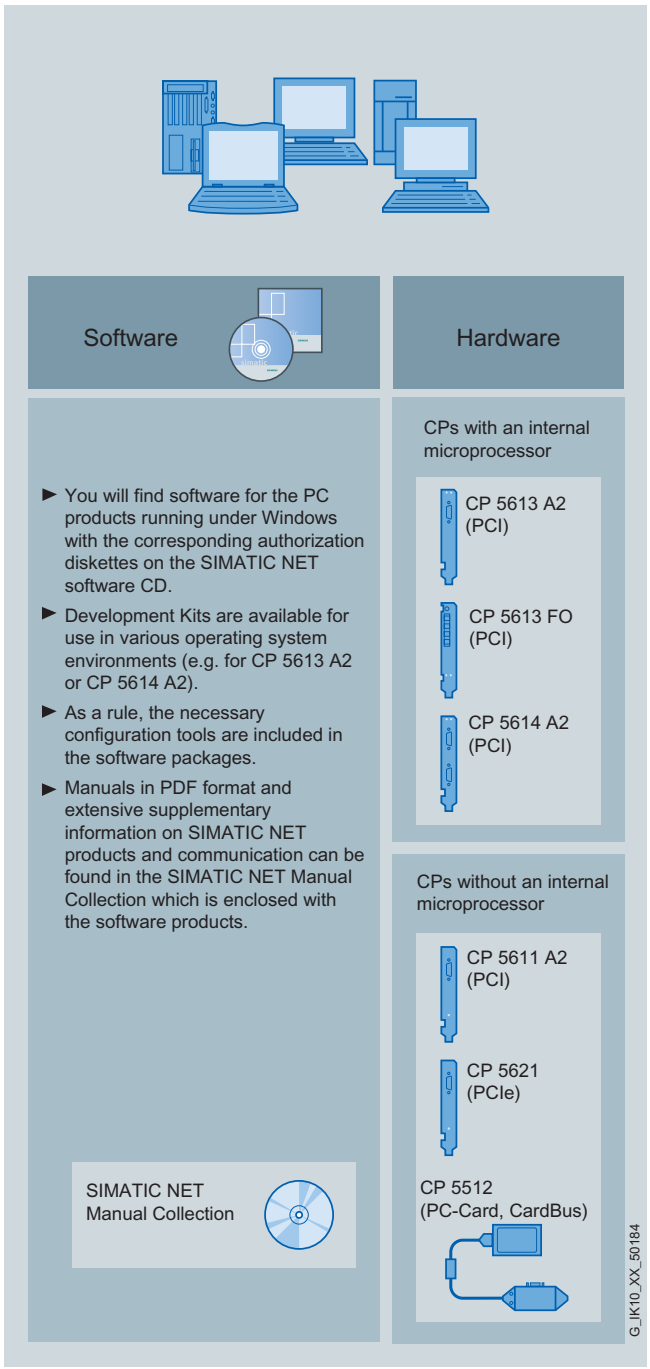
Ordering data

	Order No.
SIPLUS CP 443-5 Extended communications processor	
For connecting the SIMATIC S7-400 to PROFIBUS	
Extended version for PROFIBUS DP; with electronic manual on CD-ROM	**6AG1 443-5DX04-4XE0**
Accessories	see CP 443-5 Extended ordering data

4

Overview

Overview



System connection for PG/PC

PC card with an internal microprocessor

Recommended solution for:

- PC-based control systems (Soft Control, PLC, Numeric Control, Robot Control)
- Process control systems
- Operator control and monitoring systems (HMI)
- PROFIBUS DP slave interface (CP 5614 A2)
- PROFIBUS plants with large quantity framework (more than 8 stations)
- Multi-protocol operation
- Use of several CPs in one system
- Designs with fiber-optic interface (FO)

PC card without an internal microprocessor

Recommended solution for:

- Configuring tools (e.g. STEP 7)
- PROFIBUS DP diagnostics station (e.g. with COM PROFIBUS or as DP-Master Class 2)
- PROFIBUS DP slave connection
- PROFIBUS systems with up to 8 stations
- Mono protocol mode

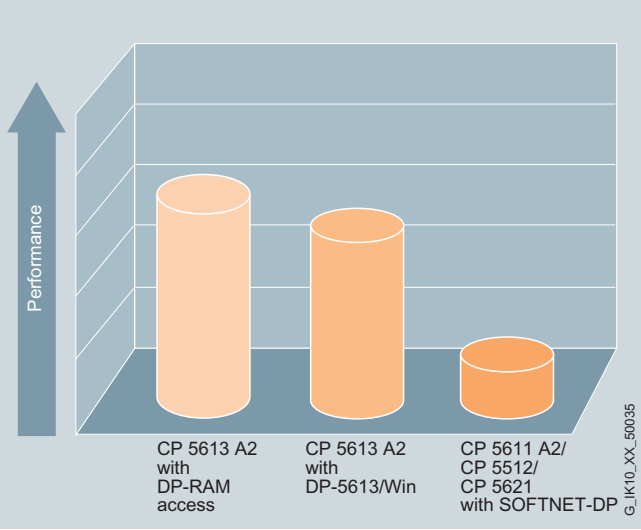
Overview

The following communications processors are available for connecting to the programming device or PC:

- CPs with an internal microprocessor:
  CP 5613 A2 (PCI), CP 5613 FO (PCI), CP 5614 A2 (PCI)
- CPs without an internal microprocessor:
  CP 5512 (PC Card/CardBus), CP 5611 A2 (PCI),
  CP 5621 (PCIe)

Performance of PROFIBUS CPs

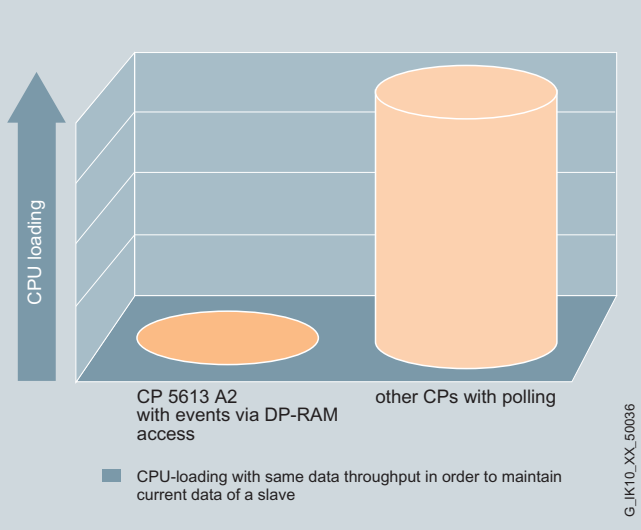
The maximum performance specifies how much digital input/output data can be read or written in 1 ms from the PROFIBUS application over the respective PROFIBUS CP (regardless of the physical characteristics of the bus).



Performance under almost identical CPU loading

CPU loading and access time

If event access (using interrupts) and polling access are compared, it can be shown that the CPU loading can be significantly reduced with the CP 5613 A2 using the event/filter mechanism, for the same data throughput.



Comparison of loading on the CPU with event access and with polling access

PROFIBUS CP performance data

		CP 5613 A2/ CP 5613 FO	CP 5614 A2	CP 5512/ CP 5611 A2/ CP 5621
Number of connectable DP-Slaves	max	122	122	60
Number of FDL tasks waiting	max	120	120	100
Number of PG/OP and S7 connections	max	50 [1]	50 [1]	8
Number of FMS connections	max	40 [2]	40 [2]	-

Note:

[1] for credit = 1; PDU size ≤ 480 bytes

[2] for credit = 1; max. 2 x CP 5613 A2 / CP 5613 FO / CP 5614 A2

Configuration with NCM PC

NCM PC replaces the previous PC configuration tools. This means that 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 and feel and create the same database. This means that uniform configuration is possible for the communication functions open communication, S7 communication and for the DP protocol and FMS protocol. Data only has to be entered once and data consistency is assured.

- 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.

More information

Additional information can be found in the Internet under:

http://support.automation.siemens.com/WW/view/de/15227599

Connection options to SIMATIC PCs

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.

													Embedded Systems				
Communication hardware	Communication software	Operating system environment of the communication software					SIMATIC Industrial PC/ Field PG						Op. sys.	SIMATIC Industrial PCs 4)			
		Windows XP Pro + SP1/2	Windows Server 2003 + SP1/2	Windows Server 2003 R2 / SP2	Vista Business / Ultimate	other operating systems	Field PG M	Rack PC 847B	Rack PC 547B, Panel PC 577B	Box PC 627B	Box PC 827B	Microbox 427B	Windows XPembedded + SP1/SP2/FP 2007	Microbox 427B	Panel PC 477, 477B	Panel PC 677B 7)	Box PC 627B
CPs and software for PROFIBUS																	
CP 5613 A2 CP 5613 FO CP 5614 A2 (PCI 32 Bit)	CP with DP base	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
	DK-5613 2) (DP-base)	○	○	○	○	○	–	○	○	○	○	–	○	–	–	○	○
	DP-5613	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
	S7-5613	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
	FMS-5613	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
CP 5611 A2 (PCI 32 Bit)	SOFTNET-DP	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
	SOFTNET-DP slave	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
	SOFTNET-S7	●	●	●	●	–	–	●	●	●	●	–	–	–	–	●	●
CP 5621 (PCIe x1)	SOFTNET-DP	●	●	●	●	–	–	○ 9)	●	○ 9)	–	–	–	–	–	○ 9)	○ 9)
	SOFTNET-DP slave	●	●	●	●	–	–	○ 9)	●	○ 9)	○ 9)	–	–	–	–	○ 9)	○ 9)
	SOFTNET-S7	●	●	●	●	–	–	○ 9)	●	○ 9)	–	–	–	–	–	○ 9)	○ 9)
CP 5512 (Cardbus 32 Bit)	SOFTNET-DP	●	●	●	●	–	●	–	–	–	–	–	–	–	–	–	–
	SOFTNET-DP slave	●	●	●	●	–	●	–	–	–	–	–	–	–	–	–	–
	SOFTNET-S7	●	●	●	●	–	●	–	–	–	–	–	–	–	–	–	–
SIMATIC PG/PC with integral PROFIBUS interface	SOFTNET-DP	●	●	●	●	–	●	–	–	●	●	○ 3)	●	○ 3)	●	●	●
	SOFTNET-DP slave	●	●	●	●	–	●	–	–	●	●	○ 3)	●	○ 3)	●	●	●
	SOFTNET-S7	●	●	●	●	–	●	–	–	●	●	○ 3)	●	○ 3)	●	●	●

1) Use of these CPs requires porting of the Development Kit DK-16xx PN IO to the relevant operating system environment. You can order the DK-16xx PN IO at www.siemens.com/simatic-net/dk16xx on the Internet. It contains sample software for Linux Suse 10 and Windows XP Professional. For IRT operation an exclusive interrupt is necessary; this is not available in all slots. The additional use of CP 1616/CP 1604 is not approvedfor SIMATIC Industrial PC versions and integrated PROFINET interface.
2) Use of these CPs in other operating system environments requires porting of the Development Kit DK-5613 to the relevant operating system environment. You can order the DK-5613 on the Internet at www.siemens.com/simatic-net/dk5613.
3) Integrated PROFIBUS interface is optional
4) possible with restrictions, if necessary, depending on memory expansion and processor capacity.
5) Integrated PROFIBUS interface is optional in some cases
6) requires at least 2 PCI or 2 PCIe slots (4-way redundancy requires 4 free PCI or 4 PCIe slots!); hybrid configurations with CP 1613 A2 (PCI) and CP 1623 (PCIe) are possible, depending on PC expansion
7) not possible for 677B in version with 1x PCI or 1x PCIe slot
8) without 4-way redundancy as there are only 2 slots
9) depending on the slots of the selected PC version

Notes
- Please always note the supplementary conditions for the specified SIMATIC NET products that you can view on the Internet pages shown below.
- for further details on XP embedded, see http://support.automation.siemens.com/WW/view/de/21661049
- further details on system requirements and operating environments can be found in the Readme file of the communication products on the SIMATIC NET PC Software CD, 2007 Edition or at http://support.automation.siemens.com/WW/view/de/26610954
- Updates and supplements to the catalog entries, as well as the above tables can be viewed at http://www.siemens.com/simatic-net/ik-info

● suitable
– not suitable
○ suitable under certain conditions

on SIMATIC NET CD 2007 Edition

G_IK10_XX_50025

Overview

DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●		●	●	●	●

- PCI card (universal keyed 5 V/3.3 V) with microprocessor for system connection for PCs and SIMATIC PG/PC to PROFIBUS with up to 12 Mbit/s
- Communication services:
  - PROFIBUS DP-Master according to IEC 61158/EN 50170
  - PG/OP communication with STEP 5 and STEP 7
  - S7 communication
  - Open communication (SEND/RECEIVE) based on the FDL interface
  - PROFIBUS FMS acc. to IEC 61158/EN 50170
- Comprehensive diagnostics possibilities for installation, commissioning and operation of the module
- High performance over direct dual-port RAM access
- Event and filter mechanisms to reduce the loading on the host CPU
- Multi-protocol mode and parallel operation of up to 4 CPs
- Implementation in Motion Control applications is possible because a constant bus cycle time is supported
- The appropriate OPC servers and configuration tools are included in the scope of supply of the respective communications software.

Benefits

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- Fast access to process data over dual-port RAM
- OPC as standard interface
- Consistent process data from a DP cycle
- More computing power is available in the PG/PC by taking the load off the host CPU
- Fast start-up through Plug&Play and diagnostic tools
- Implementation in Motion Control applications is possible because a constant bus cycle time is supported
- Simple porting to other operating system environments through dual port RAM interface
- Implementation is even possible in an industrial environment at high temperatures.
- Can be used flexibly in PG/PC due to PCI 3.3/5V, 33/66 MHz and compatibility to 64-bit PCI-X slot

Application

OPC FOUNDATION MEMBER

Compliance Tested OPC FOUNDATION

The CP 5613 A2 supports the connection of a SIMATIC PG/PC and PCs with a PCI slot to PROFIBUS.

The CP 5613 A2 provides high-performance support for control tasks on the PC (PC based Control, Numeric Control, Robot Control).

Design

- Short PCI card
- Operation possible in 3.3V and 5V PCI slots (universal keyed)
- 33 MHz or 66 MHz PCI clock
- Operation possible as 32-bit card in a 64-bit PCI X-slot
- 9-pin Sub-D socket for connection to PROFIBUS
- Diagnostics LEDs
- Parallel operation of up to 4 CPs[1)]

The module is installed by means of PCI standard mechanisms (Plug&Play).

Connection to the electrical PROFIBUS is by means of

- Bus connector and PROFIBUS bus cable or
- Bus terminal (e.g. bus terminal 12 M) and PROFIBUS bus cable

Connection to the optical PROFIBUS is by means of

- Bus cable with 2 bus connectors or
- PROFIBUS plug-in cable 830-1T

to an OLM.

When using CP 5613 A2 as a DP-master or in a PG/OP on a PROFIBUS DP, the connection to the optical PROFIBUS with integral interface and OBT is made over:

- Bus cable with 2 bus connectors or
- PROFIBUS plug-in cable 830-1T

to an optical bus terminal (OBT) for PROFIBUS DP.

[1)] FMS-5613 supports a maximum of two CP 5613 A2/5614 A2.

Function

PROFIBUS DP

Access to process data with DP-Base

The CP 5613 A2 is operated as a PROFIBUS DP master module that stores the process image (input/output and diagnostics data) in the dual-port RAM (memory area on the CP). High-performance data transfer to and from the PROFIBUS slaves is performed autonomously by the hardware of the CP 5613 A2. The user accesses the dual-port RAM directly.
The process data of the slaves are always consistent, i.e. the user receives the data of a slave from one and the same DP cycle.

Parallel operation of the DP-5613 and DP-Base software is not possible.

Event filter mechanism

The user receives up-to-date data over two access mechanisms:

- Cyclic polling of the DP-Slaves (higher loading for host CPU)
- Notification through event/filter mode on changing the input data of a slave (minimal loading for host CPU)

Both alternatives can be combined. This allows users to optimize use of the PC for their applications.

The event/filter mechanism can be used additionally for

- Notification by means of an interrupt of the diagnostic alarms from slaves
- During operation with constant bus cycle time, signaling by means of interrupt:
  - Start DP cycle
  - End of cyclic data communication with DP-Slaves

FastLogic

FastLogic means that the CP 5613 A2 can react autonomously to 4 plant statuses. This results in a short response time and independence from the host application, e.g. fast shutdown of devices.

DP programming interface

The DP programming interface (DP-Base) of the CP 5613 A2 features the following functions:

- DP-Master Class 1 including acyclic DP expansions
- DP-Master Class 2 including acyclic DP expansions

The process data is accessed directly through the dual-port RAM. The DP RAM interface not only offers fast access as DP-Master but also a basis for porting to other operating system environments (e.g. VXWorks, QNX, RMOS, RTX).

Administrative function calls (initialization and management services) are offered in a library (DP_BASE.DLL).

Development Kit DK-5613

The Development Kit DK-5613 provides access to the functions DP-Master Class 1 including acyclic DP expansions

The Software Development Kit DK-5613 is used to integrate the CP 5613 A2 and CP 5614 A2 communications processors into any operating system environment. The kit contains the necessary source code, including the descriptions in PDF format, and can be downloaded free of charge from the Internet.

Access to process data with DP-5613

- DP-Master Class 1

The CP 5613 A2 operates as a DP-Master Class 1 according to IEC 61158/EN 50170 and processes data communication with the distributed stations (DP-Slaves) completely autonomously. The central controller exchanges information with the DP-Slaves (e.g. ET 200S) in a specified, constantly repeating message cycle. The DP programming interface (DPLib.DLL) provides the PC programmer with function calls for data transfer. The DP interface also provides the SYNC and FREEZE functions as well as activation and deactivation of slaves.

The DP function expansions for Master Class 1 make it possible to perform acyclic read and write functions (DS_READ, DS_WRITE) as well as acknowledgement of alarms (ALARM_ACK) at the same time as processing cyclic data communication. Data that are to be transferred in non-isochronous mode (e.g. parameterization data) are only rarely changed, in comparison to the cyclic measured values, and are transferred at lower priority in parallel with the cyclic high-speed useful data transfer. Alarm acknowledgement by the master ensures reliable transfer of the alarms from DP-Slaves.

Parallel operation of the DP-Base und DP-5613 software is not possible.

- DP-Master Class 2

Apart from the DP-Master Class 1 services, the CP 5613 A2 also offers DP-Master Class 2 services to IEC 61158/EN 50170 in conjunction with the DP programming interface. Devices of this type (programming, configuration or operating devices) are used during start-up, for configuring the DP system or for operating the system during normal operation (diagnostics). The DP programming interface provides the following services:

- Master diagnostics
- Slave diagnostics
- Reading the inputs/outputs of a slave
- Reading the configuration data
- Changing slave addresses.

The extended DP functions comprise acyclic access to the parameters and measured values of a slave (e.g. field devices of process automation and intelligent HMI devices). This type of slave must be supplied with extensive parameter data during start-up and during normal operation (DS_READ, DS_WRITE, DS_DATA_TRANSPORT).

Function (continued)

Software for PG/OP communication

This software supports programming of the SIMATIC S5/S7 controllers (with the exception of SIMATIC S5-95U) over PROFIBUS in combination with STEP 5/STEP 7. PG/OP communication for the CP 5613 is already available after the CP 5613 A2 (DP-Base) has been installed. No additional software packages are required.

Open communication (SEND/RECEIVE) based on the FDL interface

SEND/RECEIVE (FDL interface) is already available following installation of the CP 5613 A2 (DP-Base) and provides services for data transfer, diagnostics and management. No additional software packages are required.

Software for S7 communication (S7-5613)

SIMATIC S7 system components communicate with each other using S7 communication functions. The S7 programming interface provides programming device/PC user programs with access to SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

The following services are available with S7 communication:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE (up to 64 KB per task)

Software for PROFIBUS FMS (FMS-5613)

With the FMS programming interface, PG/PCs can exchange different manufacturer data with FMS-capable controllers (e.g. S5 and S7) and field devices. Open communication is assured by using the FMS interface.

The FMS interface offers the following services:

- Administrative services
- CRL management services
- FMS connection management services
- Object directory management services for clients and server
- Variable services for clients and servers (Read, Write, Information Report)
- Server functionality
- VFD services (Virtual Field Device) for clients and servers
- Bus access information services (Live list)
- Trace and mini database

User interfaces

- OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the PROFIBUS DP, open communication, S7 communication and PROFIBUS FMS protocols for linking automation technology applications to OPC-capable Windows applications (Office, HMI systems, etc.).

- Programming interface through C library

The programming interfaces for existing applications are implemented as Dynamic Link Libraries (DLL). You can find the released compilers in the Readme file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

For Borland programming interfaces (e.g. DELPHI), partner solutions from the company SoftwareOption are offered.

For solutions for other operating systems, see Development Kit DK-5613.

Configuration

- S7 communication protocol, open communication protocol, DP protocol (DP-V0/DP-V1/DP-V2) and FMS protocol are configured in STEP 7 or NCM PC V5.1+SP2 and higher.
- The configuration tool NCM PC is included in the PROFIBUS software packages.

Diagnostics

Comprehensive diagnostic tools are available (for installation, start-up and operation) for the module itself and for the PROFIBUS DP network. These tools can be used for quick and easy start-up of a PROFIBUS network with a CP 5613 A2.

CP 5613 A2

Technical specifications

Order No.	6GK1 561-3AA01
Product type description	**CP 5613 A2**
Transfer rate	
Transmission rate as per RS422/485	
• Minimum	9.6 Mbit/s
• Maximum	12 Mbit/s
Interfaces	
Number of electrical connections for network components or terminal equipment	1
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket
• of the backplane bus	PCI (32-bit, 3.3 V/5 V; universal keyed; 33/66 MHz)
Supply voltage	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current 1 consumed from backplane bus, if DC	800 mA
Power loss	
Effective power loss	4 W
Permitted ambient conditions	
Ambient temperature	
• during operation	5 … 50 °C
• during transport	-40 … +70 °C
• during storage	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	85%
Design, dimensions and weight	
Module format	Short PCI card
• Width	107 mm
• Height	168 mm
Net weight	105 g

Order No.	6GK1 561-3AA01
Product type description	**CP 5613 A2**
Performance data	
PROFIBUS DP	
Service as DP-Master	
• DPV0	Yes
• DPV1	Yes
• DPV1 with SOFTNET-DP	No
• DPV2	Yes
Number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	30,256 KB
• of the address area of the outputs as DP-Master overall	30,256 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave	
• DPV0	No
• DPV1	No
• DPV1 with SOFTNET-DP	No
FMS function	
Number of possible connections in the case of FMS connection, for multi-protocol operation, max.	40
S7 communication	
Number of possible connections for S7/PG communication, max.	50
Open communication	
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	80
Multi-protocol operation	
Number of active connections in multi-protocol operation	50
Number of plug-in cards of the same type that can be plugged in for each PC station	4
Number of all configurable connections for each PC station	207

[1] also S5-compatible communication

Ordering data

	Order No.
CP 5613 A2 communications processor PCI card (32-bit; 3.3 V/5 V) for connection to PROFIBUS including DP-Base software with NCM PC; DP-RAM interface for DP-Master, including PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English	**6GK1 561-3AA01**
Software Upgrade for CP 5613 A2 and CP 5613 FO from V6.0 to 2007 Edition	**6GK1 561-3AA01-3AE0**
Development Kit DK-5613 Software development kit for CP 5613/CP 5614/ CP 5613 A2/CP 5614 A2/ CP 5613 FO for integration in other operating system environments on systems with a PCI slot	see http://www.siemens.com/simatic-net/dk5613
DP-5613, 2007 Edition Software for DP, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5DB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5DB00-3AL0**
• Upgrade DP-5613 from V6.4 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE0**
• Upgrade DP-5613 from V6.0, V6.1, V6.2 or V6.3 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE1**

	Order No.
S7-5613 Edition 2007 Software for S7-communication, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5CB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5CB00-3AL0**
• Upgrade S7-5613 from V6.4 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE0**
• Upgrade S7-5613 from V6.0, V6.1, V6.2 or V6.3 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE1**
FMS-5613, 2007 Edition Software for FMS protocol, including PG/OP communication, FDL, FMS-OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5FB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5FB00-3AL0**
• Upgrade FMS-5613 from V6.4 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE0**
• Upgrade FMS-5613 from V6.0, V6.1, V6.2 or V6.3 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet	**6GK1 500-0FC00**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	**6GK1 500-0AA10**

More information

You can find the DK-5613 in the Internet.

Additional information can be found in the Internet under:

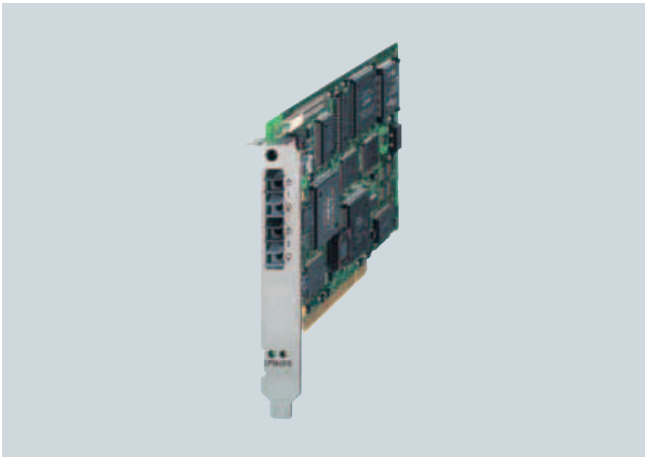
http://www.siemens.com/simatic-net/dk5613

The CP 5613 A2 module can also be used under the LINUX and UNIX operating systems. You can find information about the available LINUX distributors and UNIX operating systems from:

Siemens AG
Contact
Your IT4Industry Team
Werner-von-Siemens-Str. 60
91052 Erlangen, Germany
Tel.: +49(0)9131/7-4 61 11
Fax: +49(0)9131/7-4 47 57
E-mail: it4industry@siemens.com

CP 5613 FO

Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●		●	●	●	●

- PCI card with microprocessor for system connection for PCs and SIMATIC PGs/PC to the optical PROFIBUS at up to 12 Mbit/s
- Integrated fiber-optic interface for FO direct connection
- Communication services:
  - PROFIBUS DP master according to IEC 61158/EN 50170
  - PG/OP communication with STEP 5 and STEP 7
  - S7 communication
  - Open communication (SEND/RECEIVE) based on the FDL interface
  - PROFIBUS FMS acc. to IEC 61158/EN 50170
- Comprehensive diagnostics possibilities for installation, commissioning and operation of the module
- High performance over direct dual-port RAM access
- Event and filter mechanisms to reduce the loading on the host CPU
- Multi-protocol mode and parallel operation of up to 4 CPs
- Implementation in Motion Control applications is possible because a constant bus cycle time is supported
- The appropriate OPC servers and configuration tools are included in the scope of supply of the respective communications software.

Benefits

get Designed for Industry

- Fastest possible access to process data through dual port RAM
- OPC as standard interface
- Process-consistent data from a DP cycle
- Direct connection to the optical PROFIBUS through integrated FOC interface
- Higher computing performance in the PC by relieving the host CPU
- Fast commissioning through Plug&Play and diagnostic tools
- Implementation for motion control applications possible through support of the equidistant mode
- Easy portability to other operating systems through a dual port RAM interface
- Can also be used in high temperature industrial environments

Application

The CP 5613 FO provides a connection to the optical PROFIBUS for SIMATIC PG/PC and PCs with a PCI slot.

The CP 5613 FO provides high-performance support for control tasks on the PC (PC based Control, Numeric Control, Robot Control).

Design

- Short PCI card
- 2 duplex sockets for connecting plastic and PCF fiber-optic cables with 2 simplex connectors each to the optical PROFIBUS
- Connection of the external supply through a plug-in power supply unit. This ensures that data communication over the optical line is not interrupted when the PC is shut down.
- Diagnostic LEDs
- Parallel operation of max. 4 CPs [1)]

The module is installed using the standard PCI mechanisms (Plug&Play).

When the CP 5613 FO is used as a DP-Master or in a PG/OP on PROFIBUS DP, the optical PROFIBUS is connected with an integrated interface using:

- Plastic and PCF fiber-optic cables with simplex plugs

[1)] FMS-5613 supports up to two CP 5613/5614.

Function

PROFIBUS DP

Access to process data with DP-Base

The CP 5613 FO is operated as a PROFIBUS DP master module that stores the process image (input/output and diagnostics data) in the dual-port RAM (memory area on the CP). High-performance data transfer to and from the PROFIBUS slaves is performed autonomously by the hardware of the CP 5613 FO. The user accesses the dual-port RAM directly.

The process data of the slaves are always consistent, i.e. the user receives the data of a slave from one and the same DP cycle.

DP-Base and the DP 5613 software cannot be operated simultaneously.

Event/filter mechanism

The user receives up-to-date data over two access mechanisms:

- Cyclic polling of the DP-Slaves (higher loading for host CPU)
- Notification through event/filter mode on changing the input data of a slave (minimal loading for host CPU)

Both alternatives can be combined. This allows users to optimize use of the PC for their applications.

The event/filter mechanism can be used additionally for

- Notification by means of an interrupt of the diagnostic alarms from slaves
- During operation with constant bus cycle time, signaling by means of interrupt:
  - Start DP cycle
  - End cyclic data communication with DP-Slaves

Constant bus cycle time can be set for STEP 7 V5.1 + SP2 upwards or NCM PC V5.1+SP2.

DP programming interface

The DP programming interface (DP-Base) of the DP 5613 FO features the following functions:

- DP-Master Class 1
  including acyclic DP expansions
- DP-Master Class 2
  including acyclic expansions

The process data is accessed directly through the dual-port RAM. The dual-port RAM interface not only offers fast access as DP-Master but also easy porting to other operating system environments (e.g. VXWorks, QNX, RMOS, RTX).

Administrative function calls (initialization and management services) are offered in a library (DP_BASE.DLL).

Development Kit DK-5613

The Development Kit DK-5613 provides access to the functions DP-Master Class 1 including acyclic DP expansions

The Software Development Kit DK-5613 can be used to integrate the CP 5613/CP 5614 and CP 5613 FO communications processors into any operating system environments. The kit contains the necessary source code including the descriptions in PDF format and can be downloaded free of charge from the Internet.

Access to process data with DP-5613

- DP-Master Class 1
  The CP 5613 FO operates as DP-Master Class 1 to IEC 61158/EN 50170 and processes data communication with the distributed stations (DP-Slaves) completely autonomously. The central controller exchanges information with the DP-Slaves (e.g. ET 200S) in a specified, constantly repeating message cycle. The DP programming interface (DPLib.DLL) provides the PC programmer with function calls for data transfer. The DP interface also offers the SYNC and FREEZE functions as well as the activation and deactivation of slaves.
  The DP function expansions with respect to Master Class 1 enable acyclic read and write functions (DS_READ, DS_WRITE) and alarm acknowledgements (ALARM_ACK) to be performed in parallel with the cyclic data communication. Data that are to be transferred in acyclic mode (e.g. parameterization data) are only rarely changed in comparison to the cyclic measured values, and are transferred at lower priority in parallel with the cyclic high-speed useful data transfer. The acknowledgement of alarms by the master ensures reliable transmission of the alarms of DP-Slaves.
  DP-Base and DP 5613 software cannot be used at the same time.
- DP-Master Class 2
  Apart from the DP-Master Class 1 services, the CP 5613 FO also offers DP-Master Class 2 services to IEC 61158/EN 50170 in conjunction with the DP programming interface. Devices of this type (programming, configuration or control devices) are used during start-up, for configuring the DP system or for controlling the system during normal operation (diagnostics). The DP programming interface provides the following services:
  - Master diagnostics
  - Slave diagnostics
  - Reading the inputs/outputs of a slave
  - Reading configuration data and
  - Changing slave addresses.

The extended DP functions comprise acyclic access to the parameters and measured values of a slave (e.g. field devices of process automation and intelligent HMI devices). This type of slave must be supplied with extensive parameter data during start-up and during normal operation (DS_READ, DS_WRITE).

Function (continued)

Software for PG/OP communication

This software supports programming of the SIMATIC S5/S7 controllers (with the exception of SIMATIC S5-95U) over PROFIBUS in combination with STEP 5/STEP 7. PG/OP communication for the CP 5613 FO is available as soon as the CP 5613 (DP-Base) has been installed. No additional software packages are required.

Open communication (SEND/RECEIVE) based on the FDL interface

SEND/RECEIVE (FDL interface) is already available following installation of the CP 5613 FO (DP-Base) and provides services for data transfer, diagnostics and management. No additional software packages are required.

Software for S7 communication (S7-5613)

SIMATIC S7 system components communicate with each other using S7 communication functions. The S7 programming interface provides programming device/PC user programs with access to SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

The following services are available with S7 communication:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE (up to 64 KB per task)

Software for PROFIBUS FMS (FMS-5613)

With the FMS programming interface, PCs can exchange different manufacturer data with FMS-capable controllers (e.g. S5 and S7) and field devices. Open communication is made possible by using the FMS interface.

The FMS interface offers the following services:

- Administrative services
- CRL management services
- FMS connection management services
- Object directory management services for clients and server
- Variable services for clients and servers (Read, Write, Information Report)
- Server functionality
- VFD services (Virtual Field Device) for clients and servers
- Bus access information services (Live list)
- Trace and mini database

User interfaces

- OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the PROFIBUS DP, open communication, S7 communication and PROFIBUS FMS protocols for linking automation technology applications to OPC-capable Windows applications (Office, HMI systems, etc.).

- Programming interface through C library

The programming interfaces for existing applications are implemented as Dynamic Link Libraries (DLL). You can find the released compilers in the Readme file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

For Borland programming interfaces (e.g. DELPHI), partner solutions from SoftwareOption are offered.

For solutions for other operating systems, see Development Kit DK-5613.

Configuration

- S7 communication protocol, open communication protocol, DP protocol (DP-V0/DP-V1/DP-V2) and FMS protocol are configured in STEP 7/NCM PC V5.1+SP2 and higher.
- The configuring tool NCM PC is included in the PROFIBUS software packages.

Diagnostics data

Comprehensive diagnostic tools are available (for installation, start-up and operation) for the module itself and for the PROFIBUS network.

These tools can be used for quick and easy start-up of a PROFIBUS network with a CP 5613 FO.

Technical specifications

Order No.	6GK1 561-3FA00
Product type description	**CP 5613 A2 FO**
Transfer rate	
Transmission rate as per RS422/485	
• Minimum	9.6 Mbit/s
• Maximum	12 Mbit/s
Interfaces	
Number of electrical connections for network components or terminal equipment	1
Electrical connection version	
• of the backplane bus	PCI (32-bit; 5 V)
• for voltage supply	Low-voltage socket for hollow plug 3.5 mm (-) / 1.3 mm (+)
Version of optical connection of the PROFIBUS interface	2 x duplex socket (FO)
Supply voltage	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	5 V
• 2 from backplane bus	12 V
Supply voltage, external	
• Minimum	9 V
• Maximum	12 V
Relative symmetrical tolerance	
• at 5 V DC	5%
• at 12 V DC	5%
Current consumption	
Current consumed	
• 1 from backplane bus if DC	1,4 A
• 2 from backplane bus if DC	300 mA
• from external supply voltage at 12 V DC max.	400 mA
Power loss	
Effective power loss	7 W
Permitted ambient conditions	
Ambient temperature	
• during operation	5 … 60 °C
• during transport	-40 … +70 °C
• during storage	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	80%
Design, dimensions and weight	
Module format	PCI card
• Width	107 mm
• Height	168 mm
Net weight	120 g

Order No.	6GK1 561-3FA00
Product type description	**CP 5613 A2 FO**
Performance data	
PROFIBUS DP	
Service as DP-Master	
• DPV0	Yes
• DPV1	Yes
• DPV1 with SOFTNET-DP	No
• DPV2	Yes
Number of DP-Slaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	30,256 KB
• of the address area of the outputs as DP-Master overall	30,256 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave	
• DPV0	No
• DPV1	No
• DPV1 with SOFTNET-DP	No
FMS function	
Number of possible connections in the case of FMS connection, for multi-protocol operation, max.	40
S7 communication	
Number of possible connections for S7/PG communication, max.	50
Open communication	
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	80
Multi-protocol operation	
Number of active connections in multi-protocol operation	50
Number of plug-in cards of the same type that can be plugged in for each PC station	4
Number of all configurable connections for each PC station	207

[1] also S5-compatible communication

4

CP 5613 FO

Ordering data

	Order No.
CP 5613 FO communications processor PCI card (32-bit; 5 V) for connection to optical PROFIBUS including DP-base software with NCM PC; DP-RAM interface for DP-Master, including PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate; German/English	**6GK1 561-3FA00**
Software Upgrade for CP 5613 A2 and CP 5613 FO from V6.0 to 2007 Edition	**6GK1 561-3AA01-3AE0**
Development Kit DK-5613 Software Development Kit for CP 5613/CP 5614 for integration in other operating system environments on systems with a PCI slot	see http://www.siemens.com/simatic-net/dk5613
DP-5613, 2007 Edition Software for DP, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5DB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5DB00-3AL0**
• Upgrade DP-5613 from V6.4 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE0**
• Upgrade DP-5613 from V6.0, V6.1, V6.2 or V6.3 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE1**

	Order No.
S7-5613 Edition 2007 Software for S7-communication, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2 German/English	
• Single license for 1 installation	**6GK1 713-5CB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5CB00-3AL0**
• Upgrade S7-5613 from V6.4 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE0**
• Upgrade S7-5613 from V6.0, V6.1, V6.2 or V6.3 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE1**
FMS-5613, 2007 Edition Software for FMS protocol, including PG/OP communication, FDL, FMS-OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5FB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5FB00-3AL0**
• Upgrade FMS-5613 from V6.4 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE0**
• Upgrade FMS-5613 from V6.0, V6.1, V6.2 or V6.3 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE1**

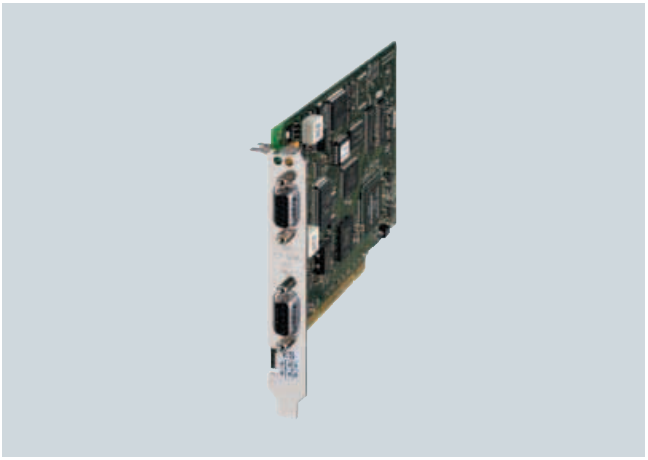
More information

You can find the DK5613 in the Internet.

Additional information can be found in the Internet under:

http://www.siemens.com/simatic-net/dk5613

Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●	●	●	●	●

- PCI card (universal keyed 5 V/3.3 V) with microprocessor for system connection for PCs and SIMATIC PG/PC to PROFIBUS with up to 12 Mbit/s
- Communication services:
  - PROFIBUS DP master and slave interface according to IEC 61158/ EN 50170 on one PCI card
  - PG/OP communication with STEP 5 and STEP 7
  - S7 communication
  - Open communication (SEND/RECEIVE) based on the FDL interface
  - PROFIBUS FMS acc. to IEC 61158/EN 50170
- Comprehensive diagnostics possibilities for installation, commissioning and operation of the module
- High performance over direct dual-port RAM access
- Event and filter mechanisms to reduce the loading on the host CPU
- Multi-protocol mode and parallel operation of up to 4 CPs
- Implementation of Motion Control applications is possible because a constant bus cycle time is supported
- The appropriate OPC servers and configuration tools are included in the scope of supply of the respective communications software.

Benefits

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- Only one slot is necessary for master and slave
- Fast access to process data over dual-port RAM
- OPC as standard interface
- Consistent process data from a DP cycle
- More computing power is available in the PG/PC by taking the load off the host CPU
- Fast start-up through Plug&Play and diagnostic tools
- Implementation in Motion Control applications is possible because a constant bus cycle time is supported
- Simple porting to other operating system environments through dual port RAM interface
- Implementation is even possible in an industrial environment at high temperatures.
- Can be used flexibly in PG/PC due to PCI 3.3/5V, 33/66 MHz and compatibility to 64-bit PCI-X slot

Application

The CP 5614 A2 supports the connection of a SIMATIC PG/PC and PCs with a PCI slot to PROFIBUS. It can be either a DP-Master or a DP-Slave.

Two different PROFIBUS networks can then be connected in a hierarchic structure on a PC with a PROFIBUS card and data can be transferred between the two.

The CP 5614 A2 provides high-performance support for control tasks on the PC (PC based Control, Numeric Control, Robot Control).

Design

- Short PCI card
- Operation possible in 3.3 V and 5 V PCI slots (universal keyed)
- 33 MHz or 66 MHz PCI clock
- Operation possible as 32-bit card in a 64-bit PCI X-slot
- 2 x 9-pin Sub-D socket for connection to PROFIBUS
- Diagnostics LEDs
- Parallel operation of up to 4 CPs[1)]

The module is installed by means of PCI standard mechanisms (Plug&Play).

Connection to the electrical PROFIBUS is by means of

- Bus connector and PROFIBUS bus cable or
- Bus terminal (e.g. bus terminal 12 M) and PROFIBUS bus cable

Connection to the optical PROFIBUS is by means of

- Bus cable with 2 bus connectors or
- PROFIBUS connecting cable 830-1

to an OLM.

Connection to the optical PROFIBUS with integral interface and OBT is by means of

- Bus cable with 2 bus connectors or
- PROFIBUS plug-in cable 830-1T

to an OLM.

When using CP 5614 A2 as a DP-master, DP-Slave or in a PG/OP on a PROFIBUS DP, the connection to the optical PROFIBUS with integral interface and OBT is made over:

- Bus cable with 2 bus connectors or
- PROFIBUS plug-in cable 830-1T

to an optical bus terminal (OBT) for PROFIBUS DP.

1) FMS-5613 supports a maximum of two CP 5613 A2/5614 A2.

CP 5614 A2

Function

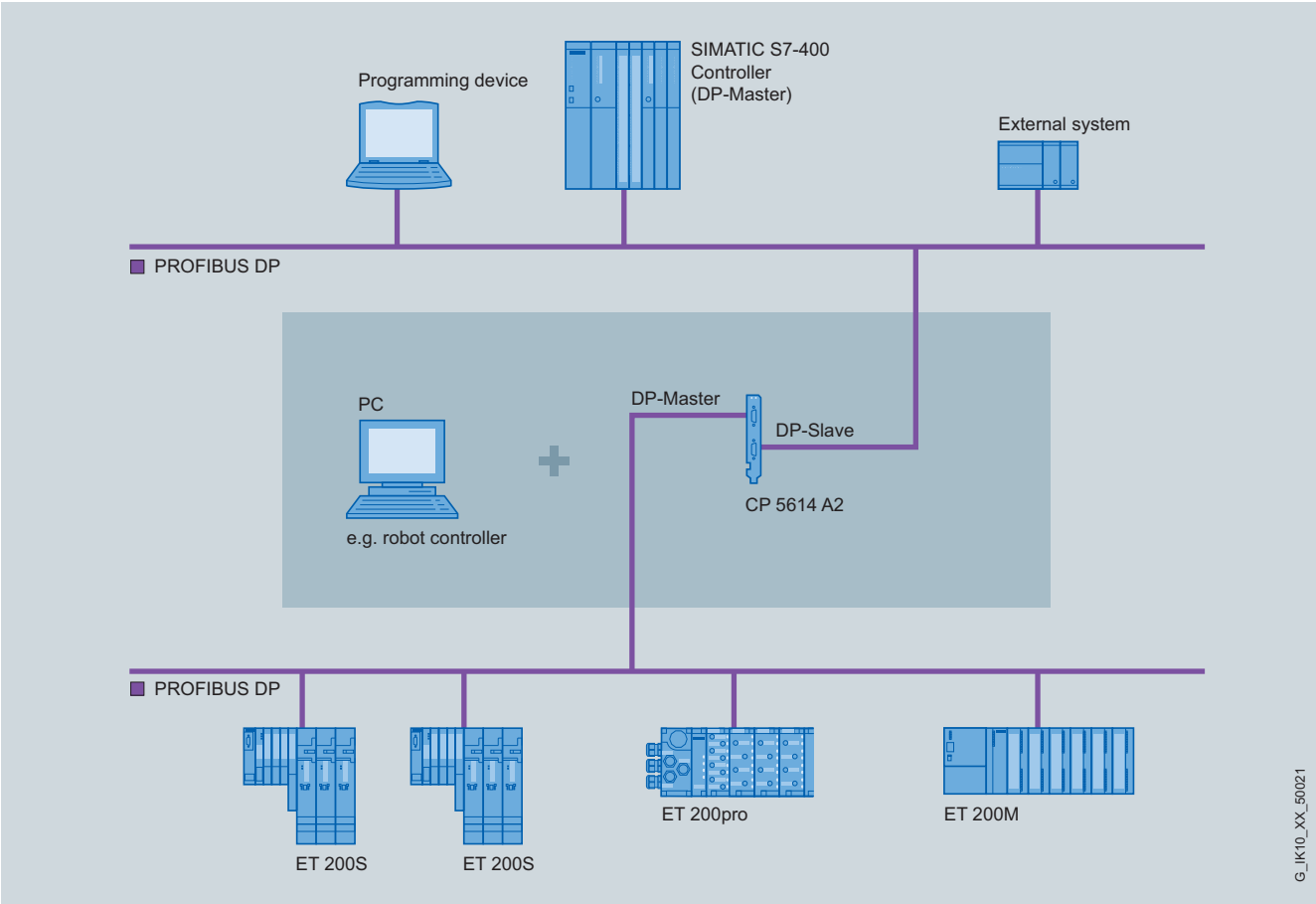
PROFIBUS DP

Access to process data

The CP 5614 A2 is operated as a PROFIBUS DP master and DP-Slave module that stores the process image (input/output and diagnostics data) in the dual-port RAM. High-performance data transfer to and from the PROFIBUS slaves is performed autonomously by the hardware of the CP 5614 A2. The user accesses the dual-port RAM directly.

The process data of the slaves are always consistent, i.e. the user receives the data of a slave from one and the same DP cycle.

Parallel operation of the DP-5613 (DP-Master) and DP Base (DP-Master, DP-Slave) software is not possible.



Configuration example CP 5613 A2 as DP-Master and DP-Slave

Event filter mechanism

The user receives up-to-date data over two access mechanisms:

- Cyclic polling of the DP-Slaves (high loading for host CPU)
- Notification through a new type of event/filter mode on changing the input data of a slave (minimal loading for host CPU)

Both alternatives can be combined. This allows users to optimize use of the PC for their applications.

The event/filter mechanism can be used additionally for

- Notification by means of an interrupt of the diagnostic alarms from slaves
- During operation with constant bus cycle time, signaling by means of interrupt:
  - Start DP cycle
  - End cyclic data communication with DP-Slaves

FastLogic

FastLogic means that the CP 5614 A2 can react autonomously to 4 plant statuses. This results in a short response time and independence from the host application, e.g. fast shutdown of devices.

Function (continued)

DP programming interface

The DP-Master programming interfaces of the CP 5613 A2 and CP 5614 A2 are identical.

The DP programming interface of the CP 5614 A2 features the following functions:

- DP-Slave
- DP-Master Class 1 including acyclic DP expansions
- DP-Master Class 2 including acyclic DP expansions

The process data is accessed directly through the dual-port RAM. The DP RAM interface not only offers fast access as DP-Master/slave but also a basis for porting to other operating system environments (e.g. VXWorks, QNX, RMOS, RTX).

Administrative function calls (initialization and management services as well as diagnostic functions) are provided through a DP-Master and DP-Slave library (DP_BASE.DLL and DPS_BASE.DLL).

A transfer mechanism (PC application) can be activated in the software as a linking component for data transfer between the master and slave interface.

Defined I/O data can be transferred in this manner between the master interface and the slave interface.

The two connected PROFIBUS networks can be operated with different PROFIBUS bus parameters because they are independent of each other.

Development Kit DK-5613

The Development Kit DK-5613 provides access to the functions DP-Master Class 1 and DP-Slave (incl. acyclic DP expansions)

The Software Development Kit DK-5613 is used to integrate the CP 5613 A2 and CP 5614 A2 communications processors into any operating system environment. The kit contains the necessary source code, including the descriptions in PDF format, and can be downloaded free of charge from the Internet.

Access to process data with DP-5613

- DP-Master Class 1

The CP 5614 A2 operates as a DP-Master Class 1 according to IEC 61158/EN 50170 and processes data communication with the distributed stations (DP-Slaves) completely autonomously. The central controller exchanges information with the DP-Slaves (e.g. ET 200S) in a fixed, repeating message cycle. The DP programming interface (DPLib.DLL) provides the PC programmer with function calls for data transfer. The DP interface also provides the SYNC and FREEZE functions as well as activation and deactivation of slaves.

The DP function expansions for masters Class 1 make it possible to perform acyclic read and write functions (DS_READ, DS_WRITE) as well as acknowledgement of alarms (ALARM_ACK) at the same time as processing cyclic data communication. Data that are to be transferred in non-isochronous mode (e.g. parameterization data) are only rarely changed, in comparison to the cyclic measured values, and are transferred at lower priority in parallel with the cyclic high-speed useful data transfer. Alarm acknowledgement by the master ensures reliable transfer of the alarms from DP-Slaves (DS_READ, DS_WRITE).

Parallel operation of the DP-Base und DP-5613 software is not possible.

- DP-Master Class 2

Apart from the DP-Master Class 1 services, the CP 5614 A2 also offers DP-Master Class 2 services to IEC 61158/EN 50170 in conjunction with the DP programming interface. Devices of this type (programming, configuration or operating devices) are used during start-up, for configuring the DP system or for operating the system during normal operation (diagnostics). The DP programming interface provides the following services:

- Master diagnostics
- Slave diagnostics
- Reading the inputs/outputs of a slave
- Reading the configuration data
- Changing slave addresses.

The extended DP functions comprise acyclic access to the parameters and measured values of a slave (e.g. field devices of process automation and intelligent HMI devices). This type of slave must be supplied with extensive parameter data during start-up and during normal operation. (DS_READ, DS_WRITE).

Software for PG/OP communication

This software supports programming of the SIMATIC S5/S7 controllers (with the exception of SIMATIC S5-95U) over PROFIBUS in combination with STEP 5/STEP 7. PG/OP communication for the CP 5614 A2 is already available after the CP 5614 A2 (DP-Base) has been installed. No additional software packages are required.

Open communication (SEND/RECEIVE) based on the FDL interface

SEND/RECEIVE (FDL interface) is already available following installation of the CP 5614 A2 (DP-Base) and provides services for data transfer, diagnostics and management. No additional software packages are required.

Software for S7 communication (S7-5613)

SIMATIC S7 system components communicate with each other using S7 communication functions. The S7 programming interface provides programming device/PC user programs with access to SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

The following services are available with S7 communication:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE (up to 64 KB per task)

Function (continued)

Software for PROFIBUS FMS (FMS-5613)

With the FMS programming interface, PG/PCs can exchange different manufacturer data with FMS-capable controllers (e.g. S5 and S7) and field devices. Open communication is assured by using the FMS interface.

The FMS interface offers the following services:

- Administrative services
- CRL management services
- FMS connection management services
- Object directory management services for clients and server
- Variable services for clients and servers (Read, Write, Information Report)
- Server functionality
- VFD services (Virtual Field Device) for clients and servers
- Bus access information services (Live list)
- Trace and mini database

User interfaces

- OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the PROFIBUS DP (DP-Master and DP-Slave), open communication, S7 communication and PROFIBUS FMS protocols for linking automation technology applications to OPC-capable Windows applications (Office, HMI systems, etc.).

- *Programming interface through C library*

The programming interfaces for existing applications are implemented as Dynamic Link Libraries (DLL). You can find the released compilers in the Read file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

For Borland programming interfaces (e.g. DELPHI), partner solutions from the company SoftwareOption are offered.

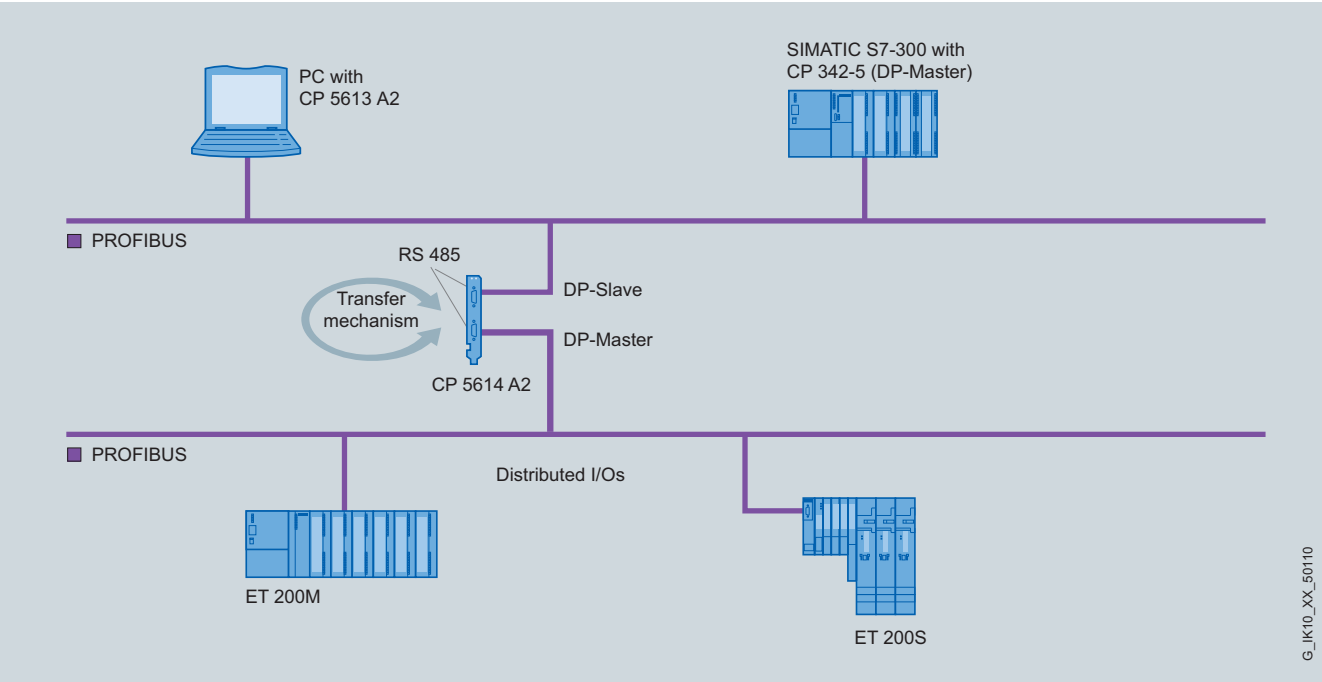
For solutions for other operating systems, see Development Kit DK-5613.

Configuration

- S7 communication protocol, open communication protocol, DP protocol (DP-V0/DP-V1/DP-V2) and FMS protocol are configured in STEP 7 or NCM PC V5.1+SP2 and higher.
- The configuration tool NCM PC is included in the PROFIBUS software packages.

Diagnostics

Comprehensive diagnostic tools are available (for installation, start-up and operation) for the module itself and for the PROFIBUS DP network. These tools can be used for quick and easy start-up of a PROFIBUS DP network with a CP 5614 A2.



Configuration example for CP 5614 A2

Technical specifications

Order No.	6GK1 561-4AA01
Product type description	**CP 5614 A2**
Transfer rate	
Transmission rate as per RS422/485	
• Minimum	9.6 Mbit/s
• Maximum	12 Mbit/s
Interfaces	
Number of electrical connections for network components or terminal equipment	2
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket
• of the backplane bus	PCI (32-bit, 3.3 V/5 V; universal keyed; 33/66 MHz)
Supply voltage	
Type of supply voltage	DC
Supply voltage 1 from backplane bus	5 V
Relative symmetrical tolerance at 5 V DC	5%
Current consumption	
Current 1 consumed from backplane bus, if DC	900 mA
Power loss	
Effective power loss	4.5 W
Permitted ambient conditions	
Ambient temperature	
• during operation	5 … 50 °C
• during transport	-40 … +70 °C
• during storage	-40 … +70 °C
Maximum relative humidity at 25 °C during operation	85%
Design, dimensions and weight	
Module format	Short PCI card
• Width	107 mm
• Height	168 mm
Net weight	120 g

Order No.	6GK1 561-4AA01
Product type description	**CP 5614 A2**
Performance data	
PROFIBUS DP	
Service as DP-Master	
• DPV0	Yes
• DPV1	Yes
• DPV1 with SOFTNET-DP	No
• DPV2	Yes
Number of DP-SLaves operable on DP-Master	124
Data volume	
• of the address area of the inputs as DP-Master overall	30,258 KB
• of the address area of the outputs as DP-Master overall	30,256 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave	
• DPV0	Yes
• DPV1	Yes
• DPV1 with SOFTNET-DP	No
Data volume	
• of the address area of the inputs as DP-Slave overall	244 bytes
• of the address area of the outputs as DP-Slave overall	244 bytes
FMS function	
Number of possible connections in the case of FMS connection, for multi-protocol operation, max.	40
S7 communication	
Number of possible connections for S7/PG communication, max.	50
Open communication	
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	80
Multi-protocol operation	
Number of active connections in multi-protocol operation	50
Number of plug-in cards of the same type that can be plugged in for each PC station	4
Number of all configurable connections for each PC station	207

[1] also S5-compatible communication

CP 5614 A2

Ordering data

	Order No.
CP 5614 A2 communications processor PCI card (32-bit; 3.3 V/5 V) master and slave interface to PROFIBUS including DP-Base software with NCM PC; DP-RAM interface for DP-Master, including PG and FDL protocol; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, Class A, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; German/English	**6GK1 561-4AA01**
Software Upgrade for CP 5613 A2 and CP 5613 FO from V6.0 to 2007 Edition	**6GK1 561-3AA01-3AE0**
Development Kit DK-5613 Software development kit for CP 5613/CP 5614/ CP 5613 A2/CP 5614 A2/ CP 5613 FO for integration in other operating system environments on systems with a PCI slot	siehe http://www.siemens.com/simatic-net/dk5613
DP-5613, 2007 Edition Software for DP, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2; German/English	
• Single license for 1 installation	**6GK1 713-5DB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5DB00-3AL0**
• Upgrade DP-5613 from V6.4 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE0**
• Upgrade DP-5613 from V6.0, V6.1, V6.2 or V6.3 to DP-5613 2007 Edition	**6GK1 713-5DB00-3AE1**
S7-5613 Edition 2007 Software for S7-communication, including PG and FDL protocol, OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5CB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software v ersion	**6GK1 713-5CB00-3AL0**
• Upgrade S7-5613 from V6.4 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE0**
• Upgrade S7-5613 from V6.0, V6.1, V6.2 or V6.3 to S7-5613 2007 Edition	**6GK1 713-5CB00-3AE1**
FMS-5613, 2007 Edition Software for FMS protocol, including PG/OP communication; FDL, FMS-OPC server and NCM PC; runtime software, software and electronic manual on USB stick, Class A for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5613, CP 5613 A2, CP 5613 FO, CP 5614, CP 5614 A2, German/English	
• Single license for 1 installation	**6GK1 713-5FB70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 713-5FB00-3AL0**
• Upgrade FMS-5613 from V6.4 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE0**
• Upgrade FMS-5613 from V6.0, V6.1, V6.2 or V6.3 to FMS-5613 2007 Edition	**6GK1 713-5FB00-3AE1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet	**6GK1 500-0FC00**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	**6GK1 500-0AA10**

More information

You can find the DK5613 in the Internet.

Additional information can be found in the Internet under:

http://www.siemens.com/simatic-net/dk5613

Overview

DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

- For the connection of PG/PC and notebooks using PC-card slot (CardBus 32-bit) to PROFIBUS and MPI of the SIMATIC S7
- Communication services:
  - PROFIBUS DP Master Class 1 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP Master Class 2 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP slave with SOFTNET-DP slave
  - PG/OP communication
  - S7 communication with SOFTNET-S7
  - Open communication (SEND/RECEIVE on basis of the FDL interface) with SOFTNET-DP or SOFTNET-S7
- PC card Type II (CardBus 32-bit); for programming device/PC with PC card slot and notebooks
  - Can be used with: STEP 7 and NCM PC; (ProTool, Micro/Win, ProTool/Pro, SIMATIC PDM for PG/OP communication)
  - SOFTNET-S7 (for S7-communication)
  - SOFTNET-DP, SOFTNET-DP slave (for DP)
- The appropriate OPC servers are included in the scope of supply of the respective communication software

Benefits

get Designed for Industry

- Connection for notebooks or other portable PCs to PROFIBUS (e.g. for diagnostics and commissioning)
- Easy installation and commissioning
- Optimized for SOFTNET.
- OPC as standard interface
- Uniform procedure and configuration functionality with NCM PC and STEP 7.

Application

The CP 5512 is used to connect programming devices and notebook computers with a PC card slot for CardBus (32-bit) to PROFIBUS and to the multipoint MPI interface of SIMATIC S7.

Design

- PC card Typ II for CardBus (32 bit)
- Adapter with 9-pin Sub-D connector for connection to PROFIBUS

Function

Various different software packages can be used to operate the CP 5512 and it allows the user to execute programming device functions and PC functions over PROFIBUS and the multipoint interface MPI.

Only one CP can be used per programming device, PG/PC or notebook computer. Similarly only one protocol (PROFIBUS DP, S7 communication or FDL) can be used per CP.

The following software packages support the CP 5512:

- STEP 7 V5.2 and higher;
  drivers for the CP 5512 that execute under Windows 2000 Professional and XP Professional are included in the scope of supply of STEP 7.
- SOFTNET-S7 V6.1 and higher;
  with this package, the S7 programming interface under Windows XP Professional can be used (Windows 2000 Professional from SOFTNET-S7 V6.1 SP1 upwards).
- SOFTNET-DP V6.1 and higher;
  the CP 5512 can be used as a PROFIBUS DP Master Class 1 or 2 under Windows XP Professional (Windows 2000 Professional from SOFTNET-DP V6.1 SP1 upwards).
- SOFTNET-DP slave V6.1 and higher;
  for using the CP 5512 as a PROFIBUS DP slave under Windows XP Professional (Windows 2000 Professional from SOFTNET-DP slave V6.1 SP1 upwards).
- STEP 7-Micro/WIN V3.2 SP4 and higher;
  hardware basis for the programming software of the SIMATIC S7-200 programmable controller.
- ProTool, ProTool/Pro V6.0 SP2;
  the CP 5512 can be used as a hardware basis for the configuration tool for SIMATIC Operator Panels, Touch Panels and Text Displays.
- NCM PC V5.2 and higher;
  under Windows XP Professional
- SIMATIC PDM;
  drivers for the CP 5512 that execute under Windows 2000 Professional and XP Professional are included in the scope of supply of SIMATIC PDM.

CP 5512

Technical specifications

Order No.	6GK1 551-2AA00
Product type description	**CP 5512**
Transfer rate	
Transmission rate as per RS422/485	
• Minimum	9.6 Mbit/s
• Maximum	12 Mbit/s
Interfaces	
Number of electrical connections for network components or terminal equipment	1
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket
• of the backplane bus	PC Card Type II (32 bit CardBus).
Supply voltage	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	3 V
• 2 from backplane bus	3,6 V
Current consumption	
Current 1 consumed from backplane bus, if DC	520 mA
Power loss	
Effective power loss	1.8 W
Permitted ambient conditions	
Ambient temperature	
• during operation	5 … 45 °C
• during transport	-20 … +60 °C
• during storage	-20 … +60 °C
Maximum relative humidity at 25 °C during operation	95%
Design, dimensions and weight	
Module format	PC Card Type II for CardBus (32-bit).
• Width	54 mm
• Height	85 mm
• Depth	5 mm
Net weight	135 g

Order No.	6GK1 551-2AA00
Product type description	**CP 5512**
Performance data	
PROFIBUS DP	
Service as DP-Master	
• DPV0	Yes
• DPV1	No
• DPV1 with SOFTNET-DP	Yes
• DPV2	No
Data volume	
• of the address area of the inputs as DP-Master overall	7,808 KB
• of the address area of the outputs as DP-Master overall	7,808 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave	
• DPV0	Yes
• DPV1	No
• DPV1 with SOFTNET-DP	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	122 bytes
• of the address area of the outputs as DP-Slave overall	122 bytes
S7 communication	
Number of possible connections for S7/PG communication, max.	8
Open communication	
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	50
Multi-protocol operation	
Number of plug-in cards of the same type that can be plugged in for each PC station	1
Number of all configurable connections for each PC station	50

[1] also S5-compatible communication

Ordering data	Order No.
CP 5512 communications processor PC-Card (CardBus, 32-bit) for connection of a programming device or notebook to PROFIBUS or MPI, under 32 bit in connection with PROFIBUS SOFTNET software or STEP 7; German/English	**6GK1 551-2AA00**
SOFTNET-S7 2007 Edition Software for S7 communication, incl. FDL protocol with OPC server and NCM PC, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621; German/English	
• Single license for 1 installation	**6GK1 704-5CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5CW00-3AL0**
• Upgrade SOFTNET-S7 from V6.4 to SOFTNET-S7, 2007 Edition	**6GK1 704-5CW00-3AE0**
• Upgrade SOFTNET-S7 from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7 2007 Edition	**6GK1 704-5CW00-3AE1**
SOFTNET-DP 2007 Edition Software for DP protocol (Master Class 1 and 2) including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit, Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/ Ultimate, for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5DW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5DW00-3AL0**
• Upgrade SOFTNET-DP from V6.4 to SOFTNET-DP, 2007 Edition	**6GK1 704-5DW00-3AE0**
• Upgrade SOFTNET-DP from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP 2007 Edition	**6GK1 704-5DW00-3AE1**

	Order No.
SOFTNET-DP Slave, 2007 Edition Software for DP-Slave, with DP-OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2; Windows Vista Business/Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5SW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5SW00-3AL0**
• Upgrade SOFTNET-DP Slave from V6.4 to SOFTNET-DP Slave, 2007 Edition	**6GK1704-5SW00-3AE0**
• Upgrade SOFTNET-DP Slave from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Slave, 2007 Edition	**6GK1704-5SW00-3AE1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet	**6GK1 500-0FC00**
PROFIBUS adapter for CP 5512	**C79459-A1890-A10**

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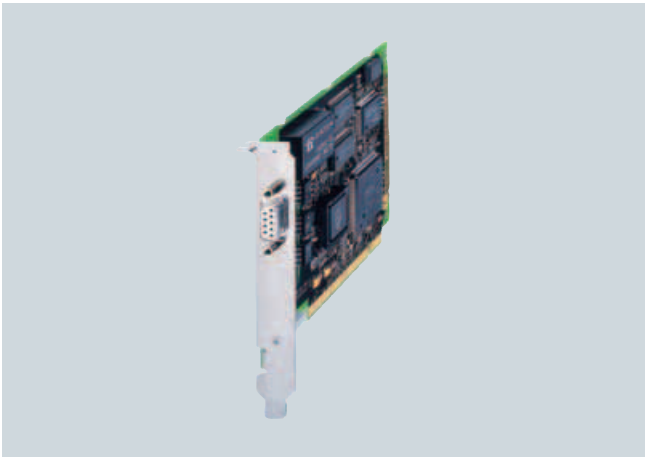
CP 5611 A2

Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

- PCI card (universal-keyed 5 V/3.3 V) for connecting PCs and SIMATIC PG/PC to PROFIBUS at up to 12 Mbit/s and to the MPI interface of SIMATIC S7
- Communication services:
  - PROFIBUS DP Master Class 1 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP Master Class 2 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP slave with SOFTNET-DP slave
  - PG/OP communication
  - S7 communication with SOFTNET-S7
  - Open communication (SEND/RECEIVE on basis of the FDL interface) with SOFTNET-DP or SOFTNET-S7
- Can be used with:
  - STEP 7, STEP 7-Micro/Win, ProTool, ProTool/Pro, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7-communication)
  - SOFTNET-DP, SOFTNET-DP slave (for DP)
- The appropriate OPC servers and configuration tools are included in the scope of supply of the respective communications software.

Benefits

get Designed for Industry

- Interface for portable PCs (e.g. for diagnostics and commissioning)
- Easy installation and startup
- Optimally matched to SOFTNET
- OPC as standard interface
- Uniform procedure and configuration functions for NCM PC and STEP 7
- Flexible use possible in PG/PC through PCI 3.3/5 V, 33/66 MHz and compatibility with 64-bit PCI X-slot

Application

The CP 5611 A2 is used to connect programming devices and PCs to PROFIBUS and to the multipoint MPI interface of SIMATIC S7:

- for programming devices and PCs with a PCI slot

Design

- Short PCI card
- Operation possible in 3.3 V and 5 V PCI slots (universal keyed)
- 33 MHz or 66 MHz PCI clock
- Operation possible as 32-bit card in a 64-bit PCI X-slot
- 9-pin Sub-D socket for connection to PROFIBUS

Function

Various software packages can be used to operate the CP 5611 A2, which allows the user to execute programming device functions and PC functions over PROFIBUS and the multipoint interface MPI.

Only one CP can be used per PG or PC. Similarly only one protocol (PROFIBUS DP, S7 communication or FDL) can be used per CP.

The following software packages support the CP 5611 A2:

- STEP 7 V3.2 and higher;
  drivers for the CP 5611 A2 are included in the scope of supply of STEP 7.
- SOFTNET-S7 V3.2 and higher;
  this package allows the S7 programming interface to be used.
- SOFTNET-DP V3.2 and higher;
  the CP 5611 A2 can be used as a PROFIBUS DP Master Class 1 or 2.
- SOFTNET DP Slave V3.2 and higher;
  for using the CP 5611 A2 as a PROFIBUS DP slave.
- COM PROFIBUS V3.3 and higher;
  the CP 5611 A2 can be used in combination with this package for start-up or diagnostics (DP online functions) for PROFIBUS DP systems.
- STEP 7-Micro/WIN V2.1 and higher;
  hardware basis for the programming software of SIMATIC S7-200 automation systems
- ProTool, ProTool/Pro;
  the CP 5611 A2 can be used as a hardware basis for the configuration tool for all SIMATIC Operator Panels, Touch Panels and Text Displays.
- NCM PC;
  drivers for the CP 5611 A2 are included in the scope of supply

Technical specifications

Order No.	6GK1 561-1AA01	6GK1 561-1AM01
Product type description	**CP 5611 A2**	**CP 5611 A2 MPI**
Transfer rate		
Transmission rate as per RS422/485		
• Minimum	9.6 Mbit/s	9.6 Mbit/s
• Maximum	12 Mbit/s	12 Mbit/s
Connections for network components/terminal equipment		
Number of electrical connections for network components or terminal equipment	1	1
Interfaces		
Electrical connection version		
• of the backplane bus	PCI (32 bit, 3.3 V/5 V; Universal Keyed; 33/66 MHz)	PCI (32 bit, 3.3 V/5 V; Universal Keyed; 33/66 MHz)
• of the PROFIBUS interface	9-pin Sub-D socket	9-pin Sub-D socket (RS 485)
Supply voltage		
Type of supply voltage	DC	DC
Supply voltage 1 from backplane bus	5 V	5 V
Relative symmetrical tolerance at 5 V DC	5%	5%
Current consumption		
Current 1 consumed from backplane bus, if DC	500 mA	500 mA
Power loss		
Effective power loss	2 W	2 W
Permitted ambient conditions		
Ambient temperature		
• during operation	+5 ... +55 °C	+5 ... +55 °C
• during transport	-20 … +60 °C	-20 … +60 °C
• during storage	-20 … +60 °C	-20 … +60 °C
Maximum relative humidity at 25 °C during operation	85%	85%
Design, dimensions and weight		
Module format	PCI card	PCI card
• Width	102 mm	111 mm
• Height	130 mm	129 mm
Net weight	100 g	100 g

Order No.	6GK1 561-1AA01	6GK1 561-1AM01
Product type description	**CP 5611 A2**	**CP 5611 A2 MPI**
Performance data		
PROFIBUS DP		
Service as DP-Master		
• DPV0	Yes	Yes
• DPV1	No	No
• DPV1 with SOFTNET-DP	Yes	Yes
• DPV2	No	No
Data volume		
• of the address area of the inputs as DP-Master overall	14.64 KB	14.64 KB
• of the address area of the outputs as DP-Master overall	14.64 KB	14.64 KB
• of the address area of the inputs per DP-Slave	244 bytes	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes	244 bytes
Service as DP-Slave		
• DPV0	Yes	Yes
• DPV1	No	No
• DPV1 with SOFTNET-DP	Yes	Yes
Data volume		
• of the address area of the inputs as DP-Slave overall	122 bytes	122 bytes
• of the address area of the outputs as DP-Slave overall	122 bytes	122 bytes
S7 communication		
Number of possible connections for S7/PG communication, max.	8	8
Open communication		
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	50	50
Multi-protocol operation		
Number of plug-in cards of the same type that can be plugged in for each PC station	1	1
Number of all configurable connections for each PC station	50	50

[1] also S5-compatible communication

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CP 5611 A2

Ordering data	Order No.
CP 5611 A2 communications processor	
• PCI card (32-bit) for connection of a programming device or PC to PROFIBUS	**6GK1 561-1AA01**
• PCI card (32-bit) CP 5611 A2 and MPI cable, 5 m	**6GK1 561-1AM01**
CP 5611 MPI communications processor	
consisting of PCI card 32 bit, 3.3 V/5 V, 33/66 MHz)	
SOFTNET-S7 2007 Edition	
Software for S7 communication, including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5CW00-3AL0**
• Upgrade SOFTNET-S7 from V6.4 to SOFTNET-S7, 2007 Edition	**6GK1 704-5CW00-3AE0**
• Upgrade SOFTNET-S7 from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7 2007 Edition	**6GK1 704-5CW00-3AE1**
SOFTNET-DP 2007 Edition	
Software for DP protocol (Master Class 1 and 2) including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single License for 1 installation	**6GK1 704-5DW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5DW00-3AL0**
• Upgrade SOFTNET-DP from V6.4 to SOFTNET-DP, 2007 Edition	**6GK1 704-5DW00-3AE0**
• Upgrade SOFTNET-DP from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP 2007 Edition	**6GK1 704-5DW00-3AE1**

	Order No.
SOFTNET-DP Slave, 2007 Edition	
Software for DP-Slave, with DP-OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/ Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single License for 1 installation	**6GK1 704-5SW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5SW00-3AL0**
• Upgrade SOFTNET-DP Slave from V6.4 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE0**
• Upgrade SOFTNET-DP Slave from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE1**
PROFIBUS FastConnect bus connector RS 485 Plug 180	**6GK1 500-0FC00**
With 180° cable outlet	
PROFIBUS bus terminal 12M	**6GK1 500-0AA10**
Bus terminal for connection of PROFIBUS stations up to 12 Mbit/s with plug-in cable	

Overview

DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

- PCI Express x1 card for connection of PCs and SIMATIC PG/PC to PROFIBUS at up to 12 Mbit/s and to the MPI of the SIMATIC S7
- Communication services:
  - PROFIBUS DP Master Class 1 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP Master Class 2 incl. acyclic DP expansions with SOFTNET-DP
  - PROFIBUS DP slave with SOFTNET-DP slave
  - PG/OP communication
  - S7 communication with SOFTNET-S7
  - Open communication (SEND/RECEIVE on basis of the FDL interface) with SOFTNET-DP or SOFTNET-S7
- Can be used with:
  - STEP 7, STEP 7-Micro/Win, ProTool, ProTool/Pro, SIMATIC PDM (for PG/OP communication)
  - COM PROFIBUS
  - SOFTNET-S7 (for S7-communication)
  - SOFTNET-DP, SOFTNET-DP slave (for DP)
- The appropriate OPC server and configuration tools are included in the scope of supply of the respective communication software.

Benefits

get Designed for Industry

- Connection for portable PCs (e.g. for diagnostics and commissioning)
- Simple installation and commissioning
- Optimally coordinated with SOFTNET
- OPC as standard interface
- Standardized procedure and configuration functionality for NCM PC and STEP 7
- Can be used flexibly as PCIe x1 card in PC/IPC with PCI Express x1, x4, x8 or x16 slots

Application

The CP 5621 permits the connection of programming devices (PGs) and PCs to PROFIBUS and to the multipoint interface (MPI) of the SIMATIC S7:

- for PGs/PCs with PCI Express slot

Design

- Short PCI card
- 9-pin Sub-D socket for connection to PROFIBUS
- Operation in the PCI Express x1, x4, x8 or x16 slots is possible

Function

The CP 5621 is operated under various software packages and offers the user the opportunity of performing functions of the programming devices and PCs by means of PROFIBUS and the multipoint interface (MPI).

Only one CP can be operated for each PG/PC. Likewise, only one protocol (PROFIBUS DP, S7-communication or FDL) can be used per CP.

The following software packs support the CP 5621:

- STEP 7 V5.4 SP 4 or higher;
  Drivers for the CP 5621 are included in the scope of delivery of STEP 7.
- SOFTNET-S7 V7.0 or higher;
  This package enables the S7 programming interface to be used.
- SOFTNET-DP V7.0 or higher;
  This enables the CP 5621 to be used as PROFIBUS DP Master Class 1 or Class 2.
- SOFTNET-DP Slave V7.0 or higher;
  For use of the CP 5621 as PROFIBUS DP slave
- STEP 7-Micro/WIN;
  Hardware basis for the programming software of the SIMATIC S7-200 automation system
- ProTool, ProTool/Pro;
  The CP 5621 can be used as the hardware basis for the configuration tool for all SIMATIC Operator Panels, Touch Panels and Text Displays.
- NCM PC;
  Drivers for the CP 5621 are included in the scope of supply (beginning with SIMATIC NET CD, 2007 Edition).

CP 5621

Technical specifications

Order No.	6GK1 562-1AA00/ 6GK1 562-1AM00
Product type description	**CP 5621/ CP 5621 MPI**
Transfer rate	
Transmission rate as per RS422/485	
• Minimum	9.6 Mbit/s
• Maximum	12 Mbit/s
Interfaces	
Number of electrical connections for network components or terminal equipment	1
Electrical connection version	
• of the PROFIBUS interface	9-pin Sub-D socket
• of the backplane bus	PCI Express x1
Supply voltage	
Type of supply voltage	DC
Supply voltage	
• 1 from backplane bus	12 V
• 2 from backplane bus	3,3 V
Relative symmetrical tolerance at 3.3 V DC	5%
Current consumption	
Current consumed	
• 1 from backplane bus if DC	200 mA
• 2 from backplane bus if DC	300 mA
Power loss	
Effective power loss	3,4 W
Permitted ambient conditions	
Ambient temperature	
• during operation	5 … 55 °C
• during transport	-20 … +60 °C
• during storage	-20 … +60 °C
Maximum relative humidity at 25 °C during operation	85%
Design, dimensions and weight	
Module format	PCI Express x1 card
• Width	111 mm
• Height	129 mm
Net weight	100 g

Order No.	6GK1 562-1AA00/ 6GK1 562-1AM00
Product type description	**CP 5621/ CP 5621 MPI**
Performance data	
PROFIBUS DP	
Service as DP-Master	
• DPV0	Yes
• DPV1	No
• DPV1 with SOFTNET-DP	Yes
• DPV2	No
Data volume	
• of the address area of the inputs as DP-Master overall	14.64 KB
• of the address area of the outputs as DP-Master overall	14.64 KB
• of the address area of the inputs per DP-Slave	244 bytes
• of the address area of the outputs per DP-Slave	244 bytes
Service as DP-Slave	
• DPV0	Yes
• DPV1	No
• DPV1 with SOFTNET-DP	Yes
Data volume	
• of the address area of the inputs as DP-Slave overall	122 bytes
• of the address area of the outputs as DP-Slave overall	122 bytes
S7 communication	
Number of possible connections for S7/PG communication, max.	8
Open communication	
Number of possible connections for open communication by (SEND/RECEIVE), max. [1]	50
Multi-protocol operation	
Number of plug-in cards of the same type that can be plugged in for each PC station	1
Number of all configurable connections for each PC station	50

[1] also S5-compatible communication

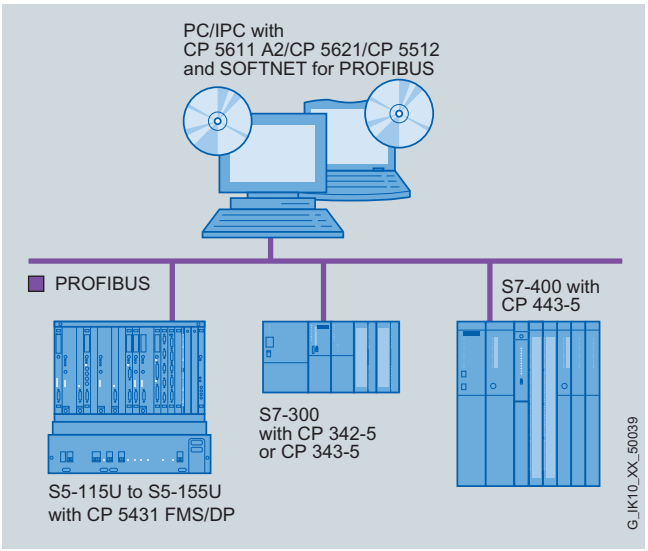
Ordering data	Order No.
CP 5621 communications processor	
• PCI Express x1 card (32-bit) for connection of a PG or PC to PROFIBUS	**6GK1 562-1AA00**
• PCI Express x1 card (32-bit) CP 5621 and MPI cable, 5 m	**6GK1 562-1AM00**
SOFTNET-S7, 2007 Edition	
Software for S7 communication, including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5CW00-3AL0**
• Upgrade SOFTNET-S7 from V6.4 to SOFTNET-S7 2007 Edition	**6GK1 704-5CW00-3AE0**
• Upgrade SOFTNET-S7 from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7, 2007 Edition	**6GK1 704-5CW00-3AE1**
SOFTNET-DP, 2007 Edition	
Software for DP protocol (Master Class 1 and 2) including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5DW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5DW00-3AL0**
• Upgrade SOFTNET-DP from V6.4 to SOFTNET-DP 2007 Edition	**6GK1 704-5DW00-3AE0**
• Upgrade SOFTNET-DP from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP, 2007 Edition	**6GK1 704-5DW00-3AE1**

	Order No.
SOFTNET-DP Slave, 2007 Edition	
Software for DP-Slave, with DP-OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2; Windows 2003 Server SP1, R2, SP2; Windows Vista Business/ Ultimate; for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5SW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5SW00-3AL0**
• Upgrade SOFTNET-DP Slave from V6.4 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE0**
• Upgrade SOFTNET-DP Slave from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE1**
PROFIBUS FastConnect bus connector RS 485 Plug 180 with 180° cable outlet	**6GK1 500-0FC00**
PROFIBUS bus terminal 12M Bus terminal for connection of PROFIBUS stations at up to 12 Mbit/s with connecting cable	**6GK1 500-0AA10**

4

SOFTNET for PROFIBUS

Overview



DP-M	DP-S	FMS	OPC	PG/OP	S7/S5
●	●		●	●	●

- Software for coupling PCs/programming devices and notebooks to programmable controllers
- Communication services:
  - PROFIBUS DP Master Class 1 and 2 with acyclic expansions
  - PROFIBUS DP slave
  - PG/OP communication
  - S7 communication
  - Open communication (SEND/RECEIVE) based on the FDL interface
- The appropriate OPC servers are included in the scope of supply of the respective communication software

Benefits

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- Low-cost integration
  - as PROFIBUS DP Master Class 1 or Master Class 2 with SOFTNET DP
  - as a PROFIBUS DP slave with SOFTNET DP slave
  - S7 communication with SOFTNET S7
- OPC as standard interface
- Uniform procedure and configuration functionality with NCM PC and STEP 7.

Application

With SOFTNET for PROFIBUS, PCs can be connected to programmable controllers, such as SIMATIC S7, over PROFIBUS.

The following user interfaces are available:

- DP protocol
- PG/OP communication for SIMATIC S7
- S7 communication
- Open communication (SEND/RECEIVE) based on the FDL interface

SOFTNET is available for the following interfaces:

- CP 5512 (PC card, CardBus 32-bit)
- CP 5611 A2 (PCI, 32-bit)
- CP 5621 (PCIe x1)
- Integral PROFIBUS interfaces of SIMATIC PGs/PCs

The operating systems that are supported are listed in the ordering data for the SOFTNET software.

Function

Software for DP protocol (SOFTNET-DP)

- DP-Master Class 1

SOFTNET-DP provides DP-Master Class 1 functionality in combination with the CP 5512, CP 5611 A2 or CP 5621. The central controller exchanges information with the DP-Slaves (e.g. ET 200S) in a fixed, repeating message cycle. The DP programming interface (DPLib.DLL) provides the PC programmer with function calls for data transfer. The DP interface also provides the SYNC and FREEZE functions as well as activation and deactivation of slaves.

The DP function expansions for Masters of Class 1 make it possible to perform read and write functions (DS_READ, DS_WRITE) as well as acknowledgement of alarms (ALARM_ACK) at the same time as processing cyclic data communication. Data that are to be transferred in non-isochronous mode (e.g. parameterization data) are only rarely changed, in comparison to the cyclic measured values, and are transferred at lower priority in parallel with the cyclic high-speed useful data transfer. Alarm acknowledgement by the master ensures reliable transfer of the alarms from DP-Slaves (DS_READ, DS_WRITE, DS_DATA_TRANSPORT).

- DP-Master Class 2

In addition to DP-Master Class 1 services, SOFTNET-DP also provides DP-Master Class 2 services. Devices of this type are used (programming, configuration or control devices) during start-up, for configuring the DP system or for controlling the plant during normal operation (diagnostics). The DP programming interface provides the following services: Reading master diagnostics, slave diagnostics, inputs/outputs of a slave, configuration data and modifying slave addresses. These extended DP functions comprise non-isochronous access to the parameters and measured values of a slave (e.g. field devices of process automation and intelligent HMI devices). This type of slave must be supplied with extensive parameter data during start-up and during normal operation (DS_READ, DS_WRITE, DS_DATA_TRANSPORT).

- DP-Slave (SOFTNET-DP-Slave)

A DP-Slave is an I/O station that reads in input data and transfers output data to the I/O. The volume of input and output information is determined by the user application and can be a maximum of 122 byte each. For the slave interface, a simple example GSD file is provided that can be adapted by the user to the slave application. This GSD file can be configured using any configuration tool which complies with the PROFIBUS DP specification IEC 61158/EN 50170, e.g. STEP 7 or NCM PC.

Software for PG/OP communication

Special programming device packages are not required for the CP 5512, CP 5611 A2 and CP 5621 because the drivers are included in the STEP 7 scope of supply.

Software for S7 communication (SOFTNET-S7)

SIMATIC S7 system components communicate with each other using S7 communication functions. The S7 programming interface provides programming device/PC user programs with access to SIMATIC S7 system components. This provides easy, flexible access to the data of the SIMATIC S7 controller.

The following services are available with S7 communication:

Administrative services

- Connection management
- Mini database
- Trace

Data transfer services

- Read/write variables
- BSEND/BRECEIVE (up to 64 KB per task)

Software for open communication (SEND/RECEIVE based on the FDL interface)

This interface based on Layer 2 is used for communication between

- PG/PC and SIMATIC S5
- PG/PC and SIMATIC S7
- PG/PC and PG/PC

used

SEND/RECEIVE offers the following services:

- Management services
- Connection establishment services
- Data transfer services

This interface is included in SOFTNET-DP and SOFTNET-S7. No configuration is necessary.

User interfaces

- OPC interface

The OPC server included in the respective software package can be used as the standard programming interface for the PROFIBUS DP, open communication and S7 communication protocols for linking automation technology applications to OPC-capable Windows applications (Office, HMI systems, etc.).

- Programming interface through C library

The programming interfaces for existing applications are implemented as Dynamic Link Libraries (DLL). You can find the released compilers in the Readme file of the SIMATIC NET CD products at http://www.siemens.com/automation/csi/net.

For Borland programming interfaces (e.g. DELPHI), partner solutions from SoftwareOption are offered.

Mode of operation

With SOFTNET, the complete protocol stack is processed in the PC.

This architecture means that in contrast to the CP 5613 or CP 5614 products, the performance of the SOFTNET packages is dependent on the configuration or loading of the PC used.

Configuration

- The S7 communication protocol, open communication protocol and DP protocol are configured in STEP 7/NCM PC V5.1 + SP2 and higher.
- The configuration tool NCM PC is included in the PROFIBUS software packages.

Technical specifications

Performance data	CP 5611 A2/CP 5621/CP 5512
Mono protocol mode	
Number of connectable DP-Slaves	max. 60
Number of FDL tasks waiting	max. 100
Number of PG/OP and S7 connections	max. 8
• DP-Master	DP-V0, DP-V1 with SOFTNET-DP
• DP-Slave	DP-V0, DP-V1 with SOFTNET-DP slave

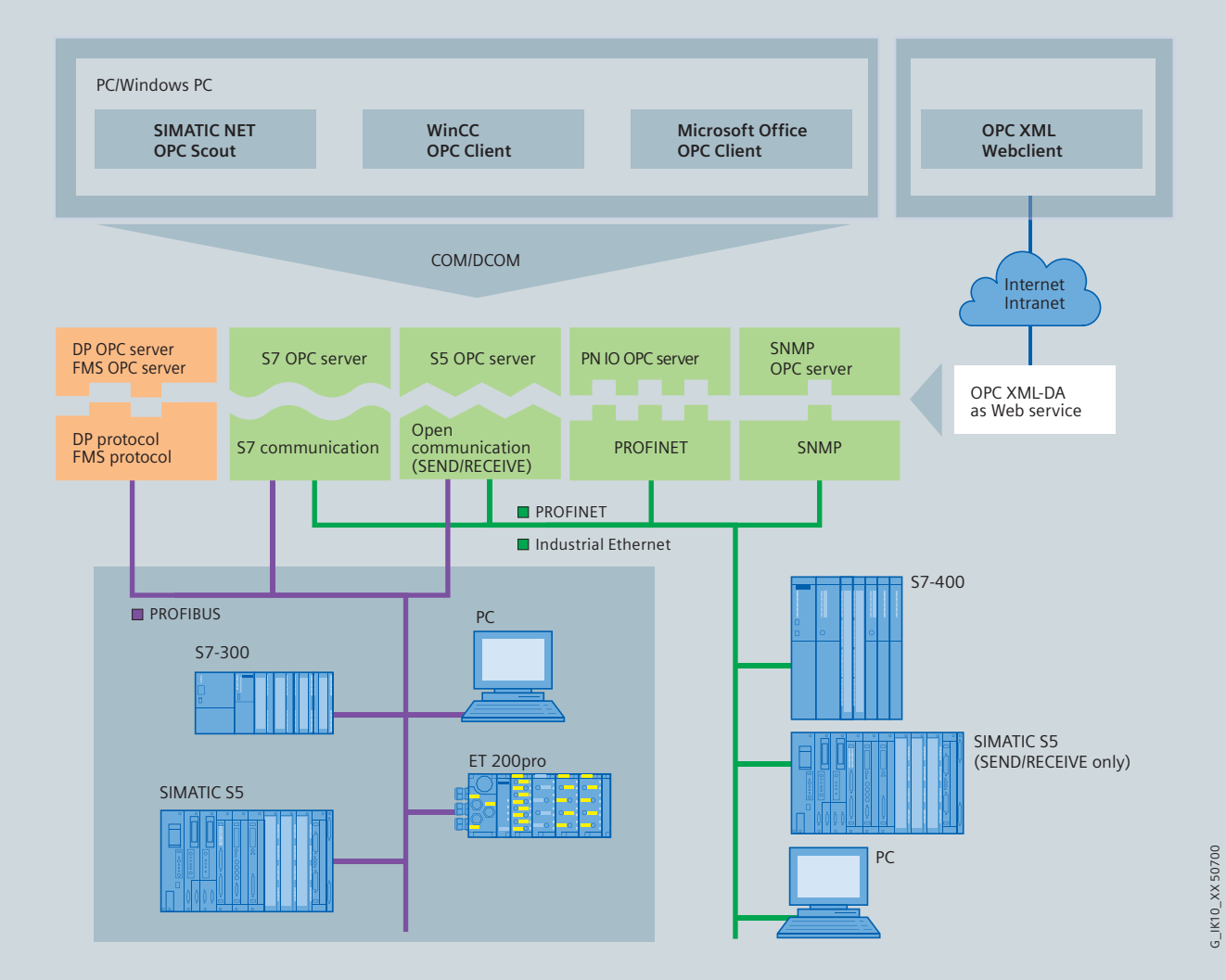
Ordering data

	Order No.
SOFTNET-S7 2007 Edition	
Software for S7 communication, including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/ Ultimate, for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5CW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5CW00-3AL0**
• Upgrade SOFTNET-S7 from V6.4 to SOFTNET-S7, 2007 Edition	**6GK1 704-5CW00-3AE0**
• Upgrade SOFTNET-S7 from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-S7 2007 Edition	**6GK1 704-5CW00-3AE1**
SOFTNET-DP 2007 Edition	
Software for DP protocol (Master Class 1 and 2) including FDL protocol with OPC server and NCM PC; runtime software, software and electronic manual on CD-ROM, license key on USB stick, Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate, for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5DW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5DW00-3AL0**
• Upgrade SOFTNET-DP from V6.4 to SOFTNET-DP, 2007 Edition	**6GK1 704-5DW00-3AE0**
• Upgrade SOFTNET-DP from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP 2007 Edition	**6GK1 704-5DW00-3AE1**

	Order No.
SOFTNET-DP Slave, 2007 Edition	
Software for DP-Slave, with DP-OPC server and NCM PC; single license for 1 installation, runtime software, software and electronic manual on CD-ROM, license key on USB stick, Class A, for 32-bit Windows XP Professional SP1, 2, Windows 2003 Server SP1, R2, SP2, Windows Vista Business/Ultimate, for CP 5512, CP 5611, CP 5611 A2, CP 5621 German/English	
• Single license for 1 installation	**6GK1 704-5SW70-3AA0**
• Software Update Service for 1 year, with automatic extension; requirement: Current software version	**6GK1 704-5SW00-3AL0**
• Upgrade SOFTNET-DP Slave from V6.4 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE0**
• Upgrade SOFTNET-DP Slave from V6.0, V6.1, V6.2 or V6.3 to SOFTNET-DP Slave, 2007 Edition	**6GK1 704-5SW00-3AE1**

Overview

- Standardized, open multi-vendor interface
- Interfacing of OPC-capable Windows applications to DP, FMS, S7 communication and open communication (SEND/RECEIVE) based on the FDL interface
- OPC Scout with browser functionality as an OPC client and OCX Data Control
- The relevant OPC servers are supplied with each communication software package



System integration with OPC server

Benefits

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- Different networks and protocols can be easily used thanks to the uniform interface
- Reduced training and familiarization costs
- Easy interfacing in the system environment and office applications over C++, Visual Basic and .NET interfaces
- Fast creation of applications
- Easy handling and cost-effective because the corresponding OPC server is included in the scope of supply of the respective communications software

OPC server for PROFIBUS

Application

OPC (Openness, Productivity & Collaboration) is implemented as an expansion of the COM (Component Object Model) communications interface and DCOM (Distributed COM) for the user software.

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 communications interfaces are available over OPC for PROFIBUS:

- DP communication for PROFIBUS DP
- DP-V0 Master Class 1 and Master Class 2
  DP-V1 Master Class 1 and Master Class 2
  PROFIdrive V3 interface for profile server
- FMS communication for PROFIBUS FMS
- S7 communication
- Open communication (SEND/RECEIVE) based on the FDL interface

The OPC server offers:

- Data Access interface 2.05
- Alarm&Event interface 1.1
- OPC XML DA interface 1.0
- Integration of automation products of different manufacturers
- The same, easy-to-use 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
- Grouping of variables (items); this way large quantities of data can be processed in a short time
- Other compilers can be used via the OPC server, however, the compiler must support the COM interface (Microsoft component model)

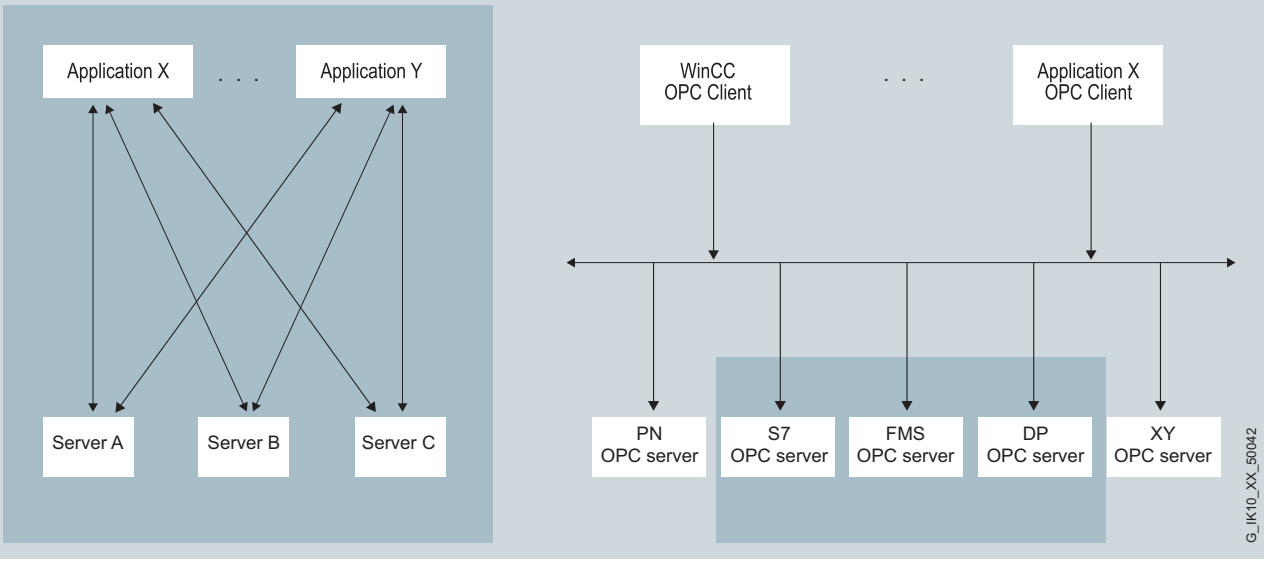
Function

- 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
- The communication protocols can be operated in parallel
- Interfaces
  - "Custom Interface“ for high-performance C++/NET applications
  - "Automation Interface" for easily created Visual Basic applications (or similar)
  - OCX Data Control for simple connection to Windows applications that support COM/DCOM
  - XML DA interface;
    Data access to S7 CPUs is therefore possible over the Internet.

Configuration

The communication parameters are configured using only the tools of the configuration software (configuration console, SIMATIC NCM PC or STEP 7 V5.1 + SP2 and higher)

Function (continued)



Comparison of conventional client/server architecture with an OPC architecture

Technical specifications

Technical specifications	
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 for configuring instead of programming • OPC XML-Interface for Data Access
Protocols	• S7 communication • Open communication (SEND/RECEIVE) • PROFIBUS DP • PROFIBUS FMS

Product versions	include OPC servers for:
DP-5613	PROFIBUS DP, XML-DA
S7-5613	S7 communication, XML-DA
FMS-5613	FMS communication, XML-DA
SOFTNET-S7 for PROFIBUS	S7 communication, XML-DA
SOFTNET-DP	PROFIBUS DP, XML-DA
SOFTNET-DP slave	PROFIBUS DP, Slave XML-DA
CP 5613 A2/5614 A2 and CP 5613 FO with DP-Base Software	Open communication (FDL) PROFIBUS DP Master, Access to DP-slave of the CP 5614 A2, XML-DA

Overview

The following types of interface for SIMATIC TP/OP/MP and SIMATIC S7 must be differentiated:

- PPI (point-to-point interface):
  Connection between SIMATIC TP/OP/MP and SIMATIC S7-200 via PPI. Communication runs on the PPI protocol; a standard FB as with SIMATIC S5 is not required.
- MPI (multi-point interface):
  Link from SIMATIC TP/OP/MP to SIMATIC S7 via the integrated PPI with S7-200 or MPI with S7-300/-400 or alternatively via the MPI of a separate interface module and the backplane bus to the SIMATIC S7-CPU. Communication runs on the MPI protocol (PG/OP communication); a standard FB as with SIMATIC S5 is not required.
- PROFIBUS interface:
  Link from SIMATIC TP/OP/MP to SIMATIC S7 via the integrated PROFIBUS interface on the CPU or alternatively via the PROFIBUS interface on a separate interface module and the backplane bus to the SIMATIC S7-CPU. Communication runs on the MPI protocol (PG/OP communication); a standard FB as with SIMATIC S5 is not required.
- PROFINET interface:
  Link from SIMATIC TP/OP/MP to SIMATIC S7 via the integrated PROFINET interface on the CPU or alternatively via the Industrial Ethernet interface on a separate interface module and the backplane bus to the SIMATIC S7-CPU. Communication runs on the MPI protocol (PG/OP communication); a standard FB as with SIMATIC S5 is not required.

The maximum possible number of S7 connections of one CPU is determined by its power (see Catalog ST 70); from the point of view of SIMATIC TP/OP/MP the following restrictions apply:

- OP 73micro, TP 177micro: 1 connection
- OP 73: max. 2 connections
- OP 77A, TP 177A, OP 77B, TP177B, OP 177B, Mobile Panel 177: max. 4 connections
- TP 277, OP 277; Mobile Panel 277, MP 277, MP 370, MP 377: max. 6 connections
- PC with WinCC flexible Runtime: max. 8 connections

PPI

(not for OP73micro, TP 177micro, OP 73, OP 77A, TP 177A, OP 77B, Mobile Panel 177 PN, Mobile Panel 277 IWLAN)

Basically the PPI is a point-to-point connection between a SIMATIC TP/OP/MP (PPI master) or alternatively a PG (PPI master) and an S7-200 (PPI slave).

However, a connection between a SIMATIC TP/OP/MP and/or a PG and an S7-200 (sequential logic point-to-point link, i.e. from the point of view of the S7-200 only one connection is active at any one time) is also possible (network topology: **PPI** only).

MPI/PROFIBUS interface/ Industrial Ethernet interface

The multipoint-capable communication interfaces of SIMATIC TP/OP/MP and SIMATIC S7 are used. Options are:

- Interface between one or a number of TP/OP/MPs (MPI master) and one or a number of S7-300/400s or WinAC (MPI master)
  (possible network topology: **MPI/PROFIBUS/Industrial Ethernet**)
- Interface between one or a number of TP/OP/MPs (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.

A master/slave link has now been added to the original format of a master/master link. This has enabled the integration of the S7-200 (except CPU 212).[1)]

Generally this type of information exchange between SIMATIC TP/OP/MP and SIMATIC S7 is independent of the network used, PPI, MPI, PROFIBUS or Industrial Ethernet: SIMATIC TP/OP/MPs are S7 clients and SIMATIC S7-CPUs are S7 servers.

[1)] For constraints with regard to transfer rates for the S7-200, see Catalog ST 70.

Overview (continued)

Controller	SIMATIC HMI			
Target hardware (PROTOCOL) (physics)	**TD 100 TD 200 TD 200C TD 400C**	**OP 73 micro TP 177micro**	**OP 73**	**Connection via**
SIMATIC S7 (PPI/MPI)				
via *PPI* to **S7-200 (PPI)**	●[1]	–	–	**MPI cable**[4]
via *MPI* or *PROFIBUS* (**PG/OP communication**) to **S7-200**	–	●[2]	●[3]	**MPI cable**[4]
via *MPI* or *PROFIBUS* (**PG/OP communication**) to **S7-300, -400**	–	–	●[3]	**MPI cable**[4]
via *PPI* network **(PPI)** to max. 1 x **S7-200**	●[1]	–	–	**PPI network**[5] (see Catalog ST 70)
via *PPI* network **(PG/OP communication)** to max. 4 x **S7-200**	●[1]	●[2]	●[3]	**PPI network**[5] (see Catalog ST 70)
via *MPI* or *PROFIBUS* network (**PG/OP communication**) to max. 4 x **S7-200**	–	●[2]	●[3]	**MPI or PROFIBUS network**[5] (see also Catalog ST 70)
via *MPI* or *PROFIBUS* network (**PG/OP communication**) to max. 4 x **S7-300, -400, WinAC**	–	–	●[3]	**MPI or PROFIBUS network**[5] (see Section 2)

● System interface possible

– System interface not possible

1) The TD series can only be connected to max. 1 x S7-200 via PPI (PPI/MPI); network operation (parallel PG, etc.) possible; transfer rate max. 187.5 Kbit/s; cable included in scope of delivery

2) OP 73micro, TP 177micro can only be connected to max. 1 x S7-200 (MPI); network operation (parallel PG, etc.) possible; transfer rate max. 187.5 Kbit/s

3) OP 73 can be connected to max. 2 x SIMATIC S7 (MPI); network operation (parallel PG, etc.) possible; transfer rate max. 1.5 Mbit/s

4) MPI cable 6ES7 901-0BF00-0AA0 (max. 187.5 Kbit/s) included in PG scope of delivery

5) Bus connector 6GK1 500-0EA02

Overview (continued)

Controller	SIMATIC HMI				
Target hardware (PROTOCOL) (physics)	**OP 77A TP 177A**	**OP 77B TP 177B DP OP 177B DP TP 177B DP/PN OP 177B DP/PN Mobile Panel 177 DP Mobile Panel 177 PN**	**TP 277 OP 277 Mobile Panel 277 Mobile Panel 277 IWLAN MP 177 MP 277 MP 377**	**WinCC flexible Runtime**	**Connection via**
SIMATIC S7 (PPI/MPI)					
via *PPI* to **S7-200 (PPI)**	–	● 1) 2)	● 1) 2)	● 1) 3)	**MPI cable** 11)
via *MPI* or *PROFIBUS* (**PG/OP communication**) to **S7-200**	● 4)	● 2) 5)	● 2) 5)	● 3) 5)	**MPI cable** 11)
via *MPI* or *PROFIBUS* (**PG/OP communication**) to **S7-300, -400**	● 4)	● 2)	● 2)	● 3)	**MPI cable** 11)
via *PPI* network **(PPI)** to max. 1 x **S7-200**	–	● 1) 2)	● 1) 2)	● 1) 3)	**PPI network** 12) (see Catalog ST 70)
via *PPI* network **(PG/OP communication)** to max. 4 x **S7-200**	● 4)	● 6)	–	–	**PPI network** 12) (see also Catalog ST 70)
via *MPI* or *PROFIBUS* network (**PG/OP communication**) to max. 4 x **S7-200**	● 4)	● 2) 5)	● 2) 5)	● 3) 5)	**MPI or PROFIBUS network** 12) (see also Catalog ST 70)
via *MPI* or *PROFIBUS* network (**PG/OP communication**) to max. 4 x **S7-300, -400, WinAC**	● 4)	● 2)	● 2)	● 3)	**MPI or PROFIBUS network** 12) (see also Catalog ST 70)
via *Industrial Ethernet (TCP/IP)* (**PG/OP communication**) to max. 4 x **S7-200, -300, -400, WinAC**	–	● 7) 8)	● 8) 9)	● 10)	**Industrial Ethernet** (see Section 2)

● System interface possible

– System interface not possible

1) Can be connected via PPI to max. 1 x S7-200 (PPI); network operation (parallel PG, etc.) possible

2) Not Mobile Panel 177 PN, Mobile Panel 277 IWLAN;
connection of Mobile Panel 177 DP, Mobile Panel 277 via special connecting cables and connection box (see Mobile Panel);
see manual for cable assignment

3) Connection via integrated MPI/PROFIBUS interface; use the CP 5611 A2 with a standard PC.

4) Max. transfer rate 1.5 Mbit/s

5) Only to passive S7-200; OP 77B (MPI) also to active S7-200

6) Only OP 77B (MPI)

7) Only TP 177B DP/PN, OP 177B DP/PN, Mobile Panel 177 PN

8) Mobile Panel 177 PN, Mobile Panel 277 connection via special connecting cable and connection box (see Mobile Panel);
see manual for cable assignment.

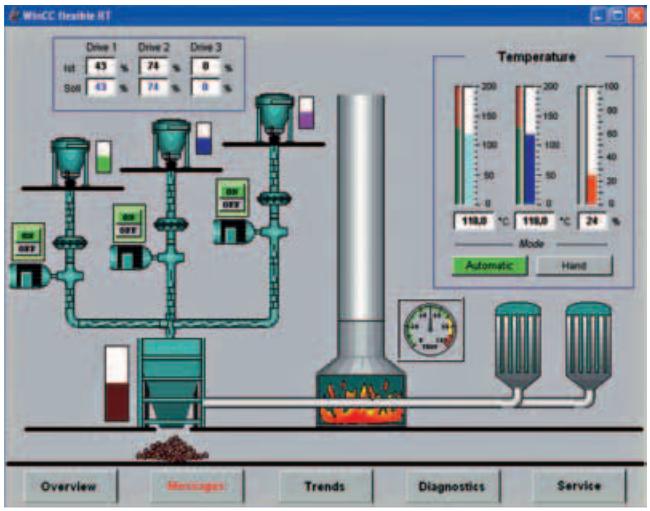
9) Mobile Panel 277 IWLAN (wireless interface, see Mobile Panel)

10) Connection via integrated Industrial Ethernet interface; use the CP 1612 with a standard PC

11) MPI cable 6ES7 901-0BF00-0AA0 (max. 187.5 Kbit/s) included in PG's scope of delivery (for download and test purposes only)

12) Bus connector 6GK1 500-0EA02

Overview



- **PC-based visualization software** for single-user systems directly at the machine
- Executable under Windows XP Professional/Vista Business/Vista Ultimate
- **Current version:**
  - SIMATIC WinCC flexible 2008 Runtime with 128, 512, 2048 or 4096 PowerTags
- 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 plot representations, 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)

Integration

SIMATIC WinCC flexible Runtime supports connection to:

Protocol	PC interfaces
SIMATIC S7 via PPI	
S7-200	CP 5512 [1] CP 5611 A2 [1] CP 5621 [1] CP 5613 A2 CP 5614 A2 PC/PPI adapter [2]
SIMATIC S7 via MPI	
S7-200 (except CPU 212) [3] S7-300 S7-400 WinAC Basis (V3.0 and higher) WinAC RTX	CP 5512 [1] CP 5611 A2 [1] CP 5621 [1] CP 5613 A2 CP 5614 A2 PC/MPI adapter [5] PC adapter USB [5] Teleservice V6.1
SIMATIC S7 via PROFIBUS DP [4]	
S7-215 [3] S7-300 CPUs with integr. PROFIBUS interface S7-300 with CP 342-5 S7-400 CPUs with integr. PROFIBUS interface S7-400 with CP 443-5 WinAC Basis (V3.0 and higher) WinAC RTX	CP 5512 [1] CP 5611 A2 [1] CP 5621 [1] CP 5613 A2 CP 5614 A2
SIMOTION [6]	
SINUMERIK [7]	

1) With MicroBox 420/427 and Panel PC 477/677 via internal multi-point interface

2) Only point-to-point to S7-200; no configuration download; operating systems: Windows 2000/XP; Order No.: 6ES7 901-3CB30-0AX0

3) Constraint with regard to baud rate for S7-200; see Catalog ST 70

4) WinCC flexible RT is a master; communication with S7 functions

5) Only point-to-point to S7-300/-400; no configuration download; operating systems: Windows 2000/XP Order No.: 6ES7 972-0CA23-0XA0 (COM) or 6ES7 972-0CB20-0XA0 (USB)

6) For further information, see Catalog PM 10

7) "Sinumerik HMI copy license OA" option required; for further information, see Catalog NC 60

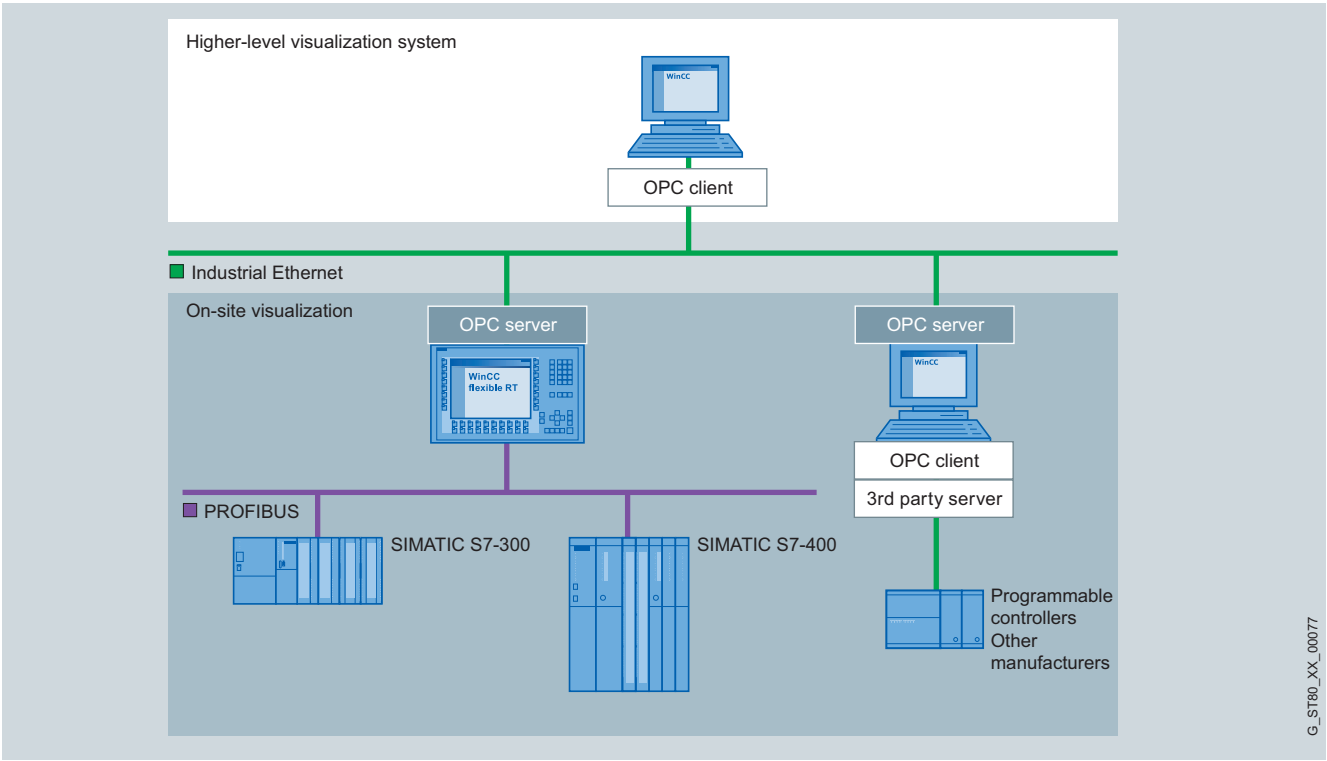
Application note

In conjunction with any PLC interface, WinCC flexible Runtime supports the use of the OPC client channel; this enables, for example, the 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.

Note:
Further information can be found in Catalog ST 80 , in the offline CA 01 Mall and in the Internet at

http://www.siemens.com/automation/mall

Integration (continued)

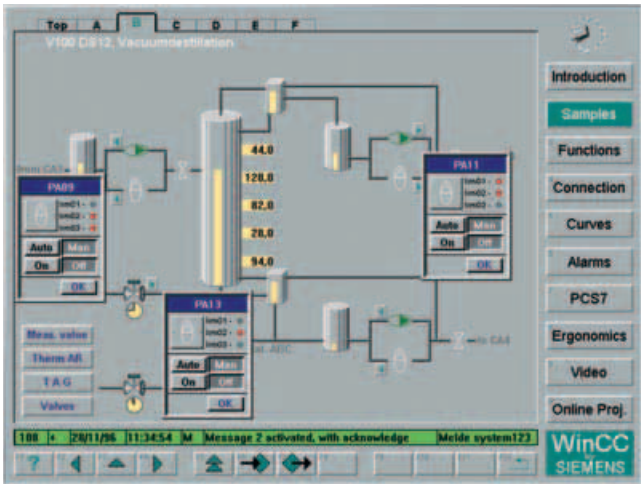


SIMATIC WinCC flexible Runtime application example

Further information

More information is available in the Internet at
http://www.siemens.com/wincc-flexible

Overview



- PC-based operator control and monitoring system for visualizing and operating processes, production flows, machines and plants in all sectors - with 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 company-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 IA) 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 product range of the SIMATIC Panel PC and SIMATIC Rack PC is available in particular for the industrial usage of WinCC systems. SIMATIC PCs stand out due to their powerful PC technology, are designed for round-the-clock continuous operation, and can be operated in both harsh industrial environments and office areas.
- Current versions:
  - **SIMATIC WinCC V7.0:**
    Executable under Windows VISTA Ultimate, Business and Enterprise, Windows XP Professional, Windows 2003 Server and Windows 2003 Server R2;
    the Microsoft SQL Server 2005 SP2 is included
  - **SIMATIC WinCC V6.2 SP2:**
    Runs under Windows XP Professional/Windows Server 2003 SP2/Windows Server 2003 R2 SP2 and Windows 2000 Professional SP4

Integration

Integration in company-wide solutions (IT and business integration)

WinCC is strictly based on Microsoft technology, which provides for the greatest possible compatibility and integration ability. ActiveX and .net[1)] controls allow for technology and sector-specific expansions. Cross-manufacturer communication is also a simply exercise. The reason: WinCC can be used as OPC client and server, and in addition to the access to current process values, it also supports standards such as OPC HDA (Historical Data Access), OPC Alarm & Events and OPC XML Data Access. Equally 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 an efficient, scalable Historian functionality based on the Microsoft SQL Server 2005 in the basic system. Thus the user is given all possibilities: from high-performance archiving of current process data, to long-term archiving with high data compression, through to a central information turntable in form of a company-wide Process Historian. With the help of the option Central Archive Server, this can be set up in the framework of a WinCC solution. Versatile clients and tools for evaluation, the open interfaces, special options (Connectivity Pack, Connectivity Station, IndustrialDataBridge) form the basis for an effective IT and business integration.

1) Only supported by WinCC V7.0

Integration in automation solutions

WinCC 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 controls

For the number of the connectable controls via Industrial Ethernet CP 1613 A2/CP 1623, the following applies for a maximum message frame length of 512 bytes:

Type of connection	Number of nodes
SIMATIC S5 Ethernet Layer 4 + TCP/IP	up to 60
SIMATIC S5 Ethernet TF	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 with CP 5611 A2, CP 5621 and a maximum of 44 controls with CP 5613 A2 can be connected. With approx. 10 or more controls, the usage of Industrial Ethernet is recommended.

Integration (continued)

Mixed mode with different controls

With their multi-protocol stack, the communications processors CP 1613 A2 / CP 1623 und CP 5613 A2 allow for the parallel operation of two protocols, e.g. for the mixed operation of different controls via a bus cable. WinCC supports the operation of two similar Interface Boards
in combination with the channels SIMATIC S5 Ethernet Layer 4 (2 x CP 1613 A2 / CP 1623), SIMATIC S7 Protocol Suite (2 x CP 1613 A2/CP 1623, 2 x CP 5613 A2) and PROFIBUS DP (4 x CP 5613 A2; max. 122 slaves per CP 5613 A2). In addition to communication over industrial Ethernet CP 1613 A2/CP 1623 or PROFIBUS CP 5613 A2, one CP 5611 A2/CP 5621 each can be used for communication with SIMATIC S7 via MPI.

Client-server communication

The communication between the clients and the server is achieved 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).

Communication redundancy

WinCC itself does not support any redundant LAN interfaces. The software package S7-REDCONNECT is required for the redundant connection of PCs via 2 x Industrial Ethernet to SIMATIC S7. This connects the SIMATIC S7 with applications on the PC, e.g. SIMATIC WinCC. A pure communication redundancy can be achieved by setting up optical rings (see Catalog IK PI).

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 with the use of the PROFIBUS DP coupling.

Connection to controls from other manufacturers:

For the connection of controls from other manufacturers, OPC (Openness, Productivity & Collaboration) is recommended.

Current notes and information about OPC servers from various suppliers can be found at:
http://www.opcfoundation.org/05_man.asp

WinCC supports the standards:

- OPC Data Access 1.1
- OPC Data Access 2.05a
- OPC Data Access 3.0
- OPC XML Data Access 1.01 (Connectivity Pack/Connectivity Station)
- OPC HDA 1.2 (Connectivity Pack/Connectivity Station)
- OPC A&E 1.1 (Connectivity Pack/Connectivity Station)

More information is available in the Internet at:
http://www.siemens.com/wincc-connectivity

Coupling overview

Protocol	Description
SIMATIC S7	
SIMATIC S7 Protocol Suite	Channel DLL for S7 functions via MPI, PROFIBUS or Ethernet Layer 4 + TCP/IP
Cross-manufacturer	
Windows DDE	Channel DLL for DDE communication, WinCC can acquire data from DDE server applications
OPC client [1)]	Channel DLL for OPC communication, WinCC can acquire data from OPC server applications
OPC server	Server applications for OPC communication; WinCC provides process data for the OPC client
PROFIBUS FMS	Channel DLL for PROFIBUS FMS
PROFIBUS DP	Channel DLL for PROFIBUS DP

1) Application note:
The parallel usage of the OPC client channel allows, for example, the connection to an SNMP-OPC server for visualization of the data contained there. The SNMP-OPC server enables monitoring of any network components (e.g. switch) that support the protocol SNMP.

Integration (continued)

Communication components for PG/PC for SIMATIC for WinCC V7.0

PROFIBUS	SIMATIC S5 PROFIBUS FDL	SIMATIC S7 Protocol Suite	PROFIBUS DP	PROFIBUS FMS	Order No.
WinCC – channel DLL					
SIMATIC S5 PROFIBUS FDL Channel DLL for S5-FDL	●				Included in the basic package
SIMATIC S7 Protocol Suite Channel DLL for S7 functions		●			Included in the basic package
PROFIBUS DP Channel DLL for PROFIBUS DP			●		Included in the basic package
PROFIBUS FMS Channel DLL for PROFIBUS FMS				●	Included in the basic package
Communication components for extension of the OS/OP					
CP 5611 A2 PCI card (32 bit) for the connection of PG/PC to PROFIBUS or MPI (communications software included in the WinCC basic package)		●			**6GK1 561-1AA01**
CP 5621 PCI Express x1 carte (32 bit) for the connection of PG/PC to PROFIBUS or MPI (communications software included in the WinCC basic package)		●			**6GK1 562-1AA00**
CP 5512 PCMCIA card (Cardbus 32 bit) for the connection of PG/PC to PROFIBUS or MPI (communications software included in WinCC basic package)		●			**6GK1 551-2AA00**
PC/MPI adapter RS 232, 9-pin, pins with RS 232/MPI converter max. 19.2 Kbit/s		●			**6ES7 972-0CA23-0XA0**
CP 5613 A2 PCI card (32 bit) for the connection of PC to PROFIBUS (communications software must be ordered separately)	●	●	●	●	**6GK1 561-3AA01**
S7-5613 2007 [1] communications software for S7 functions + FDL • for Windows XP Prof./Server 2003/ Server 2003 R2/ Vista Ultimate/Business	●	●			**6GK1 713-5CB70-3AA0**
DP-5613 2007 [1] communications software for DP-Master + FDL • for Windows XP Prof./Server 2003/ Server 2003 R2/ Vista Ultimate/Business	●		●		**6GK1 713-5DB70-3AA0**
FMS-5613 2007 [1] communications software for PROFIBUS-FMS + FDL • for Windows XP Prof./Server 2003/ Server 2003 R2/ Vista Ultimate/Business	●			●	**6GK1 713-5FB70-3AA0**

● System interface possible

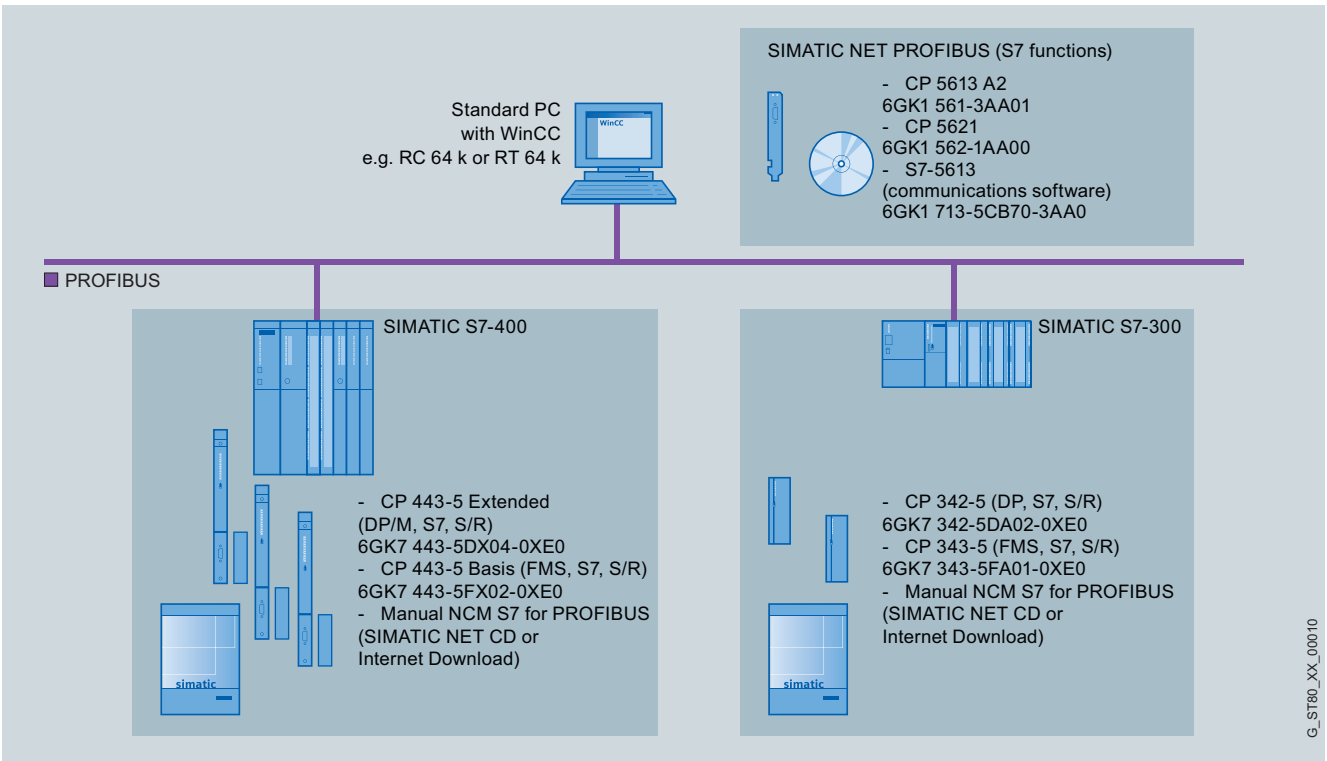
[1] Upgrade package

You can find further information in the Internet at
http://www4.ad.siemens.de/view/cs/de/14628484

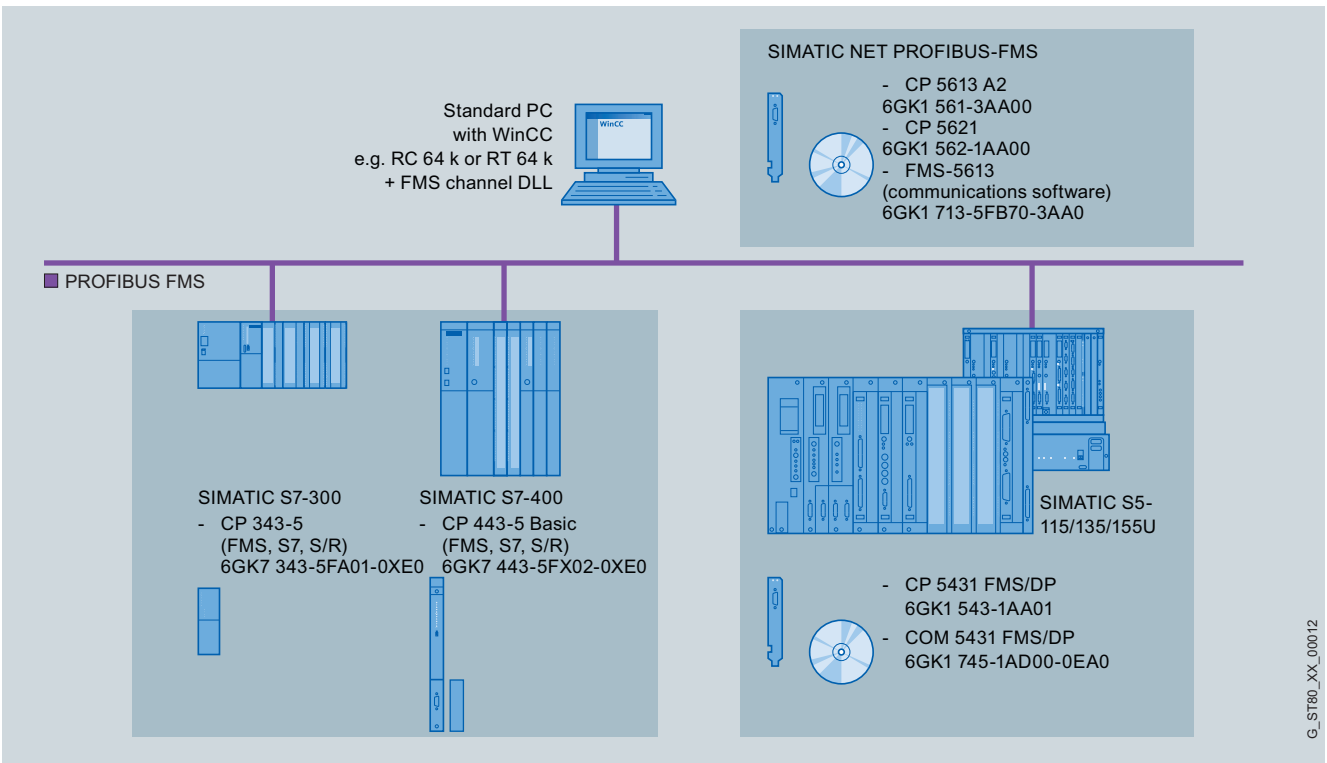
4

Integration (continued)

Communication examples

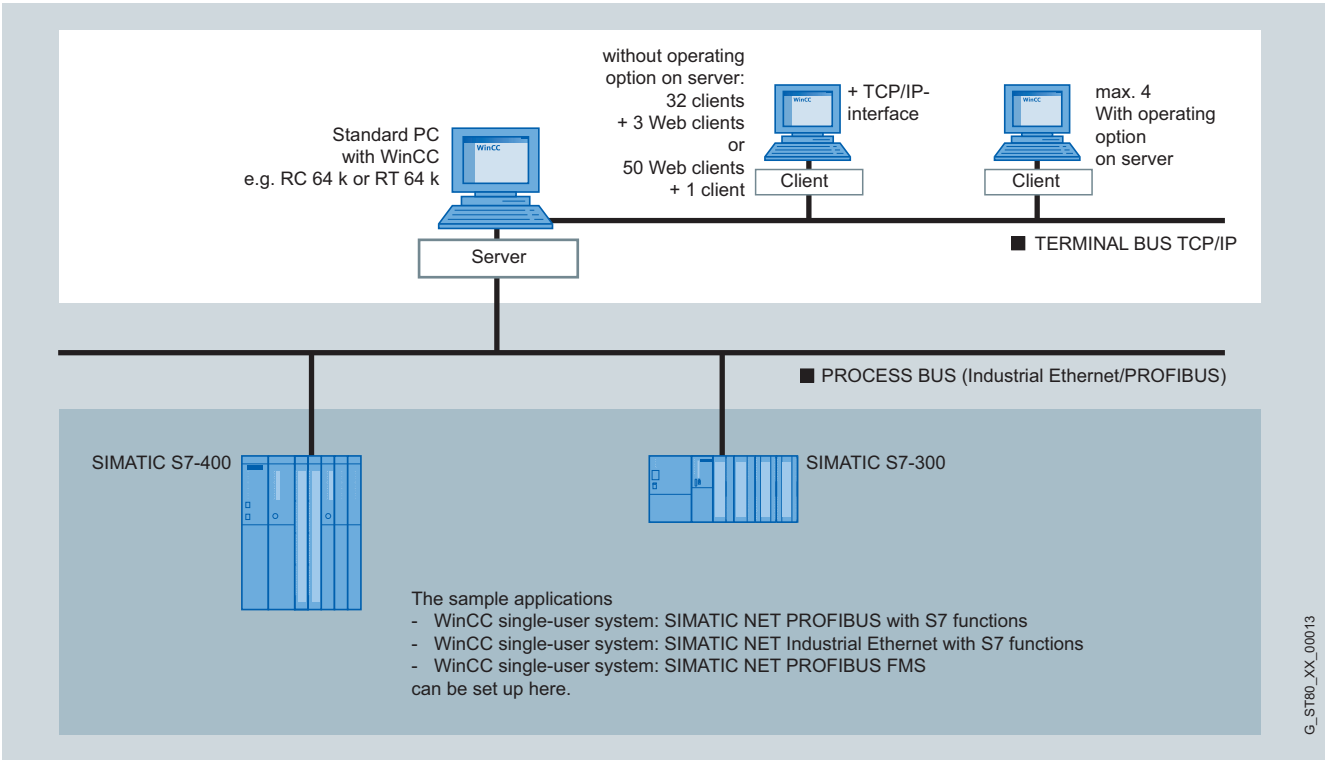


WinCC single-user system: PROFIBUS with S7 communication

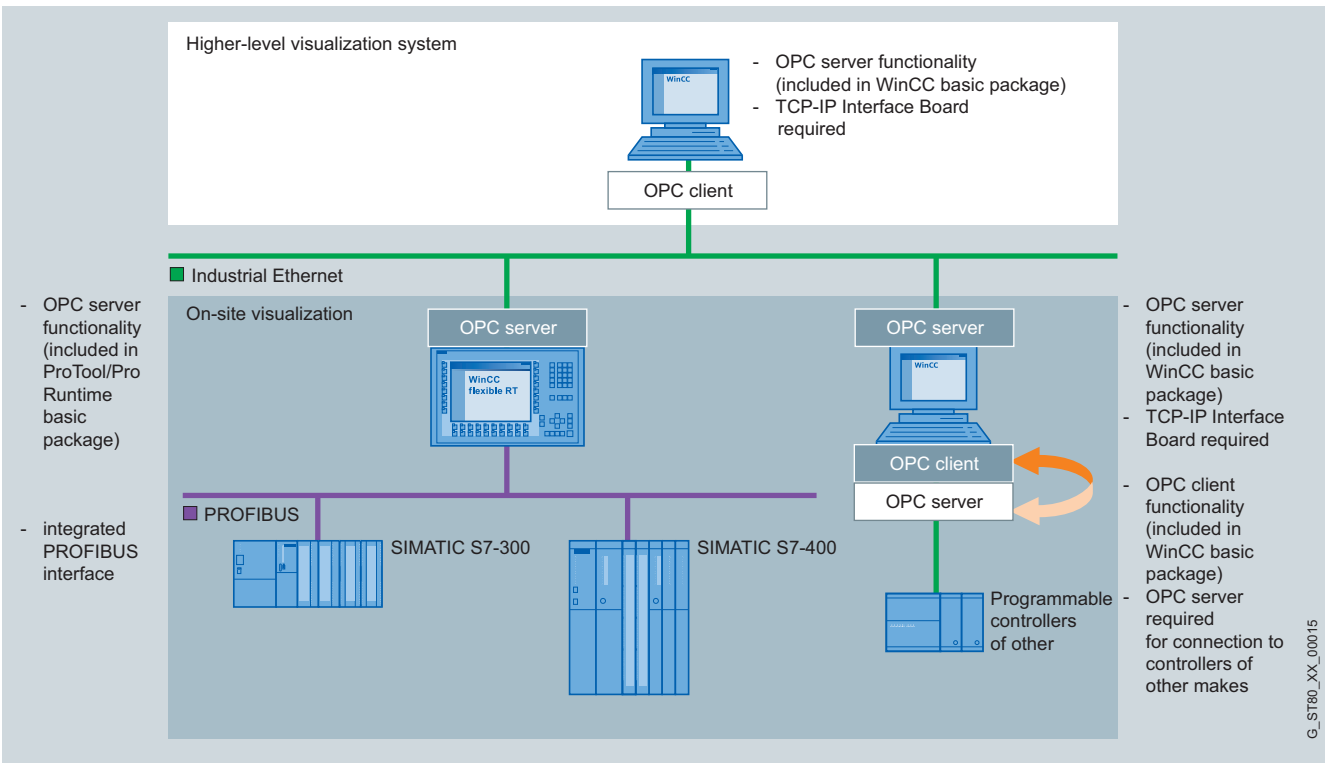


WinCC single-user system: PROFIBUS FMS

Integration (continued)



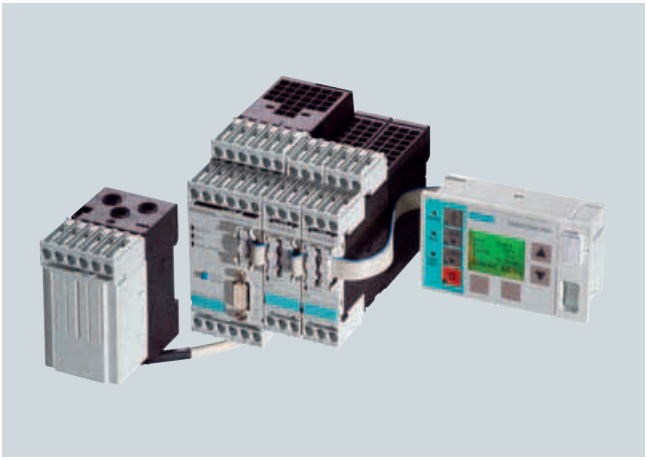
WinCC multi-user system with operable server



OPC coupling

SIMOCODE pro 3UF7 motor management and control devices

Overview



SIMOCODE pro V with current/voltage measuring module, expansion modules and operator panel with display

SIMOCODE pro is a flexible, modular motor management system for motors with constant speeds in the low-voltage performance range. It optimizes the connection between I&C and motor feeder, increases plant availability and allows significant savings to be made for start-up, operation and maintenance of a system.

When SIMOCODE pro is installed in the low-voltage switchboard, it is the intelligent interface between the higher-level automation system and the motor feeder and includes the following:

- Multifunctional, solid-state full motor protection which is independent of the automation system
- Integrated control functions instead of hardware for the motor control
- Detailed operating, service and diagnostics data
- Open communication through PROFIBUS DP, the standard for fieldbus systems

SIMOCODE ES is the software package for SIMOCODE pro parameterization, start-up and diagnostics.

Benefits

General customer benefits

- Integrating the whole motor feeder into the process control by means of a bus significantly reduces the wiring outlay between the motor feeder and PLC
- Decentralization of the automated processes by means of configurable control and monitoring functions in the feeder saves resources in the automation system and ensures full functionality and protection of the feeder even if the I&C or bus system fails
- The acquisition and monitoring of operational, service and diagnostics data in the feeder and process control system increases plant availability as well as maintenance and service-friendliness
- The high degree of modularity allows users to perfectly implement their plant-specific requirements for each motor feeder
- The SIMOCODE pro system offers functionally graded and space-saving solutions for each customer application
- The replacement of the control circuit hardware with integrated control functions decreases the number of hardware components and wiring required and in this way limits stock keeping costs and potential wiring errors
- The use of solid-state full motor protection permits better utilization of the motors and ensures long-term stability of the tripping characteristic and reliable tripping even after years of service

Multifunctional, solid-state full motor protection for rated motor currents up to 820 A

SIMOCODE pro offers comprehensive protection of the motor feeder by means of a combination of different, multi-step and delayable protection and monitoring functions:

- Inverse-time delayed solid-state overload protection (Class 5 ... 40)
- Thermistor motor protection
- Phase failure / unbalance protection
- Stall protection
- Monitoring of adjustable limit values for the motor current
- Voltage and power monitoring
- Monitoring of the power factor (motor idling/load shedding)
- Ground-fault monitoring
- Temperature monitoring, e.g. over PT100/PT1000 and
- Monitoring of operating hours, downtime and number of starts etc.

Recording of measuring curves

SIMOCODE pro can record measuring curves and therefore is able, for example, to present the progression of motor current during motor start-up.

Flexible motor control implemented with integrated control functions (instead of comprehensive hardware interlocks)

Many predefined motor control functions have already been integrated into SIMOCODE pro, including all necessary logic operations and interlocks:

- Overload relays
- Direct-on-line and reversing starters
- Star/delta starters (also with direction reversal)
- Two speeds, motors with separate windings (pole-changing switch); also with direction reversal
- Two speeds, motors with separate Dahlander windings (also with direction reversal)
- Positioner actuation
- Solenoid valve actuation
- Actuation of a circuit breaker
- Soft starter actuation (also with direction reversal)

These control functions are predefined in SIMOCODE pro and can be freely assigned to the inputs and outputs of the device (including PROFIBUS DP).

These predefined control functions can also be flexibly adapted to each customized configuration of a motor feeder by means of freely configurable logic modules (truth tables, counters, timers, edge evaluation ...) and with the help of standard functions (power failure monitoring, emergency start, external faults ...), without additional auxiliary relays being necessary in the control circuit.

SIMOCODE pro makes a lot of additional hardware and wiring in the control circuit unnecessary which results in a high level of standardization of the motor feeder in terms of its design and circuit diagrams.

Benefits (continued)

Detailed operational, service and diagnostics data

SIMOCODE pro makes different operational, service and diagnostics data available and helps to detect potential faults in time and to prevent them by means of preventative measures. In the event of a malfunction, a fault can be diagnosed, localized and rectified very quickly - there are no or very short downtimes.

Operating data

- Motor switching state derived from the current flow in the main circuit
- All phase currents
- All phase voltages
- Active power, apparent power and power factor
- Phase unbalance and phase sequence
- Time to trip
- Motor temperature
- Remaining cooling time etc.

Service data

- Motor operating hours
- Motor stop times
- Number of motor starts
- Number of overload trips
- Consumed power
- Internal comments stored in the device etc.

Diagnostics data

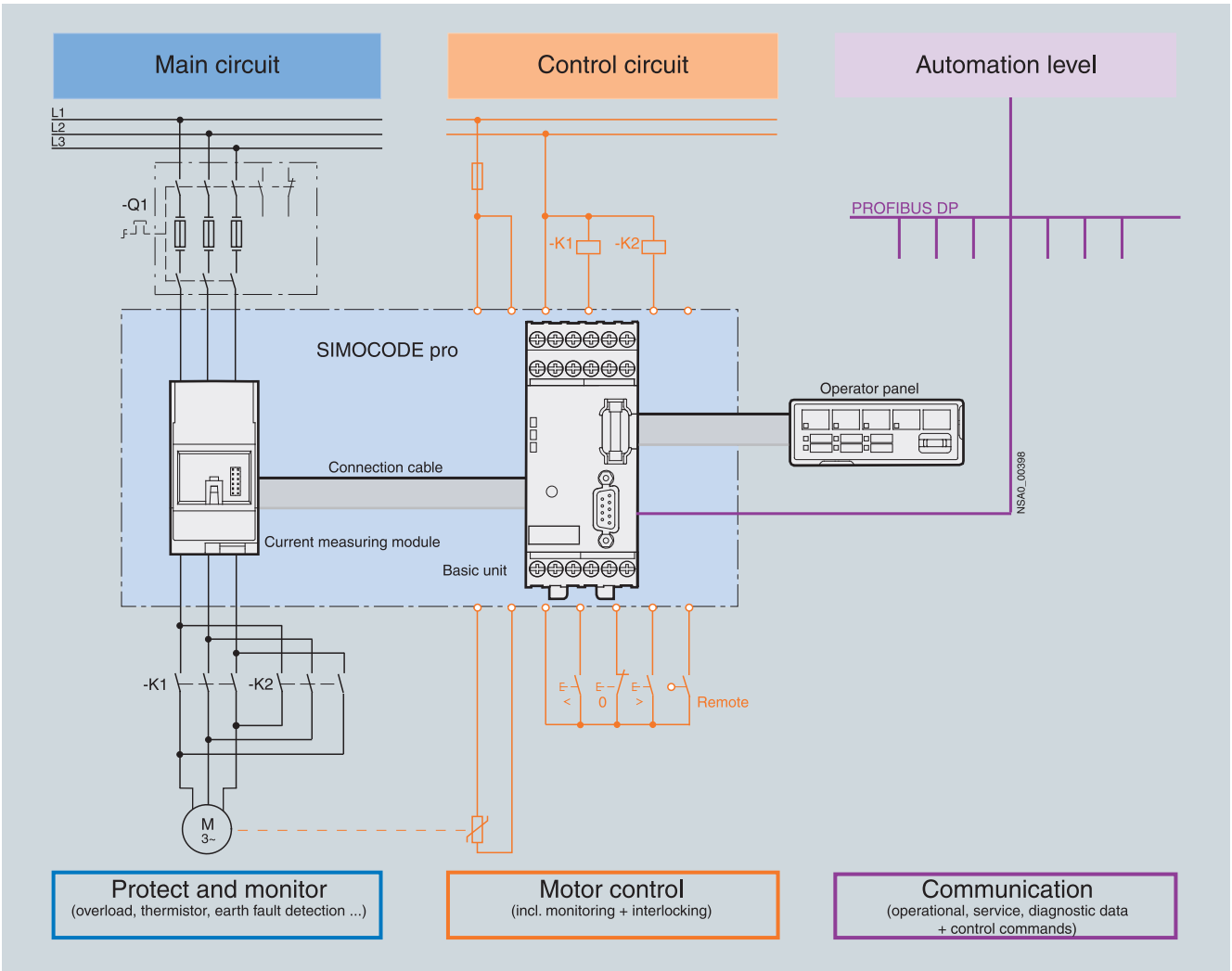
- Numerous detailed early warning and fault messages
- Internal device fault logging with time stamp
- Time stamping of freely selectable status, alarm or fault messages etc.

Communication

SIMOCODE pro is equipped with an integral PROFIBUS DP interface (Sub-D or terminal connection) and can therefore replace all individual wiring (including modular terminals), which would usually be required for exchanging data with the higher-level automation system, with a single 2-wire cable.

SIMOCODE pro supports among other things:

- Baud rates up to 12 Mbit/s
- Automatic baud rate detection
- Communication with up to 3 masters
- Time synchronization over PROFIBUS (SIMATIC S7)
- Time stamp with high timing precision (SIMATIC S7)
- Cyclic services (DPV0) and acyclic services (DPV1)
- DPV1 communication after the Y-Link etc.



SIMOCODE pro combines all the necessary functions for the motor feeder in a compact system.

Application

SIMOCODE pro is often used for automated processes where plant downtimes are very expensive (e.g. steel or cement industry) and where it is important to prevent plant downtimes through detailed operational, service and diagnostics data or to localize the fault very quickly in the event of a fault.

SIMOCODE pro is modular and space-saving and suited especially for operation in motor control centers in the process industry and for power plant technology.

Uses

Protection and control of motors

- In hazardous areas for types of protection EEx e/d according to ATEX directive 94/9/EC see Catalog LV 1
- With heavy starting (paper, cement, metal and water industries)
- In high-availability plants (chemical, oil, raw material processing industry, power plants)

Industries

Today, SIMOCODE pro is mainly used in the chemical (incl. oil and gas), steel, water, paper, pharmaceutical, cement, and glass industry. It is also used for applications in power plants and large diamond, gold and platinum mines. Based on the experience made with the predecessor system SIMOCODE-DP, SIMOCODE pro has been tailored even more specifically to the requirements of these industries.

An essential requirement in these industries is the availability of the motors and thus the availability of the whole process. Plant downtimes caused by faults frequently result in high costs. For this reason, it is very important to detect potential faults early on and to initiate targeted countermeasures. SIMOCODE pro offers users an up-to-date motor management system based on years of experience.

Selection and ordering data

	Version	Set current A	Width mm	Order No.
SIMOCODE pro				
 3UF7 000-1A.00-0	**SIMOCODE pro C, basic units 1,** PROFIBUS DP interface, 12 Mbit/s, RS 485 4 E/3 A freely assignable, input for thermistor connection, monostable relay outputs, rated control supply voltage U_s:			
	• 24 V DC			**3UF7 000-1AB00-0**
	• 110 ... 240 V AC/DC			**3UF7 000-1AU00-0**
 3UF7 010-1A.00-0	**SIMOCODE pro V, basic units 2** PROFIBUS DP interface, 12 Mbit/s, RS 485 4 E/3 A freely assignable, input for thermistor connection, monostable relay outputs, can be expanded by expansion modules, rated control supply voltage U_s:			
	• 24 V DC			**3UF7 010-1AB00-0**
	• 110 ... 240 V AC/DC			**3UF7 010-1AU00-0**
 3UF7 100-1AA00-0	**Current measuring modules**			
	Straight-through transformers	0.3 ... 3	45	**3UF7 100-1AA00-0**
		2.4 ... 25	45	**3UF7 101-1AA00-0**
		10 ... 100	55	**3UF7 102-1AA00-0**
		20 ... 200	120	**3UF7 103-1AA00-0**
	Busbar connections	20 ... 200	120	**3UF7 103-1BA00-0**
		63 ... 630	145	**3UF7 104-1BA00-0**
SIMOCODE pro				
 3UF7 110-1AA00-0	**Current/voltage measuring modules** Voltage measuring up to 690 V if required in connection with a decoupling module			
	Straight-through transformers	0.3 ... 3	45	**3UF7 110-1AA00-0**
		2.4 ... 25	45	**3UF7 111-1AA00-0**
		10 ... 100	55	**3UF7 112-1AA00-0**
		20 ... 200	120	**3UF7 113-1AA00-0**
	Busbar connections	20 ... 200	120	**3UF7 113-1BA00-0**
		63 ... 630	145	**3UF7 114-1BA00-0**
 3UF7 150-1AA00-0	**Decoupling modules** For connecting upstream from a current/voltage measuring module on the system interface when using voltage detection in non-grounded networks			**3UF7 150-1AA00-0**
 3UF7 200-1AA00-0	**Operator panels** Installation in control cabinet door or front plate, for plugging into basic unit, 10 LEDs for status indication and user-assignable buttons for controlling the motor			**3UF7 200-1AA00-0**
 3UF7 210-1AA00-0	**Operator panels with display for SIMOCODE pro V**[1)] Installation in control cabinet door or front plate, for plugging into basic unit 2, 7 LEDs for status indication and user-assignable buttons for controlling the motor, multilingual display, e.g. for indication of measured values, status information or fault messages			**3UF7 210-1AA00-0**

1) Only possible with basic unit 2, product version E03 and higher (from 12/2006).

Selection and ordering data

Version		Order No.
Expansion modules		
Note: *Expansion modules can only be used in combination with basic unit 2! A total of up to 5 expansion modules can be connected in any order to one basic unit. When an operator panel with display and/or a decoupling module is used, more restrictions on the number of expansion modules connectable per basic unit must be observed!*		
 3UF7 300-1AU00-0	**Digital modules**	
	4 binary inputs and 2 relay outputs, up to 2 digital modules can be connected per basic unit 2	
	Relay outputs / *Input voltage*	
	Monostable / 24 V DC	**3UF7 300-1AB00-0**
	Monostable / 110 ... 240 V AC/DC	**3UF7 300-1AU00-0**
	Bistable / 24 V DC	**3UF7 310-1AB00-0**
	Bistable / 110 ... 240 V AC/DC	**3UF7 310-1AU00-0**
 3UF7 400-1AA00-0	**Analog modules**	
	2 inputs (passive) for input and 1 output for output of 0/4 ...20 mA signals, max. 1 analog module can be connected per basic unit 2	**3UF7 400-1AA00-0**
 3UF7 500-1AA00-0	**Ground-fault modules**	
	1 input for connecting a summation current transformer 3UL22, up to 1 ground-fault module can be connected per basic unit 2	**3UF7 500-1AA00-0**
	Note: *For the corresponding summation current transformers for rated fault currents of 0.3 A, 0.5 A or 1 A see Catalog LV 1.*	
 3UF7 700-1AA00-0	**Temperature modules**	
	3 inputs for connecting up to max. 3 analog temperature sensors, up to max. 1 temperature module can be connected for each basic unit 2	**3UF7 700-1AA00-0**

Accessories

	Version	Order No.
Connection cables (essential accessory)		
 3UF7 932-0AA00-0	**Connection cable** In different lengths for connecting basic unit, current measuring module, current/voltage measuring module, operator panel or expansion modules or decoupling module:	
	• Length 0.025 m (flat) Note: Only suitable for connecting basic unit 2 to its expansion modules or for connecting expansion modules to each other; only when the front plates finish at the same height!	**3UF7 930-0AA00-0**
	• Length 0.1 m (flat)	**3UF7 931-0AA00-0**
	• Length 0.3 m (flat)	**3UF7 935-0AA00-0**
	• Length 0.5 m (flat)	**3UF7 932-0AA00-0**
	• Length 0.5 m (round)	**3UF7 932-0BA00-0**
	• Length 1.0 m (round)	**3UF7 937-0BA00-0**
	• Length 2.5 m (round)	**3UF7 933-0BA00-0**
PC cables and adapters		
 3UF7 940-0AA00-0	**PC cable for PC/PG communication with SIMOCODE pro** through the system interface, for connecting to the serial interface of the PC/PG	**3UF7 940-0AA00-0**
	USB/serial adapter To connect an RS 232 PC cable to the USB port of a PC, we recommend using modular safety system 3RK3, soft starter 3RW44, motor starter ET 200S/ECOFAST/ET 200pro, AS-i safety monitor, AS-i analyzer in conjunction with SIMOCODE pro 3UF7	**3UF7 946-0AA00-0**
Memory modules		
 3UF7 900-0AA00-0	The memory module enables the complete parameter assignment of a system to be saved and transferred to a new system, e.g. when a device is replaced, without the need for additional aids or detailed knowledge of the the system interface	**3UF7 900-0AA00-0**
Interface covers		
 3UF7 950-0AA00-0	**For system interface**	**3UF7 950-0AA00-0**
Addressing plug		
 3UF7 910-0AA00-0	**For assigning the PROFIBUS addresses without using a PC/PG** on SIMOCODE pro through the system interface	**3UF7 910-0AA00-0**
Door adapters		
 3UF7 920-0AA00-0	**For external connection of the system interface** outside, for example, a control cabinet	**3UF7 920-0AA00-0**
Adapters for operator panel		
 3UF7 922-0AA00-0	The adapter enables the smaller 3UF7 20 operator panel from SIMOCODE pro to be used in a front panel cutout in which previously, e.g. after a change of system, a larger 3UF5 2 operator panel from SIMOCODE-DP had been used; degree of protection IP54	**3UF7 922-0AA00-0**

Accessories (continued)

	Version	Order No.
Labeling strips		
 3UF7 925-0AA02-0	• For pushbuttons of the 3UF7 20 operator panel	**3UF7 925-0AA00-0**
	• For pushbuttons of the 3UF7 21 operator panel with display	**3UF7 925-0AA01-0**
	• For LEDs of the 3UF7 20 operator panel	**3UF7 925-0AA02-0**
	Note: *Pre-punched labeling strips for user-specific printing using the free inscription software "SIRIUS Label Designer" on a laser printer. Note the software version! Download from www.siemens.de/simocode.*	
Push-in lugs		
 3RB19 00-0B	**For screw fixing** e. g. on mounting plate, 2 units required per device	
	• Can be used with 3UF7 1.0, 3UF7 1.1 and 3UF7 1.2	**3RB19 00-0B**
	• Can be used with 3UF7 0, 3UF7 3, 3UF7 4, 3UF7 5 and 3UF7 7	**3RP19 03**
Terminal covers		
 3RT19 56-4EA1	**Covers for cable lugs and busbar connections**	
	• Length 100 mm, can be used for 3UF7 1.3-1BA00-0	**3RT19 56-4EA1**
	• Length 120 mm, can be used for 3UF7 1.4-1BA00-0	**3RT19 66-4EA1**
	Covers for box terminals	
	• Length 25 mm, can be used for 3UF7 1.3-1BA00-0	**3RT19 56-4EA2**
	• Length 30 mm, can be used for 3UF7 1.4-1BA00-0	**3RT19 66-4EA2**
 3RT19 56-4EA2	**Covers for screw terminals** between contactor and current measuring module or current/voltage measuring module for direct mounting	
	• Can be used for 3UF7 1.3-1BA00-0	**3RT19 56-4EA3**
	• Can be used for 3UF7 1.4-1BA00-0	**3RT19 66-4EA3**
Box terminal blocks		
 3RT19 5.-4G	**For round and ribbon cables**	
	• Up to 70 mm^2, can be used for 3UF7 1.3-1BA00-0	**3RT19 55-4G**
	• Up to 120 mm^2, can be used for 3UF7 1.3-1BA00-0	**3RT19 56-4G**
	• Up to 240 mm^2, can be used for 3UF7 1.4-1BA00-0	**3RT19 66-4G**
	For conductor cross-sections, see Technical Information LV 1 T.	
Bus termination		
	Bus termination module with separate supply voltage for terminating the bus following the last unit on the bus line. Supply voltage:	
	• 115/230 V AC	**3UF1 900-1KA00**
	• 24 V DC	**3UF1 900-1KB00**
System manual		
 3UF7 970-0AA01-0	**SIMOCODE pro** with token fee, languages:	
	• German	**3UF7 970-0AA01-0**
	• English	**3UF7 970-0AA00-0**
	• French	**3UF7 970-0AA02-0**

Accessories (continued)

Version	Order No.
PCS 7 function block library for SIMOCODE pro	
For integrating SIMOCODE pro into the PCS 7 process control system	
• **PCS 7 function block library for SIMOCODE pro, V6.0** Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V6.0 engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: CD incl. electronic documentation	**3UF7 982-0AA00-0**
• **PCS 7 function block library for SIMOCODE pro, V6.1** Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V6.1 engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: CD incl. electronic documentation	**3UF7 982-0AA02-0**
• **PCS 7 SIMOCODE pro function block library, V7.0** Scope of supply: AS modules and faceplates for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V7.0 engineering software for one engineering station (single license) including runtime software for execution of the AS module in an automation system (single license), German/English/French, Type of delivery: CD incl. electronic documentation	**3UF7 982-0AA10-0**
• **AS modules for integrating SIMOCODE pro in the PCS 7 process control system for PCS 7-Version V6.x** runtime software for execution of the AS module in an automation system (single license), Type of delivery: license without software and documentation	**3UF7 982-0AA01-0**
• **AS modules for integrating SIMOCODE pro in the PCS 7 process control system for PCS 7 Version V7.x** runtime software for execution of the AS module in an automation system (single license), Type of delivery: license without software and documentation	**3UF7 982-0AA11-0**
• **Upgrade for the PCS 7 function block library SIMOCODE pro, V6.0 or V6.1 on Version SIMOCODE pro V7.0** for integrating SIMOCODE pro into the PCS 7 process control system, for PCS 7 Version V7.0 (single license), German/English/French, Type of delivery: CD incl. electronic documentation	**3UF7 982-0AA13-0**


3UF7 982-0AA00-0

4

Accessories (continued)

	Version	Order No.
SIMOCODE ES 2007 Basic		
 3ZS1 312-4CC10-0YA5	**Floating license for one user** E-SW, software and documentation on CD, 3 languages (German/English/French), communication through the system interface	
	• License key on USB stick, Class A	**3ZS1 312-4CC10-0YA5**
	• License key download, Class A	**3ZS1 312-4CE10-0YB5**
SIMOCODE ES 2007 Standard		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through the system interface	
	• License key on USB stick, Class A	**3ZS1 312-5CC10-0YA5**
	• License key download, Class A	**3ZS1 312-5CE10-0YB5**
	Upgrade for SIMOCODE ES 2004 and later Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	**3ZS1 312-5CC10-0YE5**
	Powerpack for SIMOCODE ES 2007 Basic Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	**3ZS1 312-5CC10-0YD5**
	Software Update Service For 1 year with automatic extension, assuming the current software version is in use, E-SW, software and documentation on CD, communication through the system interface	**3ZS1 312-5CC10-0YL5**
SIMOCODE ES 2007 Premium		
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through the system interface	
	• License key on USB stick, Class A	**3ZS1 312-6CC10-0YA5**
	• License key download, Class A	**3ZS1 312-6CE10-0YB5**
	Upgrade for SIMOCODE ES 2004 and later Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	**3ZS1 312-6CC10-0YE5**
	Powerpack for SIMOCODE ES 2007 Standard Floating license for one user, E-SW, software and documentation on CD, license key on USB stick, Class A, 3 languages (German/English/French), communication through the system interface	**3ZS1 312-6CC10-0YD5**
	Software Update Service For 1 year with automatic extension, assuming the current software version is in use, E-SW, software and documentation on CD, communication through the system interface	**3ZS1 312-6CC10-0YL5**

More information

Important ordering notes

SIMOCODE pro is a modularly constructed motor management system which is subdivided into two device series with different functional scopes:

- SIMOCODE pro C,
  as a compact system for direct-on-line starters and reversing starters
- SIMOCODE pro V,
  as a variable system with all control functions and with the possibility of expanding the inputs, outputs and functions of the system at will using expansion modules.

Expansion possibilities	SIMOCODE pro C Basic Unit 1	SIMOCODE pro V Basic Unit 2
Operator panels	✓	✓
Operator panels with display	--	✓
Current measuring modules	✓	✓
Current/voltage measuring modules	--	✓
Decoupling modules	--	✓
Expansion modules:		
• Digital modules (max. 2)	--	✓
• Analog module (max. 1)	--	✓
• Ground-fault module (max. 1)	--	✓
• Temperature module (max. 1)	--	✓

✓ Possible
-- Not available

Note:
When an operator panel with display and/or a decoupling module is used, restrictions on the number of expansion modules connectable per basic unit must be observed, see Technical Information LV 1 T!

System manual

For selection of equipment and for configuration, it is recommended that the 3UF7 970-0AA0.-0 system manual is consulted.

Internet

You can find further information in the Internet at:
http://www.siemens.com/simocode

Current transformer 3UF18 for overload protection

Overview

The 3UF18 current transformers are protection transformers and are used for actuating overload relays. Protection transformers are designed to ensure proportional current transfer up to a multiple of the primary rated current. The 3UF18 current transformers convert the maximum current of the corresponding operating range into the standard signal 1 A secondary.

Selection and ordering data

	Mounting type	Operating range A	Order No.
For stand-alone installation			
 3UF18 43	Screw mounting and snap-on mounting on 35 mm standard mounting rail	0.25 … 2.5[1)]	**3UF18 43-1BA00**
		1.25 … 12.5[1)]	**3UF18 43-2AA00**
		2.5 … 25[1)]	**3UF18 43-2BA00**
		12.5 … 50	**3UF18 45-2CA00**
		16 … 65	**3UF18 47-2DA00**
		25 … 100	**3UF18 48-2EA00**
For mounting onto contactors and stand-alone installation			
 3UF18 68	Screw mounting	32 … 130	**3UF18 50-3AA00**
		50 … 200	**3UF18 52-3BA00**
		63 … 250	**3UF18 54-3CA00**
		100 … 400	**3UF18 56-3DA00**
		125 … 500	**3UF18 57-3EA00**
		160 … 630	**3UF18 68-3FA00**
		205 … 820	**3UF18 68-3GA00**

[1)] For the protection of EEx e motors the following setting ranges are applicable:
3UF18 43-1BA00, 0.25 A ... 1.25 A
3UF18 43-2AA00, 1.25 A ... 6.3 A
3UF18 43-2BA00, 2.5 A ... 12.5 A

Accessories

	For contactor type	Order No.
Terminal covers		
 3TX7 466-0A	For transformer/contactor combinations and stand-alone installation for transformer (cover required per connection side)	
	• 3UF18 45	**3TX7 446-0A**
	• 3UF18 48	**3TX7 466-0A**
	• 3UF18 50, 3UF18 52	**3TX7 506-0A**
	• 3UF18 54 to 3UF18 57	**3TX7 536-0A**
	• 3UF18 68-3FA00	**3TX7 686-0A**
	• 3UF18 68-3GA00	**3TX7 696-0A**
	For covering the screw terminal for direct mounting on contactor (cover required per contactor/transformer combination)	
	• 3UF18 48	**3TX7 466-0B**
	• 3UF18 50, 3UF18 52	**3TX7 506-0B**
	• 3UF18 54 to 3UF18 57	**3TX7 536-0B**
	• 3UF18 68-3FA00	**3TX7 686-0B**
	• 3UF18 68-3GA00	**3TX7 696-0B**

Overview

The 3RK3 modular safety system (MSS) is a freely parameterizable modular safety relay. Depending on the type of external connection, safety-orientated applications up to Category 4 according to EN 954-1, Performance Level e according to ISO 13849-1 and SIL3 according to IEC 62061 can be realized.

The modular safety relay permits several safety applications to be interconnected. The safety functions are easily created on the PC using a graphic parameterizing tool. For example, disconnection ranges can be set and other dependencies defined.

With additional safety-oriented expansion modules the system is flexibly adapted to the required safety applications.

The MSS comprises the following system components:
- Central module
- Expansion modules
- Interface module
- Parameterization software
- Accessories

The comprehensive error and status diagnostics provides the possibility of finding errors in the system and localizing signals from sensors. Plant downtimes can be reduced as the result.

Optional interface modules send the diagnostics data to higher-level bus systems (e.g. PROFIBUS DP). These data are then available for further processing in the automation system.

Benefits

- More functionality and flexibility through freely configurable safety logic
- For all safety applications thanks to compliance with the highest safety requirements (Category 4 according to EN 954-1, Performance Level e according to ISO 13849-1 or SIL3 according to IEC 62061)
- Suitable for use all over the world through compliance with all globally established certifications
- Modular hardware configuration
- Parameterization by means of software instead of wiring
- Removable terminals for greater plant availability

Application

The 3RK3 modular safety system can be used for all safety-oriented requirements in the manufacturing industry and offers the following safety functions:
- EMERGENCY-STOP
- Protective door monitoring
- Non-contact protective devices (BWS)
- Switching mats
- Two-hand operator controls
- Approval switches
- Operating mode selector switches
- Cycle control

Selection and ordering data

Modules – screw terminal

	Version	Order No.
Central module		
 3RK3 111-1AA10	**3RK3 Basic** Central module with safety-orientated inputs and outputs • 8 inputs • 1 two-channel relay output • 1 two-channel solid-state output Max. 7 expansion modules can be connected	**3RK3 111-1AA10**
Expansion modules		
 3RK3 211-1AA10	**4/8 F-DI** Safety-orientated expansion module • 8 inputs	**3RK3 211-1AA10**
 3RK3 221-1AA10	**2/4 F-DI 1/2 F-RO** Safety-orientated mixed expansion module • 4 inputs • 2 single-channel relay outputs	**3RK3 221-1AA10**
 3RK3 231-1AA10	**2/4 F-DI 2F-DO** Safety-orientated mixed expansion module • 4 inputs • 2 two-channel solid-state outputs	**3RK3 231-1AA10**
 3RK3 311-1AA10	**8 DO** Standard output module • 8 solid-state outputs	**3RK3 311-1AA10**
Interface module		
 3RK3 511-1AA10	**DP interface** • PROFIBUS DP interface, 12 Mbit/s, RS 485	**3RK3 511-1BA10**

Selection and ordering data (continued)

Modules – spring-loaded terminal

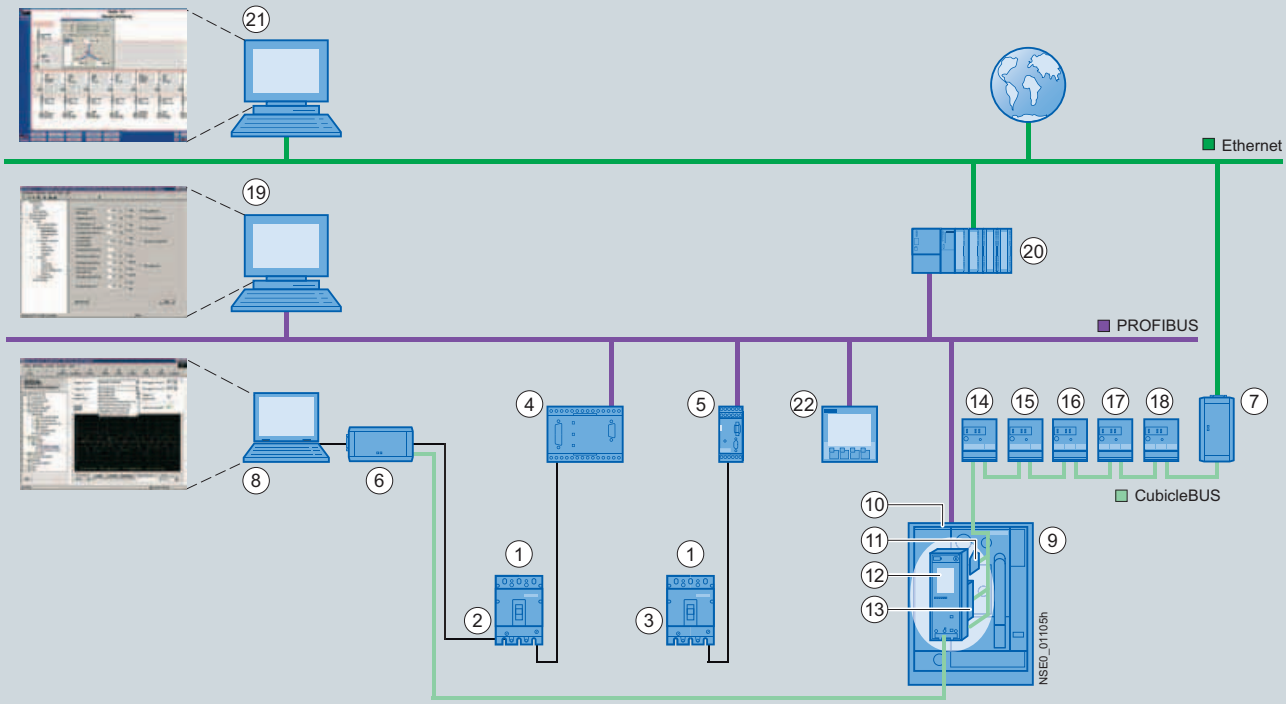
	Version	Order No.
Central module		
 3RK3 111-1AA10	**3RK3 Basic** Central module with safety-orientated inputs and outputs • 8 inputs • 1 two-channel relay output • 1 two-channel solid-state output Max. 7 expansion modules can be connected	**3RK3 111-2AA10**
Expansion modules		
 3RK3 211-1AA10	**4/8 F-DI** Safety-orientated expansion module • 8 inputs	**3RK3 211-2AA10**
 3RK3 221-1AA10	**2/4 F-DI 1/2 F-RO** Safety-orientated mixed expansion module • 4 inputs • 2 single-channel relay outputs	**3RK3 221-2AA10**
 3RK3 231-1AA10	**2/4 F-DI 2F-DO** Safety-orientated mixed expansion module • 4 inputs • 2 two-channel solid-state outputs	**3RK3 231-2AA10**
 3RK3 311-1AA10	**8 DO** Standard output module • 8 solid-state outputs	**3RK3 311-2AA10**
Interface module		
 3RK3 511-1AA10	**DP interface** • PROFIBUS DP interface, 12 Mbit/s, RS 485	**3RK3 511-2BA10**

Selection and ordering data

Accessories

	Version	Order No.
Connection cables (essential accessory)		
 3UF7 932-0AA00-0	**Connection cable** For connecting the central module, expansion modules and the interface module	
	• Length 0.025 m (flat)	**3UF7 930-0AA00-0**
PC cables and adapters		
 3UF7 940-0AA00-0	**PC cable for PC/PG communication with 3RK3 modular safety system** through the system interface, for connecting to the serial interface of the PC/PG	**3UF7 940-0AA00-0**
	USB/serial adapter To connect an RS 232 PC cable to the USB port of a PC, we recommend using modular safety system 3RK3, soft starter 3RW44, motor starter ET 200S/ECOFAST/ET 200pro, AS-i safety monitor, AS-i analyzer in conjunction with SIMOCODE pro 3UF7	**3UF7 946-0AA00-0**
Interface covers		
 3UF7 950-0AA00-0	**For system interface**	**3UF7 950-0AA00-0**
Memory modules		
 3RK3 931-0AA00	**For parameterizing the 3RK3 modular safety system without a PC/PG** through the system interface	**3RK3 931-0AA00**
Door adapters		
 3UF7 920-0AA00-0	**For external connection of the system interface** outside, for example, a control cabinet	**3UF7 920-0AA00-0**
Push-in lugs		
 3RP19 03	**For screw fixing** e. g. on mounting plate, 2 units required per device	
	• Can be used for 3RK3	**3RP19 03**
ES 2007 Standard Modular Safety System		
 3ZS1 314-5CC10 -0YA5	Parameterization, start-up and diagnostics software for the 3RK3 modular safety system • Runs on WIN 2000/Win XP PROF/Win VISTA: Business32, Ultimate32 • Without PC cable	
	Floating license for one user E-SW, software and documentation on CD, 3 languages (German/English/French), communication through the system interface	
	• License key on USB stick, Class A	**3ZS1 314-5CC10-0YA5**
	• License key download, Class A	**3ZS1 314-5CE10-0YB5**
	Software Update Service For 1 year with automatic extension, assuming the current software version is in use, E-SW, software and documentation on CD, communication through the system interface	**3ZS1 314-5CC10-0YL5**
	Connection cable	**3UF7 940-0AA00-0**

Overview



1 SENTRON 3VL
2 Electronic LCD ETU trip unit
3 Electronic ETU trip unit
4 COM10 PROFIBUS module complete with ZSI
5 COM20 PROFIBUS module[2] complete with ZSI
6 Breaker Data Adapter (BDA)
7 BDA *Plus* with Ethernet interface
8 Browser-capable input and output device (e.g. notebook)
9 SENTRON 3WL
10 COM15 PROFIBUS module[1]
11 Breaker Status Sensor (BSS)
12 Electronic ETU trip unit
13 Measurement function *Plus*
14 ZSI module
15 Digital output module with relay contacts
16 Digital output module with relay contacts, configurable
17 Analog output module
18 Digital input module
19 Switch ES Power on PC
20 PLC e.g. SIMATIC S7
21 SIMATIC powercontrol
22 SENTRON PAC

1) To connect MODBUS the COM16 module is necessary.
2) To connect MODBUS the COM21 module is necessary.

For more information about communication-capable SENTRON circuit breakers

- see Catalog LV 1/LV 1.T, Chapters 15 and 16.
- A&D Mall, Section *"SENTRON Switching and Protection Devices for Power Distribution"/"Air circuit breakers"/ "3WL Air Circuit Breakers" and/or "SENTRON Switching and Protection Devices for Power Distribution"/"Molded Case Circuit Breakers"/"3VL Molded Case Circuit Breakers"*.

SENTRON PAC3200
multifunction measuring instruments

Overview

Measuring precisely with SENTRON PAC3200 – new dimensions with the multifunction measuring instrument

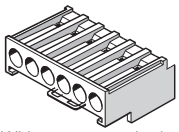
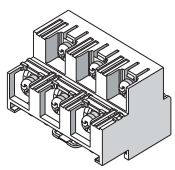
The SENTRON PAC3200 is a control panel instrument for measuring and indicating more than 50 electric power distribution variables such as voltage, current, power, electrical work and frequency with their minimum, maximum and mean values. It convinces through its compact design and high performance capacity.

A large, backlit graphic display can be read even from great distances. User-friendly, intuitive operation is made possible by plain text displays in nine languages in combination with four function buttons. Language selection is possible either directly on the device or using configuration software. SENTRON PAC3200 offers several communication options in addition to one digital input and one digital output. For integration in a higher-level power management system it is possible to use either the integrated Ethernet interface or the optionally available expansion modules.

SENTRON PAC3200 is also available with UL and CSA approval for use in the USA and Canada.

The SENTRON powerconfig software for user-friendly device configuration is included in the scope of supply.

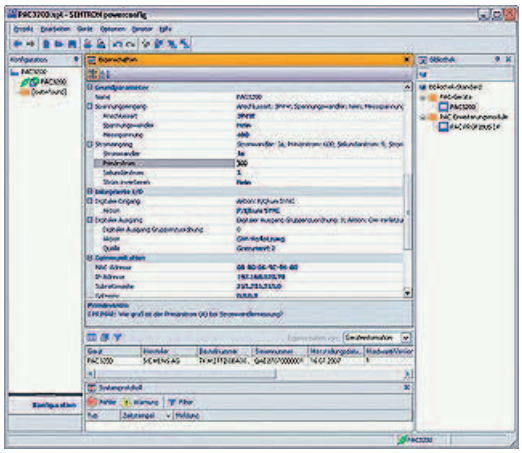
The product variants of the SENTRON PAC3200

	PAC3200	Order No.
 With screw terminals	With AC/DC power supply unit with wide voltage range and screw terminals • U_{AUX}: 95 ... 240 V AC ±10 % 110 ... 340 V DC ±10 % • U_e: max. 3 ~ 690/400 V	**7KM2112-0BA00-3AA0**
	With DC power supply unit with extra-low voltage and screw terminals • U_{AUX}: 22 ... 65 V ±10 % • U_e: max. 3 ~ 500/289 V	**7KM2111-1BA00-3AA0**
 with ring terminal lug terminals	With AC/DC power supply unit with wide voltage range and cable lug terminals • U_{AUX}: 95 ... 240 V AC ±10 % 110 ... 340 V DC ±10 % • U_e: max. 3 ~ 690/400 V	**7KM2112-0BA00-2AA0**

More information is available in the Internet at:
www.siemens.de/powermanagementsystem

The advantages of the SENTRON PAC3200 at a glance:

- UL and CSA approval for the USA and Canada
- Three-phase control panel measuring device for measuring electrical variables
- Measuring more than 50 variables such as phase voltage and phase-to-phase voltage, current, power, work, power factor, frequency...
- High measuring accuracy for electrical work; Class 0.5S according to IEC62053-22
- Can be used for single-phase measurements as well as for multiphase measurements in 3 and 4-conductor networks
- Can be connected directly to three-phase industrial networks up to 690/400 V or up to max. 500/289V for devices with DC power supply unit with extra-low voltage (CATIII)
- Measuring higher voltages using a voltage transformer; adjustable transformer ratio
- For x/1A and x/5A current transformers Adjustable transformer ratio and current direction
- 2 device types available with power supply unit with wide voltage range and with extra-low voltage in order to cover all standard AC and DC auxiliary voltage supply needs
- Slot for expansion modules such as the SENTRON PAC PROFIBUS DP or SENTRON PAC RS485 communication modules
- Small space requirement thanks to compact design (96 mm x 96 mm, mounting depth 51 mm or 73 mm with module)
- Large, graphic LCD display with intuitive user operation using function buttons
- Menu selections, test displays and documentation available in nine languages (German, English, Portuguese, Turkish, Spanish, Italian, French, Chinese and Russian) Language selection on the device or using configuration software
- IP65 using standard sealing
- Multifunctional digital input, for example for detecting counting pulses or for monitoring the status of switching devices
- Multifunctional digital output, for example for emitting active or reactive power pulses (S0) or for indicating limit value violations
- Monitoring of up to 6 limit values and connecting the limit values with logical AND / OR operations
- Measuring period averages for active and reactive power with minimum and maximum value
- Operating hours meter for indicating the load running time
- Integrated Ethernet interface (Modbus TCP or SEAbus) for easy integration into power management systems
- CD with SENTRON powerconfig software for user-friendly device configuration included in scope of supply



Overview (continued)

Measurement functions

The SENTRON PAC3200 measures the following variables:

Variable	Display range	L1/L1-2	L2/L2-3	L3/L3-1	Total	Minimum value	Mean value	Maximum value
Current	0 A .....120 kA	✓	✓	✓	--	✓	✓[1]	✓
Voltage L-N	0 V ..... 700 kV	✓	✓	✓	--	✓	✓[1]	✓
Voltage L-L	0 V ..... 1200 kV	✓	✓	✓	--	✓	✓[1]	✓
Frequency	44.00 … 67.00 Hz	✓	--	--	--	✓	--	✓
Active power per phase input "+" / output "-"	0 W ..... 100 GW	✓	✓	✓	--	✓	--	✓
Reactive power per phase pos./neg. or ind./cap.	0 var … 100 Gvar	✓	✓	✓	--	✓	--	✓
Apparent power per phase	0 VA … 100 GVA	✓	✓	✓	--	✓	--	✓
Active power total input "+" / output "-"	0 W … 100 GW	--	--	--	✓	✓	✓[2]	✓
Reactive power total pos./neg. or ind./cap.	0 var … 100 Gvar	--	--	--	✓	✓	✓[2]	✓
Apparent power total	0 VA … 100 GVA	--	--	--	✓	✓	--	✓
Power factor per phase	0 …1	✓	✓	✓	--	✓	--	✓
Power factor total	0 …1	--	--	--	✓	✓	--	✓
Active work total input "+" / output "-"	0 Wh … 1000 GWh	--	--	--	✓[3]	--	--	--
Reactive work total pos./neg. or ind./cap.	0 varh … 100 Gvarh	--	--	--	✓[3]	--	--	--
Apparent work total	0 VAh … 100 GVAh	--	--	--	✓[3]	--	--	--
THD voltage per phase	0 … 100 %	✓	✓	✓	--	--	--	✓
THD current per phase	0 … 100 %	✓	✓	✓	--	--	--	✓
Voltage asymmetry	0 … 100 %	--	--	--	✓	--	--	--
Current asymmetry	0 … 100 %	--	--	--	✓	--	--	--
Operating hours	0 h … 300 years	--	--	--	✓	--	--	--
Universal counter	0 … 999,999,999 pulses	--	--	--	✓	--	--	--

[1] The values quoted are mean values of all three phases.

[2] Can only be called up through communication. The power averages (power count values), including minimum and maximum values, are transmitted for an adjustable measurement period. The measurement period can be adjusted in the range 1 … 60 min; the default setting is 15 min.

[3] The values for high rate and low rate are shown on the display.

✓ Measuring possible

-- Measuring not possible or not meaningful

Benefits

- Thanks to the wide range of functions, only one device variant is required for different measuring tasks – this saves storage costs and procurement costs.
- Easy and quick mounting saves installation costs.
- Connection to power supply networks up to 690 V[1] without a voltage transformer saves space in the control cabinet and costs (transformer costs, transformer mounting and installation costs).
- Comprehensive and precise power measurements form the basis for identifying savings potential in the system.
- The many different measuring and monitoring functions of the SENTRON PAC3200 contribute indirectly to a higher level of availability because faults are detected early.
- With its technical configuration, various approvals and certifications such as UL and CSA for the USA and Canada, and support for nine languages, the SENTRON PAC3200 can be used world-wide.
- A large, illuminated graphic display guarantees good reading even in poor light conditions and opens up a wider application area for the device.
- Through the multilingual, intuitive user operation of the PAC3200, valuable time can be saved during start-up and operation.
- Thanks to the network-capable Ethernet interface, which is included without additional price in every standard device, the costs for system integration can be lowered. At the same time the high transmission speed helps to increase the performance of the overall system notably.
- The SENTRON powerconfig configuration software makes it easier to configure the devices. This results in considerable time savings, particularly when several PAC3200 units have to be configured.
- Easy integration in automation systems or power management systems, for example SIMATIC WinCC powerrate, SIMATIC PCS 7, is favored by the optional PAC PROFIBUS DP and PAC RS485 expansion modules interface, thus saving time and implementation costs.
- The SENTRON PAC3200 has a mounting depth of only 51 mm which means that it can also be installed in equipment with little depth.

[1] max. 500 V (U_{L-L}) for version with DC power supply unit with extra-low voltage (7KM2111-1BA00-3AA0)

SENTRON PAC3200
multifunction measuring instruments

Application

Three-phase multifunction measuring instruments are used to measure and indicate all relevant network parameters of an electrical installation and they monitor these parameters permanently.

Uses

Wherever power has to be distributed, be it in industrial or infrastructural buildings, the SENTRON PAC3200 supplies important information to the building services system or the power controlling system.

The many different communication options offered by the SENTRON PAC3200 make it an indispensable supplier of data for power management systems and for plant and building automation.

Industries

Power distribution systems for the power supply are needed in all sectors of industry. SENTRON PAC3200 is used accordingly in all sectors where power consumption and electrical parameters are to be measured.

4

Selection and ordering data

	Version	Order No.
Screw terminals		
 7KM2112-0BA00-3AA0	**SENTRON PAC3200** Control panel instrument 96 mm x 96 mm Screw terminals for connecting current and voltage AC/DC power supply unit with wide voltage range: U_{AUX}: AC 95…240 V ±10% DC 110…340 V ±10% Measuring inputs: U_e: 3~ 690/400 V I_e: /1 A or /5 A	**7KM2112-0BA00-3AA0**
 7KM2111-1BA00-3AA0	**SENTRON PAC3200** Control panel instrument 96 mm x 96 mm Screw terminals for connecting current and voltage DC power supply unit with extra-low voltage: U_{AUX}: 22…65 V DC ±10 % Measuring inputs: U_e: 3~ 500/289 V I_e: /1 A or /5 A	**7KM2111-1BA00-3AA0**
Cable lug terminals		
 7KM2112-0BA00-2AA0	**SENTRON PAC3200** Control panel instrument 96 mm x 96 mm cable lug terminals for connecting current and voltage AC/DC power supply unit with wide voltage range: U_{AUX}: AC 95…240 V ±10% DC 110…340 V ±10% Measuring inputs: U_e: 3~ 690/400 V I_e: /1 A or /5 A	**7KM2112-0BA00-2AA0**

More information

Suitable current transformers can be found
- in Catalog LV 1 2008, Section "SIVACON Power Distribution Boards, Busway and Cubicle Systems"
  --> "Components for 8US, 8UC 4NC Distribution Systems, 4NC Current Transformers for Measuring Purposes"
- in the A&D Mall, Section "Low-Voltage Controls"
  --> "Low-Voltage Power Distribution"
  --> "SIVACON Power Distribution Boards, Busway and Cubicle Systems"
  -->"Components for 8US, 8UC, 4NC Distribution Systems"
  --> "4NC Current Transformers for Measuring Purposes".

Overview

The PAC PROFIBUS DP expansion module has the following features:

- PROFIBUS DP plug-in communication module for SENTRON PAC3200
- Parameterizable from the front of the device or using parameterization software
- Using PROFIBUS DPV1, data can be transferred in both cyclic and acyclic modes
- Easy integration using GSD file, with free choice of the measurement variables to be transmitted
- Plug and play
- All baud rates from 9.6 Kbit/s to 12 Mbit/s are supported
- Connection through 9-pole Sub-D connector according to IEC 61158
- No external auxiliary power necessary
- Status indication by LED on the module

Application

The SENTRON PAC PROFIBUS DP communication module is plugged onto the rear of the PAC3200 multifunction measuring instrument. The device identifies the module automatically and presents the parameters of relevance for this module for selection in the parameterization menu.

All measurement variables supplied by the PAC3200 are selected and cyclically or acyclically transmitted by means of the GSD file.

The state of the module is indicated by an LED.

Selection and ordering data

	Version	Order No.
 7KM9300-0AB00-0AA0	**PAC PROFIBUS DP** Expansion module for SENTRON PAC3200 (PROFIBUS DPV1)	**7KM9300-0AB00-0AA0**

SENTRON multifunction measuring instruments PAC RS485 expansion modules

Overview

The PAC RS485 expansion module has the following features:

- PAC RS485 plug-in communication module for SENTRON PAC3200
- Parameterizable from the front of the device or using parameterization software
- Modbus RTU and SEAbus protocols are supported
- Plug and play
- Baud rates of 4.8 / 9.6 / 19.2 and 38.4 kBd are supported
- Connection by means of 6-pole screw terminals
- No external auxiliary power necessary
- Status indication by LED on the module

Application

The SENTRON PAC RS485 communication module is plugged onto the rear of the PAC3200 multifunction measuring instrument. The device identifies the module automatically and presents the parameters of relevance for this module for selection in the parameterization menu. The state of the module is indicated by the integrated LED.

In connection with the PAC3200, the Modbus RTU and SEAbus protocols are supported with baud rates of 4.8 / 9.6 / 19.2 and 38.4 kBd.

Selection and ordering data

	Version	Order No.
 7KM9300-0AM00-0AA0	**PAC RS485** Expansion module for SENTRON PAC3200 (SEAbus and Modbus RTU)	**7KM9300-0AM00-0AA0**

Overview

3RG78 4 and 3SF78 4 light curtains and light grids (for PROFIBUS)

- are active optoelectronic protective devices (AOPD),
- comply with type 2 or 4 acc. to EN 61496-1, -2,
- comply with SIL 2 and 3 acc. to IEC/EN 61508,
- are EU prototype tested,
- protect the operating personnel at or near dangerous machines,
- operate contact-free,
- are free of wear in comparison with mechanical systems (e.g. safety mats).

For further details, please refer to the "Safety Integrated" manual and the operating instructions for the respective devices.

Tests/service

The devices are EU prototype tested (German Technical Inspectorate (TÜV) Product Service in cooperation with the German Statutory Industrial Accident Insurance Institution (BIA)).

Where necessary, tests can be performed before initial start-up as well as during the annual inspection (e.g. as per regulatory requirements for presses). Please contact your Siemens representative.

Benefits

Integrated functions:

- Start/restart inhibit
- Contactor control
- Blanking function package with
  - Fixed blanking
  - Floating blanking
  - Reduced resolution
- Muting" function package
- Multi-scan function
- Cycle control

Configuration:

- By means of teach-in key using optomagnetic key
- Transmission of configuration data through a plug-in configuration card
- 2 transmission channels
- Cascading of host and guest devices
- Expanded display (2 × 7 segments)

Outputs/connections:

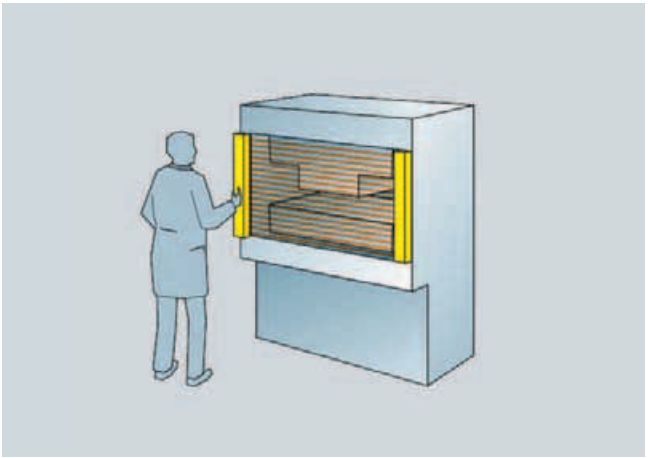
- Local interface
- Connection to PROFIBUS

SIMATIC FS400 light curtains

Application

Light curtains for finger and hand protection in hazardous areas

Protection from entering hazardous areas by mounting light curtains near dangerous machine parts (finger and hand protection)



Device selection

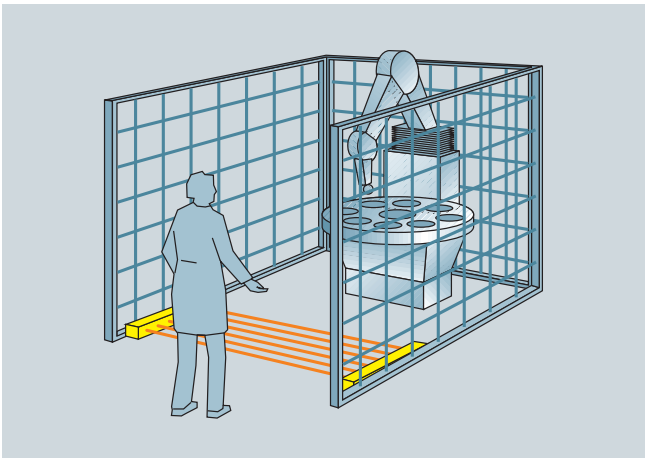
Light curtains for category 4, with 14 and 30 mm resolution

Application areas

E.g. presses, punches, filter presses, cutting machines

Light curtains to secure horizontal hazardous areas near the floor

Reliable detection of persons in hazardous areas by mounting the light curtain near the floor (not possible to crawl under)



Device selection

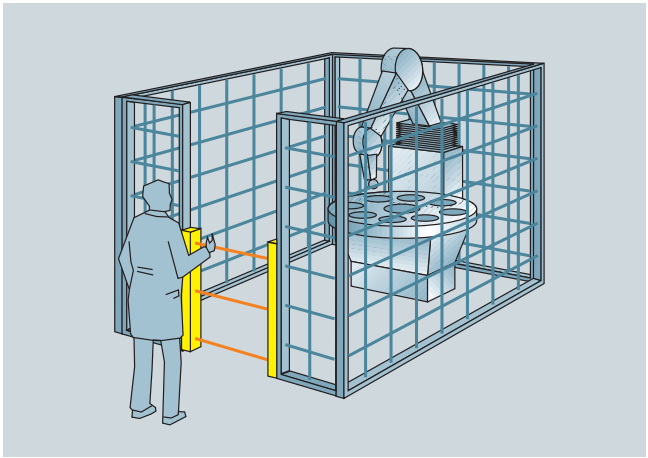
Light curtains for category 4, with 50 mm resolution

Application areas

E.g. welding and assembly lines and robots in the automotive industry

Light grids for securing access points

Reliable detection of persons when they enter hazardous areas



Device selection

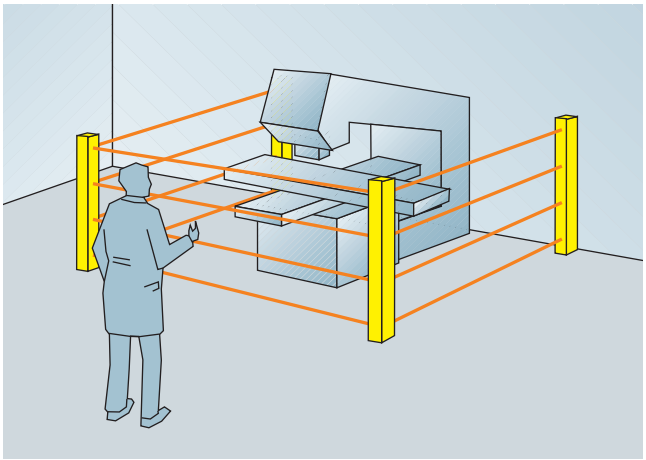
2-beam, 3-beam or 4-beam light grids for category 4, with 18 m range

Application areas

Securing access points, e.g. to robots or handling machines.

Light grids to protect access to large areas

Reliable detection of persons when they enter hazardous areas



Securing larger hazardous areas with high ranges of 70 m.

Device selection

2-beam, 3-beam or 4-beam light grids for category 4, with 70 m ranges.

Application areas

Securing access points, e.g. to automatic processing centers or palleting machines.

Safety categories

Depending on the safety category requirement to EN 954-1 that results from the C standard and/or the machine or system risk analysis, light curtains or grids up to type 2 or 4 can be used (definition of the safety categories: See page "Requirements for categories according to EN 954-1" in Catalog FS 10, Section 3).

Design

A light curtain or light grid comprises an emitter and a receiver, which must be mounted opposite each other. Depending on the resolution and the length, a certain number of transmit and receive diodes are arranged on top of each other. The infrared LEDs of the emitter emit short light pulses that are detected by the receive diodes.

- 3SF78 44 light curtains and grids with integrated evaluation for Type 4 according to IEC/EN 61496
  - Resolution 14, 30 and 50 mm
  - Protective field height: 150 mm to 3000 mm
  - 2-beam, 3-beam or 4-beam light grids
  - Transceiver, 2-beam with deflection mirror
  - Cascading of host and guest devices for greater protective field heights or lengths or for an angular arrangement (as an option)

Standards

- IEC/EN 61496-1, -2 (requirements for non-contact protection systems)
- EN 999 (including calculation of safety clearances)
- EN 954-1 (machine safety, safety-related parts of control systems)
- EN 61508 (functional safety of electrical/electronic/programmable electronic safety-related systems)

Function

Blanking function package

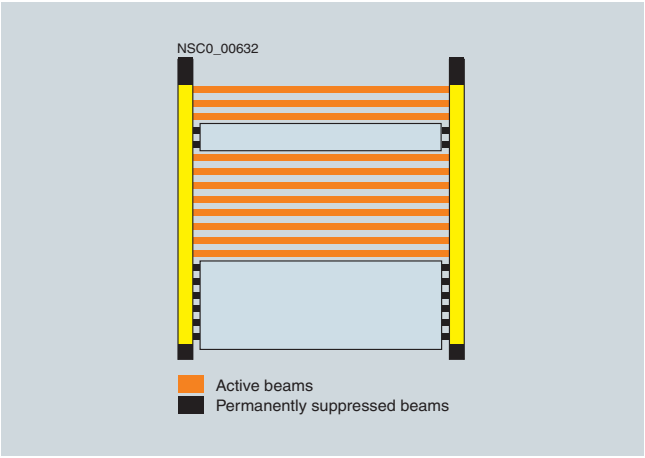
The light curtains can also be supplied with an optional blanking function.

Fixed blanking

If an object is permanently located in the light path, the corresponding zone can be suppressed. This is achieved by suppressing the required number of beams.

The suppressed objects must be permanently located in the protective zone, otherwise safety cannot be guaranteed. The light curtain switches the equipment off.

Configuration is carried out using a teach-in function by means of the safety key or using the programming and diagnostics software SafetyLab.

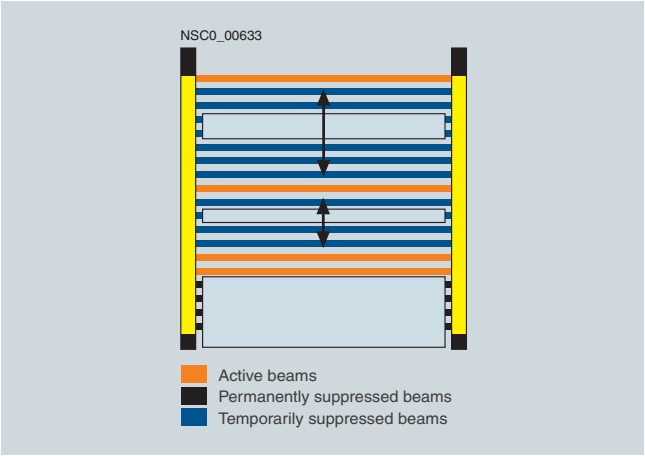


Floating blanking

If moving objects are located in the light path, any number of beams can be suppressed. The objects can move within the suppressed beams without the light curtain switching off.

If the moving objects are removed from the zone, the light curtain will interrupt the hazardous movement, otherwise safety can no longer be guaranteed.

Configuration is carried out using a teach-in function by means of the safety key or using the programming and diagnostics software SafetyLab.

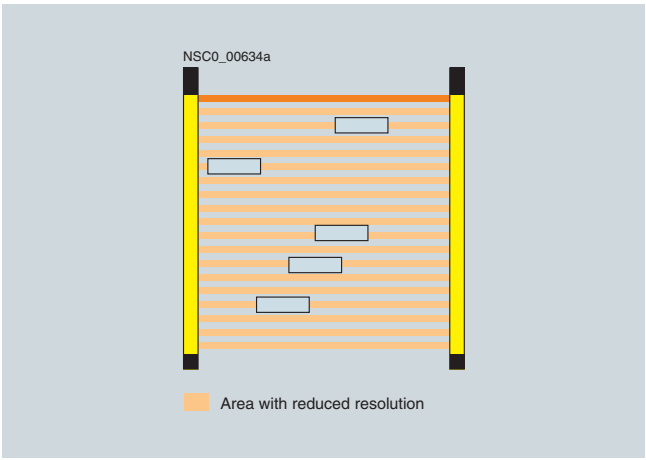


Function (continued)

Reduced Resolution

If an object is located in the light path, two or three beams can be suppressed. The difference between reduced resolution and floating blanking is that continuous monitoring does not take place.

A DIP switch is used for configuration or the programming and diagnostics software SafetyLab.



"Muting" function package

When arranged vertically, light curtains, light grids, and transceivers are often used for protecting access points. With additional sensor signals, the protective function can be suppressed to allow material to be transported in or out of hazardous areas, for example. The protective field is temporarily suppressed and, once the goods have passed through, reactivated. Personnel must not be allowed to enter the hazardous area while muting is active.

Using the number of connected sensors or the sequence of the muting signals, the devices automatically recognize the "sequential muting" mode when inputs M1 to M4 are assigned and "2-sensor parallel muting" when the signals M2 and M3 are assigned. A DIP switch can be used to set "4-sensor parallel muting".

Muting restart

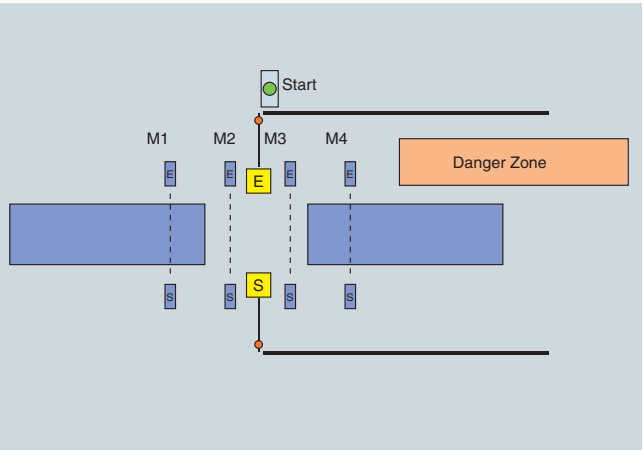
If the power fails while goods are passing the muting sensors, for example, the valid muting sequence is interrupted. When the power supply has been restored, muting is not automatically resumed because the muting sequence is not as expected.

To remove the goods from the area covered by the muting sensors, an integrated retraction mode can be activated using the start key. The light curtain attempts to find a valid muting sequence from the muting sensors. If successful, the muting indicator lamp stops flashing and is lit continuously. If unsuccessful, the start key must be kept depressed until the muting path is completely free.

4-sensor sequential muting

If the material that is to be transported in the danger zone always has the same dimensions and there is no lack of space, the use of sequential muting is preferred. With sequential muting, four muting sensors are connected. These must be activated in a predefined sequence to trigger muting. They can be activated in either of the following sequences: M1, M2, M3, M4 or M4, M3, M2, M1. The transported goods must be of sufficient length to briefly activate all 4 sensors simultaneously. Sequential muting is successfully completed when the third muting sensor to be activated is not activated any longer.

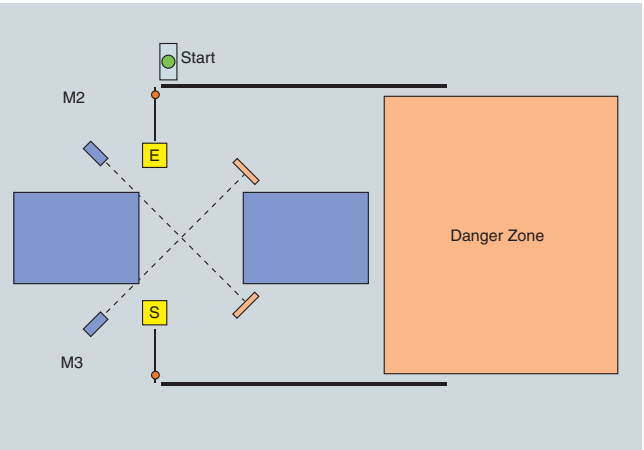
The SafetyLab software can be used to select a muting variant in which the second muting sequence is triggered before the first has finished (sequential muting with two objects). This variant saves time and, in turn, production costs for the user.



2-sensor parallel muting

Parallel muting is ideal in plants in which the dimensions of the goods are not constant or space requirements must be kept to a minimum. Two muting sensors can be used, whose beams intersect behind the protective field in the danger zone.

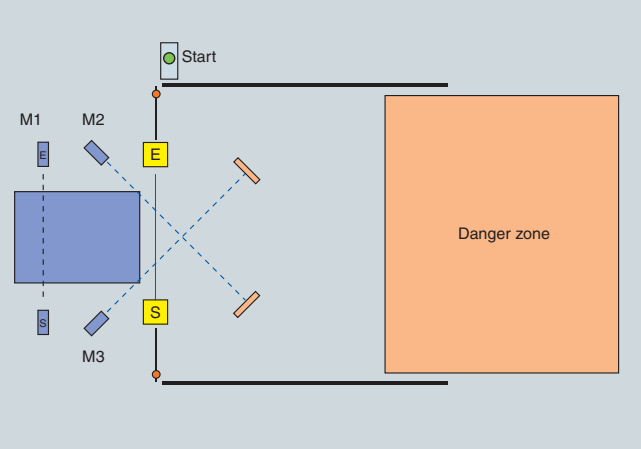
Parallel muting is used when signals M2 and M3 are switched simultaneously without M1 and M4 having been activated or connected beforehand or simultaneously. Two-sensor parallel muting is straightforward because only two muting sensors are required. Goods can also be moved forward and backward within the muting area.



Function (continued)

3-sensor direction muting

Three-sensor direction muting is configured in a similar way to 2-sensor parallel muting. Material can only be transported through the light curtain in one direction. To trigger the muting function, muting sensor M1 must first be activated, followed by muting sensors M2 and M3. If the paths for muting sensors M2 and M3 are interrupted, sensor M1 does not need to be activated.

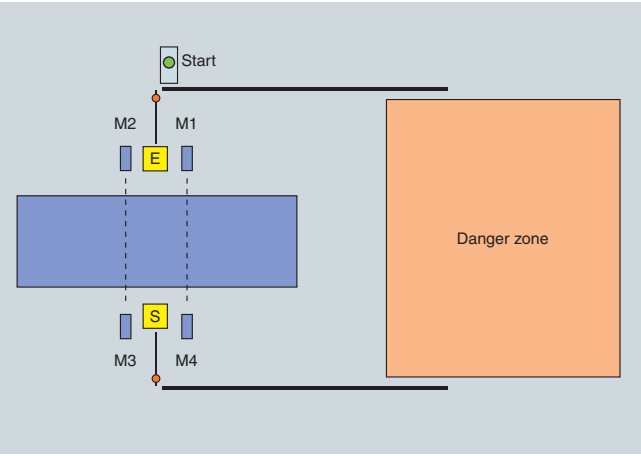


Parallel muting with 4 sensors

4-sensor parallel muting can be used advantageously wherever

- the transported material is too small to be acquired simultaneously by 4 sensors arranged sequentially,
- the available space is too small even for the crossover light beams of 2-sensor parallel muting.

The function of 4-sensor parallel muting corresponds to that of 2-sensor parallel muting with the additional characteristic of the muting activation signal being obtained from two sensor pairs. Muting is triggered when within a 2.5 s interval, M2 is activated with M3 or M1 is activated with M4.



Transceiver

The transceiver comprises a transmitter and receiver in a single unit. The infrared light of the transmit diode is reflected twice through 90° so that it returns to the receive diode of the transceiver. This creates a twin-beam light barrier that is more cost effective than conventional light barriers with separate transmitters and receivers. 3RG78 45 series transceivers have integrated contactor control and startup/restart inhibit. 3RG78 44 and 3SF78 44 series transceivers have additional integrated muting functions. These devices include five 5-pin M12 sockets on the front panel, to which the muting sensors can be directly connected.

Cascading of devices: Host/guest combinations

Cascading of devices refers to lengthening the optical axis and therefore the protective zone height, whereby protection on the horizontal and vertical levels can be realized at the same time using a flexible connecting cable between the host and guest device. The safety outputs and the processor tasks are located in the host device so that the guest devices can be connected regardless of the function package or outputs.

The standard cable that can be used to connect the host to the guest is already installed on the guest device. The host comes with the appropriate M12 socket on its underside. Host devices can only be operated together with a guest device.

The guest devices are from the 3RG78 42 series, but they are also suitable for the 3SF78 42, 3RG78 44, 3SF78 44 and 3RG78 45 series. The guest device resolution can be combined with any other resolution (e.g. the host device can have a 14 mm resolution while a 30 or 50 mm resolution is sufficient for the guest device.

PC software

PC software can be used to visualize and record the function of the light curtains.

SafetyLab is the diagnostic and parameterization software for 3RG78 44 / 3SF78 44 light curtains, light grids and transceivers. SafetyLab can be used for all available light curtain and light grid function packages as of firmware Version 3.10:

- Blanking function package
- Muting function package
- Sequence control function package

The firmware version of the receiver is indicated on the 7-segment display during start-up.

Mounting sets

To facilitate installation, alignment, commissioning and troubleshooting, a practical accessories package containing mounting columns, reflecting mirror columns, reflecting mirrors, mounting supports and laser alignment tools is available.

PROFIsafe – SIMATIC FS400 light curtains and light grids

3SF78 44 PROFIsafe series internal evaluation, Type 4

Overview

3SF78 44 light curtains and light grids for PROFIsafe with integrated processing unit for type 4 in accordance with IEC/EN 61496-1, -2

- With function packages "Blanking", "Muting", and "Cycle Control"
- Resolutions: 14, 30, and 50 mm
- Protective zone height: 150 mm to 3000 mm
- 2-beam, 3-beam or 4-beam light grids
- Cascading of host and guest devices for greater protective zone heights or lengths or for an angular arrangement (optional).

Two standard 3RG78 48-0AB mounting brackets each are enclosed with all devices (can also be ordered as accessories, see "Mounting material, Section 6).

Other versions not listed in the ordering data are available upon request.

Program overview 3SF78 44 (PROFIsafe)

Type of device	Function package	Output	Connection type	For light curtains: Resolution For light grids and transceivers: Range			LED indicator light	see page
				14 mm	30 mm	50 mm		
Light curtains	Blanking	PROFIsafe	PROFIsafe	✔	✔	-	-	Page 4/195
Light curtains	Muting	PROFIsafe	PROFIsafe	✔	✔	-	-	Page 4/196
Light grids	Muting	PROFIsafe	PROFIsafe	0.8 m ... 18 m			-	Page 4/197
Transceiver	Muting	PROFIsafe	PROFIsafe	6.5 m			with and without	Page 4/197
Light curtains	Sequence control system	PROFIsafe	PROFIsafe	✔	-	-	-	Page 4/198

Accessories

Electrical connection	
• Connecting cable with M12 connector, also applicable for supplying power to the PROFIsafe emitter	Section 6
Accessory cable	
• for the local connection to connect muting lights, key-operated switches, reset buttons, etc.	Section 6
Assembly materials	
• Fixing columns, reflecting mirror	Section 6
• Muting mounting systems	Section 6
• Muting accessories	Section 6
Laser alignment assistance, diagnostic software	Section 6

Technical specifications

Order No.	3SF7844
Product type description	**SIMATIC FS400 mit PROFIsafe**
Safety category to EN, IEC 61496-1, -2	Type 4
Protective field height	
• for 14 and 30 mm resolution	150 ... 1800 mm
• for 50 mm resolution	450 ... 3000 mm
Protective field width, range	
• for 14 mm resolution	0 ... 6 m
• for 30 and 50 mm resolution	0 ... 18 m
Detection capability (resolution)	14 mm, 30 mm, 50 mm
Supply voltage (emitter and receiver)	24 V DC ± 20 %
Wave length	880 nm (infrared)
Synchronization	Optically between emitter and receiver
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	–20 ... +60 °C
Relative humidity	15 ... 95%, ohne Kondensation
Degree of protection	IP65
Safety class to DIN VDE 0106	III
Vibration resistance	5 *g*, 10 ... 55 Hz nach IEC/EN 60068-2-6
Shock resistance	10 *g*, 16 ms nach IEC/EN 60068-2-29
Signal inputs and outputs (local socket, optional)	
Signal inputs	
• Restart inhibit unlocking	1 button with 1 NO contact (floating)
- min. switching time	300 ms
- max. switching time	4 s
• Teach-in	2-pole key-operated switch (selector switch) (floating)
- -simultaneity	< 500 ms
Voltage output (for command devices or safety sensors only)	24 V DC ± 20 %, max 0.5 A

Order No.	3SF7844
Product type description	**SIMATIC FS400 mit PROFIsafe**
General PROFIsafe receiver system data	
Safety category	• Type 4 to IEC/EN 61496-1, -2 • SIL 3 to IEC 61508
Supply voltage U_V	24 V DC, ± 20 %
Residual ripple of supply voltage U_V	± 5% within the limits of U_V, external power pack with safe isolation
Current consumption at	
• U_V = 28.8 V DC, +20%	150 mA
• U_V = 24 V DC	160 mA
• U_V = 19.2 V DC, -20%	170 mA
PROFIBUS	
• Data rate	9.6 kBd to 12 MBd
• Connection	M12 connector, b-coded
Additional PROFIsafe part response time in the receiver	20 ms
Connection cable length	
• PROFIBUS output	0.2 m
• PROFIBUS input	0.4 m
• Power supply	0.6 m
Supply cable length, max.	< 100 m
PROFIsafe services	
PROFIsafe driver version	V2, supports PROFIsafe profiles V1 and V2
Cyclic data	4 user data byte input data 4 user data byte output data
Acyclical data	To read the switching status of the individual beams
Ensure the parameters in the F-CPU via proxy function block for	• S7-315F • S7-317F • S7-416F
Number of parameter sets, can be changed using a secure program in the F-CPU	max. 255, depends on the available memory on the F-CPU
Restart delay is the larger value out of	• Watchdog time in the F-CPU +20 ms • Receiver restart delay

Ordering notes

Included in the scope of supply

3SF78 44 light curtains with Function package Blanking/Sequence control system:

Transmitter:

- Mounting bracket set 3RG78 48-0AB
- Transmitter insert

Receiver:

- Mounting bracket set 3RG78 48-0AB
- Operating instructions/data sheets
- Safety key
- Additionally for 14 mm resolution: 3RG78 48-0FH test rods (14/24/33 and 19/29 mm)
- Additionally for 30 mm resolution: 3RG78 48-0AH/BH test rods (14/30 and 38 mm)

Guest devices of the 3RG78 42 series

Transmitter:

- Mounting bracket set 3RG78 48-0AB

Receiver:

- Mounting bracket set 3RG78 48-0AB
- Additionally for 14 mm and 30 mm resolution: 3RG78 48-0AH test rod

3SF78 44 light curtains with Muting function package:

Transmitter:

- 3RG78 48-0AB mounting bracket set
- Transmitter insert

Receiver:

- Mounting bracket set 3RG78 48-0AB
- Operating instructions/data sheets
- Safety key
- Additionally for 14 mm resolution: 3RG78 48-0FH test rods (14/24/33 and 19/29 mm)
- Additionally for 30 mm resolution: 3RG78 48-0AH/BH test rods (14/30 and 38 mm)

Guest devices of the 3RG78 42 series

Transmitter:

- Mounting bracket set 3RG78 48-0AB

Receiver:

- Mounting bracket set 3RG78 48-0AB
- Additionally for 14 mm and 30 mm resolution: 3RG78 48-0AH test rod

3SF78 44 light grids with Muting function package:

Transmitter:

- Mounting bracket set 3RG78 48-0AB
- Transmitter insert

Receiver:

- Mounting bracket set 3RG78 48-0AB
- Operating instructions/data sheets

Transceiver with Muting function package:

- Mounting bracket set 3RG78 48-0AB
- Operating instructions/data sheets

Selection and Ordering data

Light curtains with Function package Blanking PROFIsafe[1)]

Protective zone height	Type	Standard device	Host device	Guest device
mm		Order No.		
Resolution 14 mm				
300	Receiver	**3SF78 44-8BB04-0SS1**	**3SF78 44-8BB04-1SS1**	**3RG78 42-6BD21**
300	Transmitter	**3SF78 44-6SB04-0SS0**	**3SF78 44-6SB04-1SS0**	**3RG78 42-6BD20**
450	Receiver	**3SF78 44-8BB06-0SS1**	**3SF78 44-8BB06-1SS1**	**3RG78 42-6BE21**
450	Transmitter	**3SF78 44-6SB06-0SS0**	**3SF78 44-6SB06-1SS0**	**3RG78 42-6BE20**
600	Receiver	**3SF78 44-8BB08-0SS1**	**3SF78 44-8BB08-1SS1**	**3RG78 42-6BF21**
600	Transmitter	**3SF78 44-6SB08-0SS0**	**3SF78 44-6SB08-1SS0**	**3RG78 42-6BF20**
750	Receiver	**3SF78 44-8BB11-0SS1**	**3SF78 44-8BB11-1SS1**	**3RG78 42-6BG21**
750	Transmitter	**3SF78 44-6SB11-0SS0**	**3SF78 44-6SB11-1SS0**	**3RG78 42-6BG20**
900	Receiver	**3SF78 44-8BB13-0SS1**	**3SF78 44-8BB13-1SS1**	**3RG78 42-6BH21**
900	Transmitter	**3SF78 44-6SB13-0SS0**	**3SF78 44-6SB13-1SS0**	**3RG78 42-6BH20**
1050	Receiver	**3SF78 44-8BB15-0SS1**	**3SF78 44-8BB15-1SS1**	**3RG78 42-6BJ21**
1050	Transmitter	**3SF78 44-6SB15-0SS0**	**3SF78 44-6SB15-1SS0**	**3RG78 42-6BJ20**
1200	Receiver	**3SF78 44-8BB17-0SS1**	**3SF78 44-8BB17-1SS1**	**3RG78 42-6BK21**
1200	Transmitter	**3SF78 44-6SB17-0SS0**	**3SF78 44-6SB17-1SS0**	**3RG78 42-6BK20**
1350	Receiver	**3SF78 44-8BB20-0SS1**	**3SF78 44-8BB20-1SS1**	**3RG78 42-6BL21**
1350	Transmitter	**3SF78 44-6SB20-0SS0**	**3SF78 44-6SB20-1SS0**	**3RG78 42-6BL20**
1500	Receiver	**3SF78 44-8BB22-0SS1**	**3SF78 44-8BB22-1SS1**	**3RG78 42-6BM21**
1500	Transmitter	**3SF78 44-6SB22-0SS0**	**3SF78 44-6SB22-1SS0**	**3RG78 42-6BM20**
1650	Receiver	**3SF78 44-8BB24-0SS1**	**3SF78 44-8BB24-1SS1**	**3RG78 42-6BN21**
1650	Transmitter	**3SF78 44-6SB24-0SS0**	**3SF78 44-6SB24-1SS0**	**3RG78 42-6BN20**
1800	Receiver	**3SF78 44-8BB26-0SS1**	**3SF78 44-8BB26-1SS1**	**3RG78 42-6BP21**
1800	Transmitter	**3SF78 44-6SB26-0SS0**	**3SF78 44-6SB26-1SS0**	**3RG78 42-6BP20**
Resolution 30 mm				
300	Receiver	**3SF78 44-8BD04-0SS1**	**3SF78 44-8BD04-1SS1**	**3RG78 42-6DD21**
300	Transmitter	**3SF78 44-6SD04-0SS0**	**3SF78 44-6SD04-1SS0**	**3RG78 42-6DD20**
450	Receiver	**3SF78 44-8BD06-0SS1**	**3SF78 44-8BD06-1SS1**	**3RG78 42-6DE21**
450	Transmitter	**3SF78 44-6SD06-0SS0**	**3SF78 44-6SD06-1SS0**	**3RG78 42-6DE20**
600	Receiver	**3SF78 44-8BD08-0SS1**	**3SF78 44-8BD08-1SS1**	**3RG78 42-6DF21**
600	Transmitter	**3SF78 44-6SD08-0SS0**	**3SF78 44-6SD08-1SS0**	**3RG78 42-6DF20**
750	Receiver	**3SF78 44-8BD11-0SS1**	**3SF78 44-8BD11-1SS1**	**3RG78 42-6DG21**
750	Transmitter	**3SF78 44-6SD11-0SS0**	**3SF78 44-6SD11-1SS0**	**3RG78 42-6DG20**
900	Receiver	**3SF78 44-8BD13-0SS1**	**3SF78 44-8BD13-1SS1**	**3RG78 42-6DH21**
900	Transmitter	**3SF78 44-6SD13-0SS0**	**3SF78 44-6SD13-1SS0**	**3RG78 42-6DH20**
1050	Receiver	**3SF78 44-8BD15-0SS1**	**3SF78 44-8BD15-1SS1**	**3RG78 42-6DJ21**
1050	Transmitter	**3SF78 44-6SD15-0SS0**	**3SF78 44-6SD15-1SS0**	**3RG78 42-6DJ20**
1200	Receiver	**3SF78 44-8BD17-0SS1**	**3SF78 44-8BD17-1SS1**	**3RG78 42-6DK21**
1200	Transmitter	**3SF78 44-6SD17-0SS0**	**3SF78 44-6SD17-1SS0**	**3RG78 42-6DK20**
1350	Receiver	**3SF78 44-8BD20-0SS1**	**3SF78 44-8BD20-1SS1**	**3RG78 42-6DL21**
1350	Transmitter	**3SF78 44-6SD20-0SS0**	**3SF78 44-6SD20-1SS0**	**3RG78 42-6DL20**
1500	Receiver	**3SF78 44-8BD22-0SS1**	**3SF78 44-8BD22-1SS1**	**3RG78 42-6DM21**
1500	Transmitter	**3SF78 44-6SD22-0SS0**	**3SF78 44-6SD22-1SS0**	**3RG78 42-6DM20**
1650	Receiver	**3SF78 44-8BD24-0SS1**	**3SF78 44-8BD24-1SS1**	**3RG78 42-6DN21**
1650	Transmitter	**3SF78 44-6SD24-0SS0**	**3SF78 44-6SD24-1SS0**	**3RG78 42-6DN20**
1800	Receiver	**3SF78 44-8BD26-0SS1**	**3SF78 44-8BD26-1SS1**	**3RG78 42-6DP21**
1800	Transmitter	**3SF78 44-6SD26-0SS0**	**3SF78 44-6SD26-1SS0**	**3RG78 42-6DP20**

[1)] For "Ordering notes", see page 4/194

3SF78 44 PROFIsafe series internal evaluation, Type 4, Function package Muting

Selection and Ordering data (continued)

Light curtains with Function package Muting PROFIsafe[1)]

Protective-zone height	Type	Standard device	Host device	Guest device
mm		Order No.		
Resolution 14 mm				
300	Receiver	**3SF78 44-8MB04-0SS1**	on request	**3RG78 42-6BD21**
300	Transmitter	**3SF78 44-6SB04-0SS1**	on request	**3RG78 42-6BD20**
450	Receiver	**3SF78 44-8MB06-0SS1**	on request	**3RG78 42-6BE21**
450	Transmitter	**3SF78 44-6SB06-0SS1**	on request	**3RG78 42-6BE20**
600	Receiver	**3SF78 44-8MB08-0SS1**	on request	**3RG78 42-6BF21**
600	Transmitter	**3SF78 44-6SB08-0SS1**	on request	**3RG78 42-6BF20**
750	Receiver	**3SF78 44-8MB11-0SS1**	on request	**3RG78 42-6BG21**
750	Transmitter	**3SF78 44-6SB11-0SS1**	on request	**3RG78 42-6BG20**
900	Receiver	**3SF78 44-8MB13-0SS1**	on request	**3RG78 42-6BH21**
900	Transmitter	**3SF78 44-6SB13-0SS1**	on request	**3RG78 42-6BH20**
1050	Receiver	**3SF78 44-8MB15-0SS1**	on request	**3RG78 42-6BJ21**
1050	Transmitter	**3SF78 44-6SB15-0SS1**	on request	**3RG78 42-6BJ20**
1200	Receiver	**3SF78 44-8MB17-0SS1**	on request	**3RG78 42-6BK21**
1200	Transmitter	**3SF78 44-6SB17-0SS1**	on request	**3RG78 42-6BK20**
1350	Receiver	**3SF78 44-8MB20-0SS1**	on request	**3RG78 42-6BL21**
1350	Transmitter	**3SF78 44-6SB20-0SS1**	on request	**3RG78 42-6BL20**
1500	Receiver	**3SF78 44-8MB22-0SS1**	on request	**3RG78 42-6BM21**
1500	Transmitter	**3SF78 44-6SB22-0SS1**	on request	**3RG78 42-6BM20**
1650	Receiver	**3SF78 44-8MB24-0SS1**	on request	**3RG78 42-6BN21**
1650	Transmitter	**3SF78 44-6SB24-0SS1**	on request	**3RG78 42-6BN20**
1800	Receiver	**3SF78 44-8MB26-0SS1**	on request	**3RG78 42-6BP21**
1800	Transmitter	**3SF78 44-6SB26-0SS1**	on request	**3RG78 42-6BP20**
Resolution 30 mm				
300	Receiver	**3SF78 44-8MD04-0SS1**	on request	**3RG78 42-6DD21**
300	Transmitter	**3SF78 44-6SD04-0SS0**	on request	**3RG78 42-6DD20**
450	Receiver	**3SF78 44-8MD06-0SS1**	on request	**3RG78 42-6DE21**
450	Transmitter	**3SF78 44-6SD06-0SS0**	on request	**3RG78 42-6DE20**
600	Receiver	**3SF78 44-8MD08-0SS1**	on request	**3RG78 42-6DF21**
600	Transmitter	**3SF78 44-6SD08-0SS0**	on request	**3RG78 42-6DF20**
750	Receiver	**3SF78 44-8MD11-0SS1**	on request	**3RG78 42-6DG21**
750	Transmitter	**3SF78 44-6SD11-0SS0**	on request	**3RG78 42-6DG20**
900	Receiver	**3SF78 44-8MD13-0SS1**	on request	**3RG78 42-6DH21**
900	Transmitter	**3SF78 44-6SD13-0SS0**	on request	**3RG78 42-6DH20**
1050	Receiver	**3SF78 44-8MD15-0SS1**	on request	**3RG78 42-6DJ21**
1050	Transmitter	**3SF78 44-6SD15-0SS0**	on request	**3RG78 42-6DJ20**
1200	Receiver	**3SF78 44-8MD17-0SS1**	on request	**3RG78 42-6DK21**
1200	Transmitter	**3SF78 44-6SD17-0SS0**	on request	**3RG78 42-6DK20**
1350	Receiver	**3SF78 44-8MD20-0SS1**	on request	**3RG78 42-6DL21**
1350	Transmitter	**3SF78 44-6SD20-0SS0**	on request	**3RG78 42-6DL20**
1500	Receiver	**3SF78 44-8MD22-0SS1**	on request	**3RG78 42-6DM21**
1500	Transmitter	**3SF78 44-6SD22-0SS0**	on request	**3RG78 42-6DM20**
1650	Receiver	**3SF78 44-8MD24-0SS1**	on request	**3RG78 42-6DN21**
1650	Transmitter	**3SF78 44-6SD24-0SS0**	on request	**3RG78 42-6DN20**
1800	Receiver	**3SF78 44-8MD26-0SS1**	on request	**3RG78 42-6DP21**
1800	Transmitter	**3SF78 44-6SD26-0SS0**	on request	**3RG78 42-6DP20**

1) For "Ordering notes", see page 4/194

Selection and Ordering data (continued)

Light grids with Function package Muting PROFIsafe[1)]

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 0.8 ... 18 m			
4 beam	300	Receiver	**3SF78 44-8MM50-0SS1**
4 beam	300	Transmitter	**3SF78 44-6SM50-0SS0**
3 beam	400	Receiver	**3SF78 44-8MP50-0SS1**
3 beam	400	Transmitter	**3SF78 44-6SP50-0SS0**
2 beam	500	Receiver	**3SF78 44-8MS50-0SS1**
2 beam	500	Transmitter	**3SF78 44-6SS50-0SS0**

Transceiver with Function package Muting PROFIsafe[1)]

No. of beams	Beam distance	Type	Standard device
	mm		Order No.
Range 6.5 m			
2 beam	500	Transceiver	**3SF78 44-8MS50-0ST0**
2 beam	500	Transceiver with integrated LED	**3SF78 44-8MS50-0MT0**
Reflective mirror for transceiver			**3RG78 48-1TL**

Selection and Ordering data (continued)

Light curtains with Function package Sequence control system PROFIsafe[1)]

Protective-zone height	Type	Standard device	Host device	Guest device
mm		Order No.		
Resolution 14 mm				
300	Receiver	3SF78 44-8TB04-0SS1	3SF78 44-8TB04-1SS1	3RG78 42-6BD21
300	Transmitter	3SF78 44-6SB04-0SS0	3SF78 44-6SB04-1SS0	3RG78 42-6BD20
450	Receiver	3SF78 44-8TB06-0SS1	3SF78 44-8TB06-1SS1	3RG78 42-6BE21
450	Transmitter	3SF78 44-6SB06-0SS0	3SF78 44-6SB06-1SS0	3RG78 42-6BE20
600	Receiver	3SF78 44-8TB08-0SS1	3SF78 44-8TB08-1SS1	3RG78 42-6BF21
600	Transmitter	3SF78 44-6SB08-0SS0	3SF78 44-6SB08-1SS0	3RG78 42-6BF20
750	Receiver	3SF78 44-8TB11-0SS1	3SF78 44-8TB11-1SS1	3RG78 42-6BG21
750	Transmitter	3SF78 44-6SB11-0SS0	3SF78 44-6SB11-1SS0	3RG78 42-6BG20
900	Receiver	3SF78 44-8TB13-0SS1	3SF78 44-8TB13-1SS1	3RG78 42-6BH21
900	Transmitter	3SF78 44-6SB13-0SS0	3SF78 44-6SB13-1SS0	3RG78 42-6BH20

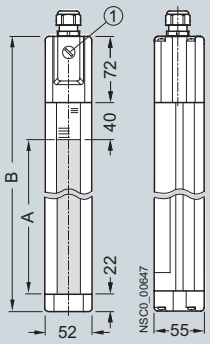
1) For "Ordering notes", see page 4/194

Ordering data	Order No.
Accessories for PROFIsafe light curtains	
PROFIBUS M12 terminating connector	**6GK1 905-0EC00**
for PROFIBUS DP 1 pack = 5 units	
PROFIBUS M12 connectors	
1 pack = 5 units	
• male insert	**6GK1905-0EA00**
• socket insert	**6GK1905-0EB00**

PROFIBUS plug-in cables	Order No.
2-core (inverted coding) preassembled, with M12 connectors, in different lengths:	
• 0.5 m	**6XV1830-3DE50**
• 1.5 m	**6XV1830-3DH15**
• 3.0 m	**6XV1830-3DH30**
• 5.0 m	**6XV1830-3DH50**
• 10.0 m	**6XV1830-3DN10**
• 15.0 m	**6XV1830-3DN15**

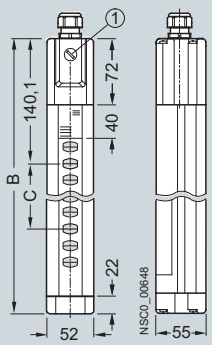
Dimensions

Standard 3SF78 44 light curtains and light grids



① Screw cap Pg 9 (receiver only, for local interface)
A Protective field height (see Selection and Ordering data)
B Overall length = Height of protective field A + 134 mm

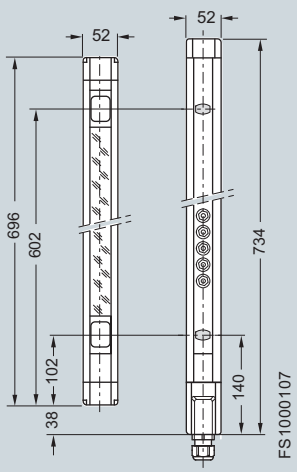
3SF78 44 light grids, additional dimensions



Additional dimensions for light grids only:

Type	B	C	Beams
3SF78 44-..M	1184	300	4
3SF78 44-..P	1034	400	3
3SF78 44-..S	734	500	2

3RG78 48-1TL reflective mirror (left) and muting transceiver (right)



Note:
Information regarding mounting material for SIMATIC FS400 light curtains and light grids can be found in Section 6.

Overview

Our optical distance sensors provide perfect all-round protection to type 3 in accordance with IEC/EN 61496.

In an operating field of 190° and over a distance of up to 4.0 m (up to 15 m in non-safety-related applications), the laser scanner reliably senses every object and every person. And it works so simply: The distance sensor emits light pulses at regular intervals.

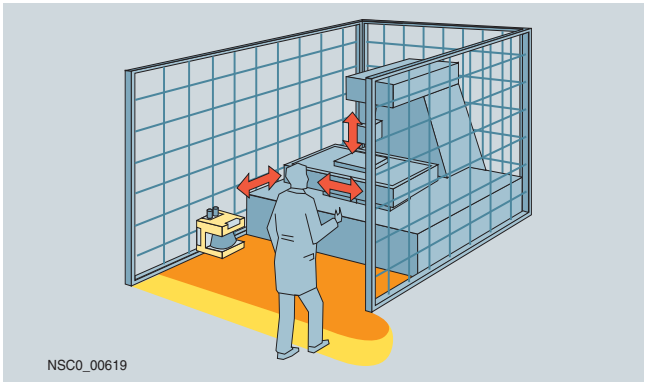
If they hit an obstruction, the sensor receives the reflected light and evaluates it. If this is evaluated as the predefined area to be protected, a Stop function is triggered.

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

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

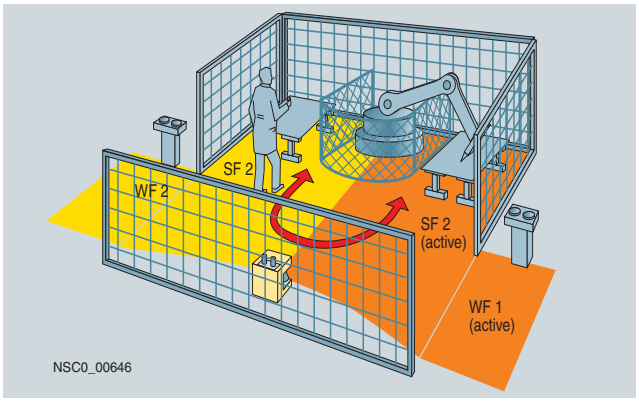
Application

Horizontal danger zone protection



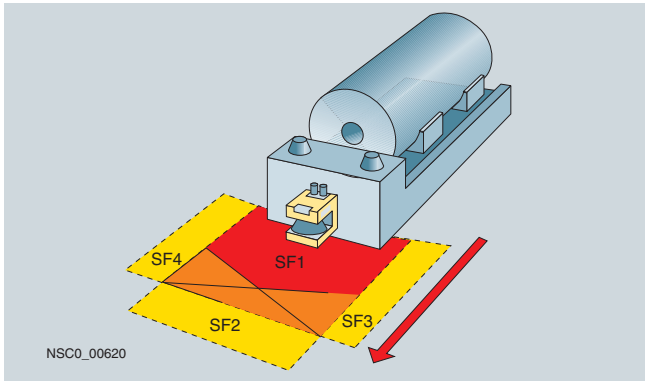
- Reliable detection of persons and objects in danger zones around machines and plants.
- Flexible programming of almost any protection and warning zones.

Horizontal danger zone protection with more than one protective field



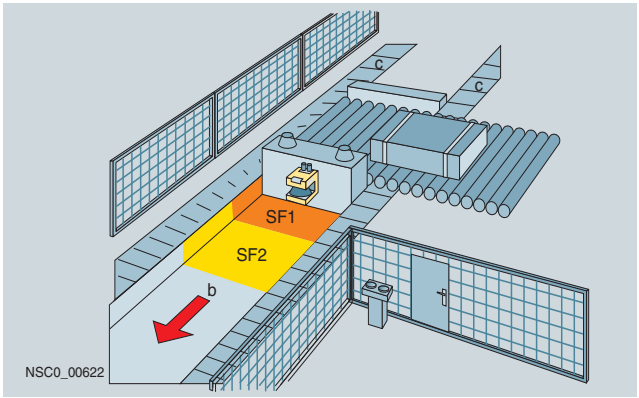
- Reliable detection of persons in different danger zones by switching between protective fields.
- Increased availability due to accurate protection of just the fields that are currently active.

Route monitoring for automatic guided vehicle systems



- Reliable detection of persons and objects approaching the vehicle.
- The laser scanner offers a greater protection range than bumpers and, therefore, permits higher speeds.

Collision protection for shifting units



- Reliable protection of persons in the path of the vehicle.
- Objects in the path of the vehicle are detected in good time and damage to the vehicle or its load is prevented.

Other applications

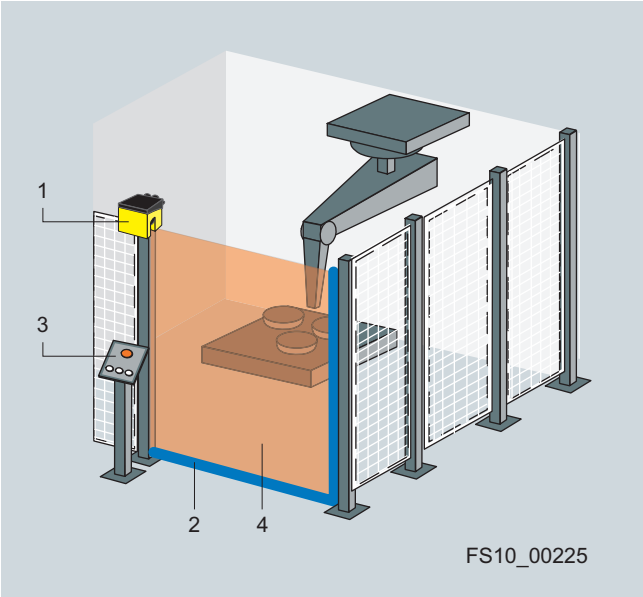
- Many different types of hazardous area protection,
- Protection for rooms and entrances
- Projecting object monitoring to protect machines and personnel
- Non-safety-relevant measuring or detection tasks (e.g. determining distances, positions, or contours).

Application (continued)

Access protection by means of entry control

Access protection by means of entry control can be used when the entry location to a machine or to a danger zone can be precisely defined and when no other unsecured access to this area exists.

The laser scanner is preferably mounted above the entry point, aligned vertically. To protect the protective devices, laser scanners and fence from inadvertent adjustment and malicious manipulation, the protective fields of the laser scanners must be defined using reference contours. In this operating mode, the scanner uses the sampled environment as a reference and can therefore monitor changes to the structure of the protective equipment as well as each individual measurement to detect an entering person.



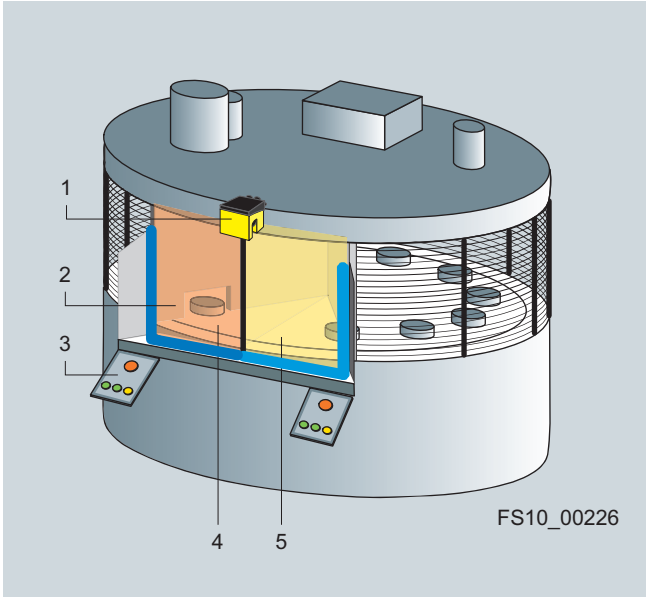
Access through entry control

1 Laser scanners
2 Reference contour
3 Emergency stop
4 Protective field

Securing danger zones by means of hand and arm guards

If a machine operator has to be close to the dangerous movement or if the operator coordinates the positioning and removal of workpieces at the machine, danger zone protection must be implemented at the machine.

A protective device must be used to guard these danger zones. The laser scanner is approved for securing danger zones by means of hand and arm guards and can, also in combination with protective field changeover, ensure flexible work safety. To protect the protective devices, laser scanners and the screens (attached to the sides as a reference and as additional access protection) from inadvertent adjustment and malicious manipulation, the protective fields of the laser scanners must be defined using reference contours.

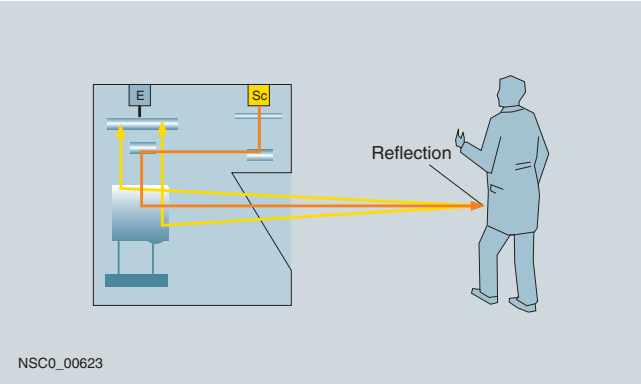


Application example for a circular table

1 Laser scanners
2 Reference contour
3 Emergency stop
4, 5 Protective fields with reference classes

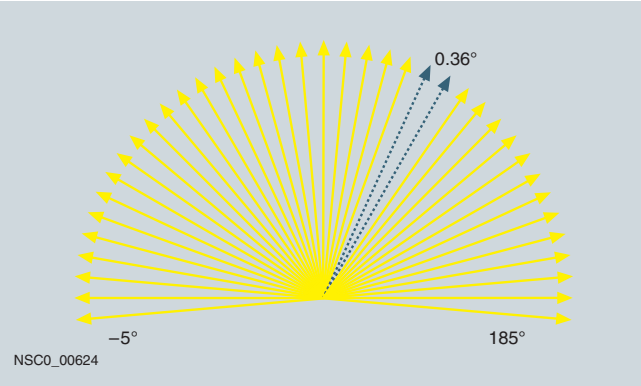
Function

The laser scanner is an optical, contact-free surface scanner – designed primarily for operator protection.



Using a laser diode with transmission optics, the laser scanner continuously generates bundled light pulses that are scattered throughout the operating range by an integrated rotating mirror. If objects or persons enter the field, it evaluates the reflected light pulses and continuously calculates the exact position coordinates on the basis of the light propagation time. If the defined personnel protective field is penetrated, the laser scanner stops the machine immediately (within the system response time). The Stop function is reset when the protective field is free again, either automatically or following acknowledgement (depending on the operating mode).

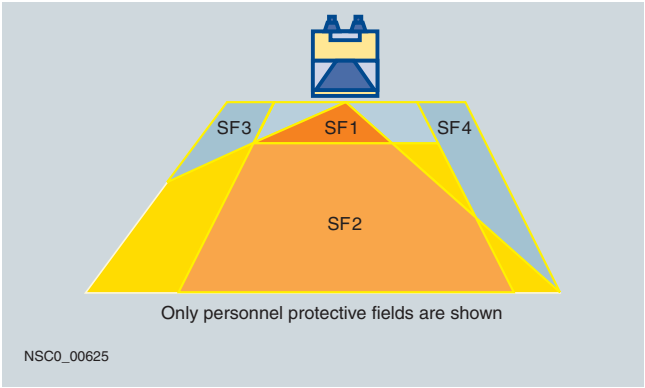
The operating range of the laser scanner spans 190° and is subdivided into angle segments of 0.36°.



The scan rate is 25 scans/second, i.e. one light pulse every 40 ms in each segment. A special algorithm ensures that objects larger than 70 mm (this corresponds to the scanner resolution) can be reliably detected and that contamination (e.g. dust) does not reduce system availability. The laser scanner detects people (even if they are wearing dark clothing) at a distance of up to 4 m (failsafe). People or objects can, however, be detected at a distance of up to 15 m so that a warning can be output, for example (not safety relevant).

Four protective field/warning field pairs

Four variable protective field pairs for the personnel protective field and warning field, which can be easily set on the PC, ensure that the laser scanner can be adapted to suit any requirement.



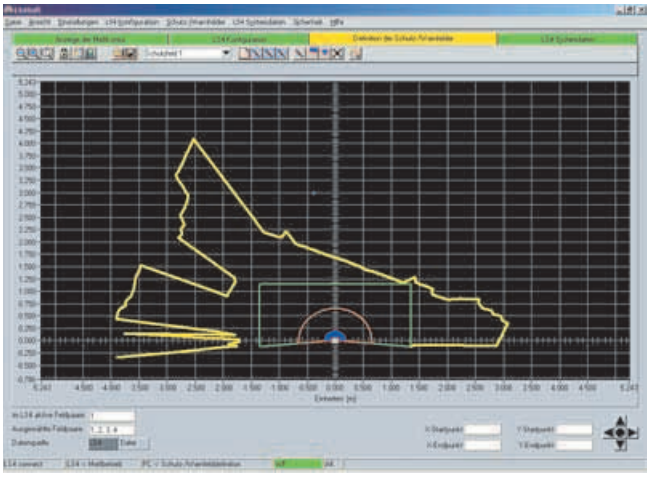
It can be implemented in stationary applications (machines and installations) or mobile applications (vehicles, automatic guided vehicle systems, or shifting units). In the case of a robot, for example, different operating ranges can be protected, whereby the laser scanner operates in succession with regard to time and space. In the case of automatic guided vehicle systems, four programmable protective fields can be protected (e.g. rapid travel, slow travel, turning left, turning right).

LS4soft operator software

Thanks to the PC operator software LS4soft, it could not be easier to optimize the laser scanner settings. The following functions have been integrated:

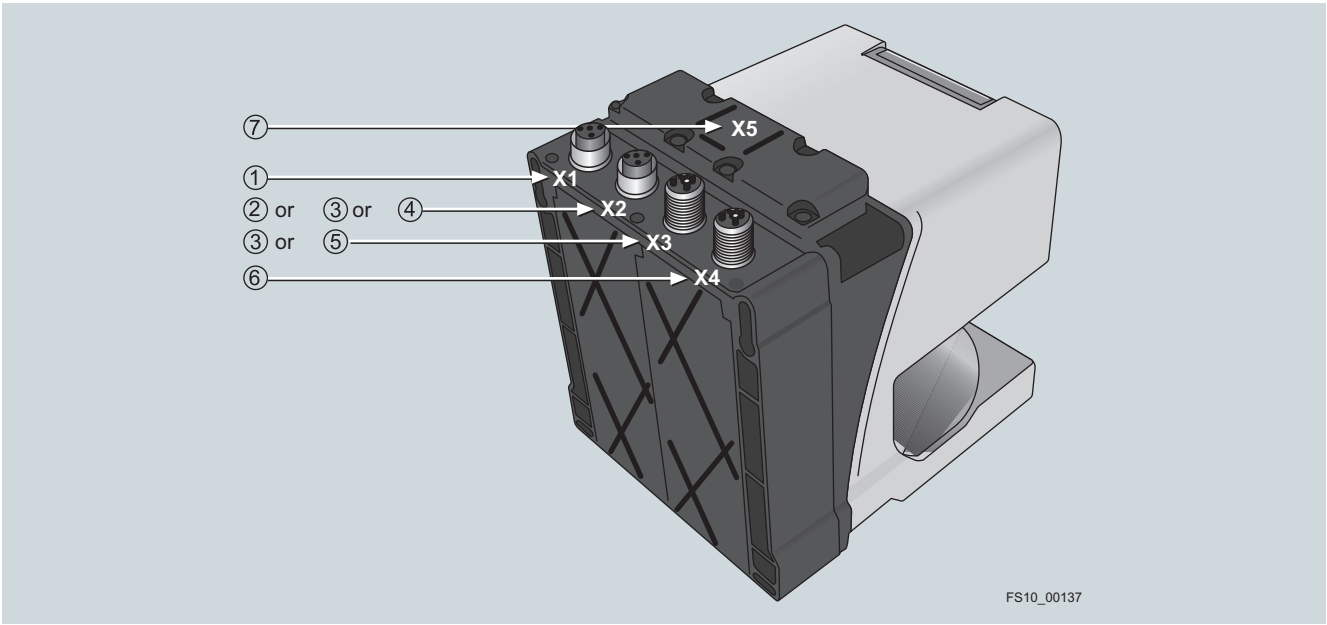
- User-friendly configuration of the protective field using a PC or laptop
- Configuration of additional functions, such as protective field selection, restart inhibit, etc. by means of a software wizard
- Comprehensive range of displays, e.g. defined protective fields, current scan contours, system settings, etc. reliable, password-protected access with different authorization levels
- Executable under Microsoft Windows 95/98/NT/2000/XP

The operator software is supplied with the laser scanner.



PROFIsafe laser scanner

Integration



Connector pin assignment

Terminal	Description	Item	Connectable accessories	Order No.
X1	M12 connector for connecting a restart button (optional)	①	M12 connector with terminal housing, 5-pin	**3RX8 000-0CD55**
X2	M12 socket for PROFIBUS output cable	②	Terminating resistor for PROFIBUS DP	**6GK1 905-0EC00**
		③	PROFIBUS M12 connecting cable, with plug and socket, 2-pin	**6XV1 830-3DE50** (0.5 m) **6XV1 830-3DH15** (1.5 m) **6XV1 830-3DH30** (3.0 m) **6XV1 830-3DH50** (5.0 m) **6XV1 830-3DN10** (10.0 m) **6XV1 830-3DN15** (15.0 m)
		④	PROFIBUS M12 connecting plug with male insert	**6GK1 905-0EA00**
X3	M12 plug for PROFIBUS input cable	③	PROFIBUS M12 connecting cable, with plug and socket, 2-pin	**6XV1 830-3DE50** (0.5 m) **6XV1 830-3DH15** (1.5 m) **6XV1 830-3DH30** (3.0 m) **6XV1 830-3DH50** (5.0 m) **6XV1 830-3DN10** (10.0 m) **6XV1 830-3DN15** (15.0 m)
		⑤	PROFIBUS M12 connecting plug with female insert	**6GK1 905-0EB00**
X4	M12 plug for 24 V DC power supply	⑥	M12 cable socket with terminal housing, 5-pin	**3RX8 000-0CB55**
X5	Optical PC interface	⑦	PC connecting cable for laser scanner with optical interface, 9-pin	**3RG78 38-1DC**

Technical specifications

Order No.	**3SF78 34-6PB00** **3SF78 34-6PE00**
Product type description	**PROFIsafe laser scanner**
Protective field	
Detection range	0 ... 4 m
Luminance factor	min. 1.8 %
Object size and diameter	70 mm (cylindrical test body)
Response time	
• dual evaluation (2 scans)	80 ms (only laser scanner without PROFIBUS system times)
• adjustable up to 16 scans	640 ms (only laser scanner without PROFIBUS system times)

Order No.	**3SF78 34-6PB00** **3SF78 34-6PE00**
Product type description	**PROFIsafe Laserscanner**
Number	4 (can be switched via PROFIBUS)
Safety category	Category 3 to EN 954-1, type 3 to IEC 61496-1 or EN 61496-3
Output	PROFIBUS (PROFIsafe profile)
Start	Start test and start inhibit can be set separately
Restart	160 ms to 10 s (can be set or is manual)

Technical specifications (continued)

Order No.	3SF78 34-6PB00 3SF78 34-6PE00
Product type description	**PROFIsafe laser scanner**
Protective field supplement	
• For deactivated dust suppression	83 mm
• For activated dust suppression	
- protective field size < 3.5 mm	83 mm
- protective field size > 3.5 mm	100 mm
• Additional supplement in the case of existing retro-reflectors or highly reflective surfaces (e.g. certain metals or ceramics) in the scan plane	
- more than 1.2 m behind the protective field line	0 mm
- in protective field or up to 1.2 m behind the protective field line	110 mm
Warning field	
Detection range	0 ... 15 m
Luminance factor	min. 20%
Object size	150 × 150 mm
Response time	
• dual evaluation (2 scans)	80 ms (only laser scanner without PROFIBUS system times)
• adjustable up to 16 scans	640 ms (only laser scanner without PROFIBUS system times)
No. of warning fields	4 (can be switched via PROFIBUS)
Output	PROFIBUS
Contour measurement	
Detection range	0 ... 50 m
Luminance factor	min. 20%
Output	RS 232 serial interface via infrared interface
Radial resolution	5 mm
Lateral resolution	0.36°
Supply voltage	
• Via external supply	DC24 V (+20% / -30 %)
• Note	The power pack for the external power supply must have a safe line separation to IEC 60742 and must bridge brief power failures of up to 20 ms.
Overcurrent protection	Fuse 1.25 A (medium slow)
Current consumption	350 mA typical
Inputs	
Restart/reset	Connection of a command device for "with restart inhibit" mode and/or device resets, monitored dynamically
Signal definition	
• High (logical 1)	16 ... 30 V
• Low (logical 0)	< 3 V
Control cable	
• Length	Max. 50 m (cable cross-section: 0.5 mm^2, shielded)
Field pair changeover	Field pair switchover via PROFIBUS (PROFIsafe profile)
RS232 interfaces via infrared interface	For device parameterization and field definition

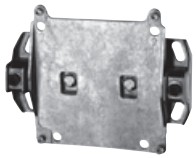
Order No.	3SF78 34-6PB00 3SF78 34-6PE00
Product type description	**PROFIsafe laser scanner**
Optic	
Rotation angle	190°
Angle resolution	0.36°
Lateral tolerance	
• without assembly system (for rear of enclosure)	± 0.18°
• with assembly system (for mounting surface)	± 0.22°
Scan rate	25 scans/s or 40 ms/scan
Laser protection class	
• to standard	EN 60825-1, class 1 (eye safe)
Wave length	905 nm
Beam divergence	2 mrad
Time Base	100 s
Environment and material	
Degree of protection	IP65
Ambient temperature	
• Operation	0 ... +50 °C
• Storage	-20 ... +60 °C
Enclosure insulation class	Protection class 2
Humidity	To DIN 40040, table 10, code E (fairly dry)
Dimensions (W × H × D) in mm	141 × 167 × 168
Emitter	Infrared laser diode (λ = 905 nm)
Casing	Cast aluminum, plastic, steel connection plate
Vibratory load over 3 axes to IEC 60068, part 2-6	10 ... 150 Hz, max. 5 *g*
Continuous shock over 3 axes to IEC 60068, part 2-29	10 *g*, 16 ms
Rotating mirror drive	Brushless DC motor
Rotating mirror bearing	Maintenance-free ball bearing

PROFIsafe laser scanner

Selection and ordering data	Order No.
SIMATIC FS620I PROFIsafe laser scanner Including LS4soft software for securing danger zones	**3SF78 34-6PB00**
SIMATIC FS660I PROFIsafe laser scanner with vertical security Including LS4soft software for securing danger zones, danger points and access protection	**3SF78 34-6PE00**

Accessories

Assembly system, twistable, for simple adjustment	**3RG78 38-1AA**

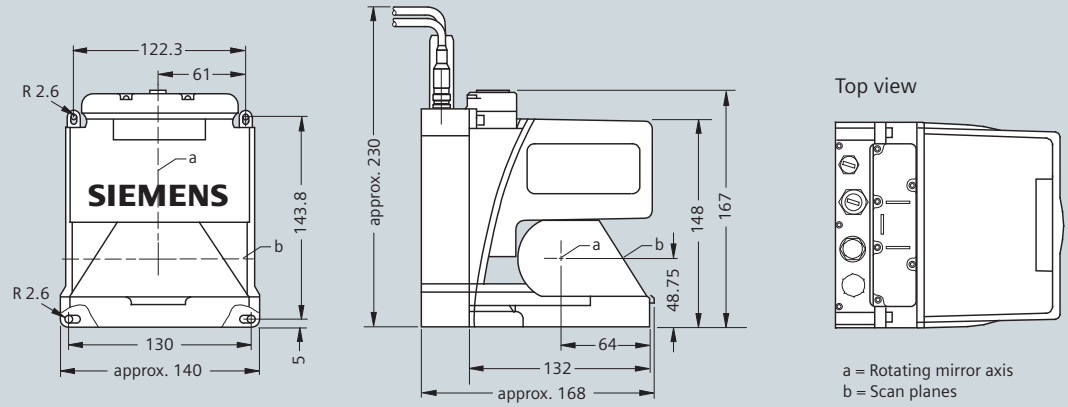


Adapter plate for PLS mounting support	**3RG78 38-1AB**
Cleaning set Includes cleaning fluid (1000 ml), cloths (x 100)	**3RG78 38-7RS**

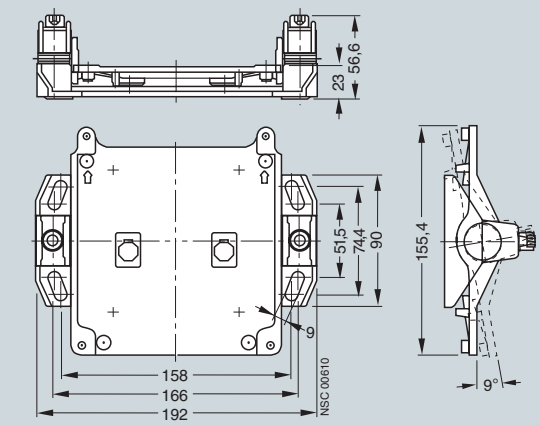
	Order No.
Connectors and cables	
PC connection cable for AS-Interface and PROFIBUS laser scanners, including plug (9-pin), and optical interface	**3RG78 38-1DC**
PROFIBUS M12 terminating connector For PROFIBUS DP 1 pack = 5 units	**6GK1 905-0EC00**
PROFIBUS M12 connectors 1 pack = 5 units	
• Male pins	**6GK1 905-0EA00**
• Socket insert	**6GK1 905-0EB00**
PROFIBUS M12 plug-in cables 2-core (inverted coding) preassembled, with M12 connectors, in different lengths:	
• 0.5 m	**6XV1 830-3DE50**
• 1.5 m	**6XV1 830-3DH15**
• 3.0 m	**6XV1 830-3DH30**
• 5.0 m	**6XV1 830-3DH50**
• 10.0 m	**6XV1 830-3DN10**
• 15.0 m	**6XV1 830-3DN15**

Dimensions

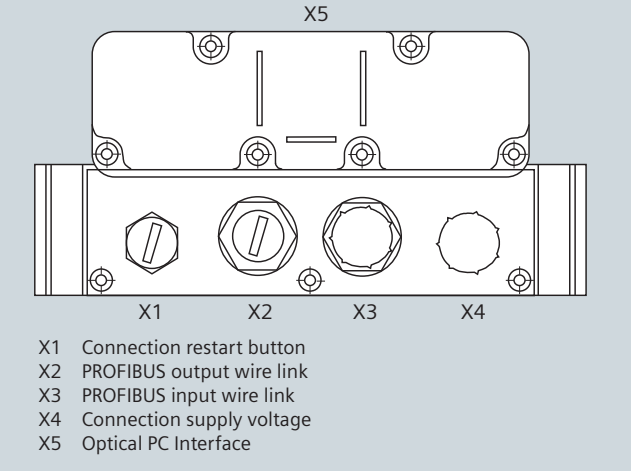
PROFIsafe laser scanner



Assembly system 3RG7 838-1AA



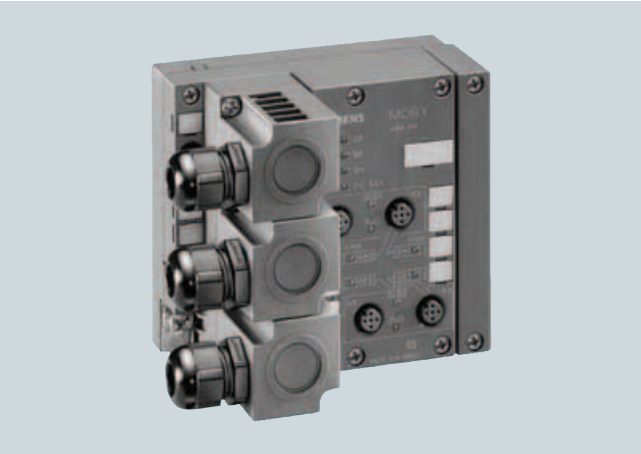
Schematics



X1 Connection restart button
X2 PROFIBUS output wire link
X3 PROFIBUS input wire link
X4 Connection supply voltage
X5 Optical PC Interface

ASM 450

Overview

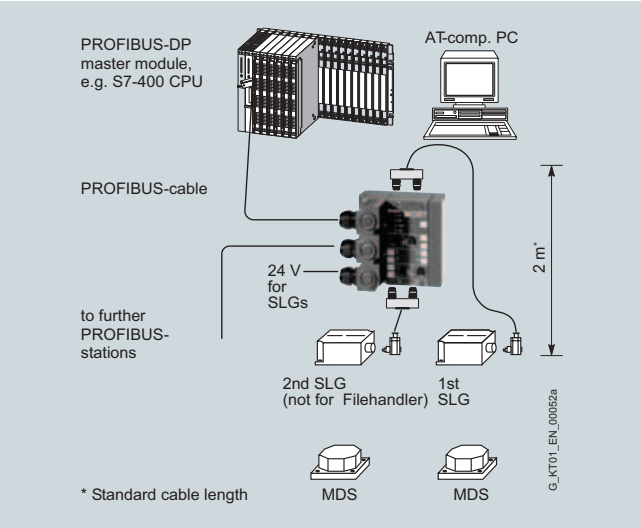


The low-cost communications module ASM 450 is an autonomous PROFIBUS DP slave for the operation of MOBY components via the PROFIBUS DP:

- SIMATIC S7 (including FB/FC software)
- SINUMERIK
- SICOMP IMC, PC, PLC

Thanks to their high degree of protection and ruggedness, they are particularly suitable for machine-level use.

Design



Configuration

The ASM communications modules are mounted on the ET 200X standard module. The relevant configuration and mounting instructions should be referred to in the ET 200X manual. Expansion modules from the ET 200X spectrum cannot be used.

Function

The PROFIBUS DP procedure according to EN 50170 Vol. 2 PROFIBUS for the communication between ASM and SIMATIC S5/S7 (or any PROFIBUS master) and the MOBY-specific procedures for communication between ASM and SLG are implemented on the ASMs.

The data in the MDS is accessed as follows:

- Direct addressing via absolute addresses

On the PROFIBUS DP, the ASM occupies a node address on the bus that is set on the basic module. The ASM is integrated into the hardware configuration by means of a device master (GSD) file. Then the ASM can be configured by means of the software tool HW_Config of the SIMATIC Manager or another PROFIBUS tool.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

For the connection to any PROFIBUS DP master, the software interface is disclosed in the documentation.

The **IP67 connectors (Order No. 6ES7194-1AA01-0XA0)** are to be ordered separately!

ASM 450 (for MOBY E/I)

The ASM 450 has two SLG interfaces. When using two SLG interfaces, the module operates in multiplex mode so that the MDS can only be read reliably when it is not moving. The data in the MDS is accessed direct by means of absolute addresses.

Using the software functions FC44 for the SIMATIC S7, the ASM operates in cyclic mode, i.e. the data throughput depends among other things on the size of the address window (max. 208 byte), number of slaves, etc.

Technical specifications

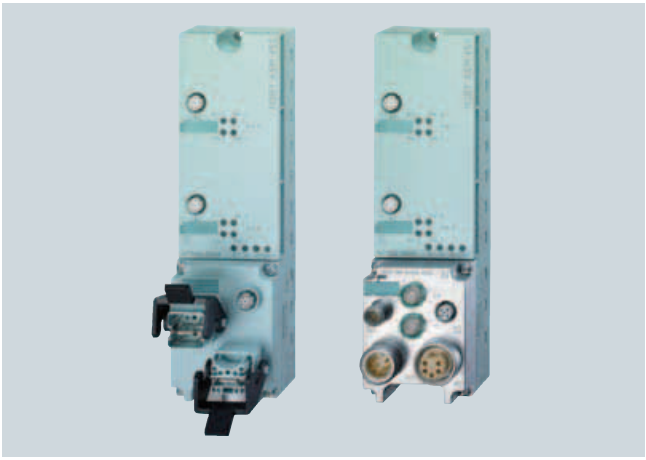
Order No.	6GT2 002-0EB00
Communication modulee	**ASM 450**
Serial interface to user	PROFIBUS DP
Procedure conforms to:	IEC 61784
Connection to PROFIBUS	PG 11 gland (3 x 6ES7194-1AA01-0XA0, not included in scope of delivery)
Data transmission rate	9.6 Kbaud to 12 Mbaud (automatic detection)
Max. block length	208 Byte
Serial interface to SLG	Connector
Max. cable length	500 m, SLG-dependent, (standard length 2 m)
Connectable SLGs	SLG 7x or SLG 4x; in multiplex mode
Data transmission rate	19.2 Kbaud to 57.6 Kbaud (depending on the MOBY family)
Software function	
Programming	Depending on the PROFIBUS DP master
Function blocks	
SIMATIC S7	FC44
MDS addressing	Direct via addresses
Commands	Initialize MDS, read data, write data, etc.
Digital inputs/outputs	2/2
Galvanic isolation	Yes
Power supply	
Permissible range	20 … 30 V DC (rated value 24 V DC)
Current consumption	Max. 180 mA; typ. 130 mA (without SLG)
Ambient temperature	
Operation	0 °C ... +55 °C
Transport and storage	-40 °C ... +70 °C
Degree of protection	IP67
Dimensions (W x H x D) in mm	134 x 110 x 55 (without bus connector)
Weight, approx.	0.5 kg

Ordering data

	Order No.
ASM 450 communication module Max. 2 SLGs can be connected in multiplex mode, without connectors	**6GT2 002-0EB00**
Accessories	
Connector For ASM 450 for the PROFIBUS DP interface and 24 V supply, 3 units per ASM 450 are necessary	**6ES7 194-1AA01-0XA0**
Integrated plug connector for ASM 450; T functionality; spare part	**6ES7 194-1FC00-0XA0**
MOBY M12 dual-pin connector for ASM 450 For mounting individual ASM SLG, without cable	**6GT2 090-0BC00**
MOBY E, I, U connecting cable Preassembled, between ASM 450 and SLG, angled connector, in the following lengths:	
• 2 m (preferred length)	**6GT2 091-1CH20**
• 5 m	**6GT2 091-1CH50**
• 10 m	**6GT2 091-1CN10**
• 20 m	**6GT2 091-1CN20**
• 50 m	**6GT2 091-1CN50**
Preassembled, between ASM 450 and SLG, angled connector 2 m long	**6GT2 091-2CH20**
CD "RFID Systems Software & Documentation" FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation	**6GT2 080-2AA10**

ASM 456

Overview



The cost-effective ASM 456 communication module is a stand-alone PROFIBUS DP slave used to operate the RFID systems MOBY D/E/I/U and SIMATIC RF300 over PROFIBUS DP/DP-V1:

- SIMATIC S7 (including FB/FC software)
- SINUMERIK
- SICOMP IMC, PC, PLC
- SIMOTION (with integrated software library)

Thanks to their high degree of protection and ruggedness, they are particularly suitable for machine-level use. The modular structure with different PROFIBUS connection systems allows them to be used in all applications. The system-wide, plug-in connection technique ensures rapid start-up.

Benefits

- Two parallel MOBY channels ensure real-time mode at dynamic read points.
- Modular design with different bus interfacing possibilities ensures universal implementation.
- SLG connection using an 8-pin M12 connector for quick mounting of all components.
- Easy changeover from ASM 452 to ASM 456 thanks to 100 % software compatibility.
- High-performance hardware ensures fast data exchange with the SLG (reader). Consequently the data are available for the application even faster.
- Easy downloading of firmware via SIMATIC Manager for function expansions and error rectification ensure high-availability of the RFID system.
- The parameterizable MOBY-specific PROFIBUS diagnostics facilitate start-up and troubleshooting.
- A wide selection of pre-assembled PROFIBUS connecting cables can be ordered for ASM 456. This saves time and money during installation and assures better quality.

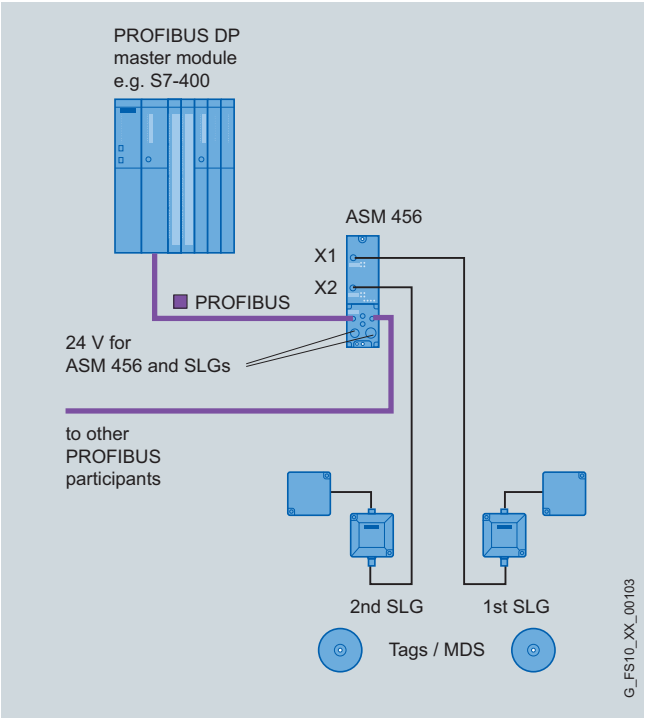
Application

The ASM 456 communication module has been specially designed for a wide range of applications in industrial automation and logistics. Thanks to the high degree of protection of IP67, the ASM 456 can be installed in the process without a control cabinet.

Used primarily for the ASM 456:

- Mechanical engineering, automation systems, conveyor systems
- Ancillary assembly lines in the automobile industry/suppliers
- Small assembly lines
- Production, packaging, textile, plastics and printing machines SIMOTION

Design



Function

The ASM 456 comprises a basic module and a connection block that must be ordered separately. When connecting PROFIBUS, the customer can choose between ECOFAST connections and M12, 7/8" connections.

One or two read/write devices are connected to the ASM with a read/write device cable pre-assembled and ready to use. The standard length of the cable is 2 m. If other cable lengths to the SLG are required, an extension cable measuring between 2 m and 50 m can be used. The cable can also be assembled by the customer as required.

The PROFIBUS DP procedure according to EN 50170 Vol. 2 PROFIBUS for the communication between ASM and SIMATIC S5/S7 (or any PROFIBUS master) and the MOBY-specific procedures for communication between ASM and SLG are implemented on the ASMs.

In principle, access to the data in the MDS can take place as follows:

- Direct addressing via absolute addresses
- Conveniently via the MOBY file handler (MOBY I/U only) using file names

On the PROFIBUS DP/DP-V1, the ASM occupies a node address on the bus that is set on the connection block. The ASM is integrated into the hardware configuration by means of a device master (GSD) file. Then the ASM can be configured by means of the software tool HW_Config of the SIMATIC Manager or another PROFIBUS tool.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

The ASM 456 has two SLG interfaces. The data in the MDS can be directly accessed by means of absolute addresses (FB/FC45, FC55) or more conveniently using the MOBY file handler (FC 56) by means of the file names. The ASM is operated in non-cyclic mode over PROFIBUS DP V1. Consequently, a very large amount of data can be transferred to/from the ASM without overloading the PROFIBUS cycle. This has advantages when transferring large volumes of data. In addition, the ASM can process concatenated MDS commands very quickly in this mode.

Function blocks FB101/116/132 in the SIMATIC S7 are available for the "RFID standard profile" mode. The data in the MDS can be addressed either via absolute addresses or via the file handler. This mode additionally integrates the communication module in SIMOTION.

Technical specifications

Order No.	**6GT2 002-0ED00**
Communication module	**ASM 456**
Ambient temperature	
• During operation	0 … 55 °C temperature change 10 K/h, all mounting positions Or -25 … 60 °C
• Storage	-40 … +70 °C 20 K/h
Relative humidity	
• During operation	15 up to max. 95 %, no condensation
• Storage	5 up to max. 95 %, no condensation
Atmospheric pressure	
• During operation	1080 … 795 hPa (corresponds to altitude of -1000 … 2000 m)
• Storage	1080 to 660 hPa (corresponds to altitude of -1000 … 3500 m)
Contaminant concentration	SO_2: < 0.5 ppm (rel. humidity < 60 %, no condensation) H_2S: < 0.1 ppm (rel. humidity < 60 %, no condensation)
Power supply	Rated value: 24 V DC Permissible range: 20 … 30 V DC
Current consumption	• Max. 200 mA without write/read device • Typ. 80 mA without write/read device • Max. 800 mA with two write/read devices
Degree of protection	IP67
Housing color	IP Basic 714
Dimensions (W x H x D) in mm	
• ASM 456 only	60 x 210 x 30
• ASM 456 with ECOFAST connection block	60 x 210 x 60
Weight (without connection block)	Approx. 210 g
Fixing	2 screws M5 x 20 mm
PROFIBUS	IEC 61784
• Transmission rate	9.6 kbit/s … 12 Mbit/s
• Protocol	DP-V1
Serial SLG interface (gross transmission rate)	MOBY I/E: 19200 bit/s MOBY U/D: 19200, 38400, 57600, 115200 bit/s SIMATIC RF300: 19200, 57600, 115200 bit/s
Cable length to write/read device	
• Standard length	2 m
• Optional preassembled cable	5 m, 10 m, 20 m, 50 m
• Cable for self-assembly	Depending on write/read device, up to 1000 m
Supply voltage to write/read device	24 V / up to 0.3 A per write/read device

ASM 456

Ordering data

Ordering data	Order No.
ASM 456 communication module For connection of 2 write/read devices	**6GT2 002-0ED00**
Accessories for ECOFAST connection	
ECOFAST connection block	**6ES7 194-3AA00-0AA0**
PROFIBUS ECOFAST HYBRID plug 180	
• With male insert (5 per pack)	**6GK1 905-0CA00**
• With socket insert (5 per pack)	**6GK1 905-0CB00**
PROFIBUS ECOFAST termination plug with terminating resistors	**6GK1 905-0DA10**
ECOFAST hybrid cable (pre-assembled)	**6XV1 830-7Bxxx**[1]
ECOFAST hybrid cable (non-assembled)	**6XV1 830-7AH10**
Accessories M12, 7/8" connection	
M12, 7/8" connection block	**6ES7 194-3AA00-0BA0**
M12 terminating resistor for PROFIBUS (5 per pack)	**6GK1 905-0EC00**
PROFIBUS cable with pre-assembled M12 connectors	**6XV1 830-3Dxxx**[1]
Cable for supply voltage with pre-assembled 7/8" connectors	**6XV1 822-5Bxxx**[1]
PROFIBUS FC standard cable non-assembled	**6XV1 830-0EH10**
PROFIBUS M12 connecting plug (5 per pack)	
• With pin insert	**6GK1 905-0EA00**
• With socket insert	**6GK1 905-0EB00**
Connecting plug 7/8" for voltage (5 per pack)	
• With pin insert	**6GK1 905-0FA00**
• With socket insert	**6GK1 905-0FB00**
Sealing caps 7/8" for unused 24 V loop-through (1 pack = 10 units)	**6ES7 194-3JA00-0AA0**
Accessories	
M12 connecting cable, prefabricated, between ASM 456 and SIMATIC RF300 reader, 2 m, plug angled	**6GT2 891-0JH20**
SLG cable for MOBY I/E/U	
• 2 m	**6GT2 091-0FH20**
• 5 m	**6GT2 091-0FH50**
SLG cable for MOBY D; 2 m	**6GT2 691-0FH20**
SLG cable RF300 extension cable MOBY I/E/U/D and SIMATIC RF300	
• 2 m	**6GT2 891-0FH20**
• 5 m	**6GT2 891-0FH50**
• 10 m	**6GT2 891-0FN10**
• 20 m	**6GT2 891-0FN20**
• 50 m	**6GT2 891-0FN50**
M12 sealing caps for unused reader connections (10 units)	**3RX9 802-0AA00**

[1] This cable is available in different lengths (see FDB or Catalog IK PI)

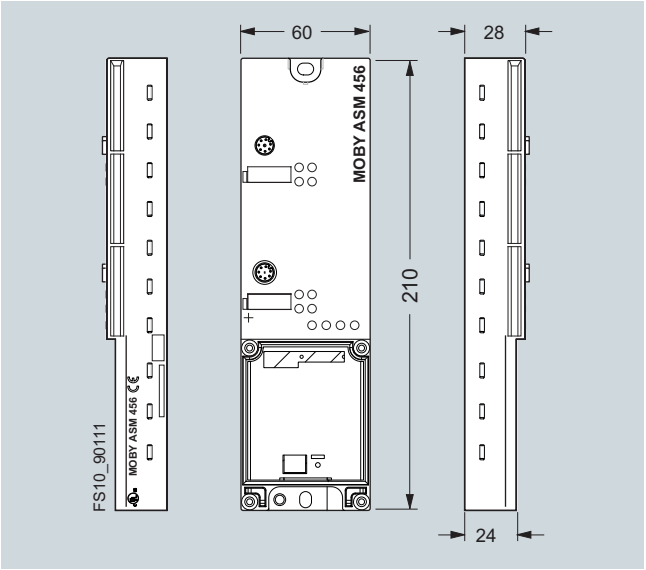
Dimensions

CAD data

Dimension drawing available as CAD graphic (DXF format).

Additional information can be found in the Internet under:

http://www.automation.siemens.com/bilddb/index.asp?objKey=G_FS10_XX_90111



Overview

The ASM 470 and 475 are low-cost modules for connecting the MOBY D, E, I, U and RF300 identification systems to the S7-300 and ET 200M.

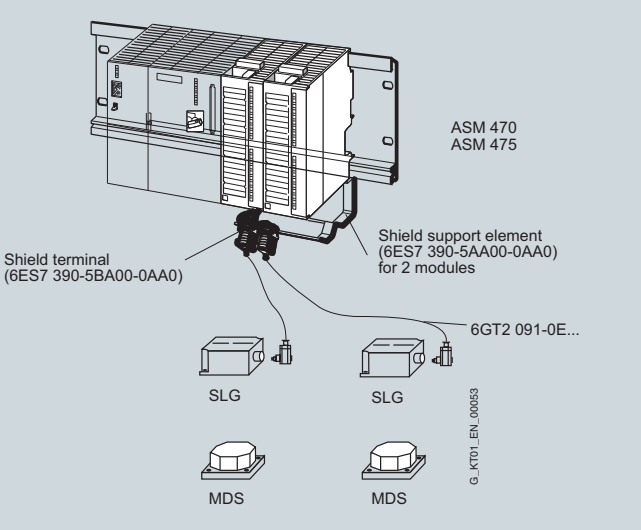
Application

The ASM 470 and ASM 475 communications modules integrate the MOBY identification systems into the following systems:

- SIMATIC S7-300
- S7-400, PC (CP5412 (A2)) via ET 200M
- SINUMERIK 840D/810D

A maximum of two SLGs can be connected and operated in parallel mode (ASM 470 only in multiplex mode).

Design



Configuration

Function

As many as eight ASM communication modules can be plugged into one SIMATIC S7-300 rack and operated. In a configuration with several racks (max. 4), the ASMs can be plugged into and operated on any rack. This means that as many as 32 ASMs can be operated in the maximum configuration of a SIMATIC S7-300. The electrical isolation between SLG and SIMATIC S7-300 bus ensures a noise-resistant setup.

Error messages and operating states (MDS in field, command active etc.) are indicated using LEDs.

Communication between the ASM 475 and S7-CPU takes place by means of acyclic message frames of the P-bus, so that the useful data (max. 238 byte) is transmitted very quickly and effectively. The ASM 475 is fully integrated into the diagnostics of the SIMATIC Manager by means of an Object Manager (OM). Depending on the PROFIBUS master, as many as 126 ET 200M modules can be operated on one PROFIBUS line.

ASM 470 (for MOBY I/E)

The data in the MDS is accessed direct by means of physical addresses using the ASM 470. Communication with the ASM takes place in the process image in blocks of 12 byte and is slower than with the ASM 475. Via ET 200M, it can be operated on any non-Siemens PROFIBUS master.

ASM 475 (for MOBY I/E/U/D/RF300)

The data in the MDS is accessed direct by means of physical addresses using the ASM 475. The data is transferred between FC/FB45, FC55 and ASM at great speed and without placing a great load on the CPU. In the MOBY I/U mode, the ASM can also be operated with the FC56 (file handler).

Dimensions

CAD data

Dimension drawing available as CAD graphic (DXF format).

Additional information can be found in the Internet under:

http://www.automation.siemens.com/bilddb/index.asp?objKey=G_FS10_XX_90112

ASM 470/475

Technical specifications

Order No.	6GT2 002-0FA10	6GT2 002-0GA10	6GT2002-0GA10
Communication modules	**ASM 470**	**ASM 475**	**ASM 475 (mit MOBY I/U-Filehandler)**
Serial interface to SLG	RS422		
SLG connection point	Max. 2 pieces via screw terminals in front connector		
Interface/cable length, max. connectable length	RS422/1000 m, depending on SLG and cable type		
Connectable SLGs	MOBY I/E (multiplex mode)	MOBY I/E/U/D/RF300	MOBY I/U
Interface for 24 V DC	Via screw terminals in front connector		
Function blocks			
SIMATIC S7	FC47	FC/FB45, FC55 (multitag)	FC56
MDS addressing	Direct access via addresses		Access via DOS-like file system
Commands	Initialize MDS, read data from MDS, write data to MDS, etc.		Format MDS, read file, write file, etc.
Dialog function	Yes (MOBY I)	No	
Power supply			
• Nominal value	24 V DC		
• Permitted range	20 ... 30 V DC		
Electrical isolation between S7-300 and MOBY	Yes		
Current consumption from S7 bus terminal, max.	100 mA		
Power loss, typically	1 W		
Ambient temperature			
Operation			
• Horizontal configuration of SIMATIC	0 … +60 °C		
• Vertical configuration of SIMATIC	0 … +40 °C		
Transport and storage	-40 … +70 °C		
Dimensions (W x H x D) in mm	40 x 125 x 120		
Weight, approx.	0.2 kg		

Ordering data

	Order No.
MOBY communication module ASM 470 For SIMATIC S7-300 and ET 200M	**6GT2 002-0FA10**
MOBY communication module ASM 475 For SIMATIC S7-300 and ET 200M, parameterizable	**6GT2 002-0GA10**
Accessories	
Front connector (1 x per ASM)	**6ES7 392-1AJ00-0AA0**
MOBY E, I, U connecting cable	
Preassembled, between ASM 470/475 and write/read device, angled connector, in the following lengths:	
• 2 m	**6GT2 091-0EH20**
• 5 m	**6GT2 091-0EH50**
• 10 m	**6GT2 091-0EN10**
• 20 m	**6GT2 091-0EN20**
• 50 m	**6GT2 091-0EN50**
Preassembled, between ASM 470/475 and write/read device, straight connector, in the following lengths:	
• 2 m	**6GT2 091-2EH20**
• 5 m	**6GT2 091-2EH50**
• 10 m	**6GT2 091-2EN10**
• 50 m	**6GT2 091-2EN50**

	Order No.
MOBY D connecting cable	
Pre-assembled, between the ASM 475 and SLG D1xS, 9-pin Sub-D connector in the following lengths:	
• 5 m	**6GT2 491-0EH50**
• 20 m	**6GT2 491-0EN20**
• 50 m	**6GT2 491-0EN50**
SIMATIC RF300 connecting cable	
preassembled, between ASM 452/473/475 and RF3xxR, IP65, straight connector, in the following lengths1):	
• 2 m	**6GT2 891-0EH20**
• 5 m	**6GT2 891-0EH50**
CD: "RFID Systems Software & Documentation"	**6GT2 080-2AA10**
FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation	

[1] The connecting cables can be extended using the RF300 connecting cable for the ASM 456.
These connecting cables are supplied in the lengths 2 m, 5 m, 10 m, 20 m and 50 m (6GT2 891-0Fxxx)

Overview

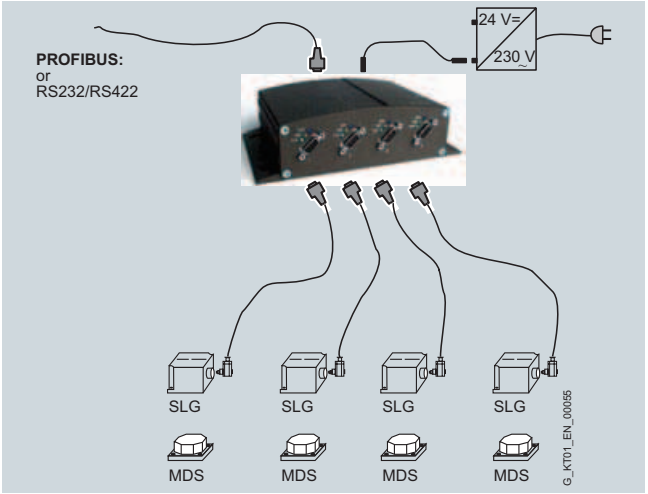
Up to 4 write/read devices or antennas can be connected **in parallel** to the low-cost connection modules. The user can select between two interfaces:

- PROFIBUS DP-V1 (ASM 754)
- RS232/RS422; serial interface to PC/PLC (ASM 424, ASM 724)

Design

Mounting

For easy mounting on a standard rail, an optional adapter is available.



Configuration

Function

Up to four write/read devices or antennas from the corresponding MOBY system can be connected to the rugged housing. Data in the MDS is accessed directly over the physical addresses. The extended MOBY E functions (multitag, access rights, password, etc.) are not supported.

Error messages and operating states (MDS in the field, transmission, etc.) are indicated additionally by means of LEDs and simplify commissioning and service.

PROFIBUS DP-V1 interface (ASM 754)

Communication to the application uses the acyclic protocol service of PROFIBUS DP-V1. The station address on PROFIBUS is set directly on the ASM by means of a DIP switch.

The function **FC45 or FC55 (multitag)** is available to SIMATIC S7 users for easy integration in the application. The ASM is integrated into the hardware configuration via a GSD file. The ASM can then be configured via the SW tool HW_Config of SIMATIC Manager or another PROFIBUS tool.

For connection to any PROFIBUS DP-V1 master, the programming interface is described in the FC45 documentation.

RS232/RS422 interface (ASM 424, ASM 724)

A WINDOWS 98/NT/2000 C library (**MOBY API**, DLL functions) incl. 3964R driver with basic functions (open/close channel, read data from data memory, etc.) is available to the PC user for his application.

MOBY E

Up to four **SLA 7x** can be connected in parallel to the **ASM 754/724** which, however, operate internally in multiplex mode. If more than one SLA 7x is connected, the **MOBY E** data memory can only be reliably read or written in the stationary state.

MOBY I/E

Up to four **SLG 4x** or **SLG 7x** can be connected in parallel to the **ASM 424**. MOBY data memories can be read or written simultaneously on all 4 SLGs.

ASM 424, ASM 754/724

Technical specifications

Order No.	6GT2 302-2EE00	6GT2 002-2CE00, 6GT2 302-2CE00
Communications module	**ASM 754**	**ASM 424, ASM 724**
Serial interface to user	PROFIBUS DP-V1, 9-pin Sub-D connector (Order No. 6ES7 972-0BA 12-0AX0)	RS232/RS422 9-pin Sub-D connector
Cable length, max	See PROFIBUS	30 m for RS232, 500 m for RS422
Procedure/protocol	IEC 61784	3964 R
Data transmission rate	9600 Kbit/s up to 12 Kbit/s (automatic detection)	38.4 bit/s
Block length, max	4 words cyclic/ 238 byte acyclic	238 byte
Serial interface to SLA/SLG	4 x 9-pin Sub-D socket	
Cable length, max	55 m to SLA; 1000 m to SLG	
Connectable SLG/SLA	MOBY I/E: max. 4 x SLG 4x or SLG 7x (parallel mode) MOBY E: max. 4 x SLA 7x (multiplex mode) Note: Mixed mode is not possible	
Software function		
Programming	Depending on the PROFIBUS DP-V1 master	Depending on the PC/PLC
Available software (CD "RFID Systems Software & Documentation")	FC45 for SIMATIC S7-300/400	C library MOBY API for PC with Windows 89/NT
• MDS addressing	Access directly via addresses	
• Commands	Initialize MDS, read data from MDS, write to MDS, etc.	

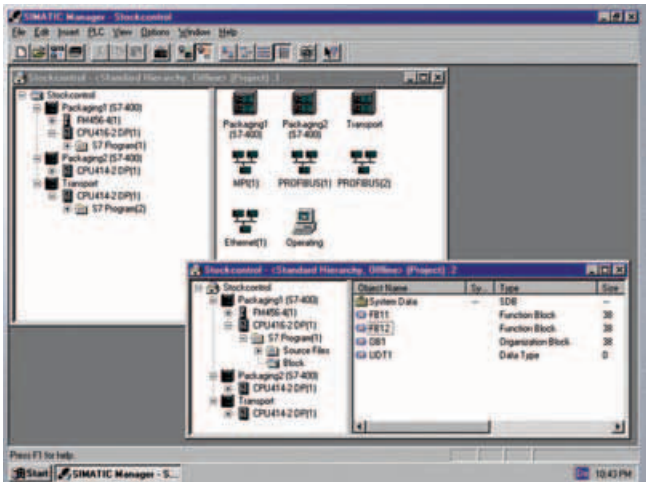
Order No.	6GT2 302-2EE00	6GT2 002-2CE00, 6GT2 302-2CE00
Communications module	**ASM 754**	**ASM 424, ASM 724**
Power supply		
• Rated value	24 V DC (separate connector)	
• Permissible range	20 … 30 V DC	
Current consumption	250 mA	
Starting current, max.	1.1 A (without SLA)	
Mounting	4 x M5 screws	
Degree of protection	IP40 (higher degree of protection on request)	
MTBF (at 40 °C)	100,000 hours	
Housing		
• Dimensions (W x H x D) in mm	205 x 130 x 60 (without connector)	
• Material	Aluminum	
• Color	Anthracite	
Ambient temperature		
• Operation	-25 … +55 °C (condensation not permitted)	
• For transport and storage	-40 … +85 °C (condensation not permitted)	
Weight, approx.	1.3 kg	

Ordering data

	Order No.
ASM 424 communication module With serial interface RS232/RS422, max. 4 SLG 4x or 4 SLG 7x can be connected	**6GT2 002-2CE00**
ASM 724 communication module With serial interface RS 232/RS422, max. 4SLA 7x can be connected	**6GT2 302-2CE00**
754 communication module With PROFIBUS DP-V1 interface, max. 4 SLG 7x can be connected	**6GT2 302-2EE00**

	Order No.
Accessories	
CD: "RFID Systems Software & Documentation" FB/FC for SIMATIC, 3964R driver for DOS/Windows 95/NT/2000/XP, C-libraries, PC presentation program, RFID documentation	**6GT2 080-2AA10**

Application



Prior to start-up, the PROFIBUS DP field bus and the individual nodes must be parameterized.

During configuration and parameterization the user is supported by user-friendly tools. For SIMATIC masters, all functions are integrated in the STEP 7 programming language. These tools enable the PROFIBUS DP fieldbus to be easily

- configured
- parameterized,
- documented,
- started up,
- tested and
- diagnosed.

For further information, please refer to "Industrial automation systems; SIMATIC Industrial Software; Software for SIMATIC S7/M7/C7; Standard Tools".

Function

The STEP 7 programming software allows user-prompted parameterization of the distributed I/O as well as field devices on PROFIBUS DP. This includes primarily:

- Configuration of the field bus system
- Creation of an address list for the master module
- Adjustment of data transmission rate on the field bus
- Adjustment of the failure mode.

The STEP 7 programming software allows identical programming and configuring of centralized and distributed I/O modules.

The reference configuration of the PROFIBUS DP field bus is stored on the PROFIBUS DP master module.

Diagnostics

The diagnostics function can be used during start-up and normal operation to localize and rectify errors easily.

For this purpose, the programming device or PC is connected to PROFIBUS DP or direct to the relevant I/O device or field device.

GSD data

STEP 7 can also be used to parameterize field devices of other manufacturers. In order to facilitate easy and convenient programming, the product usually comes with GSD files which can be embedded in the parameterization tools.

For connection of distributed ET 200 I/O modules to masters of other manufacturers, the GSD files are also centrally available in the interface center These can be requested:

- via modem on Tel.: ++49 911/737972 or ++49 911/730983
- at the Internet address http://www.siemens.com/automation/csi/gsd

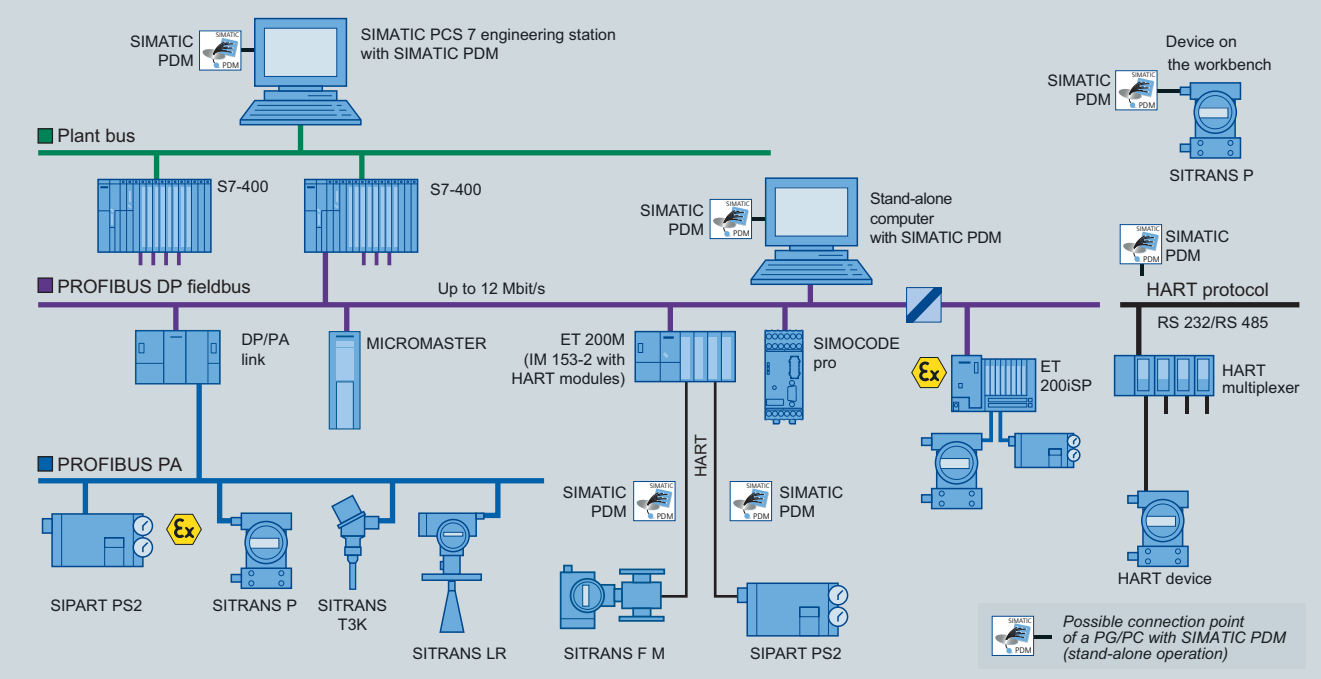
When ET 200 stations are connected to master modules which are not parameterized with COM PROFIBUS or STEP 7 (operation on third-party master modules), a fixed preassigned GSD file can be created with COM PROFIBUS. This file is then loaded into the configuration tool of the third-party manufacturer and can be used for simple parameter assignment of the station. This allows the use of the user-friendly plain-text parameterization feature of COM PROFIBUS; there is no need for hexadecimal code inputs in the third-party configuring tool.

STEP 7

Ordering data	Order No.
STEP 7 Version 5.4	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows 2000 Prof./XP Prof. *Delivery package:* German, English, French, Spanish, Italian; incl. 3.5" authorization diskette, without documentation	
• Floating License on CD	**6ES7 810-4CC08-0YA5**
• Rental license for 50 hours	**6ES7 810-4CC08-0YA6**
• Software Update Service on CD (requires current software version)	**6ES7 810-4BC01-0YX2**
• Upgrade Floating License 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0YE5**
• Trial License STEP 7 V5.4; on CD, runs for 14 days	**6ES7 810-4CC08-0YA7**
STEP 7 Version 5.4, Japanese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional, Japanese *Delivery package:* English, Japanese; incl. 3.5" authorization diskette, without documentation	
• Floating License, Japanese, on CD	**6ES7 810-4CC08-0JA5**
• Upgrade floating license Japanese 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0JE5**
STEP 7 Version 5.4, Chinese	
Target system: SIMATIC S7-300/400, SIMATIC C7, SIMATIC WinAC *Requirements:* Windows XP Professional, Chinese *Delivery package:* English, Chinese; incl. 3.5" authorization diskette, without documentation	
• Floating License, Chinese, on CD	**6ES7 810-4CC08-0KA5**
• Upgrade floating license Chinese 3.x/4.x/5.x to V5.4; on CD	**6ES7 810-4CC08-0KE5**
Documentation package STEP 7 basic information Comprising Getting Started, hardware configuration manual, programming manual, migration manual	
• German	**6ES7 810-4CA08-8AW0**
• English	**6ES7 810-4CA08-8BW0**
• French	**6ES7 810-4CA08-8CW0**
• Spanish	**6ES7 810-4CA08-8DW0**
• Italian	**6ES7 810-4CA08-8EW0**

	Order 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	**6ES7 810-4CA08-8AW1**
• English	**6ES7 810-4CA08-8BW1**
• French	**6ES7 810-4CA08-8CW1**
• Spanish	**6ES7 810-4CA08-8DW1**
• Italian	**6ES7 810-4CA08-8EW1**
SIMATIC Manual Collection Electronic manuals on DVD, five languages: S7-200/300/400, C7, LOGO!, SIMATIC DP, PC, PG, STEP 7, engineering software, runtime software, PCS 7, SIMATIC HMI, SIMATIC NET	**6ES7 998-8XC01-8YE0**
SIMATIC Manual Collection update service for 1 year Current "Manual Collection" DVD and the three subsequent updates	**6ES7 998-8XC01-8YE2**
EPROM programming device, USB prommer To program SIMATIC memory cards and EPROM modules	**6ES7 792-0AA00-0XA0**
MPI cable For linking SIMATIC S7 and CP through MPI (5 m)	**6ES7 901-0BF00-0AA0**
Components for connecting a PC to MPI and PROFIBUS	
• For PCs with a free PCI slot:	
CP 5611	**6GK1 561-1AA01**
CP 5611 MPI incl. MPI cable (5 m)	**6GK1 561-1AM01**
CP 5621 PCI Express x1 card (32 Bit)	**6GK1 562-1AA00**
CP 5621 MPI PCI Express x1 card (32 Bit) incl. MPI cable (5 m)	**6GK1 562-1AM00**
• For PCs with a free PCMCIA slot:	
CP 5512 For Windows XP Professional	**6GK1 551-2AA00**
• For PCs with a free PCMCIA slot:	
PC adapter USB For connecting a PC to S7-300/-400/C7 through a USB interface; with USB cable (5 m)	**6ES7 972-0CB20-0XA0**
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-PG Edition 2006	**6GK1704-1PW70-3AA0**

Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameterization, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

Using *one* software, SIMATIC PDM enables the processing of more than 1200 devices from Siemens and over 100 vendors worldwide on *one* homogeneous user interface. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open device manager available in the world. Devices which previously were not supported can be easily integrated in SIMATIC PDM at any time by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and consequential costs.

Process Device Manager SIMATIC PDM

Design

Customer-oriented product structure

The SIMATIC PDM Process Device Manager can be used in a versatile manner in the context of Totally Integrated Automation (TIA). Use in the engineering system of SIMATIC PCS 7 is one possible application.

The customer-oriented products structure of SIMATIC PDM supports you in adaptation of the scope of functions and performance to your individual requirements. You can select the minimum configuration SIMATIC PDM Single Point, one of the application-specific, predefined product configurations SIMATIC PDM Service, SIMATIC PDM PCS 7 or SIMATIC PDM S7, or produce your desired configuration from the individual components offered (see table).

The selection depends on the application range and environment of use:

- System-integrated in a SIMATIC PCS 7/S7 configuration environment:
  - SIMATIC PDM PCS 7 (for integration in an engineering system for SIMATIC PCS 7)
  - SIMATIC PDM S7 (for integration in a SIMATIC S7 configuration environment)
- SIMATIC PDM stand-alone as service tool for operation on a mobile computer on the PROFIBUS or with direct connection to the device:
  - SIMATIC PDM Single Point (for processing of a single field device via a point-to-point coupling)
  - SIMATIC PDM Service (for enhanced servicing, including modification logbook and lifelist detailed diagnostics)

	SIMATIC PDM stand-alone		**SIMATIC PDM system-integrated**		
	Minimum configuration	Components for individual configuration	Predefined product configurations		
Product name	**SIMATIC PDM Single Point**	**SIMATIC PDM Basic**	**SIMATIC PDM Service**	**SIMATIC PDM S7**	**SIMATIC PDM PCS 7**
TAGs included in scope of delivery	**1**	**4**	**128**	**128**	**128**
TAG expansions	*Cannot be expanded*	**TAG options** - 128 TAGs - 512 TAGs - 1024 TAGs - 2048 TAGs and/or **PowerPacks**	**PowerPacks** - From 128 to 512 TAGs - From 512 to 1024 TAGs - From 1024 to 2048 TAGs - From 2048 to unlimited TAGs		
Option "Integration in STEP 7/PCS 7"		opt	opt	•	•
Option "Routing through S7-400"		opt	opt	opt	•
Option "Communication via standard HART multiplexer"		opt	opt	opt	opt

• Components included in delivery of individual PDM configurations
opt can be ordered as options

Note:
For definition of TAG, see under TAG options/PowerPacks.

Minimum configuration SIMATIC PDM Single Point

This low-cost minimum configuration with handheld functionality is tailored to processing exactly *one* field device via a point-to-point coupling. All device functions are supported as defined in the device description. These functions include:

- Unlimited selection of devices / management of device catalog
- Communication via PROFIBUS DP/PA or HART modem
- Parameterization and diagnostics in accordance with the device description
- Exporting and importing of parameter data
- Device identification
- Lifelist

The following system functions of SIMATIC PDM Basic are not available with SIMATIC PDM Single Point:

- EDD-based diagnostics in the lifelist
- Project editing
- Storage function (only exporting and importing of parameter data)
- Recording functions
- Routing
- Communication with HART field devices via remote I/Os

The functions of SIMATIC PDM Single Point cannot be extended (e.g. to SIMATIC PDM Basic or with the routing option through S7-400), nor can it be expanded with TAG options or PowerPacks.

Design (continued)

Predefined product configurations

SIMATIC PDM Service

This is a predefined product configuration especially for mobile use in servicing for projects with up to 128 TAGs. It offers service engineers all functions of SIMATIC PDM Basic, including modification logbook, calibration report and detailed diagnostics in the lifelist. SIMATIC PDM Service can be expanded by the functional options "Integration in STEP 7/PCS 7", "Routing through S7-400" and "Communication via standard HART multiplexer" as well as by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM Service:

- SIMATIC PDM Basic
- Option: 128 TAGs

SIMATIC PDM PCS 7

SIMATIC PDM PCS 7 is a predefined product configuration for integration into the engineering system (engineering tool set) and the maintenance station of SIMATIC PCS 7. The product version designed for projects with up to 128 TAGs allows the use of all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist). In addition, it contains the functionality for integration of the SIMATIC PDM into HW-Config as well as the routing from the central engineering system to the field devices. SIMATIC PDM PCS 7 can be expanded by the option "Communication via standard HART multiplexer" and by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM PCS 7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7
- Option: Routing through S7-400

SIMATIC PDM S7

SIMATIC PDM S7 is a predefined product configuration tailored to the use of SIMATIC PDM in a SIMATIC S7 configuration environment. It offers all functions of SIMATIC PDM Basic (including modification logbook, calibration report and detailed diagnostics in the lifelist) as well as the functionality for integration of PDM into HW-Config. SIMATIC PDM S7 can be expanded by the functional options "Routing through S7-400" und "Communication via standard HART multiplexer" and by SIMATIC PDM PowerPacks (see under TAG options/PowerPacks). The following program components are part of SIMATIC PDM S7:

- SIMATIC PDM Basic
- Option: 128 TAGs
- Option: Integration in STEP 7/SIMATIC PCS 7

Components for individual configuration

SIMATIC PDM Basic

SIMATIC PDM Basic is the basic component for production of individual SIMATIC PDM configurations from single components. It contains all functions required for operation and parameterization of the devices, as well as enabling for the following communication modes:

- PROFIBUS DP/PA,
- HART communication (modem, RS 232 and PROFIBUS),
- Modbus,
- SIREC bus and
- SIPART DR.

Without TAG expansion, SIMATIC PDM Basic can manage projects with up to 4 TAGs, and can be used - with observation of the system requirements - for stand-alone operation on any computer (PC/notebook) with local connection to bus segments or with direct connection to the device.

SIMATIC PDM Basic can be expanded by functional options and TAG options/PowerPacks. Use of the following functions requires at least 128 TAGs:

- Modification logbook
- Calibration report
- Detailed diagnostics in the lifelist

SIMATIC PDM Basic is also available in the form of a rental license for 50 operating hours for low-cost processing of short-term projects.

SIMATIC PDM option: Integration in STEP 7/PCS 7

This option is required for use of SIMATIC PDM within a SIMATIC S7 or SIMATIC PCS 7 project with a local connection to the PROFIBUS. SIMATIC PDM can then be started directly from the hardware project (HW-Config).

SIMATIC PDM option: Routing through S7-400

This option is required additive to the option "Integration in STEP7/PCS 7" if SIMATIC PDM is to be used in a central engineering system for SIMATIC PCS 7/S7 with Ethernet bus connection to the automation systems for plant-wide configuration, parameterization, commissioning and diagnostics of field devices.

SIMATIC PDM option: Communication via standard HART multiplexer

This option permits SIMATIC PDM to use the HART OPC server for communication with HART field devices via HART multiplexers.

TAG options/PowerPacks

A TAG corresponds to a SIMATIC PDM object, which represents individual field devices or components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

In contrast to PowerPacks, TAG options are only suitable for product configurations on the basis of individual components. Using the SIMATIC PDM TAG options, the basic software SIMATIC PDM Basic can be expanded from 4 TAGs to 128, 512, 1024 or 2048 TAGs, and with the help of an additive PowerPack also to unlimited TAGs.

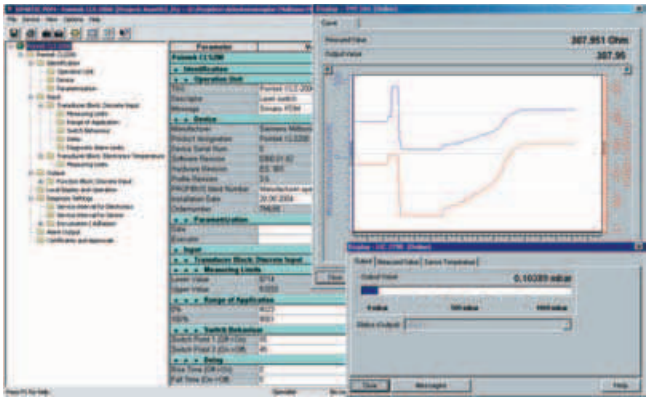
The number of available TAGs can be subsequently increased for all SIMATIC PDM product configurations by means of the SIMATIC PDM PowerPacks. PowerPacks are available for expansion to 512, 1024, 2048 and unlimited TAGs.

Demonstration software

A demonstration version of SIMATIC PDM is also available. Online communication and storage functions are not available with this version.

Process Device Manager SIMATIC PDM

Function



Parameter view of SIMATIC PDM with trend curve and online display

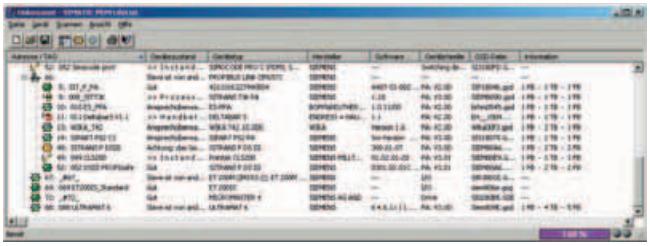
Core functions

- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication with operating modes, alarms and states
- Simulation
- Diagnostics (standard, detailed)
- Management (e.g. networks and PCs)
- Export/import (parameter data, reports)
- Commissioning functions, e.g. measuring circuit tests of device data
- Device replacement (lifecycle management)
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

Support of system management

SIMATIC PDM supports the operative system management in particular through:

- Uniform presentation and operation of devices
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs
- Graded user privileges including password protection



PDM lifelist with status and diagnostics display

Graphical user interface

The GUI of SIMATIC PDM satisfies the requirements of the directives VDI/VDE GMA 2187 and IEC 65/349/CD. Even complex devices with several hundred parameters can thus be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

Several views are available to users to help them with their tasks:

- Hardware project view
- Process device network view (preferably for stand-alone application)
- Process device plant view as TAG-related view, also with display of diagnostics information
- Parameter view for parameterizing the field devices
- Lifelist view for commissioning and service

Communication

SIMATIC PDM supports several communication protocols and components for communicating with devices that have the following interfaces:

- PROFIBUS DP/PA interface
- HART interface
- Modbus interface
- Special interface from Siemens

Further communication protocols on request.

Routing

From the central engineering system of the SIMATIC PCS 7 process control system, you can navigate with SIMATIC PDM through the various bus systems and remote I/Os down to the connected devices. By means of this routing functionality, every device in the plant which can be parameterized per EDD can be processed. The following processing functions are available:

- Read diagnostics information from the device
- Modify device settings
- Adjust and calibrate devices
- Monitor process values
- Create simulation values
- Reparameterize devices.

Integration

Device Integration

SIMATIC PDM supports all devices described by EDD (Electronic Device Description). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time it is the directive of the established organizations for PROFIBUS (PNO: PROFIBUS International) and HART (HCF: HART Communication Foundation).

The devices are directly integrated in SIMATIC PDM through their EDD or the current HCF catalog. In the EDD the device is described in terms of its functions and construction using the Electronic Device Description Language (EDDL) specified by PNO. Using this description, SIMATIC PDM automatically creates its user interface with the specific device data.

The current device catalog of SIMATIC PDM covers more than 1200 devices from over 100 manufacturers world-wide. In addition, devices from all manufacturers can be integrated in SIMATIC PDM by simply importing their EDDs. It is thus possible to keep the device range up to date at all times and to add to the number of manufacturers and devices supported by SIMATIC PDM. To permit improved transparency, SIMATIC PDM also allows the creation of project-specific device catalogs. If devices are to be used which cannot be found in the SIMATIC PDM device catalog, we will be glad to help you integrate them.

Contact addresses

Siemens AG, Automation and Drives,
Technical Support

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Support Request

Additional information can be found in the Internet under:

http://www.siemens.com/automation/support-request

Technical specifications

Requirements for stand-alone operation	
Hardware	• PG/PC/notebook with processor corresponding to operating system requirements • Main memory 256 MB or more • Vacant hard disk 210 MB or more
Operating systems (alternative)	• Microsoft Windows 2000 Professional SP1 or higher • Microsoft Windows XP Professional SP1/SP2
Further software components	
• SIMATIC PDM integrated in STEP 7	STEP 7 V5.1 or higher with ServicePack 6 or higher, order separately

Ordering data

	Order No.
Minimum configuration SIMATIC PDM Single Point	
SIMATIC PDM Single Point V6.0 for operation and parameterization of one field device; communication via PROFIBUS DP/PA or HART modem, including 1 TAG, cannot be expanded with respect to functions or with TAG option/PowerPack 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library	**6ES7 658-3HX06-0YA5**

Process Device Manager SIMATIC PDM

Ordering data	Order No.
Predefined SIMATIC PDM V6.0 product configurations for special applications	
SIMATIC PDM Service V6.0 Complete package for stand-alone users for servicing, with • SIMATIC PDM Basic V6.0 • Option "128 TAGs" 6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3JX06-0YA5**
SIMATIC PDM S7 V6.0 Complete package for use in a SIMATIC S7 configuration environment, with • SIMATIC PDM Basic V6.0 • Option "Integration in STEP 7/PCS 7" • Option "128 TAGs" 6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3KX06-0YA5**
SIMATIC PCS 7 V6.0 Complete package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system; 6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows XP Professional Floating license for 1 user, with • SIMATIC PDM Basic • Option "Integration in STEP 7/PCS 7" • Option "Routing through S7-400" • Option "128 TAGs" Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library as well as supplementary DVD with Microsoft ServicePacks and tools	**6ES7 658-3LX06-0YA5**

Ordering data	Order No.
Components for individual configuration	
SIMATIC PDM Basic V6.0 for operation and parameterization of field devices and components, communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS) and Modbus, including 4 TAGs 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library	
• Floating license for 1 user	**6ES7 658-3AX06-0YA5**
• Rental license for 50 hours	**6ES7 658-3AX06-0YA6**
Integration in STEP 7 / SIMATIC PCS 7 Only required if integration of SIMATIC PDM into HW-Config is to be used; 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3BX06-2YB5**
Routing through S7-400 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3CX06-2YB5**
Communication via standard HART multiplexer 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions	
• Floating license for 1 user	**6ES7 658-3EX06-2YB5**

Ordering data	Order No.
TAG options / PowerPacks	
SIMATIC PDM TAG option for TAG expansion, additive to SIMATIC PDM Basic V6.0 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	
• Up to 128 TAGs	**6ES7 658-3XA06-2YB5**
• Up to 512 TAGs	**6ES7 658-3XB06-2YB5**
• Up to 1024 TAGs	**6ES7 658-3XC06-2YB5**
• Up to 2048 TAGs	**6ES7 658-3XD06-2YB5**
SIMATIC PDM PowerPack for subsequent TAG expansion of all SIMATIC PDM V6.0 product configurations 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Floating license for 1 user Type of delivery: License key disk, certificate of license, terms and conditions	
• From 128 TAGs to 512 TAGs	**6ES7 658-3XB06-2YD5**
• From 512 TAGs to 1024 TAGs	**6ES7 658-3XC06-2YD5**
• From 1024 TAGs to 2048 TAGs	**6ES7 658-3XD06-2YD5**
• From 2048 TAGs to unlimited TAGs	**6ES7 658-3XH06-2YD5**

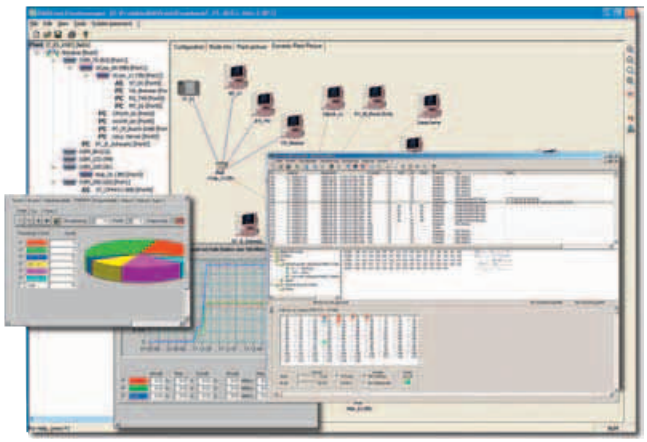
	Order No.
Demonstration software	
SIMATIC PDM Demo V6.0 without online communication and storage functionality 6 languages (German, English, French, Spanish, Italian, Chinese), executes with Windows 2000 Professional or Windows XP Professional Type of delivery: 2 CDs with SIMATIC PDM V6.0 and device library	**6ES7 658-3GX06-0YC8**
SIMATIC PDM Upgrade/Update Service	
SIMATIC PDM Upgrade from V5.x to V6.0 for all product versions and combinations 6 languages (German, English, French, Italian, Spanish, Chinese), executes with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Type of delivery: License key disk, emergency key disk, certificate of license, terms and conditions; 2 CDs with SIMATIC PDM V6.0 and device library	**6ES7 651-5CX06-0YE5**
SIMATIC PDM Software Update Service Subscription for 1 year with automatic extension Requirement: current software version	**6ES7 658-3XX00-0YL8**

BANYnet bus analysis and diagnostics

Overview

BANYnet is a tool based on Microsoft Windows for documentation, monitoring, diagnostics, recording and analysis of Ethernet and PROFIBUS networks.

- Management of all IP and MAC addresses in the network
- Generation of a network overview map
- Automatic scanning of network
- Monitoring of network nodes for "Failure", "Newly added", "Not registered"
- Reading out of data, message frame types and error statistics from the network components
- Display of bus load
- Recording of message frame traffic
- Recording of PROFINET communication
- Recording of PROFIBUS communication
- Comprehensive trigger, filter and sorting functions



BANYnet plant configuration

Benefits

- Continuously updated overview of the configured network (number/type of components)
- Permanent bus load display ensures sufficient performance in the network
- Fast localization of errors in network components
- Network optimization through statistics on type and length of message frame, cycle time, etc.

Application

The functionality for this is distributed as follows between five independent program modules:

- The Plant Manager of BANYnet Ethernet offers valuable support toward configuration of your plant through management of IP and MAC addresses, automatic generation of the plant display, and import and export functions.
- The Observer scans the network using various protocols, and displays safety-related changes in the network topology both in an overview and in a hierarchy.
- The Plant Diagnostics reads the configuration data as well as comprehensive message frame type and error statistics from the SNMP-capable network components, and provides information to assist searching for errors in the Ethernet network. Data such as bus load or lifelist are evaluated and displayed online.
- The Bus Analysis records the message frame traffic on one or more Ethernet buses synchronously, and interprets the message frames throughout all levels, including SIMATIC S7/PCS 7 and PROFINET. Comprehensive trigger, filter and sorting functions allow fast localization of errors.
- The Profibus Scope records the message frame traffic of a PROFIBUS network using a CP 5512, and interprets the message frames accordingly. Comprehensive trigger, filter and sorting functions allow fast localization of errors.

BANYnet bus analysis and diagnostics

Function

The **Plant Manager** is used to configure the database of the BANYnet project. All information required is created in data structures. An import/export function allows data exchange with other programs. A user-friendly plant overview is automatically generated from the data structures. The Plant Manager can therefore be used for both documentation and configuration of Ethernet networks. Tables provide detailed information on the properties of the nodes. Furthermore, any type of information can be assigned to the individual nodes for documentation purposes.

The **Plant Diagnostics** scans the system data of SNMP-capable network nodes (e.g. switches, PCs), and thus provides information on the configured nodes. The bus load display of the individual ports (numeric or graphic) and the list of nodes provide great assistance in locating errors in the Ethernet network.

Statistics functions provide information on the number of individual message frame types (packet lengths, message frame types, error types, etc.). The events (traps) sent by the switch can be displayed in a list.

Parameterization of the SCALANCE X and OSM/ESM Industrial Ethernet switches is supported in addition, e.g. IP address, port configuration or firmware update.

The **Bus Analysis** allows user-friendly analysis of recorded files (import/export of Netmon or Sniffer files is also possible) over several interfaces simultaneously (e.g. for redundancy analyses) by means of the integral BANYmon. Errors can be rapidly located using predefined or user-generated filter and sorting functions. When one of the listed message frames is clicked, the associated detailed information is output. SIMATIC S5/S7/PCS 7-specific message frames are interpreted and displayed according to their type (e.g. redundant message frames, alarm-8 message frames, etc.).

When using a CP 1616, PROFINET data traffic can be recorded without time losses and with complete message frame interpretation.

The **Observer** permits user-friendly and reliable dynamic monitoring of your network. The actual state is compared with the project created in the Plant Manager, and changes are displayed immediately. In order to locate events such as errors or the penetration of unknown nodes, it is possible to graphically trace the network hierarchy back to the source. In addition, these events are saved in log files for later analysis and documentation.

Furthermore, the scanned data can be imported into the project and updated supplementary to the Plant Manager.

The **PROFIBUS Scope** permits recording, saving and user-friendly analysis of bus events. It supports all baud rates from 9.6 Kbit/s to 12 Mbit/s, and determines these automatically. The recording can be carried out in a linear buffer or a cyclic buffer of selectable size. Long-term recording is possible in this manner. The start and end of recording can be automated using triggers. The data quantities can be reduced during the recording using predefined or user-created filter and sorting functions, and errors can be easily located by means of the subsequent analysis. When a listed message frame is clicked, its detailed information is output. The SIMATIC S7/PCS 7-specific message frames are interpreted and displayed depending on their type (e.g. redundant message frames, alarm-8 message frames, etc.). The following protocols are interpreted: DP, FDL, DPV1, DPV2, FMS and S7.

The BANYnet function for executing several recordings in parallel can be used for the **redundancy analysis**. BANYnet PROFIBUS is connected to the redundant bus segments for this purpose. Since the recorded message frames are assigned synchronous time stamps, the communication flow information can be easily compared. This allows fast and exact locating of redundancy problems.

Note:
The computer with the BANYnet PROFIBUS program package requires a CP 5512 (PC card) for the PROFIBUS connection.

Ordering data

Ordering data	Order No.
BANYnet bus analysis and diagnostics Program package for PC/PG for Microsoft Windows NT/2000/XP SP2 and electronic documentation on CD, dual language (German, English), software protected by USB dongle	
• **BANYnet Ethernet** for Industrial Ethernet networks	**9AE4 100-1DB00**
• **BANYnet PROFIBUS** for PROFIBUS networks; (CP 5512 is required)	**9AE4 100-1DE00**
• **BANYnet Ethernet and PROFIBUS** for Ethernet and PROFIBUS networks; (CP 5512 is required)	**9AE4 100-1DF00**
CP 5512 communications processor PC card (CardBus, 32 bit) for connection of a programming device or notebook to PROFIBUS or MPI, under 32 bit in connection with PROFIBUS SOFTNET software or STEP 7; German/English	**6GK1 551-2AA00**

More information

Support:

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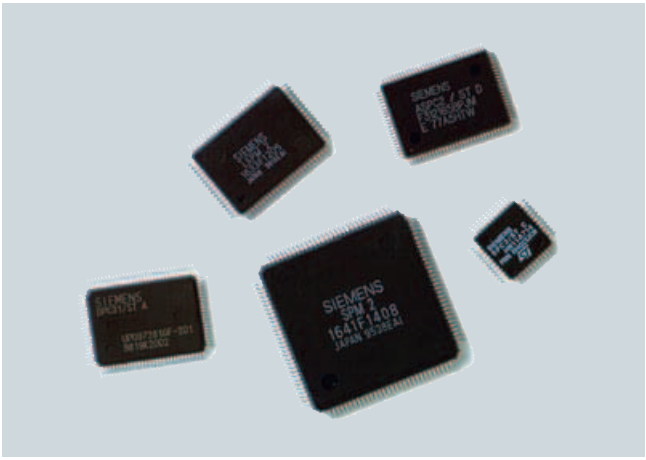
PROFIBUS DP ASICs

Overview



- Easy connection of field devices to PROFIBUS FMS/DP/PA
- Low Power Management is integrated for SPC 4-2, DPC 31 and SIM 1-2
- Various ASICs are available for different functional requirements and fields of application

Application

The PROFIBUS DP ASICs allow equipment manufacturers to connect their devices to PROFIBUS easily.

They can be implemented at transmission rates of up to 12 Mbit/s.

Different ASICs are available for different functional requirements and fields of application:

- Master applications:
  ASPC 2 for PROFIBUS DP and FMS, with hardware-controlled bus access.
- Intelligent slaves:
  SPC 3 for PROFIBUS DP, with hardware-controlled bus access;
  DPC 31 for PROFIBUS DP and PROFIBUS PA, with an integrated 8031 core;
  SPC 4-2 for PROFIBUS DP, PROFIBUS FMS and PROFIBUS PA (intrinsically safe applications) with hardware-controlled bus access.
- Connection in intrinsically safe systems:
  SIM 1-2 for physical connection in intrinsically safe fieldbus systems as a Medium Attachment Unit for IEC 61158-2 bei 31.25 kbit/s. Especially for combining with the SPC 4-2 and DPC 31.
- Simple slaves:
  LSPM 2 with 32 input/output bits for confined spaces
- Connection to fiber-optic conductors:
  FOCSI
  module for electrical conditioning of signals already received or to be sent. The module ensures that the optically transmitted signals are properly electrically restored (retiming/retriggering)

For initial development, order quantities of 5/6 ASICs are possible (not suitable for batch assembly because the pins of the ASIC can be bent due to the packaging; packing units larger than 5/6 units must be used)

The number of ASICs per packing unit depends on the ASIC type (see ordering data).

The ASICS ASPC 2, SPC3, DPC31 and LSPM2 can also be supplied in a lead-free design (see ordering data).

Design

ASPC 2

The ASPC 2 is a preprocessing communications chip for master applications with a maximum transmission rate of 12 Mbit/s. The ASIC has not been disclosed. The brief user manual describes the pins and the electrical properties of the ASPC 2. A separate microprocessor and the appropriate firmware are required for operation. The firmware is tuned to the 80C165 processor and can be obtained by purchasing a license.

SPC 3

The SPC 3 is a preprocessing communications chip with a processor interface. The SPC 3 processes message frame identification, address identification, execution of the data back-up sequences and protocol processing for PROFIBUS DP.

Firmware is offered for the Siemens SPC 3 (see ordering data).

DPC 31

The DPC 31 is a preprocessing communications module with a processor interface and an integrated processor core (C31 core).

It supports the connection of intelligent field devices as slaves on PROFIBUS DP and PROFIBUS PA.

The DPC 31 autonomously processes all communications tasks and has, in addition, an integral C31 core for further applications. It combines the communication properties of the ASICs SPC 3 and SPC 4-2 in one chip. The integrated C31 core can also be programmed as required. Firmware is offered for the Siemens ASIC DPC 31 (see ordering data).

SPC 4-2

The SPC 4-2 is a preprocessing communications chip with a processor interface. It is designed for combined applications and due to the Low Power Management function, it is ideally suited to use in intrinsically safe applications. Firmware is offered for the SPC 4-2 by the company TMG itec [1]. The signals are converted for PROFIBUS PA using the SIM 1-2 module.

1) Order from:
TMG itec
76137 Karlsruhe
Tel. +49 (0)721 82 80 60

SIM 1-2

The SIM 1-2 supplements the SPC 4-2 or DPC 31. Only a few external components are required in addition to these ASICs to be able to connect field devices to an intrinsically safe network in accordance with PROFIBUS PA. In combination with the SPC 4-2 or DPC 31, the functions of a PROFIBUS PA slave can be processed from physical linking through to communication control.

SIM 1-2 supports all send and receive functions (including Jabber Control) as well as the high-resistance decoupling of auxiliary power from the bus cable. It provides an adjustable, stabilized supply voltage and also supports configuration of an electrically isolating power supply with just a few passive components.

The ASIC contains a special interface logic which provides a low-overhead, minimum power interface for galvanic signal separation as an alternative to the standard signal interface.

It can be connected to all Manchester encoders/decoders to the IEC 61 158-2 standard at 31.25 kbit/s.

Design (continued)

LSPM 2

LSPM 2 is a single-chip solution with 32 input/output bits. It processes all bus communication autonomously. An additional microprocessor and firmware are not required. The compact MQFP casing with 80 pins makes it ideal for applications with low space requirements.

FOCSI

This ASIC functions as an expansion to the existing PROFIBUS ASICs. The FOCSI module (Fiber Optic Controller from Siemens) ensures proper electrical conditioning and transfer of the received/sent optical signal. To inject the signal into a fiber-optic conductor, apart from FOCSI, the appropriate optical transmitter and receiver will be required. FOCSI can be used with the PROFIBUS DP ASICs described above.

Additional ordering data available on request

Technical specifications

	LSPM 2	SPC 3	DPC 31
Protocol	PROFIBUS DP	PROFIBUS DP	PROFIBUS DP, PROFIBUS PA
Application range	simple slave application	intelligent slave application	intelligent slave application
Transmission rate, max.	12 Mbit/s	12 Mbit/s	12 Mbit/s
Bus access	in ASIC	in ASIC	in ASIC
Automatic determination of transmission rate	yes	yes	yes
Microprocessor required	no	yes	integrated
Scope of firmware	not necessary	4 … 24 KB	4 … 24 KB
Message buffer	-	1.5 KB	6 KB
Power supply	5 V DC	5 V DC	3.3 V DC
Power loss, max.	0.35 W	0.5 W	0.2 W
Permitted ambient temperature	-40 … +75 °C	-40 … +85 °C	-40 … +85 °C
Casing	MQFP, 80-pin	PQFP, 44-pin	PQFP, 100-pin
Frame size	4 cm^2	2 cm^2	4 cm^2
Delivery quantities (pcs.)	6/66/330/4950	6/96/750/960/4800	STEP B: 6/60/300/5100 STEP C: 6/66/660/4620

	SPC 4-2	ASPC 2	SIM 1-2	FOCSI
Protocol	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS DP PROFIBUS FMS PROFIBUS PA	PROFIBUS PA	-
Application range	Intelligent slave application	Master application	Medium Attachment	Medium Management Unit
Transmission rate, max.	12 Mbit/s	12 Mbit/s	31.25 kbit/s	12 Mbit/s
Bus access	in ASIC	in ASIC	-	-
Automatic determination of transmission rate	yes	yes	-	-
Microprocessor required	yes	yes	-	-
Scope of firmware	3 to 30 KB	80 KB	not required	not required
Message buffer	3 KB	1 MB (external)	-	-
Voltage supply	5 V DC, 3.3 V	5 V DC	via bus	3.3 V DC
Power loss, max.	0.6 W at 5V 0.01 W at 3.3 V	0.9 W	0.05 W	0.75 W
Permissible ambient temperature	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C	-40 … +85 °C
Enclosure	TQFP, 44-pin	P-MQFP, 100-pin	MLPQ, 40-pin	TQFP, 44-pin
Frame size	2 cm^2	4 cm^2	36 mm^2	2 cm^2
Delivery quantities (pcs.)	5/160	6/66/660/4620	30/60/1000	40

PROFIBUS DP ASICs

Ordering data	Order No.
ASIC ASPC 2	
For constructing master interfaces (quantity discount)	
• 6 units (lead-free)	**6ES7 195-0AA05-0XA0**
• 66 units (lead-free)	**6ES7 195-0AA15-0XA0**
• 660 units (lead-free)	**6ES7 195-0AA25-0XA0**
• 4620 units (lead-free)	**6ES7 195-0AA35-0XA0**
ASIC LSPM 2	
For constructing simple slave interfaces (quantity discount)	
• 6 units (lead-free)	**6ES7 195-0BA02-0XA0**
• 66 units (lead-free)	**6ES7 195-0BA12-0XA0**
• 330 units (lead-free)	**6ES7 195-0BA22-0XA0**
• 4950 units (lead-free)	**6ES7 195-0BA32-0XA0**
ASIC SPC 3	
For constructing intelligent slave interfaces (quantity discount)	
• 6 units (lead-free)	**6ES7 195-0BD04-0XA0**
• 96 units (lead-free)	**6ES7 195-0BD14-0XA0**
• 960 units (lead-free)	**6ES7 195-0BD24-0XA0**
• 4800 units (lead-free)	**6ES7 195-0BD34-0XA0**
• 750 units (lead-free) T&R	**6ES7 195-0BD44-0XA0**
ASIC FOCSI	
Fiber Optic Controller from Siemens for conditioning signals for the optical PROFIBUS	
• 40 units (lead-free)	**6ES7 195-0EA20-0XA0**
ASIC DPC 31 STEP B	
For constructing intelligent DP-Slave interfaces (quantity discounts)	
• 6 units (lead-free)	**6ES7 195-0BE02-0XA0**
• 60 units (lead-free)	**6ES7 195-0BE12-0XA0**
• 300 units (lead-free)	**6ES7 195-0BE22-0XA0**
• 5100 units (lead-free)	**6ES7 195-0BE32-0XA0**

	Order No.
ASIC DPC 31 STEP C	
For constructing intelligent DP-Slave interfaces (quantity discounts)	
• 6 units (lead-free)	**6ES7 195-0BF01-0XA0**
• 66 units (lead-free)	**6ES7 195-0BF11-0XA0**
• 660 units (lead-free)	**6ES7 195-0BF21-0XA0**
• 4620 units (lead-free)	**6ES7 195-0BF31-0XA0**
ASIC SPC 4-2	
For constructing intelligent DP-Slave interfaces (quantity discounts)	
• 5 units for laboratory development (lead-free)	**6GK1 588-3AA00**
• 160 units (lead-free, 1 tray)	**6GK1 588-3AA15**
ASIC SIM 1-2	
For connection according to IEC H1 for PROFIBUS PA with a transmission rate of 31.25 kbit/s	
• 30 units (in tube)	**6GK1 588-3BB01**
• 60 units (in tube)	**6GK1 588-3BB02**
• 1000 units (tape & reel)	**6GK1 588-3BB21**
Accessories	
Firmware for Siemens ASIC SPC 3	
• DP firmware	**6ES7 195-2BA00-0XA0**
• DPV1 firmware	**6ES7 195-2BA01-0XA0**
• DPV1 firmware upgrade	**6ES7 195-2BA02-0XA0**
Firmware for Siemens ASIC DPC 31	
• DPV1 firmware	**6ES7 195-2BB00-0XA0**

Application

The PROFIBUS DP interface modules make it easy to connect devices to PROFIBUS DP. They are based on the described ASICs from the Siemens AG. The interface modules can be used for a data transmission rate of up to 12 Mbit/s.

Various interface modules are available for different functional requirements and applications.

Interface modules for master:

- IM 180 to connect a field device to PROFIBUS DP in the form of a master
- IM 181 PC carrier board to adapt the IM 180 to the ISA bus of a PC

Interface modules for slaves:

- IM 182-1PC slave board to connect AT-compatible PCs as DP-Slaves
- IM 183-1 to connect a field device to the PROFIBUS DP as a slave
- IM 184 to connect a simple third-party device to the PROFIBUS DP as a slave

Design

IM 180 interface module

The IM 180 interface module consists essentially of an 80C165 microprocessor, the ASIC ASPC 2, an OTP EEPROM and a RAM.

A dual-port RAM forms the interface to the host system.

IM 181-1 PC carrier board

The IM 181-1 PC carrier board is used for accommodating the IM 180 when this is to be operated in a PC system with ISA bus.

A driver for Windows NT and demo software that shows how to integrate the IM 180/IM 181-1 into the DOS operating system are offered as accessories.

IM 182-1 PC slave board

The simple IM 182-1 PC slave card (ISA bus) is based on the ASIC SPC 3. It contains all bus physics. A 9-pin Sub-D connector is used for connecting to PROFIBUS DP. The firmware of the SPC 3 can be used as an accessory on the PC. The 1.5 KB RAM of the SPC 3 forms the interface to the host system. A driver for Windows NT is also offered.

IM 183-1 interface module

The IM 183-1 interface module consists essentially of the ASIC SPC 3, the 80C32 microprocessor, an OTP EEPROM, as well as an RS 485 interface for connecting to PROFIBUS DP.

There is also an additional RS 232 interface on the module.

IM 184 interface module

The IM 184 interface module consists essentially of the ASIC LSPM 2, an OTP EEPROM, as well as an RS 485 interface for connecting to PROFIBUS DP.

The IM 184 can provide 32 input/output bits.

The brochure "PROFIBUS Technology Components", Order No.: 6ZB5310-0CT01-0BB0, contains further information.

Manuals for PROFIBUS DP connections are available for free in the Internet.

Additional information can be found in the Internet under:

http://support.automation.siemens.com/WW/view/de/10805255/133000

- Distributed I/O
- Miscellaneous
- Technology components, manuals

Connections/interfaces

Technical specifications

	6ES7 180-0AA00-0XA0	6ES7 181-0AA01-0XA0	6ES7 182-0AA01-0XA0
Supply voltages			
Rated value			
• 5 V DC	Yes		Yes
Current consumption			
Current consumption, typ.	250 mA		250 mA
interfaces			
Host interface	Dual-Port-RAM		
Protocols			
PROFIBUS DP protocol	Yes		Yes
PROFIBUS DP			
Transmission speed, max.	12 Mbit/s		12 Mbit/s
Hardware components/ modules/ASIC			
ASIC	ASPC 2		SPC 3
Memory configuration	2x 128 KB		
Scope of firmware	80 KB		4 to 24 KB (incl. test program)
Programming device			
Microprocessor type	80C165 (40 MHz)		Processor of the PG/PC
Environmental requirements			
Operating termperature			
• min.	0 °C		0 °C
• max.	70 °C		60 °C
General information			
Application area	Master applications	Carrier board for interface module IM 180	Slave applications
Dimensions			
pcb size, width	100 mm	168 mm	168 mm
PCB size, height	100 mm	105 mm	105 mm

	6ES7 183-0AA01-0XA0	6ES7 184-0AA00-0XA0
Supply voltages		
Rated value		
• 5 V DC	Yes	Yes
Current consumption		
Current consumption, typ.	250 mA	150 mA
Protocols		
PROFIBUS DP protocol	Yes	Yes
PROFIBUS DP		
Transmission speed, max.	12 MBit/s	12 MBit/s
Hardware components/mod-ules/ASIC		
ASIC	SPC 3	LSPM 2
Memory configuration	32 KB SRAM; 64 KB EPROM	
Scope of firmware	4 to 24 KB (incl. test program)	not necessary

	6ES7 183-0AA01-0XA0	6ES7 184-0AA00-0XA0
Programming device		
Microprocessor type	80C32 (20 MHz)	not necessary
Environmental requirements		
Operating termperature		
• min.	0 °C	0 °C
• max.	70 °C	70 °C
General information		
Application area	Slave applications	simlpe slave applications
Dimensions		
pcb size, width	86 mm	85 mm
PCB size, height	76 mm	64 mm

Ordering data	Order No.
SIMATIC S5/S7 IM 180 master module For PROFIBUS DP, max. 12 Mbit/s	**6ES7 180-0AA00-0XA0**
IM 181 PC carrier module for IM 180 Max. 12 Mbit/s	**6ES7 181-0AA01-0XA0**
SIMATIC S5/S7 IM 182-1 PC slave board For PROFIBUS DP, max. 12 Mbit/s	**6ES7 182-0AA01-0XA0**
SIMATIC S5/S7 IM 183-1 slave module For PROFIBUS DP, max. 12 Mbit/s	**6ES7 183-0AA01-0XA0**
SIMATIC S5/S7 IM 184 slave module For PROFIBUS DP, max. 12 Mbit/s	**6ES7 184-0AA00-0XA0**

	Order No.
Accessories	
Demonstration software Demonstration of the supply to the DPR interface of the IM 180/IM 181 under MS-DOS	**6ES7 195-2AA00-0XA0**
Windows NT driver for IM 180 and IM 182	**6ES7 195-2AC00-0XA0**

4

Development packages

Overview

Development packages

Using the development packages, PROFIBUS hardware and software applications can be developed and tested using the various PROFIBUS ASICs or the interface modules (IM) provided.

The comprehensive interacting hardware and software components considerably reduce development costs for a PROFINET device.

The development kits provide a fully functional development environment which development engineers can build on with their special requirements for hardware and software.

The package documentation is supplied on CD in English and German.

The packages make our PROFIBUS know-how accessible to other users. The development team is available to provide advice to new users even with their own developments – this consultancy service is also a component part of the development kit.

Following completion of a development, devices can be certified by our experts in the PROFIBUS interface centers – we can help new users here, too.

Development package 4 for PROFIBUS-ASIC SPC 3, IM 183-1, IM 184 and CP 5613.

With development package 4 you can develop and test master and slave applications for connection to PROFIBUS DP.

Hardware included

- CP 5613 Master Interface
- IM 181-1 Slave Interface (intelligent slave with ASIC SPC 3)
- IM 184 Slave Interface (simple slave with ASIC LSPM 2)
- Bus connector and bus cable

Software included

- COM PROFIBUS (for configuring the bus system)
- Firmware for IM 183-1 (original firmware for ASIC SPC 3, including development license)
- Simulation software for development package 4 (for testing and operating development package components)

Developing slaves

The package contains all the components (hardware, software and firmware) required for developing a PROFIBUS slave with the ASIC SPC 3 or LSPM 2.

It is also possible to develop a PROFIBUS slave directly using the IM 183-1 and IM 184 (as a piggy-back to proprietary electronics).

Master system with CP 5613

With the CP 5613 and accompanying simulation software, a fully functional PROFIBUS master is provided. This can be built on to implement a master application very quickly.

Proprietary master systems

If you want to develop your own master interface, you should acquire the ASPC 2 master-firmware stack with the appropriate license. This is available as an object code or source code. The firmware is designed to suit Processor 80C165.

This license and the firmware are not component parts of the development package. Feel free to consult our experts in the interface centers if you wish.

PROFIBUS DP/PA development package

The package facilitates set up of PROFIBUS slaves with a variety of PROFIBUS standards:

- PROFIBUS DP-V1 (RS 485)
- PROFIBUS PA (IEC 1158) and
- PROFIBUS based on fiber-optic cables.

The development environment shows applications implemented using PROFIBUS-ASICs DPC 31.

The use of ASICs SIM1 as medium attachment unit for adaptation to the PROFIBUS PA physical specification according to IEC 1158-2 continues to be explained.

Hardware included:

- DPC 31 development board; for developing/testing proprietary applications
- CP 5613; serves as master interface for the PC (PCI card)
- Optical bus terminal; for conversion of copper cables to FOCs
- Pre-assembled PROFIBUS cables

Software included:

- Testing and simulation software under WinNT for use on the PC in connection with the CP 5613 master module
- Sample program for the DPC 31 board
- DPC 31 DPV1 original firmware, including developer license
- Parameterization software for CP 5613 "COM PROFIBUS" for DP operation
- PDM (process device manager) demo software for PA operation

When developing PROFIBUS PA applications, order a PROFIBUS DP/PA coupler (6ES7 157-0AC80-0XA0) separately.

The DP/PA coupler converts the PROFIBUS DP physical specifications into those of PROFIBUS PA.

This module is not included in the development package!

Ordering data

Ordering data	Order No.
Development package 4 For PROFIBUS ASIC SPC 3, IM 183-1 and CP5613, English/German	**6ES7195-3BA20-0YA0**
DP/PA development package For PROFIBUS ASIC DPC 31 and SIM1, English/German	**6ES7 195-3BA10-0YA0**
PROFIsafe starter kit V3.3 SIMATIC DP/PA development package (6ES7195-3BA10-0YA0) is required	**6ES7 195-3BF01-0YA0**

PROFIBUS SCOPE diagnostic software

Overview

- Diagnostic tool for the maintenance of PROFIBUS networks
- Diagnostic concept in all phases of the plant life-cycle
- Network monitoring using clear 4-window technology
- Parallel display of current and historic information
- Graphic status indicators and diagnostic messages in plain text
- Identification of critical network stations at a mouse-click (TOP 10 – one click)
- Analysis of variables for network monitoring
- Live List in a clear matrix presentation
- Extensive search, trigger and filter functions for protocol analysis
- Monitoring of cyclic I/O data
- Alarm signaling by e-mail/text message in event of fault
- Flexible hardware concepts (for measurements on-site and stationary)
- Automatic documentation of the measurement results
- License-free reader mode

Application

PROFIBUS Scope is an indispensable tool for startup, acceptance testing, acute troubleshooting, and ongoing operation of PROFIBUS installations. Through regular or permanent network monitoring, faults can be detected early and preventive maintenance measures can be quickly put in place. This reduces downtimes and increases plant availability.

As an extremely user-friendly tool, the PROFIBUS Scope also enables users without in-depth PROFIBUS knowledge to monitor the bus status efficiently. Thanks to the clear 4-window technology with graphic status indicators and diagnostic messages in plain text, all relevant information on the status of the network and of the network stations is available at a glance. Any faults that occur can be quickly identified and pinpointed independently of the PLC Master and PLC software.

The flexible hardware concept of the PROFIBUS Scope also permits plant-wide network monitoring via Ethernet in addition to the interface via Siemens standard hardware for on-site measurements. A temporary or permanent measurement access via the ETHERNET-PROFIBUS-INTERFACE (xEPI) on the DIN rail supports predictive maintenance of PROFIBUS networks. Automatic documentation of the measurement results is an advantage particularly during commissioning and for reference and comparison measurements. The PROFIBUS Scope is therefore recommended not only in vendor-specific specifications, but also in the PNO Guideline "Validation of PROFIBUS Systems" as a suitable test tool for plant acceptance (e.g. in the pharmaceuticals industry).

Design

Hardware requirements:

- USB slot Version 1.1 or higher for the hardware dongle (license)

Communications processor:

- CP 5512
- CP 5611 / CP 5611 A2/CP 5621
- Programming device with CP 5611
- xEPI (ETHERNET PROFIBUS INTERFACE)

Software requirements:

- Windows 2000 | Windows XP | Windows Server 2003

Function

Diagnostics operating mode

Clear representation of the PROFIBUS network with network tree, status displays, device table and diagnostics table. Message frame traffic is analyzed automatically. Clear plaintext messages facilitate error analysis. The clearly arranged 4-window method permits an immediate online analysis that can be documented in the form of a test log.

Signals operating mode

Recording of cyclic I/O data for PROFIBUS DP. These are represented in a y/t diagram. This results in direct monitoring of process data and it is possible to analyze individual measuring points and signals.

Messages operating mode

Classic bus monitor with comprehensive trigger and re-trigger functions (down to one bit), recording and view filters as well as search functions. Repeat messages and error messages are detected. Complex troubleshooting at the protocol level can thus be carried out. Live List of all network stations in a clear matrix presentation (with multi-master recognition) is available.

General

- Automatic transfer rate detection (max. 12 Mbit/s)
- Protocol analysis (DP-V0, DP-V1, DP-V2, FMS, FDL/MPI and PA)
- Data export to .CSV
- Live list
- Language version German/English
- Online and offline operation
- Online help

Ordering data

Ordering data	Order No.
PROFIBUS SCOPE diagnostic software executable under Windows 2000, Windows XP, Windows Server 2003 including jump start; Optional: active PROFIBUS cable, measurement adapter, measurement flap	Order directly from: TREBING + HIMSTEDT Trebing & Himstedt Prozessautomation GmbH & Co. KG Wilhelm-Hennemann-Strasse 13 19061 Schwerin, Germany Tel.: +49(0) 385 3 95 72-0 Fax: +49(0) 385 3 95 72-22 E-mail: info@t-h.de Internet: http://www.t-h.de

More information

Additional information can be found in the Internet under:

http://www.t-h.de

Delphi-S7, Delphi-DPLib and Delphi-DPSoftnetSlave

Overview

The Delphi software products offer programming interfaces for Delphi developments with access to PROFIBUS.

The following protocols are available:

- PROFIBUS DP (Delphi-DPLib)
  for the DP-5613 software with CP 5613 A2/CP 5614 A2 or SOFTNET-DP with CP 5512, CP 5611 A2 or CP 5621
- PROFIBUS DP SOFTNET slave (Delphi-DPSoftnetSlave)
  for all SIMATIC DP-Slave products for CP 5611 A2 or CP 5621
- S7 communication (Delphi-S7)
  for the S7-5613 software with CP 5613 A2/CP 5614 A2 or SOFTNET-S7 with CP 5512/CP 5611 A2 or CP 5621

The products enable easy access to the Siemens SIMATIC NET programming interfaces under Borland Delphi.

In its communication functions, the interface for Borland Delphi is analogous to the Siemens interface for the programming language C. All the services of the relevant communication protocols over PROFIBUS are supported.

Benefits

get Designed for Industry

- Interfacing the Borland world to SIMATIC NET
- Developments are executable on computers with PCI, PCI Express, PCMCIA or PC card slots

Technical specifications

Type	Delphi-S7, Delphi-DPLib and Delphi-DPSoftnetSlave for Borland Delphi
System requirements	• Borland Delphi 6.0 or higher • All Windows operating systems as of Windows NT 4.0 • CP 5512, CP 5611 A2, CP 5621, CP 5613 A2/CP 5614 A2 • Software packages for CP 5613 A2/CP 5614 A2 or CP 5512, CP 5611 A2, CP 5621

Ordering data

Ordering data	Order No.
Delphi-DPLib for Borland Delphi Including example program, documentation German and English	**Delphi-DPLib**
Delphi-DPSoftnetSlave for Borland Delphi Including example program, documentation German and English	**Delphi-DPSoftnetSlave**
Delphi-S7 for Borland Delphi or C++-Builder Including example program, documentation German and English	**Delphi-S7**
For more information contact:	SoftwareOption Outsourcing Services GmbH SoftwareOption Outsourcing Services GmbH, Carsten Buchloh Waldstraße 30 D-52080 Aachen Tel.: +49 - (0)2405 - 47 16 727 Fax: +49 - (0)2405 - 47 16 729 E-mail: Carsten.Buchloh@SoftwareOption.de Internet: www.SoftwareOption.de

Note:
Fully functional test versions are available for download on the Internet. You can also order the full versions online.

More information

Additional information can be found in the Internet under:

http://www.SoftwareOption.com