Network solutions for PROFIBUS
according to IEC 61158/61784

Brochure · March 2010
PROFIBUS – system overview

Introduction

PROFIBUS is the successful open fieldbus that can be used for fast and cost-effective production in a wide area of applications.

Distributed automation structures are the prerequisite for such flexible manufacturing. Connecting production areas with local networks secures the information flow necessary for this.

PROFIBUS is a bus system for process and field communication in cell networks with few stations and with field devices, as well as for data communication in accordance with IEC 61158/61784.

Automation devices such as PLCs, PCs, HMI devices, sensors or actuators can communicate via a standardized bus.

This allows the use of a wide range of PROFIBUS products from Siemens and other manufacturers for solving automation tasks. These products can be operated together in a PROFIBUS network.

PROFIBUS thus offers openness for connecting standard components from other manufacturers.

Part of TIA

Totally Integrated Automation (TIA) stands for an integrated range of products and systems for automation in all areas – from incoming goods, through the production process to the dispatch of goods, from the field level, through the production control level to the connection to the corporate management level:

• An integrated software tool set supports all project phases, from the selection of hardware, programming and operation, to diagnostics and maintenance.
• The tools access a common database.
• This saves input costs and ensures project-wide consistency.

Outstanding features

• PROFIBUS is a powerful, open, and rugged bus system that offers trouble-free communication.
• The system is fully standardized, which enables simple 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.
• Investment security through continuous compatible further development.
• Network components for use in harsh industrial environments.
• Fast assembly and startup 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 the active OLM network component.
• Fail-safe communication with PROFIsafe.
• High levels of operational reliability and plant availability thanks to different diagnostics options.
Communication functions

Process or field communication (PROFIBUS PA, PROFIBUS DP) 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 automation system, not just to increase the number of I/O stations that can be connected, but also to enable individual production areas to be handled independently (segmentation).

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

- PROFIBUS DP (distributed I/O) is used to connect distributed I/Os, e.g. SIMATIC ET 200, with extremely fast response times in accordance with the IEC 61158/61784 standard.

- PROFIBUS PA (Process Automation) extends PROFIBUS DP with intrinsically safe transmission technology in accordance with the standard IEC 61158-2.

Contents

PROFIBUS – system overview

Introduction .............................................. 2
Possible applications .................................. 6
Networking options .................................... 7
  – electrical networks ................................. 8
  – optical networks ................................. 9
  – hybrid networks ................................ 11
Network selection criteria ............................. 12
FastConnect for electrical bus cables ............. 13
SplitConnect for PROFIBUS PA .................... 14
FastConnect for optical bus cables ................. 15

Passive network components

Electrical bus cables ................................. 16
Optical bus cables ................................... 18

Active network components

Electrical network .................................... 19
Optical network ...................................... 21

Network transitions ................................. 22

Communications processors for SIMATIC

CPs for SIMATIC S7 ................................. 24
CPs for SIMATIC S7: Function overview ....... 26

Communications processors for PG/PC

CPs for PG/PC ..................................... 27
CPs with internal microprocessor ................. 28
CPs without internal microprocessor ............. 29
Possible applications with OPC
(Openness, Productivity & Collaboration) ..... 30
CPs for PG/PC: Function overview .............. 32

Connection options

Electrical and optical networking ................. 33

Technology components for PROFIBUS ......... 35

Advantages at a glance .............................. 35
**PROFIBUS – system overview**

**Introduction**

**General overview of PROFIBUS**

PROFIBUS is used to connect field devices, such as distributed I/O devices or drives, to automation systems such as SIMATIC S7 and S7mEC, PC-based controllers, WinAC, SIMOTION, SINUMERIK, or SIMATIC IPCs.

PROFIBUS is standardized in accordance with IEC 61158/61784 and is a powerful, open and rugged fieldbus system with short response times. PROFIBUS is available in different forms for various applications.

**PROFIBUS DP**  
(distributed I/O)

PROFIBUS DP is used for connecting distributed field devices, e.g. SIMATIC ET 200, or drives with extremely fast response times. PROFIBUS DP is used when sensors/actuators are distributed at the machine or in the plant (e.g. field level).

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

**Openness all along the line**

Thanks to the openness of PROFIBUS DP, standard-compliant components from different manufacturers can also be connected.

The IEC 61158/61784 standards provide future protection for your investment.

Member companies worldwide offer the most diverse products with PROFIBUS DP interface for the field area.

Siemens has a full product range of standard and fail-safe controllers, network components, communication software, and field devices.

And for field device manufacturers we offer everything to do with the PROFIBUS DP interface, such as ASICs, training, certification, and much more.

**PROFIsafe**

permits standard and safety-related communication on one and the same bus cable. It is an open solution for safety-related communication over standard buses and uses the PROFIBUS services.
Isochronous mode

The CPU, I/O and user program are synchronized with the PROFIBUS cycle. The "isochronous mode" function is supported by the CPUs of SIMATIC S7-400, SIMOTION, SINUMERIK and servo drives. The drives are controlled using the PROFIdrive profile.

PROFIBUS PA
(process automation)

PROFIBUS PA extends PROFIBUS DP with intrinsically safe transmission of data and power (e.g. transducers in the food processing industry) in accordance with the international standard IEC 61158-2 (same protocol, different physical properties).

PROFIBUS FMS
(Fieldbus Message Specification)

PROFIBUS FMS is used for data communication between automation systems of different manufacturers. This enables precise, distributed implementation of general closed-loop control and measuring tasks.

* PDM is a parameterization tool for intelligent field devices
PROFIBUS – system overview

Application options

Factory automation

It is possible to use PROFIBUS DP in, for example, the food and beverages industry, to implement production lines with variable speeds or options for controlling the plant during operation.

Many variables have to be flexible in order to allow fault-free production. Plant availability is becoming increasingly important. Downtimes caused by repairs are usually more expensive than the appropriate monitoring of systems for wear or possible faults. With the aid of high-performance components in the communication, for example, errors can be located and reported quickly.

Process automation

Process automation has high performance and reliability requirements and demands simple and safe operation of plants.

PROFIBUS PA uses the intrinsically safe transmission technology specified in the international IEC 61158-2 standard. This allows field devices to be integrated into the hazardous zone. The basis for this is PROFIBUS DP that has been expanded for intrinsically-safe operation. The acyclic communication services of PROFIBUS DP/PA allow online access to device parameters, that is, the process control systems have direct access to the actual status of the field device data and to the status and diagnostics messages. Using PROFIBUS DP/PA, the field devices become an integral component of the company-wide automation concept from open-loop and closed-loop control right up to asset management, including spare parts management and warehouse management.

Building automation

The networking of large buildings or parts of buildings allows centralized or distributed access to all stations.

Electrical installation systems are found not only in residential and non-residential buildings but also in every industrial plant. Most devices and also many building systems such as lighting, heating, air conditioning, fans, blinds, or access controls are operated almost without exception with electric power. These systems, just like those in industrial automation, must be regulated, controlled, and monitored.
Networking options

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

PROFIBUS is standardized in accordance with IEC 61158/61784 for universal automation (PROFIBUS FMS and PROFIBUS DP), and in accordance with IEC 61158-2 for process automation (PROFIBUS PA).
PROFIBUS – system overview

Networking options – electrical networks

The electrical network uses a shielded, twisted pair cable. The RS485 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 electrical network can be configured as a bus or tree structure. The individual segments are connected via repeaters. The transmission rate can be set in steps from 9.6 Kbit/s to 12 Mbit/s in accordance with IEC 61158/61784.

The maximum segment length depends on the transmission rate.

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.

Features of the electrical network

- Transmission method in accordance with IEC 61158/61784 for universal automation (PROFIBUS FMS/DP), and in accordance with IEC61158-2 for the intrinsically-safe area (PROFIBUS PA)
- Shielded 2-wire cable
- Transmission method: RS485 (in accordance with EIA)
- Bus topology with bus terminals and bus connectors for connecting PROFIBUS stations
- Network is immune to interference thanks to double-shielded cables and a simple, uniform installation and grounding concept
- Simple and fast connector assembly with FastConnect
- The DP transmission system of RS485 (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)
Networking options – optical networks

The optical network uses fiber-optic cables as the transmission medium. The fiber-optic cable is provided with a coating. The term "fiber" is often also used for fiber-optic cables (FOC). Optical networks are especially suitable for long ranges. There is a choice between plastic, PCF or glass fiber-optic cables.

Features of the optical network
- The transmission link is insensitive to electromagnetic influences
- It is suitable for long ranges
- Galvanic isolation is implemented
- You can choose between plastic, PCF or glass fiber-optic cables
- It is tap-proof since no radiation is emitted from the line
- It is easy to lay since the cable is light-weight and pre-assembled, and there are no grounding problems
- No additional lightning protection concept is required in the outdoor area
- Rugged construction of the fiber-optic cable for industrial applications both indoors and outdoors
- The fiber-optic cables galvanically isolate the modules.
**Optical PROFIBUS with OLMs**

Using optical link modules (OLMs) it is possible to construct an optical network in a linear, ring, or star topology. A network topology for increased availability requirements can be established using the redundant ring structure.

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 RS485 interface can be connected via an Optical Bus Terminal (OBT). The maximum distance between two stations is 50 m in the case of plastic fiber-optic cable.

To cover distances of up to 300 m, special fiber-optic cables are offered.
Networking options – mixed networks

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 may be connected to one PROFIBUS network.
## PROFIBUS – system overview

### Network selection criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Electrical network</th>
<th>Optical network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RS 485 conforming to IEC 61158/61784</td>
<td>Plastic</td>
</tr>
<tr>
<td><strong>EMC</strong></td>
<td>● ● ○</td>
<td>● ● ● ○</td>
</tr>
<tr>
<td><strong>Inter-building networking</strong></td>
<td>● ● ○ ○¹</td>
<td>● ● ○ ○</td>
</tr>
<tr>
<td><strong>Operating distance</strong></td>
<td>● ● ○ ○²</td>
<td>● ● ○ ○</td>
</tr>
<tr>
<td><strong>Suitability for high transmission rate</strong></td>
<td>● ● ● ○⁴</td>
<td>–</td>
</tr>
<tr>
<td><strong>Simple plug fitting</strong></td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td><strong>Simple cable laying</strong></td>
<td>● ● ● ○</td>
<td>● ● ● ○</td>
</tr>
<tr>
<td><strong>Equipotential bonding measures required</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Performance spectrum for special applications</strong></td>
<td>● ● ●</td>
<td>● ○ ○ ○</td>
</tr>
<tr>
<td><strong>Used for moving nodes</strong></td>
<td>● ● ○ ○</td>
<td>–</td>
</tr>
<tr>
<td><strong>Use in intrinsically safe area</strong></td>
<td>–</td>
<td>● ● ● ●</td>
</tr>
</tbody>
</table>

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  
6) Trailing cable required
FastConnect for electrical bus cables

The FastConnect stripping technology facilitates swift and simple connection of PROFIBUS connectors to the PROFIBUS cables.

The special design of the FastConnect bus cables permits the use of the FastConnect stripping tool, with which the outer sheath and the braided shield can be removed to measure in one operation. Cables prepared in this way are attached to the FastConnect bus connectors using the insulation displacement method.

The system comprises three components that are coordinated with one another:

- FastConnect bus cables for quick assembly
- FastConnect stripping tool
- FastConnect bus connector for PROFIBUS

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

Advantages of the FastConnect system

- Reduction of the connection times of terminals by removing the outer sheath and braided shield in one operation
- Assembly errors such as short-circuit between shield and core are prevented
- Simple assembly operations thanks to preset FC stripping tool
- Contact assignment can be checked in the closed state by means of the transparent cover on the insulation piercing connecting devices and color coding
- FastConnect connecting system available for degrees of protection IP20 and IP65.
PROFIBUS – system overview

SpliTConnect for PROFIBUS PA

SpliTConnect for fieldbus systems is used for constructing fieldbus segments as per IEC 61158-2 (e.g. PROFIBUS PA) with field device interface points.

The bus cable is easy to assemble thanks to the FastConnect system (FastConnect stripping tool, FC Process Cable compliant with IEC 61158-2).

The FC Process Cable is stripped as with FastConnect. Additional grounding of the SpliTConnect Tap can be implemented using a contacting screw.

The terminal devices can be connected using the FC Process Cable in accordance with IEC 61158-2 or the SpliTConnect M12 Outlet/M12 Jack. The SpliTConnect Coupler can be used to construct a PROFIBUS PA hub by connecting SpliTConnect Taps in series.

By replacing the contacting screw with the SpliTConnect Terminator, the SpliTConnect Tap can be used as a bus terminating element.

Advantages of SpliTConnect

- The connection times of terminals are reduced by fast and easy removal of the outer sheath and braided shield in one operation
- Simple assembly operations thanks to preset FC stripping tool
- Connection of the terminal device is facilitated by use of the FastConnect system
- Widely diverse uses possible thanks to the modular SpliTConnect system
- Reduction in number of types and parts thanks to uniform connection system for PROFIBUS PA
FastConnect for optical bus cables

FastConnect for glass fiber-optic cables

- For the FastConnect FOC system, fiber-optic cables with glass core (62.5/200/230) are offered. They are suitable for easy assembly in the field; FC glass FOC: Duplex cable for fiber-optic networks indoors and outdoors.

- FastConnect glass fiber-optic cables are assembled on-site using the FC FO termination kit. The termination kit permits the stripping and the "cleaving" of the fiber in the assembled connector.

- FastConnect SC and FastConnect BFOC connectors are available for the assembly of glass fiber-optic cables.

Assembly with FastConnect for glass fiber-optic cables
## Passive network components

### Electrical bus cables

<table>
<thead>
<tr>
<th>Cable type with FastConnect technology</th>
<th>Designation</th>
<th>Features</th>
<th>Fields of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS FC standard cable GP</td>
<td></td>
<td>Quick and easy connector assembly with the aid of the stripping tool. Shielded twisted-pair cables constructed with radial symmetry.</td>
<td>Standard cable for universal applications</td>
</tr>
<tr>
<td>FC robust cable</td>
<td></td>
<td></td>
<td>Special cable for chemically and mechanically demanding environments</td>
</tr>
<tr>
<td>FC food cable</td>
<td></td>
<td></td>
<td>Special cable for the food and beverages industry</td>
</tr>
<tr>
<td>FC ground cable</td>
<td></td>
<td></td>
<td>Special cable for routing underground</td>
</tr>
<tr>
<td>FC flexible cable</td>
<td></td>
<td></td>
<td>Special cable for use in cable carriers</td>
</tr>
<tr>
<td>FC trailing cable</td>
<td></td>
<td></td>
<td>Trailing cable for moving machine parts (stranded)</td>
</tr>
<tr>
<td>FC FRNC cable GP</td>
<td></td>
<td></td>
<td>Halogen-free and flame-retardant cable</td>
</tr>
<tr>
<td>FC process cable GP</td>
<td></td>
<td></td>
<td>Bus cable for fieldbus systems compliant with IEC 61158-2 (hazardous and non-hazardous areas)</td>
</tr>
<tr>
<td>PROFIBUS Festoon cable GP</td>
<td></td>
<td></td>
<td>Special cable for festoon suspension</td>
</tr>
<tr>
<td>Torsion cable</td>
<td></td>
<td></td>
<td>Special cable for use on machine parts where the cable is subject to torsion (stranded)</td>
</tr>
<tr>
<td>ECOFAST hybrid cable GP</td>
<td></td>
<td></td>
<td>Hybrid cable for data transmission and voltage supply to ECOFAST stations (stranded)</td>
</tr>
<tr>
<td>SIENOPYR marine cable</td>
<td></td>
<td></td>
<td>Halogen-free, tread-resistant, flame-retardant and marine approved cable for permanent laying in ships and offshore installations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable type without FastConnect technology</th>
<th>Designation</th>
<th>Features</th>
<th>Fields of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS Festoon cable GP</td>
<td>Shielded, twisted-pair cable with circular cross-section; sold by the meter</td>
<td>Special cable for festoon suspension</td>
<td></td>
</tr>
<tr>
<td>Torsion cable</td>
<td>Shielded, twisted-pair cable with circular cross-section</td>
<td>Special cable for use on machine parts where the cable is subject to torsion (stranded)</td>
<td></td>
</tr>
<tr>
<td>ECOFAST hybrid cable GP</td>
<td>Hybrid cable for data transmission and voltage supply to ECOFAST stations (stranded)</td>
<td>Hybrid cable for data transmission and voltage supply to ECOFAST stations (stranded)</td>
<td></td>
</tr>
<tr>
<td>SIENOPYR marine cable</td>
<td>Halogen-free, tread-resistant, flame-retardant and marine approved cable for permanent laying in ships and offshore installations</td>
<td>Halogen-free, tread-resistant, flame-retardant and marine approved cable for permanent laying in ships and offshore installations</td>
<td></td>
</tr>
</tbody>
</table>

### The following applies for all PROFIBUS connecting cables:

- Due to the double shielding, they are particularly suitable for laying in industrial environments subject to electromagnetic interference.
- A consistent grounding concept can be implemented via the outer sheath and the ground terminals of the bus terminal.
- The printed meter marks simplify assembly.
<table>
<thead>
<tr>
<th>Cable type</th>
<th>Designation</th>
<th>Features</th>
<th>Fields of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecting cables</td>
<td>PROFIBUS connecting cable 830-1T</td>
<td>Twisted-pair conductors (cores of stranded copper) with a braided shield and a 9-pin sub D connector at each end. Both ends of the cable are terminated with a resistor combination (not switched).</td>
<td>The PROFIBUS connecting cable 830-1T can be used to establish the connection between an electrical PROFIBUS interface and a PROFIBUS station (OLM, OBT and end station) at up to 12 Mbit/s.</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS connecting cable 830-2</td>
<td>PROFIBUS standard bus cable pre-assembled with two 9-pin connectors (angled at 90°). One connector of the pre-assembled connecting cable is equipped with a programming device interface.</td>
<td>The connecting cable 830-2 is used for connecting PROFIBUS stations (e.g. HMI) to PLCs at transmission rates of up to 12 Mbit/s.</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS M12 connecting cable 1)</td>
<td>Pre-assembled connecting cable (PROFIBUS FC Trailing Cable) with two 5-pin M12 plugs/sockets</td>
<td>The PROFIBUS M12 connecting cable is used for connecting PROFIBUS stations (e.g. SIMATIC ET 200) with IP65 degree of protection</td>
</tr>
<tr>
<td></td>
<td>7/8” connecting cable 1)</td>
<td>Pre-assembled connecting cable with two 5-pin 7/8” plugs/sockets</td>
<td>The 7/8” connecting cable is used for supplying energy to PROFIBUS stations (e.g. SIMATIC ET 200) with IP65 degree of protection</td>
</tr>
<tr>
<td>Hybrid</td>
<td>PROFIBUS hybrid standard cable GP</td>
<td>Hybrid cable with two energy cores (1.5 mm²), sold by the meter</td>
<td>The hybrid cable is used for supplying data and energy to the ET 200pro</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS hybrid robust cable</td>
<td></td>
<td>Cable versions:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>■ Standard cable for universal applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>■ Rugged, trailing-type and weld spatter-proof hybrid cable, e.g. for use in welding cells</td>
</tr>
</tbody>
</table>

1) For special lengths with 180° or 90° cable outlet, see http://support.automation.siemens.com/ww/view/en/26999294
# Passive network components

## Optical bus cables

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Designation</th>
<th>Features</th>
<th>Fields of application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber-optic cable with FastConnect technology</td>
<td>FC FO standard cable GP (62.5/200/230)</td>
<td>Glass fiber with green outer sheath, sold by the meter</td>
<td>For indoor and outdoor installation</td>
</tr>
<tr>
<td></td>
<td>FC FO trailing cable (62.5/200/230)</td>
<td></td>
<td>Cable versions: Robust round cable for permanent installation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Robust round cable for use in trailing cables and moving applications</td>
</tr>
<tr>
<td>Fiber-optic cable without FastConnect technology</td>
<td>FO standard cable GP (50/125)</td>
<td>Glass fiber, sold by the meter or pre-assembled with 4 BFOC or SC connectors</td>
<td>For indoor and outdoor installation</td>
</tr>
<tr>
<td></td>
<td>FO ground cable (50/125)</td>
<td></td>
<td>Cable versions: Rugged standard cable for universal applications</td>
</tr>
<tr>
<td></td>
<td>FO trailing cable GP (50/125)</td>
<td></td>
<td>Cable protected against the ingress of water lengthwise and transversely for installation outdoors; with non-metallic rodent protection; underground laying possible</td>
</tr>
<tr>
<td></td>
<td>FO trailing cable (50/125)</td>
<td></td>
<td>Cable for use in cable carriers</td>
</tr>
<tr>
<td></td>
<td>SIENOPYR marine-duplex fiber-optic cable (62.5/125)</td>
<td></td>
<td>Halogen-free, tread-resistant, flame-retardant and marine-approved cable for laying in ships and offshore units</td>
</tr>
<tr>
<td></td>
<td>ECOFAST fiber-optic hybrid cable (DESINA-compatible)</td>
<td>Sold by the meter or pre-assembled with DESINA connectors</td>
<td>Hybrid cable for data transmission and voltage supply</td>
</tr>
<tr>
<td>PROFIBUS plastic fiber-optic</td>
<td>PROFIBUS plastic fiber-optic</td>
<td>Plastic, PCF fiber-optic cable; sold by the meter or pre-assembled with Simplex connectors</td>
<td>Plastic and PCF fiber-optic cables are used for the construction of optical PROFIBUS DP networks in indoor applications.</td>
</tr>
<tr>
<td></td>
<td>Duplex core</td>
<td></td>
<td>Up to 80 m with low mechanical loads, e.g. laboratory structures</td>
</tr>
<tr>
<td></td>
<td>Standard cable</td>
<td></td>
<td>Up to 50 m, with Kevlar tension elements</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS PCF plastic fiber optic standard cable</td>
<td></td>
<td>Up to 400 m, with Kevlar tension elements</td>
</tr>
<tr>
<td></td>
<td>Standard cable GP 200/230</td>
<td></td>
<td>Up to 300 m, with Kevlar tension elements</td>
</tr>
<tr>
<td></td>
<td>Trailing cable 200/230</td>
<td></td>
<td>Up to 300 m, with Kevlar tension elements</td>
</tr>
<tr>
<td></td>
<td>Trailing cable GP 200/230</td>
<td></td>
<td>Up to 300 m, with Kevlar tension elements</td>
</tr>
</tbody>
</table>
Active network components

Electrical network

Bus connector

The RS485 bus connectors for PROFIBUS are used for connecting a PROFIBUS station or a PROFIBUS network component to the bus cable for PROFIBUS. There are different versions of the bus connectors in sub D, RJ45 or M12 connection technology that are optimized for the devices to be connected.

Bus terminals

The PROFIBUS bus terminals enable connection of a bus node to a PROFIBUS network.

Different versions are available:
• Up to 1.5 Mbit/s: RS485 bus terminal
• Up to 12 Mbit/s: 12M bus terminal

The bus terminals have a prepared device connection for PROFIBUS stations. Stations are connected to PROFIBUS networks by simply connecting sub D connectors to the spur line. Multi-point connections can be implemented by directly lining up several bus terminals (up to 32 stations per segment) at bus terminal 12M.

Active terminating element

The active RS485 terminating resistor is used to terminate bus segments. Power supply is independent of the bus stations. Separately from the other I/O components, the terminating resistor is supplied with a permanent voltage or with a voltage switched from the I/O. By terminating the bus system, the stations (e.g. ET 200M/S) can be freely connected and disconnected without malfunctions.

Repeater RS485

The RS485 repeater with IP20 connects two PROFIBUS or MPI bus segments in RS485 technology with up to 32 stations, including repeaters. It enables transfer rates from 9.6 Kbit/s to 12 Mbit/s (including 45.45 Kbit/s for PROFIBUS PA).

The repeater is used for:
• Increasing the number of stations (up to 127) and expansion
• Galvanic isolation of segments
• Regeneration of the signals in amplitude and time
Active network components

Electrical network

Diagnostics repeater

STEP 7 or COM PROFIBUS prompts the diagnostics repeater to determine the topology of the bus system and saves it in the internal diagnostics memory.

If a fault occurs, the repeater automatically transmits a standard diagnostic message to the bus master with the following information:

- Affected segment
- Fault location (e.g. between station X and Y)
- Distance of the fault location from station X or Y as well as from the repeater in meters
- Type of fault

The following faults are diagnosed:

- Break in data lines A, B
- Data-line-to-shield short circuit
- Bus terminating resistor missing

Sporadic errors are also detected. The error messages are displayed graphically in STEP 7. They are completely integrated into the SIMATIC system diagnostics (e.g. overview diagnostics, "Report system error" function).

Power Rail Booster

The Power Rail Booster enables a PROFIBUS DP connection via contact conductors as used, for example, on suspended monorail conveyors or high-bay storage and retrieval systems. The diverse PROFIBUS DP system capabilities, such as diagnostics and PROFIsafe safety engineering over the bus, can continue to be used.

BT 200 hardware tester

The PROFIBUS line can be tested during the installation phase with the BT 200 tester. Installation errors are found quickly and simply and the installation engineer requires no special knowledge of PROFIBUS.

Even before commissioning of the plant it is possible to test the RS485 interface of the PROFIBUS DP slave with the BT 200. Outputting a list of accessible slaves on the pre-wired bus is also possible, and this without a master on PROFIBUS DP.
Optical network

Optical Link Module OLM

With the PROFIBUS OLM (Optical Link Modules), optical PROFIBUS networks can be established in linear, star and redundant ring topologies. The transfer 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)
- OLM/G12-EEC for outdoor use at temperatures as low as -20 °C

**Benefits**

- Automatic detection of all PROFIBUS data rates: 9.6 Kbit/s to 12 Mbit/s including 45.45 Kbit/s (PROFIBUS PA).
- 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 socket)
- Unrestricted multi-master operation:
  - Expanded segmentation functions for localization of faults on fiber-optic and RS485 segments
- Fast localization of faults:
  - Indication of module status through floating signaling contact
  - Checking the fiber-optic cable route quality: Measurement output for optical receiver for logging and validity checking of the fiber-optic path attenuation with a voltmeter
  - Signaling of the fault at its location of origin, no indication of secondary faults
- High cascading depth: Line and redundant ring up to 124 OLM (only limited by monitoring times)
- Large range due to use of glass fiber-optic cables in lengths of up to 15 km

OBT optical bus terminal

The OBT (Optical Bus Terminal) is used to connect a PROFIBUS DP station without integral optical interface or an existing RS485 bus segment to an optical line. It thus opens up the benefits of optical data transfer for existing DP devices or network segments in combination with devices possessing an integral optical interface (e.g. ET 200S FO).

The OBT is also used as the "socket outlet" for connecting mobile devices (e.g. programming devices) without interrupting the bus. The PROFIBUS DP station is connected to the RS485 interface of the OBT via a cable terminated at both ends, e.g. 830-1T connecting cable. 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 cable pre-assembled with 2 × 2 Simplex connectors, max. 50 m
- PCF fiber-optic cable pre-assembled with 2 × 2 Simplex connectors, max. 300 m.

**Benefits**

- Existing devices with electrical interface can be connected to new optical networks, as can existing bus segments
- Low-cost solution for simple optical networking
- Time savings thanks to simple and fast assembly of the fiber-optic cable connectors directly on-site.
Network transitions between the bus systems
Network transitions between one bus system and another are implemented using links, controllers (PLCs) or PCs.

In the case of PLCs or IPCs, this takes place via integrated interfaces and communications processors (CPs). Links pass the data through from one network to another without additional links.

Links are independent components that form the seamless transition between the various bus systems, e.g. between Industrial Ethernet and PROFIBUS. For example, HMI systems can gain easy access from Industrial Ethernet to field devices on the PROFIBUS or on the AS-Interface.

This enables implementation of vertical integration from the control level to the field level.

The following links are available:

- **IE/PB Link PN IO**
  - for the transition from Industrial Ethernet to PROFIBUS
- **IWLAN/PB Link PN IO**
  - for the transition from IWLAN to PROFIBUS
- **DP/AS-i LINK Advanced, DPI/AS-i F LINK and DP/AS Interface Link 20E** for the transition from PROFIBUS to AS-Interface

On Industrial Ethernet, the proxy represents one or more fieldbus devices (e.g. on PROFIBUS). It ensures transparent conversion of the communication between the networks (no tunneling of the protocols), and forwards the cyclic data, for example, to the fieldbus devices.

As PROFIBUS master, the proxy coordinates data exchange between the PROFIBUS stations. At the same time, it is an Ethernet station with PROFINET communication. Proxies can be implemented as controllers or purely as network transitions. The same principle is applied when integrating AS-Interface systems.

As well as wired proxies on Industrial Ethernet, SIMATIC NET also offers proxies with Industrial Wireless LAN connection.
Communications processors for SIMATIC

CPs for SIMATIC S7

The SIMATIC NET communications processors can be used for applications in factory or process automation. Thanks to their openness in accordance with international standards, different components are able to work with each other. They are characterized in particular by their ruggedness in the industrial environment.

Effectiveness and efficiency are essential in the case of solution concepts for plant components of automation tasks. This means that very high demands are imposed on the communication performance with regard to data rates. Thanks to their protocol preprocessing, the communications processors maintain a constant data throughput. At a stable high level, they offer fast response times and rule out any fluctuations in communication performance.

The CPs perform communication tasks for the terminals and only take up few of their resources.

The PLC as an element of communication

Programmable logic controllers (PLCs) are of key importance in the world of automation. And industrial communication forms the nerve center in this respect. The CPs for PLCs adopt a key role in industrial communication.

The CPs offer the following advantages

- CPs for SIMATIC, e.g. SIMATIC S7-300/-400
- By means of open communication with standards, SIMATIC can communicate with any other device.

SiMATIC NET increases availability by means of modular, networked subsystems, as in the case of electrical supply, which also takes place in individual circuits.

Communications processors for SIMATIC S7

The communications processors are all designed for use in rough industrial environments with a wide range of temperatures. The communications processors are also certified for marine use (e.g. ABS), enabling them to be used on ships or offshore installations. The CPs feature S7 communication (client, server, multiplexing), open communication (SEND/RECEIVE) and PG/OP communication as standard.
CPs for S7-300 and S7-400

The CP 342-5, CP 342-5 FO and CP 343-5 communications processors connect SIMATIC S7-300 to PROFIBUS and CP 443-5 Basic and Extended connect SIMATIC S7-400 to PROFIBUS. They are PROFIBUS DP masters or slaves, or PROFIBUS FMS masters with an electrical or optical interface up to 12 Mbit/s.

The communications processors are easy to configure and can be programmed using PROFIBUS. They offer cross-network PG communication using S7 routing, and can be replaced with the need for a programming device.

The PROFIBUS communications processors for SIMATIC offer the following advantages:

• Expansion of the process I/O to SIMATIC S7-300 using several PROFIBUS interfaces
• Flexible use of the process I/O by means of dynamic activation of DP slaves
• Sub-process-oriented design of an automation solution through the use of several CPs
• Optimization of applications and a host of possible applications thanks to transmission of data with S7 communication
• Extensive operator control and monitoring thanks to multiplex function with OP communication
• Suitable for closed-loop control tasks thanks to SYNC/FREEZE and equidistant bus cycle
• Comprehensive diagnostics are provided via NCM S7, including operating status of the CP, general diagnostics and statistics functions, connection diagnostics, and diagnostics buffer. Configuration is carried out using STEP 7
• Time-of-day synchronization is supported for CP 443-5 Basic and Extended
• Increased plant availability thanks to redundant connection of the process I/O (e.g. ET 200M) in the SIMATIC S7-400 H system (on CP 443-5 Basic and Extended)
• Addition of distributed I/O during operation (CP 443-5 Extended)
Communications processors for SIMATIC

CPs for SIMATIC S7: Overview of functions

<table>
<thead>
<tr>
<th>Hardware</th>
<th>PROFIBUS DP</th>
<th>PROFIBUS FMS</th>
<th>PG/OP</th>
<th>S7 communication</th>
<th>Open communication</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DP master Class 1</td>
<td>DP master Class 2</td>
<td>DP slave</td>
<td>Read</td>
<td>Write</td>
<td>Info./Report</td>
</tr>
<tr>
<td>SIMATIC S7-300</td>
<td>CP 342-5/CP 342-5 FO</td>
<td>1)</td>
<td>2)</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>CP 343-5</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>SIMATIC S7-400</td>
<td>CP 443-5 Extended</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>CP 443-5 Basic</td>
<td></td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

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

Function overview for SIMATIC S7

PROFIBUS configuration for SIMATIC and PG/PC
Communications processors for PG/PC

CPs for programming device/PC

For the implementation of flexible production, PCs and programming devices (PGs) are becoming increasingly important in the industrial sector, in addition to programmable controllers.

Thanks to their flexible programming capability, the production system can be quickly adapted to the automation task.

With powerful communication structures, automation projects today can be implemented economically and with the necessary flexibility.

**PC as an element of communication**

The PC assumes an important role in industrial communication. Combined with real-time applications, such as in a Windows environment, it forms an ideal basis for visualization (e.g. WinCC).

Together with SoftControl software the PC handles communications tasks that could only previously be solved using a programmable controller.

### Benefits

- CPs for PCI, PCIe, PCMCIA, PCI 104 format or with USB port
- They offer flexibility depending on the resource requirements in the PC
- CPs with or without an internal microprocessor
- Simple integration into the system environment and office applications using open and standardized interfaces, e.g. with the OPC server.

**Note:**

The necessary configuration tools for the SIMATIC NET communications processors for PGs/PGs are included in all software packages. The software that runs under Windows can be found on the SIMATIC NET CD for Windows operating systems, including the associated manuals in PDF format and comprehensive additional information on SIMATIC NET products and communication.
Communications processors for PG/PC

CPs with an internal microprocessor

The CPs with an internal microprocessor are PCI cards and permit the connection of PCs and SIMATIC PG/PCs to PROFIBUS at up to 12 Mbit/s. This provides high-performance support for control tasks on the PC (PC-based control, numeric control, robot control).

These CPs can be used as:
- DP master and DP slave:
  - CP 5614 A2 (PCI 32-bit)
  - CP 5624 (PCIe x1)

- DP master or DP slave:
  - CP 5603 (PCI-104)
  - CP 5613 A2 (PCI 32-bit)
  - CP 5623 (PCIe x1)

- DP master with additional optical interface
  - CP 5613 FO (PCI 32-bit)

In connection with the corresponding software, the CPs support the following communication services:

- PROFIBUS DP master Class 1 and 2 or DP slave according to IEC 61158/61784
- PG/OP communication with STEP 5 or STEP 7
- S7 communication with S7-5613 software package
- Open communication (SEND/RECEIVE) based on the FDL interface
- PROFIBUS FMS according to IEC 61158/61784 with FMS-5613 software package

Benefits

- Fast access to process data by means of direct access to the dual port RAM of the hardware
- Saving of slots through parallel operation as DP master and DP slave (CP 5614 A2/CP 5624)
- High computing performance in the PG/PC; reduces workload of host CPU by preprocessing the communication on the hardware
- Use of different operating system environments; driver as source code for porting to the operating system environment
- Use also in motion control applications; real-time capable data exchange through constant bus cycle time
- Preventive maintenance measures (CP 5623 A2/CP 5624); deriving of measures by evaluating system runtime and ambient temperature

<table>
<thead>
<tr>
<th>System</th>
<th>Hardware</th>
<th>Software packages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMATIC IPC/PG</td>
<td>CP 5603 (PCI-104)</td>
<td>DP-Base; DP-5613 S7-5613 FMS-5613</td>
<td>For the control application For multiprotocol; more than 8 stations, several CPs in one PC</td>
</tr>
<tr>
<td></td>
<td>CP 5613 A2 (PCI 32-bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP 5613 FO (PCI 32-bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP 5614 A2 (PCI 32-bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP 5614 FO (PCI 32-bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP 5623 (PCIe x1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CP 5624 (PCIe x1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

System interface for PG/PC
CPs without an internal microprocessor

The CPs without an internal microprocessor permit the connection of SIMATIC PGs/PCs and PCs to PROFIBUS and to the multipoint interface (MPI) of the SIMATIC S7.

They can be used as a DP master or DP slave:

- CP 5512 (CardBus 32-bit)
- CP 5611 A2 (PCI 32-bit)
- CP 5621 (PCIe x1)
- CP 5711 (USB V2.0)

In connection with the corresponding software, the CPs support the following communication services:

- PROFIBUS DP master Class 1 and 2 according to IEC 61158/61784 with SOFTNET-DP software package
- PROFIBUS DP slave with SOFTNET-DP Slave software package
- PG/OP communication with STEP 7
- S7 communication with SOFTNET-S7 software package
- Open communication (SEND/RECEIVE) on basis of the FDL interface with SOFTNET-DP or SOFTNET-S7 software package

Benefits

- Portability and flexibility: Connection for portable PCs, e.g. for diagnostics and commissioning
- Easy installation and commissioning due to plug & play technology
- Economical PROFIBUS controllers and device solutions

<table>
<thead>
<tr>
<th>System</th>
<th>Hardware</th>
<th>Software packages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIMATIC IPC/PG/PC</td>
<td>CP 5512 (CardBus 32-bit) CP 5611 A2 (PCI 32-bit) CP 5621 (PCIe x1) CP 5711 (USB V2.0)</td>
<td>SOFTNET-S7 SOFTNET-DP SOFTNET-DP slave STEP 7</td>
<td>Monoprotocol; up to 8 stations For parameterizing the existing plant with SIMATIC S7; for configuring the S7-CPs</td>
</tr>
</tbody>
</table>

Communication for PG/PC with SOFTNET for PROFIBUS
Communications processors for PG/PC
Options for use with OPC (Openness, Productivity & Collaboration)

OPC is a standardized, open, and vendor-independent interface that is widely used in automation.

As a rule, OPC communication consists of a server and one or several clients. These clients can be located on the same PC or also on other PCs in the Ethernet network.

OPC servers are available for a wide variety of protocols, such as PROFINET, SNMP and networks, such as Ethernet.

**OPC servers from SIMATIC NET have the following functions:**

- Connection of automation solutions of various manufacturers to SIMATIC PLCs, field devices and Ethernet network components
- Servers for OPC DA, OPC DA-XML and OPC A&E-capable clients
- Configuration with STEP 7 or alternatively in free NCM PC
- Programming interface for the OPC server via the Custom Interface (C++) and "Automation Interface" (VB)
- Optimized communication between OPC client and server by grouping of variables (items)
- Application examples and documentation
OPC server for PROFIBUS:

**S7 OPC server**
The S7 OPC server permits communication with SIMATIC S7-300/400 systems via the S7 protocol and with SIMATIC S5 systems via SEND/RECEIVE protocol.

**DP OPC server**
The DP OPC server permits access to process and diagnostics data of the distributed IO.

**FMS OPC server**
The FMS OPC server offers simple communication with FMS-capable field devices.

OPC servers for Industrial Ethernet und PROFINET:

**S7 OPC server**
The S7 OPC server permits communication with SIMATIC S7-300/400 systems via the S7 protocol and with SIMATIC S5 systems via SEND/RECEIVE.

**PN CBA OPC server**
The PN CBA OPC server implements access to variables from PROFINET CBA components such as the IE/PB Link. Components created with the SIMATIC iMap engineering tool can be used with variables and symbols defined in STEP 7.

**PN IO OPC server**
The PN IO OPC server permits communication with the PROFINET IO devices via the PROFINET protocol. This allows PROFINET functionality to be added even to existing installations.

**SNMP OPC server**
The SNMP OPC server permits the diagnosis and parameterization of any Ethernet devices, such as switches, that have SNMP functionality (Simple Network Management Protocol). SNMP is an open and widely used protocol for the administration of TCP/IP networks. Products with SNMP functionality have an "SNMP agent" that makes information available in a structured form.

www.siemens.com/snmp-opc-server
# Communications processors for PG/PC

## CPs for PG/PC: Overview of functions

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
<th>Operation system (2 Bit)</th>
<th>Other operating systems</th>
<th>OPC</th>
<th>PROFIBUS DP</th>
<th>PROFIBUS FMS</th>
<th>PG/OP</th>
<th>S7 communication</th>
<th>Open communication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Windows XP Pro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Windows 2003 Server / 2003 R2 Server</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Windows Vista Business / Ultimate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5603 (PCI-104)</td>
<td>CP with DP-Base 1) 4)</td>
<td>• • • • • • • • • • • • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5613 A2 CP 5613 FO CP 5614 A2 (PCI 32 Bit)</td>
<td>DP-5613 4)</td>
<td>• • • • • • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5623 CP 5624 (PCIe x1)</td>
<td>S7-5613</td>
<td>• • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FMS-5613</td>
<td>• • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>DK-5613</td>
<td>• • •</td>
<td>6) 6) 6) 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5611 A2 (PCI 32 Bit)</td>
<td>SOFTNET-DP</td>
<td>• • • • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5621 (PCIe x1)</td>
<td>SOFTNET-DP Slave</td>
<td>• • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5512 (CardBus 32 Bit)</td>
<td>SOFTNET-S7</td>
<td>• • • • • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CP 5711 (USB V2.0)</td>
<td>STEP 7</td>
<td>• • •</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Included in scope of supply of the hardware
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) DP master and DP slave only possible with CP 5614/CP 5624
6) With porting via DK-5613
7) SEND/RECEIVE based on the FDL interface

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

© Siemens AG 2010

---

**Function overview for PG/PC**
Connection options

Electrical and optical networking

The options for connecting an electrical or optical network to a CP are implemented with the different network components.

Typical connection for electrical networking with OBT

Typical connection for electrical networking with PROFIBUS FastConnect RS485 bus connector
Connection options

Electrical and optical networking

Typical connection for optical networking with PROFIBUS OLM

Typical connection for optical networking with plastic fiber-optic cable and Simplex connector

Typical connection for an intrinsically-safe network
### PROFIBUS

#### Technology components

**ASICs for PROFIBUS** enable third-party manufacturers to connect their devices and systems simply to the PROFIBUS fieldbus.

ASICs enable, for example, the short response times on PROFIBUS DP that are required at transfer rates of up to 12 Mbit/s.

Different ASICs and connections are available for the different functional requirements such as master devices, or simple or intelligent slaves.

#### Advantages of the PROFIBUS components at a glance

| Integrated use in factory and process automation (PROFIBUS PA) |
| Problem-free connection of components from different manufacturers, standardized in accordance with IEC 61158/61784 and GB/T 20540.1-2006 / GB/T 20540.6-2006 (Chinese national standard) |
| Investment security due to compatible developments |
| High degree of investment protection: existing systems can be extended and integrated into new PROFINET systems |
| Connection to AS-Interface and IO-Link |
| Line, tree and ring topologies |
| 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. |
| High availability through ring redundancy with OLM |
| WLAN interfacing of PROFIBUS to PROFINET |
| Fail-safe communication with PROFIsafe |

#### Industrial compatibility

- Rugged design
- Modular design for standard rail mounting

#### Diagnostics with network components

- Fast fault localization by means of signaling contact, LEDs, measuring sockets, and test devices
- Continuous monitoring of network components through a simple and effective signaling concept

#### Permanently secure and quick-assembly plug-in connectors

- Fast assembly and startup on site with the help of the FastConnect wiring system
- Plug-in connectors for degree of protection IP20 and IP65
- Different bus cables for different applications
- Time savings when commissioning thanks to pre-assembled cables
- Fiber-optic networking (plastic/glass) for short and long distances
The information provided in this brochure contains descriptions or characteristics of performance which in case of actual use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract. Availability and technical specifications are subject to change without notice.

All product designations may be trademarks or product names of Siemens AG or supplier companies whose use by third parties for their own purposes could violate the rights of the owners.