SIEMENS

SIMATIC PCS 7 Process Control System

System components

SIMATIC PCS 7

| Catalog ST PCS 7 | Edition 2014/15 |

Answers for industry.

Related catalogs

SIMATIC ST PCS 7 T
SIMATIC PCS 7
Process Control System
Technology components

E86060-K4678-A141-A1-7600

SIMATIC ST PCS 7 AO
Add-ons for the
SIMATIC PCS 7
Process Control System

E86060-K4678-A121-B1-7600

SIMATIC ST 70
Products for
Totally Integrated Automation

E86060-K4670-A101-B4-7600

SIMATIC HMI / ST 80/ST PC
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E86060-K6201-A101-B6-7600

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Products for Automation and Drives CA 01
Interactive Catalog, DVD

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Industry Mall
Information and Ordering Platform
in the Internet:

www.siemens.com/industrymall

SIMATIC PCS 7 Process Control System
System components

SIMATIC PCS 7

Catalog ST PCS 7 · 2014/15

Supersedes:
Catalog ST PCS 7 · June 2013

Refer to the Industry Mall for current updates of this catalog:
www.siemens.com/industrymall

The products contained in this catalog can also be found in the Interactive Catalog CA 01.
Article No.: E86060-D4001-A510-D3-7600

Please contact your local Siemens branch.

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Answers for industry.

Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

The Siemens Industry Sector is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility. With a global workforce of more than 100 000 employees, the Industry Sector comprises the Industry Automation, Drive Technologies, and Customer Services divisions, as well as the Metals Technologies Business Unit.
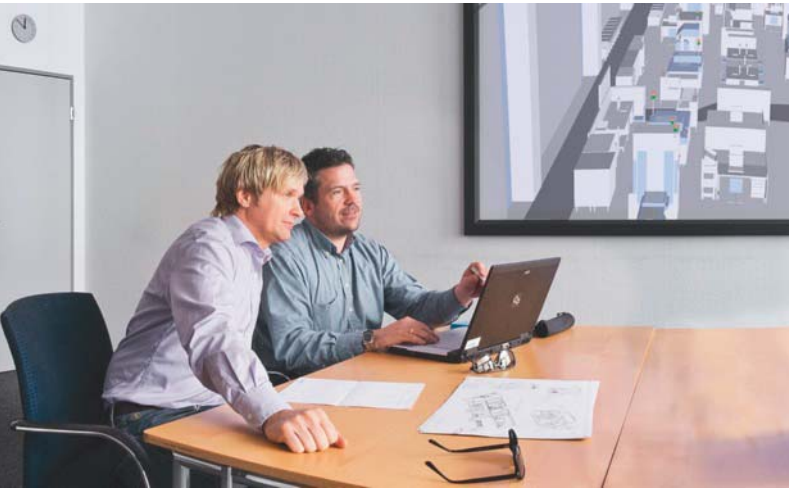
We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

Market launch times can be reduced by up to 50% due to the combination of powerful automation technology and industrial software from Siemens Industry. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.

ERP – Enterprise Resource Planning

PLM – Product Lifecycle Management
- Product Design
- Production Planning and Simulation
- Data Management

Management Level

MES – Manufacturing Execution Systems

SIMATIC IT

Plant Engineering
COMOS

■ Ethernet

Operations Level

SIMATIC PCS 7 Operator System

Maintenance/ Asset Management

Engineering Station

Energy Management

SIMATIC WinCC SCADA System

■ Industrial Ethernet

TIA Portal

Control Level

SIMATIC PCS 7 Automation System

SINUMERIK Computer Numeric Control

SIMOTION Motion Control

SIMATIC NET Industrial Communication

SIMATIC Controller Modular / PC-Based

SIMATIC HMI Human Machine Interface

SIRIUS Industrial Controls

Field Level

■ PROFIBUS PA

Process Instrumentation

SIMATIC Ident Industrial Identification

SIMATIC Distributed I/O

SINAMICS Drive Systems

SITOP Power Supply

Low-Voltage Distribution

Totally Integrated Automation

■ HART

■ IO-Link

SIMOTICS Motors

Efficient automation starts with efficient engineering.

Totally Integrated Automation: Efficiency driving productivity.

Efficient engineering is the first step toward better production that is faster, more flexible, and more intelligent. With all components interacting efficiently, Totally Integrated Automation (TIA) delivers enormous time savings right from the engineering phase. The result is lower costs, faster time-to-market, and greater flexibility.
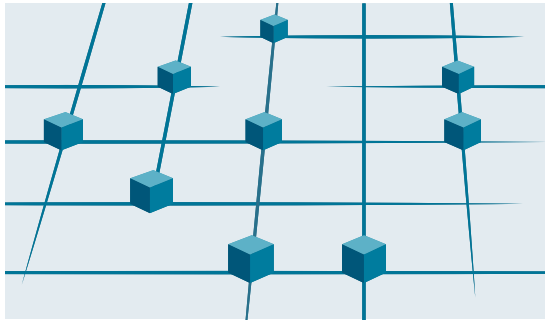
Totally Integrated Automation
Efficient interoperability of all automation components

- PROFINET
- Industrial Ethernet
- PROFIBUS
- AS-Interface
- KNX GAMMA instabus

Totally Integrated Power
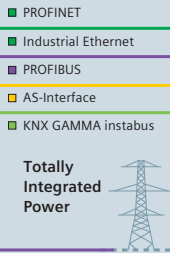
A unique complete approach for all industries

As one of the world's leading automation suppliers, Siemens provides an integrated, comprehensive portfolio for all requirements in process and manufacturing industries. All components are mutually compatible and system-tested. This ensures that they reliably perform their tasks in industrial use and interact efficiently, and that each automation solution can be implemented with little time and effort based on standard products. The integration of many separate individual engineering tasks into a single engineering environment, for example, provides enormous time and cost savings.

With its comprehensive technology and industry-specific expertise, Siemens is continuously driving progress in manufacturing industries – and Totally Integrated Automation plays a key role.

Totally Integrated Automation creates real value added in all automation tasks, especially for:

- **Integrated engineering**
  Consistent, comprehensive engineering throughout the entire product development and production process
- **Industrial data management**
  Access to all important data occurring in productive operation – along the entire value chain and across all levels
- **Industrial communication**
  Integrated communication based on international cross-vendor standards that are mutually compatible
- **Industrial security**
  Systematic minimization of the risk of an internal or external attack on plants and networks
- **Safety Integrated**
  Reliable protection of personnel, machinery, and the environment thanks to seamless integration of safety technologies into the standard automation

Making things right with Totally Integrated Automation

Totally Integrated Automation, industrial automation from Siemens, stands for the efficient interoperability of all automation components. The open system architecture covers the entire production process and is based on end-to-end shared characteristics: consistent data management, global standards, and uniform hardware and software interfaces.

Totally Integrated Automation lays the foundation for comprehensive optimization of the production process:
- Time and cost savings due to efficient engineering
- Minimized downtime due to integrated diagnostic functions
- Simplified implementation of automation solutions due to global standards
- Better performance due to interoperability of system-tested components

Totally Integrated Power
We bring power to the point – safely and reliably.

Comprehensive answers for power distribution in complex energy systems – from Siemens

Efficient, reliable, safe: These are the demands placed on electrification and especially power distribution. And our answer – for all application areas of the energy system – is Totally Integrated Power (TIP). It's based on our comprehensive range of products, systems, and solutions for low and medium voltage, rounded out by our support throughout the entire lifecycle – from planning with our own software tools to installation, operation, and services.

Smart interfaces allow linking to industrial or building automation, making it possible to fully exploit all the optimization potential of an integrated solution. This is how we provide our customers around the world with answers to their challenges. With highly efficient, reliable, and safe power distribution, we lay the foundation for sustainable infrastructure and cities, buildings, and industrial plants. We bring power to the point – wherever and whenever it is needed.

More information: www.siemens.com/tip

Totally Integrated Power offers more:

- **Consistency**:
  For simplified plant engineering and commissioning as well as smooth integration into automation solutions for building or production processes
- **One-stop-shop**:
  A reliable partner with a complete portfolio for the entire process and lifecycle – from the initial idea to after-sales service
- **Safety**:
  A comprehensive range of protection components for personnel safety and line and fire protection, safety by means of type testing
- **Reliability**:
  A reliable partner who works with customers to develop long-lasting solutions that meet the highest quality standards
- **Efficiency**:
  Bringing power to the point means greater plant availability and maximum energy efficiency in power distribution
- **Flexibility**:
  End-to-end consistency and modular design of Totally Integrated Power for any desired expansions and adaptation to future requirements
- **Advanced technology**:
  Reliable power distribution especially for applications in which supply is critical, continuous refinement of the technology

Challenges are our speciality

Automation

Process/ Industrial automation	Operation & Monitoring	Load manage- ment	Load curves	Forecast	Mainte- nance	Status reporting/ failure man- agement	Protocols	Power Quality	Cost center	Building automation
PROFINET	PROFIBUS	...					Industrial Ethernet		Modbus	

Electrification

Renewables

≤ 110 kV

Storage technologies

Medium-voltage switchgear and protection technology

Transformer

Low-voltage switchboard with protection and measuring technology

Low-voltage distribution

Products, systems and solutions

Consulting, planning   Engineering   Order, delivery   Installation, commissioning   Operation   Service, modernization

SIMATIC PCS 7
performance you trust

OS server,
Batch server,
Route Control server,
Maintenance server,
Process Historian

**Operator System (OS)
Single Station**

Mobile
Client

OS Client
427D

OS/Batch/Route Control/Maintenance clients

☐ Industrial
Wireless LAN

■ Industrial Ethernet

**PCS 7
BOX**

PCS 7 AS mEC RTX
with S7-300 I/Os

**Standard
automation systems**

ET 200pro

ET 200M

■ PROFINET

Compact systems

**Embedded
automation systems**

Zone 2

Zone 1

Ex operator
terminal

☐ Wireless HART

ET 200M, Ex-I/O, HART

Weighing systems

ET 200M

ET 200SP

■ AS-Interface

■ Modbus, serial connection

SCALANCE X
switch

IE/PB
link

■ PROFIBUS DP

Integrated
power
management

IE/PB link +
DP/PA coupler

AFD

AFDiS

■ PROFINET

■ PROFIBUS PA

Integrated drives

Web Client
- OS
- Maintenance
- Information

ERP

Web Server

Optional servers
- Web Server
- OpenPCS 7
- Information Server

■ Ethernet, Office LAN

Front Firewall

Optional clients
- Simulation with SIMIT
- MES/MIS with SIMATIC IT
- COMOS Plant Lifecycle Management

Engineering Stations

Network printer

Back Firewall

Fault-tolerant automation systems

Safety-related automation systems

Zone 2

Zone 1

ET 200M

ET 200M single/redundant

MTA

ET 200M F modules

■ PROFIBUS DP-iS

ET 200iSP

Zone 1

ET 200iSP

ET 200SP

Y-link

Gas analysis

PA link ■ PROFIBUS PA

AFD   AFD

SIMOCODE pro for PROFINET

PA link/FF link

AFS   AFD   AFDiS

■ PA/FF H1

ET 200pro

PA link/FF link

■ PA/FF H1

AFD   AFDiS

ET 200S

PROFINET

PROFIBUS DP

PROFIBUS DP

G_PCS7_XX_00388

Totally Integrated Automation with SIMATIC PCS 7

SIMATIC PCS 7 is one of the international leaders in process control systems, and has the potential to implement innovative solutions for the special challenges associated with the process industry. The functional diversity, flexibility, and performance of the current version mean that SIMATIC PCS 7 pushes the limits of a typical process control system, and its technological enhancements offer many additional possibilities and new perspectives.

SIMATIC PCS 7 benefits from its seamless integration in Siemens Totally Integrated Automation (TIA), a complete range of matched products, systems, and solutions for all hierarchy levels of industrial automation – from the enterprise management level, to the control level, all the way down to the field level. This enables uniform, customer-specific automation in all sectors of manufacturing, process, and hybrid industry.

An essential advantage of the consistency of the product and system spectrum and the solutions based upon this spectrum is that faster and more precise control sequences, as well as integrated security functions of shared hardware, engineering, and engineering tools can be used for automation of continuous and discontinuous processes.

Performance you trust

In process engineering plants, the process control system is the starting point for optimal value added:
All procedures and processes can be operated, monitored and influenced with the process control system.

The more powerful the process control system, the more effectively this potential can be used. For this reason, performance is in the foreground with SIMATIC PCS 7, alongside scalability, flexibility, and integration. Starting with planning and engineering, the process control system offers powerful tools, functions and features for cost-effective and efficient plant operation through all phases of the plant life cycle.

Performance through integration

Integration is one of the special strengths of SIMATIC PCS 7.
This has many aspects:

- Horizontal integration into TIA

- Vertical integration into hierarchical communication

- System-integrated tools for engineering tasks

- Integration of the field level, including drives, switchgear, etc.

- Integrated functions, e.g. for batch process automation, route control, process safety, energy management, telecontrol tasks, etc.

Horizontal integration

A system for integrated automation of the entire process chain, from incoming raw materials to outgoing goods – this is one of the decisive advantages resulting from the seamless integration of SIMATIC PCS 7 into Totally Integrated Automation.

The process control system is mainly responsible for automating the primary processes here, but it can do much more: All auxiliary facilities, as well as the electrical infrastructure in the form of low-voltage or medium-voltage switchgear and the building management system, can also be integrated into the system.

Integration of selected SIMATIC standard components – automation systems, industrial PCs, network components, or distributed process I/O – into the process control system guarantees optimum interaction of individual components, and secures economic benefits such as simple selection, reduced stock keeping, and global support.
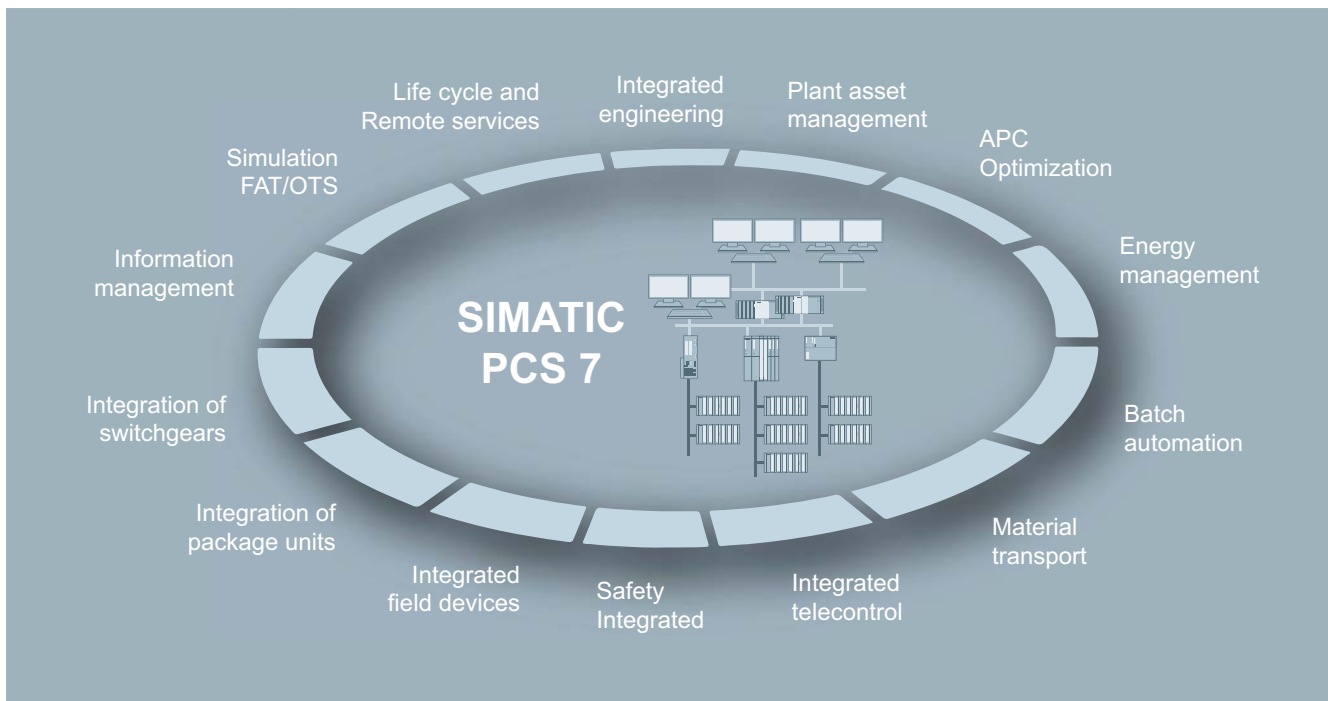
Vertical integration

The hierarchal communication of a company encompasses the field level, the control level, and the process level, up to management and enterprise resource planning (ERP). Thanks to standardized interfaces – based on international industry standards as well as internal interfaces – SIMATIC PCS 7 is able to provide process data for analysis, planning, coordination, and optimization of plant sequences or production and business processes – in real time, and at any location in the company.

Central engineering

SIMATIC PCS 7 convinces with graded functional diversity, consistent operator control philosophy, and uniformly structured engineering and management tools. A central engineering system with a coordinated range of tools for integrated system engineering and configuring of batch automation, safety functions, material transport or telecontrol systems creates value added over the entire life cycle. Reductions in configuring and training costs result in minimization of total cost of ownership (TCO) over the entire plant life cycle.

Functional diversity

Depending on the typical process automation or customer-specific requirements, SIMATIC PCS 7 can be functionally expanded for the following, for example:

- Batch process automation (SIMATIC BATCH)
- Functional safety and protection functions (Safety Integrated for Process Automation)
- Route control for material transport (SIMATIC Route Control)
- Telecontrol of remote units (SIMATIC PCS 7 TeleControl)
- Automation of electrical switchgear (SIMATIC PCS 7 PowerControl)

Further additional functions that are also integrated, or can be integrated, seamlessly into the control system make optimization of processes and reductions in operating costs possible. SIMATIC PCS 7 has, for example, tools for energy and asset management, and it offers higher quality closed-loop control functions, as well as industry-specific automation solutions and libraries.

Customized performance

Thanks to a unique scalable system architecture, SIMATIC PCS 7 creates the ideal basis for cost-effective implementation of individual automation solutions and economic operation of process plants.

SIMATIC PCS 7 users derive sustained profit from a modular system platform based on standard SIMATIC components. Its uniformity enables flexible scaling of hardware and software, as well as perfect interaction both within the system and beyond system limits. The architecture of the SIMATIC PCS 7 Process Control System is designed in such a manner that instrumentation and control can be configured in accordance with customer requirements and optimally matched to the dimensions of the plant. The control system can be subsequently expanded or reconfigured at any time if there is an increase in capacity or a technological modification. When the plant grows, SIMATIC PCS 7 simply grows along with it – without the provision of expensive reserve capacities.

Performance in engineering

With regard to planning and engineering, performance can be equated with minimizing time and costs. In conjunction with COMOS, SIMATIC PCS 7 offers a unique approach here: Integrated planning workflow from the description of the process to the automation program.

A standardized system interface, strictly object-oriented working, and centralized data management mean data consistency across all planning steps, including automatically updated system documentation.

Engineering using other planning tools is also mastered extremely efficiently by SIMATIC PCS 7 by means of the Advanced Engineering System. This can be used to import plant data from CAD/CAE tools without problems. It additionally allows automatic generation of the AS configuration thanks to simple multiplication of process tag types and model solutions, as well as parameter processing.

Performance in operation

Process control also becomes more complex due to the multi-layer nature of automation engineering and the increased merging with information technology. Intuitive and fault free operation is therefore more important than ever with regard to efficient working and the minimization of downtimes and servicing requirements. Using effective Advanced Process Control (APC) functions and an excellent operator system, SIMATIC PCS 7 supports optimization as well as user-friendly and safe control of the process. Monitoring of product quality and performance indicators additionally allows the process to be operated more economically. At the same time, SIMATIC PCS 7 convinces with high flexibility, plant availability, and investment security.

Process control and maintenance

SIMATIC PCS 7's operator system is used to monitor process operation using various views, and permits interventions when necessary. Its architecture is flexible and scalable – from single-user systems up to multi-user systems with a redundant client/server architecture. The operator interface takes account of the current specifications of NAMUR (user association of automation technology in the process industries) and PI (Profibus International) and offers a high level of user-friendliness for simple, intuitive interaction with the plant. Ergonomic symbols, task-oriented faceplates, uniform representation of status information, and optimized alarm functions allow safe process control.

The alarm management function integrated in SIMATIC PCS 7 is able to focus on essential alarms and to specifically guide the operator in exceptional circumstances. In this way, it systematically reduces the workload of operating staff.

Preventive and predictive maintenance strategies reduce total cost of ownership. With the SIMATIC PCS 7 Maintenance Station, maintenance personnel always have a watchful eye on critical production equipment such as pumps, valves, distillation columns or motors, and can carry out the relevant maintenance measures in good time before servicing is required – independent of the maintenance plan and without the risk of an unplanned plant standstill.

Process optimization

SIMATIC PCS 7 supports process optimization in many different manners, including:

- Control Performance Monitoring
- Advanced Process Control
- Process Historian

The Control Performance Monitoring function monitors and signals the control quality of the closed-loop control block. If the performance declines, the controller can be optimized in good time or specific maintenance measures can be initiated.

The integrated I&C libraries of SIMATIC PCS 7 also provide higher quality closed-loop control functions with which cost-effective Advanced Process Control applications can be implemented: multi-variable control, predictive control, or override control. It is thus possible to effectively improve profitability, product quality, safety, and environmental protection in small and medium-sized plants.

Current and historic process data form the basis of all optimization. Secure and user-friendly real-time data storage and analysis is handled using the Process Historian. The process values, messages, and batch data managed in the database of the Process Historian can be called extremely rapidly. User-specific processing and visualization of this historic data are supported by the information server, which is a reporting system based on the Microsoft Reporting Services.

- Flexible, high-performance Manufacturing Execution System (MES)

- System expansion for operator systems for the integration of third-party controllers, programmable logic controllers and package units

- Products for migration of the process control systems TELEPERM M, APACS+/QUADLOG or Bailey INFI 90/NET 90 with SIMATIC PCS 7

SIMATIC PCS 7 technology components have been released for all versions and service packs of SIMATIC PCS 7 system components. Development and testing of SIMATIC PCS 7 technology components is dependent on the corresponding SIMATIC PCS 7 system components, so versioning and release is normally performed asynchronously, that is following a delay of between 3 and 6 months.

Additional functionality can be integrated using add-on products

Modularity, flexibility, scalability, and the openness of SIMATIC PCS 7 offer optimal prerequisites for integrating supplementary components and solutions in the process control system in an applicative manner and thus extend and round off its functionality.

Many supplementary add-on products for SIMATIC PCS 7 have been developed by Siemens as well as by external partners (see Catalog ST PCS 7, Add-ons for the SIMATIC PCS 7 Process Control System). These software packages and hardware components authorized by the system manufacturer enable cost-effective implementation of SIMATIC PCS 7 for special automation tasks.

SIMATIC PCS 7 system and technology components

With the rugged, high-performance **SIMATIC PCS 7 system components** from Catalog ST PCS 7, you already have a versatile platform for cost-effective implementation and economical operation of your process control systems. Perfect interplay of these system components makes it possible for you to sustain high-quality production and to establish new products significantly faster on the market.

With **SIMATIC PCS 7 technology components** from Catalog ST PCS 7 T that can be seamlessly integrated into the process control system, you can expand the functional scope of the system components in a carefully targeted manner for specific automation tasks.

This covers a wide spectrum, for example:

- Telecontrol for monitoring and controlling remote units

- Automation technology for electrical low-voltage or medium-voltage switchgear

- •Industry-specific automation systems for the cement and mining industries, as well as for laboratory and training facilities

- Graphical objects for task-oriented optimization of process visualization

- Block libraries for technological functions, package unit and panel integration, monitoring and analyzing mechanical assets, as well as for building automation systems (heating, ventilation, air-conditioning – FMCS/HVAC)

- Editors and function blocks for the efficient configuration of small or medium-sized automation systems with simple parameter control and materials management

- Process analytical technology for quality assurance through optimization of development and production processes based on up-to-date measurements, and critical quality and performance attributes

- Simulation system for testing and commissioning of plant-specific application software

Software Media and Logistics

1

Software Media and Logistics

1

PCS 7 Software Packages

■ Design

Product categories for SIMATIC PCS 7 software

Generally, the SIMATIC PCS 7 and TIA software products offered in Catalog ST PCS 7 can be categorized as follows:

- **Core products** (single, floating or rental license) with:
  - Installation software
  - License key for software licensing
- **Secondary products** (single, floating or rental license) with:
  - License key for licensing of installation software is delivered with a core product or supplied separately
- **Cumulative volume licenses (quantity options)** with
  - License keys for a specific license volume in the form of process objects (POs), archive tags, TAGs, agents, clients, sources or units

All software products categorized in this way are available as packages. As an alternative to this physical form of delivery, the installation software, software and volume licensing are often available online as well.

The available forms of delivery for each product are explicitly specified in the ordering data and identified by different article numbers.

Delivery form package

The products are delivered in a form and package suitable for parcel shipping by conventional means of transportation (e.g. shipped by truck, rail or air) to the shipping address of the customer.

Within the SIMATIC PCS 7 core products, the SIMATIC PCS 7 installation software (SIMATIC PCS 7 Software Media Package or SIMATIC PCS 7 Software Media Package ASIA) and the software license for the specific SIMATIC PCS 7 software product are separate packages. They are no longer sealed together in one product package.

The SIMATIC PCS 7 Software Media Package or its regional ASIA version is supplied with the SIMATIC PCS 7 core products for each single order item. When ordering more than one item, you can influence the number of Software Media Packages using the order item. For example, if you order three SIMATIC PCS 7 OS Software Single Station V8.1 software products as a single order item, you will receive only one SIMATIC PCS 7 Software Media Package. However, if you distribute the order between three order items, you will receive a SIMATIC PCS 7 Software Media Package for each of the three software licenses.

Additional SIMATIC PCS 7 Software Media Packages and volume licenses specified for the core product can be ordered separately depending on the requirement.

The following table illustrates this ordering and delivery logistics:

Order				Product package	
Item No.	Quantity	Product name	Article No.	Quantity	Components
Ordering of 3 units with one order item					
010	**3**	**SIMATIC PCS 7 OS Software Single Station V8.1 including 100 OS Runtime POs**	6ES7658-2AA18-0YA0	3	License key USB stick, certificate of license
				1	SIMATIC PCS 7 Software Media Package
Ordering of 3 units with three order items					
010	**1**	**SIMATIC PCS 7 OS Software Single Station V8.1 including 100 OS Runtime POs**	6ES7658-2AA18-0YA0	1	License key USB stick, certificate of license
				1	SIMATIC PCS 7 Software Media Package
020	**1**	**SIMATIC PCS 7 OS Software Single Station V8.1 including 100 OS Runtime POs**	6ES7658-2AA18-0YA0	1	License key USB stick, certificate of license
				1	SIMATIC PCS 7 Software Media Package
030	**1**	**SIMATIC PCS 7 OS Software Single Station V8.1 including 100 OS Runtime POs**	6ES7658-2AA18-0YA0	1	License key USB stick, certificate of license
				1	SIMATIC PCS 7 Software Media Package

The following SIMATIC PCS 7 software products are supplied without the SIMATIC PCS 7 Software Media Package or its ASIA variant:

- Secondary products
- Core products with rental license
- Client software

The ordering and delivery logistics described for the core products is therefore not relevant for these products. SIMATIC PCS 7 Software Media Packages and SIMATIC PCS 7 Software Media Packages ASIA can be ordered separately depending on requirements.

■ **Design** (continued)

Delivery form online

We offer online delivery for SIMATIC PCS 7 software and license keys via the Internet as an innovative alternative to the physical delivery of goods. The decisive advantage over the physical delivery of goods lies in the fact that the software and licenses are available immediately and can be easily managed.

The software products and licenses that can be downloaded have different article numbers. They are ordered through the normal channels, e.g. the Industry Mall.

When ordering via the Industry Mall, you can filter out the ordering data of those products that can be delivered online with reference to the selected branch of the product and offering tree. This can be done by selecting the type of delivery "Online delivery" from a drop-down list on the right of the screen. In this manner you will achieve a better overview of the online offering.

When ordering a product that can be delivered online, the email address of the ship-to party must be provided. The recipient of the goods is informed by email as soon as the ordered products are available for downloading. The email message with the availability information also contains the login data. Parallel delivery on a data carrier does not take place.

The software, license key and associated documents, e.g. the Certificate of License (CoL), are downloaded in the Automation License Manager (ALM). A license key can be downloaded once only. To log in, the login data received in the email is required. As an alternative, the access data to the Industry Mall account can be used for logging in.

Apart from the download, ALM also supports license management. You can, for example, get an overview of the available licenses or those obtained online, allocate licenses, and run a hardware-specific license analysis.

In contrast to the delivery package, the SIMATIC PCS 7 Software Media Package with online delivery of core products is not included in the download. For online delivery, the downloadable SIMATIC PCS 7 Software Media Package must always be additionally ordered as a separate add-on.

SIMATIC PCS 7 Software Support Package

We offer you supplementary documentation and additive software (drivers, service packs, tools, etc.) for SIMATIC PCS 7 in the form of the SIMATIC PCS 7 Software Support Package. It is only authorized for use in combination with the corresponding SIMATIC PCS 7 Software Media Package/SIMATIC PCS 7 Software Media Package ASIA. Software licenses are not involved.

If required, you can also obtain some of the software components in the SIMATIC PCS 7 Software Support Package directly from the respective manufacturer.

■ Ordering data

	Article No.
SIMATIC PCS 7 Software Media Packages	
SIMATIC PCS 7 Software Media Package V8.1[1] Installation software and electronic documentation on DVD, 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, including trial license for 14 days	
• Delivery form package Software DVDs, certificate of license	**6ES7658-4XX18-0YT8**
• Delivery form online Software download, online certificate of license Note: E-mail address required!	**6ES7658-4XX18-0YG8**
SIMATIC PCS 7 Software Media Package ASIA V8.1[1] Installation software and electronic documentation on DVD, 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, including trial license for 14 days	
• Delivery form package Software DVDs, certificate of license	**6ES7658-4XX18-0CT8**
SIMATIC PCS 7 Software Support Package V8.x[2] Add-on documentation and software (drivers, service packs, and tools, etc.) on DVD, 5 languages (English, German, French, Italian, Spanish), software class B, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit	
• Delivery form package Software DVDs, certificate of license	**6ES7650-4XX08-0YT8**

[1] Permanent use of SIMATIC PCS 7 software requires valid software licenses. In addition to the SIMATIC PCS 7 software from the SIMATIC PCS 7 Software Media Package, you may require supplementary software (for details, see product information), which can be obtained directly from the manufacturers or in the form of the SIMATIC PCS 7 Software Support Package.

[2] SIMATIC PCS 7 Software Support Package V8.x is authorized for use only in combination with the SIMATIC PCS 7 Software Media Package V8.1 or the SIMATIC PCS 7 Software Media Package ASIA V8.1.

Software Media and Logistics

PCS 7 Software Packages

1

■ **More information**

Regional product versions

Originally, all SIMATIC PCS 7 software products were designed for international use, i.e. there was only one product version for worldwide use, which was offered in up to 6 languages: English, German, French, Italian, Spanish and Chinese. However, the number of supported languages was not uniform; it varied depending on the product. This internationally usable product variant remains available for all SIMATIC PCS 7 software products.

In addition, a regional "ASIA" product version will also be offered for the SIMATIC PCS 7 Software Media Package and specific SIMATIC PCS 7 software products of the "Engineering System" and "Operator System" system components. The ASIA products are currently available in two languages: English and Chinese (simplified). They are explicitly identified in the name by the suffix "ASIA".

If a product listed in this catalog does not have the suffix "ASIA" in its name, it can always be used globally. However, the following restriction applies: If a regional ASIA product is offered, the pendant for international use does not support the Asian languages (currently Chinese simplified) present in the ASIA product.

The products for international use, i.e. products without the suffix "ASIA", are not intended as the basis for runtime systems with fonts in Asian languages.

The following special points must be observed as a result of the definition of separate products for installation software and licenses. The SIMATIC PCS 7 installation software is available in the form of two data medium packages:

- SIMATIC PCS 7 Software Media Package
- SIMATIC PCS 7 Software Media Package ASIA

The specific ASIA software licenses harmonize exclusively with the SIMATIC PCS 7 Software Media Package ASIA. SIMATIC PCS 7 software licenses for which there is no ASIA pendant can be used with both SIMATIC PCS 7 Software Media Packages.

Overview

Software Update Service for SIMATIC PCS 7

Siemens offers a cost-effective Software Update Service (SUS) for international SIMATIC PCS 7 software products (except for specially marked regional versions, such products with the "ASIA" label). If you utilize this service, you participate in the further development of the SIMATIC PCS 7 software you are using, and are always in possession of the latest release versions. You can join the software update service for SIMATIC PCS 7 by purchasing SUS packages, and this is only possible on the basis of the current software versions at the time of purchase.

The SUS packages represent a structural division of the SIMATIC PCS 7 software product range using functional and system-specific aspects. The number and composition of the package components identified as **list elements** are mainly characterized by license aspects (see "Design" for structure and contents, page 1/6). A list element can represent a single software product or also be a synonym for several products of the same type.

When purchasing **one** SUS package, you automatically receive all upgrades and ServicePacks for the software referred to in this package for one year. Within this period of one year, you are therefore authorized to update **one** corresponding license from your stock for **each** list element in this package. The total number of SUS packages of one type which you require is therefore determined by the list element which includes most of the software licenses you use.

An example of the SUS OS server package should make this clear once again based on a fictitious license inventory:

Software products in inventory	License inventory	License inventory per list item	Number of SUS packages
• 3 × PCS 7 OS Software Server, 1 × PCS 7 Process Historian Redundancy	3 2	5	5
• 1 × PCS 7 Information Server Basic Package	1	1	
• 3 × PCS 7 SFC Visualization	3	3	

For a list item that represents several products, existing licenses of these products are to be added in the inventory first. In the example, these are the licenses of the "PCS 7 OS Software Server" and "PCS 7 Process Historian Redundancy" for the first list element of the SUS OS server. Be aware that the "PCS 7 Process Historian Redundancy" product contains 2 licenses.

The license inventory is defined by a single product for the other list items. The list item that combines the most licenses is ultimately decisive in determining the number of required SUS packages. Based on the example, you would therefore need to order 5 SUS OS server packages.

Duration of subscription, cancellation

Delivery is to the address entered in the order. An SUS is automatically extended for a further year unless canceled no later than 3 months prior to expiration. Cancellation must be made in writing, and must be sent to the dispatch center with reference to the contract number.

SUS editions

SUS packages are available as:
• SUS Standard Edition
• SUS Compact Edition
• SUS Download Edition

The SUS Standard Edition is the most comprehensive package form. If you order this edition n-times, you will receive n number of packing units.

Each of these packing units contains
• Initial delivery: 1 Certificate of Contract
• Upgrade delivery: 1 data carrier set, 1 license key USB stick with **one** license

The SUS Compact Edition reduces the scope of the package for the Software Update Service for multiple workstations and simplifies the central management of licenses.

If you order the SUS Compact Edition n-times, you will receive only one packing unit. This packing unit contains
• Initial delivery: n Certificates of Contract
• Upgrade delivery: 1 data carrier set, 1 license key USB stick with **n** licenses

The SUS Compact Edition is offered for the following SIMATIC PCS 7 SUS packages:
• SUS OS Single Station
• SUS OS Server
• SUS OS Client, SFC Visualization
• SUS SIMATIC BATCH Server/Single Station
• SUS SIMATIC BATCH Client

The SUS Download Edition delivered over the Internet has the advantage that software and licenses are available more rapidly than with the physical delivery, and can also be managed more easily.

When delivering the SUS Download Edition, the e-mail address of the consignee is obligatory. An order item can only be assigned to a single e-mail address. The consignee is informed by e-mail as soon as the Certificates of Contract or the software and licenses are available for downloading.

Downloading of software, license keys, and associated documents is carried out in the Automation License Manager (ALM).

Software Media and Logistics

Software Update Service

■ **Overview** (continued)

The following table uses an example to clarify the differences between the SUS editions:

Edition	SUS Standard Edition	SUS Compact Edition	SUS Download Edition
Packaging	Package	Package	Online delivery
Order	25 × SUS Standard Edition in one order item	25 × SUS Compact Edition in one order item	25 × SUS Download Edition in one order item
First delivery	25 packing units with: • 1 × Certificate of Contract (CoC)	1 packing unit with: • 25 × Certificate of Contract (CoC)	1 e-mail message for • 25 × Online Certificate of Contract (ECoC)
Subsequent delivery of Service Packs	25 × Service Pack (data carrier set)	1 × Service Pack (data carrier set)	1 × Service Pack (download)
Subsequent delivery of upgrades	25 packing units with: • 1 × data carrier set • 1 × license key USB stick with 1 license • 1 × Certificate of License (CoL)	1 packing unit with: • 1 × data carrier set • 1 × license key USB stick with 25 licenses • 25 × Certificate of License (CoL)	1 e-mail message for • Software download • 25 × license key download • 25 × Certificate of License online
Billing	1 bill	1 bill	1 bill

If a comparable product exists in a different edition for an existing SUS package, the existing SUS contract can be modified accordingly if required.

Software Update Service for TIA products

In addition to the SUS for the SIMATIC PCS 7 process control system, there is also an SUS for SIMATIC PCS 7 products used in a different context (CFC, SIMATIC PDM) within the scope of Totally Integrated Automation (TIA). In the case of SIMATIC PDM, this is identical to the SUS PDM package for the Software Update Service for SIMATIC PCS 7.

The SUS range is rounded-off by the SUS for SIMATIC S7 products used in the context of SIMATIC PCS 7, e.g. SUS S7-PLCSIM.

■ **Design**

Structure and content of the SUS packages for the SIMATIC PCS 7 Software Update Service

Note:

Each item of an SUS package (element in list) represents a software license.

SUS Engineering AS/OS	• PCS 7 Engineering AS/OS, PCS 7 Engineering AS • PCS 7 ES Single Station (AS/OS: 250 POs) • PCS 7 Management Console • PCS 7 Import-Export Assistant • Version Cross Manager • Version Trail • PCS 7 SFC Visualization • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1613 A2
SUS PDM	• PDM Basic PDM Service PDM S7 PDM PCS 7 PDM PCS7-FF PDM PCS 7 Server PDM Integration in STEP 7/PCS 7 PDM Extended PDM Communication FOUNDATION Fieldbus PDM Routing PDM Server • PDM HART Server
SUS OS single station (2 SUS packages are required for a redundant pair)	• PCS 7 OS Software Single Station, PCS 7 OS Software Single Station Redundancy (for one single station) • PCS 7 OpenPCS 7/OS Client • PCS 7 OpenPCS 7 • PCS 7 SFC Visualization • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1613 A2

SUS OS server (2 SUS packages are required for a redundant pair)	• PCS 7 OS Software Server, PCS 7 OS Software Server Redundancy (for one server), PCS 7 Process Historian Basic Package, PCS 7 Process Historian Redundancy (for one server) PCS 7 Process Historian and Information Server Basic Package • PCS 7 Process Historian Archive BATCH • PCS 7 Process Historian OPC UA Server • PCS 7 Information Server Basic Package • PCS 7 OpenPCS 7/OS Client • PCS 7 OpenPCS 7 • PCS 7 SFC Visualization • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1613 A2
SUS OS Client, SFC Visualization	• PCS 7 OS Software Client • PCS 7 SFC Visualization
SUS Web Server	• PCS 7 Web Server • PCS 7 Web Diagnostics Server • PCS 7 Web Diagnostics Client
SUS Maintenance Station	• PCS 7 Maintenance Station Engineering • PCS 7 Maintenance Station Runtime Basic Package • PCS 7 OS Software Client
SUS SIMATIC BATCH Server/ Single Station	• PCS 7 SIMATIC BATCH Server • PCS 7 SIMATIC BATCH Single Station Package • PCS 7 SIMATIC BATCH Basic • PCS 7 SIMATIC BATCH API • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1613 A2
SUS SIMATIC BATCH Client	• PCS 7 SIMATIC BATCH Client • PCS 7 SIMATIC BATCH Recipe System
SUS SIMATIC Route Control	• PCS 7 SIMATIC Route Control Engineering • PCS 7 SIMATIC Route Control Center • PCS 7 SIMATIC Route Control Server • PCS 7 BCE • IE S7 license for communication via CP 1623/CP 1613 A2

■ Ordering data

	Article No.		Article No.

SUS Standard Edition

SIMATIC PCS 7 Software Update Service, Standard Edition
Subscription for 1 year with automatic extension; requirement: Current software version; form of delivery

	Article No.
• PCS 7 Software Update Service for Engineering AS/OS	**6ES7658-1XX00-0YL8**
• PCS 7 Software Update Service for OS Single Station	**6ES7658-2AX00-0YL8**
• PCS 7 Software Update Service for OS Server	**6ES7658-2BX00-0YL8**
• PCS 7 Software Update Service for OS Client, SFC Visualization	**6ES7658-2CX00-0YL8**
• PCS 7 Software Update Service for Web Server	**6ES7658-2GX00-2YL8**
• PCS 7 Software Update Service for Maintenance Station	**6ES7658-7GX00-0YL8**
• PCS 7 Software Update Service for SIMATIC BATCH Server/Single Station	**6ES7657-0SA00-0YL8**
• PCS 7 Software Update Service for SIMATIC BATCH Client	**6ES7657-0XX00-2YL8**
• PCS 7 Software Update Service for SIMATIC Route Control	**6ES7658-7DX00-0YL8**

Software Update Service for TIA products, Standard Edition
(SIMATIC PCS 7 products used in a different context, as well as SIMATIC S7 products used with SIMATIC PCS 7)

Subscription for 1 year with automatic extension; requirement: current software version

	Article No.
• SIMATIC PDM Software Update Service	**6ES7658-3XX00-0YL8**
• S7-PLCSIM Software Update Service	**6ES7841-0CA01-0YX2**

SUS Compact Edition

SIMATIC PCS 7 Software Update Service, Compact Edition
Subscription for 1 year with automatic extension; requirement: Current software version; form of delivery

	Article No.
• PCS 7 Software Update Service for OS Single Station	**6ES7658-2AX00-0YM8**
• PCS 7 Software Update Service for OS Server	**6ES7658-2BX00-0YM8**
• PCS 7 Software Update Service for OS Client, SFC Visualization	**6ES7658-2CX00-0YM8**
• PCS 7 Software Update Service for SIMATIC BATCH Server/Single Station	**6ES7657-0SA00-0YM8**
• PCS 7 Software Update Service for SIMATIC BATCH Client	**6ES7657-0XX00-2YM8**

SUS Download Edition

SIMATIC PCS 7 Software Update Service, Download Edition
Subscription for 1 year with automatic extension; requirement: current software version; delivery form: online
Note:
E-mail address required!

	Article No.
• PCS 7 Software Update Service for Engineering AS/OS	**6ES7658-1XX00-0YV8**
• PCS 7 Software Update Service for OS Single Station	**6ES7658-2AX00-0YV8**
• PCS 7 Software Update Service for OS Server	**6ES7658-2BX00-0YV8**
• PCS 7 Software Update Service for OS Client, SFC Visualization	**6ES7658-2CX00-0YV8**
• PCS 7 Software Update Service for Web Server	**6ES7658-2GX00-2YV8**
• PCS 7 Software Update Service for Maintenance Station	**6ES7658-7GX00-0YV8**
• PCS 7 Software Update Service for SIMATIC BATCH Server/Single Station	**6ES7657-0SA00-0YV8**
• PCS 7 Software Update Service for SIMATIC BATCH Client	**6ES7657-0XX00-2YV8**
• PCS 7 Software Update Service for SIMATIC Route Control	**6ES7658-7DX00-0YV8**
• SIMATIC PDM Software Update Service	**6ES7658-3XX00-0YV8**

Software Media and Logistics

1

Overview

PCS 7 online help is supplied with SIMATIC PCS 7. It can be called using the SIMATIC Manager. The help can be dynamically expanded with add-on help documents.

The complete SIMATIC PCS 7 system documentation is provided as a free-of-charge, multilingual manual collection on the Internet via **My Documentation Manager**.

My Documentation Manager not only enables you to view documents, you can also collect them in your own library and generate your own documents. Information about using these functions as well as FAQs are available in My Documentation Manager.

The SIMATIC PCS 7 system documentation provides both beginners and experienced users with valuable information on all aspects of the process control system. The range extends from the system introduction, covers initial steps and cross-system topics, up to a description of individual system components. With the "Getting Started" documentation you can gain initial practical experience using example projects.

In order to use this, select the manuals for your SIMATIC PCS 7 version on the website for SIMATIC PCS 7 technical documentation:

www.siemens.com/pcs7-documentation

You can open the available SIMATIC PCS 7 manuals directly in the My Documentation Manager, or first start the My Documentation Manager and then select the desired documentation in the integrated Siemens library.

In addition to the SIMATIC PCS 7 system documentation, the Siemens library in the My Documentation Manager provides access to the technical documentation of other products and systems from the SIMATIC range of products.

More information

The "SIMATIC Technical Documentation" site on the Internet directs you straight to the complete range of technical documentation available for SIMATIC products and systems in English, German, French, Italian, Spanish and Chinese. If other languages are available, you can also find them there. You can select individual documents from this range for viewing or downloading.

Additional information is available on the Internet at:

www.siemens.com/simatic-docu
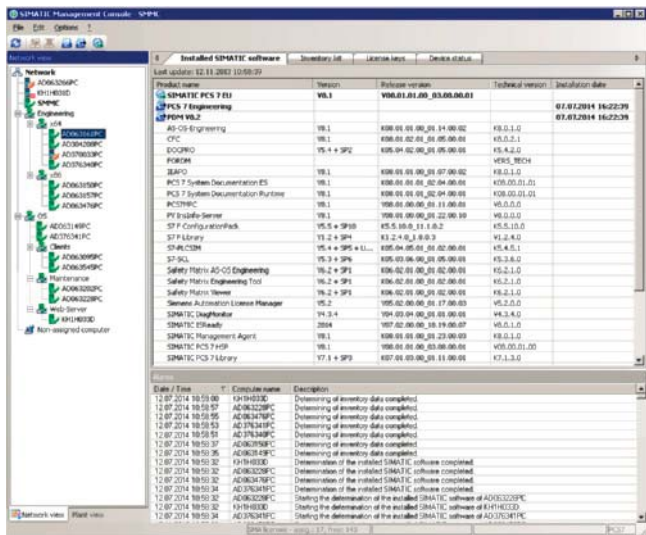
System Administration

Management Console

■ Overview

SIMATIC Management Console: Overview of installed software status

A process control system includes numerous heterogeneous components with specific parameters and settings. It is also subject to a dynamic change process due to updates, upgrades as well as modernization measures and expansion. As the plant gets older, it becomes more difficult for you to keep track of the current state of hardware and software. What is more, establishing and maintaining transparency without system support is very time consuming.

The SIMATIC PCS 7 Management Console enables you to reduce the work for managing your SIMATIC PCS 7 plant to a minimum. You also have the latest status of the installed hardware and software components immediately at hand.

SIMATIC PCS 7 Management Console enables:
- Centralized, standardized administration of SIMATIC PCS 7 software
- Inventory of all installed hardware and software components of the SIMATIC PCS 7 plant

■ Design
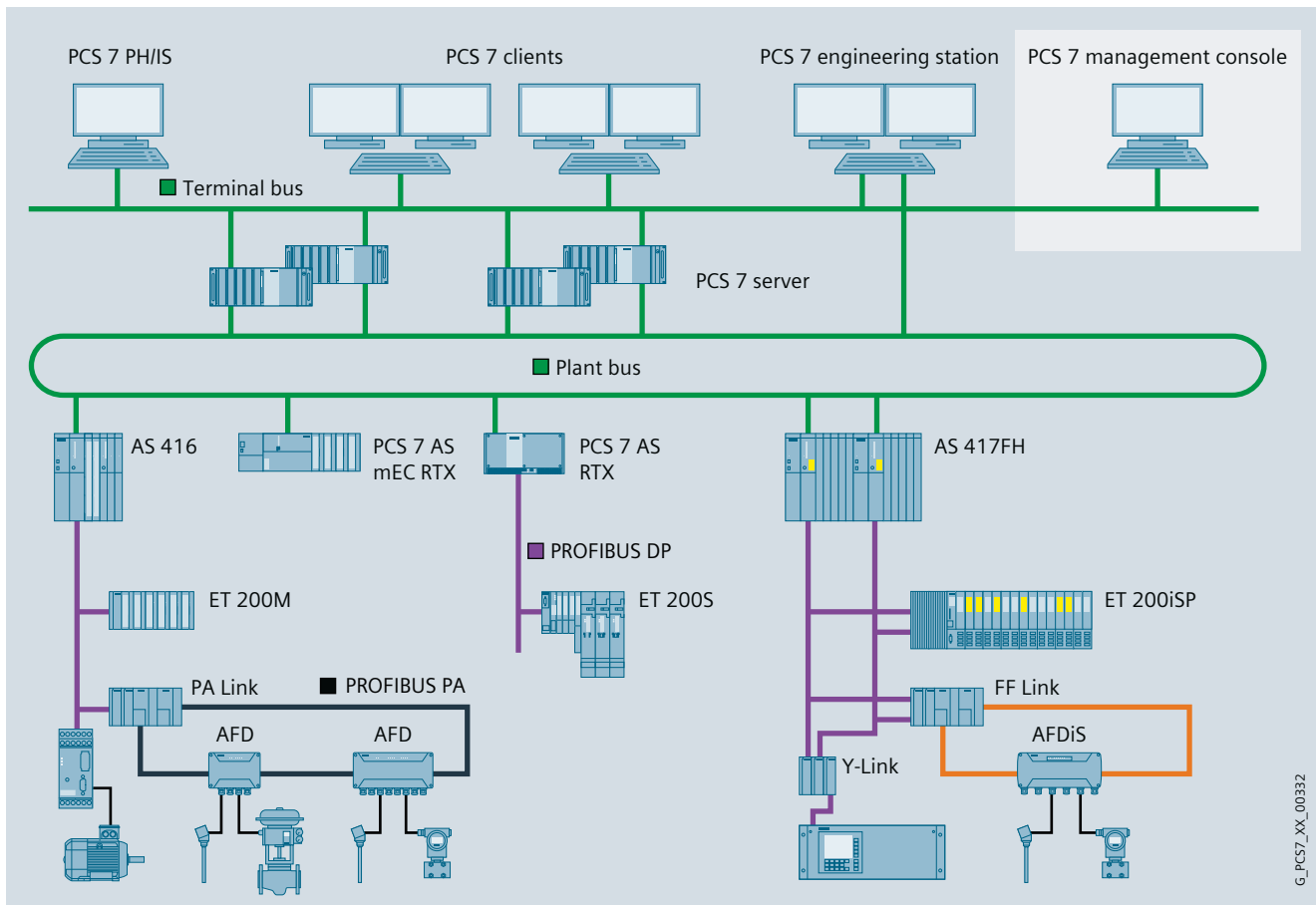
Example of a SIMATIC PCS 7 plant with a stand-alone SIMATIC PCS 7 Management Console

Design (continued)

The SIMATIC PCS 7 Management Console enables you to manage either individual SIMATIC PCS 7 plants or multiple plants of a SIMATIC PCS 7 plant network.

For small and medium-sized SIMATIC PCS 7 plants, the SIMATIC PCS 7 Management Console can be installed and operated on a PCS 7 engineering station.

However, a stand-alone SIMATIC PCS 7 Management Console is typically used for medium-sized and large SIMATIC PCS 7 plant networks. For the single station or server versions of SIMATIC PCS 7 Industrial Workstation that are a suitable as the basic hardware for such a dedicated SIMATIC PCS 7 Management Console, see "SIMATIC Rack PC" in the section "Industrial Workstation/IPC", page 3/3.

SIMATIC PCS 7 Industrial Workstations of a SIMATIC PCS 7 plant managed with the SIMATIC PCS 7 Management Console are licensed as Management Console agents.

One Management Console Agent license is required for each SIMATIC PCS 7 Industrial Workstation managed by the Management Console. The Management Console agents are available in cumulative sets with 10, 50 and 100 licenses.

Function

Central administration of SIMATIC PCS 7 software

The central administration of the software versions of all stations in your SIMATIC PCS 7 plant significantly reduces your administrative work. SIMATIC PCS 7 installations, updates and service packs are subject to administration. In addition to the latest SIMATIC PCS 7 software V8.1, upgrades to V8.1 are also supported. The software can be installed on a single target station or in parallel on multiple target stations. The installation on the target station does not require active participation of the user. Thanks to the upstream security mechanisms, unintended adverse effects on runtime operation can be prevented.

Setup management
- Provision of SIMATIC PCS 7 installation files on dedicated file servers or combined on the SIMATIC PCS 7 Management Console
- Addition/removal of SIMATIC PCS 7 setups in the central setup management of the SIMATIC PCS 7 Management Console
- Creation of pre-configured setup packages based on plant/user-specific aspects (e.g. OS client package)
- Rollout of pre-configured setup packages to target stations

Status monitoring of the target stations
- Check of target stations for installation readiness by determining and displaying the operating state or role (e.g. OS runtime active/inactive, redundancy mode)
- Implicit, remote disabling of a station in preparation for the start of a SIMATIC PCS 7 update installation
- Status monitoring of the entire SIMATIC PCS 7 installation (e.g. resumption of the installation after restart or network interruption)
- Implicit, remote enabling of a station after completion of a SIMATIC PCS 7 update installation

SIMATIC PCS 7 system inventory

General inventory taking of installed hardware and software components from a central location offers the following advantages, for example:
- Quick analysis of the installed components as preparation for replacement actions or upgrades
- Simple creation of a detailed inventory report

The SIMATIC PCS 7 system inventory spans all levels of a SIMATIC PCS 7 plant: company management level, control level, and field level. It covers all SIMATIC PCS 7 system components in these levels, e.g. SIMATIC PCS 7 workstations, Industrial Ethernet switches, automation systems (controllers), remote I/Os, links, field devices, drives, etc.

SIMATIC PCS 7 system inventory implies:
- Central acquisition of inventory data by reading it from the database of the SIMATIC PCS 7 engineering system or directly from the components
- Generation of an inventory report in Microsoft Excel format
- Creation of a license certificate in the form of a list of installed and actually used software licenses

System Administration

Management Console

■ Ordering data	Article No.		Article No.

2

SIMATIC PCS 7
Management Console V8.1

5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008/2008 R2 Standard 64-bit, floating license for 1 user

• Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license

6ES7658-5BX18-2YB5

• Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

6ES7658-5BX18-2YH5

Management Console Agents[1]
Independent of language, software class A, floating license for 1 user

• Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license
  - 10 agents   **6ES7658-5BA00-2YB5**
  - 50 agents   **6ES7658-5BB00-2YB5**
  - 100 agents   **6ES7658-5BC00-2YB5**
• Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!
  - 10 agents   **6ES7658-5BA00-2YH5**
  - 50 agents   **6ES7658-5BB00-2YH5**
  - 100 agents   **6ES7658-5BC00-2YH5**

[1] An agent is required for each SIMATIC PCS 7 Industrial Workstation managed by the Management Console.

Industrial Workstation/IPC

Industrial Workstation/IPC
Introduction

Overview

We offer a select range of modern and powerful SIMATIC PCS 7 Industrial Workstations for the systems located above the controller level in the SIMATIC PCS 7 system architecture, e.g. for:

- Engineering
- Operating and monitoring (also via Internet/intranet)
- Asset management
- Batch automation
- Route control
- Remote control
- IT applications

SIMATIC PCS 7 Industrial Workstations based on a SIMATIC Rack PC of type IPC547E, IPC647D or IPC 847D are optimized for use as single station, server or client, and can be expanded specific to the system.

As a supplement to these, the SIMATIC Microbox PC in the version SIMATIC PCS 7 OS Client 427 as well as the SIMATIC Box PC in the version SIMATIC PCS 7 BOX OS Client 627 provide low-cost client alternatives for operator control and monitoring and for batch automation.

Application

Basic hardware for single station/server

SIMATIC PCS 7 Industrial Workstations of type IPC547E, IPC647D or IPC 847D, which are available for use as single station or server, vary in their performance, features, expansion reserves, and length of the product lifecycle. A table compares the essential features of these types in the catalog section "SIMATIC Rack PC, introduction", allowing you to quickly narrow down the search for your specific application. You can then use the detailed technical data in the same catalog section to define this preselection in detail.

Basic hardware for clients

Compared to the more compact client versions SIMATIC PCS 7 OS Client 427 and SIMATIC PCS 7 BOX OS Client 627, clients based on a SIMATIC Rack PC have a larger number and greater variety of interfaces. They therefore offer more expansion options and can be used more universally. In multi-monitor mode, you can control up to four process monitors with equivalent quality.

The main advantage of the SIMATIC PCS 7 OS Client 427 is its highly compact and rugged design which allows maintenance-free 24/7 operation without fans. The version with solid-state drive (SSD) is particularly resistant to vibration and shock since there are no rotating storage media. As a result of the design, however, the expansion options of the SIMATIC PCS 7 OS Client 427 are restricted.

The compact and sturdy SIMATIC PCS 7 BOX OS Client 627 with a comparable interface configuration is slightly larger than a client on the basis of the SIMATIC Microbox PC. In return, it is additionally equipped with a DVD drive and two free slots for expansion modules. Furthermore, it can also be ordered as a design version with Panel Front (TFT Touch Panel).

Options

Notes on the use of other basic hardware and non-SIMATIC software

Siemens guarantees the compatibility of hardware and software for system configurations based on components in this catalog.

The system test confirms that the system software of the SIMATIC PCS 7 process control system can be run on the basic hardware offered in this catalog. Despite comprehensive tests, it cannot be excluded that the function of a SIMATIC PCS 7 system could be disturbed or interfered with as a result of additional non-SIMATIC software, i.e. software which has not been explicitly approved for SIMATIC PCS 7.

If you use hardware other than the basic hardware offered in this catalog, or additional non-SIMATIC software, this is at your own risk. If compatibility problems arise as a result of these hardware/software components, the support provided for their elimination is not free of charge.

The licenses for plant bus communication via Industrial Ethernet, i.e. for Basic Communication Ethernet (BCE) and CP 1613/1623/1628 communication (IE) are bound to the SIMATIC PCS 7 Industrial Workstations. Depending on the selected type of communication, the SIMATIC PCS 7 Industrial Workstations for single stations and servers are delivered as standard with a network adapter plus BCE license or a CP 1623 plus SIMATIC NET HARDNET IE S7 communications software.

If you are using SIMATIC PCS 7 V8.1 on other computers (not SIMATIC PCS 7 Industrial Workstations), you additionally require a SIMATIC PCS 7 BCE V8.1 license (article number 6ES7650-1CD18-2YB5) for all single stations or servers which are connected to the plant bus via a standard network adapter and not via a CP 1623/CP 1613 A2/CP 1628.

Overview

Rack PC family IPC647, IPC847, IPC547

With the SIMATIC PCS 7 Industrial Workstation of type IPC547E, we offer you an excellent platform for the configuration of single stations, servers or clients for SIMATIC PCS 7 V8.1. With its all-round capabilities it is ideal for numerous applications in process automation. The more powerful types, IPC647D and IPC847D, are excellent alternatives to meet higher requirements.

Because the basic components such as chipset, processor or memory, are identical, many technical specifications of the IPC647D and IPC847D types are comparable. The essential differences result from the different overall heights. Since the IPC647D is only half as high as IPC847D, the number and variety of the free slots are reduced in this case. On the other hand, the more compact design requires significantly less space and enables higher packing densities in the control cabinet. This allows the realization of space-saving designs.

The IPC847D is the most powerful and best equipped SIMATIC PCS 7 Industrial Workstation. Its numerous and varied slots provide a great deal of potential for expansion. The IPC847D is predestined for use as a server or single station. Since it would be over-dimensioned as a client, it is not offered in this version.

Application

Features		SIMATIC PCS 7 Industrial Workstation		
		IPC547E	IPC647D	IPC847D
Available SIMATIC PCS 7 pre-installations	V8.1	●	●	●
Available versions	ES/OS Single Station	●	●	●
	OS Server	●	●	●
	OS Client	●	●	–
Height		4 U	2 U	4 U
ECC work memory		–	●	●
Software RAID controller (onboard)	RAID1	●	●	●
Hard disks/ Solid State Drive (SSD)	SATA	●	●	●
	SSD	●	●	●
No. of slots	PCIe x16	2	2 or 4	5
	PCIe x8	1	–	–
	PCIe x4	–	–	3
	PCIe x1	–	–	–
	PCI	4	0 or 2	3
Redundant power supply	with diagnostics	–	●	●
	Without diagnostics	●	–	–
Lifecycle	Marketing	1.5 to 2 years	5 years	5 years
	Spare parts/repair	3 years	5 years	5 years

Industrial Workstation/IPC
SIMATIC Rack PC

3

■ **Application** (continued)

Specially optimized versions are available for operation as single stations, servers or clients. The operating system and the following ES/OS software of the SIMATIC PCS 7 process control system are factory installed:

- Single station: PCS 7 Engineering Software for AS/OS (including OS Runtime software)
- Server: PCS 7 OS Software Server
- Client: PCS 7 OS Software Client

You only need the corresponding licenses in order to use the pre-installed SIMATIC PCS 7 software.

Note:

Please note the standard installation if you use the SIMATIC PCS 7 Industrial Workstations within the SIMATIC PCS 7 process control system for other tasks, e.g. as basic hardware for SIMATIC BATCH, SIMATIC Route Control, PCS 7 TeleControl, PCS 7 PowerControl, PCS 7 Process Historian, PCS 7 Information Server or PCS 7 Web Server. You can then expand or discard the existing SIMATIC PCS 7 pre-installation, or restore it using one of the supplied restore DVDs (for details, see section restore DVDs under IPC547E, IPC647D or IPC847D, page 3/14, page 3/22 and page 3/30).

■ **Design**

Types of plant bus communication

A SIMATIC PCS 7 workstation in the single station or server version can be used in a variety of ways on the Industrial Ethernet plant bus depending on the type and number of automation systems connected:

Interface	Software	for AS communication
Communication module CP 1623/CP 1613 A2/CP 1628	SIMATIC NET HARDNET-IE S7 communication software, licensed for up to four CP 1623/CP 1613 A2/CP 1628 (license for 4 units)	with up to 64 AS single stations (not AS redundant stations)
	SIMATIC NET HARDNET-IE S7-REDCONNECT communication software, licensed for up to four CP 1623/CP 1613 A2/CP 1628 (license for 4 units)	with redundant automation systems (redundant stations)
Ethernet card	BCE (Basic Communication Ethernet) license	with up to 8 AS single stations

The SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack is suitable for upgrading the SIMATIC NET HARDNET-IE S7 communication software (for ordering data, see section "Communication", section "Industrial Ethernet, System Connection of PCS 7 systems", page 10/46)

The Industrial Ethernet versions of the SIMATIC PCS 7 Industrial Workstation for single stations and servers are equipped as standard with a CP 1623 communication module and SIMATIC NET HARDNET-IE S7 communications software. The BCE license is involved in the BCE versions of the SIMATIC PCS 7 Industrial Workstation.

Upgrade from BCE to CP 1613/1623/1628 communication

OS single stations and OS servers with BCE communication can also be upgraded at a later time for communication with CP 1613/1623/1628. Items required:

- Network card for connecting to Industrial Ethernet:
  - CP 1623 with PCI Express interface or
  - CP 1613 A2 with conventional PCI interface or
  - CP 1628 with PCIexpress interface and additional security functions
- S7 communications software for CP 1613/CP 1623/CP 1628
  - SIMATIC NET HARDNET-IE S7 for communication with AS single stations or
  - SIMATIC NET HARDNET-IE S7-REDCONNECT for communication with AS redundancy stations and AS single stations

For additional information and ordering data for the components mentioned, see section "Communication", section "Industrial Ethernet, System Connection of PCS 7 systems", page 10/46.

Expansion components

The core component of the SIMATIC PCS 7 Industrial Workstation is a SIMATIC industrial PC without mouse, keyboard and monitor. This basic hardware can be expanded further with the following components from this catalog depending on the environment of use and customer requirements:

- Accessories
  - Memory modules
  - Country-specific power supply cable
  - Tower Kit (IPC547E and IPC847D only)
- Expansion components
  - Mouse and keyboard
  - Multi-monitor mode
  - Smart card reader
  - Signal output

Multi-monitor mode is already supported as standard by two optional versions with two or up to four monitors. These can be selected when compiling the SIMATIC PCS 7 Industrial Workstation via selection table or configurator.

Multi-monitor mode can also be installed subsequently. Information on multi-monitor mode as well as the ordering data required for retrofitting can be found in the section "Multi-monitor mode", page 3/41.

3

Technical specifications

Comparison of the workstation types for SIMATIC PCS 7 V8.1

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Design and equipment features			
Design			
19" rack	4 U	2 U	4 U
Ready for telescopic rails?	Yes	Yes	Yes
Horizontal/vertical installation	Yes/Yes	Yes/No	Yes/Yes
19" fixing bracket with handle; dis-mountable from outside	Yes	Yes	Yes
Tower kit (accessory)	Yes	No	Yes
Degree of protection	IP30 at front (front door closed); IP20 at the rear according to EN 60529	IP41 at front (front door closed); IP20 at the rear according to EN 60529	IP41 at front (front door closed); IP20 at the rear according to EN 60529
Dust protection	With closed front door in conformity with IEC 60529 Filter class G2 EN 779, particles > 0.5 mm are blocked by 99%	With closed front door in conformity with IEC 60529 Filter class G2 EN 779, particles > 0.5 mm are blocked by 99%	With closed front door in conformity with IEC 60529 Filter class G2 EN 779, particles > 0.5 mm are blocked by 99%
Chipset	Intel Q87	Intel C226 (DH82C226 PCH)	Intel C226 (DH82C226 PCH)
CPU			
Processor, clock	• Intel Core i7-4770S (4C/8T; 3.1 (3.9) GHz, 8 MB cache, iAMT) • Intel Core i5-4570S (4C/4T; 2.9 (3.6) GHz, 6 MB cache, iAMT) • Intel Pentium Dual Core G3420 (2C/2T; 3.2 GHz, 3 MB cache)	• Intel Xeon E3-1268L v3, 4 cores, 8 threads, 2.3 (3.3) GHz, GT2, 8 MB cache, Turbo Boost, VT-d, iAMT • Intel Core i5-4570TE, 2 cores, 4 threads, 2.7 (3.3) GHz, GT2, 4 MB cache, Turbo Boost, VT-d, iAMT • Intel Core i3-4330TE, 2 cores, 4 threads, 2.4 GHz, GT2, 4 MB cache	• Intel Xeon E3-1268L v3, 4 cores, 8 threads, 2.3 (3.3) GHz, GT2, 8 MB cache, Turbo Boost, VT-d, iAMT • Intel Core i5-4570TE, 2 cores, 4 threads, 2.7 (3.3) GHz, GT2, 4 MB cache, Turbo Boost, VT-d, iAMT • Intel Core i3-4330TE, 2 cores, 4 threads, 2.4 GHz, GT2, 4 MB cache
Main memory (SDRAM)			
Type	DDR3-1600 SDRAM (PC3-12800)	DDR3-1600 SDRAM (PC3-12800), with or without ECC	DDR3-1600 SDRAM (PC3-12800), with or without ECC
Maximum configuration	4 DIMM memory sockets in total; together up to 32 GB	4 DIMM memory sockets in total; together up to 32 GB	4 DIMM memory sockets in total; together up to 32 GB
Standard configuration	4 GB DDR3-1600 SDRAM (2 × 2.0 GB); dual channel 8 GB DDR3-1600 SDRAM (2 × 4.0 GB); dual channel 16 GB DDR3-1600 SDRAM (2 × 8.0 GB); dual channel 32 GB DDR3-1600 SDRAM (4 × 8.0 GB); dual channel 8 GB or more can be selected for OS server or ES/OS single station 4 GB and more can be selected for OS client	4 GB DDR3 SDRAM (2 × 2.0 GB); dual channel 4 GB DDR3 SDRAM (1 × 4.0 GB); single channel, ECC 8 GB DDR3 SDRAM (2 × 4.0 GB); dual channel (without/with ECC) 16 GB DDR3 SDRAM (2 × 8.0 GB); dual channel (without/with ECC) 32 GB DDR3 SDRAM (4 × 8.0 GB); dual channel (without/with ECC) 8 GB or more can be selected for OS server or ES/OS single station 4 GB and more can be selected for OS client	8 GB DDR3 SDRAM (2 × 4.0 GB); dual channel (without/with ECC) 16 GB DDR3 SDRAM (2 × 8.0 GB); dual channel (without/with ECC) 32 GB DDR3 SDRAM (4 × 8.0 GB); dual channel (without/with ECC) 8 GB or more can be selected for OS server or ES/OS single station
Motherboard slots	Total of 7 slots: 4 × PCI 1 × PCIe x8 (1 lane, Gen 2.0) 1 × PCIe x16 (4 lanes, Gen 2.0) 1 × PCIe x16; Gen 3.0 Modules up to 312 mm in length can be used	Selectable bus modules with total of 4 slots: • 2 × PCIe x16 (8 lanes, Gen 3.0) and 2 × PCI • 1 × PCIe x16 (8 lanes, Gen 3.0), 1 × PCIe x16 (4 lanes, Gen 2.0); 2 × PCIe x16 (4 lanes, Gen 3.0) Modules up to 312 mm in length can be used	Bus module with total of 11 slots: 1 × PCIe x16 (8 lanes, Gen 3.0) 2 × PCIe x16 (4 lanes, Gen 3.0) 2 × PCIe x16 (4 lanes, Gen 2.0 3 × PCIe x4 (4 lanes, Gen 2.0) 3 × PCI Modules up to 312 mm in length can be used

Industrial Workstation/IPC
SIMATIC Rack PC

■ **Technical specifications** (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Possible slots for SATA drives			
On the front	Alternative for HDD/SSD: 3 × 5.25", 1 × 5.25" + 3 × slimline removable drive bay 3.5" or 4 × slimline removable drive bay 3.5" 1 × 3.5" (slimline) for DVD burner	2 × slimline removable drive bay 3.5" for HDD/SSD 1 × 3.5" (slimline) for DVD burner	4 × slimline removable drive bay 3.5" for HDD/SSD 1 × 3.5" (slimline) for DVD burner
Indoors	2 × 3.5" for HDD/SSD	2 × 3.5" for HDD (in shock and vibration-damped drive cage; alternative to removable drive bay)	2 × 3.5" for HDD in shock and vibration-damped drive cage 2 × 3.5" for HDD/SSD, integral
RAID controller	Onboard: Intel PCH RAID controller with Intel Rapid Storage Technology	Onboard: Mobile Intel 8 series SATA RAID controller	Onboard: Mobile Intel 8 series SATA RAID controller
Drives			
Hard disk (HDD)	500 GB or 1 TB SATA 3.5" (6 Gbit/s) with NCQ technology	500 GB or 1 TB SATA 3.5" (6 Gbit/s) with NCQ technology	500 GB or 1 TB SATA 3.5" (6 Gbit/s) with NCQ technology
Solid-State Drive (SSD) • With ES/OS single station or OS server • With OS client	240 GB or 480 GB SATA 2.5" (eMLC) 160 GB, 240 GB or 480 GB SATA 2.5" (eMLC)	240 GB or 480 GB SATA 2.5" (eMLC) 160 GB, 240 GB or 480 GB SATA 2.5" (eMLC)	240 GB or 480 GB SATA 2.5" (eMLC) –
DVD burner	DVD±R/RW 5.25" SATA Slimline Read: • DVD-ROM: single layer 8x, dual layer 6x • DVD-R/+R: single layer 8x, dual layer 6x • DVD-RW/+RW 8x; DVD-RAM 5x • CD-R 24x, CD-RW 24x Write: • DVD+R 8x, DVD+RW 8x, DVD-R 8x, DVD-RW 6x • DVD+R9 (DL) 6x, DVD-R DL 2x • CD-R 24x, CD-RW 24x	DVD±R/RW 5.25" SATA Slimline Read: • DVD-ROM: single layer 8x, dual layer 6x • DVD-R/+R: single layer 8x, dual layer 6x • DVD-RW/+RW 8x; DVD-RAM 5x • CD-R 24x, CD-RW 24x Write: • DVD+R 8x, DVD+RW 8x, DVD-R 8x, DVD-RW 6x • DVD+R9 (DL) 6x, DVD-R DL 2x • CD-R 24x, CD-RW 24x	DVD±R/RW 5.25" SATA Slimline Read: • DVD-ROM: single layer 8x, dual layer 6x • DVD-R/+R: single layer 8x, dual layer 6x • DVD-RW/+RW 8x; DVD-RAM 5x • CD-ROM/CD-R 24x, CD-RW 24x Write: • DVD+R 8x, DVD+RW 8x, DVD-R 8x, DVD-RW 6x • DVD+R (DL) 6x, DVD-R DL 2x • CD-R 24x, CD-RW 24x
Floppy disk drive	No	No	No

HDD/SSD configuration	HDD (single station, server or client)
	• 500 GB or 1 TB HDD SATA internal; 0.2 g vibration, 1 g shock
	• 500 GB or 1 TB HDD SATA in removable drive bay; at the front
	• 1 TB RAID1 internal; 0.2 g vibration, 1 g shock (2 × 1 TB HDD SATA, data mirroring)
	• 1 TB RAID1 in removable drive bay; for hot swapping; at the front (2 × 1 TB HDD SATA, data mirroring)
	• 1 TB RAID1 (2 × 1 TB HDD SATA, data mirroring) plus 1 TB hot-spare HDD SATA; each in removable drive bay; for hot swapping; at the front
	SSD
	• SSD SATA internal:
	  - 240 GB or 480 GB (single station or server)
	  - 160 GB, 240 GB or 480 GB (client)
	• SSD SATA in removable drive bay; at the front
	  - 240 GB or 480 GB (single station or server)
	  - 160 GB, 240 GB or 480 GB (client)
	HDD+SSD (single station or server)
	• 1 TB RAID1 (2 × 1 TB HDD SATA, data mirroring), for hot swapping plus 240 GB SSD, each in removable drive bay; at the front
		HDD (single station, server or client)
		• 500 GB or 1 TB HDD SATA internal; 0.5 g vibration, 5 g shock
		• 500 GB or 1 TB HDD SATA in removable drive bay; at the front
		• 1 TB RAID1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring)
		• 1 TB RAID1 in removable drive bay; for hot swapping; at the front (2 × 1 TB HDD SATA, data mirroring)
		SSD
		• SSD SATA internal:
		  - 240 GB or 480 GB (single station or server)
		  - 160 GB, 240 GB or 480 GB (client)
		• SSD SATA in removable drive bay; at the front
		  - 240 GB or 480 GB (single station or server)
		  - 160 GB, 240 GB or 480 GB (client)
		HDD+SSD (single station or server)
		• 1 TB RAID1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) plus 240 GB SSD, internal, in the DVD drive slot
		• 1 TB RAID1 in removable drive bay; for hot swapping; at the front (2 × 1 TB HDD SATA, data mirroring) plus 240 GB SSD, internal, in the DVD drive slot
			HDD (single station or server)
			• 500 GB or 1 TB HDD SATA internal; 0.5 g vibration, 5 g shock
			• 500 GB or 1 TB HDD SATA in removable drive bay; at the front
			• 1 TB RAID1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring)
			• 1 TB RAID1 in removable drive bay; for hot swapping; at the front (2 × 1 TB HDD SATA, data mirroring)
			• 1 TB RAID1 (2 × 1 TB HDD SATA, data mirroring) plus 1 TB hot-spare HDD SATA; each in removable drive bay; for hot swapping; at the front
			SSD (single station or server)
			• 240 GB or 480 GB SSD SATA internal
			• 240 GB or 480 GB SSD SATA in removable drive bay; at the front
			HDD+SSD (single station or server)
			• 1 TB RAID1 internal; 0.5 g vibration, 5 g shock (2 × 1 TB HDD SATA, data mirroring) plus 240 GB SSD in removable drive bay, at the front
			• 1 TB RAID1 (2 × 1 TB HDD SATA, data mirroring), for hot swapping plus 240 GB SSD, each in removable drive bay; at the front

■ Technical specifications (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Graphics card	Onboard Intel graphics controller, integrated in processor; version depends on processor, either HD Graphics 4600 (i7-4770S and i5-4570S) or HD Graphics 4400 (G3420)	Onboard Intel graphics controller HD Graphics P4600/P4700; 2-D and 3-D engine integrated in processor	Onboard Intel graphics controller HD Graphics P4600/P4700; 2-D and 3-D engine integrated in processor
Graphics memory	Dynamic Video Memory Technology (uses between 32 MB and 1.7 GB RAM)	Dynamic Video Memory Technology (uses between 32 MB and 1.7 GB RAM)	Dynamic Video Memory Technology (uses between 32 MB and 1.7 GB RAM)
Resolutions. frequencies, colors	• DVI connection: up to 1 920 × 1 200 at 60 Hz, 32-bit color depth (VGA via adapter cable) • DisplayPort: up to 3 840 × 2 160 at 60 Hz, 32-bit color depth (DVI-D or VGA via adapter cable)	• VGA connection: up to 2 560 × 1 600 at 120 Hz, 32-bit color depth (DVI-I to VGA or DisplayPort to VGA via adapter cable) • DVI connection: up to 2 048 × 1 152 at 60 Hz / 32-bit color depth • DisplayPort: up to 4 096 × 2 160 at 24 Hz / 32-bit color depth	• VGA connection: up to 2 560 × 1 600 at 120 Hz, 32-bit color depth (DVI-I to VGA or DisplayPort to VGA via adapter cable) • DVI connection: up to 2 048 × 1 152 at 60 Hz / 32-bit color depth • DisplayPort: up to 4 096 × 2 160 at 24 Hz / 32-bit color depth
Interface modules, interfaces			
Terminal bus interface	2 × Ethernet port (RJ45) 10/100/1000 Mbit/s, teaming-capable, two independent controllers: Intel Clarkville i217LM and Intel Springville i210-AT	2 × Ethernet port (RJ45) 10/100/1000 Mbit/s, electrically isolated, teaming-capable, two independent controllers: Intel WGI217LM and Intel WGI210IT	2 × Ethernet port (RJ45) 10/100/1000 Mbit/s, electrically isolated, teaming-capable, two independent controllers: Intel WGI217LM and Intel WGI210IT
Plant bus interface module (single station/server), alternatives			
• BCE	Ethernet network card RJ45 10/100/1000 Mbit/s (PCIe x1)	Ethernet network card RJ45 10/100/1000 Mbit/s (PCIe x1)	Ethernet network card RJ45 10/100/1000 Mbit/s (PCIe x1)
• IE	CP 1623 communication module (PCIe x1)	CP 1623 communication module (PCIe x1)	CP 1623 communication module (PCIe x1)
USB 3.0	4 channels, 500 mA high current, super speed • 2 × at rear • 2 × at front	4 channels, 500 mA high current, super speed • 2 × at rear • 1 × at front • 1 × internal, with mechanical locking, e.g. for USB dongle	4 channels, 500 mA high current, super speed • 2 × at rear • 1 × at front • 1 × internal, with mechanical locking, e.g. for USB dongle
USB 2.0	7 channels, 500 mA high current, high speed • 6 × at rear • 1 × internal, with mechanical locking, e.g. for USB dongle	3 channels, 500 mA high current, high speed • 2 × at rear • 1 × at front	3 channels, 500 mA high current, high speed • 2 × at rear • 1 × at front
Serial (COM)	1 × COM1 (V.24), 9-pin sub-D connector	1 × COM1 (V.24), 9-pin sub-D connector	1 × COM1 (V.24), 9-pin sub-D connector
Parallel (LPT)	No	No	No
Audio	Realtek ALC671, 6-channel DAC support; 1 x Line In; 1 x Micro In; 1 x Line Out (2 W into 4 Ω)	1 × Micro In; 1 × Line Out/headphones (2 × 0.5 W/ 8 Ω); IDT 92HD81HD	1 × Micro In; 1 × Line Out/headphones (2 × 0.5 W/ 8 Ω); IDT 92HD81HD
Display port	Yes, 2 ×	Yes, 2 ×	Yes, 2 ×
DVI	1 × DVI-I for digital connection of a monitor	1 × DVI-I for digital connection of a monitor	1 × DVI-I for digital connection of a monitor
Multi-monitor interface	2 monitors: Integral interfaces: 1 × DVI and 1 × DVI via DisplayPort DVI adapter 3 or 4 monitors: Multi-monitor graphics card "4 Screens"	2 monitors: Integral interfaces: 1 × DVI and 1 × DVI via DisplayPort DVI adapter 3 or 4 monitors: Multi-monitor graphics card "4 Screens"	2 monitors: Integral interfaces: 1 × DVI and 1 × DVI via DisplayPort DVI adapter 3 or 4 monitors: Multi-monitor graphics card "4 Screens"
Keyboard	1 × PS/2	1 × PS/2	1 × PS/2
Mouse	1 × PS/2	1 × PS/2	1 × PS/2

Industrial Workstation/IPC
SIMATIC Rack PC

▍Technical specifications (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Operating systems and diagnostics software			
ES/OS single station/OS client	Windows 7 Ultimate 64-bit, multi-language (German, English, French, Italian, Spanish, Chinese)	Windows 7 Ultimate 64-bit, multi-language (German, English, French, Italian, Spanish, Chinese)	Windows 7 Ultimate 64-bit, multi-language (German, English, French, Italian, Spanish, Chinese)
OS server	Windows Server 2008 R2 Standard 64-bit including 5 CAL, multi-language (German, English, French, Italian, Spanish, Chinese)	Windows Server 2008 R2 Standard 64-bit including 5 CAL, multi-language (German, English, French, Italian, Spanish, Chinese)	Windows Server 2008 R2 Standard 64-bit including 5 CAL, multi-language (German, English, French, Italian, Spanish, Chinese)
System tested SIMATIC Industrial Software	SIMATIC IPC DiagMonitor integrated in pre-installation	SIMATIC IPC DiagMonitor integrated in pre-installation	SIMATIC IPC DiagMonitor integrated in pre-installation
Monitoring and diagnostics functions			
Watchdog	• Monitoring of program execution • Monitoring time adjustable in the software • Response to faults can be configured	• Monitoring of program execution • Monitoring time adjustable in the software • Restart can be configured for faults	• Monitoring of program execution • Monitoring time adjustable in the software • Restart can be configured for faults
Temperature	Exceeding the range of permitted operating temperatures	Violation of permissible operating temperature	Violation of permissible operating temperature
Fans	Speed monitoring for • Front fan • Processor fan • Power supply fan	Speed monitoring for • Front fan • Processor fan • Power supply fan	Speed monitoring for • Front fan • Processor fan • Power supply fan
Battery	Two-stage monitoring; service life following first warning at least 1 month	Two-stage monitoring; service life following first warning at least 1 month	Two-stage monitoring; service life following first warning at least 1 month
Drives	SMART messages of hard disks; RAID states "Normal", "Degraded" and "Rebuild"	SMART messages of hard disks; RAID states "Normal", "Degraded" and "Rebuild"	SMART messages of hard disks; RAID states "Normal", "Degraded" and "Rebuild"
Indicators (front LEDs)	• POWER (device switched on) • TEMP (temperature status) • FAN (fan/temperature monitoring) • HDD (hard disk activity) • HDD0/1/2/3 alarm (RAID status messages)	• POWER (device switched on) • HDD (hard disk activity) • ETHERNET 1, ETHERNET 2 (Ethernet status) • WATCHDOG (ready/fault signal) • TEMP (temperature status) • FAN (fan/temperature monitoring) • HDD0/1 ALARM (RAID status messages)	• POWER (device switched on) • ETHERNET 1, ETHERNET 2 (Ethernet status) • WATCHDOG (ready/fault signal) • TEMP (temperature status) • FAN (fan/temperature monitoring) • HDD0/1/2 ALARM (RAID status messages) and HDD	HDD3 ALARM (hard disk activity and RAID status message)
Safety			
Protection class	Protection class I in accordance with IEC 61140	Protection class I in accordance with IEC 61140	Protection class I in accordance with IEC 61140
Safety directives	IEC 60950-1; EN 60950-1; UL60950-1; CSA C22.2 No. 60950-1-07	IEC 60950-1; EN 60950-1; UL 60950-1; CSA C22.2 No 60950-1-07	IEC 60950-1 EN 60950-1 UL 60950-1 CSA C22.2 No 60950-1-07
Noise level			
Operation	< 45 dB(A) according to DIN 45635 (40 dB(A) at 20 °C, Windows idle mode)	< 45 dB(A) at 25 °C according to EN ISO 7779 (without DVD drive)	< 55 dB(A) at 25 °C according to EN ISO 7779 (all drives in operation; high CPU loading) < 45 dB(A) at 25 °C according to EN ISO 7779 (without DVD drive; low CPU loading)

Technical specifications (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Electromagnetic compatibility (EMC)			
Interference emission	EN 61000-6-3; EN 61000-6-4; CISPR 22, EN 55022 Class B; FCC Class A / EN 61000-3-2 Class D; EN 61000-3-3	EN 61000-6-3, FCC Class A; EN 61000-6-4; CISPR 22, EN 55022 Class B; EN 61000-3-2 Class D and EN 61000-3-3	EN 61000-6-3, FCC Class A; EN 61000-6-4; CISPR 22, EN 55022 Class B; EN 61000-3-2 Class D and EN 61000-3-3
Immunity to conducted interference on the supply lines	±2 kV (to IEC 61000-4-4, burst) ±1 kV (to IEC 61000-4-5, symmetrical surge) ±2 kV (to IEC 61000-4-5, asymmetrical surge)	±2 kV (to IEC 61000-4-4; burst) ±1 kV (to IEC 61000-4-5; symmetrical surge) ±2 kV (to IEC 61000-4-5; asymmetrical surge)	±2 kV (to IEC 61000-4-4; burst) ±1 kV (to IEC 61000-4-5; symmetrical surge) ±2 kV (to IEC 61000-4-5; asymmetrical surge)
Immunity to interference on signal lines	±1 kV (to IEC 61000-4-4; burst; length < 30 m) ±2 kV (to IEC 61000-4-4; burst; length > 30 m) ±2 kV (to IEC 61000-4-5; length > 30 m)	±1 kV (to IEC 61000-4-4; burst; length < 30 m) ±2 kV (to IEC 61000-4-4; burst; length > 30 m) ±2 kV (to IEC 61000-4-5; length > 30 m)	±1 kV (to IEC 61000-4-4; burst; length < 30 m) ±2 kV (to IEC 61000-4-4; burst; length > 30 m) ±2 kV (to IEC 61000-4-5; length > 30 m)
Immunity to static discharge	±4 kV contact discharge (according to IEC 61000-4-2) ±8 kV atmospheric discharge (according to IEC 61000-4-2)	±6 kV contact discharge (according to IEC 61000-4-2) ±8 kV atmospheric discharge (according to IEC 61000-4-2)	±6 kV contact discharge (according to IEC 61000-4-2) ±8 kV atmospheric discharge (according to IEC 61000-4-2)
Immunity to radiofrequency radiation	1 V/m, 2 to 2.7 GHz, 80 % AM (according to IEC 61000-4-3) 3 V/m, 1.4 to 2 GHz, 80 % AM (according to IEC 6100-4-3) 10 V/m, 80 to 1 000 MHz, 80 % AM (according to IEC 6100-4-3) 10 V, 150 kHz to 80 MHz, 80 % AM (according to IEC 61000-4-6)	3 V/m, 2 to 2.7 GHz, 80 % AM (according to IEC 61000-4-3) 10 V/m, 80 to 1 000 MHz and 1.4 to 2 GHz, 80 % AM (according to IEC 6100-4-3) 10 V, 10 kHz to 80 MHz, 80 % AM (according to IEC 61000-4-6)	3 V/m, 2 to 2.7 GHz, 80 % AM (according to IEC 61000-4-3) 10 V/m, 80 to 1 000 MHz and 1.4 to 2 GHz, 80 % AM (according to IEC 6100-4-3) 10 V, 10 kHz to 80 MHz, 80 % AM (according to IEC 61000-4-6)
Magnetic field	30 A/m, 50 Hz/60 Hz (according to IEC 61000-4-8)	100 A/m, 50 Hz/60 Hz (according to IEC 61000-4-8)	100 A/m, 50 Hz/60 Hz (according to IEC 61000-4-8)
Climatic conditions			
Temperature	Tested according to IEC 60068-2-2, IEC 60068-2-1, IEC 60068-2-14	Tested according to IEC 60068-2-2, IEC 60068-2-1, IEC 60068-2-14	Tested according to IEC 60068-2-2, IEC 60068-2-1, IEC 60068-2-14
• Operation	+5 ... +35 °C (without restriction) +5 ... +40 °C (no DVD burner operation) CPU up to 65 W power loss Gradient: max. 10 K/h, no condensation	+5 ... +35 °C (without restriction) +5 ... +40 °C (with DVD burner)[1] +5 ... +45 °C (without DVD burner)[1] +5 ... +50 °C (without DVD burner, no HDD operation in removable drive bay)[2] Gradient: max. 10 °C/h, no condensation [1] Power dissipation of the expansion modules in total < 55 W [2] Power dissipation of the expansion modules in total < 30 W	+5 ... +35 °C [1] +5 ... +40 °C (with DVD burner)[1] +5 ... +45 °C (without DVD burner)[1] +5 ... +50 °C (without DVD burner, max. 3 removable drive bays)[2] Gradient: max. 10 °C/h, no condensation [1] Power dissipation of the expansion modules in total max. 80 W [2] Power dissipation of the expansion modules in total < 30 W
• Storage/transport	-20 ... +60 °C Gradient: max. 20 K/h, no condensation	-20 ... +60 °C Gradient: max. 20 °C/h, no condensation	-20 ... +60 °C Gradient: max. 20 °C/h, no condensation
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30	Tested according to IEC 60068-2-78, IEC 60068-2-30	Tested according to IEC 60068-2-78, IEC 60068-2-30
• Operation	5 ... 80 % at 25 °C (no condensation) Gradient: max. 10 K/h, no condensation	5 ... 80 % at 25 °C (no condensation) Gradient: max. 10 °C/h, no condensation	5 ... 80 % at 25 °C (no condensation) Gradient: max. 10 °C/h, no condensation
• Storage/transport	5 ... 95 % at 25 °C (no condensation) Gradient: max. 20 K/h, no condensation	5 ... 95 % at 25 °C (no condensation) Gradient: max. 20 °C/h, no condensation	5 ... 95 % at 25 °C (no condensation) Gradient: max. 20 °C/h, no condensation
Atmospheric pressure			
• Operation	1080 ... 795 hPa (corresponds to a height of -1 000 ... 2 000 m)	1080 ... 795 hPa (corresponds to a height of -1 000 ... 2 000 m)	1080 ... 795 hPa (corresponds to a height of -1 000 ... 2 000 m)
• Storage/transport	1080 ... 660 hPa (corresponds to a height of -1 000 ... 3 500 m)	1080 ... 660 hPa (corresponds to a height of -1 000 ... 3 500 m)	1080 ... 660 hPa (corresponds to a height of -1 000 ... 3 500 m)

Industrial Workstation/IPC
SIMATIC Rack PC

■ **Technical specifications** (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Mechanical environmental conditions			
Vibrations	Tested according to IEC 60068-2-6, 10 cycles	Tested according to IEC 60068-2-6, 10 cycles	Tested according to IEC 60068-2-6, 10 cycles
• Operation	20 ... 58 Hz: Amplitude 0.015 mm; 58 ... 200 Hz: 2 m/s² (approx. 0.2 g)	10 ... 58 Hz: Amplitude 0.0375 mm; 58 ... 500 Hz: 4.9 m/s² (approx. 0.5 g)	10 ... 58 Hz: Amplitude 0.0375 mm[1]; 58 ... 500 Hz: 4.9 m/s² (approx. 0.5 g)[1]
	Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.	Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.	Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.
			[1] With HDD mounting on side panel and assembly of device using telescopic rails max. 0.019 mm at 10 to 58 Hz; max. 3 m/s² at 58 to 500 Hz
• Storage/transport	5 ... 8.51 Hz: Amplitude 3.5 mm; 8.51 ... 500 Hz: 9.8 m/s²	5 ... 9 Hz: Amplitude 3.5 mm; 9 ... 500 Hz: 9.8 m/s²	5 ... 9 Hz: Amplitude 3.5 mm; 9 ... 500 Hz: 9.8 m/s²
Shock resistance	Tested according to IEC 60068-2-27	Tested according to IEC 60068-2-27, IEC 60068-2-29	Tested according to IEC 60068-2-27, IEC 60068-2-29
• Operation	Half sine: 9.8 m/s², 20 ms (approx. 1 g), 100 shocks per axis	Half sine: 50 m/s², 30 ms (approx. 5 g), 100 shocks per axis	Half sine: 50 m/s², 30 ms (approx. 5 g), 100 shocks per axis[1]
	Note: No mechanical loads can be tolerated when using hard disks in removable drive bay and during burning process with CD/DVD burners.	Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.	Note: No mechanical loads when using hard disks in removable drive bay and during DVD burning process.
			[1] With HDD mounting on side panel and assembly of device using telescopic rails max. 0.019 mm at 10 to 58 Hz; max. 3 m/s² at 58 to 500 Hz
• Storage/transport	Half sine: 250 m/s², 6 ms, 1 000 shocks per axis	Half sine: 250 m/s², 6 ms, 1000 shocks per axis	Half sine: 250 m/s², 6 ms, 1000 shocks per axis
Approvals, standards			
CE in conformity with 2004/108/EC, 2006/95/EC	Yes	Yes	Yes
Industrial area of application • Interference emission • Noise immunity	EN 61000-6-4: 2007 + A1:2011 EN 61000-6-2:2005	EN 61000-6-4 2007 + A1:2011 EN 61000-6-2:2005	EN 61000-6-4 2007 + A1:2011 EN 61000-6-2:2005
Application in apartment, business, trade, small enterprise • Interference emission • Noise immunity	EN 61000-6-3: 2007 + A1:2011 EN 61000-6-1:2007	EN 61000-6-3: 2007 + A1:2011 EN 61000-6-1:2007	EN 61000-6-3:2007 + A1:2011 EN 61000-6-1:2007
cULus: • 60950-1, File No. E11 5352 • CAN/CSA-C22.2 No. 60950-1-07 (I.T.E.)	Yes	Yes	Yes
USA: FCC Rules, Part 15, Class A	Yes	Yes	Yes
Canada: ICES-003, Class B; NMB-003, Class B	Yes	Yes	Yes
Australia: EN 61000-6-3:2007	Yes	Yes	Yes
Korea: Korean Certification (KC Mark)	Yes	Yes	Yes
Special features			
Quality assurance according to ISO 9001:2008	Yes	Yes	Yes

■ **Technical specifications** (continued)

Type	SIMATIC IPC547E	SIMATIC IPC647D	SIMATIC IPC847D
Power supply			
Nominal supply voltage (U_N)	Single power supply unit: • 100 to 240 V AC (-15 %; +10 %) Redundant power supply unit: • 2 × 100 to 240 V AC (-15 %; +10 %)	Single power supply unit: • 100 to 240 V AC (-15 %; +10 %) Redundant power supply unit: • 2 × 100 to 240 V AC (-15 %; +10 %)	Single power supply unit: • 100 to 240 V AC (-15 %; +10 %) Redundant power supply unit: • 2 × 100 to 240 V AC (-15 %; +10 %)
Frequency	50 ... 60 Hz (min. 47 Hz, max. 63 Hz, sinusoidal)	50 ... 60 Hz (minimum 47 Hz to maximum 63 Hz, sinusoidal)	50 ... 60 Hz (minimum 47 Hz to maximum 63 Hz, sinusoidal)
Short-term voltage dip	20 ms at 93 V (max. 10 events per hour; recovery time of at least 1 s)	20 ms at 93 V (max. 10 events per hour; recovery time of at least 1 s)	20 ms at 93 V (max. 10 events per hour; recovery time of at least 1 s)
Power consumption at 230 W secondary (maximum configuration)	290 W max. at 80 % efficiency with single or redundant power supply unit	240 W max. at 80 % efficiency with single or redundant power supply unit	270 W max. at 80 % efficiency with single power supply unit 300 W max. at 70 % efficiency with redundant power supply unit
AC input current	• Continuous current up to 6 A at 100 V; up to 3 A at 240 V • Up to 80 A for 3.6 ms during startup with single power supply unit • Up to 210 A per module for 1.65 ms during startup with redundant power supply unit	• Continuous current up to 6 A • Up to 30 A for 5 ms during startup	• Continuous current up to 7 A • Up to 30 A for 5 ms during startup
Max. current output (DC)	• +5 V: 26 A; +3.3 V: 24 A (in total up to 190 W) • +12 V: 15 A; +12 V: 15 A • -12 V: 0.2 A • +5 V_{aux}: 2 A Total sum of all voltages max. 230 W	• +5 V: 30 A; +3.3 V: 28 A (in total up to 160 W) • +12 V: 15 A • -12 V: 0.5 A • -5 V: 0.5 A • +5 V_{aux}: 2 A Total sum of all voltages max. 190 W	• +5 V: 26 A; +3.3 V: 24 A (in total up to 190 W) • +12 V: 15 A; +12 V: 15 A • -12 V: 0.2 A • +5 V_{aux}: 2 A Total sum of all voltages max. 210 W
Dimensions and weights			
Installation dimensions (W × H × D) in mm	433.5 × 176.5 × 445.5	430.4 × 88.1 × 444.6	430.4 × 177.4 × 444.4
Weight	15 ... 23 kg	10 ... 14 kg	16 ... 23 kg

3

Industrial Workstation/IPC
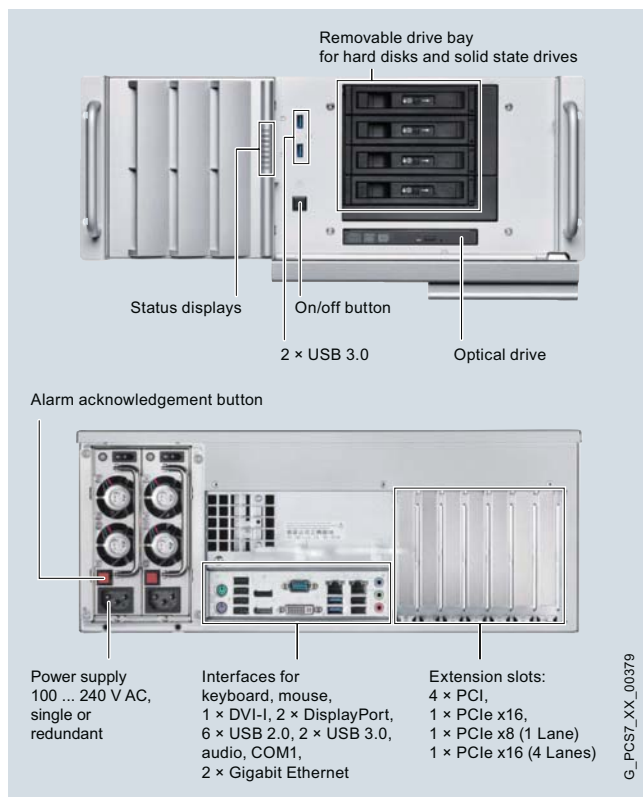SIMATIC Rack PC

IPC547E

3

■ Overview

SIMATIC Rack PC IPC547E

The SIMATIC PCS 7 Industrial Workstations based on a SIMATIC Rack PC of type IPC547E are UL-certified and have the CE mark for use in industry as well as residential, business and commercial environments. With their innovative Intel PC architecture of 19" rack design, their high availability, flexibility and service friendliness they are highly suitable for the specific requirements associated with process control technology.

■ Design

Removable drive bay
for hard disks and solid state drives

Status displays

On/off button

2 × USB 3.0

Optical drive

Alarm acknowledgement button

Power supply
100 ... 240 V AC,
single or
redundant

Interfaces for
keyboard, mouse,
1 × DVI-I, 2 × DisplayPort,
6 × USB 2.0, 2 × USB 3.0,
audio, COM1,
2 × Gigabit Ethernet

Extension slots:
4 × PCI,
1 × PCIe x16,
1 × PCIe x8 (1 Lane)
1 × PCIe x16 (4 Lanes)

G_PCS7_XX_00379

SIMATIC IPC547E, front with open front door (top) and rear

The SIMATIC PCS 7 Industrial Workstations of type IPC547E have an all-metal enclosure in 19" rack design (4 Us), which is particularly protected against dust by a filter and pressurized ventilation. This mechanically and electromechanically rugged enclosure has a service-friendly design. The SIMATIC PCS 7 Industrial Workstations of type IPC547E can be positioned and installed horizontally or vertically. Using an optional tower kit, the Rack PC can be converted into an industry tower. The compact dimensions also allow space-saving assembly in 500-mm deep 19" control cabinets.

The SIMATIC PCS 7 Industrial Workstations of type IPC547E are suitable for reliable 24-hour continuous operation at ambient temperatures between 5 and 40 °C. Shocks up to 1 g and vibrations up to 0.2 g can be tolerated during operation.

Further essential features

Powerful technology with modern processors and graphic controllers

- Motherboard based on the Intel chipset Q87
- Main memory expansion with 4 to 32 GB (client) or 8 to 32 GB (server/single station) DDR3-1600 SDRAM, without ECC (in dual-channel mode for optimum performance)
- Powerful and energy-saving Intel multi-core processors: i7, i5, or Pentium Dual Core
- Powerful Intel graphics controller onboard, integrated in the processor
  - Either HD Graphics 4600 (i7 and i5) or HD Graphics 4400 (Pentium Dual Core) version depending on the type of processor
  - 2 digital interfaces: DVI-I and DisplayPort (DVI-D via DisplayPort DVI adapter)
  - Analog VGA connection via DVI-I to VGA adapter or DisplayPort to VGA
- Optional graphics expansion for multi-monitor mode with up to 4 process monitors (up to 2 process monitors on the onboard graphics controller)
- Optimization to maximum performance with 160/240/480 GB solid-state drive

■ **Design** (continued)

Expansion options and interfaces

- 2 × 10/100/1000 Mbit/s Ethernet RJ45 port integrated onboard
- Numerous slots for PCI/PCI-Express expansion modules (all for modules up to 312 mm in length)
  - 4 × PCI
  - 1 × PCIe x8 (1 lane)
  - 1 × PCIe x16
  - 1 × PCIe x16 (4 lanes)
- Total of 4 USB 3.0 ports
  - 2 on the rear of the device
  - 2 on the front
- Total of 7 USB 2.0 ports
  - 6 on the rear of the device
  - 1 internal, e.g. for software license dongle ASIA
- Serial COM interface (1 × COM1)
- Further interfaces at the rear of the device:
  - 2 × PS/2 for mouse and keyboard
  - Audio (1 × Line In, 1 × Line Out, 1 × Micro In)
- Connections for SATA drives, occupied in accordance with preconfigured features:
  - HDD/SSD in slimline removable drive bay (up to 4) or in the 5.25" slot (at the front)
  - 1 slimline DVD burner (at the front)
  - Up to 2 HDD/SSD 3.5"/2.5" in the internal drive cage
- Slots for drives (occupied in accordance with configuration):
  - 3 slots 5.25" (at the front) for accommodating 4 slimline removable drive bays for HDD/SSD
  - 1 slot 3.5" (at the front) for slimline DVD burner
  - 2 slots 3.5" (internal)

High system availability

- High-quality components with high MTBF values
- RAID1 configuration for data mirroring on 2 SATA hard disks (also in hot swap drive bay for replacement of a hard disk during operation)
- Faulty hard disk in a RAID configuration can be quickly identified via the HDD alarm LED
- RAID configuration optionally with hot-spare hard disk (reserve) for automatically taking over the function of a faulty hard disk
- Redundant 100 to 240 V AC power supply with hot swap functionality as a design variation
- Lockable front door provides access protection for removable media, USB ports, operator controls (on/off button), fan, and air filter on the front
- Diagnostics and monitoring functions for temperature, fan, and program execution (watchdog) as well as for battery and drives
- LEDs on front for power, hard disk activity, and status of RAID, temperature and fans

Integration in SIMATIC PCS 7 system diagnostics

- Can be integrated into the system diagnostics with the SIMATIC PCS 7 Maintenance Station by means of the SIMATIC IPC DiagMonitor diagnostics software for monitoring the program execution (watchdog), temperature, fan speed, hard disk status and system failure

Practical and service-friendly design for industrial use

- High EMC
- Degree of protection at front: IP30 (with front door closed), at rear: IP20
- Dust protection through fan-controlled pressurized cooling via filter
- Filter can be replaced without tools
- Special hard disk holders and card retainers for protection against vibration and shock
- Fast replacement of hard disks by means of hot-swap frame (configuration option)
- Simple cabinet assembly possible using telescopic rails

High investment protection

- System-tested with SIMATIC PCS 7
- Marketing period 1.5 to 2 years, supply with replacement parts/repairs over 3 years
- Support for legacy interfaces (PS/2, COM)
- Certification for worldwide marketing (cULus)
- Installation compatible across device generations
- Worldwide service and support

Industrial Workstation/IPC
SIMATIC Rack PC

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■ **Design** (continued)

Restore DVD

The operating system and the SIMATIC PCS 7 software are already preinstalled on the SIMATIC PCS 7 Industrial Workstations. The supplied restore DVDs permit fast restoring of the delivered status or a new installation for a different application.

The following table shows you the contents of the supplied restore DVDs and the preinstalled software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V8.1 Industrial Workstation	Included Restore DVDs	Preinstalled on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC547E W7 (IE or BCE)	Restore DVD 1: Windows 7 Ultimate 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows 7 Ultimate 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS server IPC547E BCE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
SIMATIC PCS 7 OS server IPC547E IE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
Client		
SIMATIC PCS 7 OS client IPC547E W7	Restore DVD 1: Windows 7 Ultimate 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows 7 Ultimate 64-bit operating system plus software installation for operation as OS client	●

Individual configuration of SIMATIC PCS 7 Industrial Workstations

By selecting predefined equipment features, you can individually configure the SIMATIC PCS 7 Industrial Workstation and thus also its article number. Selection tables for single station, server and client are available for this in the Section "Selection and ordering data" (paper catalog) . A further selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as replacement parts.

The PCS 7 INDUSTRIAL WORKSTATION IPC547E configurator in the Industry Mall allows you to interactively select and order the SIMATIC PCS 7 Industrial Workstation in the single station, server or client version – directly for the system or as a replacement part.

Individually configured SIMATIC PCS 7 Industrial Workstations will be built to order. Therefore the average delivery time for such an order is 15 working days.

■ **Technical specifications**

Detailed technical specifications for the SIMATIC PCS 7 Industrial Workstation of type IPC547E is available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction", page 3/5.

Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC547E

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660- 4 ▪ ▪ ▪ ▪ - 1 A ▪ ▪
SIMATIC IPC547E industrial PC	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Processor and system type	
• Pentium Dual Core G3420 (2C/2T, 3.30 GHz, 3 MB cache), ES/OS single station	A
• Core i5-4570S (4C/4T, 2.90 (3.60) GHz, 6 MB cache, iAMT), ES/OS single station	D
• Core i7-4770S (4C/8T, 3.10 (3.90) GHz, 8 MB cache, iAMT), ES/OS single station	G
Hard disks and solid-state drives	
with SATA hard disk (HDD)	
• 500 GB HDD SATA, 0.2 g vibration, 1 g shock; internal	A
• 1 TB HDD SATA, 0.2 g vibration, 1 g shock; internal	B
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.2 g vibration, 1 g shock; internal	C
• 500 GB HDD SATA in removable drive bay; at the front	D
• 1 TB HDD SATA in removable drive bay, at the front	E
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
• RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare; in removable drive bay, for hot swapping; at the front	G
HDD SATA + SSD	
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping; at the front + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front	J
SSD	
• 240 GB SSD (eMLC) SATA; internal	L
• 480 GB SSD (eMLC) SATA; internal	M
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	P
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	Q
Main memory	
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel	1
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel	2
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel	3
Communication with plant bus	
• BCE	0
• Industrial Ethernet (CP 1623)	1
• Without additional communication modules	8

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660- 4 ▪ ▪ ▪ ▪ - 1 A ▪ ▪
SIMATIC IPC547E industrial PC	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Enclosure type/swap media/ multi-monitor option	
Unpainted enclosure	
• Without optical drive	
- Without multi-monitor mode	A
- Multi-monitor mode for 2 screens[1]	B
- Multi-monitor mode for 4 screens[2]	C
• With DVD±RW (slim)	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens[1]	E
- Multi-monitor mode for 4 screens[2]	F
Painted enclosure	
• Without optical drive	
- Without multi-monitor mode	G
- Multi-monitor mode for 2 screens[1]	H
- Multi-monitor mode for 4 screens[2]	J
• With DVD±RW (slim)	
- Without multi-monitor mode	K
- Multi-monitor mode for 2 screens[1]	L
- Multi-monitor mode for 4 screens[2]	M
Power supply unit, country-specific version	
• 100 to 240°V°AC industrial power supply to NAMUR	
- Power cord for Europe	0
- Power cord for the UK	1
- Power cord for Switzerland	2
- Power cord for the USA	3
- Power cord for Italy	4
- Power cord for China	5
• 2 × 100 to 240 V AC, redundant power supply; without power cord	6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)

[2] Incl. PCIe x16 graphics card

Industrial Workstation/IPC
SIMATIC Rack PC

IPC547E

■ **Ordering data** (continued)

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-							
	4	■	■	■	■	- 1 D	■	■

SIMATIC IPC547E industrial PC

Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed

Processor and system type								
• Pentium Dual Core G3420 (2C/2T, 3.30 GHz, 3 MB cache), OS server		B						
• Core i5-4570S (4C/4T, 2.90 (3.60) GHz, 6 MB cache, iAMT), OS server		E						
• Core i7-4770S (4C/8T, 3.10 (3.90) GHz, 8 MB cache, iAMT), OS server		H						

Hard disks and solid-state drives								
with SATA hard disk (HDD)								
• 500 GB HDD SATA, 0.2 g vibration, 1 g shock; internal			A					
• 1 TB HDD SATA, 0.2 g vibration, 1 g shock; internal			B					
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.2 g vibration, 1 g shock; internal			C					
• 500 GB HDD SATA in removable drive bay; at the front			D					
• 1 TB HDD SATA in removable drive bay, at the front			E					
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front			F					
• RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare; in removable drive bay, for hot swapping; at the front			G					
HDD SATA + SSD								
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping; at the front + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front			J					
SSD								
• 240 GB SSD (eMLC) SATA; internal			L					
• 480 GB SSD (eMLC) SATA; internal			M					
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front			P					
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front			Q					

Main memory								
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel				1				
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel				2				
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel				3				

Communication with plant bus								
• BCE					0			
• Industrial Ethernet (CP 1623)					1			
• Without additional communication modules					8			

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-		
	4 ■ ■ ■ ■ - 1 D	■	■

SIMATIC IPC547E industrial PC

Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed

Enclosure type/swap media/ multi-monitor option		
Unpainted enclosure		
• Without optical drive		
- Without multi-monitor mode	A	
- Multi-monitor mode for 2 screens[1]	B	
- Multi-monitor mode for 4 screens[2]	C	
• With DVD±RW (slim)		
- Without multi-monitor mode	D	
- Multi-monitor mode for 2 screens[1]	E	
- Multi-monitor mode for 4 screens[2]	F	
Painted enclosure		
• Without optical drive		
- Without multi-monitor mode	G	
- Multi-monitor mode for 2 screens[1]	H	
- Multi-monitor mode for 4 screens[2]	J	
• With DVD±RW (slim)		
- Without multi-monitor mode	K	
- Multi-monitor mode for 2 screens[1]	L	
- Multi-monitor mode for 4 screens[2]	M	

Power supply unit, country-specific version		
• 100 to 240°V°AC industrial power supply to NAMUR		
- Power cord for Europe		0
- Power cord for the UK		1
- Power cord for Switzerland		2
- Power cord for the USA		3
- Power cord for Italy		4
- Power cord for China		5
• 2 × 100 to 240 V AC, redundant power supply; without power cord		6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)
[2] Incl. PCIe x16 graphics card

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■ Ordering data (continued)

SIMATIC PCS 7 Industrial Workstation for OS client	Article No.								
	6ES7660-								
SIMATIC IPC547E industrial PC Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	**4**	■	■	■	■	-	**1**	**A**	■ ■
Processor and system type									
• Pentium Dual Core G3420 (2C/2T, 3.30 GHz, 3 MB cache), OS client	C								
• Core i5-4570S (4C/4T, 2.90 (3.60) GHz, 6 MB cache, iAMT), OS client	F								
• Core i7-4770S (4C/8T, 3.10 (3.90) GHz, 8 MB cache, iAMT), OS client	J								
Hard disks and solid-state drives									
with SATA hard disk (HDD)									
• 500 GB HDD SATA, 0.2 g vibration, 1 g shock; internal		A							
• 1 TB HDD SATA, 0.2 g vibration, 1 g shock; internal		B							
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.2 g vibration, 1 g shock; internal		C							
• 500 GB HDD SATA in removable drive bay; at the front		D							
• 1 TB HDD SATA in removable drive bay, at the front		E							
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front		F							
• RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare; in removable drive bay, for hot swapping; at the front		G							
SSD									
• 160 GB SSD (eMLC) SATA; internal		K							
• 240 GB SSD (eMLC) SATA; internal		L							
• 480 GB SSD (eMLC) SATA; internal		M							
• 160 GB SSD (eMLC) SATA, in removable drive bay; at the front		N							
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front		P							
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front		Q							
Main memory									
• 4 GB DDR3 SDRAM (2 × 2 GB), dual channel			0						
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel			1						
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel			2						
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel			3						
Communication with plant bus									
• Without additional communication modules				8					

SIMATIC PCS 7 Industrial Workstation for OS client	Article No.								
	6ES7660-								
SIMATIC IPC547E industrial PC Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	**4**	■	■	■	■	-	**1**	**A**	■ ■
Enclosure type/swap media/ multi-monitor option									
Unpainted enclosure									
• Without optical drive									
- Without multi-monitor mode								A	
- Multi-monitor mode for 2 screens[1]								B	
- Multi-monitor mode for 4 screens[2]								C	
• With DVD±RW (slim)									
- Without multi-monitor mode								D	
- Multi-monitor mode for 2 screens[1]								E	
- Multi-monitor mode for 4 screens[2]								F	
Painted enclosure									
• Without optical drive									
- Without multi-monitor mode								G	
- Multi-monitor mode for 2 screens[1]								H	
- Multi-monitor mode for 4 screens[2]								J	
• With DVD±RW (slim)									
- Without multi-monitor mode								K	
- Multi-monitor mode for 2 screens[1]								L	
- Multi-monitor mode for 4 screens[2]								M	
Power supply unit, country-specific version									
• 100 to 240°V°AC industrial power supply to NAMUR									
- Power cord for Europe									0
- Power cord for the UK									1
- Power cord for Switzerland									2
- Power cord for the USA									3
- Power cord for Italy									4
- Power cord for China									5
• 2 × 100 to 240 V AC, redundant power supply; without power cord									6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)

[2] Incl. PCIe x16 graphics card

Industrial Workstation/IPC
SIMATIC Rack PC

IPC547E

■ **Ordering data** (continued)

SIMATIC PCS 7 Industrial Workstations of type IPC547E as replacement part

Without hardware expansions, software pre-installation, system software licenses, restore DVDs

Replacement for ES/OS single station, OS server, or OS client of type IPC547E

SIMATIC PCS 7 Industrial Workstation as replacement part	Article No. 6ES7660-
SIMATIC IPC547E industrial PC. Without SIMATIC PCS 7 restore DVDs, without pre-installation	4 ■ ■ ■ ■ - 8 ■ ■ ■

Processor and system type
- Pentium Dual Core G3420 (2C/2T, 3.30 GHz, 3 MB cache), replacement part — **W**
- Core i5-4570S (4C/4T, 2.90 (3.60) GHz, 6 MB cache, iAMT), replacement part — **X**
- Core i7-4770S (4C/8T, 3.10 (3.90) GHz, 8 MB cache, iAMT), replacement part — **Y**

Hard disks and solid-state drives

with SATA hard disk (HDD)
- 500 GB HDD SATA, 0.2 g vibration, 1 g shock; internal — **A**
- 1 TB HDD SATA, 0.2 g vibration, 1 g shock; internal — **B**
- RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.2 g vibration, 1 g shock; internal — **C**
- 500 GB HDD SATA in removable drive bay; at the front — **D**
- 1 TB HDD SATA in removable drive bay, at the front — **E**
- RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front — **F**
- RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare; in removable drive bay, for hot swapping; at the front — **G**

HDD SATA + SSD
- RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping; at the front + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front — **J**

SSD
- 160 GB SSD (eMLC) SATA; internal — **K**
- 240 GB SSD (eMLC) SATA; internal — **L**
- 480 GB SSD (eMLC) SATA; internal — **M**
- 160 GB SSD (eMLC) SATA, in removable drive bay; at the front — **N**
- 240 GB SSD (eMLC) SATA, in removable drive bay; at the front — **P**
- 480 GB SSD (eMLC) SATA, in removable drive bay; at the front — **Q**

Main memory
- 4 GB DDR3 SDRAM (2 × 2 GB), dual channel — **0**
- 8 GB DDR3 SDRAM (2 × 4 GB), dual channel — **1**
- 16 GB DDR3 SDRAM (2 × 8 GB), dual channel — **2**
- 32 GB DDR3 SDRAM (4 × 8 GB), dual channel — **3**

Communication with plant bus
- BCE — **0**
- Industrial Ethernet (CP 1623) — **1**
- Without additional communication modules — **8**

SIMATIC PCS 7 Industrial Workstation as replacement part	Article No. 6ES7660-
SIMATIC IPC547E industrial PC. Without SIMATIC PCS 7 restore DVDs, without pre-installation	4 ■ ■ ■ ■ - 8 ■ ■ ■

Operating system
- Windows 7 Ultimate, 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese) — **A**
- Windows Server 2008 R2 Standard Edition, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese) — **D**
- Without operating system — **X**

Enclosure type/swap media/ multi-monitor option

Unpainted enclosure
- Without optical drive
  - Without multi-monitor mode — **A**
  - Multi-monitor mode for 2 screens[1] — **B**
  - Multi-monitor mode for 4 screens[2] — **C**
- With DVD±RW (slim)
  - Without multi-monitor mode — **D**
  - Multi-monitor mode for 2 screens[1] — **E**
  - Multi-monitor mode for 4 screens[2] — **F**

Painted enclosure
- Without optical drive
  - Without multi-monitor mode — **G**
  - Multi-monitor mode for 2 screens[1] — **H**
  - Multi-monitor mode for 4 screens[2] — **J**
- With DVD±RW (slim)
  - Without multi-monitor mode — **K**
  - Multi-monitor mode for 2 screens[1] — **L**
  - Multi-monitor mode for 4 screens[2] — **M**

Power supply unit, country-specific version
- 100 to 240 V AC industrial power supply to NAMUR
  - Power cord for Europe — **0**
  - Power cord for the UK — **1**
  - Power cord for Switzerland — **2**
  - Power cord for the USA — **3**
  - Power cord for Italy — **4**
  - Power cord for China — **5**
- 2 × 100 to 240 V AC, redundant power supply; without power cord — **6**

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)
[2] Incl. PCIe x16 graphics card

3

Ordering data

	Article No.			Article No.

Additional and expansion components

	Article No.
SIMATIC PC keyboard (USB connection) German/international key assignment	**6ES7648-0CB00-0YA0**
SIMATIC IPC mouse Optical (BlueTrack) mouse with scroll wheel and USB connection	
• Color: anthracite	**6ES7648-0BB00-0XA0**
• Color: white	**6ES7648-0BB00-0XA1**
Memory expansion	
• 2 GB DDR3 SDRAM (1 × 2 GB)	**6ES7648-2AJ50-0MA0**
• 4 GB DDR3 SDRAM (1 × 4 GB)	**6ES7648-2AJ60-0MA0**
• 8 GB DDR3 SDRAM (1 × 8 GB)	**6ES7648-2AJ70-0MA0**
Tower kit for SIMATIC PCS 7 Industrial Workstations Tower kit for conversion of a Rack PC into an industrial tower PC	**6ES7648-1AA00-0XC0**
Retainer for locking of the internal USB port	**6ES7648-1AA00-0XK0**
Tray for low-profile removable drive bay for 3.5" hard drive (SATA/SAS) or 2.5" SSD (SATA), without drive	**6ES7648-0EG01-1BA0**

	Article No.
Adapter cable	
• DisplayPort to DVI-D for onboard graphics	**6ES7648-3AF00-0XA0**
• DisplayPort to VGA for onboard graphics	**6ES7648-3AG00-0XA0**
• DVI-I to VGA for onboard graphics, 250 mm long	**6ES7648-3AB00-0XA0**
3 m power cord for Rack PC[1]	
• Europe (for Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden)	**6ES7900-0AA00-0XA0**
• For UK	**6ES7900-0BA00-0XA0**
• For Switzerland	**6ES7900-0CA00-0XA0**
• For the USA	**6ES7900-0DA00-0XA0**
• For Italy	**6ES7900-0EA00-0XA0**
• For China	**6ES7900-0FA00-0XA0**
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack For communication with fault-tolerant AS systems, see section "Communication", section "Industrial Ethernet – system connection of PCS 7 systems", page 10/46	

[1] The SIMATIC PCS 7 preferred types are delivered as standard with a "European power cable". The country-specific versions listed above are required for some countries.

Accessories

Power supply cord for Rack PC

The SIMATIC PCS 7 preferred types are always delivered with a "European power supply cord". This can be used in Germany, France, Spain, Netherlands, Belgium, Sweden, Austria and Finland.

The country-specific versions listed in the Ordering data are required for other countries. The following picture shows the design of a number of power supply plugs:

Europe   USA

Great Britain   Italy

Switzerland   China

Country-specific power supply cords for Rack PC

Tower Kit for IPC547E

The Tower Kit enables conversion of a SIMATIC PCS 7 Industrial Workstation with rack PC design to an industrial tower PC. A Tower Kit can be ordered as an accessory for the SIMATIC PCS 7 Industrial Workstation IPC547E.

Tower Kit for IPC547E

Industrial Workstation/IPC
SIMATIC Rack PC

IPC647D

■ Overview

SIMATIC IPC647D

Based on a SIMATIC Rack PC of type IPC647D, SIMATIC PCS 7 Industrial Workstations in 19" format are extremely compact, rugged and powerful. They are UL-certified and have the CE mark for use in industry as well as residential, business and commercial environments. They are therefore ideally suited for use as a single station, server or client in the SIMATIC PCS 7 process control system. They enable high packing density in the control cabinet and save a significant amount of space in the control room due to their low overall height (2 Us).

■ Design
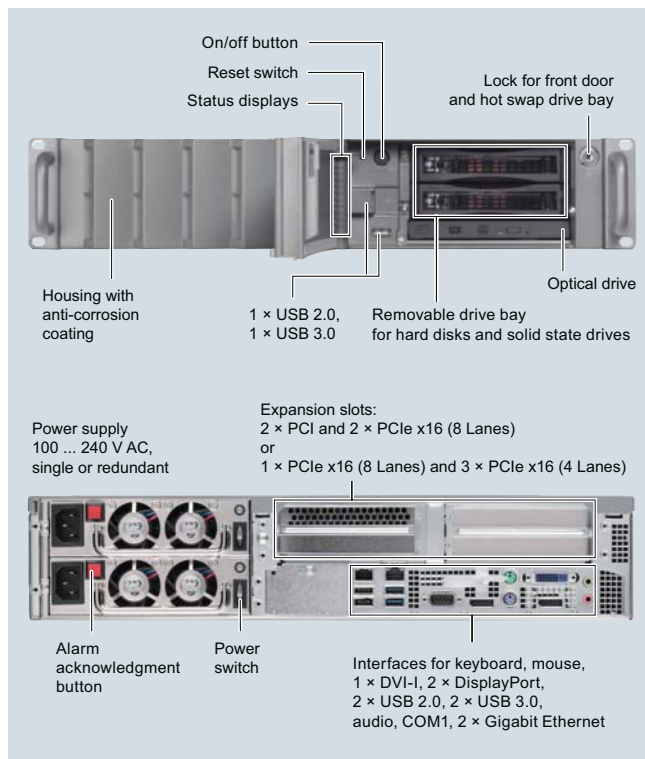
SIMATIC IPC647D, front with open front door (top) and rear

The SIMATIC PCS 7 Industrial Workstations of type IPC647D have a painted all-metal enclosure in 19" rack design (2 Us), which is particularly protected against dust by a filter and pressurized ventilation. This mechanically and electromechanically rugged enclosure has a service-friendly design.

SIMATIC PCS 7 Industrial Workstations of type IPC647D are especially suited for space-saving mounting in 500-mm deep 19" control cabinets due to their compact dimensions. They can be installed or positioned horizontally.

The SIMATIC PCS 7 Industrial Workstations of type IPC647D are suitable for reliable 24-hour continuous operation at ambient temperatures between 5 and 50 °C. Shocks up to 5 g and vibrations up to 0.5 g can be tolerated during operation.

Further essential features

Powerful technology with modern processors and graphic controllers
- Motherboard based on an Intel C226 chipset (DH82C226 PCH)
- Main memory expansion with 4 to 32 GB (client) or 8 to 32 GB (server/single station) DDR3-1600 SDRAM, with or without ECC (mainly in dual-channel mode for the optimum performance)
- Powerful and energy-saving Intel multi-core processors with virtualization technology: XEON E3, Core i5 or Core i3
- Powerful Intel graphics controller HD Graphics 4600/4700 onboard, integrated in the processor:
  - 2 digital interfaces: DVI-I and DisplayPort (DVI-D via DisplayPort DVI adapter)
  - Analog VGA connection via DVI-I to VGA adapter or DisplayPort to VGA
- Optional graphics expansion for multi-monitor mode with up to 4 process monitors (up to 2 process monitors on the onboard graphics controller)
- Optimization to maximum performance with 160/240/480 GB solid-state drive

■ **Design** (continued)

Expansion options and interfaces

- 2 × 10/100/1000 Mbit/s Ethernet RJ45 port integrated onboard
- Alternative bus modules with up to 4 slots for PCI/PCI-Express expansion modules (all for modules up to 312 mm long)
  - 2 × PCIe x16 (8 lanes) and 2 × PCI or
  - 1 × PCIe x16 (8 lanes) and 3 × PCIe x16 (4 lanes)
- Total of 4 USB 3.0 ports
  - 2 × on the rear of the device
  - 1 × on the front
  - 1 × internal, e.g. for software license dongle ASIA
- Total of 3 USB 2.0 ports
  - 2 × on the rear of the device
  - 1 × on the front
- Serial COM interface (1 × COM1)
- Further interfaces at the rear of the device:
  - 2 × PS/2 for mouse and keyboard
  - Audio (1 × Line Out, 1 × Micro In)
- Connections for SATA drives, occupied in accordance with preconfigured features:
  - Up to 2 HDD/SSD in slimline removable drive bay (at the front) or alternatively
  - Up to 2 HDD in the vibration-damped drive cage (internal)
  - 1 slimline DVD burner (at the front) or alternatively
  - 1 SSD in the DVD drive slot

High system availability and safety

- High-quality components with high MTBF values
- RAID1 configuration for data mirroring on 2 SATA hard disks (also in hot swap drive bay for replacement of a hard disk during operation)
- Faulty hard disk in a RAID network can be quickly identified via the HDD alarm LED
- Redundant power supply 100 to 240 V AC as design variation
- Efficient self-diagnostics via LEDs on front for power, watchdog (ready/fault signal), hard disk activity, and status of Ethernet, RAID, fans and temperature
- Closing of the front door prevents:
  - Access to drives, removable memory media, USB interface, operator controls (reset, power), front fan and filter mat
  - Opening of the enclosure cover

Integration in SIMATIC PCS 7 system diagnostics

- Can be integrated into the system diagnostics with the SIMATIC PCS 7 Maintenance Station by means of the SIMATIC IPC DiagMonitor diagnostics software for monitoring the program execution (watchdog), temperature, fan speed, hard disk status and system failure

Practical and service-friendly design for industrial use

- High EMC
- Degree of protection at front: IP41 (with door closed), at rear: IP20
- Dust protection by means of pressurized ventilation with regulated front fan and dust filter
- Front fan and dust filter can be replaced without tools
- Special hard disk holders and card retainers for protection against vibration and shock
- Fast replacement of hard disks by means of hot-swap frame (configuration option)
- Simple cabinet assembly possible using telescopic rails

High investment protection

- System-tested with SIMATIC PCS 7
- Marketing period 5 years, supply with replacement parts/repairs over further 5 years
- Support for legacy interfaces (PS/2, COM)
- Certification for worldwide marketing (cULus)
- Worldwide service and support

Industrial Workstation/IPC
SIMATIC Rack PC

IPC647D

3

■ **Design** (continued)

Restore DVD

The operating system and the SIMATIC PCS 7 software are already preinstalled on the SIMATIC PCS 7 Industrial Workstations. The supplied restore DVDs permit fast restoring of the delivered status or a new installation for a different application.

The following table shows you the contents of the supplied restore DVDs and the preinstalled software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V8.1 Industrial Workstation	Included Restore DVDs	Preinstalled on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC647D W7 (IE or BCE)	Restore DVD 1: Windows 7 Ultimate 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows 7 Ultimate 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS server IPC647D BCE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2:	
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as an engineering station	–
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as SIMATIC PCS 7 Web Server	–
SIMATIC PCS 7 OS server IPC647D IE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2:	
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as engineering station	–
Client		
SIMATIC PCS 7 OS client IPC647D W7	Restore DVD 1: Windows 7 Ultimate 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows 7 Ultimate 64-bit operating system plus software installation for operation as OS client	●

Individual configuration of SIMATIC PCS 7 Industrial Workstations

By selecting predefined equipment features, you can individually configure the SIMATIC PCS 7 Industrial Workstation and thus also its article number. Selection tables for single station, server and client are available for this in the Section "Selection and ordering data" (paper catalog) . A further selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as replacement parts.

The PCS 7 INDUSTRIAL WORKSTATION IPC647D configurator in the Industry Mall allows you to interactively select and order the SIMATIC PCS 7 Industrial Workstation in the single station, server or client version – directly for the system or as a replacement part.

Individually configured SIMATIC PCS 7 Industrial Workstations will be built to order. Therefore the average delivery time for such an order is 15 working days.

■ **Technical specifications**

Detailed technical specifications for the SIMATIC PCS 7 Industrial Workstation of type IPC647D is available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction", page 3/5.

■ Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC647D

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660-
	5 ■ ■ ■ ■ - 1 A ■ ■
SIMATIC Industrial PC IPC647D	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Processor and system type	
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), ES/OS single station	A
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), ES/OS single station	D
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), ES/OS single station	G
Hard disks and solid-state drives	
with SATA hard disk (HDD)	
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal	A
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal	B
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal	C
• 500 GB HDD SATA, in removable drive bay; at the front	D
• 1 TB HDD SATA, in removable drive bay, at the front	E
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
HDD SATA + SSD	
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD (eMLC) SATA; internal in the DVD drive slot[1]	H
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping, at the front + 240 GB SSD (eMLC) SATA; internal, in the DVD drive slot[1]	J
SSD	
• 240 GB SSD (eMLC) SATA; internal	Q
• 480 GB SSD (eMLC) SATA; internal	R
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	T
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	U
Main memory	
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel	1
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel	2
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel	3
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel	5
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel	6
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel	7
Communication with plant bus	
• BCE	0
• Industrial Ethernet (CP 1623)	1
• Without additional communication modules	8

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660-
	5 ■ ■ ■ ■ - 1 A ■ ■
SIMATIC Industrial PC IPC647D	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Interfaces on bus module/swap media/ multi-monitor option	
Bus module with 2 × PCI, 2 × PCIe x16 (8 lanes)	
• Without optical drive	
- Without multi-monitor mode	A
- Multi-monitor mode for 2 screens[2]	B
- Multi-monitor mode for 4 screens[3]	C
• With DVD±RW (slim)[1]	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens[2]	E
- Multi-monitor mode for 4 screens[3]	F
Bus module with 1 × PCIe x16 (8 lanes), 3 × PCIe x16 (4 lanes)	
• Without optical drive	
- Without multi-monitor mode	G
- Multi-monitor mode for 2 screens[2]	H
- Multi-monitor mode for 4 screens[3]	J
• With DVD±RW (slim)[1]	
- Without multi-monitor mode	K
- Multi-monitor mode for 2 screens[2]	L
- Multi-monitor mode for 4 screens[3]	M
Power supply unit, country-specific version	
• 100 to 240 V AC industrial power supply to NAMUR	
- Power cord for Europe	0
- Power cord for the UK	1
- Power cord for Switzerland	2
- Power cord for the USA	3
- Power cord for Italy	4
- Power cord for China	5
• 2 × 100 to 240 V AC, redundant power supply; without power cord	6

[1] The drive option RAID1 with SSD cannot be used together with a DVD drive since they use the same drive slot.

[2] Incl. 1 adapter cable (DisplayPort to DVI-D)

[3] Incl. PCIe x16 graphics card

Industrial Workstation/IPC
SIMATIC Rack PC

IPC647D

◼ Ordering data (continued)

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-							
	5	◼	◼	◼	- 1	D	◼	◼
SIMATIC Industrial PC IPC647D								
Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed								
Processor and system type								
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), OS server	B							
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), OS server	E							
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), OS server	H							
Hard disks and solid-state drives								
with SATA hard disk (HDD)								
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal		A						
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal		B						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal		C						
• 500 GB HDD SATA, in removable drive bay; at the front		D						
• 1 TB HDD SATA, in removable drive bay, at the front		E						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front		F						
HDD SATA + SSD								
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD (eMLC) SATA; internal in the DVD drive slot[1]		H						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping, at the front + 240 GB SSD (eMLC) SATA; internal, in the DVD drive slot[1]		J						
SSD								
• 240 GB SSD (eMLC) SATA; internal		Q						
• 480 GB SSD (eMLC) SATA; internal		R						
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front		T						
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front		U						
Main memory								
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel			1					
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel			2					
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel			3					
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel			5					
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel			6					
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel			7					
Communication with plant bus								
• BCE				0				
• Industrial Ethernet (CP 1623)				1				
• Without additional communication modules				8				

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-							
	5	◼	◼	◼	- 1	D	◼	◼
SIMATIC Industrial PC IPC647D								
Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed								
Interfaces on bus module/swap media/ multi-monitor option								
Bus module with 2 × PCI, 2 × PCIe x16 (8 lanes)								
• Without optical drive								
- Without multi-monitor mode							A	
- Multi-monitor mode for 2 screens[2]							B	
- Multi-monitor mode for 4 screens[3]							C	
• With DVD±RW (slim)[1]								
- Without multi-monitor mode							D	
- Multi-monitor mode for 2 screens[2]							E	
- Multi-monitor mode for 4 screens[3]							F	
Bus module with 1 × PCIe x16 (8 lanes), 3 × PCIe x16 (4 lanes)								
• Without optical drive								
- Without multi-monitor mode							G	
- Multi-monitor mode for 2 screens[2]							H	
- Multi-monitor mode for 4 screens[3]							J	
• With DVD±RW (slim)[1]								
- Without multi-monitor mode							K	
- Multi-monitor mode for 2 screens[2]							L	
- Multi-monitor mode for 4 screens[3]							M	
Power supply unit, country-specific version								
• 100 to 240 V AC industrial power supply to NAMUR								
- Power cord for Europe								0
- Power cord for the UK								1
- Power cord for Switzerland								2
- Power cord for the USA								3
- Power cord for Italy								4
- Power cord for China								5
• 2 × 100 to 240 V AC, redundant power supply; without power cord								6

[1] The drive option RAID1 with SSD cannot be used together with a DVD drive since they use the same drive slot.

[2] Incl. 1 adapter cable (DisplayPort to DVI-D)

[3] Incl. PCIe x16 graphics card

■ Ordering data (continued)

SIMATIC PCS 7 Industrial Workstation for OS client	Article No. 6ES7660- 5 ▪ ▪ ▪ ▪ - 1 A ▪ ▪
SIMATIC Industrial PC IPC647D	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Processor and system type	
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), OS client	C
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), OS client	F
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), OS client	J
Hard disks and solid-state drives	
with SATA hard disk (HDD)	
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal	A
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal	B
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal	C
• 500 GB HDD SATA, in removable drive bay; at the front	D
• 1 TB HDD SATA, in removable drive bay, at the front	E
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
SSD	
• 160 GB SSD (eMLC) SATA; internal	P
• 240 GB SSD (eMLC) SATA; internal	Q
• 480 GB SSD (eMLC) SATA; internal	R
• 160 GB SSD (eMLC) SATA, in removable drive bay; at the front	S
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	T
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	U
Main memory	
• 4 GB DDR3 SDRAM (2 × 2 GB), dual channel	0
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel	1
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel	2
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel	3
• 4 GB DDR3 SDRAM (1 × 4 GB); ECC, single channel	4
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel	5
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel	6
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel	7
Communication with plant bus	
• Without additional communication modules	8

SIMATIC PCS 7 Industrial Workstation for OS client	Article No. 6ES7660- 5 ▪ ▪ ▪ ▪ - 1 A ▪ ▪
SIMATIC Industrial PC IPC647D	
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Interfaces on bus module/swap media/ multi-monitor option	
Bus module with 2 × PCI, 2 × PCIe x16 (8 lanes)	
• Without optical drive	
- Without multi-monitor mode	A
- Multi-monitor mode for 2 screens[2]	B
- Multi-monitor mode for 4 screens[3]	C
• With DVD±RW (slim)	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens[2]	E
- Multi-monitor mode for 4 screens[3]	F
Bus module with 1 × PCIe x16 (8 lanes), 3 × PCIe x16 (4 lanes)	
• Without optical drive	
- Without multi-monitor mode	G
- Multi-monitor mode for 2 screens[2]	H
- Multi-monitor mode for 4 screens[3]	J
• With DVD±RW (slim)	
- Without multi-monitor mode	K
- Multi-monitor mode for 2 screens[2]	L
- Multi-monitor mode for 4 screens[3]	M
Power supply unit, country-specific version	
• 100 to 240°V°AC industrial power supply to NAMUR	
- Power cord for Europe	0
- Power cord for the UK	1
- Power cord for Switzerland	2
- Power cord for the USA	3
- Power cord for Italy	4
- Power cord for China	5
• 2 × 100 to 240 V AC, redundant power supply; without power cord	6

[2] Incl. 1 adapter cable (DisplayPort to DVI-D)

[3] Incl. PCIe x16 graphics card

3

Industrial Workstation/IPC
SIMATIC Rack PC

■ **Ordering data** (continued)

SIMATIC PCS 7 Industrial Workstations of the type IPC647D as replacement part

Without hardware expansions, software pre-installation, system software licenses, restore DVDs

Replacement for ES/OS single station, OS server, or OS client of type IPC647D

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
Industrial PC SIMATIC IPC647D without pre-installation, without SIMATIC PCS 7 restore DVDs	5 ▪ ▪ ▪ ▪ - 8 ▪ ▪ ▪
Processor and system type	
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), replacement part	W
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), replacement part	X
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), replacement part	Y
Hard disks and solid-state drives	
with SATA hard disk (HDD)	
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal	A
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal	B
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal	C
• 500 GB HDD SATA, in removable drive bay; at the front	D
• 1 TB HDD SATA, in removable drive bay, at the front	E
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
HDD SATA + SSD	
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD (eMLC) SATA; internal in the DVD drive slot[1]	H
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping, at the front + 240 GB SSD (eMLC) SATA; internal, in the DVD drive slot[1]	J
SSD	
• 160 GB SSD (eMLC) SATA; internal	P
• 240 GB SSD (eMLC) SATA; internal	Q
• 480 GB SSD (eMLC) SATA; internal	R
• 160 GB SSD (eMLC) SATA, in removable drive bay; at the front	S
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	T
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	U
Main memory	
• 4 GB DDR3 SDRAM (2 × 2 GB), dual channel	0
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel	1
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel	2
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel	3
• 4 GB DDR3 SDRAM (1 × 4 GB); ECC, single channel	4
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel	5
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel	6
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel	7
Communication with plant bus	
• BCE	0
• Industrial Ethernet (CP 1623)	1
• Without additional communication modules	8

	Article No.
SIMATIC PCS 7 Industrial Workstation as replacement part	**6ES7660-**
Industrial PC SIMATIC IPC647D without pre-installation, without SIMATIC PCS 7 restore DVDs	5 ▪ ▪ ▪ ▪ - 8 ▪ ▪ ▪
Operating system	
• Windows 7 Ultimate, 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)	A
• Windows Server 2008 R2 Standard Edition incl. 5 CAL, 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)	D
• Without operating system	X
Interfaces on bus module/swap media/multi-monitor option	
Bus module with 2 × PCI, 2 × PCIe x16 (8 lanes)	
• Without optical drive	
- Without multi-monitor mode	A
- Multi-monitor mode for 2 screens[2]	B
- Multi-monitor mode for 4 screens[3]	C
• With DVD±RW (slim)[1]	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens[2]	E
- Multi-monitor mode for 4 screens[3]	F
Bus module with 1 × PCIe x16 (8 lanes), 3 × PCIe x16 (4 lanes)	
• Without optical drive	
- Without multi-monitor mode	G
- Multi-monitor mode for 2 screens[2]	H
- Multi-monitor mode for 4 screens[3]	J
• With DVD±RW (slim)[1]	
- Without multi-monitor mode	K
- Multi-monitor mode for 2 screens[2]	L
- Multi-monitor mode for 4 screens[3]	M
Power supply unit, country-specific version	
• 100 to 240 V AC industrial power supply to NAMUR	
- Power cord for Europe	0
- Power cord for the UK	1
- Power cord for Switzerland	2
- Power cord for the USA	3
- Power cord for Italy	4
- Power cord for China	5
• 2 × 100 to 240 V AC, redundant power supply; without power cord	6

[1] The drive option RAID1 with SSD cannot be used together with a DVD drive since they use the same drive slot.

[2] Incl. 1 adapter cable (DisplayPort to DVI-D)

[3] Incl. PCIe x16 graphics card

Ordering data

Additional and expansion components

	Article No.
SIMATIC PC keyboard (USB connection) German/international key assignment	6ES7648-0CB00-0YA0
SIMATIC IPC mouse Optical (BlueTrack) mouse with scroll wheel and USB connection	
• Color: anthracite	6ES7648-0BB00-0XA0
• Color: white	6ES7648-0BB00-0XA1
Memory expansion	
• 2 GB DDR3 SDRAM (1 × 2 GB)	6ES7648-2AJ50-0MA0
• 4 GB DDR3 SDRAM (1 × 4 GB)	6ES7648-2AJ60-0MA0
• 4 GB DDR3 SDRAM with ECC (1 × 4 GB)	6ES7648-2AJ60-1MA0
• 8 GB DDR3 SDRAM (1 × 8 GB)	6ES7648-2AJ70-0MA0
• 8 GB DDR3 SDRAM with ECC (1 × 8 GB)	6ES7648-2AJ70-1MA0
Retainer for locking of the internal USB port	6ES7648-1AA00-0XK0
Rack unit for low-profile removable drive bay for 3.5" hard drive (SATA/SAS) or 2.5" SSD (SATA), without drive	6ES7648-0EG01-1BA0
Filter mats for SIMATIC IPC647D (packing unit: 10 units)	A5E02396171

	Article No.
Adapter cable	
• DisplayPort to DVI-D for onboard graphics	6ES7648-3AF00-0XA0
• DisplayPort to VGA for onboard graphics	6ES7648-3AG00-0XA0
• DVI-I to VGA for onboard graphics, 250 mm long	6ES7648-3AB00-0XA0
3 m power cord for Rack PC [1]	
• Europe (for Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden)	6ES7900-0AA00-0XA0
• For UK	6ES7900-0BA00-0XA0
• For Switzerland	6ES7900-0CA00-0XA0
• For the USA	6ES7900-0DA00-0XA0
• For Italy	6ES7900-0EA00-0XA0
• For China	6ES7900-0FA00-0XA0
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack For communication with fault-tolerant AS systems, see Chapter "Communication", Section "Industrial Ethernet – system connection of PCS 7 systems", page 10/46	

[1] The SIMATIC PCS 7 preferred types are delivered as standard with a "European power cable". The country-specific versions listed above are required for some countries.

Accessories

Power supply cord for Rack PC

The SIMATIC PCS 7 preferred types are always delivered with a "European power supply cord". This can be used in Germany, France, Spain, Netherlands, Belgium, Sweden, Austria and Finland.

The country-specific versions listed in the Ordering data are required for other countries. The following picture shows the design of a number of power supply plugs:

Europe

USA

Great Britain

Italy

Switzerland

China

Country-specific power supply cords for Rack PC

Industrial Workstation/IPC
SIMATIC Rack PC

IPC847D

3

■ Overview

SIMATIC IPC847D

The SIMATIC PCS 7 Industrial Workstation of type IPC847D is the most powerful and best equipped system platform. It satisfies all requirements for implementing complex server applications and for archiving process data.

Many basic components, such as chipset, processor, memory, etc. are for the most part identical to those of type IPC647D. As a result of the double overall height, the SIMATIC PCS 7 Industrial Workstation of type IPC847D has more slots and therefore ample potential for expansions. Since it would be over-dimensioned as a client, it is only offered as a single station and server.

■ Design
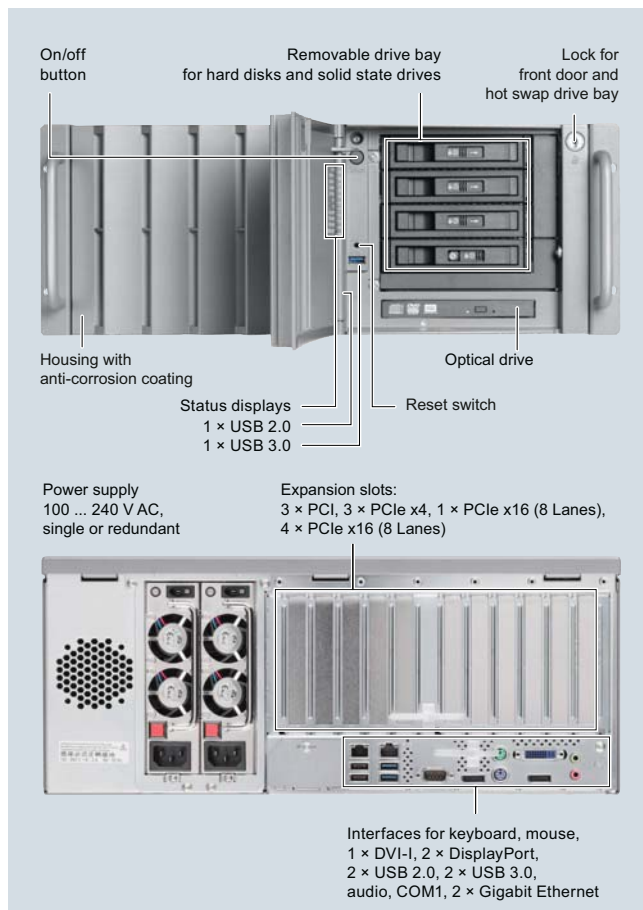
SIMATIC IPC847D, front with open front door (top) and rear

SIMATIC PCS 7 Industrial Workstations of type IPC847D are UL-certified and have the CE marking for use in industry as well as residential, business and commercial environments.

The painted all-metal enclosure in 19" mounting format (4 HUs) is especially protected against dust by a filter and pressurized ventilation. It features a mechanically and electromagnetically rugged design and is very easy to service.

The SIMATIC PCS 7 Industrial Workstations of type IPC847D can be positioned and installed horizontally or vertically. Using an optional tower kit, the Rack PC can be converted into an industry tower. The dimensions of the IPC847D also allow space-saving assembly in 500-mm deep 19" control cabinets.

The SIMATIC PCS 7 Industrial Workstations of type IPC847D are suitable for reliable 24-hour continuous operation at ambient temperatures between 5 and 50 °C. Shocks up to 5 g and vibrations up to 0.5 g can be tolerated during operation.

Further essential features

Powerful technology with modern processors and graphic controllers

- Motherboard based on an Intel C226 chipset (DH82C226 PCH)
- Main memory expansion with 4 to 8 GB DDR3-1066 SDRAM, either with or without ECC (mainly in dual-channel mode for the best performance)
- Powerful and energy-saving Intel multi-core processors with virtualization technology: XEON E3, Core i5 or Core i3
- Powerful Intel graphics controller HD Graphics 4600/4700 onboard, integrated in the processor:
  - 2 digital interfaces: DVI-I and DisplayPort (DVI-D via DisplayPort DVI adapter)
  - Analog VGA connection via DVI-I to VGA adapter or DisplayPort to VGA
- Optional graphics expansion for multi-monitor mode with up to 4 process monitors (up to 2 process monitors on the onboard graphics controller)
- Optimization to maximum performance with 240/480 GB solid-state drive

■ **Design** (continued)

Expansion options and interfaces

- 2 × 10/100/1000 Mbit/s Ethernet RJ45 port integrated onboard
- Bus module with up to 11 slots for PCI/PCI-Express expansion modules (all for modules up to 312 mm long)
  - 1 × PCIe x16 (8 lanes)
  - 4 × PCIe x16 (4 lanes)
  - 3 × PCIe x4 (4 lanes)
  - 3 × PCI
- Total of 4 USB 3.0 ports
  - 2 × on the rear of the device
  - 1 × on the front
  - 1 × internal, e.g. for software license dongle ASIA
- Total of 3 USB 2.0 ports
  - 2 × on the rear of the device
  - 1 × on the front
- Serial COM interface (1 × COM1)
- Further interfaces at the rear of the device:
  - 2 × PS/2 for mouse and keyboard
  - Audio (1 × Line Out, 1 × Micro In)
- Connections for SATA drives, occupied in accordance with preconfigured features:
  - Up to 4 HDD/SSD in slimline removable drive bay (at the front)
  - 1 slimline DVD burner (at the front)
  - Up to 2 HDD/SSD 3.5"/2.5" in the internal drive cage
  - Up to 2 HDD in the rear drive cage (internal, vibration-damped)

High system availability and safety

- High-quality components with high MTBF values
- RAID 1 configuration for data mirroring on 2 SATA hard disks (also in hot swap drive bay for replacement of a hard disk during operation)
- Faulty hard disk in a RAID configuration can be quickly identified via the HDD alarm LED
- RAID configuration optionally with hot-spare hard disk (reserve) for automatically taking over the function of a faulty hard disk
- Redundant 100 to 240 V AC power supply with "hot swap" functionality (module replacement during operation) as design variation
- Efficient self-diagnostics via LEDs on front for power, watchdog (ready/fault signal), hard disk activity, and status of Ethernet, RAID, fans and temperature
- Closing of the front door prevents:
  - Access to drives, removable memory media, USB interface, operator controls (reset, power), front fan and filter mat
  - Opening of the enclosure cover

Integration in SIMATIC PCS 7 system diagnostics

- Can be integrated into the system diagnostics with the SIMATIC PCS 7 Maintenance Station by means of the SIMATIC IPC DiagMonitor diagnostics software for monitoring the program execution (watchdog), temperature, fan speed, hard disk status and system failure

Practical and service-friendly design for industrial use

- High EMC
- Degree of protection at front: IP41 (with door closed), at rear: IP20
- Dust protection by means of pressurized ventilation with regulated front fan and dust filter
- Front fan and dust filter can be replaced without tools
- Special hard disk holders and card retainers for protection against vibration and shock
- Fast replacement of hard disks by means of hot-swap frame (configuration option)
- Simple cabinet assembly possible using telescopic rails

High investment protection

- System-tested with SIMATIC PCS 7
- Marketing period 5 years, supply with replacement parts/repairs over further 5 years
- Support for legacy interfaces (PS/2, COM)
- Certification for worldwide marketing (cULus)
- Installation compatible across device generations
- Worldwide service and support

Industrial Workstation/IPC
SIMATIC Rack PC

IPC847D

■ **Design** (continued)

Restore DVD

The operating system and the SIMATIC PCS 7 software are already preinstalled on the SIMATIC PCS 7 Industrial Workstations. The supplied restore DVDs permit fast restoring of the delivered status or a new installation for a different application.

The following table shows you the contents of the supplied restore DVDs and the preinstalled software for each version of the SIMATIC PCS 7 Industrial Workstation.

SIMATIC PCS 7 V8.1 Industrial Workstation	Included Restore DVDs	Preinstalled on delivery
Single station		
SIMATIC PCS 7 ES/OS IPC847D W7 (IE or BCE)	Restore DVD 1: Windows 7 Ultimate 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2: Windows 7 Ultimate 64-bit operating system plus software installation for operation as ES/OS single station	●
Server		
SIMATIC PCS 7 OS server IPC847D BCE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2:	
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as engineering station	–
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as SIMATIC PCS 7 Web Server	–
SIMATIC PCS 7 OS server IPC847D IE SRV08	Restore DVD 1: Windows Server 2008 R2 64-bit operating system with default settings for optimized SIMATIC PCS 7 operation	–
	Restore DVD 2:	
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as OS server	●
	• Windows Server 2008 R2 64-bit operating system plus software installation for operation as engineering station	–

Individual configuration of SIMATIC PCS 7 Industrial Workstations

By selecting predefined equipment features, you can individually configure the SIMATIC PCS 7 Industrial Workstation and thus also its article number. Selection tables for single station and server are available for this in the section "Selection and ordering data" (paper catalog). A further selection table enables you to order complete SIMATIC PCS 7 Industrial Workstations as replacement parts.

The PCS 7 INDUSTRIAL WORKSTATION IPC847D configurator in the Industry Mall allows you to interactively select and order the SIMATIC PCS 7 Industrial Workstation in the single station or server version – directly for the system or as a replacement part.

Individually configured SIMATIC PCS 7 Industrial Workstations will be built to order. Therefore the average delivery time for such an order is 15 working days.

■ **Technical specifications**

Detailed technical specifications for the SIMATIC PCS 7 Industrial Workstation of type IPC847D is available under "Comparison of the workstation types" in the catalog section "SIMATIC Rack PC, Introduction", page 3/5.

■ Ordering data

Individually configurable SIMATIC PCS 7 Industrial Workstations IPC847D

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660-						
	6	■ ■ ■ ■	-	1	A	■ ■	
SIMATIC IPC847D industrial PC							
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed							
Processor and system type							
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), ES/OS single station	A						
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), ES/OS single station	D						
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), ES/OS single station	G						
Hard disks and solid-state drives							
with SATA hard disk (HDD)							
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal	A						
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal	B						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal	C						
• 500 GB HDD SATA, in removable drive bay; at the front	D						
• 1 TB HDD SATA, in removable drive bay, at the front	E						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare; in removable drive bay, for hot swapping; at the front	G						
HDD SATA + SSD							
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD SATA; in removable drive bay, at the front	M						
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front	N						
SSD							
• 240 GB SSD (eMLC) SATA; internal	R						
• 480 GB SSD (eMLC) SATA; internal	S						
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	T						
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	U						
Main memory							
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel		1					
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel		2					
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel		3					
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel		5					
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel		6					
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel		7					
Communication with plant bus							
• BCE		0					
• Industrial Ethernet (CP 1623)		1					
• Without additional communication modules		8					

SIMATIC PCS 7 Industrial Workstation for ES/OS single station	Article No. 6ES7660-			
	6 ■ ■ ■ ■ - 1 A		■	■
SIMATIC IPC847D industrial PC				
Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed				
Interfaces on bus module/swap media/multi-monitor option				
Bus module with 3 × PCI, 3 × PCIe x4, 5 × PCIe x16				
• Without optical drive				
- Without multi-monitor mode			A	
- Multi-monitor mode for 2 screens[1]			B	
- Multi-monitor mode for 4 screens[2]			C	
• With DVD±RW (slim)				
- Without multi-monitor mode			D	
- Multi-monitor mode for 2 screens[1]			E	
- Multi-monitor mode for 4 screens[2]			F	
Power supply unit, country-specific version				
• 100 to 240°V°AC industrial power supply to NAMUR				
- Power cord for Europe				0
- Power cord for the UK				1
- Power cord for Switzerland				2
- Power cord for the USA				3
- Power cord for Italy				4
- Power cord for China				5
• 2 × 100 to 240 V AC, redundant power supply; without power cord				6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)
[2] Incl. PCIe x16 graphics card

3

Industrial Workstation/IPC
SIMATIC Rack PC

IPC847D

■ Ordering data (continued)

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-
	6 ▢ ▢ ▢ ▢ - 1 D ▢ ▢
SIMATIC IPC847D industrial PC	
Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Processor and system type	
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), OS server	B
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), OS server	E
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), OS server	H
Hard disks and solid-state drives	
with SATA hard disk (HDD)	
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal	A
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal	B
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal	C
• 500 GB HDD SATA, in removable drive bay; at the front	D
• 1 TB HDD SATA, in removable drive bay, at the front	E
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front	F
• RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare, in removable drive bay, for hot swapping; at the front	G
HDD SATA + SSD	
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD SATA, internal	M
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front	N
SSD	
• 240 GB SSD (eMLC) SATA; internal	R
• 480 GB SSD (eMLC) SATA; internal	S
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front	T
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front	U
Main memory	
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel	1
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel	2
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel	3
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel	5
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel	6
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel	7
Communication with plant bus	
• BCE	0
• Industrial Ethernet (CP 1623)	1
• Without additional communication modules	8

SIMATIC PCS 7 Industrial Workstation for OS server	Article No. 6ES7660-
	6 ▢ ▢ ▢ ▢ - 1 D ▢ ▢
SIMATIC IPC847D industrial PC	
Windows Server 2008 R2 Standard Edition operating system, 64-bit, incl. 5 CAL, multi-language (English, German, French, Italian, Spanish, Chinese), and SIMATIC PCS 7 V8.1 pre-installed	
Interfaces on bus module/swap media/ multi-monitor option	
Bus module with 3 × PCI, 3 × PCIe x4, 5 × PCIe x16	
• Without optical drive	
- Without multi-monitor mode	A
- Multi-monitor mode for 2 screens[1]	B
- Multi-monitor mode for 4 screens[2]	C
• With DVD±RW (slim)	
- Without multi-monitor mode	D
- Multi-monitor mode for 2 screens[1]	E
- Multi-monitor mode for 4 screens[2]	F
Power supply unit, country-specific version	
• 100 to 240 V AC industrial power supply to NAMUR	
- Power cord for Europe	0
- Power cord for the UK	1
- Power cord for Switzerland	2
- Power cord for the USA	3
- Power cord for Italy	4
- Power cord for China	5
• 2 × 100 to 240 V AC, redundant power supply; without power cord	6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)

[2] Incl. PCIe x16 graphics card

Ordering data (continued)

SIMATIC PCS 7 Industrial Workstations of the type IPC847D as replacement part

Without hardware expansions, software pre-installation, system software licenses, restore DVDs

Replacement for ES/OS single station or OS server of the type IPC847D

SIMATIC PCS 7 Industrial Workstation as replacement part	Article No. 6ES7660-						
Industrial PC SIMATIC IPC847D without pre-installation, without SIMATIC PCS 7 restore DVDs	6	■	■	■	■ - 8	■	■ ■
Processor and system type							
• Core i3-4330TE (2C/4T, 2.40 GHz, 4 MB cache), replacement part	W						
• Core i5-4570TE (2C/4T, 2.70 GHz, 4 MB cache, TB, VT-d, AMT), replacement part	X						
• Xeon E3-1268L v3 (4C/8T, 2.30 GHz, 8 MB cache, TB, VT-d, AMT), replacement part	Y						
Hard disks and solid-state drives							
with SATA hard disk (HDD)							
• 500 GB HDD SATA, 0.5 g vibration, 5 g shock; internal		A					
• 1 TB HDD SATA, 0.5 g vibration, 5 g shock; internal		B					
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock; internal		C					
• 500 GB HDD SATA, in removable drive bay; at the front		D					
• 1 TB HDD SATA, in removable drive bay, at the front		E					
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); in removable drive bay, for hot swapping; at the front		F					
• RAID1, 1 TB (2 x 1 TB HDD SATA, data mirroring) + 1 TB HDD SATA as hot spare, in removable drive bay, for hot swapping; at the front		G					
HDD SATA + SSD							
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring); 0.5 g vibration, 5 g shock, internal + 240 GB SSD SATA, in removable drive bay, at the front		M					
• RAID1, 1 TB (2 × 1 TB HDD SATA, data mirroring), in removable drive bay, for hot swapping + 240 GB SSD (eMLC) SATA, in removable drive bay, at the front		N					
SSD							
• 240 GB SSD (eMLC) SATA; internal		R					
• 480 GB SSD (eMLC) SATA; internal		S					
• 240 GB SSD (eMLC) SATA, in removable drive bay; at the front		T					
• 480 GB SSD (eMLC) SATA, in removable drive bay; at the front		U					
Main memory							
• 8 GB DDR3 SDRAM (2 × 4 GB), dual channel			1				
• 16 GB DDR3 SDRAM (2 × 8 GB), dual channel			2				
• 32 GB DDR3 SDRAM (4 × 8 GB), dual channel			3				
• 8 GB DDR3 SDRAM (2 × 4 GB), ECC, dual channel			5				
• 16 GB DDR3 SDRAM (2 × 8 GB), ECC, dual channel			6				
• 32 GB DDR3 SDRAM (4 × 8 GB), ECC, dual channel			7				

SIMATIC PCS 7 Industrial Workstation as replacement part	Article No. 6ES7660-					
Industrial PC SIMATIC IPC847D without pre-installation, without SIMATIC PCS 7 restore DVDs	6	■ ■ ■ ■ - 8	■	■	■	
Communication with plant bus						
• BCE			0			
• Industrial Ethernet (CP 1623)			1			
• Without additional communication modules			8			
Operating system						
• Windows 7 Ultimate, 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)				A		
• Windows Server 2008 R2 Standard Edition incl. 5 CAL, 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)				D		
• Without operating system				X		
Interfaces on bus module/swap media/ multi-monitor option						
Bus module with 3 × PCI, 3 × PCIe x4, 5 × PCIe x16						
• Without optical drive						
- Without multi-monitor mode					A	
- Multi-monitor mode for 2 screens[1]					B	
- Multi-monitor mode for 4 screens[2]					C	
• With DVD±RW (slim)						
- Without multi-monitor mode					D	
- Multi-monitor mode for 2 screens[1]					E	
- Multi-monitor mode for 4 screens[2]					F	
Power supply unit, country-specific version						
• 100 to 240 V AC industrial power supply to NAMUR						
- Power cord for Europe						0
- Power cord for the UK						1
- Power cord for Switzerland						2
- Power cord for the USA						3
- Power cord for Italy						4
- Power cord for China						5
• 2 × 100 to 240 V AC, redundant power supply; without power cord						6

[1] Incl. 1 adapter cable (DisplayPort to DVI-D)

[2] Incl. PCIe x16 graphics card

Industrial Workstation/IPC
SIMATIC Rack PC

IPC847D

■ Ordering data

	Article No.			Article No.
Additional and expansion components				

<table>
<tr><td>SIMATIC PC keyboard
(USB connection)
German/international key assignment</td><td>6ES7648-0CB00-0YA0</td></tr>
<tr><td>SIMATIC IPC mouse
Optical (BlueTrack) mouse with scroll wheel and USB connection
• Color: anthracite
• Color: white</td><td>

6ES7648-0BB00-0XA0
6ES7648-0BB00-0XA1</td></tr>
<tr><td>Memory expansion
• 2 GB DDR3 SDRAM (1 × 2 GB)
• 4 GB DDR3 SDRAM (1 × 4 GB)
• 4 GB DDR3 SDRAM with ECC (1 × 4 GB)
• 8 GB DDR3 SDRAM (1 × 8 GB)
• 8 GB DDR3 SDRAM with ECC (1 × 8 GB)</td><td>
6ES7648-2AJ50-0MA0
6ES7648-2AJ60-0MA0
6ES7648-2AJ60-1MA0

6ES7648-2AJ70-0MA0
6ES7648-2AJ70-1MA0</td></tr>
<tr><td>Tower kit for SIMATIC PCS 7 Industrial Workstations
Tower kit for conversion of a Rack PC into an industrial tower PC</td><td>6ES7648-1AA00-0XD0</td></tr>
<tr><td>Retainer
for locking of the internal USB port</td><td>6ES7648-1AA00-0XK0</td></tr>
<tr><td>Rack unit for low-profile removable drive bay
for 3.5" hard drive (SATA/SAS) or 2.5" SSD (SATA), without drive</td><td>6ES7648-0EG01-1BA0</td></tr>
<tr><td>Filter mats
for SIMATIC IPC847D
(packing unit: 10 units)</td><td>A5E01064980</td></tr>
</table>

<table>
<tr><td>Adapter cable
• DisplayPort to DVI-D for onboard graphics
• DisplayPort to VGA for onboard graphics
• DVI-I to VGA for onboard graphics, 250 mm long</td><td>
6ES7648-3AF00-0XA0

6ES7648-3AG00-0XA0

6ES7648-3AB00-0XA0</td></tr>
<tr><td>3 m power cord for Rack PC[1]
• Europe (for Austria, Belgium, Finland, France, Germany, Netherlands, Spain, Sweden)
• For UK
• For Switzerland
• For the USA
• For Italy
• For China</td><td>
6ES7900-0AA00-0XA0

6ES7900-0BA00-0XA0
6ES7900-0CA00-0XA0
6ES7900-0DA00-0XA0
6ES7900-0EA00-0XA0
6ES7900-0FA00-0XA0</td></tr>
<tr><td>SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack
For communication with fault-tolerant AS systems, see Chapter "Communication", Section "Industrial Ethernet – system connection of PCS 7 systems", page 10/46</td><td></td></tr>
</table>

[1] The SIMATIC PCS 7 preferred types are delivered as standard with a "European power cable". The country-specific versions listed above are required for some countries.

■ Accessories

Power supply cord for Rack PC

The SIMATIC PCS 7 preferred types are always delivered with a "European power supply cord". This can be used in Germany, France, Spain, Netherlands, Belgium, Sweden, Austria and Finland.

The country-specific versions listed in the Ordering data are required for other countries. The following picture shows the design of a number of power supply plugs:

Europe		USA	
Great Britain		Italy	
Switzerland		China	

Country-specific power supply cords for Rack PC

Tower Kit for IPC847D

The Tower Kit enables conversion of a SIMATIC PCS 7 Industrial Workstation with rack PC design to an industrial tower PC. A Tower Kit can be ordered as an accessory for the SIMATIC PCS 7 Industrial Workstation IPC847D.

Tower Kit for IPC847D

■ **Overview**

The SIMATIC BOX PC components for SIMATIC PCS 7 V8.1 will be available soon. This section will be updated following release.

3

Industrial Workstation/IPC
SIMATIC Microbox PC

OS Client 427D

◼ Overview

SIMATIC PCS 7 OS Client 427D

The SIMATIC PCS 7 OS Client 427D based on the SIMATIC IPC427D (Microbox) can be used in SIMATIC PCS 7 systems as a client for the operator system and SIMATIC BATCH.

For these applications, it is an excellent alternative to clients based on a SIMATIC BOX PC or SIMATIC Rack PC.

The SIMATIC PCS 7 OS Client 427D is available in two versions. These differ with regard to the data storage medium used:
- SIMATIC PCS 7 OS Client 427D (HDD)
  with a hard disk drive 2.5" SATA-HDD, 320 GB
- SIMATIC PCS 7 OS Client 427D (SSD)
  with a solid-state drive 2.5" SATA-SSD, 160 GB (eMLC)

◼ Design

Due to their exceptional physical properties, both versions of the SIMATIC PCS 7 OS Client 427D allow maintenance-free 24/7 operation without the support of a fan.

The absence of rotating storage media means that the SSD version is particularly resistant to vibration and shock. When operating in a restricted access location (RAL), e.g. in a lockable control cabinet, operating temperatures from 0 °C to +50 °C are permissible for this version in a horizontal mounting position.

The compact design of the SIMATIC PCS 7 OS Client 427D (HDD/SSD) and the flexible assembly options (DIN rail, wall or portrait mounting) in a horizontal or vertical orientation help to achieve a space-saving design.

Expansions/interfaces

However, expansions and the number of interfaces are limited as a result of the compact design. The SIMATIC PCS 7 OS Client 427D (HDD/SSD) has:
- 4 USB 3.0 ports (max. 2 high-current ports can be used simultaneously)
- 1 COM1 port (RS 232)
- 1 DVI-I port (combined DVI/VGA)
- 1 display port (DVI with DPP-to-DVI adapter); can be used for multi-monitor operation with two monitors
- 2 Ethernet interfaces 10/100/1000 Mbps (RJ45)

The two integral Ethernet interfaces have a teaming capability and are thus suitable for connection to a redundant terminal bus (for details on implementation, refer to the function manual "Fault-tolerant process control systems", Section "Redundant, fault-tolerant terminal bus").

The SIMATIC PCS 7 OS Client 427D (HDD/SSD) is supplied without input/output devices. In addition to mouse and keyboard, two further input/output devices can be externally connected via the existing USB ports, e.g. 3.5" floppy disk drive, optical drive (DVD-ROM/DVD±RW) or chipcard reader USB.

A process monitor with analog (VGA) or digital (DVI) connection can be operated at the DVI-I port. The adapter cable required for the analog VGA connection can be ordered as an option.

You can use the display port as a second graphics interface to implement multi-monitor mode with two process monitors. The first monitor in this case is operated on the DVI-I interface, the second on the display port (directly or via a DPP-to-DVI adapter).

The following resolutions are possible in multi-monitor mode:
- 1024 × 768
- 1152 × 864
- 1280 × 1024
- 1600 × 1200
- 1680 × 1050
- 1920 × 1080
- 1920 × 1200

Monitoring functions

Configurable monitoring functions can be recorded and evaluated via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Maintenance Station. These monitoring functions include:
- Program execution (watchdog)
- Processor and board temperatures
- Enhanced diagnostics/messages, e.g. operating hours counter, hard disk status or system status, backup battery status

The "Power" and "Watchdog" signals are displayed on LEDs.

Pre-installed software

The following software is pre-installed on the SIMATIC PCS 7 OS Client 427D (HDD/SSD):
- Windows 7 Ultimate 64-bit operating system, multi-language (English, German, French, Italian, Spanish, Chinese)
- SIMATIC PCS 7 OS Software Client V8.1
- SIMATIC IPC DiagMonitor diagnostics software

■ Technical specifications

SIMATIC IPC427D (Microbox), SIMATIC PCS 7 OS Client 427D version

Design and equipment features	
Design	• DIN rail or wall mounting; horizontal (preferred) or vertical • Portrait assembly; vertical
Degree of protection in accordance with IEC 60529	IP20
CPU • Processor • Second Level Cache	Intel Core i7-3517UE 1.7 GHz 4 MB
Main memory (module up to 8 GB operable without/with ECC)	4 GB DDR3-SDRAM 1066 (1 SO-DIMM module without ECC)
Graphics • Graphic controller	Intel HD4000 integrated in the chip-set
• Graphics memory	32 ... 512 MB shared memory
• Resolutions/frequencies	
- CRT	Up to 1920 × 1200, 60 ... 120 Hz
- DVI	Up to 1920 × 1200, 60 Hz
- Display port (DPP)	Up to 1920 × 1200, 60 Hz
Drives, alternative	
• Hard disk drive	1 × 2.5" SATA-HDD 320 GB
• Solid State Disk	1 × 2.5" SATA-HDD 160 GB (eMLC)
• CD-ROM/DVD-RW/diskette	Connectable via USB (not included in scope of delivery)
Interfaces	
• Ethernet	2 × Ethernet ports (RJ45) Intel 82579LM and Intel 82574L 10/100/1000 Mbps, isolated, teaming-capable
• USB	4 × USB 3.0, max. 2 × high-current can be operated simultaneously
• Serial	1 × COM1 RS 232, max. 115 Kbps, 9-pin Sub-D connector
• Parallel	–
• Graphics connection	1 × DVI-I (DVI/VGA combined) • DVI: Digital • VGA: Analog
	1 × display port (DPP); DVI via DPP-to-DVI adapter
• Keyboard, mouse	Connectable via USB (not included in scope of delivery)
LED displays	• PC ON/WD for power supply and watchdog • L1, L2 and L3 freely programmable by the user
Operating system, basic software	
Operating system	Windows 7 Ultimate 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)
System-tested SIMATIC industrial software	SIMATIC IPC DiagMonitor integrated in pre-installation

Monitoring and diagnostics functions	
Watchdog	• Monitoring of program execution • Restart can be parameterized following faults • Monitoring time adjustable in the software
Temperature	• Processor • Motherboard in vicinity of display socket and RAM module (via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Asset Management)
Battery monitoring	Battery status register readable; residual life after reaching the warning level at least 1 month
Operating hours counter	(via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Asset Management)
Safety	
Protection class	Protection class I in accordance with IEC 61140
Safety directives	EN 60950-1; UL 60950-1; CAN/CSA-C22.2 No. 60950-1; UL 508; CAN/CSA-C22.2 No. 142
Noise level	
Operation	< 40 dB (A) to DIN 45635-1
Electromagnetic compatibility (EMC)	
Interference emission	EN 61000-6-3, EN 61000-6-4, CISPR220 Class B; FCC Class A
Immunity to conducted interference on the supply lines	±2 kV (according to IEC 61000-4-4; burst)
	±1 kV (according to IEC 61000-4-5; symmetrical surge)
	±2 kV (according to IEC 61000-4-5; asymmetrical surge)
Immunity to interference on signal lines	±1 kV (according to IEC 61000-4-4; burst; length < 3 m)
	±2 kV (according to IEC 61000-4-4; burst; length > 3 m)
	±2 kV (according to IEC 61000-4-5; surge; length > 30 m)
Immunity to static discharge	±6 kV contact discharge (according to IEC 61000-4-2)
	±8 kV air discharge (to IEC 61000-4-2)
Immunity to high-frequency radiation	10 V/m, 80 to 1 000 MHz and 1.4 to 2 GHz, 80 % AM (to IEC 61000-4-3)
	1 V/m, 2 to 2.7 GHz, 80 % AM (to IEC 61000-4-3)
	10 V, 10 kHz to 80 MHz, 80 % AM (to IEC 61000-4-6)
Immunity to magnetic fields	100 A/m rms value 50/60 Hz to IEC 61000-4-8

Industrial Workstation/IPC
SIMATIC Microbox PC

OS Client 427D

▪ Technical specifications (continued)

Climatic conditions	
Temperature	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14
• Horizontal mounting position, in operation	
- Operation with hard disk and max. 2 expansion modules (max. load 10 W)	+5 ... +40 °C[1]
- Operation with SSD and max. 2 expansion modules (max. load 10 W)	0 to +40 °C
- Operation with SSD in RAL[2] and max. 2 expansion modules (max. load 10 W)	0 ... +50 °C[1]
• Vertical mounting position, in operation	
- Operation with hard disk (without expansion module)	+5 ... +35 °C[1]
- Operation with SSD (without expansion module)	0 ... +40 °C
- Operation with SSD in RAL[2] and max. 2 expansion modules (max. load 10 W)	0 ... +45 °C[1]
• Storage/transport	
- HDD	-40 ... +60 °C
- SSD	-40 ... +70 °C
• Gradient	
- Operation	Max. 10 °C/h
- Storage	20 °C/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30
• Operation	5 ... 80% at 25 °C (no condensation)
• Storage/transport	5 ... 95% at 25 °C (no condensation)

Mechanical environmental conditions	
Vibrations	Tested according to IEC 60068-2-6
• Operation	
- With SSD	5 ... 9 Hz: 3.5 mm; 9 ... 500 Hz: 9.8 m/s²
- With hard disk and wall installation	10 ... 58 Hz: 0.0375 mm; 58 ... 200 Hz: 4.9 m/s²
- With hard disk and DIN rail mounting or vertical installation	Starting prohibited
• Storage/transport	5 ... 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s²
Shock resistance	Tested according to IEC 60068-2-27
• Operation	Without hard disk drive: 150 m/s², 11 ms; with hard disk drive: 50 m/s², 30 ms
• Storage/transport	250 m/s², 6 ms

Standards, specifications, approvals	
Residential area, business and commercial operations, and small businesses	
• Interference emission	EN 61000-6-3: 2007
• Noise immunity	EN 61000-6-1: 2007
CE industrial environment	
• Interference emission	EN 61000-6-4: 2007
• Noise immunity	EN 61000-6-2: 2005
cULus	Underwriters Laboratories (UL) compliant with Standard UL 60950-1 and Canadian National Standard
	CAN/CSA-C22.2 No. 60950-1 (I.T.E) and compliant with UL 508, and Canadian National Standard
	CAN/CSA-C22.2 No. 142 (IND.CONT.EQ)

Special features	
Quality assurance	according to ISO 9001

Power supply (electrically isolated)	
Supply voltage	24 V DC (19.2 ... 28.8 V)
Short-term voltage dip	Min. 15 ms (at 20.4 V)
	Max. 10 events per hour; recovery time of at least 1 s
Max. current consumption (at 24 V DC)	4 A
Max. power consumption (at 24 V DC)	64.8 W

Dimensions and weights	
Dimensions (W x H x D in mm)	262 × 133 × 50.5
Weight	Approx. 2 kg

[1] If the "Turbo Mode Level" setting in BIOS Setup "Power" menu is not set to "Temperature optimized", the maximum ambient temperature must be reduced by 5 °C.

[2] RAL = Restricted Access Location: Installation of device in operating environment with restricted access, e.g. a locked switchgear cabinet

3

Ordering data

	Article No.
SIMATIC IPC427D (Microbox), SIMATIC PCS 7 OS Client 427D version SIMATIC IPC427D for use as SIMATIC PCS 7 OS Client/Batch Client	
Intel Core I7-3517UE, 2 × 1.7 GHz, 4 MB Second Level Cache; 4.0 GB DDR3 SDRAM 1066 (1 SO-DIMM module); 2 × Ethernet 10/100/1000 Mbps (RJ45) onboard; 4 × USB 3.0 (High Current); 24 V DC power supply	
SIMATIC IPC DiagMonitor diagnostics software and restore DVDs; SIMATIC PCS 7 OS Software Client V8.1 pre-installed	
Note: Product package without 3.5" floppy drive, optical drive, mouse, keyboard or monitor	
Operating system Windows 7 Ultimate 64-bit, multi-language (English, German, French, Italian, Spanish, Chinese)	
• **SIMATIC PCS 7 OS client 427D (HDD)** version with hard disk drive, 1 × 320 GB, HDD SATA	**6ES7650-0UG18-0YX0**
• **SIMATIC PCS 7 OS Client 427D (SSD)** version with solid-state drive, 1 x 160 GB, SSD SATA (eMLC)	**6ES7650-0UG18-0YX1**

Additional and expansion components

8.0 GB DDR3-SDRAM (1 SO-DIMM module without ECC)	**6ES7648-2AH70-0KA0**
SIMATIC IPC, graphics adapter cable, DVI-I to VGA Length 250 mm	**6ES7648-3AB00-0XA0**
SIMATIC IPC, graphics adapter DPP to DVI Converts display port to DVI-D	**A5E30126998**
Keyboard/mouse	
SIMATIC IPC keyboard German/international with USB connection	**6ES7648-0CB00-0YA0**
SIMATIC IPC mouse Optical (BlueTrack) mouse with scroll wheel and USB connection • Color: anthracite • Color: white	**6ES7648-0BB00-0XA0** **6ES7648-0BB00-0XA1**

Accessories

Portrait assembly	
Portrait assembly kit For space-saving installation of the SIMATIC PCS 7 OS Client 427D (front)	**6ES7648-1AA20-0YP0**

Accessories

Portrait assembly kit

The portrait assembly kit allows space-saving installation of the SIMATIC Microbox PC in the control cabinet. The technical specifications of the SIMATIC Microbox PC correspond in this design form to those with a vertical DIN rail assembly.

As a result of the portrait assembly, the mounting area required (W × H in mm) is reduced from 262 × 133 to 61.5 × 315. Together with the kit, the SIMATIC Microbox PC occupies a mounting depth of 149.7 mm in the control cabinet. Since all interfaces of the SIMATIC Microbox PC are accessible from the front, this type of assembly is very convenient for commissioning.

When using the portrait assembly kit for the SIMATIC Microbox PC, please also observe the information on operation planning and device installation in the "SIMATIC IPC427D industrial PC" manual.

Industrial Workstation/IPC
Expansion components

Mouse and keyboard

3

Design

Mouse

SIMATIC PCS 7 Industrial Workstations, SIMATIC PCS 7 compact systems as well as OS clients based on SIMATIC BOX/ Microbox PC are delivered without a mouse.

The SIMATIC IPC mouse is recommended as the input device for the operator-controlled stations of a SIMATIC PCS 7 system. This is a robust mouse, suitable for everyday use in harsh environments on practically any surface. It has the following characteristics:

• Precise BlueTrack technology
• Pleasant coated, anti-slip surface
• Ergonomic, symmetrical design for right- and left-handed users
• Practical, large scroll wheel
• Three buttons (including scroll wheel button)
• Cable connection (USB)

Keyboard

SIMATIC PCS 7 industrial workstations, SIMATIC PCS 7 compact systems as well as OS Clients based on SIMATIC BOX and Microbox PC are delivered without a keyboard.

A keyboard without additional special functions which is suitable for process operation with SIMATIC PCS 7 is e.g. the SIMATIC PC keyboard with USB connection and German/international key assignment.

The SIMATIC PC keyboard is a stable, standard MF2 keyboard with 105 keys, and can also be used on a PS/2 interface together with the supplied USB-PS/2 adapter. It combines the convenience of an office keyboard with the rugged design of an industrial device.

Technical specifications

Mouse

SIMATIC PC mouse	
Designation	SIMATIC IPC mouse, USB
Color	Anthracite or white
Interfaces	USB
Dimensions (L x W x H) in mm	115 x 65.6 x 40.8
Weight, approx.	92 g
Connecting cable	Length 2 m, USB plug
Approvals corresponding to office environment	• FCC Declaration of Conformity (USA) • UL and cUL Listed Accessory (USA and Canada) • ICES-003 report on file (Canada) • EIP Pollution Control Mark (China) • CE Declaration of Conformity, Safety and EMC (EU) • WEEE (EU) • GOST Certificate (Russia) • VCCI Certificate (Japan) • ACA/MED Declaration of Conformity (Australia and New Zealand) • BSMI Certificate (Taiwan) • KCC Certificate (Korea) • CB Scheme Certificate (International)

Keyboard

SIMATIC PC keyboard	
Designation	SIMATIC PC keyboard, USB
Layout	MF2, 105 keys, German/international
Interfaces	USB; PS/2 via USB-PS/2 adapter
Dimensions (L x W x H) in mm	470 x 195 x 44
Weight, approx.	1.4 kg
Connecting cable	1.75 m long, USB plug
Temperature • Operation • Storage/transport	 0 ... +50 °C -20 ... +60 °C
Approvals	FCC, cURus, GS, CE, c-tick, GOST-R

Ordering data — Article No.

	Article No.
SIMATIC IPC mouse Optical (BlueTrack) mouse with scroll wheel and USB connection	
• Color: anthracite	6ES7648-0BB00-0XA0
• Color: white	6ES7648-0BB00-0XA1
SIMATIC PC keyboard German/international key assignment, with USB connection and USB-PS/2 adapter	6ES7648-0CB00-0YA0

Overview

Using multi-monitor mode, the visualization of a project/ subproject when engineering or a plant/unit in process operation can be divided among up to 4 process monitors per operator station with application of different views. These project/plant sections can all be operated using just one keyboard and one mouse. Compared to single-channel mode, it is possible to enormously improve the efficiency, convenience and ergonomics of engineering and process control.

The SIMATIC PCS 7 Industrial Workstations are already equipped with an onboard graphics interface which supports multi-monitor mode with 2 process monitors.

One process monitor can be connected to the DVI-I port of the onboard graphics interface. The second one can be connected via an adapter cable (DisplayPort to DVI-D) to its DisplayPort.

A separate multi-monitor graphics card "4 Screens" is available for controlling 3 or 4 process monitors.

Both versions of the multi-monitor mode can be delivered factory-set with the SIMATIC PCS 7 Industrial Workstation (configuration option) or retrofitted. The desired configuration option can be selected using the online configurator of the SIMATIC PCS 7 Industrial Workstation or the ordering data tables of the single station, server or client versions.

The multi-monitor graphics card "2 Screens" can be used as an alternative to the onboard graphics interface or for retrofitting. This graphics card must be ordered separately.

Technical specifications

Multi-monitor graphics cards	Graphics card "2 Screens"	Graphics card "4 Screens"
Memory	512 MB DDR2	512 MB DDR2
Resolution • Max. analog resolution per channel • Max. digital resolution per channel	2048 x 1536 1920 x 1200	1920 x 1200 1920 x 1200
Electromagnetic compatibility (EMC)	Class B	Class B
Slot requirement	1 x PCIe (Express) x16	1 x PCIe (Express) x16
Low-profile format	The format of the cards is "low profile"	
	Scope of delivery: 2 retaining clamps for installation in systems with the "low-profile format" as well as in systems with the ATX format of full height	
Passive cooling and low current consumption	Design without fan for silent operation and to improve product reliability	

Industrial Workstation/IPC
Expansion components

Multi-monitor mode

Ordering data	Article No.		Article No.
Multi-monitor mode with two process monitors via onboard graphics interface		**Multi-monitor mode with three or four process monitors**	
Adapter cable DisplayPort to DVI-D for onboard graphics	6ES7648-3AF00-0XA0	**Multi-monitor graphics card "4 Screens"** For operation of 4 process monitors on 1 station	6ES7652-0XX04-1XE1
Multi-monitor mode with two process monitors via multi-monitor graphics card		Delivery package: Quad graphics card, driver CD, 1 quad DVI cable for 4 digital outputs, 4 adapters for VGA outputs	
Multi-monitor graphics card "2 Screens" For operation of 2 process monitors on 1 station Delivery package: Dual graphics card, driver CD, 1 dual DVI cable for 2 digital outputs, 2 adapters for VGA outputs	6ES7652-0XX04-1XE0		

3

Overview

A smart card reader can be used to check operator privileges on a single station or client. The smart card reader then works together with SIMATIC Logon, the user administration and access control function integrated in SIMATIC PCS 7 (see section "IT Security", under "SIMATIC Logon"), page 15/6.

The smart card has the function of a "key" for the operator station. Inputs are only permissible as long as it is inserted in the reader. Such unambiguous identification is particularly necessary for plants having to comply with validation requirements.

Technical specifications

Type	USB smart card reader
Interface	
Interface type	USB 2.0 CCID (Chip Card Interface Device), USB 1.1 compatible
Transmission rate	12 Mbit/s
Power supply	Via USB
Design and equipment	
Design	Desktop unit with foot for vertical positioning; adhesive pad at rear for optional mounting
Material	ABS
Color	Two shades of gray
Status display	Two-color LED
Cable length	1.8 m
Dimensions and weights	
Dimensions (LxWxD in mm)	80 x 67 x 28
Weight without foot	110 g
Weight with foot	141 g
Ambient temperatures during operation	
Temperature	0 … 55 °C
Humidity	10 … 90 %
Service life/MTBF	
Insertion cycles	100 000
MTBF (Mean Time Between Failures)	500 000 h
Test symbols / approvals	• Microsoft WHQL (Windows Hardware Quality Lab) • ISO 7816 • USB 2.0 (USB 1.1 compatible) • CCID (Chip Card Interface Device) • GSA Fips201 approved product list
Safety/environmental standards	• CE • WEEE • FCC • UL • VCCI • MIC • RoHS

Ordering data

	Article No.
USB smart card reader Desktop unit with USB cable	**6ES7652-0XX02-1XC0**
SIMATIC PCS 7 TCOS 3.0 chip card for chip card reader Pack with 10 units; 1 card is required per user	**6ES7652-0XX00-1XD2**

Industrial Workstation/IPC
Expansion components

3

■ Overview
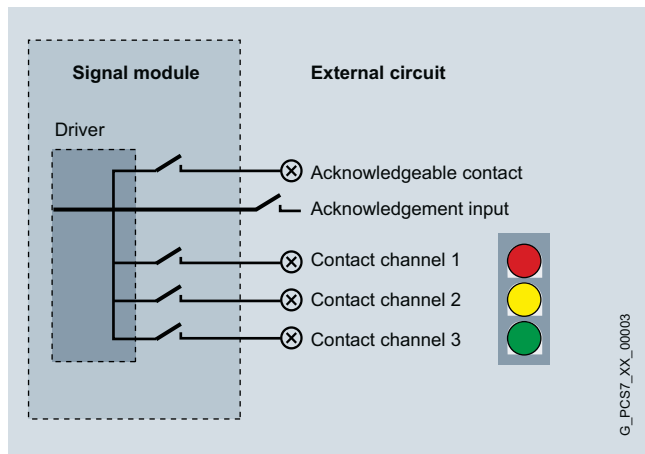
OS single station and OS client can be expanded by a signal module. These signal modules can control a horn and up to 3 different lamps or buzzer tones that represent a variety of message classes. Using a hardware timer (watchdog), the signal modules can detect and signal the failure of an operator station. A hardware acknowledgment button can also be connected.

The signal modules are installed in a PCI slot in the operator station.

They can be operated under the following operating systems:
- Windows 7 Ultimate 32/64-bit
- Windows Server 2008 R2 Standard 64-bit

■ Ordering data

	Article No.
PCI Signal module PCI card for installation in an operator station	**6DS1916-8RR**
Connecting cable For connection of an external horn to a signal module	
• 3 m	**6XV2175-8AH30**
• 10 m	**6XV2175-8AN10**
• 32 m	**6XV2175-8AN32**
• 50 m	**6XV2175-8AN50**

Engineering System

4

Engineering System
Introduction

■ Overview

The engineering system of the SIMATIC PCS 7 process control system is based on the high-performance SIMATIC PCS7 Industrial Workstation, which can be used either in office applications or in industrial environments.

The engineering software run on this hardware can be optimally matched to different customer requirements and tasks. The basic functionality defined by the standard engineering software can be optionally expanded depending on the project-specific task and its implementation.

The software licenses provided for the engineering system can be used to configure two system variants for different applications areas:

- **Classic, dedicated engineering station**
  allows in addition to engineering a 2-hour OS test mode, but no productive operation as an operator station
- **Combined engineering/operator station for small applications**
  allows in addition to engineering also process control for small plants in productive operation

■ Design

The architecture of the engineering system depends on how the SIMATIC PCS 7 project is processed:

- Locally, on a central engineering station
- In the engineering network (concurrent engineering)

Central engineering station

Hardware platform for the central engineering station is the SIMATIC PCS 7 Industrial Workstation in the single station version. This is based on a SIMATIC IPC of Rack PC design which is prepared for installation in 19" rack systems. It is available in two versions which have different communication links to the Industrial Ethernet plant bus:

- SIMATIC PCS 7 ES/OS IPC[1] BCE W7
  Connection to plant bus with 10/100/1000 Mbps RJ45 network adapter and Basic Communication Ethernet (BCE) for communication with up to 8 automation systems (not redundant stations)
- SIMATIC PCS 7 ES/OS IPC[1] IE W7
  Connection to plant bus with CP 1613 A2/1623/1628 communication module for communication with max. 64 automation systems

Two onboard 10/100/1000 Mbps Ethernet RJ45 ports are available for connecting to the terminal bus.

The Windows 7 Ultimate 64-bit operating system and the SIMATIC PCS 7 engineering software for AS/OS are factory installed on the SIMATIC PCS 7 Industrial Workstation. The scope of performance of the pre-installed SIMATIC PCS 7 engineering software is defined by installation of the purchased software licenses.

Engineering network

With concurrent engineering in an engineering network, the project is localized on one of the participating Engineering Stations, the "Project server". The engineering stations working as "Project clients" can access the project server data via LAN/WAN. Every engineering station in the network (project server/client) is able to download configuration data to a SIMATIC PCS 7 subsystem provided it has the required communication connections.

With this architecture, it is appropriate to install the project server on a SIMATIC PCS 7 Industrial Workstation, server version. The Windows Server 2008 R2 Standard 64-bit operating system and the SIMATIC PCS 7 OS Software server are factory installed on this (adaptation/expansion of SIMATIC PCS 7 installation required).

Like the single station version of the SIMATIC PCS 7 Industrial Workstation, the server version is also available in two versions which differ with regard to the plant bus communication:

- SIMATIC PCS 7 OS Server IPC[1] BCE SRV08
  Connection to plant bus with 10/100/1000 Mbps RJ45 network adapter and Basic Communication Ethernet (BCE) for communication with up to 8 automation systems (not redundant stations)
- SIMATIC PCS 7 OS Server IPC[1] IE SRV08
  Connection to plant bus with CP 1613 A2/1623/1628 communication module for communication with max. 64 automation systems

With the SIMATIC PCS 7 Industrial Workstation, single station version, you can use the same hardware platform for the project clients as for the central engineering station.

Configuration can be made easier by multi-monitor mode with up to 4 process monitors, both for a central engineering station and for individual stations in an engineering network.

See section "Industrial Workstation/IPC" for ordering data and detailed information on the product package and technology of the SIMATIC PCS 7 Industrial Workstations, page 3/3.

[1] IPC stands for one of the SIMATIC IPC types from the product range in the section "Industrial Workstation/IPC, SIMATIC Rack PC", which are authorized for SIMATIC PCS 7 V8.1.

4

Overview

The functionality of the engineering system is largely covered by the standard engineering software. The following software options are available in addition for special functions:

- SIMATIC Version Cross Manager
- SIMATIC Version Trail
- SIMATIC PCS 7 Advanced Engineering System (AdvES)
- SIMATIC PCS 7 Import/Export Assistant
- SIMATIC PDM Process Device Manager for SIMATIC PCS 7
- Engineering Process Safety
  (see chapter 14 "Safety Integrated for Process Automation")

- SIMATIC PCS 7 Maintenance Station Engineering
  (see chapter 7 "Plant Device Management")
- SIMATIC Route Control Engineering
  (see chapter 13 "Route Control")
- SIMATIC PCS 7 TeleControl OS Engineering (see Technology components, section "Telecontrol technology" in Catalog ST PCS 7 T)
- SIMATIC PCS 7 PowerControl OS Engineering (see Technology components, section "Switchgear automation" in Catalog ST PCS 7 T)
- S7-PLCSIM for the functional testing of CFC/SFC programs

Design

SIMATIC PCS 7 Engineering System
with operating system Windows 7 Ultimate 64-bit or Windows Server 2008 R2 Standard 64-bit

	Classic, exclusively engineering station						Combined engineering/ operator station for small applications	
Productive operation as an operator station possible	–						●	
Version	Project server		Project client		Single station		Single station	
	BCE	IE	BCE	IE	BCE	IE	BCE	IE
SIMATIC PCS 7 Industrial Workstation including operating system								
BCE communication for up to 8 automation systems (no redundant systems) — SIMATIC PCS 7 ES/OS IPC[1] BCE W7	–	–	●	–	●	–	●	–
SIMATIC PCS 7 OS Server IPC[1] BCE SRV08	●	–	–	–	–	–	–	–
IE communication — SIMATIC PCS 7 ES/OS IPC[1] IE W7	–	–	–	●	–	●	–	●
SIMATIC PCS 7 OS Server IPC[1] IE SRV08	–	●	–	–	–	–	–	–
Additional Industrial Ethernet communications software								
SIMATIC NET HARDNET-IE S7 REDCONNECT PowerPack for IE communication with redundant automation systems (additive to SIMATIC NET HARDNET-IE S7)	–	●	–	●	–	●	–	●
Standard engineering software, alternatives								
SIMATIC PCS 7 Engineering Software, unlimited POs — AS and OS, including 2-hour OS test mode	●		●		●		–	
AS	●		●		●		–	
SIMATIC PCS 7 ES single station, with 250 AS/OS Runtime POs	–		–		–		●	
Supplementary engineering software (optional)								
Version Cross Manager	●		●		●		●	
Version Trail	●		●		●		●	
Advanced Engineering System (AdvES)	●		●		●		●	
Import/Export Assistant	●		●		●		●	
Engineering Process Safety — S7 F Systems	●		●		●		●	
Safety Matrix Tool	●		●		●		●	
PCS 7 Maintenance Station Engineering	●		●		●		●	
SIMATIC Route Control Engineering	●		●		●		●	
SIMATIC PDM	●		●		●		●	
SIMATIC PCS 7 TeleControl OS Engineering[2]	●		●		●		●	
SIMATIC PCS 7 PowerControl OS Engineering[2]	●		●		●		●	
Simulation with S7-PLCSIM	●		●		●		●	

Hardware and software components of the engineering system, as well as possible configurations

[1] IPC stands for one of the SIMATIC IPC types from the product range in the section "Industrial Workstation/IPC, SIMATIC Rack PC", which are authorized for SIMATIC PCS 7 V8.1.

[2] Products can be found in Catalog ST PCS 7 T, SIMATIC PCS 7 technology components

Note on Microsoft SQL Server software

The "SQL Server" software from Microsoft which is delivered together with SIMATIC PCS 7 is exclusively intended for this process control system. It must not be used in any other context without previous written approval by Siemens.

Engineering System
ES Software

Standard Engineering Software

■ Overview

The standard engineering software provides the basic functionality for configuration of SIMATIC PCS 7 plants with:

- Automation systems
- Process I/O
- Communication networks
- Operator systems
- Maintenance station
- SIMATIC BATCH
- SIMATIC Route Control

Licensing of the standard engineering software depends on use of the engineering station as:

- Classic, dedicated engineering station (not suitable for productive operation as an operator station)
- Combined engineering/operator station for small applications (suitable for productive operation as an operator station)

■ Application

Classic, exclusive engineering station with unlimited number of process objects for engineering (Engineering unlimited POs)

Two software versions with unlimited engineering POs are available for the classical engineering station:

- AS/OS – for engineering of automation systems (AS) and operator systems (OS)
- AS – only for AS engineering

With the AS/OS software version, the OS configuration can be tested in an OS test mode limited to 2 hours. This OS test mode is not suitable for productive operation. After 2 hours, the engineering station automatically switches to demonstration mode.

Rental License

A 30-day or 50-hour rental license for AS engineering (unlimited POs) gives you a cost-effective alternative for short-term projects or short-term capacity bottlenecks.

The licenses for 30 days and 50 hours differ as follows with regard to runtime billing:

- With the 30-day license, the uninterruptible timer starts at the time of first usage. Time billing is thus independent of usage.
- With the 50-hour license, only the actual period of use is billed. The timer stops when the SIMATIC PCS 7 application is exited, and restarts when the application is opened again.

Combined engineering/operator station for small applications

The combined engineering/operator station is designed to support compact process control plants. This combines an unlimited AS/OS Engineering license (unlimited POs) with an AS/OS Runtime license for 250 POs. These licenses can only be used together on a station. It is not possible to separate the Engineering and Runtime licenses for use on different stations.

The runtime POs can be expanded with cumulative Runtime licenses:

- SIMATIC PCS 7 AS Runtime license for 100, 1 000 or 10 000 POs, see section "Automation systems", "Modular AS 410 systems", page 8/4
- SIMATIC PCS 7 OS Runtime license for 100, 1 000 or 5 000 POs, see section "Operator system", "OS software" under "OS standard software for single station / server / client", page 5/6

Division of work during engineering

To enable engineering to be carried out in the shortest possible time, it is necessary to use resources optimally. The engineering system of the SIMATIC PCS 7 process control system not only supports uniform engineering of the project on an engineering station but also provides various options for dividing the work.

Concurrent Engineering

With Concurrent Engineering multiple project engineers can work concurrently on one project in CFC and SFC, without having to split the project up into sub-projects beforehand. During commissioning, for example, charts can be used in the online (debug) mode and at the same time changes can be made to the project. The Graphics Designer supports parallel working on a project even when creating process displays.

The project is localized on one of the participating engineering stations, the "Project server". The engineering stations working as "Project clients" can access the project data via LAN/WAN. A specific chart can be found very quickly using a cross-project search function.

CFC and SFC charts can be opened and viewed by several project engineers concurrently. However, the system rejects concurrent write accesses to the database. If the project engineer attempts to access a chart which is already being used, a corresponding warning is output in a dialog window.

Every engineering station in the network (project server/client) is able to download configuration data to a SIMATIC PCS 7 subsystem provided it has the required communication connections.

Multiproject Engineering

Multi-project engineering permits division of a complex project into several subprojects in accordance with technological criteria in order to allow several teams to work on the project in parallel. To achieve this, a host "Multi-project" is defined in the SIMATIC Manager. The individual projects can be added or removed from a multiproject at any time. Similarly, projects can be divided or combined (Branch & Merge).

The subprojects in a multiproject are stored on a central server and moved to the local engineering stations for editing. The engineering performance is then not affected by network access.

Central configuration functions for multi-projects help to reduce the configuration overhead. For example, a hierarchy folder can be created in the current project and also automatically in all other projects. It cannot be modified there, but objects can be inserted. All block types used in a multi-project can also be updated centrally.

Function

Essential tools of the standard engineering software and their functions:

SIMATIC Logon

SIMATIC Logon is a user administration and access control function integrated in the engineering system. Together with the detailed recording facilities provided by the change log, SIMATIC Logon offers plant owners exceptional system support when verifying changes.

Using SIMATIC Logon, the administrator can assign specific access privileges to groups of users, thus controlling the possi-

bilities for data access. Access rights for stations of the process control system and operator privileges for blocks can both be set up. Configurable change logs permit the recording of all access operations to the engineering system as well as all online changes concerning the automation systems, operator systems, SIMATIC BATCH or SIMATIC Route Control.

If the modification reports are linked to the data of SIMATIC Logon during evaluation, it can be clearly proven who has carried out a specific modification and at what time. Such verifications are often the object of special sector-specific requirements, formulated, for example, in FDA 21 CFR Part 11 or GAMP.
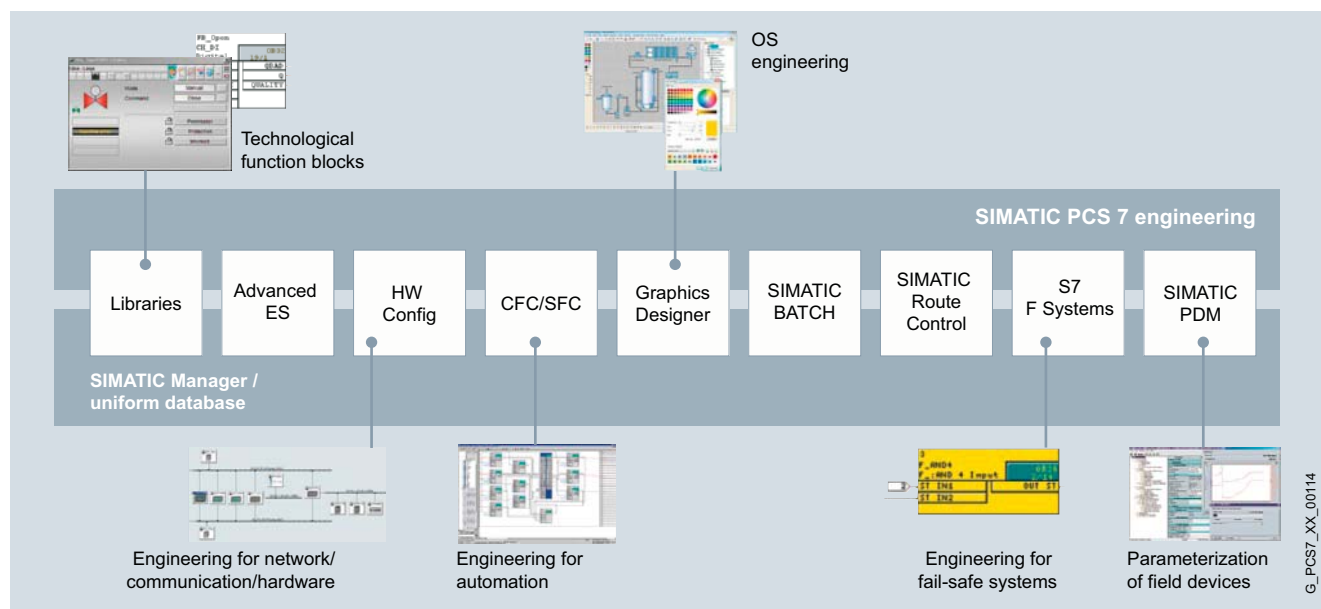
SIMATIC Manager

The SIMATIC Manager is the control center of the engineering system. It is the integration platform for the engineering toolset as well as the configuration basis for all engineering tasks of the SIMATIC PCS 7 process control system. All aspects of the SIMATIC PCS 7 project are created, managed, archived and documented here.

The engineering toolset contains tools which are optimally matched to one another for system-wide project-oriented engineering, and which simultaneously provide the basis for asset management of the I&C equipment. These include tools for effective engineering of the following components:

- Control system hardware including distributed I/O and field devices
- Communication networks
- Automation functionality for continuous and batch processes (AS engineering)
- Operation and monitoring functionality (OS engineering)
- Mass data engineering and cooperation with CAD/CAE planning tools (Advanced Engineering System)
- Diagnostics and asset management functionality
- Batch processes, automated with SIMATIC BATCH
- Material transport, controlled by SIMATIC Route Control
- Safety applications (Safety Integrated for Process Automation)

Technologists as well as process and production engineers can carry out planning and configuration in their familiar environments when using this range of tools as well as predefined blocks and charts.

The hardware required for use in a SIMATIC project, such as automation systems, communications components and process I/O, is stored in an electronic catalog. The hardware can be configured and configured using the HW-Config tool.

Creating hierarchy folders implements a project structure, the plant hierarchy (PH). By storing CFC and SFC charts for automation systems and pictures and reports for operator stations in a hierarchy folder along with additional documentation, the configuring engineer implicitly determines the hierarchical assignment.

Function blocks (FBs) and functions (FCs) can be encrypted and decrypted with the S7-Block Privacy application to protect know-how. Following encryption, the blocks and their attributes can no longer be modified. Only the interfaces of the blocks are then visible.

Engineering System
ES Software

4

■ Function (continued)

To implement the automation logic, standardized function blocks must be combined with other blocks in the graphic configuration tool CFC according to technological specifications. You can simply select predefined blocks or charts for this purpose from a catalog and then position, graphically interconnect and configure them in the working area. The process tag data relevant to operation and monitoring, such as messages and variables, are generated at the same time.

Sequential controls permit control and selective processing of the basic automation functions created per CFC by means of changes in operating mode and status. Convenient editing functions for the graphic configuration of sequential controls as well as powerful test and commissioning functions are offered by the SFC editor.

With the optional Advanced Engineering System, configuring and commissioning can be effectively rationalized, e.g. by means of automatic generation of the hardware configuration or multiple use of standardized software modules. The Advanced Engineering System can also exchange data with higher-level planning systems for this purpose (for additional information, refer to section "Advanced Engineering", page 4/15).

Complete SIMATIC PCS 7 projects or all project modifications can be compiled in one working step and downloaded to the target systems involved, e.g. to automation systems, operator systems or SIMATIC BATCH. The engineering system automatically ensures that the sequence is correct. The procedure is displayed and controlled in a central dialog.

A more effective method for less comprehensive changes to the standard automation, e.g. addition or modification of single process tags, is selective compilation and downloading at chart level. This can be started from the technological hierarchy, from the CFC, or from the chart folder.

The project engineer can recognize all changes since the last download by their color, and the current chart states by means of the corresponding symbols. The project engineer can make a specific choice in a dialog form for selective downloading. In association with the Version Trail, each download is automatically followed by archiving.

In the case of blocks being executed on the AS 410 automation system, it is even possible to change types during runtime by means of seamless copying (TCiR).

The SIMATIC Manager can also be used to organize the project data for engineering of the operator systems. All the relevant process tag data relevant to operation and monitoring is generated when the automation function is defined. A powerful Graphics Designer is available for generation of the process displays. The basis for generating process displays is provided by static symbols and dynamic block icons and faceplates that are organized in libraries and linked to the parameters of the function blocks.
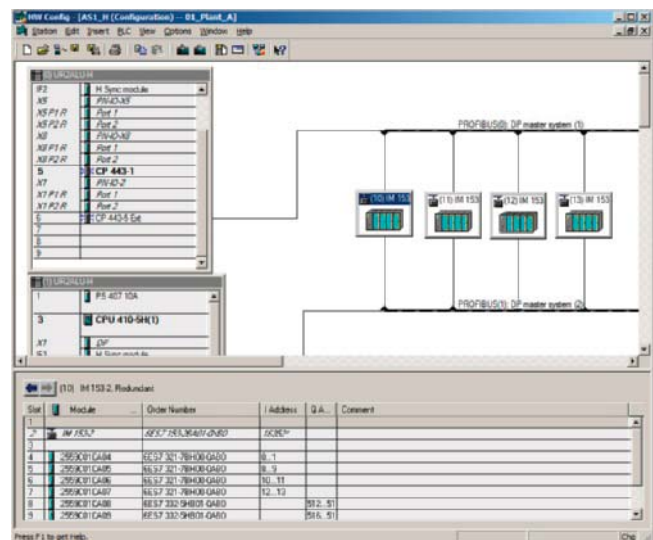
Component view: hardware configuration in the SIMATIC Manager with HW-Config
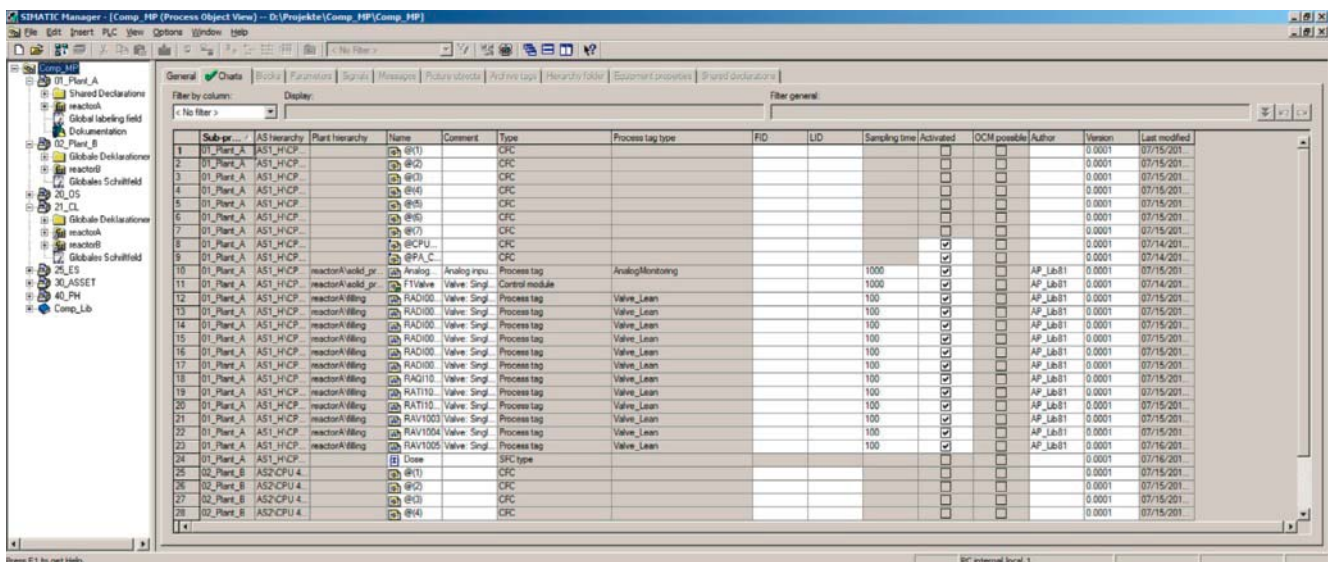
Process tags in the process object view

Function (continued)

Project views

The SIMATIC Manager supports the various tasks for creating a plant project by means of the following project views:

- **Component view (HW-Config)**
  for configuration of hardware such as automation systems, bus components or process I/O
- **Process object view**
  as the central development environment for all aspects of process tags/objects

The process object view of the SIMATIC Manager supports the work of a process engineer by providing a universal view of the process tag. It shows the technological hierarchy of the plant (presented in tree form) in combination with a tabular view of all aspects of the process tag/object (general, charts, blocks, parameters, signals, messages, image objects, archive variables, hierarchy folders, equipment properties, and global declarations). This provides the technologist with fast orientation.

All objects in the marked branch of the hierarchy are displayed in the table so that they can be directly processed with user-friendly edit, filter, replace, import and export functions. A special test mode offers the facility for testing process tags and CFCs online and for starting them up.

The OS areas and the image hierarchy for process control, as well as the SIMATIC PCS 7 asset management, can be derived from the technological hierarchy. Furthermore, it also forms the basis for the plant-oriented identification of process objects.

Common displays can be positioned in pictures by means of the image hierarchy, and automatically linked to lower-level images. The configuration engineer is only responsible for the correct positioning. Since the number of common display fields and their semantics can be configured, it is also possible to implement customized alarm configurations.

I&C and process messages are already pre-configured in the function blocks, and operator input messages are already pre-configured in the faceplates. These are automatically generated when the triggering event occurs. If required, message texts can be modified or message priorities defined.

Using the process object view, "Smart Alarm Hiding" can also be configured. This refers to the dynamic hiding of alarms that are of secondary importance to the safe and interference-free operation of the plant under certain plant conditions. Depending on the operating status of a plant unit (startup, service etc.), messages of the technological blocks grouped in this plant unit are shown or hidden in accordance with the previously set configuration. Alarms can be displayed or hidden separately for each of the maximum 32 operating states through selection of option boxes in the alarm matrix of the process object view. Although hidden alarms are not signaled visually and audibly, they are still logged and archived as before.
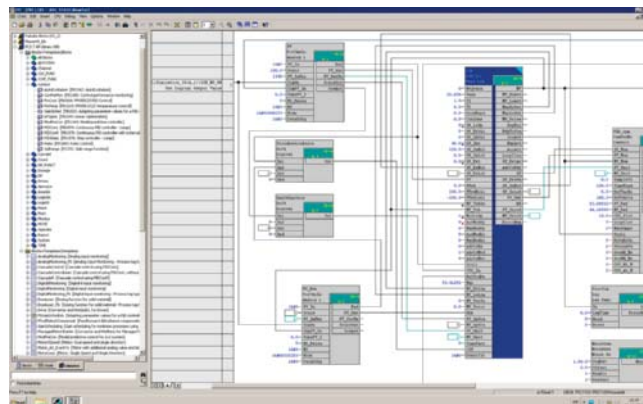
Continuous function chart

Continuous function chart (CFC)

The CFC editor permits graphic configuration of the continuous automation functions. In addition to convenient editing functions, its scope of functions also includes powerful test and commissioning functions as well as individually configurable documentation functions.

When creating a new CFC, a new runtime group with the same name as the chart is created. All the blocks that are subsequently entered in the chart are automatically added to this runtime group. Each block is therefore already assigned runtime properties when it is inserted, and configuration engineers can optimize these properties by means of modifications in the runtime editor or by using algorithms.

The algorithm first determines the optimum block sequence separately for each runtime group, and then the optimum sequence of runtime groups.

Instances of function block types can be positioned on CFCs, assigned parameters, and interconnected. Operator privilege levels can already be defined at block level for each block attribute so that finely granular operator privileges can be implemented.

Additional potential for rationalization is offered by special configuration techniques such as chart-in-chart for implementing hierarchical charts, or the multiple use of chart block types (individual control unit types and process tag types) or SFC types (standardized sequence controls) in the form of instances.

The CFC editor supports the following types of standardized software modules:

- **Function block type**
  The function block types supplied with I&C libraries are used for I&C modeling of engineering equipment such as valves or motors. The smallest standardized software modules for multiple usage have connections for actuating and control signals and for parameter assignment and monitoring functions. Some also contain interlocking functions for automatic transition to defined safety settings.
- **Process tag type**
  Process tag types implemented with function blocks each represent a standardized CFC for the basic automation of specific I&C functions, e.g. for a level controller. Their instances can be modified centrally by the type-instance concept, and also manually adapted and linked.

Engineering System
ES Software

◼ Function (continued)

- **Control module type**
  The control module type (CMT) marks a new type of standardized software module. In conjunction with the Advanced Engineering System, this offers even more efficient engineering than classic process tag types. A CMT can contain blocks, charts, control variables (block I/Os such as signals and parameters) and messages.

Note:

The CFC is not only a component in the standard engineering software of the SIMATIC PCS 7 process control system. It can also be used as a separate product in the context of Totally Integrated Automation (TIA) together with other SIMATIC products. This SIMATIC CFC is a component of Catalog ST 70, section "SIMATIC Software" (article number of the current SIMATIC CFC V8.1: 6ES7658-1EX18-0YA5).
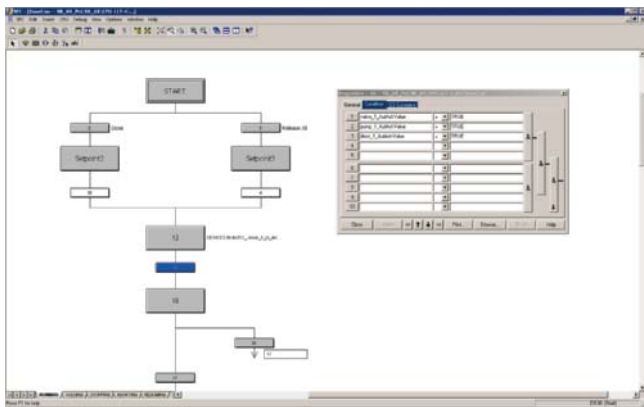
Sequential function chart

Sequential function chart (SFC)

The SFC editor is used for the graphical configuration and commissioning of sequential controls for batch production operations. It possesses convenient editing functions as well as powerful test and commissioning functions.

Using a sequential control, basic automation functions usually created using CFC are controlled and selectively processed by means of changes in operating mode and status. Depending on the subsequent use, the sequential controls can be created either as a SFC plan or SFC type

SFC plan

The SFC can be used to implement sequence controls which can be applied once and which access several partial areas of the production plant. Each SFC plan contains standardized inputs and outputs for status information and for control by the user program or the user. The SFC plan can be positioned and linked as a block in the CFC. The required CFC block connections are selected by simple operations and connected to the steps or transitions of the step chains. A status management conforming to ISA 88 enables the configuration of up to 8 separate sequencers within a single SFC, e.g. for states such as RUNNING, HOLDING or ABORTING, or for different operating modes.

SFC type

SFC types are standardized sequential controls which can be applied repeatedly and which access one partial area of the production plant. They can be organized in libraries, and handled like normal function blocks, i.e. they can be selected from a catalog and positioned, interconnected and configured as an instance in a CFC plan.

Changes to the original automatically result in corresponding changes in all instances. An SFC type may contain up to 32 sequences. Using the function "Create/update block symbols", a block symbol is automatically positioned and interconnected in the associated process display for all SFC instances with HMI features.

I&C libraries

The use of library elements plays a major role in minimizing the amount of engineering required and thus also the project costs.

Two I&C libraries are integrated in the standard engineering software of SIMATIC PCS 7 V8.1:

- Advanced Process Library (current standard, pre-installed)
- PCS 7 Standard Library (former standard, can be installed subsequently if required)

Pre-configured and tested blocks, faceplates and symbols are organized in these libraries and form the basic elements for the graphic configuration of automation solutions.

The comprehensive range of blocks can be categorized as follows:

- Blocks for mathematical operations, analog and digital logic
- Interlocking blocks
- Technological function blocks with integral display, operation and signaling functions, e.g.:
  - Standard Control and Advanced Process Control blocks
  - Motor and valve blocks
  - Counter blocks
  - Dosing block
- Blocks for the integration of field devices
- Operator control and monitoring blocks
- Message and diagnostics blocks

Furthermore, pre-configured process tag types for process equipment such as pumps, valves, dosing units and controllers (cascade, spit-range) etc. extend the scope of library elements.

Starting with SIMATIC PCS 7 V8.1, several versions of a library can coexist next to each other. This results in advantages when adapting the user software in the event of a system upgrade.

4

Function (continued)
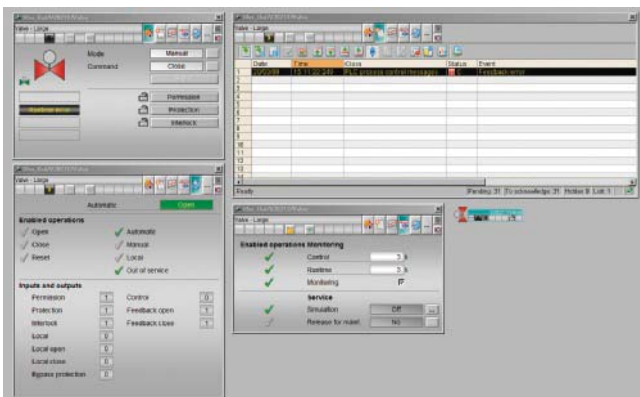
Examples of OS standard faceplates from the SIMATIC PCS 7 Advanced Process Library, valves

Advanced Process Library

The Advanced Process Library (APL) based on many years of experience of project engineers and plant owners takes into consideration current NAMUR recommendations and PNO specifications. Proven functions as well as visually attractive GUIs for a high level of operator convenience facilitate and also force interaction of operators with the plant.

Alternative, small versions of function blocks reduced to core functions, whose block icons and faceplates occupy less space in the process display, improve clarity in complex process displays.

Other features worth mentioning are:

- Special operating modes:
  - "Local" for integration and application of local control options
  - "Shutdown" for deactivating a measuring point for maintenance and service
- Several faceplate views:
  - "Preview" with information on the I/O signal status, automatic control, and possible/permissible operator inputs; display of real value for simulation
  - "Memo view" for temporary operator information
- Convenient interlocking blocks with initial signal information, can be directly called from the technological function blocks, e.g. from a motor block
- Flexible adaptation of functions in the library blocks
- Commissioning support through direct simulation on the operator station
- Protection against operator errors as the result of detailed grading of user privileges
- Explicit enabling/disabling of operations for a process tag for individual operator stations of the plant using the function "Local operator enabling"
- Integration of any compact drives and switch/starter objects via standard PROFIBUS profiles
- Coordination of multiple access operations, e.g. of SFC/SIMATIC BATCH, to equipment such as valves, dosing units or pumps
- Tacking of operator input windows facilitates repeated, successive operations

Technology libraries

The additional technology libraries "Industry Library" and "Condition Monitoring Library" offered in Catalog ST PCS 7 T (SIMATIC PCS 7 technology components) expand the standard functionality of the APL. All display icons, function blocks and faceplates of these libraries are designed in the style of the APL.

The Industry Library contains blocks for:

- Building automation (heating, ventilation, air conditioning)
- Operator control and monitoring using touch panels
- Integration of SIMATIC S7 package units (optimized for S7-300)
- Interfacing of external Advanced Process Control systems
- Multiple control room concepts
- Other technological functions, e.g. for expanding measured value monitoring, or specifying a setpoint trend

The Condition Monitoring Library contains blocks for:
- Monitoring of centrifugal pumps (PumpMon)
- Monitoring of control valves (VlvMon)
- Online valve test during operation (PST)
- Monitoring for pressure loss, and early detection of blockages (PressDropMon)

Advanced Process Control (APC) functions

In addition to numerous basic control functions, e.g. PID control, cascade control, split range control and ratio control, the I&C libraries of SIMATIC PCS 7 also provide function blocks and templates for advanced control functions at no extra cost.

Gain scheduling

The GainSched block allows continuous adjustment of the controller parameters in non-linear processes depending on the operating point. The block, which works in a similar manner to the polygon block, can derive three separate output values from one input value (measured variable X), which serve as regulating parameters for an interconnected controller block. Depending on the characteristic of the measured variable X, the GainSched changes the regulating parameters of the combined closed-loop controller in a sliding manner.

Override control

The outputs of two or more controllers are connected to a common final control element. The decision concerning which controller actually receives access to the final control element is made depending on the evaluation of the current process state.

Lead-lag/feed-forward control

A strong interference which can be measured is compensated in advance by feed-forward control. The control is thus limited to model uncertainties and non-measurable faults.

Engineering System
ES Software

Function (continued)
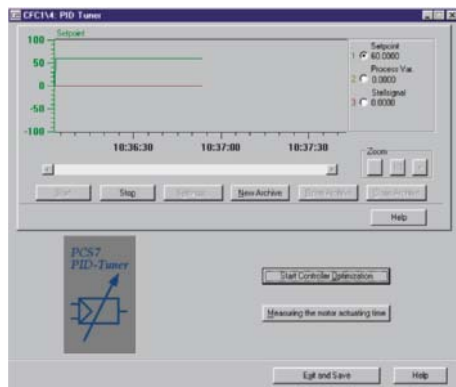
PID tuning

The integrated PID Tuner is suitable for optimization of the CTRL_PID and CTRL_S software controllers in circuits with PID, PI, or P control. On the basis of an experimentally determined model of the controlled system, favorable controller parameters for an optimum disturbance response or an optimum control response of the controller can be determined according to the procedure of absolute value optimization. Optimization can be carried out in manual or automatic mode. The typical controller values (actual value, setpoint, manipulated variable) are recorded by a trend function. The transient response of the controllers with the determined parameters can be checked by defining jumps. The controller parameters can be saved, and recalled as required.

Monitoring of the control quality

The ConPerMon block determines the control quality of a controller block (e.g. PID controller) on the basis of the online data of the setpoint, actual value and manipulated variable. Depending on deviation of the comparison quality, e.g. the control quality at commissioning, it can trigger a warning or an alarm. The faceplates of all control quality monitoring of a plant or a plant unit can be summarized in OS screens, which enables problems to be detected early on, analyzed, and specifically corrected.

Smith Predictor

The Smith Predictor can significantly improve the control quality of processes with long and relatively constant dead times. By eliminating the dead time component using a process model running parallel to the actual process, the controller can be designed for a process free of dead time, and thus set more effectively.

Model-based predictive multi-variable control

Model-based predictive multi-variable controllers (MPC) separately analyze the behavior of several interdependent variables for complex processes over a longer period. The results are used for optimized control of these variables. They eliminate adverse interactions which occur with separate control of the interdependent variables. Using a mathematical model of the process dynamics, MPCs are able to predict the future process response over a defined period of time (prediction horizon) and optimize a quality criterion on this basis.

The APL provides two multi-variable controllers with different functionalities and performance:
- MPC4x4 (ModPreCon) for up to 4 coupled manipulated variables and controlled variables
- MPC10x10 for up to 10 coupled manipulated variables and controlled variables and up to 4 measurable disturbance variables

Note:
Model-based multi-variable controllers make high demands on memory and processing time of the designated automation system. For that reason, please check the resources of the designated automation system before using them.

Graphics Designer

The project data for the engineering of the operator systems are organized with the SIMATIC Manager. All the data relevant to operation and monitoring of a process tag, such as messages and HMI variables, are generated automatically during definition of the automation function. A powerful graphics designer is available for the generation of process displays.

DOCPRO

DOCPRO is a tool for effective generation and management of plant documentation in accordance with defined standards. DOCPRO permits you to structure your project data in any manner, to process them in the form of standardized circuit manuals, and to print them in a uniform layout. You can incorporate your own cover sheets, layouts, graphics, logos or title block data. It is easy to control printing, i.e. you can specifically output individual parts of the project or all project data on the printer.

4

Ordering data

	Article No.		Article No.
Software for a classic, dedicated engineering station without scale limitation, not suitable for productive operation as an operator station		**Software for a combined engineering/operator station for small applications, suitable for productive operation as an operator station**	
SIMATIC PCS 7 AS/OS Engineering Software V8.1 Unlimited POs, activated for 2-hour OS test mode		**SIMATIC PCS 7 ES Single Station V8.1** Including 250 AS/OS Runtime POs	
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
		• 5 languages (English, German, French, Italian, Spanish)	
• Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1	**6ES7658-5AX18-0YA5**	- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1	**6ES7651-5AA18-0YA0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-5AX18-0YH5**	- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7651-5AA18-0YH0**
SIMATIC PCS 7 AS/OS Engineering Software ASIA V8.1 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		• ASIA, 2 languages (English, Chinese)	
• Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1	**6ES7658-5AX18-0CA5**	- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1	**6ES7651-5AA18-0CA0**

For additional information on the Software Media Package, see chapter "Software Media and Logistics", section "PCS 7 Software Packages", page 1/2.

	Article No.
SIMATIC PCS 7 AS Engineering Software V8.1 Unlimited POs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- Floating license for 1 user	**6ES7658-1AX18-0YB5**
- Rental license for 30 days (time billing independent of use)	**6ES7658-1AX18-0YA6**
- Rental license for 50 hours (time billing dependent on use)	**6ES7658-1AX18-0YB6**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- Floating License for 1 user	**6ES7658-1AX18-0YH5**
- Rental license for 30 days (time billing independent of use)	**6ES7658-1AX18-0YH6**

Engineering System
ES Software

Standard Engineering Software

More information

Regional product versions

Originally, all SIMATIC PCS 7 software products were designed for international use, i.e. there was only one product version for worldwide use, which was offered in up to 6 languages: English, German, French, Italian, Spanish and Chinese. However, the number of supported languages was not uniform; it varied depending on the product. This internationally usable product variant remains available for all SIMATIC PCS 7 software products.

In addition, a regional "ASIA" product version will also be offered for the SIMATIC PCS 7 Software Media Package and specific SIMATIC PCS 7 software products of the "Engineering System" and "Operator System" system components. The ASIA products are currently available in two languages: English and Chinese (simplified). They are explicitly identified in the name by the suffix "ASIA".

If a product listed in this catalog does not have the suffix "ASIA" in its name, it can always be used globally. However, the following restriction applies: If a regional ASIA product is offered, the pendant for international use does not support the Asian languages (currently Chinese simplified) present in the ASIA product.

The products for international use, i.e. products without the suffix "ASIA", are not intended as the basis for runtime systems with fonts in Asian languages.

The following special points must be observed as a result of the definition of separate products for installation software and licenses. The SIMATIC PCS 7 installation software is available in the form of two data medium packages:

- SIMATIC PCS 7 Software Media Package
- SIMATIC PCS 7 Software Media Package ASIA

The specific ASIA software licenses harmonize exclusively with the SIMATIC PCS 7 Software Media Package ASIA. SIMATIC PCS 7 software licenses for which there is no ASIA pendant can be used with both SIMATIC PCS 7 Software Media Packages.

Overview

The SIMATIC Version Cross Manager is a user-friendly tool for determining the differences between various versions of individual projects or multi-projects by:

- tracing missing, additional or differing objects by comparing hardware configuration, communication, plant hierarchy, CFC/SFC plans, SFC details, block types, messages, global tags, signals and run sequences
- Graphic display of comparison results in a combination of tree and tabular formats
- Clear hierarchical structuring according to the technological hierarchy of the plant
- Color-coded identification of the differences

Ordering data   Article No.

SIMATIC
Version Cross Manager V7.1
Can be used with SIMATIC PCS 7 V7.1, V8.0 and V8.1

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package   **6ES7658-1CX17-2YA5**
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license as well as TIA Engineering Toolset CD

- Delivery form online   **6ES7658-1CX17-2YH5**
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

More information

Upgrade

You can upgrade SIMATIC PCS 7 engineering systems with Engineering Software V7.1/V8.0 to version 8.1 using the SIMATIC PCS 7 Engineering Upgrade Packages. However, the SIMATIC Version Cross Manager remains unchanged in the version 7.1, and can be used in both SIMATIC PCS 7 V7.1 and in SIMATIC PCS 7 V8.0 and V8.1. Since upgrading is not essential, it is therefore not part of the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS V7.1/V8.0 to V8.1.

For further information, see chapter 16 "Update/upgrade packages".

TIA applications

The Version Cross Manager is not only a software component of the SIMATIC PCS 7 Engineering System. As a separate product, it can also be used together with other SIMATIC products in the context of Totally Integrated Automation (TIA). This SIMATIC Version Cross Manager is a component of Catalog ST 70, section "SIMATIC software":

- SIMATIC Version Cross Manager V7.1, article number:
  - 6ES7658-1CX17-2YA5 (package)
  - 6ES7658-1CX17-2YH5 (online)

4

Engineering System
ES Software

Version Trail

Overview
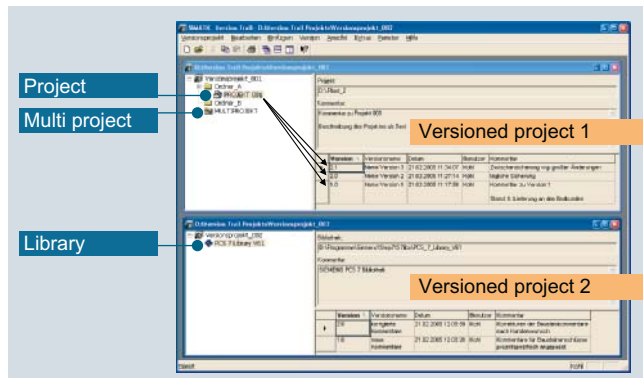
SIMATIC Version Trail is a software option for engineering which, together with the SIMATIC Logon central user administration, can assign a version history to libraries, projects and multi-projects.

Function

SIMATIC Version Trail tags the with a version ID when archiving, and enters the following information in the version history:

- Version
- Version name
- Date and time
- User
- Comment

Individual versions can be retrieved from the archive, and used further. SIMATIC Logon organizes the access protection.

Archiving and retrieval procedures can be automated on a time-driven basis. Retrieval of block parameters from the automation system can be coupled with the archiving procedure, but it can also be performed independently of this on a time-driven basis and with version assignment.

The version history managed by Version Trail can be displayed and printed. An already completed version cannot be modified at a later date. In conjunction with the Version Cross Manager, an archived version can be compared with an existing project or a second archived version.

Ordering data   Article No.

SIMATIC Version Trail V8.1
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick,
  certificate of license as well as
  TIA Engineering Toolset CD   **6ES7658-1FX18-2YA5**

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!   **6ES7658-1FX18-2YH5**

More information

Upgrade

You can upgrade SIMATIC PCS 7 engineering systems with Engineering Software V7.1/V8.0 to version 8.1 using the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS. A component of these upgrade packages is also the upgrade for SIMATIC Version Trail to V8.1.

For further information, see chapter 16 "Update/upgrade packages".

For application scenarios beyond SIMATIC PCS 7, a separate SIMATIC Version Trail upgrade can be obtained for upgrading SIMATIC Version Trail from V8.0 to V8.1.

TIA applications

SIMATIC Version Trail is not only a software component of the SIMATIC PCS 7 Engineering System. It is also a separate product which can be used in the context of Totally Integrated Automation (TIA) together with other SIMATIC products. As such it is a component of Catalog ST 70, section "SIMATIC software":

- SIMATIC Version Trail V8.1, article number 6ES7658-1FX18-2YA5 (package) or 6ES7658-1FX18-2YH5 (online)

In the context of TIA, a separate SIMATIC Version Trail upgrade is available in each case:

- SIMATIC Version Trail Upgrade V7.1 to V8.0, article number 6ES7658-1FX08-2YE5 (package)
- SIMATIC Version Trail Upgrade V8.0 to V8.1, article number 6ES7658-1FX18-2YE5 (package)

Note:

Version Trail cannot be used as a stand-alone application; it only runs together with SIMATIC Logon (see section "IT security"), page 15/6.

Overview
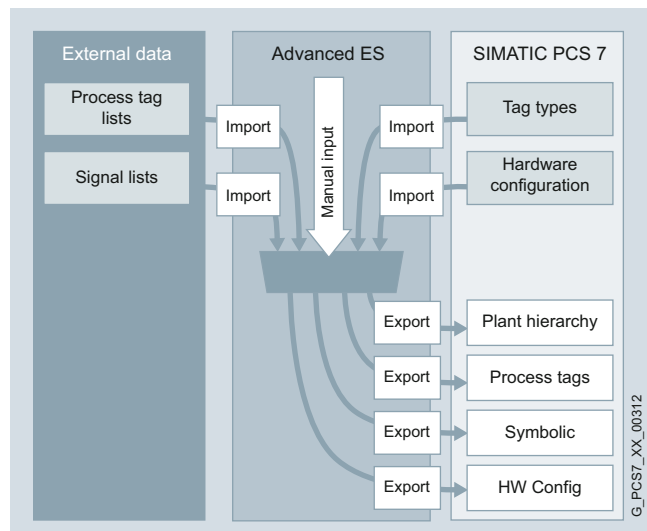
Data flow when using the Advanced Engineering System

Using the Advanced Engineering System (AdvES), consulting engineers and planning offices as well as end customers can significantly reduce their configuration and commissioning costs while simultaneously improving the engineering quality.

The SIMATIC PCS 7 Advanced Engineering System (AdvES) expands the functionality for plant configuration and can be started from a SIMATIC PCS 7 project in SIMATIC Manager. It acts as a link between

- Tools for basic and detailed planning, e.g. EPlan, ELCAD or SmartPlant, and
- Standard engineering tools from the SIMATIC PCS 7 engineering toolset, e.g. CFC, HW Config, plant hierarchy.

AdvES uses various data import options in order to collect existing engineering data from the SIMATIC PCS 7 process control system and from process tag and signal lists in Microsoft Excel format and to prepare these for utilization in the SIMATIC PCS 7 engineering system.

Benefits

Engineering and planning offices as well as end customers benefit from the use of SIMATIC PCS 7 Advanced Engineering System (AdvES) in particular through:

- Shorter configuration and commissioning times
  - Qualification is simplified due to standardized interfaces
  - Less coordination overhead with the planner
  - Short-term changes from bi-directional generation
- Increased quality
  - Errors are avoided due to standardized interfaces
  - Plausibility and data consistency can be checked
  - Changes to automation are reliably integrated in system planning
- No overhead for creating and maintaining proprietary tools and solutions

Function

Data from process tag and signal lists can be automatically imported into AdvES. Integrated change management supports the repeated importing of modified data from Microsoft Excel.

AdvES recognizes process tags in Excel lists after the first assignment, automatically assigns them to process tag types of any PCS 7 project library, and then generates the following data:

- PCS 7 process tag instances with signal and parameter settings
- Plant hierarchy (PH)
- Hardware configuration

Inconsistencies can be detected quickly by means of plausibility and data consistency checks, displayed in a log, and then eliminated in a targeted manner.

Manual processing functions for editing plant hierarchies and process tags as well as for interconnection of signals between process tags allow completion of the imported data. Numerous filter functions support data selection.

The AdvES rationalizes mass data engineering by means of multiplying standardized software modules. Both the individual control module types (CMTs) and the classic process tag types are supported. AdvES is optimized for working with the control module types. Special editors for mass data processing offload the project engineer from time-consuming routine work.

With the support of integrated design templates, the different table views of the AdvES data can also be displayed as reports and printed.
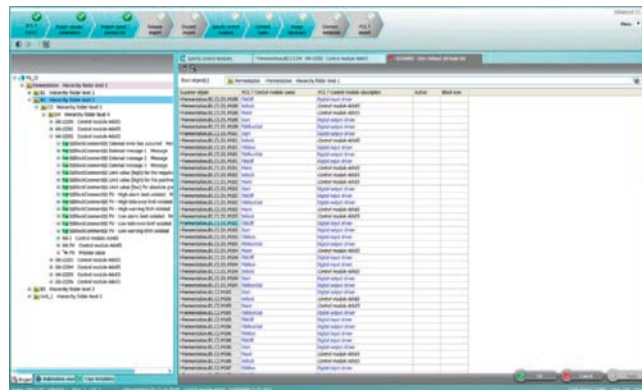
Integrated workflow management with progress indicator in the header bar

The user is supported in carrying out tasks by integrated workflow management. The sequence and progress of execution are displayed in a header.

Engineering System
ES Software

Advanced Engineering

Basic functions of the
SIMATIC PCS 7 Advanced Engineering System (AdvES)

- Import of system planning data and SIMATIC PCS 7 engineering data
- Processing functions for the manual completion of imported data
- Simple interconnection of several process tags
- Generating of process tags from signal and process tag lists
- Generation of hardware configurations from signal lists
- Batch processing of process tags, signals, and parameters
- Automatic plausibility and consistency check
- Transfer of data into the SIMATIC PCS 7 Engineering System
- Reports on documentation updates
- Variant formation of individual SIMATIC PCS 7 control modules

4

Ordering data	Article No.
SIMATIC PCS 7 Advanced Engineering System V8.0 (incl. SP1) for SIMATIC PCS 7 V8.0 and V8.1 Engineering software, 2 languages (English, German), software class A, runs on Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit; floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7658-1GX08-2YA5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-1GX08-2YH5**

More information

You can upgrade SIMATIC PCS 7 engineering systems with Engineering Software V7.1/V8.0 to version 8.1 using the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS.

However, the SIMATIC PCS 7 Advanced Engineering System Upgrade is not included in the SIMATIC PCS 7 Engineering Upgrade Package. It is offered as a separate product.

Since the SIMATIC PCS 7 Advanced Engineering System V8.0 (incl. SP) can be used both in SIMATIC PCS 7 V8.0 and SIMATIC PCS 7 V8.1, only an upgrade from V7.1 to V8.0 (incl. SP) is currently available.

For further information, see chapter 16 "Update/upgrade packages".

Overview

G_PCS7_XX_00115
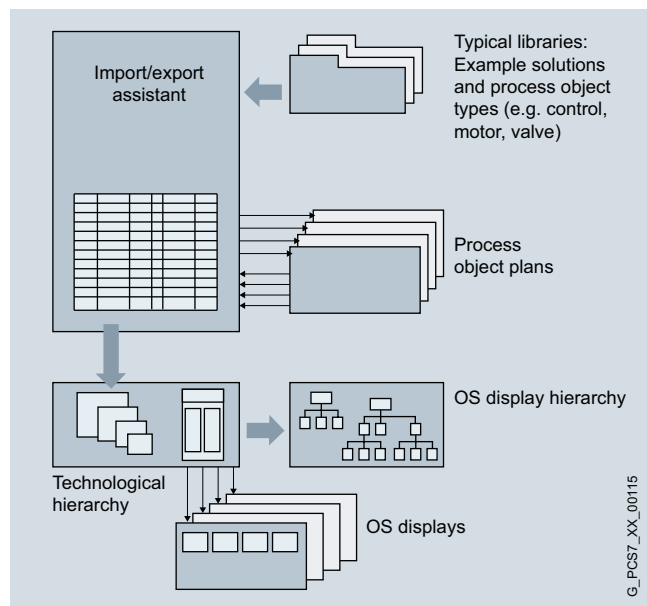
Efficient processing of mass data

The import/export assistant (IEA) and the more sophisticated Advanced Engineering System (AdvES) can be used for rational engineering of mass data. The IEA is based on the principle of multiple application of process tag types and example solutions. It is particularly suitable for plants with numerous process tags of the same type or with multiple plant components of the same type.

Following exporting of the PCS 7 project, the data can be modified, duplicated, adapted and also reimported using the IEA editor or a spreadsheet program such as Microsoft Excel.

Comparison with the parameters optimized during commissioning is possible at a later point in time.

Function

- Generation/modification of process tag types or example solutions
- Data import
- Data export
- Matching of process tags

Ordering data
Article No.

SIMATIC PCS 7 Import-Export Assistant V8.1
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit; floating license for 1 user

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license

  6ES7658-1DX18-2YB5

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required!

  6ES7658-1DX18-2YH5

More information

You can upgrade SIMATIC PCS 7 engineering systems with Engineering Software V7.1/V8.0 to version 8.1 using the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS. The upgrade for SIMATIC PCS 7 Import/Export Assistant to V8.1 is also part of these upgrade packages.

For further information, see chapter 16 "Update/upgrade packages".

4

Engineering System
Simulation

Simulation with S7-PLCSIM

■ Overview

G_PCS7_XX_00181
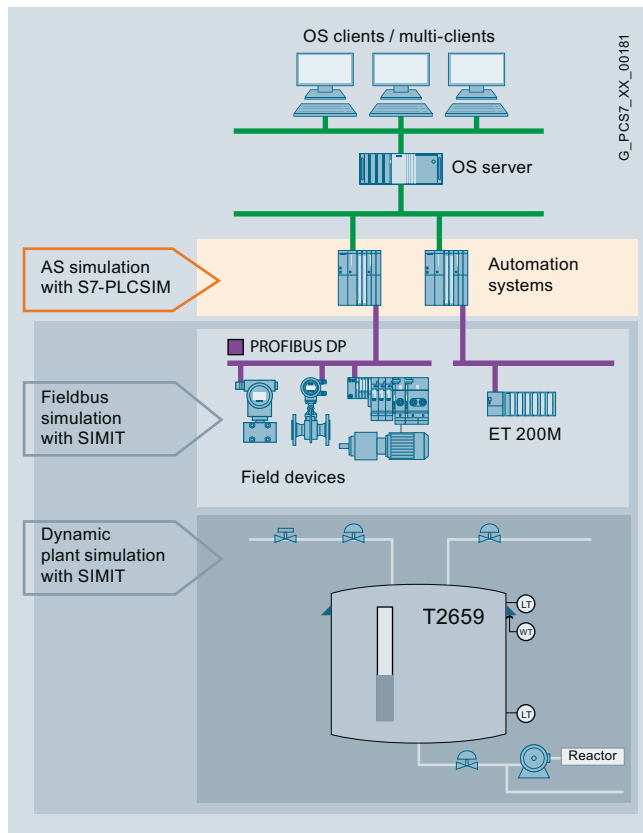
Overview of simulation software for SIMATIC PCS 7

The S7-PLCSIM simulation software supports functional testing of the user programs generated with CFC/SFC on a programming device/PC, irrespective of the availability of the target hardware. Detection and elimination of programming errors is thereby shifted to an earlier development phase. This enables faster commissioning, reduces the costs and increases the program quality.

Note:

SIMATIC PCS 7 V8.1 is supported as of S7-PLCSIM V5.4 SP5 Update 1.

■ Function

S7-PLCSIM simulates a SIMATIC S7 CPU with the associated process images. The program to be tested is loaded into the simulated S7 CPU in a manner identical to the procedure with real hardware, and is executed there. S7-PLCSIM is completely integrated in STEP 7. Process data can be exchanged between S7-PLCSIM and other Windows applications via an interface.

■ Ordering data

	Article No.
S7-PLCSIM V5.4 (including SP) Functional testing on PC/PG of programs created with CFC/SFC	**6ES7841-0CC05-0YA5**

5 languages (English, German, French, Italian, Spanish), runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003/2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic documentation on CD, license key USB stick, certificate of license

■ More information

Update/Upgrade

S7-PLCSIM Versions 3.x, 4.x, 5.0, 5.2 or 5.3 can be upgraded to Version 5.4. In addition, a Software Update Service in the form of a subscription is offered for S7-PLCSIM.

For additional information, see the subsections "Updates/upgrades asynchronous to the PCS 7 version" and "Software Update Service" in the "Update/upgrade packages" section, page 16/31.

Further test and simulation programs

SIMIT Simulation Framework for testing and commissioning of the project-specific user software on a partially virtual plant, see Catalog ST PCS 7 T "SIMATIC PCS 7 Process Control System – Technology components" section "Simulations and training systems".

Operator system
Introduction

Overview

The operator system of the SIMATIC PCS 7 process control system allows easy and safe control of the process by the operating personnel. The operator can observe the process sequence by means of various views and intervene to control the system when necessary.

The operator system architecture is extremely variable and can be flexibly adapted to different plant architectures and customer requirements.

The basis is formed by perfectly coordinated operator stations for single-user systems (OS single stations) and for multi-user systems with client/server architecture.

The system software of the operator stations can be expanded by cumulative SIMATIC PCS 7 OS Runtime licenses for 100, 1 000 and 5 000 process objects (PO) up to following configuration limits:

• 5 000 POs per OS Single Station
• 12 000 POs per OS Server (with client/server architecture)

Benefits

• Flexible, modular architecture with scalable hardware and software components for single-user and multiple station systems
• High-performance operator stations based on versatile and rugged SIMATIC PCS 7 Industrial Workstations, optimized for use in industrial environments
• Client/server multiple station systems with up to 18 OS servers/pairs of servers, each for 12 000 process objects (PO) and up to 40 OS clients
• High-performance archiving system based on Microsoft SQL Server with short-term archives and integrated archive backup, can be optionally expanded for long-term archiving with the Process Historian
• Self-diagnostics (health check) for monitoring important OS server applications
• Integration of modifications without interrupting runtime operations, and online testing through selective loading of redundant servers
• Optimized AS/OS communication: data transmission only following change in data, independent of AS reply cycle; suppression of nuisance alarms
• User-friendly process control and high operational reliability with support of multi-screen technology
• Extended status displays through combination of status/ analog values with alarm information
• Highly effective alarm management provides support for operating personnel
  - Assignment of priorities with up to 16 message priorities as additional attribute to the message classes
  - Visual and audible suppression of messages which are irrelevant to a specific operating state (dynamic or manual)
  - Suppression of sensor/actuator alarms during startup or in event of malfunction
• Centralized user administration with access control and electronic signature
• Sign-of-life monitoring for subordinate systems connected to the plant bus
• System-wide time synchronization based on UTC (Universal Time Coordinated)

Design

All operator stations are based on modern SIMATIC PCS 7 Industrial Workstations optimized for use as OS single station, OS client or OS server. The SIMATIC PCS 7 Industrial Workstations are optimized for use in harsh industrial environments and are characterized by powerful industrial PC technology combined with the Microsoft Windows 7 Ultimate 64-bit or Server 2008 R2 Standard 64-bit operating system. Standard components and interfaces from the PC world offer generous scope for system-, customer- or sector-specific options and expansions.

The operating system and the following ES/OS software of the SIMATIC PCS 7 process control system are factory installed:

- Single station: PCS 7 Engineering Software for AS/OS including OS Runtime software
- Server: PCS 7 OS Software Server
- Client: PCS 7 OS Software Client

You only need the corresponding software licenses in order to use the pre-installed SIMATIC PCS 7 software.

Depending on the customer's particular requirements and whether used as OS single station, OS server or OS client, you can expand the SIMATIC PCS 7 Industrial Workstations with optional hardware components, e.g. with:

- Hardware and software components for redundant operation
- Signal module for audible and visual signaling of messages
- Smart card reader for access protection
- Multi-monitor graphics card for operation of up to 4 process monitors
- Process monitors for office and industrial environments

See section "Industrial Workstation/IPC" for ordering data and detailed information on the product package and technology of the SIMATIC PCS 7 Industrial Workstations.

Single-user system (OS single station)

In a single station system architecture, all operation and monitoring functions for a complete project (plant/unit) are concentrated in one station.

This OS single station can be operated on the plant bus together with other single-user systems or parallel to a multi-user system. Redundant operation of two OS single stations is also possible (SIMATIC PCS 7 single station redundancy).

Depending on the version (IE or BCE), the OS single station can be connected to the Industrial Ethernet plant bus via one of the following network components:

- IE: CP 1623 communication module (pre-installed in SIMATIC PCS 7 Industrial Workstation), CP 1628 or CP 1613 A2 for communication with up to 64 automation systems
- BCE: Standard Ethernet network adapter (10/100/1000 Mbps) and Basic Communication Ethernet for communication with up to 8 automation systems (not redundancy stations)

Two 10/100/1000 Mbps Ethernet RJ45 ports are always integrated onboard for use as desired.

The OS engineering is located as standard in a separate engineering system

Multi-user system with client/server architecture
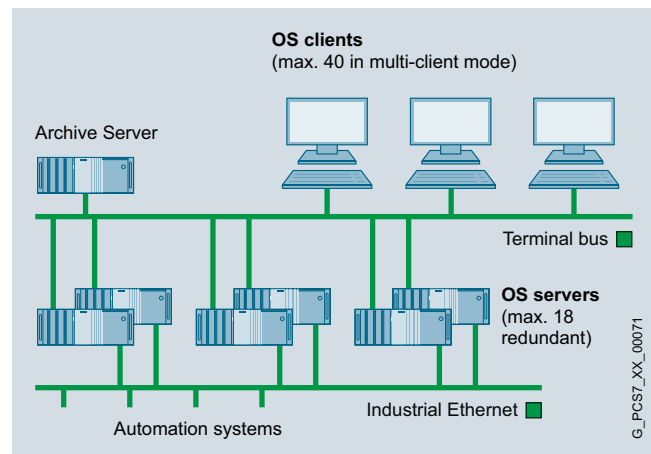
A multiple station system consists of operator terminals (OS clients) which receive data (project data, process values, archive data, alarms and messages) from one or more OS servers over a terminal bus. The terminal bus can share the transmission medium with the plant bus or it can be designed as a separate bus (Industrial Ethernet with TCP/IP).

In this architecture, redundant OS servers may be set up to meet higher availability requirements. Critical applications running on the OS server are monitored by Health Check for software faults. If a fault is detected, switchover to the redundant system is triggered. Synchronization of the redundant OS servers takes place automatically and at high speed.

OS clients can access the data of not only one OS server/server pair, but from several OS servers/pairs of servers simultaneously (multi-client mode). This makes it possible to divide a plant into technological units and to distribute the data accordingly to several OS servers/pairs of servers. In addition to scalability, the advantage of distributed systems is the ability to decouple plant areas from each other, which results in higher availability.

SIMATIC PCS 7 supports multi-user systems with up to 18 OS servers or 18 redundant OS pairs of servers. In multi-client mode, OS clients can access data from some or all of the 18 OS servers/pairs of servers in parallel (up to 40 OS clients with simultaneous access to all).

The OS servers are designed in addition with client functions which permit them to access the data (archives, messages, tags, variables) from the other OS servers of the multi-user system. This means that process graphics on one OS server can also be linked with variables on other OS servers (area-independent displays).

Operator system
Introduction

5

Design (continued)

Like the OS single stations, the OS servers can be connected to the Industrial Ethernet plant bus using one of the following network components

- IE: CP 1623 communication module (pre-installed in SIMATIC PCS 7 Industrial Workstation), CP 1628 or CP 1613 A2 for communication with up to 64 automation systems
- BCE: Standard Ethernet network adapter (10/100/1000 Mbps) and Basic Communication Ethernet for communication with up to 8 automation systems (not redundancy stations)

Two 10/100/1000 Mbps Ethernet RJ45 ports onboard can be used to connect to the terminal bus.

Data archiving

The OS single stations and OS servers already include a high-performance archiving system, configurable at run-time, based on Microsoft SQL Server with cyclic archives for short-term archiving of process values (typically for 1 to 4 weeks) and messages/events (typically for 2 months). This may be combined with an external data archiving system for long-term data storage. The Process Historian offered in the chapter "Process data archiving and reporting" is available for this purpose.

The archive data can be saved on all storage media supported by the operating system. This requires additional hardware and software, e.g. a DVD writer with suitable burning software.

Technical specifications

Definitions

OS tag	An OS tag or parameter is a defined memory location required for operating and monitoring with the operator system; values can be written into it and read from it (e.g. setpoint, actual value etc.).
Process object (PO)	A process object (PO) is synonymous with an operable and monitorable block. A PO usually has several OS tags (which can be operated and monitored). The number of OS tags differs depending on the block type. For example, motors or valves require fewer tags than closed-loop controls or dosing units.
Licensing	Licensing and license verification of the OS software for SIMATIC PCS 7 are based on the process objects.
	Every block fulfilling the following criteria is counted and calculated as a PO: • The block is not a driver block. • The block can be operated and monitored. • This block can handle messages.
	The license verification also takes into account the sum of all OS tags used.

OS quantity framework

Max. number of OS single stations	8
Max. number of OS servers/pairs of servers	18
Max. number of automation systems per OS server/pair of servers	64
Max. number of OS clients in multi-client mode [1] (per multi-user system)	40
Max. number of monitors per operator station with multi-channel operation	4
Max. number of monitors per system	60
Max. number of OS areas	64
Max. number of windows per monitor	1 to 16 (adjustable)
Number of trends per trend window	10
Selection time for OS area display (100 process symbols)	< 2 s
Max. number of process objects: • Per OS single station • Per OS server	 5 000 POs 12 000 POs
Max. number of configurable messages per server/single station	200 000
Number of process tags • Per OS single station • Per OS server • Per multi-user system	 Approx. 3 000 Approx. 7 000 Approx. 126 000
Integral high-performance archive system (cyclic buffer), based on Microsoft SQL server, for:	
• Process value archiving (per OS server / single station)	Approx. 1 500/s
• Message archiving (per OS server / single station)	Steady-state load approx. 10/s Message peak approx. 3 000 / 4 s

[1] If every OS client has access to all OS servers/pairs of servers

Overview

The SIMATIC PCS 7 Industrial Workstation, the operating system, and the OS software are matched to one another in accordance with the application as OS single station, OS server or OS client.

Design

The OS standard software is already pre-configured for the corresponding OS single station, OS server or OS client as the target system, and pre-installed on it. You only need the corresponding software licenses in order to use it.

This basic level can be extended using additive software components and licenses.

OS single stations and OS clients can be additionally equipped with SIMATIC PCS 7 SFC Visualization and Safety Matrix Viewer.

You can also implement redundant system configurations with OS single stations and OS servers. See the subsection "OS redundancy" in the section "Operator system" for details (page 5/13).

The following tables provide a selection aid for ordering an operator station. Depending on whether a redundant or non-redundant design is selected, the tables indicate the respectively required number of

- SIMATIC PCS 7 Industrial Workstations
- Licenses for OS standard software
- Volume licenses (quantity options)
- Licenses for optional supplementary OS software

Single-user system		
OS Single Station **with Windows 7 Ultimate 64-bit operating system**	**Redundancy**	
	without	with
SIMATIC PCS 7 Industrial Workstation **including operating system, alternatives**		
• SIMATIC PCS 7 ES/OS IPC[1] BCE W7 with BCE communication for up to 8 automation systems (no redundancy stations)	1	2
• SIMATIC PCS 7 ES/OS IPC[1] IE W7 with Industrial Ethernet communication	1	2
Additional IE communications software **for SIMATIC PCS 7 ES/OS IPC[1] IE W7**		
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack	1	2
OS standard software		
SIMATIC PCS 7 OS Software Single Station V8.1	1	–
SIMATIC PCS 7 Single Station Redundancy V8.1 incl. RS 232 connecting cable, 10 m	–	1
Volume licenses and supplementary OS software (optional)		
SIMATIC PCS 7 OS Runtime License for adding OS Runtime POs	1	2
SIMATIC PCS 7 OS Archive for expansion of short-term cyclic buffer archive	1	2
SIMATIC PCS 7 SFC Visualization V8.1	1	2
SIMATIC Safety Matrix Viewer V6.2	1	2

Multi-user system with client/server architecture		
OS Server **with Windows Server 2008 R2 Standard 64-bit** **operating system**	**Redundancy**	
	without	with
SIMATIC PCS 7 Industrial Workstation **including operating system, alternatives**		
• SIMATIC PCS 7 OS Server IPC[1] BCE SRV08 with BCE communication for up to 8 automation systems (no redundancy stations)	1	2
• SIMATIC PCS 7 OS Server IPC[1] IE SRV08 with Industrial Ethernet communication	1	2
Additional IE communications software **for SIMATIC PCS 7 OS Server IPC[1] IE SRV08**		
SIMATIC NET HARDNET IE S7 REDCONNECT PowerPack	1	2
OS standard software		
SIMATIC PCS 7 OS Software Server V8.1	1	–
PCS 7 Server Redundancy V8.1, incl. RS 232 connecting cable, 10 m	–	1
Volume licenses (optional)		
SIMATIC PCS 7 OS Runtime License for adding OS Runtime POs	1	2
SIMATIC PCS 7 OS Archive for expansion of short-term cyclic buffer archive	1	2

OS client with Windows 7 Ultimate 32-bit operating system; connection for terminal bus onboard	
SIMATIC PCS 7 Industrial Workstation/IPC **including operating system, alternatives**	
• SIMATIC PCS 7 OS Client IPC[1] W7, alternatively with - Onboard standard graphics - Multi-monitor graphics card "2 screens" or "4 screens"	1
• SIMATIC PCS 7 BOX OS Client 627D, alternatively - without panel - with front panel	1
• SIMATIC PCS 7 OS Client 427D (Microbox)	1
OS standard software	
SIMATIC PCS 7 OS Software Client V8.1 (software license for PCS 7 BOX OS Client 627D in scope of delivery)	1 (PCS 7 OS Client 427D) or 0 (PCS 7 OS Client 627D)
Supplementary OS software (optional)	
SIMATIC PCS 7 SFC Visualization V8.1	1
SIMATIC Safety Matrix Viewer V6.2	1

[1] IPC stands for one of the SIMATIC IPC types from the product range in the section "Industrial Workstation/IPC, Pre-configured bundles, SIMATIC Rack PC" which are authorized for SIMATIC PCS 7 V8.1.

Note on Microsoft SQL Server software

The "SQL Server" software from Microsoft which is delivered together with SIMATIC PCS 7 is exclusively intended for this process control system. It must not be used in any other context without previous written approval by Siemens.

5

Operator system
OS software

■ Overview

The OS standard software is adapted to the SIMATIC PCS 7 Industrial Workstations offered (OS single station, OS server and OS client).

It can be adapted to plants of various sizes by adding cumulative SIMATIC PCS 7 OS Runtime licenses for sets of 100, 1 000 and 5 000 process objects (PO). The expansion limits are

- 5 000 POs per OS Single Station
- 12 000 POs per OS Server

The high-performance circular buffer archiving system integrated in the OS standard software for OS single station and OS server for the temporary archiving of up to 512 tags can be expanded up to the expansion limit of 10 000 tags with cumulative SIMATIC PCS 7 OS volume licenses.

The OS standard software for a redundant pair of OS servers or two redundant OS single stations is combined in a package (SIMATIC PCS 7 Server Redundancy/SIMATIC PCS 7 Single Station Redundancy). See section "OS redundancy" for details (page 5/13).

■ Function
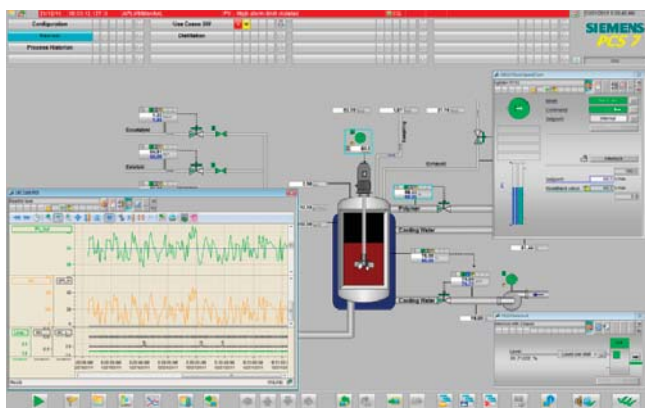
OS process control with freely-positionable windows

Graphical user interface (GUI)

The predefined user interface of the operator system has all the features typical of a control system. It is multilingual, clearly structured, ergonomic and easy to understand. Operators can survey the process extremely easily, and rapidly navigate between different views of the plant. The system supports them in this process with hierarchical display structures that can be configured as required. These facilitate the direct selection of lower-level areas during process control. The current position within the hierarchy can always be recognized in a window of the Picture Tree Manager.

Process displays and process tags can also be called directly by their name, or by a "Loop-in-alarm" starting from a selected message An online language selector permits the user to change the display language during runtime.

A standard view and a server view are available for the technological representation of a plant, each with variously designed area overviews. Features provided in both views include:

- Message line for the last received message, configurable for priority-based display of message with highest message class or priority
- Date, time and name of the operator
- Area overview; number of displayed areas depends on resolution: up to 36 (lowest/XGA), up to 144 (highest/WQXGA)
- Working area for plant displays and movable windows for faceplates, trends, messages etc.
- System function keys

The project editor in the operator system offers a wide range of different image formats and resolutions for displaying process graphics:

Graphic standard	Format	Resolution	Support of multi-monitor mode
XGA	4:3	1024 × 768	Yes
XGA+	4:3	1152 × 864	Yes
SXGA	5:4	1280 × 1024	Yes
UXGA	4:3	1600 × 1200	Yes
WSXGA+	16:10	1680 × 1050	Yes
HD 1080 (Full HD)	16:9	1920 × 1080	Yes
WUXGA	16:10	1920 × 1200	Yes
WQXGA	16:10	2560 × 1600	–

Their use depends on how the graphics controller of the operator station and the process monitors controlled by it are designed.

The representative and functional display of your plant is supported by a high-quality, modern design. The global appearance can be set using predefined or user-specific designs: color palette, colors, styles (fill patterns), optical effects (2D/3D, shading, transparency, colored identification of an image object when selected, etc.). These can be changed locally for each image object.

In addition, the design is fundamentally influenced using a wide range of attractive elements provided by the Graphics Designer when configuring in the engineering system:

- Object palettes with styles, controls (applications for control and monitoring, e.g. for curve and message display), standard objects and smart objects
- Global symbol library with standardized display objects for plants and units
- Symbols and faceplates from the SIMATIC PCS 7 libraries, especially the Advanced Process Library (APL)

■ Function (continued)

TrendControls function for table displays and curve displays
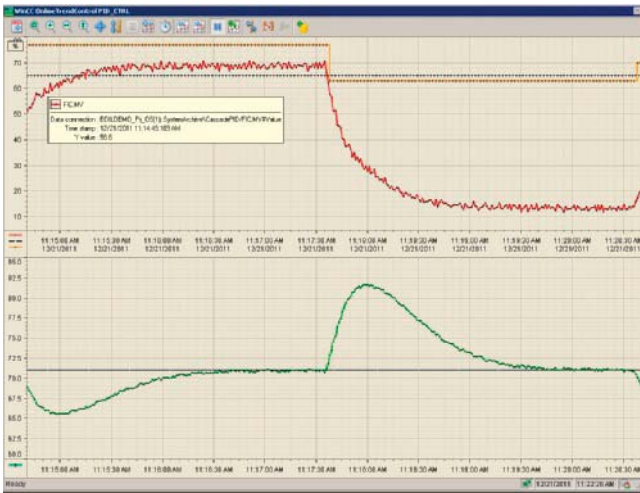
Trend window on the operator station

The TrendControls function permits operators to display archived values of archive tags from the process value archive as well as online values of process tags from the tag management in relation to time (table/trend window) or in relation to another value (function window). The time can be defined statically (absolute, as configured) or dynamically (in relation to the actual system time) as:

- Start and end times
- Start time and period
- Start time and number of measuring points

All TrendControls have scrolling functions and a function for directly selecting the start or end.

During runtime, operators can individually adapt the TrendControls functions which have already been predefined during plant configuration, and save the settings globally or user-specific. They are able to change the data link during runtime, and to access other data. It is also possible to integrate exported archive databases online.

The displayed data can be processed further by:

- Exporting per CSV file
- Output in a predefined print job

TrendControls functions can also be combined with a ruler window. Depending on the selection of a time or time range in the trend/table window using a ruler, it shows additional information in three views:

- Coordinate window with X and Y coordinates of the curve points at the points of intersection of the rulers
- Statistics range window with the values lying within a selected range
- Statistics window with statistical information on a selected range: minimum, maximum, average, standard deviation, integral

AlarmControl function for message display and processing

Up to 200 000 messages can be configured per OS single station/OS server:

- Predefined system messages, triggered by a system event
- Individual or group messages, initiated by a change in process states
- Operator input messages, resulting from the manual operation of objects

The message system integrated in the operator system records these process messages and local events, saves them in message archives, and displays them by means of the freely-configurable AlarmControl function (message view/window).

Operators can use the toolbar to select various standardized lists with integral scrolling function:

- Entered state list: currently present, unacknowledged messages
- Acknowledged list: currently present, acknowledged messages
- Exited state list: not yet acknowledged, but already exited messages
- Operator list: current and archived operator input messages
- Process control list: current and archived I&C messages
- Chronicle: all currently present and archived messages arranged in chronological order
- List of manually or automatically suppressed messages
- List of messages to be suppressed when they occur

The AlarmControl function displays:

- Each message in a separate message line
- Message state and color according to the configured message class (e.g. fault requiring acknowledgment) and message type (e.g. alarm or warning)
- Selected message blocks, each in a separate column:
  - System blocks: system data such as date and time, priority, triggering CPU/station, user name, loop-in-alarm, message state (UP/DOWN), acknowledgment status (acknowledged/not yet acknowledged, duration from UP to DOWN/acknowledged)
  - Process value blocks: current process value at time of message, e.g. temperature
  - User text blocks: 255 characters of text, e.g. message text with fault location and cause of malfunction
- Status and info text represented as symbol

Parallel to the display, all messages recorded during runtime and their changes in state can be documented in chronological order in a message sequence log.

Flexible setting options for audible output and priorities which can be defined using signal tags support the signaling of messages through a sound card or by controlling external horns via a signal module.

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Operator system
OS software

■ **Function** (continued)

Operators can individually adapt the AlarmControl function during runtime by filtering, selecting or sorting the display according to the contents of individual message blocks, e.g. chronologically according to message priority or fault location, and save the settings globally or user-specific. It is also possible to integrate exported archive databases online.

The displayed data can be processed further by:

• Exporting per CSV file
• Output in a predefined print job

After a power failure, the last messages (e.g. 60) can be reloaded from the message archive to the message window. Thus, when the system is restarted, the last message map prior to the power failure is reconstructed.

With large quantity frameworks and a high number of messages, the following measures can be used to noticeably reduce the operator workload by reducing the relevant messages and improving the transparency:

• Visual and audible hiding of messages which are of reduced importance in certain situations for the safe and fault-free operation of the plant, e.g. process signals (logging and archiving are not influenced):
  - Dynamically, i.e. depending on pre-configured definition for up to 32 operating states (Smart Alarm Hiding)
  - Manually, for a limited period
• Assignment of priorities using up to 16 message priorities as additional attribute to the known message classes
• Intentional blocking and enabling of messages from an individual process tag or all process tags of the display/area by the operator in the event of faults on a sensor/actuator or during commissioning (recording of blocking and enabling in the operator activity log)

The "Loop-in-alarm" and "Select display using process tag" functions support the quick evaluation and resolution of faults. Using "Loop-in-alarm", the operator can jump directly from a message selected in the message window to the process display with the object which caused the fault, and can then call up the associated faceplate (loop display) through the process tag whose block icon is colored (cyan). The faceplate window (loop display) can be anchored so that it remains visible even when the display is changed.

Group displays visually signal the messages currently present in the process display. They also provide information on whether messages are disabled or not.

The last message to have arrived – or the message with the highest priority when alarm priorities are utilized – is displayed at the top edge of the standard view. Using the button "Extended message line", the AlarmControl function can be displayed as a window with all received messages. A list of all messages currently present with maximum priority 16 can also be directly called using a button.
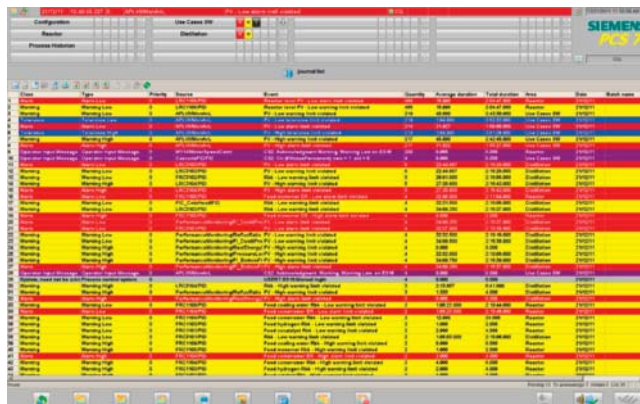
Message window on the operator station

Reporting and logging system

Whereas the reporting system is provided to document the project during its configuration, the logging system is used to print out the data recorded during operation in a clear manner. Different types of predefined logs are available:

• Message sequence log
• Message and archive log
• Measured value log
• Operator activity log
• System message log
• User log

However, a page layout editor can be used to create completely new page layouts or to individually adapt predefined ones. Log objects to be printed are simply selected from the editor's object palette, positioned and configured.

The log objects are categorized as follows:

• Host log objects, e.g.
  - Static objects (circle, rectangle etc.)
  - Dynamic objects that are assigned current values during output
  - System objects (date/time, project name etc.)
  - Special runtime log objects
• OS-specific log objects, e.g.:
  - Control objects (windows for messages, tables, trends, functions, and user data)
  - Current value of a process tag
  - Contents of user archives
  - Embedded layout
  - Hardcopy
• Log objects for integration of external data, e.g.:
  - CSV provider (CSV data as table or curve)
  - ODBC data source (field as text or table)
  - COM provider (COM objects as text, table or image)

The current data of the log defined in the page layout is output on the printer by means of a predefined or self-generated print job. Prior to output on the printer, the logs can be saved in EMF format and displayed as a preview on the screen. Print jobs can be started manually, time-controlled or event-controlled. Operators are able to scan the status of the print jobs online.

■ **Function** (continued)

Data archiving

The high-performance archiving system, configurable at runtime, in the OS standard software on OS Single Stations and OS Servers temporarily records process values and messages/events (alarms) in cyclic archives. Intervals of approximately 1 to 4 weeks for process values and approximately 2 months for alarms are typical for this short-term archiving. Data from the cyclic archives can be exported time-controlled or event-controlled to the Process Historian for permanent archiving. See the "Process data archiving and reporting" section for information on this.

Central user administration, access control and electronic signature

With SIMATIC Logon, the operator system has central user administration with access control that complies with the validation requirements of 21 CFR Part 11. The administrator can divide the users into groups and assign differently defined access rights (roles) to these groups. The operator obtains the specific rights when logging on within the scope of the access control. Apart from the keyboard, an optional smart card reader, for example, can be used as the logon device. In addition, SIMATIC Logon offers the "electronic signature" function.

SIMATIC Logon is fully integrated in SIMATIC PCS 7. In the context of SIMATIC PCS 7, no software licenses need be ordered for this. For additional information on SIMATIC Logon as well as ordering data for an optional smart card reader, see "Expansion components, smart card reader" in the section "Industrial Workstation/IPC", page 3/43.

Sign-of-life monitoring

With the "Sign-of-life monitoring" function, the operator system is able to monitor the correct operation of all lower-level systems connected to the plant bus. A graphical plant configuration display shows the operating state of each monitored component. Additional functionality in this respect is offered by the SIMATIC PCS 7 Maintenance Station (see section "Diagnostics and Maintenance").

Time-of-day synchronization

TC400 central plant clock

Together with a SICLOCK time generator (see catalog "Add-ons for SIMATIC PCS 7"), the operator system of the SIMATIC PCS 7 process control system can implement the system-wide synchronization on the basis of UTC (Universal Time Coordinated). This feature is especially beneficial for widely distributed plants present in different time zones, e.g. pipelines.

5

Operator system
OS software

OS standard software for single station/server/client

Ordering data	Article No.
OS Software Single Station	

**SIMATIC PCS 7
OS Software Single Station V8.1
including 100 OS Runtime POs**
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation

- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7658-2AA18-0YA0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required! — **6ES7658-2AA18-0YH0**

SIMATIC PCS 7 OS Software Single Station ASIA V8.1 including 100 OS Runtime POs
2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation

- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7658-2AA18-0CA0**

| **OS Software Server** | |

**SIMATIC PCS 7
OS Software Server V8.1
including 100 OS Runtime POs**
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation

- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7658-2BA18-0YA0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required! — **6ES7658-2BA18-0YH0**

**SIMATIC PCS 7
OS Software Server ASIA V8.1
including 100 OS Runtime POs**
2 languages (English, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation

- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7658-2BA18-0CA0**

Ordering data	Article No.
Volume licenses (quantity options)	

Runtime licenses for PO expansion for OS Software Single Station/ OS Software Server

SIMATIC PCS 7 OS Runtime License
For extending the OS Runtime POs, cumulative

Independent of language, software class A, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 100 POs — **6ES7658-2XA00-0XB0**
  - 1 000 POs — **6ES7658-2XB00-0XB0**
  - 5 000 POs — **6ES7658-2XC00-0XB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required!
  - 100 POs — **6ES7658-2XA00-0XH0**
  - 1 000 POs — **6ES7658-2XB00-0XH0**
  - 5 000 POs — **6ES7658-2XC00-0XH0**

Expansion of integrated high-performance circular buffer archive (512 tags) of OS Single Station and OS Server

SIMATIC PCS 7 OS Archive
Cumulative archive licenses, independent of language, software class A, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 1 500 tags — **6ES7658-2EA00-2YB0**
  - 5 000 tags — **6ES7658-2EB00-2YB0**
  - 10 000 tags — **6ES7658-2EC00-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required!
  - 1 500 tags — **6ES7658-2EA00-2YH0**
  - 5 000 tags — **6ES7658-2EB00-2YH0**
  - 10 000 tags — **6ES7658-2EC00-2YH0**

5

Ordering data

OS Software Client	Article No.
SIMATIC PCS 7 **OS Software Client V8.1** 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit; floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7658-2CX18-0YB5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license <u>Note</u>: E-mail address required!	**6ES7658-2CX18-0YH5**
SIMATIC PCS 7 **OS Software Client ASIA V8.1** 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license	**6ES7658-2CX18-0CB5**

Conversion of the software license from OS Single Station to OS Server	Article No.
SIMATIC PCS 7 OS Software **ConversionPack Single Station** **to Server V8.1** For conversion of an operator station from OS Single Station to OS Server Supports all languages of the OS Software Single Station, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7658-2BA18-0YD0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license <u>Note</u>: E-mail address required!	**6ES7658-2BA18-0YJ0**

For additional information on the Software Media Package, see section "Software Media and Logistics", "Software Packages", page 1/2.

Options

Subsequent conversion of the software license from OS Single Station to OS Server

In practice, it is frequently the case that systems based on OS single stations are later expanded to client-server configurations. The SIMATIC PCS 7 OS Software ConversionPack Single Station to Server allows you to subsequently convert the software license of your existing OS single station to an OS server license.

5

Operator system
OS software

Overview
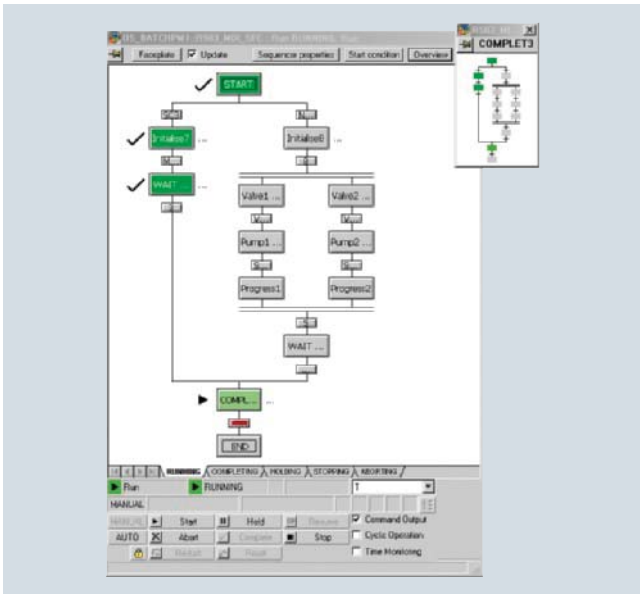
The OS standard software can be expanded with the SIMATIC PCS 7 SFC Visualization. This allows you to display and operate configured sequential controls on the engineering system. No additional configuration work is necessary for this.

In an overview display it is possible, for example, to open step and transition displays and to present step comments or dynamically supplied step enabling conditions.

Ordering data | Article No.

SIMATIC PCS 7
SFC Visualization V8.1
For displaying and operating SFC sequence controls on an operator station

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick,
  certificate of license   **6ES7652-0XD18-2YB5**

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license   **6ES7652-0XD18-2YH5**
  Note:
  E-mail address required!

Overview

OS single stations and OS servers can have a redundant design if necessary:

- A SIMATIC PCS 7 Single Station Redundancy programming package is required to design redundant OS single stations. In addition to the OS software for the redundant operation of two stations, this contains an RS 232 connecting cable for optimization of internal communication between the two stations
- A SIMATIC PCS 7 Server Redundancy programming package is required to design redundant OS servers. It contains the OS software for a redundant server pair as well as an RS 232 connecting cable for optimization of internal server-server communication

A separate Ethernet connection can be used instead of the serial RS 232 connection for optimization of internal communication between the two redundant stations (OS single stations/ OS servers). This is an alternative e.g. with larger distances between the stations or if the COM interface is required elsewhere.

An optical or electrical connection can be used depending on the environmental conditions and the distance between the redundant stations, e.g. up to 100 m per crossover network cable with RJ45 connectors. For further information, refer to the Manual "SIMATIC PCS 7 V8.1 Fault-Tolerant Process Control Systems"; for suitable cable material and further accessories, refer to Catalog IK PI (Industrial Communication).

What further components are required depends on the plant architecture. The design of the plant bus and terminal bus is of particular importance, as well as the type and number of subordinate automation systems. The maximum requirements are determined by the redundant configuration shown in the figure with a fault-tolerant automation system and two redundant rings each for the plant bus and terminal bus.

Design

The following table provides an overview of which components are required for a redundant OS single station or OS pair of servers depending on certain criteria:

Hardware and software components		Up to 8 AS per single station or server pair	9 to 64 AS per single station or server pair	Min. 1 redundant AS
SIMATIC PCS 7 Industrial Workstation, single station or server version, alternatives				
• Including Ethernet network card 10/100/1000 Mbps and BCE		2	–	–
• incl. CP 1613 A2/CP 1623/CP 1628 and SIMATIC NET HARDNET-IE S7		2 (alternative to BCE)	2	2
Software				
SIMATIC PCS 7 Single Station/Server Redundancy (including RS 232 cable)		1	1	1
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack		–	–	2
Connection to redundant plant bus (2 rings), alternatives				
• BCE	Desktop adapter network card	2	–	–
• CP 1613 A2, CP 1623, CP 1628	Communication module	2 (alternative to BCE)	2	2
	SIMATIC NET HARDNET-IE S7	2 (alternative to BCE)	2	2
	SIMATIC NET HARDNET-IE S7 REDCONNECT	–	–	2
Connection to redundant terminal bus with PRP (2 rings)				
SOFTNET-IE RNA communication software		1 × per PCS 7 station on the terminal bus	1 × per PCS 7 station on the terminal bus	1 × per PCS 7 station on the terminal bus
Integration of non-PRP-enabled devices in redundant terminal bus with PRP				
SCALANCE X204RNA		1 × for 2 terminal devices	1 × for 2 terminal devices	1 × for 2 terminal devices

Operator system
Redundant operator systems

Design (continued)

Connection to plant bus

Redundant OS single stations / OS servers with BCE communication	Redundant OS single stations / OS servers with CP 1623/CP 1628/CP 1613 A2 communication	
• FastEthernet card • PCS 7 single station redundancy or PCS 7 server redundancy	• CP 1623/1628/1613 A2 • SIMATIC NET HARDNET-IE S7 software • PCS 7 single station redundancy or PCS 7 server redundancy	• CP 1623/1628/1613 A2 • SIMATIC NET HARDNET-IE S7 software + SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack • PCS 7 single station redundancy or PCS 7 server redundancy
■ Plant bus	■ Plant bus	■ Plant bus
Max. 8 automation systems per single station/pair of servers	Max. 64 automation systems per single station/pair of servers	Redundant automation systems

Components for connection of redundant OS single stations / OS servers on the plant bus
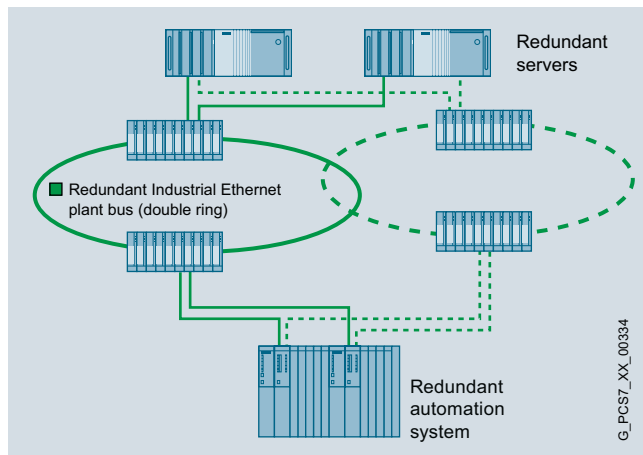
Redundant plant bus

The operator systems (single stations or servers) communicate with the automation systems via the Industrial Ethernet plant bus. The following special points must be observed for redundant configurations:

• BCE communication via Ethernet network adapter 10/100/1000 Mbps is generally also sufficient for redundant operator stations. Up to 8 automation systems can be connected per pair of servers in this manner (only AS single stations, not AS redundant stations). The BCE license is included for the BCE versions of the SIMATIC PCS 7 Industrial Workstation. It is also valid for an additional desktop adapter network adapter.

• Industrial Ethernet communication via CP 1623 (preinstalled in the IE version of the SIMATIC PCS 7 Industrial Workstation) or alternatively CP 1628 (with extra security functions) and CP 1613 A2 (with conventional PCI interface) is required in the following cases:
  - The number of automation systems per OS is larger than 8.
  - Redundant automation systems (AS redundant stations) are used.

• The IE versions of the SIMATIC PCS 7 Industrial Workstation are equipped with a CP 1623 and SIMATIC NET HARDNET-IE S7 communication software, licensed for up to four CP 1623/CP 1628/CP 1613 A2 (license for 4 units). If subordinate automation systems (AS redundant stations) are to be connected, SIMATIC NET HARDNET-IE S7-REDCONNECT is required, however. The SIMATIC NET product HARDNET-IE S7REDCONNECT PowerPack (license for 4 units) can be used to upgrade features.

• If an operator station with BCE communication is to be upgraded for operation with redundant automation systems (AS redundancy stations), a CP 1623, CP 1628 or CP 1613 A2 communication module is required in addition to the SIMATIC NET HARDNET-IE S7-REDCONNECT (license for 4 units).

• If the plant bus is to be designed as a redundant dual ring, you require two interface modules (2 x Ethernet network cards 10/100/1000 Mbps or 2 x CP 1613 A2/CP 1623/CP 1628) per OS single station / OS server.

The communication software for CP 1623, CP 1628 or CP 1613 A2 is always supplied with the SIMATIC PCS 7 software and is installed based on the operating system.

In order to activate this communication software, you may need additional licenses for the

• SIMATIC NET HARDNET-IE S7,
• SIMATIC NET HARDNET-IE S7-REDCONNECT or
• SIMATIC NET HARDNET-IE S7 REDCONNECT PowerPack communication products.

■ **Design** (continued)

Connection to terminal bus
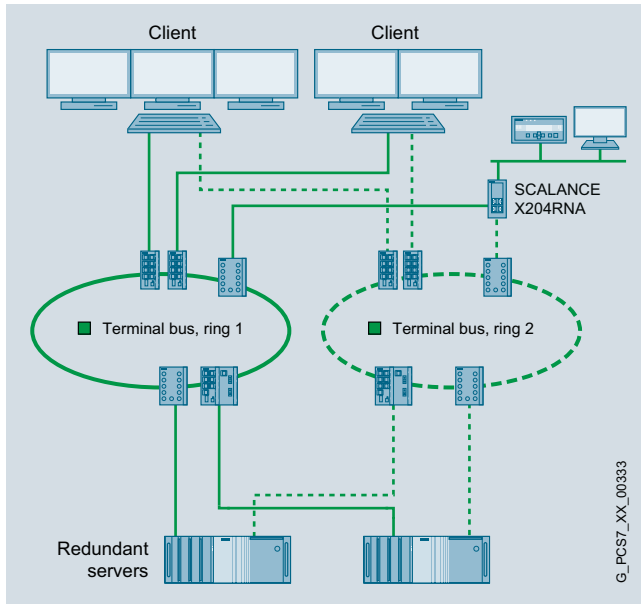
Redundant terminal bus

You can connect clients and servers to the terminal bus using integrated Industrial Ethernet interfaces or a desktop network adapter card.

A configuration with two separate rings is recommended for the redundant, fault-tolerant terminal bus. Communication is performed in this case using the Parallel Redundancy Protocol (PRP) in accordance with IEC 62439-3. Each PCS 7 station should be connected to one of two Industrial Ethernet interfaces on each of the two separate rings.

The SIMATIC NET SOFTNET-IE RNA communication software on the redundantly connected PCS 7 stations organizes communication processes based on the PRP. Therefore, SIMATIC NET SOFTNET-IE RNA communication software is required on each of the redundantly connected PCS 7 stations.

Connecting non-PRP-enabled devices

Up to 2 non-PRP-enabled devices that have only one Industrial Ethernet port, such as SICLOCK TC 400, a WLAN access point or an infrastructure computer, such as DNS, WINS, DHCP or a file server, can be integrated into a redundant, fault-tolerant terminal bus with PRP via a SCALANCE X204RNA.

Product versions of the SCALANCE X204RNA:

- SCALANCE X204RNA
  Router in plastic housing with 4 electrical ports for connecting up to two non-PRP-enabled terminal devices to redundant networks
- SCALANCE X204RNA EEC
  Router in metal housing with two electric terminal device ports and two optical/electrical combo ports for network connection of up to two non-PRP-enabled terminal devices to redundant networks

SCALANCE X-200RNA is typically installed with the stations to be connected in a control cabinet.

For information on configuration and accessories such as cable material, plug connectors and transceivers, see section Communication, Industrial Ethernet, System Connection PCS 7 Systems, page 10/46.

For more information and technical specifications for the two SCALANCE X204RNA product versions, see Catalog IK PI.

For details on redundant SIMATIC PCS 7 configurations, refer to the manual "Fault-tolerant Process Control Systems".

Operator system
Redundant operator systems

OS redundancy

5

Ordering data

	Article No.

Design of redundant OS single stations

SIMATIC PCS 7 OS Software Single Station Redundancy V8.1, including 100 OS Runtime POs
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 2 installations

- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, RS 232 cable, 10 m, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-3AA18-2YA0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-3AA18-2YH0**

SIMATIC PCS 7 OS Software Single Station Redundancy ASIA V8.1, including 100 OS Runtime POs
2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 2 installations

- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) 2 x ASIA license key USB hardlock, certificate of license, RS 232 cable, 10 m, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7652-3AA18-2CA0**

Design of redundant OS servers

SIMATIC PCS 7 OS Software Server Redundancy V8.1, including 100 OS Runtime POs
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 2 installations

- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, RS 232 cable, 10 m, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-3BA18-2YA0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-3BA18-2YH0**

SIMATIC PCS 7 OS Software Server Redundancy ASIA V8.1, including 100 OS Runtime POs
2 languages (English, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 2 installations

- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) 2 × ASIA license key USB hardlock, certificate of license, RS 232 cable, 10 m, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7652-3BA18-2CA0**

	Article No.

Volume licenses (quantity options)

Runtime licenses for PO expansion for SIMATIC PCS 7 OS Single Station/OS Server (cumulative); 2 required

SIMATIC PCS 7 OS Runtime license
For extending the OS Runtime POs, cumulative

Independent of language, software class A, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 100 POs — **6ES7658-2XA00-0XB0**
  - 1 000 POs — **6ES7658-2XB00-0XB0**
  - 5 000 POs — **6ES7658-2XC00-0XB0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required!
  - 100 POs — **6ES7658-2XA00-0XH0**
  - 1 000 POs — **6ES7658-2XB00-0XH0**
  - 5 000 POs — **6ES7658-2XC00-0XH0**

Expansion of integral high-performance circular buffer archive (512 tags) of OS Single Station and OS Server, 2 licenses required for each

SIMATIC PCS 7 OS Archive
Cumulative archive licenses, independent of language, software class A, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 1 500 tags — **6ES7658-2EA00-2YB0**
  - 5 000 tags — **6ES7658-2EB00-2YB0**
  - 10 000 tags — **6ES7658-2EC00-2YB0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required!
  - 1 500 tags — **6ES7658-2EA00-2YH0**
  - 5 000 tags — **6ES7658-2EB00-2YH0**
  - 10 000 tags — **6ES7658-2EC00-2YH0**

Ordering data

	Article No.		Article No.
Conversion of two OS single stations to redundant OS single stations		**Conversion of two OS servers to redundant OSservers**	
SIMATIC PCS 7 OS Software ConversionPack 2x Single Station to Single Station Redundancy V8.1		**SIMATIC PCS 7 OS Software ConversionPack 2x Server to Server Redundancy V8.1**	
For conversion of two OS single stations to OS single station redundancy		For the conversion of two OS servers to OS server redundancy	
Supports all languages of the OS Software Single Station, software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 2 installations		Supports all languages of the OS Software Server, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 2 installations	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license and RS 232 cable, 10 m	6ES7652-3AA18-2YD0	• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license and RS 232 cable, 10 m	6ES7652-3BA18-2YD0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license <u>Note</u>: E-mail address required!	6ES7652-3AA18-2YJ0	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license <u>Note</u>: E-mail address required!	6ES7652-3BA18-2YJ0
Conversion of two redundant OS single stations to redundant OS servers		**Individual components**	
		RS 232 connecting cable, 10 m As a replacement part for redundant OS single stations/OS servers	6ES7902-1AC00-0AA0
SIMATIC PCS 7 OS Software ConversionPack Single Station Redundancy to Server Redundancy V8.1		**Expansion components for OS single stations / OS servers** For connection to redundant plant bus (BCE or CP 1613 A2/1623/1628), for upgrading from BCE to CP 1613 A2/1623/1628 including communication with redundant AS	
For the conversion of two redundant OS single stations from OS single station redundancy to OS server redundancy		**Desktop adapter network card** for BCE and as spare part for redundant terminal bus	
Supports all languages of the OS Software Single Station Redundancy, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 2 installations		INTEL PCI network adapter for connection to Industrial Ethernet (10/100/1000 Mbps), with RJ45 connection	
		<u>Note</u>: License for the BCE communication with SIMATIC PCS 7 Industrial Workstations with BCE communication already included	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license and RS 232 cable, 10 m	6ES7652-3BA18-2YC0	• With conventional PCI interface	A5E00718412
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license <u>Note</u>: E-mail address required!	6ES7652-3BA18-1YJ0	• With PCI Express interface	A5E01579552
		CP 1613 A2 PCI card with one port (ITP or RJ45) for connecting to Industrial Ethernet (10/100 Mbps)	6GK1161-3AA01
		CP 1623 PCI Express x1 card for connection to Industrial Ethernet (10/100/1000 Mbps), with 2-port switch (RJ45)	6GK1162-3AA00
		CP 1628 PCI Express x1 card for connecting to Industrial Ethernet (10/100/1000 Mbps), with 2-port switch (RJ45) and integrated security functions (firewall, VPN)	6GK1162-8AA00

5

Operator system
Redundant operator systems

OS redundancy

■ Ordering data

	Article No.
Licenses may be required for activating the functionality of the CP 1623, CP 1628 or CP 1613 A2 (Communications software is part of the SIMATIC PCS 7 software)	
Activation license if no redundant AS are used	
SIMATIC NET HARDNET-IE S7 V12 Runtime software, 2 languages (German/English), software class A	6GK1716-1CB12-0AA0
License for up to 4 Industrial Ethernet CPs, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
Activation licenses when using redundant AS	
Alternative license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT V12 Runtime software, 2 languages (German/English), software class A	6GK1716-0HB12-0AA0
License for up to 4 Industrial Ethernet CPs, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
Additive license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V12 Runtime software, 2 languages (German/English), software class A	6GK1716-0HB12-0AC0
License for up to 4 Industrial Ethernet CPs, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	

	Article No.
Components for connecting SIMATIC PCS 7 stations to a redundant terminal bus with PRP	
SOFTNET-IE RNA V12 Software for linking of SIMATIC PCS 7 stations to PRP-enabled networks with integrated SNMP	6GK1711-1EW12-0AA0
Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
SCALANCE X-204RNA Industrial Ethernet routers With integrated SNMP access, Web diagnostics and PROFINET diagnostics, for connecting to non-PRP-enabled terminal devices on PRP networks, with operating instructions, Industrial Ethernet network manual and configuration software on CD	
• **SCALANCE X204RNA** with four 100 Mbps RJ45 ports	6GK5204-0BA00-2KB2
• **SCALANCE X204RNA EEC** with two 100 Mbps RJ45 ports and two RJ45/SFP combo ports	6GK5204-0BS00-3LA3
Accessories such as cable material, plug connectors and transceivers	See section Communication, Industrial Ethernet, System Connection PCS 7 Systems, page 10/46

For additional information on the Software Media Package, see chapter "Software Media and Logistics", section "PCS 7 Software Packages", page 1/2.

■ Options

Subsequent conversions

It is common practice to retroactively change or expand a plant. The following SIMATIC PCS 7 OS Software ConversionPacks support both retrofitting of the redundancy functionality, as well as the conversion from redundant OS single stations to redundant OS servers:

• SIMATIC PCS 7 OS Software ConversionPack 2x Single Station to Single Station Redundancy for converting two OS Single Stations to OS Single Station Redundancy

• SIMATIC PCS 7 OS Software ConversionPack 2x Server to Server Redundancy for converting two OS Servers to OS Server Redundancy

• SIMATIC PCS 7 OS Software ConversionPack Single Station Redundancy to Server Redundancy for converting two redundant OS Single Stations from OS Single Station Redundancy to OS Server Redundancy

5

Overview
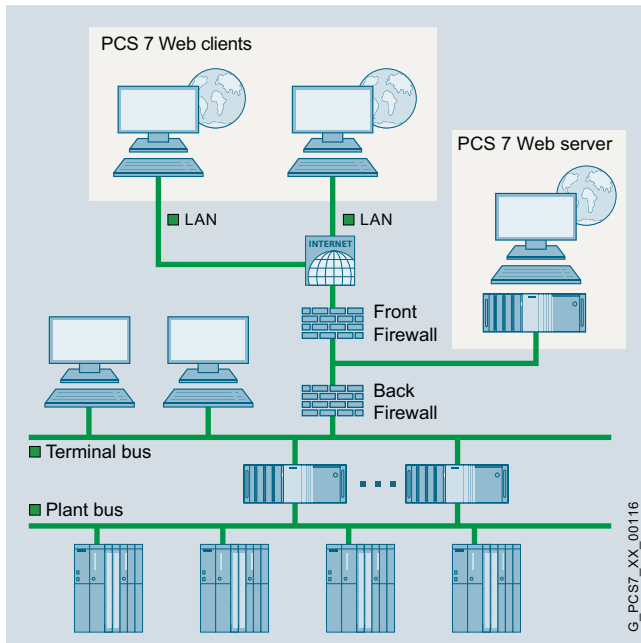
The PCS 7 Web server makes available the project data of the OS servers for PCS 7 Web clients and thus enables worldwide operator control and monitoring of a plant via intranet/Internet.

It does this by accessing project-specific process data in the lower-level OS servers using the mechanisms of a multi-client. The integrated OS user management guarantees a high degree of security here.

Application

A differentiation is basically made between the following types of application when operating and monitoring SIMATIC PCS 7 systems via the Web:

- Standard:
  Up to 50 PCS 7 web clients access the data of **one** PCS 7 web server over intranet/Internet.

- Diagnostics:
  One or only a few Web clients have access to **several** PCS 7 Web servers/single-user systems for remote operation, diagnostics or monitoring.

Design

The products offered in the context of SIMATIC PCS 7 for operation and monitoring via Web permit cost-optimized solutions for both types of task:

- Server-based licensing is recommended for the "Standard" type of application. The PCS 7 Web server requires a SIMATIC PCS 7 Web Server Basic license as well as at least one of the cumulative PCS 7 Web Server licenses which enable simultaneous access to 1, 5 or 10 PCS 7 Web clients. Licenses are not installed on the PCS 7 Web clients themselves.

- Diagnostics licenses are tailored for such types of application. The SIMATIC PCS 7 Web Diagnostics license available for the PCS 7 Web client enables the client to access the assigned PCS 7 Web server/single-station systems at all times. Each PCS 7 Web server/single-station system requires a SIMATIC PCS 7 Web Diagnostics Server license at the server end.

Since there are no functional differences between the license-free PCS 7 Web client and the PCS 7 Web client with SIMATIC PCS 7 Web Diagnostics license, mixed operation is possible.

The SIMATIC PCS 7 OS server with Microsoft Windows Server 2008 R2 Standard 64-bit operating system offered in the section "Industrial Workstation/IPC" can be used as the basic hardware for the PCS 7 Web server. The OS Software Server of the SIMATIC PCS 7 V8.1 process control system is preinstalled on this basic device in addition to the operating system.

For the configuration of the PCS 7 Web server, you additionally need the "OS Software Client" license for both the "Standard" application as well as for the "Diagnostics" application. Deviating from the specification in the ordering data, the license of the OS Software Client in this special application is enabled for the server operating system Windows Server 2008 R2 Standard 64-bit.

Siemens Industry Automation provides protection against numerous threats to IT security with comprehensive SIMATIC PCS 7 security concept, professional services, products and solutions. See the IT Security chapter for more information on this.

Function
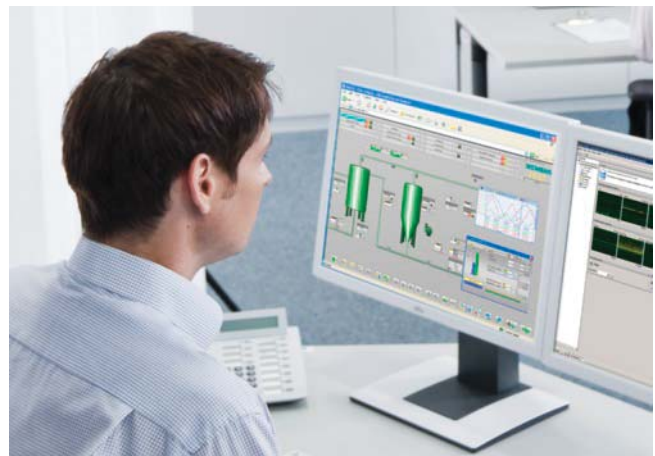
The PCS 7 Web clients equipped with Internet Explorer and plug-ins which can be installed via intranet/Internet, access the project data provided by the PCS 7 Web server . The process displays are converted by "Publishing" into a form suitable for presentation by the Internet Explorer.

A plant can be operated and monitored via the PCS 7 Web clients in the same manner as via the OS clients. SFC Visualization is supported in addition to the standard OS functions. Trend displays can be configured online.

The user must log on with the PCS 7 Web client similar to an OS client, and the rules for assigning of rights are also identical. Operator actions on the PCS 7 Web client are recorded in the OS operator activities report.

Operator system
Operator control and monitoring via Web

SIMATIC PCS 7 Web server

Ordering data

"Standard" application	Article No.
SIMATIC PCS 7 Web Server Basic V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-2GX18-2YB0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-2GX18-2YH0
SIMATIC PCS 7 Web Server license (cumulative) Independent of language, software class A, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 1 client	6ES7658-2GE00-0XB0
- 5 clients	6ES7658-2GF00-0XB0
- 10 clients	6ES7658-2GG00-0XB0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 1 client	6ES7658-2GE00-0XH0
- 5 clients	6ES7658-2GF00-0XH0
- 10 clients	6ES7658-2GG00-0XH0

"Diagnostics" application	Article No.
SIMATIC PCS 7 Web Diagnostics Server V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-2HX18-2YB0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-2HX18-2YH0

	Article No.
SIMATIC PCS 7 Web Diagnostics Client V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-2JX18-2YB0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-2JX18-2YH0
Additive OS Software Client license for the "Standard" and "Diagnostics" applications (required on the PCS 7 Web Server in addition to SIMATIC PCS 7 Web Server license or SIMATIC PCS 7 Web Diagnostics Server license)	
SIMATIC PCS 7 OS Software Client V8.1[1] 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit; floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-2CX18-0YB5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-2CX18-0YH5
SIMATIC PCS 7 OS Software Client ASIA V8.1[1] 2 languages (English, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license	6ES7658-2CX18-0CB5

[1] Deviating from the specification in the ordering data, the license of the OS Software Client in these special applications is also enabled for the server operating system Windows Server 2008 R2 Standard 64-bit.

More information

To ensure safe operation of the plant, you need to take suitable security measures that also include IT security (e.g. network segmentation). For more information on the topic of industrial security, go to:
www.siemens.com/industrialsecurity

Process data archiving and reporting
Introduction

Overview

OS server / OS single station:
short-term archiving (cyclic)

Process values

Slow
archiving cycle
> 1 min

e.g.
2 weeks

30 byte/
value

Fast
archiving cycle
≤ 1 min

e.g.
7 days

Max.
30 byte/
value

Messages/events

Alarm archive

e.g.
2 months

200 to
4 000 byte/
message

Batch server

Batch data

On user request,
transfer following
end of a batch

XML
files

Automatic saving
e.g. daily

Long-term archiving
with Process Historian

Microsoft
SQL server

Saving on
hard disk
e.g. for 6 months

Automatic
saving
(applicative)
e.g. weekly

Database
backup/
recovery

Backup
archiving
on DVD

G_PCS7_XX_00070

Short-term and long-term data archiving

The operator system already includes a high-performance archiving system based on Microsoft SQL Server with cyclic logs for short-term archiving of process values (typically 1 to 4 weeks) and messages/events (typically 2 months). Data from the cyclic logs and batch data from SIMATIC BATCH can be exported time-controlled or event-controlled to the Process Historian for permanent archiving.

The Process Historian can be expanded by an Information Server to work as a reporting system. The Information Server can access the archived data in the Process Historian and in the operator stations in parallel.

Data managed in the Process Historian can be saved on commercially available storage media (e.g. DVD). This requires additional hardware and software which support the employed operating system, e.g. a DVD burner with appropriate burner software.

Benefits

Process Historian
- Scalable high-performance archiving system
- Preferred variant for the higher performance range
- No restriction with respect to single stations, servers or server pairs that can be archived
- Single or redundant configuration possible
- May be combined with Information Server for the generation of reports

Overview
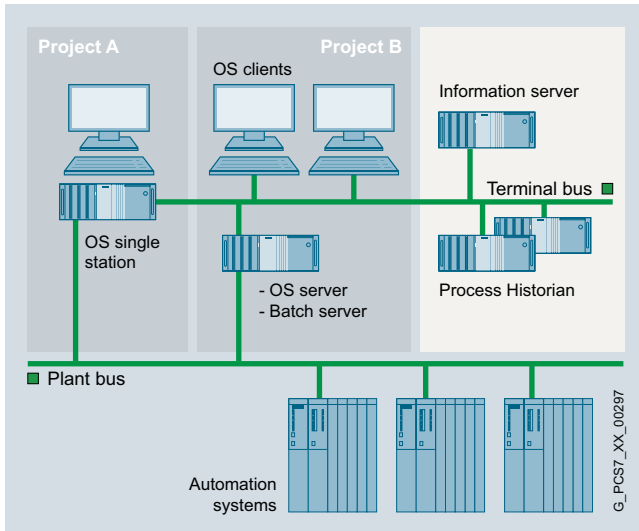
The Process Historian is used for long-term archiving of the following data from the SIMATIC PCS 7 process control system:

- OS archive data (process values and messages)
- Batch data

The process values and messages exported from the OS archives, as well as the batch data from SIMATIC BATCH are managed by the Process Historian in a central database. They can be visualized on OS clients or OS single stations either directly or with the support of the information server.

Design

The basic hardware for the Process Historian is the SIMATIC PCS 7 Industrial Workstation of type IPC847D, server version (see section "Industrial Workstation/IPC", page 3/28). With larger quantity frameworks (more than 3 OS servers in maximum archive configuration), it is recommendable to use the premium server from Catalog ST PCS 7 AO.

If high availability is required, a Process Historian can be configured with a redundant server pair.

The Information Server can be installed and operated on the Process Historian hardware or on separate hardware. When the Process Historian is configured redundantly, the separation of the Information Server is mandatory. When the Information Server is separate, any OS client version of the SIMATIC PCS 7 Industrial Workstation is suitable (see section "Industrial Workstation/IPC").

The Process Historian and Information Server run under the Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit operating system; the Information Server on separate hardware can also run under Windows 7 Ultimate 32/64-bit.

The Process Historian and Information Server do not need a connection to the plant bus. They can be connected to the OS and batch servers of the SIMATIC PCS 7 system via terminal bus, e.g. via the integrated network connection (Ethernet RJ45 port onboard) of the server.

Configuration of the Process Historian

The licenses contained in the SIMATIC PCS 7 Process Historian Basic Package, SIMATIC PCS 7 Process Historian Server Redundancy or SIMATIC PCS 7 Process Historian and Information Server Basic Package are required for configuration of the Process Historian as the long-term archive of a SIMATIC PCS 7 system. These licenses must always be stored on the Process Historian server. The SIMATIC PCS 7 Process Historian Archive BATCH software product for archiving batch data from SIMATIC BATCH can be ordered optionally.

Configuration of applicative couplings with the Process Historian
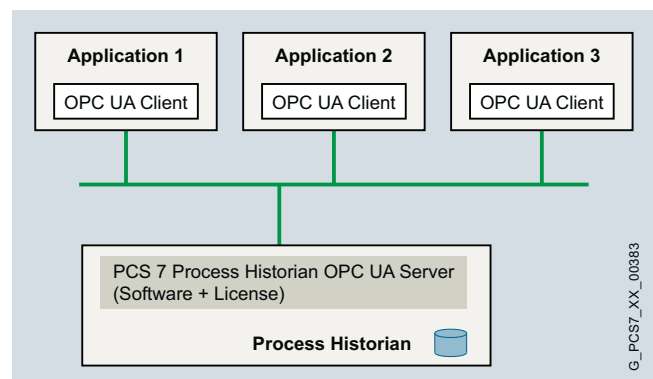
Reading of Process Historian data via OPC UA

As an OPC UA client, any applications can read the process values and messages archived in the database of the Process Historian. A SIMATIC PCS 7 Process Historian OPC UA Server is required for this on the Process Historian (software from SIMATIC PCS 7 Software Media Package plus single license for one installation).

Process data archiving and reporting
Process Historian and Information Server

■ **Design** (continued)

Configuration of the Information Server
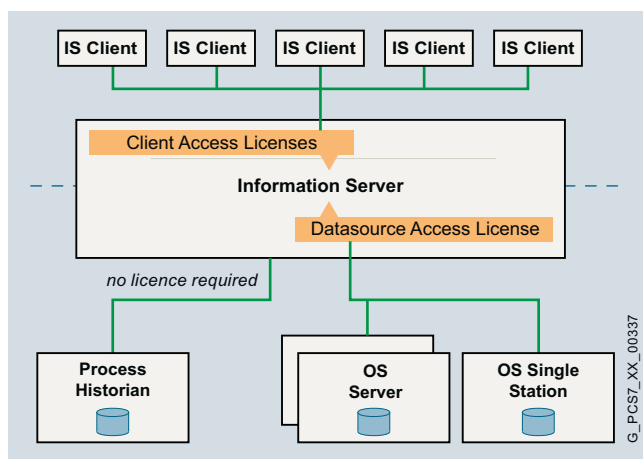
In addition to the SIMATIC PCS 7 Information Server Basic Package or the SIMATIC PCS 7 Process Historian and Information Server Basic Package, for configuration of the Information Server you require cumulative SIMATIC PCS 7 Information Server Client Access licenses corresponding to the number of clients that access the Information Server.

The Information Server is able to access one or multiple data sources in parallel. In addition to the Process Historian, this might also include archive data from from operator stations (OS single station, OS server). In contrast to accessing the Process Historian, to read data from OS single stations and OS servers you need cumulative licenses for SIMATIC PCS 7 Information Server Data Source Access. The license volume depends on the number of sources.

The installation of the SIMATIC PCS 7 Information Server Client Access and Data Source Access licenses is performed on the Information Server.

Software products/licenses	Single Server			Server Redundancy
	Process Historian plus Information Server	Information Server	Process Historian	Process Historian
Basic hardware				
Premium Server or SIMATIC PCS 7 Industrial Workstation, OS Server version	1	–	1	2
SIMATIC PCS 7 Industrial Workstation, OS Client version	–	1	–	–
Software products/licenses				
SIMATIC PCS 7 Process Historian and Information Server Basic Package	1	–	–	–
SIMATIC PCS 7 Information Server Basic Package	–	1	–	–
SIMATIC PCS 7 Process Historian Basic Package	–	–	1	–
SIMATIC PCS 7 Process Historian Server Redundancy	–	–	–	1
SIMATIC PCS 7 Process Historian Archive BATCH	1	–	1	2
SIMATIC PCS 7 Process Historian OPC UA Server	1	–	1	2
Quantity options/volume licenses				
SIMATIC PCS 7 Information Server Client Access licenses, cumulative (sets of 1, 3, 5, 10)	Licenses for 1 server	Licenses for 1 server	–	–
SIMATIC PCS 7 Information Server Data Source Access, cumulative source licenses (sets of 1, 3)	Licenses for 1 server	Licenses for 1 server	–	–

Configuration options

The SIMATIC PCS 7 Process Historian Conversion Pack 2x Server to Server Redundancy enables you to convert two Process Historian (PH) servers with the Process Historian Basic Package to redundant PH servers with Process Historian redundancy.

■ **Design** (continued)

Conversion of Central Archive Server (CAS)

Change in product from CAS to Process Historian

A change in product from CAS to Process Historian is possible with products from the SIMATIC PCS 7 V8.0 range. In the separate catalog section "Previous versions", the following conversion packages are available under "SIMATIC PCS 7 V8.0, Process data archiving and reporting":

- SIMATIC PCS 7 CAS Conversion Pack "Single CAS Software V7.1+SP4/V8.0 to Process Historian Basic Package V8.0" for conversion of a single CAS to a corresponding Process Historian
- SIMATIC PCS 7 CAS Conversion Pack "Redundant CAS Software V7.1+SP4/V8.0 to Process Historian Server Redundancy V8.0" for conversion of a redundant CAS to a redundant Process Historian

The single or redundant Process Historian V8.0 can subsequently be upgraded to V8.1 (for further information, see "Update/upgrade packages, Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1, Upgrades for Process Historian and Information Server", page 16/8).

Migration of CAS database

The migration wizard of the Process Historian V8.1 supports the migration of CAS databases with SIMATIC PCS 7 V7.0 and higher.

■ **Function**

Process Historian

The Process Historian can archive process values, messages, and batch data from the SIMATIC PCS 7 process control system. It is configured in a SIMATIC PCS 7 project similar to other stations of the SIMATIC PCS 7 process control system (e.g. OS Server, Batch Server, Route Control Server, OpenPCS 7 Server or all clients).

The process values and messages managed in the database of the Process Historian on the OS clients and OS single stations can be visualized in a clear and comprehensible manner. Data selection is supported by integrated filter functions. Messages and process values can be shown in table form, and process values also in graphic form. Tables of process values can be exported in CSV format for processing in other Windows applications, e.g. Microsoft Excel.

Any application can access the archived process values and messages in the Process Historian via OPC UA.

The data managed by Process Historian can be transferred to commercially available storage media (backup/restore). This requires additional hardware and software suitable for the operating system of the Process Historian, e.g. a DVD burner with appropriate burner software.

The Process Historian also supports backup and restoring of the complete database – both manually and automatically.

Archiving and visualization functions

- Real-time archiving of process values and messages from SIMATIC PCS 7 operator systems (OS Single Stations and OS Servers)
- Archiving the batch data of SIMATIC BATCH
- Conversion of runtime segments in archive segments:
  - Loss-free data compression
  - Reduction of segments in accordance with assignment and release of unused storage space
- Support of multiple SIMATIC PCS 7 projects
- Scaling relative to the basic hardware employed in respect to performance and quantity structure
- Swapping out of all data as well as cataloging onto external storage media
- Reading the swapped-out data and cataloging from external storage media
- Data visualization on the OS clients/OS single stations:
  - Configuration of views (picture windows and masks) including the selection criteria for displaying the data
  - Visualizing of messages in table form dependent on filter functions
  - Displaying of process values in table or graphic form dependent on filter functions
  - Visualizing a batch overview (selecting the detailed log of a batch from the batch overview is possible)

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Process data archiving and reporting
Process Historian and Information Server

■ **Function** (continued)

Information Server

The Information Server is the reporting system of the Process Historian. Based on the Microsoft Reporting Services, it offers web-based thin-client access to the historical data. Add-ins for Microsoft Word and Excel provide additional access to the database of the Process Historian.

View in the Web browser

Add-ins for Microsoft Word and Excel

IS client

Process Historian and information server (IS)

G_PCS7_XX_00298
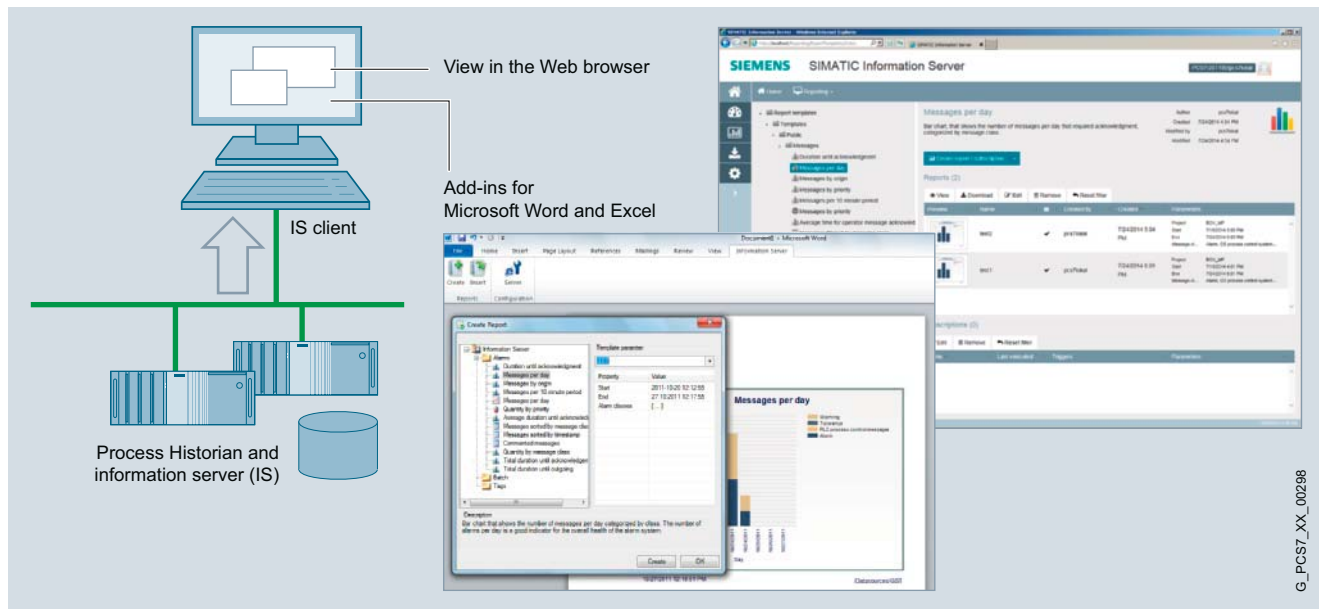
Reporting functions

- Frequently used report templates for process values, messages and batches
- Open reporting system for creating any number of new report templates
- Storage of configured (parameterized) report templates for faster access
- Report export in common document formats
- Support of subscriptions for cyclic report generation including e-mail service
- Creation and storage of role-based dashboards

- Role management for Windows users; supports workgroups and Active Directory; user rights can be assigned for specific projects
- Generation of reports and inserting as graphics in Microsoft Office Word documents
- Creation of Microsoft Excel reports for historical process values and messages as well as storage of the Excel report templates on the Information Server
- Support of subscriptions for Excel report templates

Ordering data

Ordering data	Article No.		Article No.

Process Historian and Information server on shared hardware

SIMATIC PCS 7 Process Historian and Information Server Basic Package V8.1
For the shared installation of Process Historian and Information Server on an Industrial Workstation

5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 1 installation
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license **6ES7652-7AX18-2YB0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! **6ES7652-7AX18-2YH0**

Process Historian and Information Server on separate hardware

SIMATIC PCS 7 Information Server Basic Package V8.1
For installation of the Information Server on a single station or server version of the Industrial Workstation (separate from the Process Historian)

5 languages (German, English, French, Italian, Spanish), software class A, runs with Windows 7 Ultimate 32/64-bit, Windows Server 2008 R2 Standard 64-bit, or Windows Server 2012 R2 Standard 64-bit, single license for one installation
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license **6ES7652-7EX18-2YB0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! **6ES7652-7EX18-2YH0**

SIMATIC PCS 7 Process Historian Basic Package V8.1
For installation of the Process Historian on a server version of the Industrial Workstation (separate from the Information Server)

5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 1 installation
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license **6ES7652-7BX18-2YB0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! **6ES7652-7BX18-2YH0**

SIMATIC PCS 7 Process Historian Server Redundancy V8.1
For installation of a redundant Process Historian on server versions of two Industrial Workstations

5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 2 installations
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license **6ES7652-7CX18-2YB0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! **6ES7652-7CX18-2YH0**

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Process data archiving and reporting
Process Historian and Information Server

6

■ Ordering data	Article No.

Functional option for Process Historian

SIMATIC PCS 7 Process Historian Archive BATCH V8.1
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7652-7DX18-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license — **6ES7652-7DX18-2YH0**
  Note: E-mail address required!

SIMATIC PCS 7 Process Historian OPC UA Server V8.1
for connection to third-party system
5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7652-7FX18-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license — **6ES7652-7FX18-2YH0**
  Note: E-mail address required!

Quantity options for Information Server

SIMATIC PCS 7 Information Server Client Access
Cumulative Client Access licenses, independent of language, software class A, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 1 client — **6ES7652-7YA00-2YB0**
  - 3 clients — **6ES7652-7YB00-2YB0**
  - 5 clients — **6ES7652-7YC00-2YB0**
  - 10 clients — **6ES7652-7YD00-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note: E-mail address required!
  - 1 client — **6ES7652-7YA00-2YH0**
  - 3 clients — **6ES7652-7YB00-2YH0**
  - 5 clients — **6ES7652-7YC00-2YH0**
  - 10 clients — **6ES7652-7YD00-2YH0**

Ordering data	Article No.

SIMATIC PCS 7 Information Server Data Source Access
License for direct access to the archive data of operator stations (sources)

Cumulative source licenses, independent of language, software class A, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 1 source — **6ES7652-7YE00-2YB0**
  - 3 sources — **6ES7652-7YF00-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
  Note: E-mail address required!
  - 1 source — **6ES7652-7YE00-2YH0**
  - 3 sources — **6ES7652-7YF00-2YH0**

Conversion of two Process Historian servers to redundant Process Historianservers

SIMATIC PCS 7 Process Historian Conversion Pack 2x Server to Server Redundancy V8.1
For conversion of two Process Historian (PH) servers with Process Historian Basic Package to redundant PH servers with Process Historian Redundancy

5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows Server 2008 R2 Standard 64-bit or Windows Server 2012 R2 Standard 64-bit; single license for 2 installations
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7652-7CX18-2YD0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license — **6ES7652-7CX18-2YJ0**
  Note: E-mail address required!

Plant Device Management

Plant Device Management
SIMATIC PDM

■ Overview

Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, 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 2 500 devices from Siemens and over 200 vendors worldwide on *one* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can 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.

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 integrated in SIMATIC PDM by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

• Uniform presentation and operation of devices
• Uniform representation of diagnostics information
• 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

When used in SIMATIC PCS 7, SIMATIC PDM is integrated in the maintenance station of the process control system and transmits parameter data and diagnostics information. You can change directly to the SIMATIC PDM views from the diagnostics faceplates in the Maintenance Station.

As an option, SIMATIC PDM can also be started on any SIMATIC PCS 7 maintenance station client (MS Client) in order to parameterize and diagnose the devices integrated per Electronic Device Description (EDD). In this context, SIMATIC PDM user administration based on SIMATIC Logon allows various roles with defined function privileges to be assigned to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices described per Electronic Device Description (EDD), SIMATIC PDM delivers a range of information for display and further processing on the maintenance station, e.g.:

• Device type information (electronic rating plate)
• Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
• Results of internal condition monitoring functions
• Status information (e.g. local configuration changes)
• Information on changes (audit trail report)
• Parameter information

■ Application

Components	Product packages						
	SIMATIC PDM stand-alone		SIMATIC PDM system-integrated				
	Minimum configuration	Basic configuration	Application-specific configurations				
	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7		
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2
SIMATIC PDM TAGs[1] in product package	1	4	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
SIMATIC PDM expansion options							
Count Relevant Licenses (accumulative) - 10 TAGs - 100 TAGs - 1 000 TAGs	*cannot be expanded*	o	o	o	o	o	o
SIMATIC PDM Basic		●	●	●	●	●	●
SIMATIC PDM Extended		o	o	●	●	●	●
SIMATIC PDM integration in STEP 7/PCS 7		o	o	●	●	●	●
SIMATIC PDM routing		o	o	o	●	●	●
SIMATIC PDM Server		o	o	o	o	●	o
SIMATIC PDM Communication FOUNDATION Fieldbus		o	o	o	o	o	●
SIMATIC PDM HART server		o	o	o	o	o	o
SIMATIC PDM command interface[2]		o	o	–	–	–	–

SIMATIC PDM product structure

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

[1] For TAG definition, see "Design" section under "SIMATIC PDM TAGs", page 7/6

[2] Only for special applications, not envisaged for wide use: Programming knowledge is necessary.

Customer-oriented product structure

SIMATIC PDM is highly versatile in the context of Totally Integrated Automation (TIA): Stand-alone or system-integrated in a SIMATIC PCS 7 / SIMATIC S7 configuration environment.

The customer-oriented products structure of SIMATIC PDM helps you to adapt the scope of functions and performance to your individual requirements. You have the following options:

SIMATIC PDM stand-alone

• Product packages for operation on a mobile computer with local bus connection or with direct connection to the device, optionally as:
   - Minimal configuration SIMATIC PDM Single Point for processing of a single field device via point-to-point coupling
   - Application-specific configuration SIMATIC PDM Service for extended service tasks

• Product package SIMATIC PDM Basic as the basis for an individual SIMATIC PDM configuration with optional product components (see table)

SIMATIC PDM system-integrated

• Product packages for integration of SIMATIC PDM in the engineering system (engineering toolset) and Maintenance Station of the SIMATIC PCS 7 process control system:
   - SIMATIC PDM PCS 7
   - SIMATIC PDM PCS 7 Server (enables SIMATIC PDM to be started on any MS client)
   - SIMATIC PDM PCS 7-FF (also supports the FOUNDATION Fieldbus H1)

• Product package SIMATIC PDM S7 for integration in a SIMATIC S7 configuration environment

In some circumstances, the various product packages can be expanded with optional product components (for details, see the Design section, page 7/6).

Selection criteria

In addition to considering the environment of use and the functional and performance features when selecting the product (see table in "Design" section, page 7/4), also observe the system requirements (see "Technical specifications" section, page 7/7).

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Plant Device Management
SIMATIC PDM

Design

Product range	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7		
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2
TAGs contained	**1**	**4**	**4 + 100**	**4 + 100**	**4 + 100**	**4 + 100**	**4 + 100**
Project: Create offline	●	●	●	●	●	●	●
Project: Usable TAG extensions	–	●	●	●	●	●	●
Project: Process device network view	●	●	●	●	●	●	●
Project: Process device plant view	●	●	●	●	●	●	●
Project: Export/import devices	–	–	●	–	–	–	–
Project: Export/import parameters	–	o	●	●	●	●	●
Project: HW Config	–	o	o	●	●	●	●
Project: Utilization of SIMATIC PDM options	–	●	●	●	●	●	●
Project: Integration in STEP 7/PCS 7	–	o	o	●	●	●	●
Communication: HART modem	●	●	●	●	●	●	●
Communication: HART interface	●	●	●	●	●	●	●
Communication: PROFIBUS DP/PA	●	●	●	●	●	●	●
Communication: HART over PROFIBUS DP	●	●	●	●	●	●	●
Communication: FF H1	–	o[1]	o[1]	o	o	o	●
Communication: Modbus	●	●	●	●	●	●	●
Communication: Ethernet	●	●	●	●	●	●	●
Communication: PROFINET	●	●	●	●	●	●	●
Communication: HART over PROFINET	●	●	●	●	●	●	●
Devices: Export/import parameters	–	o	●	●	●	●	●
Devices: Comparison of parameter values	–	o	●	●	●	●	●
Devices: Saving parameters	●	●	●	●	●	●	●
Devices: Change log (Audit Trail)	–	o	●	●	●	●	●
Devices: Calibration report	–	o	●	●	●	●	●
Devices: Print function	●	o	●	●	●	●	●
Devices: Document manager	–	o	●	●	●	●	●
Lifelist: Basic functionality	●	●	●	●	●	●	●
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	–	o	●	●	●	●	●
Communication: S7 routing	–	o	o	o	●	●	●
Communication: HART multiplexer	–	o	o	o	o	o	o
Communication: Wireless HART	–	o	o	o	o	o	o
Function: HART SHC mode (increased communication speed)	●	●	●	●	●	●	●
Function: Device parameterization on PCS 7 maintenance station clients	–	o	o	o	o	●	o

SIMATIC PDM overview of functions and features

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

[1] Not in stand-alone mode

■ **Design** (continued)

SIMATIC PDM stand-alone product range

SIMATIC PDM Single Point V8.2

This minimum configuration with handheld functionality is designed for processing exactly *one* field device via point-to-point coupling. Additional functions or SIMATIC PDM TAGs are not possible. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible. The device functions are supported as defined in the device description.

The following types of communication are possible:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic V8.2

Provided the system requirements are met, SIMATIC PDM Basic can be used for stand-alone operation on any computer (IPC/notebook) with local connection to bus segments or direct connection to the device. The product package features all the basic functions required for operation and parameter assignment of the devices and is enabled for the following communication modes:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

As a basic block for individual configuration, SIMATIC PDM Basic can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs.

SIMATIC PDM Service V8.2

The product package for mobile servicing applications can be executed on any computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 100 SIMATIC PDM TAGs

Similar to SIMATIC PDM Basic, SIMATIC PDM Service can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

SIMATIC PDM system-integrated product range

SIMATIC PDM S7 V8.2

The product package designed for use in a SIMATIC S7 configuration environment requires the installation of STEP 7 V5.5+SP4. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

SIMATIC PDM PCS 7 V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. SIMATIC PDM can then be integrated in the engineering toolset of the SIMATIC PCS 7 Engineering System V8.1. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server (see "Optional product components", page 7/6) as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

SIMATIC PDM PCS 7 Server V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Server option. It is then possible to parameterize field devices integrated per Electronic Device Description (EDD) on any client of the SIMATIC PCS 7 Maintenance Station V8.1.

SIMATIC PDM PCS 7 Server can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM HART Server (see "Optional product components", page 7/6) as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

SIMATIC PDM PCS 7-FF V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Communication FOUNDATION Fieldbus option. SIMATIC PDM can then also parameterize field devices on the FOUNDATION Fieldbus H1.

SIMATIC PDM PCS 7-FF can be expanded with the functional options SIMATIC PDM Server and SIMATIC PDM HART Server (see "Optional product components", page 7/6) as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

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Plant Device Management
SIMATIC PDM

Design (continued)

Optional product components

SIMATIC PDM Extended V8.2 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- Extended information in the Lifelist
- Export and import functions
- Print functions
- Document manager
- Comparison function

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM integration option in STEP 7/PCS 7 V8.2

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM Routing V8.2 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing is offered as an optional product component for SIMATIC PDM Basic, SIMATIC PDM Service, and SIMATIC PDM S7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF.

SIMATIC PDM Server V8.2 option

This option is intended for use of SIMATIC PDM in the SIMATIC PCS 7 Maintenance Station V8.1. Selected field devices can then be handled using the SIMATIC PDM configuration GUI on each client of the SIMATIC PCS 7 Maintenance Station V8.1.

SIMATIC PDM Communication FOUNDATION Fieldbus V8.2 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

SIMATIC PDM HART Server V8.2 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, wireless HART field devices can also be parameterized with SIMATIC PDM.

SIMATIC PDM Command Interface V8.2 option

SIMATIC PDM configurations for stand-alone operation, based on the SIMATIC PDM Basic or SIMATIC PDM Service product package, can be remote-controlled by this option with regard to configuration and field device operation.

Note: The SIMATIC PDM Command Interface option can only be used specific to a project. It is not envisaged for wide use. Programming knowledge is necessary.

SIMATIC PDM TAGs (version-independent)

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM 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. SIMATIC PDM 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).

SIMATIC PDM Software Media Package V8.2

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, type of delivery "Package" (not with optional product components), a SIMATIC PDM Software Media Package is supplied together with each ordering item. Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

- Stand-alone operation
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

■ Function
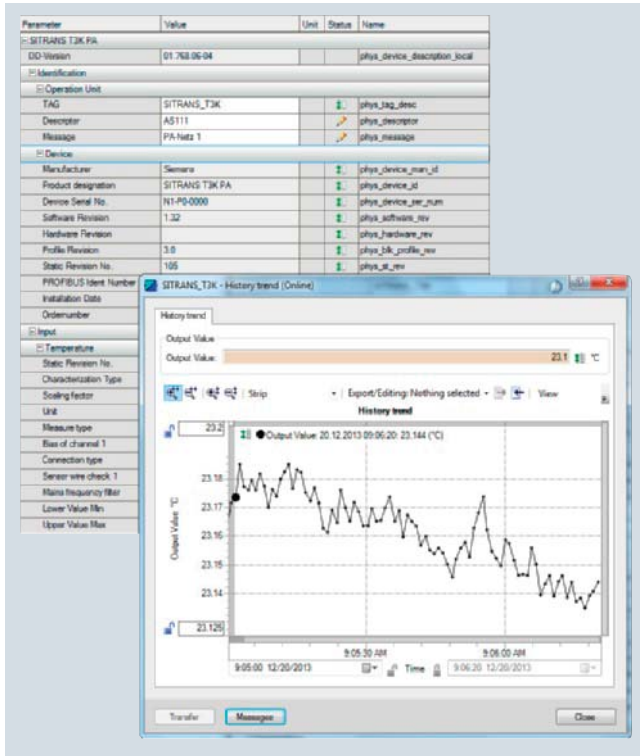
SIMATIC PDM, parameter view and trend window

SIMATIC PDM core functions

- Creation of project-specific device libraries
- 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 (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- 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

■ 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 guideline of the established organizations for

- PROFIBUS and PROFINET (PI – PROFIBUS & PROFINET International)
- HART (HCF: HART Communication Foundation)
- FF (Fieldbus Foundation)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or the current HCF or Fieldbus Foundation libraries. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. Existing devices can be updated, and further devices integrated into SIMATIC PDM, by simply importing the manufacturer's device-specific EDD.

Fieldbus Foundation provides pre-defined device descriptions (standard DD) for the basic functions of specific field device types. The basic functions are implemented using various standard function and transmission blocks.

Technical support

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

www.siemens.com/automation/support-request

Contacts in the Region

The Technical Support responsible for your Region can be found on the Internet at:

www.automation.siemens.com/partner

■ Technical specifications

SIMATIC PDM V8.2	
Hardware	• PG/PC/notebook with processor corresponding to operating system requirements
Operating systems (alternative)	• Windows 7 Professional/Ultimate/Enterprise SP1 (32-bit/64-bit) • Windows Server 2008 R2 SP1 Standard Edition (64-bit)
Integration in STEP 7/PCS 7	• SIMATIC PCS 7 V8.1 (incl. update 1) • STEP 7 V5.5+SP4

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Plant Device Management
SIMATIC PDM

■ **Ordering data**	**Article No.**		**Article No.**

SIMATIC PDM stand-alone product packages

Minimum configuration

SIMATIC PDM Single Point V8.2
including 1 TAG; product package for operation and configuration of one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET

Additional functions or SIMATIC PDM TAGs are not possible

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3HA28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3HA28-0YH5**

Basic configuration for individual product packages

SIMATIC PDM Basic V8.2
including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3AB28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3AB28-0YH5**

Configuration for mobile service

SIMATIC PDM Service V8.2
Product package for stand-alone user in service, with
- SIMATIC PDM Basic incl. 4 TAGs
- 100 TAGs

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3JD28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3JD28-0YH5**

SIMATIC PDM system-integrated product packages

Configuration for integration in SIMATIC S7 configuration environment

SIMATIC PDM S7 V8.2
Product package for use in a SIMATIC S7 configuration environment, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 TAGs

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

Note: STEP 7 V5.5+SP4 is required to use the full functionality of SIMATIC PDM S7 V8.2!
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3KD28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3KD28-0YH5**

■ Ordering data

	Article No.

Configuration for integration in SIMATIC PCS 7 configuration environment

SIMATIC PDM PCS 7 V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 V8.2!

• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position
  6ES7658-3LD28-0YA5

• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.
  6ES7658-3LD28-0YH5

SIMATIC PDM PCS 7-FF V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7-FF V8.2!

• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position
  6ES7658-3MD28-0YA5

• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.
  6ES7658-3MD28-0YH5

	Article No.

SIMATIC PDM PCS 7 Server V8.2

Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 Server V8.2!

• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position
  6ES7658-3TD28-0YA5

• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.
  6ES7658-3TD28-0YH5

Plant Device Management
SIMATIC PDM

Ordering data	Article No.		Article No.

Optional product components for SIMATIC PDM V8.2

SIMATIC PDM Extended V8.2
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license **6ES7658-3NX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Note:
  E-mail address required! **6ES7658-3NX28-2YH5**

SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V8.2
only required for integration of SIMATIC PDM into HW Config

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license **6ES7658-3BX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Note:
  E-mail address required! **6ES7658-3BX28-2YH5**

SIMATIC PDM Routing V8.2
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license **6ES7658-3CX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download, online certificate of license
  Note:
  E-mail address required! **6ES7658-3CX28-2YH5**

SIMATIC PDM Server V8.2
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick, certificate of license **6ES7658-3TX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Note:
  E-mail address required! **6ES7658-3TX28-2YH5**

SIMATIC PDM Communication FOUNDATION Fieldbus V8.2
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license **6ES7658-3QX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Note:
  E-mail address required! **6ES7658-3QX28-2YH5**

SIMATIC PDM HART Server V8.2
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license **6ES7658-3EX28-2YB5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license
  Note:
  E-mail address required! **6ES7658-3EX28-2YH5**

Ordering data

	Article No.
SIMATIC PDM **Command Interface V8.2** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	6ES7658-3SX28-2YB5

	Article No.
SIMATIC PDM TAGs TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user	
• Delivery form package License key on USB stick and certificate of license	
- 10 TAGs	6ES7658-3XC00-2YB5
- 100 TAGs	6ES7658-3XD00-2YB5
- 1 000 TAGs	6ES7658-3XE00-2YB5
• Delivery form online License key download and online certificate of license Note: E-mail address required!	
- 10 TAGs	6ES7658-3XC00-2YH5
- 100 TAGs	6ES7658-3XD00-2YH5
- 1 000 TAGs	6ES7658-3XE00-2YH5

	Article No.
SIMATIC PDM **Software Media Package**	
SIMATIC PDM **Software Media Package V8.2** Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit	
Note: Can only be used in conjunction with a valid license or in demo mode!	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software on DVD	6ES7658-3GX28-0YT8
• Delivery form online (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software download Note: E-mail address required!	6ES7658-3GX28-0YG8

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More information

Update/Upgrade

Product packages and optional product components from the product range of SIMATIC PDM V6.0, V6.1, V8.0 or V8.1 (incl. service pack) can be directly upgraded to V8.2 using upgrade packages. Excepted from this are SIMATIC PDM Single Point and SIMATIC PDM Communication via standard HART multiplexer.

Product packages and optional product components from the product range of SIMATIC PDM V7.0 can first be upgraded to V8.0 and then to V8.2.

When upgrading to SIMATIC PDM V8.2, be aware of the compatible versions of SIMATIC PCS 7 and STEP 7.

A Software Update Service in the form of a subscription is also offered for SIMATIC PDM.

For additional information, see the subsections "Updates/upgrades asynchronous to the PCS 7 version" and "Software Update Service" in the "Update/upgrade packages" section, page 16/29.

Plant Device Management
SIMATIC PCS 7 Maintenance Station

Overview

Automation		Maintenance
Enterprise Resource Planning (ERP level)		Enterprise Asset Management System
Manufacturing Execution Systems (MES level)		MES Maintenance Operations
Controls (Process and field level)		Plant Asset Management
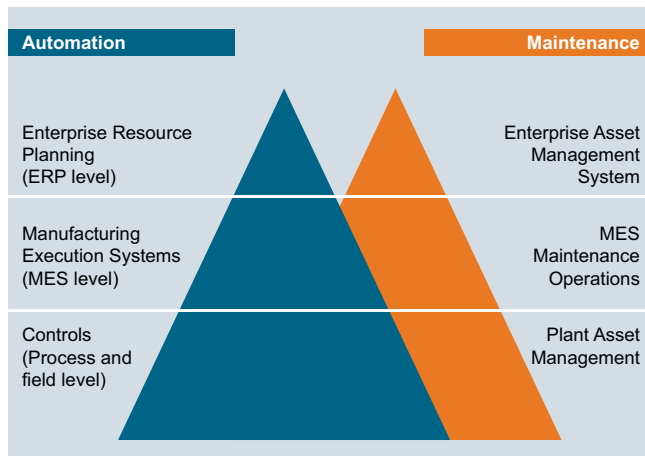
The maintenance station is specialized for plant asset manage-
ment (also known as plant-floor asset management), i.e. the
management of company assets that are used as fixed assets
for production. Its tasks include efficient administration and
management of equipment in technological systems, in partic-
ular the I&C equipment, with the objective of maintaining and
increasing the value.

The following maintenance strategies are used for this purpose:

- **Corrective maintenance**
  Response to pending error and diagnostics messages
  - Failures are risked or minimized by redundant configurations
  - Maintenance in the form of repair or replacement

- **Preventive maintenance**
  Preventive diagnostics and maintenance
  - Initiation of appropriate maintenance measures before a
    fault actually occurs
  - Maintenance in the form of time-dependent or status-
    dependent maintenance (depending on degree of wear)

- **Predictive maintenance**
  Predictive diagnostics for timely detection of potential
  problems and determination of the remaining service life

Using the maintenance station, the maintenance engineer can
check the hardware of the automation system, evaluate its diag-
nostics messages and information and derive maintenance
measures from them. He or she is thus in a position to plan,
control and document the entire maintenance cycle - starting
with the arrival of a diagnostics message, continuing with the
evaluation of detailed diagnostics information and the planning,
initiation and tracking of maintenance measures, all the way to
their completion.

SIMATIC PCS 7 Maintenance Station
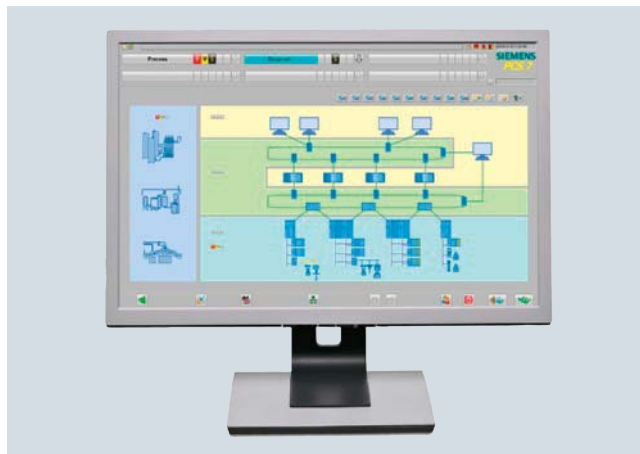
The SIMATIC PCS 7 Maintenance Station is fully integrated into
the SIMATIC PCS 7 process control system. It supplements the
process control system with a valuable instrument for minimizing
the total cost of ownership of a plant.

Parallel to process control, the SIMATIC PCS 7 Maintenance
Station provides consistent maintenance information and func-
tions for the system components of the plant (assets):

- The plant operator receives all process-relevant information
  via the operator system, as well as an overview of the
  diagnostics status of the process control system.

- The maintenance engineer checks the hardware of the
  automation system using the SIMATIC PCS 7 Maintenance
  Station, and processes its diagnostics messages and mainte-
  nance requests.

The SIMATIC PCS 7 Maintenance Station provides maintenance
and service personnel access to:

- Components of the process control system, e.g. intelligent
  field devices and I/O modules, fieldbuses, controllers, network
  components and plant buses as well as single stations,
  servers and clients

- Assets that do not directly belong to the process control
  system, such as pumps, motors, centrifuges, heat
  exchangers (mechanical assets) or control loops. They are
  represented by proxy objects in which the diagnostics rules
  are stored.

It is therefore no longer the case that maintenance functions and
information are only available in a separate level independent of
the production process. Additional hardware or software compo-
nents for plant asset management are superfluous.

Design

Architecture

The SIMATIC PCS 7 Maintenance Station uses hardware and software components of the engineering system (ES) and operator system (OS) for asset management. Depending on the project-specific SIMATIC PCS 7 architecture, it can be implemented on the basis of a SIMATIC PCS 7 BOX (PCS 7 BOX RTX ES/OS system or PCS 7 BOX ES/OS system), a SIMATIC PCS 7 single station, or a client/server combination.

As a result of the close interlacing, ES, OS, and asset management functions run on common hardware. Such a multi-functional station cannot only be used for asset management, but also for system engineering or HMI.

The following table shows possible hardware/software configurations of the SIMATIC PCS 7 Maintenance Station (MS).

Required SIMATIC PCS 7 hardware/software	SIMATIC PCS 7 BOX	SIMATIC PCS 7 ES single station	MS/ES client	MS server
Basic hardware				
PCS 7 BOX RTX ES/OS system or PCS 7 BOX ES/OS system (Windows 7 Ultimate 32-bit operating system)	●	–	–	–
SIMATIC PCS 7 ES/OS IPC[1] BCE/IE W7 (Windows 7 Ultimate 64-bit operating system)	–	●	●	–
SIMATIC PCS 7 OS Server IPC[1] BCE/IE SRV08 (Windows Server 2008 R2 Standard 64-bit operating system)	–	–	–	●
Required SIMATIC PCS 7 software corresponding to operating system or basic hardware (without taking into account the quantity frameworks)				
SIMATIC PCS 7 Engineering Software AS/OS	–	●	●	–
Optional[2]: SIMATIC PDM PCS 7, SIMATIC PDM PCS 7-FF[3] or SIMATIC PDM PCS 7 Server[4]	●	●	●	–
SIMATIC PCS 7 OS Software Server	–	–	–	●
SIMATIC PCS 7 OS Software Client	–	–	●	–
SIMATIC PCS 7 Maintenance Station Engineering	●	●	●	–
SIMATIC PCS 7 Maintenance Station Runtime (basic package and additional asset TAGs)	●	●	–	●

[1] IPC stands for one of the SIMATIC IPC types from the product range in the section "Industrial Workstation/IPC, SIMATIC Rack PC", which are authorized for SIMATIC PCS 7.

[2] Only when using intelligent field devices or AssetMon functionality

[3] SIMATIC PDM-FF required for plants with FOUNDATION Fieldbus H1

[4] Allows SIMATIC PDM to be started on every MS Client

The MS Server can even be operated as a redundant pair of servers. The redundant MS servers must be configured like redundant OS servers and expanded by the SIMATIC PCS 7 Maintenance Station Runtime software.

The SIMATIC PCS 7 Maintenance Station Runtime basic package already contains 100 asset TAGs. These can be expanded by cumulative SIMATIC PCS 7 Maintenance Station Runtime licenses for 100 or 1 000 asset TAGs (Count Relevant Licenses).

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■ **Design** (continued)

The signaling system, user interface, picture hierarchy and operator prompting are based on the HMI philosophy of the operator system. The diagnostics data of all assets are displayed on uniform faceplates whose contents depend on the intelligence of the respective component. This means that working with the SIMATIC PCS 7 Maintenance Station is simple and intuitive – a time-consuming training period is not required.

For all devices described per Electronic Device Description (EDD), SIMATIC PDM delivers a range of information for display and further processing on the maintenance station. When used in SIMATIC PCS 7, SIMATIC PDM is integrated in the SIMATIC PCS 7 Maintenance Station and transmits parameter data and diagnostics information to the maintenance station. SIMATIC PDM with the SIMATIC PDM Server option can also be opened from any SIMATIC PCS 7 Maintenance Station Client (MS Client) to allow diagnostics as well as parameterization of the devices integrated per Electronic Device Description (EDD). Opening is carried out directly from the faceplate views. To enable editing of devices, users are assigned the functional privileges corresponding to their role following identification.

The diagnostics displays structured according to the plant hierarchy with the operating states of the SIMATIC PCS 7 components can be displayed both on single MS clients or on combined MS/OS clients. The faceplates of these stations can also display the enhanced diagnostics information determined by SIMATIC PDM. Furthermore, SIMATIC PDM can be opened specific to a device. However, enhanced online diagnostics functions in conjunction with HW-Config can only be called by a station which is both an MS client and engineering station for SIMATIC PCS 7 at the same time.

User management and access control for the SIMATIC PCS 7 Maintenance Station is handled by SIMATIC Logon integrated in SIMATIC PCS 7.

Configuration

The SIMATIC PCS 7 Maintenance Station is based on the hardware and software project of the application which is generated during the standard configuration with the SIMATIC PCS 7 engineering system. With system support, all data relevant to the plant asset management are derived from the project data of the application, and the diagnostics screens are also generated, simply by pressing a button. The procedure is simple, and requires no additional configuration work:

- Generation of the hardware and software project of the application
- Parameter settings for optional functionalities
- System-supported generation of the diagnostics screens with all components present in the project, including the picture hierarchy based on the project's hardware structure
- Compilation of the configuration data, and downloading to the operator station and Maintenance Station with subsequent test and commissioning phase

The names of imported pictures, icons, etc. can be permanently changed for further use in the maintenance project.

Conformity to international standards, specifications, and recommendations

Plant asset management with the SIMATIC PCS 7 Maintenance Station conforms to international standards, specifications, and recommendations. It is based on the NAMUR requirements (process control standards committee in the chemical and pharmaceutical industries) defined for systems for plant asset management and for status messages from field devices:

- NAMUR recommendation NE91 (requirements for systems for plant asset management)
- NAMUR recommendation NE 105 (requirements for the integration of fieldbus devices in engineering tools)
- NAMUR recommendation NE107 (status messages from field devices "Device failure", "Maintenance requirements", "Function check")

In addition, it also observes IEC 61804-2 for describing devices by means of the Electronic Device Description Language (EDDL) and specifications made by the PROFIBUS & PROFINET International (PI) organization, e.g.:

- PROFIBUS Profile Guidelines Identification & Maintenance Functions
- PROFIBUS PA Profile for Process Control Devices

Function
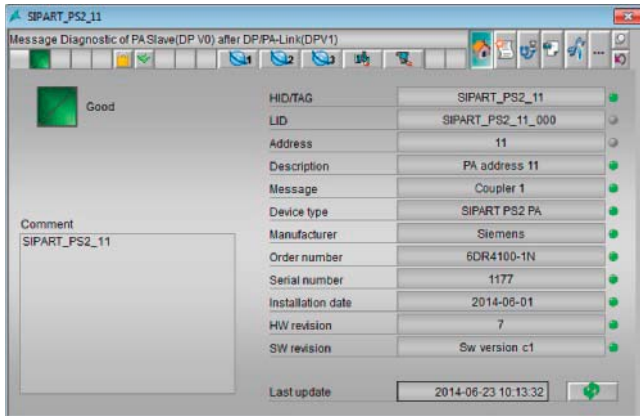
Diagnostics message of a component in the "Identity" faceplate view

The SIMATIC PCS 7 Maintenance Station provides maintenance engineers with comprehensive maintenance information on the system components (assets) of the plant. Starting from the overview display, maintenance engineers can navigate to the diagnostics displays of the subordinate hardware levels to obtain information on the diagnostics status of individual plant areas or components. If a fault is signaled in the overview display, the "Loop in alarm" function permits rapid switching to the diagnostics faceplate of the associated component.

The scope of information available depends on the individual possibilities of the asset, and is filtered according to the user's area of responsibility.

The following information is available, for example:

- Display of diagnostics status detected by the system
- Information on the component, such as process tag name, manufacturer or serial number
- Display of diagnostics messages of an individual component
- Visualization of the type and current state of the initiated maintenance measure

Information on mechanical assets

For mechanical assets without self-diagnostics (pumps, motors, etc.), the AssetMon function block can determine inadmissible operating states from various measured values and their deviations from a defined normal status. These are displayed as maintenance alarms on the SIMATIC PCS 7 Maintenance Station. AssetMon is able to process up to 3 analog values and up to 16 binary values.

In addition, AssetMon is suitable for implementation of:

- Individual diagnostics structures
- Project-specific diagnostics rules
- Condition monitoring functions

Enhanced information for assets according to IEC 61804-2

Further information can be called for assets described by the electronic device description (EDD) according to IEC 61804-2. This information is automatically read out of the components and made available by SIMATIC PDM in the background.

- Device type information (electronic rating plate)
- Detailed diagnostics information
  - Device-specific information from the vendor
  - Information on fault diagnostics and troubleshooting
  - Additional documentation
- Results of internal condition monitoring functions
- Status information (e.g. local configuration changes)
- Information on changes (audit trail report)
- Parameter information

Visualization of the maintenance information
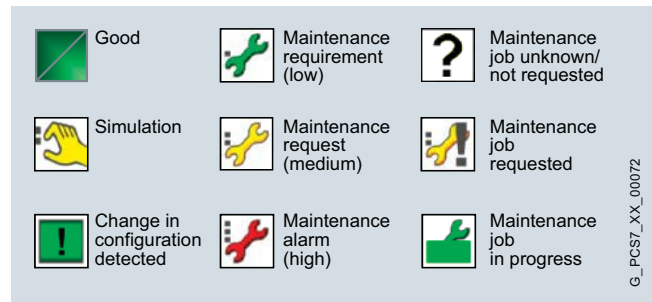
Uniform symbols for visualization of the maintenance status as well as operator prompting

The hierarchical structuring of information and the uniform symbols support the overview, facilitate orientation, and permit the maintenance engineer to rapidly access detailed information starting from the plant overview.

The symbol set defined for the plant asset management contains symbols which identify the diagnostic status of the devices/components, the relevance of the maintenance request, and the status of the maintenance measure.

Group displays in the plant overview visualize the diagnostics status of the subordinate structures/components according to a type of traffic light with red, yellow or green.

Appropriate to their significance, the components described per EDD can be marked as follows and also directly filtered using these features:

- Normal
- Important
- Safety Instrumented Function (SIF)

Diagnostics screens display the status of components and subordinate devices/components through standardized symbols with the following elements:

- Bitmap of component
- TAG identification of component
- Maintenance state display
- Group display for diagnostics status of subordinate components

Clicking an element in the symbol display either opens the subordinate hierarchy level or a component faceplate. The component faceplate offers various views of the associated component with additional device-specific information, e.g. an identification, message or maintenance view.

7

Plant Device Management
SIMATIC PCS 7 Maintenance Station

■ Ordering data	Article No.		Article No.

SIMATIC PCS 7 Maintenance Station Runtime Basic Package V8.1
including SNMP OPC server license and 100 asset TAGs

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-7GB18-0YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required! — **6ES7658-7GB18-0YH0**

SIMATIC PCS 7 Maintenance Station Runtime Asset TAGs
for adding asset TAGs, cumulative

Independent of language, software class A, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 100 asset TAGs — **6ES7658-7GB00-2YB0**
  - 1 000 asset TAGs — **6ES7658-7GC00-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!
  - 100 Asset TAGs — **6ES7658-7GB00-2YH0**
  - 1 000 Asset TAGs — **6ES7658-7GC00-2YH0**

Maintenance Station Engineering

SIMATIC PCS 7 Maintenance Station Engineering V8.1

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-7GX18-0YB5**
- Delivery form online (without SIMATIC PCS 7 Software Media Package): License key download, online certificate of license Note: E-mail address required! — **6ES7658-7GX18-0YH5**

Asset TAGs

Asset TAGs license the number of asset objects monitored in SIMATIC PCS 7. An asset object represents individual hardware components within a SIMATIC PCS 7 project, e.g.

- Measuring devices monitored per EDD, positioners, switching devices, or remote I/O stations
- Basic devices or Ethernet components monitored per OPC coupling in the Maintenance Station

The asset TAGs of the SIMATIC PCS 7 Maintenance Station Runtime licenses (sets of 100 and 1 000) are cumulative (Count Relevant Licenses).

Automation systems
Introduction

■ Overview

SIMATIC PCS 7 automation systems in various designs: Modular S7-400 systems as well as embedded systems (mEC and Microbox system)

Automation systems are available in three different designs for the SIMATIC PCS 7 process control system. The automation performance can therefore be finely scaled within wide limits.

The automation systems offered can be classified as follows:

- Modular systems of the S7-400 series with hardware controller in the versions "Standard", "High availability" and "Safety-related"
  - AS 410 automation systems
  - Complementary S7-400 systems
- Embedded systems with software controller
  - mEC automation system
  - Microbox automation system

■ Application

Automation system with APL	AS 412H	AS 414-3	AS 414-3IE	AS 414H	AS 416-2	AS 416-3	AS 416-3IE	AS 416H	AS 417-4	AS 417H	AS RTX	AS mEC
						AS 410						
Analog value measurements	10	50	100	100	200	400	400	400	500	600	300	300
Digital value measurements	20	160	250	250	450	800	800	800	1 000	1 000	600	600
PID controls	5	35	50	50	75	150	150	150	180	200	200	200
Motors	7	40	75	75	100	200	200	200	350	400	150	150
Valves	7	40	75	75	100	200	200	200	350	400	250	250
SFC	0	15	15	15	40	100	100	100	200	200	100	100
Steps	0	150	150	150	400	1 000	1 000	1 000	2 000	2 000	800	800
Dosing	0	3	3	3	15	25	25	25	50	50	50	50
Digital inputs DI	30	200	350	300	600	1 200	1 200	1 200	1 700	1 800	1 200	1 200
Digital outputs DO	10	60	100	110	200	400	400	400	550	650	400	400
Analog inputs AI	15	100	175	150	300	600	600	600	800	900	600	600
Analog outputs AO	5	30	75	50	100	200	200	200	250	350	200	200
Process objects (PO)	30	200	350	350	600	1 200	1 200	1 200	1 800	2 000	1 200	1 200

Typical mixed configuration limits for SIMATIC PCS 7 automation systems, based on the SIMATIC PCS 7 Advanced Process Library (APL)

Note:

The values quoted here are not AS-specific maximum values for the particular item. Instead, they represent a typical distribution of the available total capacity of the AS during mixed operation of all the items of a contiguous block.

The number of process objects is not an absolute value, but depends on the library used as well as on the number and type of blocks used in the application.

■ **Application** (continued)

Modular automation systems of the S7-400 range

AS type	CPU	Interfaces			
		PN/IE (2 ports)	**MPI/ DP**	**DP**	**DP module as optional plug-in**
Standard systems					
AS 410S	CPU 410-5H Process Automation	2	–	1	–
AS 414-3	CPU 414-3	–	1	1	1
AS 414-3IE	CPU 414-3 PN/DP	1	1	–	1
AS 416-2	CPU 416-2	–	1	1	–
AS 416-3	CPU 416-3	–	1	1	1
AS 416-3IE	CPU 416-2 PN/DP	1	1	–	1
AS 417-4	CPU 417-4	–	1	1	2
High availability and safety-related systems					
AS 410H/F/FH	CPU 410-5H Process Automation (1 × or 2 ×)	2	–	1	–
AS 412H/F/FH	CPU 412-5H (1 × or 2 ×)	1	1	1	–
AS 414H/F/FH	CPU 414-5H (1 × or 2 ×)	1	1	1	–
AS 416H/F/FH	CPU 416-5H (1 × or 2 ×)	1	1	1	–
AS 417H/F/FH	CPU 417-5H (1 × or 2 ×)	1	1	1	–

The rugged automation systems of the S7-400 series are suitable for universal use. They are characterized by high processing and communication performance. The product range offered basically differs in the following features:

- **AS 410 automation systems**
  - Preferred systems for new plants with SIMATIC PCS 7 V8.0
  - Suitable for SIMATIC PCS 7 as of V8.0+SP1; for V8.0+SP1 including hardware upgrade package (HUP CPU 410-5H)
  - Standard systems, high availability systems, and safety-related systems are based on the very same CPU
  - Performance of the general purpose CPU scalable based on the number of process objects
  - Changes in the type of module during operation (TCiR) possible together with the SIMATIC PCS 7 Engineering System V8.1 and higher
- **Complementary S7-400 systems**
  - Can be used in plants with SIMATIC PCS 7 V8/V7
  - As an alternative to AS 410, primarily in systems with SIMATIC PCS 7 V7
  - Scalable based on types of CPU differing in performance

The CPU for all automation systems of the S7-400 series is already equipped as standard with the PROFIBUS DP fieldbus connection. Depending on the type of CPU, one or two further PROFIBUS DP interfaces are possible directly on the CPU using additive IF 964 DP interface modules. If required, up to 10 PROFIBUS communication modules can be additionally operated on each CPU.

Depending on the type, PROFINET IO connection is possible via the CPU interface or a CP 443-1 communication module.

Embedded automation systems

The SIMATIC PCS 7 AS mEC RTX and SIMATIC PCS 7 AS RTX embedded automation systems are low-price, compact systems for the lower and medium performance ranges. They are particularly suitable for small applications, especially at plant level and as OEM products, e.g. in package units.

Both systems have exceptional physical properties, but differ with regard to design and expandability.

- SIMATIC PCS 7 AS mEC RTX
  - S7-300 design
  - Centrally expandable with up to 8 S7-300 I/O modules
  - PROFINET IO interface, suitable for connection of distributed ET 200M/ET 200SP remote I/O stations
- SIMATIC PCS 7 AS RTX
  - Microbox design
  - PROFIBUS DP interface with routing capability

■ **More information**

Catalog information

- For detailed information and ordering data for AS 410 automation systems, refer to the following catalog section "Modular AS 410 systems", page 8/4.
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-
-

Online configurators

Selected SIMATIC S7-400 components are combined as "AS bundles" according to the task involved for the modular SIMATIC PCS 7 automation systems. Configurators in the Industry Mall help you to assemble the AS bundles:

- Online configurators for AS 410 automation systems
  - SIMATIC PCS 7 AS 410 Single Station configurator
  - SIMATIC PCS 7 AS 410 Redundancy Station configurator
- Online configurators for complementary S7-400 systems
  - SIMATIC PCS 7 AS Single Station configurator
  - SIMATIC PCS 7 AS Redundancy Station configurator

8

Automation systems
S7-400 modular systems

AS 410 modular systems

■ Overview

With the rugged all-round AS 410 system, the SIMATIC PCS 7 process control system offers an exclusive automation system from the SIMATIC S7-400 series, which can be used in all domains due to its versatility. For specific requirements, you can configure it as a:

- Standard AS 410S automation system
- Fault-tolerant AS 410H automation system
- Safety-related AS 410F/FH automation system

With its high-performance hardware and optimized firmware, the innovative CPU 410-5H Process Automation of the AS 410 covers the entire spectrum of conventional AS 412 to AS 417 automation systems. Its automation performance can be flexibly scaled based on the number of SIMATIC PCS 7 process objects (POs).

System expansion cards are available for
- 100 PO
- 500 POs
- 1 000 POs
- 1 600 POs
- ≥ 2 000 POs (POs 2k+)

The type reduction to a single CPU offers numerous advantages. It significantly simplifies selection and configuration of the automation system as well as spare part inventory and plant expansion.

■ Design

Similar to all SIMATIC PCS 7 automation systems of the S7-400 series, AS 410 automation systems are available as "AS bundles" as follows:

- Individual components bundled per system in one delivery
- Pre-assembled and tested complete systems (no extra charge compared to delivery of individual components)

With a SIMATIC PCS 7 Industry Library Runtime license and a SIMATIC PCS 7 AS Runtime license, the AS bundles are equipped for 100 process objects (PO). Building on this, the number of process objects can be increased with cumulative AS Runtime licenses for 100, 1 000 or 10 000 POs.

The configuration of the AS bundles as well as the Article No.'s can be defined by selecting pre-configured ordering units.

System-specific ordering configurations are available in tabular form for this purpose in the sections "Standard automation systems", "Fault-tolerant automation systems" and "Safety-related automation systems".

For interactive configuration of AS bundles, two online configurators are also available in the Industry Mall:

- SIMATIC PCS 7 AS 410 Single Station configurator
- SIMATIC PCS 7 AS 410 Redundancy Station configurator

CPU, aluminum rack (except UR1), (optionally) redundant power supply modules and communication modules of the SIMATIC PCS 7 AS 410 bundles are provided with an additional coating (conformal coating).

Flexible and scalable availability

8
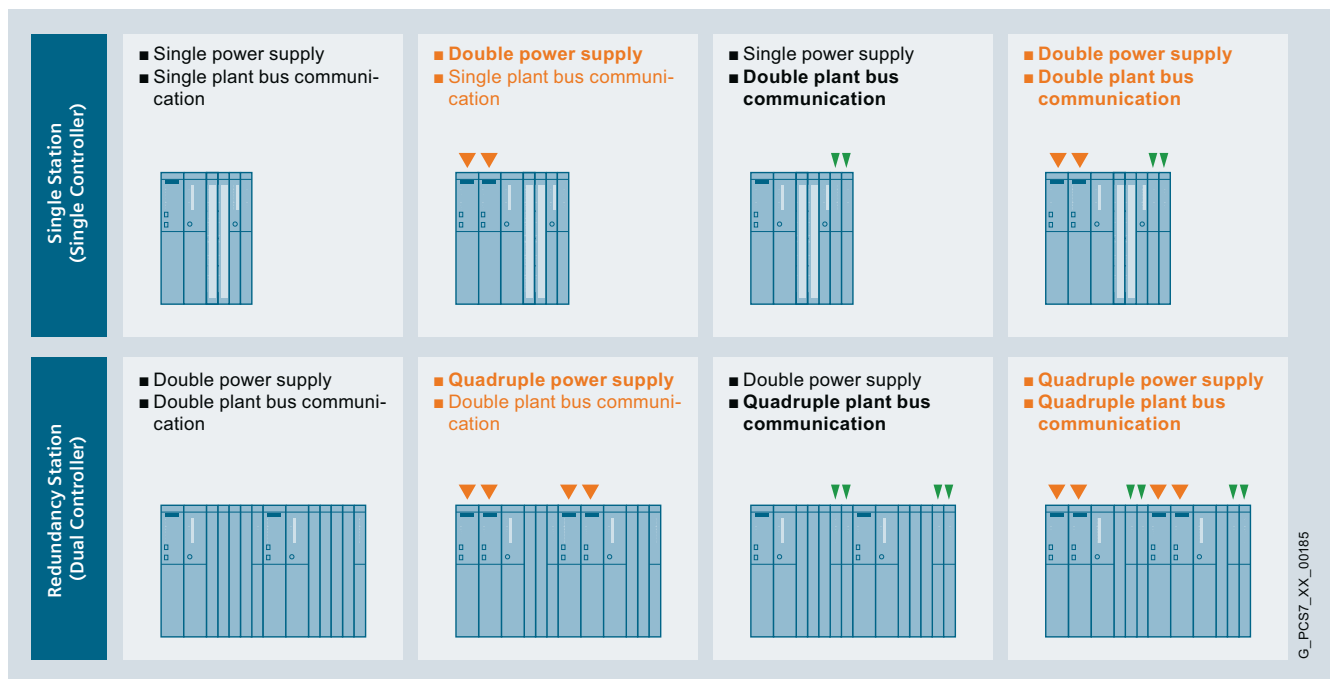
■ Design (continued)

A particular characteristic of the modular S7-400 systems is the flexible and scalable availability of various components.

For a SIMATIC PCS 7 AS Single Station of the AS 410 type, you have the option of specifically increasing the availability by implementing a redundant configuration of the power supply or the Industrial Ethernet communications module, and combining these measures.

Even the AS Redundancy Station of the AS 410 type with its redundant CPUs offers significantly higher availability. It operates according to the 1oo2 principle, in which a switch is made from the active subsystem to the standby system in the event of a fault. Starting from here, you can double the power supply or the Industrial Ethernet communications module for each subsystem, and combine these measures.

CPU 410-5H Process Automation

PROFIBUS DP

PROFINET IO (2-port switch)

2 slots for the sync module

PROFINET IO (2-port switch)

G_PCS7_XX_00376
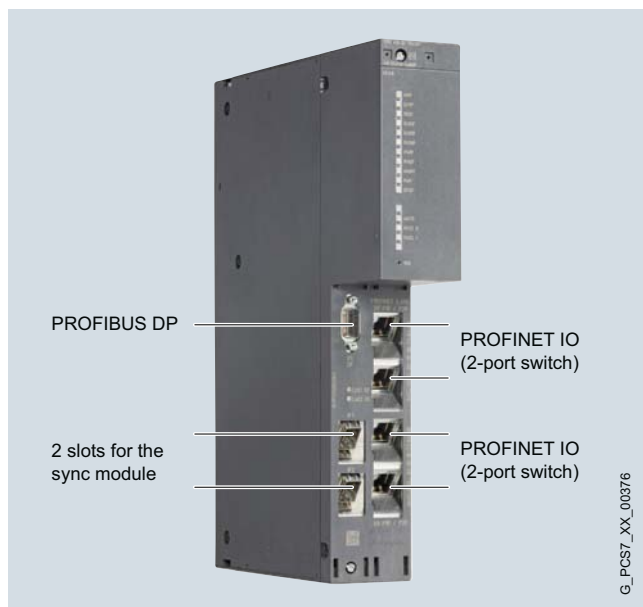
CPU 410-5H Process Automation

The CPU 410-5H Process Automation is the heart of standard automation systems, as well as the fault-tolerant and safety-related AS 410 automation systems. Expansion cards for 100 PO, 500 PO, 1 000 PO, 1 600 PO and ≥ 2 000 PO (PO 2k+) can be used to increase their performance in a user-defined manner to up to approximately 2 600 PO.

If the performance limit defined by the system expansion card is reached during configuration, commissioning or operation, a subsequent increase in performance is possible without replacing the hardware by using an appropriate number of CPU 410 Expansion Packs 100 POs/500 POs.

As shown in the figure, CPU 410-5H Process Automation is equipped with two PROFINET IO interfaces (2-port switch in each case) for up to 250 I/O devices and a PROFIBUS DP interface for up to 96 PROFIBUS DP slaves. Two integrated slots allow the synchronization of two redundant subsystems via sync modules and sync cables (FOC).

CPU 410-5H Process Automation supports NTP as well as S7 time synchronization.

Other features include:

- Integrated 48 MB load memory and 16 MB RAM each for program and data
- Cycle time up to 10 ms/9 process tasks
- Total number of I/Os (on PROFIBUS DP and PROFINET IO) approx. 7 500, 16 KB each for inputs and outputs
- Additional protection of the circuit board with coating (conformal coating)
- High-precision time stamping
- Recessed RESET button
- Preset hardware parameters (PCS 7 skinning)
- Changes in the type of module during operation (TCiR) in association with the SIMATIC PCS 7 Engineering System V8.1 and higher

For detailed information about CPU 410-5H Process Automation, see "Technical specifications", page 8/6.

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level fieldbus (PROFIBUS PA or FOUNDATION Fieldbus H1). For details on this, see sections "PROFIBUS DP" (page 10/64), "PROFIBUS PA" (page 10/71) and "FOUNDATION Fieldbus H1" (page 10/84) in the "Communication" chapter.

PROFIBUS DP segments with distributed process I/O can be operated on a PROFIBUS DP interface in the CPU and on additive CP 443-5 Extended (conformal coating) PROFIBUS DP interfaces. You can configure up to 4 individual or redundant CP 443-5 Extended PROFIBUS DP interfaces (conformal coating) for an automation system using the configurators for SIMATIC PCS 7 automation systems in the Industry Mall as well as in the catalog sections "Standard automation systems", "Fault-tolerant automation systems" and "Safety-related automation systems".

You can additionally implement further PROFIBUS interfaces using separately ordered CP 443-5 Extended PROFIBUS DP interfaces (conformal coating). According to the manual, up to 10 CP 443-5 Extended interfaces (conformal coating) can be operated in one automation system.

I/O connection via PROFINET IO

You can easily and efficiently connect AS 410 automation systems to remote I/O stations via the PROFINET IO interfaces integrated in the CPU 410-5H Process Automation, for example, to remote ET 200M or ET 200SP I/O stations (see also the "PROFINET" section in the "Communication" chapter, page 10/58). PROFINET IO interfaces made available by additive communication modules of the CP 443-1 type (conformal coating) cannot be used.

Automation systems
S7-400 modular systems

AS 410 modular systems

■ Technical specifications

CPU 410-5H Process Automation

General information	
Firmware version	V8.0
Engineering with	SIMATIC PCS 7 V8.1
Degree of protection	IP20
Version	with conformal coating (ISA-S71.04 severity level G1; G2; G3)
Power supply	
Supply voltage	5 V DC from system power supply
Input current • From backplane bus, 5 V DC max. • From interface 5 V DC, max.	 1.7 A 90 mA
Power loss, typical	7.5 W
Memory	
RAM • For program • For data	 16 MB 16 MB
Load memory, integrated	48 MB
Buffering with battery	Yes, all data
CPU performance	
Clock	450 MHz (multiprocessor system)
Average processing time of APL typicals	Approx. 110 µs
PCS 7 process objects, can be set with system expansion card	up to approx. 2 600
Process tasks	
Cyclic interrupts (can be set from 10 ms to 5 s)	9

I/O	
Total number of I/Os	Approx. 7 500 (16 KB inputs/outputs)
Number of I/Os per DP interface	Approx. 3 800 (8 KB inputs/outputs)
Number of I/Os per PN interface	Approx. 3 800 (8 KB inputs/outputs)
Communication	
Number of S7 connections	120
Alarm_8P	10 000 (max. 80 000 messages)
Interfaces	
• X1: PROFIBUS DP	1 × up to 12 Mbit/s, 9-pin Sub-D socket
• X5: PROFINET IO with 2 ports	2 × 10/100 Mbit/s, RJ45
• X8: PROFINET IO with 2 ports	2 × 10/100 Mbit/s, RJ45
• IF1: Sync module slot (redundant systems)	Sync module 1
• IF2: Sync module slot (redundant systems)	Sync module 2
Electromagnetic compatibility (EMC)	
Emission of radio interference acc. to EN 55011	Limit class A, for use in industrial areas
Climatic conditions	
Temperature • Operation	 0 ... 60 °C
Relative humidity • Operation	 0 to 95%, without condensation
Standards, specifications, approvals	
CE mark	Yes
cULus	Yes
CSA approval	Yes
FM approval	Yes
ATEX approval	Yes
Dimensions and weights	
Dimensions (W x H x D in mm)	50 × 290 × 219
Weight	approx. 1.1 kg

■ Accessories

Backup batteries

Lithium backup batteries of type AA with 2.3 Ah are used in the power supply modules of all SIMATIC PCS 7 automation systems of the S7-400 range (AS bundles). Since lithium batteries are easily inflammable, more rigorous transport and storage regulations apply to them.

To avoid subjecting the AS bundles to these more rigorous transport and storage regulations, the backup batteries must be ordered and delivered separately (article no. 6ES7971-0BA00).

The following backup batteries are required depending on the configuration of the AS bundles:

• SIMATIC PCS 7 AS Single Station with
  - 1 power supply module: 2 units
  - 2 redundant power supply modules: 4 units
• SIMATIC PCS 7 AS Redundancy Station with
  - 2 power supply modules: 4 units
  - 2 x 2 redundant power supply modules: 8 units

8

Overview

Standard AS 410S automation system

The AS 410S modular standard automation systems are suitable for general use. These are always your first choice if high availability through redundancy and safety-related functions are not relevant for the application.

In the range from 100 to approx. 2 600 POs, their performance can be customized to meet the task at hand using system expansion cards (for more information, see the previous section of the catalog "Modular S7-400 systems", page 8/5).

An AS 410S is also the base system for a fault-tolerant (AS 410H) or a safety-related automation system (AS 410F, AS 410FH). Your decision for the AS 410S is therefore not final, you can remain flexible. If the task changes, the automation system can be used differently at any time and the target system can be expanded accordingly.

Design

Individual configuration of AS bundles

The configuration of the standard automation systems as well as the Article No.'s can be defined by selecting pre-configured ordering units.

Typical combinations can be selected from tables in the section "Selection and ordering data". The complete range is available to you via the SIMATIC PCS 7 AS 410 Single Station online configurator in the Industry Mall.

Subsequent increase in performance

If the performance limit defined by the ordered system expansion card is reached during configuration, commissioning or operation, a subsequent increase in performance is possible by using an appropriate number of CPU 410 Expansion Packs 100 POs/500 POs. Hardware modifications are not necessary.

I/O connection via PROFIBUS DP

Several PROFIBUS DP segments with distributed process I/Os can be operated on one standard automation system. A PROFIBUS DP interface is already integrated in the CPU 410-5H Process Automation. Using the configurator in the Industry Mall or in the selection and ordering data, up to four more PROFIBUS DP interfaces can be configured via additional CP 443-5 PROFIBUS DP interfaces (conformal coating).

I/O connection via PROFINET IO

Standard AS 410S automation systems can only be connected to remote I/O stations, for example ET 200M/ET 200SP, via the two PROFINET interfaces (2-port switch) integrated in CPU 410-5H Process Automation (see also chapter "Communications", section "PROFINET", page 10/58).

The availability of the I/O devices can be increased by a ring topology with media redundancy (MRP). If the transmission link in the ring is interrupted at a given location, for example, due to a break in the ring cable or the failure of a station, the redundancy manager, e.g. the CPU, immediately activates the alternative communication path.
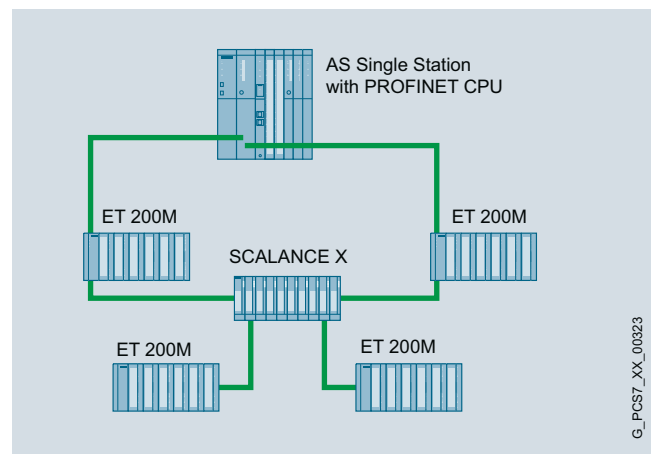
Example for PROFINET IO communication with media redundancy

Industrial Ethernet (IE) plant bus communication

If the PROFINET interfaces integrated in the CPU are not used for PROFINET IO, they can then also be used for the connection to the Industrial Ethernet plant bus. Otherwise, the AS 410S standard automation system can be connected to the Industrial Ethernet plant bus via the CP 443-1 communication module (conformal coating). If necessary, the availability of plant bus communication can be increased by using a second CP 443-1 communication module (conformal coating).

Redundant power supply

If you have two separate power supply networks for your plant, you can increase the availability of the AS 410S standard automation systems by using two redundant power supplies.

Runtime licenses

With a SIMATIC PCS 7 Industry Library Runtime license and a SIMATIC PCS 7 AS Runtime license, the AS bundle is equipped for 100 process objects (PO). The number of process objects can be extended by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1000) of additional Runtime licenses are irrelevant with regard to the implementable quantity framework.

8

Automation systems
S7-400 modular systems

Ordering data

	Article No.
	6ES7654-

AS 410S CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	■	C	■	0	■	-	■	■	F	■
Type of delivery										
• Individual components, not pre-assembled	5									
• Pre-assembled and tested	6									
System expansion card										
• System expansion card 100 PO			J							
• System expansion card 500 PO			L							
• System expansion card 1 000 PO			N							
• System expansion card 1 600 PO			P							
• System expansion card PO 2k+ (≥ 2 000)			Q							
Additive Industrial Ethernet interfaces[1]										
• Without CP 443-1					0					
• 1 × CP 443-1[2]					3					
• 2 × CP 443-1[2]					4					
Racks										
• UR2 (9 slots), aluminum[1][2]							3			
• UR2 (9 slots), steel[1]							4			
• UR1 (18 slots), aluminum							5			
• UR1 (18 slots), steel							6			
Power supply (without backup batteries)										
• 1 × PS 407, 10 A for 120/230 V AC/DC								B		
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy[2]								C		
• 1 × PS 407, 20 A for 120/230 V AC/DC								D		
• 2 × PS 407, 10 A for 120/230 V AC/DC, redundant[2]								E		
• 1 × PS 405, 10 A for 24 V DC								G		
• 1 × PS 405, 10 A for 24 V DC, optional redundancy[2]								H		
• 1 × PS 405, 20 A for 24 V DC								J		
• 2 × PS 405, 10 A for 24 V DC, redundant[2]								K		
Additive PROFIBUS DP interfaces[1]										
• Without CP 443-5 Extended										0
• 1 × CP 443-5 Extended[2]										1
• 2 × CP 443-5 Extended[2]										2
• 3 × CP 443-5 Extended[2]										3
• 4 × CP 443-5 Extended[2]										4

[1] Up to 5 CPs (Industrial Ethernet/PROFIBUS) can be plugged into the UR2 rack with a single power supply, or up to 3 with a redundant power supply.

[2] Conformal coating

8

Individual components

	Article No.
Individual components for AS 410S standard automation systems	
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	6ES7410-5HX08-0AB0
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	6ES7654-5CJ00-0XF0
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	6ES7654-5CL00-0XF0
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	6ES7654-5CN00-0XF0
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	6ES7654-5CP00-0XF0
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	6ES7654-5CQ00-0XF0
CPU 410 expansion pack For subsequent increase in performance of the CPU 410-5H Process Automation Upgrade option for 1 installation, independent of language • Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2CA00-0XE0
- 500 POs	6ES7653-2CC00-0XE0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2CA00-0XK0
- 500 POs	6ES7653-2CC00-0XK0

■ **Ordering data**

	Article No.
SIMATIC NET CP 443-1 (conformal coating) Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO, and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7443-1EX30-0XE1
SIMATIC NET CP 443-5 Extended (conformal coating) Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamping, electronic manual on CD; module occupies 1 slot	6GK7443-5DX05-0XE1
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KA02-0AA0
• **10 A, optional redundancy** (conformal coating), 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KR02-0AA1
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	6ES7407-0RA02-0AA0
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KA02-0AA0
• **10 A, optional redundancy** (conformal coating), 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KR02-0AA1
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0RA02-0AA0
Backup battery Type AA, 2.3 Ah	6ES7971-0BA00
Aluminum rack	
• UR1, 18 slots	6ES7400-1TA11-0AA0
• UR2, 9 slots (conformal coating)	6ES7400-1JA11-0AA1
Steel rack	
• UR1, 18 slots	6ES7400-1TA01-0AA0
• UR2, 9 slots	6ES7400-1JA01-0AA0

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2BA00-0XB5
- 1 000 PO	6ES7653-2BB00-0XB5
- 10 000 PO	6ES7653-2BC00-0XB5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2BA00-0XH5
- 1 000 POs	6ES7653-2BB00-0XH5
- 10 000 POs	6ES7653-2BC00-0XH5

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Automation systems
S7-400 modular systems

Overview

Redundancy Station AS 410H

Fault-tolerant automation systems are used to reduce the risk of production failures. The higher investment costs for fault-tolerant automation systems are frequently negligible compared to the costs resulting from production failures. The higher the costs of a production failure, the more worthwhile it is to use a fault-tolerant system.

The SIMATIC PCS 7 fault-tolerant automation systems can be used on their own in a plant configuration, or together with standard and safety-related automation systems.

Design

The AS 410H, which consists of two redundant, galvanically isolated subsystems, can be mounted on a UR2-H compact rack with a split backplane bus or on two separate racks (UR1 or UR2). The configuration in two racks has the advantage that the redundant subsystems are spatially separated (for example, by a fire-proof wall) and can be located far apart from each other. Depending on the sync modules used, distances from 10 m to 10 km are possible between the two subsystems. As a result of the electrical isolation, the system is also resistant to EMC interference.

Individual configuration of AS bundles

The configuration of the high availability automation systems and the Article No.'s can be defined by selecting pre-configured ordering units.

Typical combinations can be selected from tables in the section "Selection and ordering data". The complete range for selection is available via the SIMATIC PCS 7 AS 410 Redundancy Station online configurator in the Industry Mall.

Ordering information:
- For an AS 410H redundant configuration based on two AS Single Stations (AS 410S), you additionally require 4 sync modules (up to 10 m or up to 10 km) and 2 fiber-optic sync cables. The selection depends on the distance between the two AS Single Stations.
- FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

Subsequent increase in performance

If the performance limit defined by the ordered system expansion card is reached during configuration, commissioning or operation, a subsequent increase in performance is possible by using an appropriate number of CPU 410 Expansion Packs 100 POs/500 POs. Hardware modifications are not necessary.

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level fieldbus (PROFIBUS PA or FOUNDATION Fieldbus H1).

Several PROFIBUS DP segments with distributed process I/Os can be operated on an AS 410H high availability automation system. A PROFIBUS DP interface is integrated in each of the two CPUs 410-5H Process Automation. Using the online configurator in the Industry Mall or in the selection and ordering data, up to four more PROFIBUS DP interfaces can be configured for each redundant subsystem with add-on CP 443-5 PROFIBUS DP interfaces (conformal coating).

With redundant PROFIBUS DP lines, the process I/Os can be connected to an AS 410H as follows:
- ET 200M remote I/Os stations with two IM 153-2 High Feature interface modules on a special bus module
- ET 200iSP remote I/Os stations with two IM 152-1 on a special terminal module
- Field devices on the PROFIBUS PA over a PA link to two redundant IM 153-2 High Feature interface modules
- Field devices on the FOUNDATION Fieldbus H1 via an FF link with two redundant IM 153-2 FF interface modules
- Non-redundant PROFIBUS DP devices, e.g. ET 200S or ET 200pro remote I/O stations per Y-Link

■ **Design** (continued)

I/O connection via PROFINET IO

High availability AS 410H automation systems can be connected via PROFINET IO with remote I/O stations, for example, ET 200M or ET 200SP remote I/O stations. Only the PROFINET interfaces integrated in the CPUs can be used for this on the automation system.

The maximum availability with minimum error reaction times is achieved by the AS 410H when used in conjunction with system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication in which each I/O device establishes a communication link to each of the two CPUs of an AS 410H over the topological network. Then, the failure of a CPU does not automatically lead to failure of the connected I/O devices.
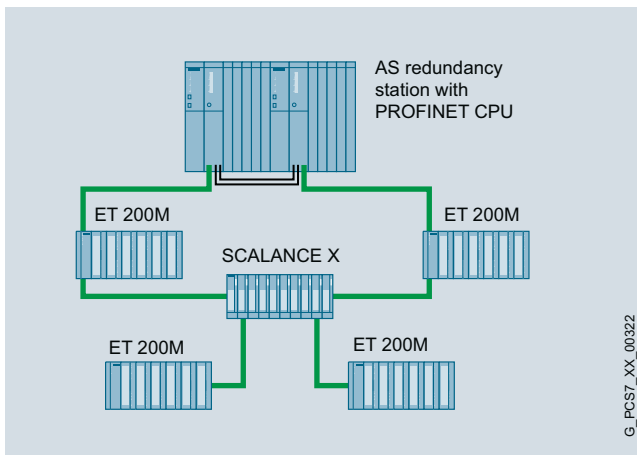
PROFINET IO communication with system redundancy

Communication via the Industrial Ethernet (IE) plant bus

If the PROFINET interfaces integrated in the CPUs of the AS 410H are not used for PROFINET IO, they can then also be used for the connection to the Industrial Ethernet plant bus. Otherwise, the two subsystems of the AS 410H can be connected to the plant bus using one CP 443-1 communication module (conformal coating) each.

The plant bus can be implemented in the form of a ring structure, which can also be configured with redundant architecture if the availability requirements are high. When there are two redundant rings it makes sense to configure two IE interface/communication modules in each case and to distribute their connections between the two rings (4-way connection). Double faults such as failure of the switch on ring 1 with simultaneous interruption of the bus cable on ring 2 can thus be tolerated.

Runtime licenses

With SIMATIC PCS 7 Industry Library Runtime and the SIMATIC PCS 7 AS Runtime license, the automation systems are equipped with 100 process objects (PO) on delivery. The number of process objects can be extended by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1000) of additional Runtime licenses are irrelevant.

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Automation systems
S7-400 modular systems

Fault-tolerant automation systems

Ordering data

	Article No.
	Article No.
AS 410H (Redundancy Station)	**6ES7656-**
2 × CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	☐ C ☐ ☐ ☐ - ☐ ☐ F ☐

Type of delivery							
• Individual components, not pre-assembled	5						
• Pre-assembled and tested	6						
System expansion card							
• 2 × system expansion card 100 POs		J					
• 2 × system expansion card 500 POs		L					
• 2 × system expansion card 1 000 POs		N					
• 2 × system expansion card 1 600 POs		P					
• 2 × system expansion card PO 2k+ (≥ 2 000)		Q					
Sync modules and cables							
• 2 × 2 sync module for distances up to 10 m and 2 × FO sync cable, 1 m			3				
• 2 × 2 sync module for up to 10 km and 2 × FO sync cable, 1 m, for testing			4				
Additive Industrial Ethernet interfaces[1]							
• Without CP 443-1				0			
• 2 × 1 CP 443-1[2]				3			
• 2 × 2 CP 443-1[2]				4			
Racks							
• 1 × UR2-H (2 × 9 slots), aluminum[1][2]					1		
• 1 × UR2-H (2 × 9 slots), steel[1]					2		
• 2 × UR2 (9 slots), aluminum[1][2]					3		
• 2 × UR2 (9 slots), steel[1]					4		
Power supply (without backup batteries)							
• 2 × PS 407, 10 A for 120/230 V AC/DC						B	
• 2 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy[2]						C	
• 2 × PS 407, 20 A for 120/230 V AC/DC						D	
• 2 × 2 PS 407, 10 A for 120/230 V AC/DC, redundant[2]						E	
• 2 × PS 405, 10 A for 24 V DC						G	
• 2 × PS 405, 10 A for 24 V DC, optional redundancy[2]						H	
• 2 × PS 405, 20 A for 24 V DC						J	
• 2 × 2 PS 405, 10 A for 24 V DC, redundant[2]						K	
Additive PROFIBUS DP interfaces[1]							
• Without CP 443-5 Extended							0
• 2 × 1 CP 443-5 Extended[2]							1
• 2 × 2 CP 443-5 Extended[2]							2
• 2 × 3 CP 443-5 Extended[2]							3
• 2 × 4 CP 443-5 Extended[2]							4

[1] In configurations with UR2/UR2-H racks, up to 5 CPs (Industrial Ethernet/ PROFIBUS) can be configured with a single power supply, or up to 3 CPs for each subsystem with a redundant power supply.

[2] Conformal coating

Individual components

	Article No.
Individual components of the high availability SIMATIC PCS 7 AS 410H automation systems	
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	**6ES7410-5HX08-0AB0**
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	**6ES7654-5CJ00-0XF0**
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	**6ES7654-5CL00-0XF0**
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	**6ES7654-5CN00-0XF0**
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	**6ES7654-5CP00-0XF0**
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	**6ES7654-5CQ00-0XF0**
CPU 410 expansion pack For subsequent increase in performance of the CPU 410-5H process automation Upgrade option for 1 installation, independent of language	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2CA00-0XE0
- 500 POs	6ES7653-2CC00-0XE0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2CA00-0XK0
- 500 POs	6ES7653-2CC00-0XK0
Sync set For coupling two redundant CPUs; for distances up to	
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	**6ES7656-7XX30-0XE0**
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	**6ES7656-7XX40-0XE0**

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■ Ordering data

	Article No.		Article No.
Sync module For coupling two redundant CPUs; 2 modules required for each CPU; for distances up to		**Aluminum rack** • UR1, 18 slots • UR2, 9 slots (conformal coating) • UR2-H, for divided central control- lers; 2 × 9 slots (conformal coating)	**6ES7400-1TA11-0AA0** **6ES7400-1JA11-0AA1** **6ES7400-2JA10-0AA1**
• 10 m • 10 km	**6ES7960-1AA06-0XA0** **6ES7960-1AB06-0XA0**		
Sync cable (fiber-optic cable) For connecting two redundant CPUs, 2 cables required for each redundant automation system		**Steel rack** • UR1, 18 slots • UR2, 9 slots • UR2-H, for divided central control- lers; 2 × 9 slots	**6ES7400-1TA01-0AA0** **6ES7400-1JA01-0AA0** **6ES7400-2JA00-0AA0**
• 1 m • 2 m • 10 m	**6ES7960-1AA04-5AA0** **6ES7960-1AA04-5BA0** **6ES7960-1AA04-5KA0**		
Other lengths	On request	**Runtime licenses for SIMATIC** **PCS 7 automation systems** (can be added to existing licenses)	
SIMATIC NET CP 443-1 **(conformal coating)** Communication module for con- necting SIMATIC S7-400 to Indus- trial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 inter- face; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diag- nostics, multicast, access protec- tion over IP access list, initialization over LAN 10/100 Mbit/s; with elec- tronic manual on DVD	**6GK7443-1EX30-0XE1**	**SIMATIC PCS 7** **AS Runtime license** Independent of language, floating license for 1 user • Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license - 100 PO - 1 000 PO - 10 000 PO	 **6ES7653-2BA00-0XB5** **6ES7653-2BB00-0XB5** **6ES7653-2BC00-0XB5**
SIMATIC NET CP 443-5 Extended **(conformal coating)** Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE1**	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required! - 100 PO - 1 000 PO - 10 000 PO	 **6ES7653-2BA00-0XH5** **6ES7653-2BB00-0XH5** **6ES7653-2BC00-0XH5**
PS 407 power supply module with battery compartment for 2 backup batteries, module occu- pies 2 slots		**Y-Link**	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KA02-0AA0**	**Y-Link** For connection of devices with only 1 PROFIBUS DP interface to a redundant automation system	**6ES7197-1LA11-0XA0**
• **10 A, optional redundancy** (conformal coating), 120/ 230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7407-0KR02-0AA1**		
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	**6ES7407-0RA02-0AA0**		

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■ Options

Y-Link

• Bus coupler for transition from a redundant PROFIBUS DP master system to a single-channel PROFIBUS DP master system

• For connection of devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system

The Y-link comprises:

• Two IM 153-2 High Feature interface modules for extended temperature range

• One Y coupler including RS 485 repeater

• One BM IM157 (IM/IM) bus module for two IM 153-2 High Feature modules, for extended temperature range

• One BM Y coupler bus module

Evaluation of the Y-Link diagnostics (and hence indirectly of the connected DP standard slaves) is supported by driver blocks.

PS 405 power supply module with battery compartment for 2 backup batteries, module occu- pies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KA02-0AA0**
• **10 A, optional redundancy** (conformal coating), 24 V DC; 5 V DC/10 A, 24 V DC/1 A	**6ES7405-0KR02-0AA1**
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	**6ES7405-0RA02-0AA0**
Backup battery Type AA, 2.3 Ah	**6ES7971-0BA00**

Automation systems
S7-400 modular systems

Safety-related automation systems

■ Overview

AS Single Station AS 410F

Safety-related automation systems are used for critical applications where a fault could endanger life or result in damage to the plant or the environment. These F/FH systems also referred to as "fail-safe automation systems" detect both faults in the process and their own internal faults in association with the safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus. They automatically transfer the plant to a safe state in the event of a fault.

■ Design

The PROFIsafe profile allows safety-related communication between the automation system (controller) and the process I/O via both PROFIBUS and PROFINET. The decision for choosing either PROFINET IO or the PROFIBUS DP/PA fieldbuses has a significant influence on the architecture of the safety-related system.

For information on the safety-related design versions with PROFIBUS DP/PA and PROFINET IO, refer to the section "Introduction" in the "Safety Integrated for Process Automation" chapter, page 14/3.

The safety-related SIMATIC PCS 7 automation systems are based either on the hardware of the AS 410S standard automation system (F systems) or the hardware of the AS 410H high availability automation system (FH systems), which have been supplemented with safety functions using S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Station AS 410F** with only one CPU (safety-related)
- **AS Redundancy Station AS 410FH** with two redundant CPUs (safety-related and high availability)

The availability can be flexibly increased with a redundant design for the power supply or the Industrial Ethernet communications module (for details, see the section "Modular S7-400 systems" under "Flexible and scalable availability", page 8/4).

All AS 410F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

In these systems with multitasking capability, several programs can be executed simultaneously in one CPU – basic process control (BPCS) applications or also safety-related applications. The programs are reaction-free, i.e. faults in BPCS applications have no effect on safety-related applications, and vice versa. Special tasks with very short response times can also be implemented.

The redundant FH systems operating according to the 1-out-of-2 principle consist of two subsystems of identical design. These are electrically isolated from each other to achieve optimum EMC, and are synchronized with each other via fiber-optic cables. A bumpless switchover is made from the active subsystem to the standby subsystem in the event of a fault. The two subsystems can be present in the same rack or separated by up to 10 km. The spatial separation provides additional security in the case of extreme influences in the environment of the active subsystem, e.g. resulting from a fire.

The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

■ **Design** (continued)

Individual configuration of AS bundles

Configuration of the safety-related automation systems as well as the Article No.'s can be defined by selecting pre-configured ordering units.

Typical combinations for the respective system can be selected using tables in the section "Selection and ordering data". These are divided into:

- AS Single Station AS 410F with one CPU
- AS Redundancy Station AS 410FH with two redundant CPUs, mounted on one common rack (UR2-H) or two separate racks (UR2)

The complete range for selection is available using two correspondingly structured online configurators in the Industry Mall:

- SIMATIC PCS 7 AS 410 Single Station configurator
- SIMATIC PCS 7 AS 410 Redundancy Station configurator

System expansion cards including an S7 F systems Runtime license should be selected here for safety-related AS 410 F/FH automation systems.

FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

The components suitable for engineering the safety-related applications can be ordered in the section "Safety Integrated for Process Automation":

- S7 F Systems
  F programming tool with F block library for programming safety-related user programs on the engineering system
- SIMATIC Safety Matrix
  Convenient safety lifecycle tool for configuration, operation and servicing

Subsequent increase in performance

If the performance limit defined by the ordered system expansion card is reached during configuration, commissioning or operation, a subsequent increase in performance is possible by using an appropriate number of CPU 410 Expansion Packs 100 POs/500 POs. Hardware modifications are not necessary.

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level PROFIBUS PA fieldbus. Several PROFIBUS DP segments with distributed process I/Os can be operated on an AS 410F/FH automation system.

A PROFIBUS DP interface is already integrated in each CPU 410-5H Process Automation. Using the online configurator in the Industry Mall or in the selection and ordering data, up to four additional PROFIBUS DP interfaces can be configured with additive CP 443-5 PROFIBUS DP interfaces (conformal coating) for each AS 410F as well as for each subsystem of the AS 410FH.

Connection of the process I/Os to two redundant PROFIBUS DP lines of an FH system (AS Redundancy Station) is carried out as described in the section "High availability automation systems".

The FOUNDATION Fieldbus (FF) H1 and the FF devices are not supported by Safety Integrated for Process Automation.

I/O connection via PROFINET IO

Safety-related AS 410F/FH automation systems can be connected via PROFINET IO with remote I/O stations, for example, ET 200M or ET 200SP remote I/O stations. Only the two PROFINET interfaces (2-port switch) integrated in the CPU can be used for this on the automation system. For additional information, refer to section "Introduction" in the "Safety Integrated for Process Automation" chapter, page 14/3.

Communication over the plant bus

If the PROFINET interfaces integrated in the CPU of the safety-related automation systems are not used for PROFINET IO, they are then available for connection to the Industrial Ethernet plant bus. Otherwise, the AS 410F and the two subsystems of the AS 410FH can be connected to the plant bus via one CP 443-1 (conformal coating) communication module each.

The plant bus can be implemented in the form of a ring structure, which can also be configured with redundant architecture if the availability requirements are high. When there are two redundant rings, it makes sense to configure two IE interface/communication modules per AS (AS 410F) or AS subsystem (AS 410FH) and to distribute their connections over the two rings (4-way connection). Double faults such as failure of the switch on ring 1 with simultaneous interruption of the bus cable on ring 2 can thus be tolerated.

Runtime licenses

In the factory state, safety-related automation systems come with a SIMATIC PCS 7 AS Runtime license for 100 process objects (PO), SIMATIC PCS 7 Industry Library Runtime and the S7 F systems RT license. The 100 POs of the SIMATIC PCS 7 AS Runtime license can be expanded by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1000) of additional Runtime licenses are irrelevant.

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Automation systems
S7-400 modular systems

Safety-related automation systems

■ **Ordering data**

AS 410F (Single Station) CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	Article No. 6ES7654-
	■ C ■ 0 ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	5
• Pre-assembled and tested	6
System expansion card	
• System expansion card 100 PO including S7 F systems Runtime license	A
• System expansion card 500 PO including S7 F systems Runtime license	C
• System expansion card 1 000 PO including S7 F systems Runtime license	E
• System expansion card 1 600 PO including S7 F systems Runtime license	F
• System expansion card PO 2k+ (≥ 2 000) including S7 F systems Runtime license	G
Additive Industrial Ethernet interfaces[1]	
• Without CP 443-1	0
• 1 × CP 443-1[2]	3
• 2 × CP 443-1[2]	4
Racks	
• UR2 (9 slots), aluminum[1][2]	3
• UR2 (9 slots), steel[1]	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 × PS 407, 10 A for 120/230 V AC/DC	B
• 1 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy[2]	C
• 1 × PS 407, 20 A for 120/230 V AC/DC	D
• 2 × PS 407, 10 A for 120/230 V AC/DC, redundant[2]	E
• 1 × PS 405, 10 A for 24 V DC	G
• 1 × PS 405, 10 A for 24 V DC, optional redundancy[2]	H
• 1 × PS 405, 20 A for 24 V DC	J
• 2 × PS 405, 10 A for 24 V DC, redundant[2]	K
Additive PROFIBUS DP interfaces[1]	
• Without CP 443-5 Extended	0
• 1 × CP 443-5 Extended[2]	1
• 2 × CP 443-5 Extended[2]	2
• 3 × CP 443-5 Extended[2]	3
• 4 × CP 443-5 Extended[2]	4

[1] Up to 5 CPs (Industrial Ethernet/PROFIBUS) can be plugged into the UR2 rack with a single power supply, or up to 3 with a redundant power supply.

[2] Conformal coating

AS 410FH (Redundancy Station) 2 × CPU 410-5H with PROFIBUS DP and PROFINET IO interface 32 MB RAM (16 MB each for program and data) with SIMATIC PCS 7 AS Runtime license for 100 PO and SIMATIC PCS 7 Industry Library Runtime license	Article No. 6ES7656-
	■ C ■ ■ ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	5
• Pre-assembled and tested	6
System expansion card	
• 2 × system expansion card 100 PO including S7 F Systems Runtime license	A
• 2 × system expansion card 500 PO including S7 F Systems Runtime license	C
• 2 × system expansion card 1 000 PO including S7 F Systems Runtime license	E
• 2 × system expansion card 1 600 PO including S7 F Systems Runtime license	F
• 2 × System expansion card PO 2k+ (≥ 2 000) including S7 F Systems Runtime license	G
Sync modules and cables	
• 2 × 2 sync module for distances up to 10 m and 2 × FO sync cable, 1 m	3
• 2 × 2 sync module for up to 10 km and 2 × FO sync cable, 1 m, for testing	4
Additive Industrial Ethernet interfaces[1]	
• Without CP 443-1	0
• 2 × 1 CP 443-1[2]	3
• 2 × 2 CP 443-1[2]	4
Racks	
• 1 × UR2-H (2 × 9 slots), aluminum[1][2]	1
• 1 × UR2-H (2 × 9 slots), steel[1]	2
• 2 × UR2 (9 slots), aluminum[1][2]	3
• 2 × UR2 (9 slots), steel[1]	4
Power supply (without backup batteries)	
• 2 × PS 407, 10 A for 120/230 V AC/DC	B
• 2 × PS 407, 10 A for 120/230 V AC/DC, optional redundancy[2]	C
• 2 × PS 407, 20 A for 120/230 V AC/DC	D
• 2 × 2 PS 407, 10 A for 120/230 V AC/DC, redundant[2]	E
• 2 × PS 405, 10 A for 24 V DC	G
• 2 × PS 405, 10 A for 24 V DC, optional redundancy[2]	H
• 2 × PS 405, 20 A for 24 V DC	J
• 2 × 2 PS 405, 10 A for 24 V DC, redundant[2]	K
Additive PROFIBUS DP interfaces[1]	
• Without CP 443-5 Extended	0
• 2 × 1 CP 443-5 Extended[2]	1
• 2 × 2 CP 443-5 Extended[2]	2
• 2 × 3 CP 443-5 Extended[2]	3
• 2 × 4 CP 443-5 Extended[2]	4

[1] In configurations with UR2/UR2-H racks, up to 5 CPs (Industrial Ethernet/ PROFIBUS) can be configured with a single power supply, or up to 3 CPs for each subsystem with a redundant power supply.

[2] Conformal coating

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■ **Ordering data**

	Article No.		Article No.
Individual components			

	Article No.
Individual components of the safety-related SIMATIC PCS 7 automation systems AS 410F and AS 410FH	
S7 F Systems RT License For processing safety-related application programs, for one AS 410F/FH system each	6ES7833-1CC00-6YX0
CPU 410-5H Process Automation (conformal coating) 32 MB RAM integrated (16 MB each for program and data); module occupies 2 slots	6ES7410-5HX08-0AB0
CPU 410-5H Process Automation 100 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 100 PO	6ES7654-5CJ00-0XF0
CPU 410-5H Process Automation 500 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 500 PO	6ES7654-5CL00-0XF0
CPU 410-5H Process Automation 1 000 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 000 PO	6ES7654-5CN00-0XF0
CPU 410-5H Process Automation 1 600 PO Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for 1 600 PO	6ES7654-5CP00-0XF0
CPU 410-5H Process Automation PO 2k+ Bundle CPU bundle, consisting of CPU 410-5H Process Automation and system expansion card for PO 2k+ (≥ 2 000)	6ES7654-5CQ00-0XF0
CPU 410 expansion pack For subsequent increase in performance of the CPU 410-5H process automation	
Upgrade option for 1 installation, independent of language	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2CA00-0XE0
- 500 POs	6ES7653-2CC00-0XE0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2CA00-0XK0
- 500 POs	6ES7653-2CC00-0XK0

	Article No.
Sync set For coupling two redundant CPUs; for distances up to	
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	6ES7656-7XX30-0XE0
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	6ES7656-7XX40-0XE0
Sync module For coupling two redundant CPU; 2 modules required for each CPU, for distances up to	
• 10 m	6ES7960-1AA06-0XA0
• 10 km	6ES7960-1AB06-0XA0
Sync cable (fiber-optic cable) For connecting two redundant CPUs, 2 cables required for each redundant automation system	
• 1 m	6ES7960-1AA04-5AA0
• 2 m	6ES7960-1AA04-5BA0
• 10 m	6ES7960-1AA04-5KA0
Other lengths	On request
SIMATIC NET CP 443-1 (conformal coating) Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7443-1EX30-0XE1
SIMATIC NET CP 443-5 Extended (conformal coating) Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	6GK7443-5DX05-0XE1

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Automation systems
S7-400 modular systems

Safety-related automation systems

Ordering data	Article No.
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• 10 A 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KA02-0AA0
• 10 A, optional redundancy (conformal coating), 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KR02-0AA1
• 20 A 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	6ES7407-0RA02-0AA0
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• 10 A 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KA02-0AA0
• 10 A, optional redundancy (conformal coating), 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KR02-0AA1
• 20 A 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0RA02-0AA0
Backup battery Type AA, 2.3 Ah	6ES7971-0BA00
Aluminum rack	
• UR1, 18 slots	6ES7400-1TA11-0AA0
• UR2, 9 slots (conformal coating)	6ES7400-1JA11-0AA1
• UR2-H, for divided central controllers; 2 x 9 slots (conformal coating)	6ES7400-2JA10-0AA1
Steel rack	
• UR1, 18 slots	6ES7400-1TA01-0AA0
• UR2, 9 slots	6ES7400-1JA01-0AA0
• UR2-H, for divided central controllers; 2 × 9 slots	6ES7400-2JA00-0AA0

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 AS Runtime license Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2BA00-0XB5
- 1 000 POs	6ES7653-2BB00-0XB5
- 10 000 POs	6ES7653-2BC00-0XB5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2BA00-0XH5
- 1 000 POs	6ES7653-2BB00-0XH5
- 10 000 POs	6ES7653-2BC00-0XH5
AS 410F/FH Engineering See section "Safety Integrated for Process Automation", S7 F Systems, page 14/5	
Y-Link	
Y-Link For connection of devices with only one PROFIBUS DP interface to a redundant automation system	6ES7197-1LA11-0XA0

Overview

With the S7-400 automation systems, which are scalable via different types of CPU, you have an alternative to AS 410 automation systems. The systems that can be used in plants with SIMATIC PCS 7 V7/V8 can be classified as follows:

- Standard automation systems
- High availability automation systems
- Safety-related automation systems

Standard automation systems

The AS 414-3, AS 414-3IE, AS 416-2, AS 416-3, AS 416-3IE and AS 417-4 standard automation systems are extremely robust and feature high processing and communication performance.

The AS 414-3 and AS 414-3IE are tailored for smaller-scale applications with smaller quantity structures, which allows for a low-cost starter solution with a modular and scalable system based on the S7-400 controller range. Larger quantity structures can be implemented using the AS 416-2, AS 416-3/416-3IE and AS 417-4 automation systems. These systems are preferred for medium and large-sized plants.

High availability automation systems

The aim in using high availability automation systems is to minimize the risk of a production outage. In accordance with their basic design, these systems are categorized as:

- AS Single Stations: AS 412-5-1H, AS 414-5-1H, AS 416-5-1H, and AS 417-5-1H with only one CPU, e.g. for the following applications:
  - Subsequent expansion to a redundant system
  - Redundant configuration on UR1 racks, comprising 2 Single Stations, 4 sync modules, and 2 sync fiber-optic cables
- AS Redundancy Stations: AS 412-5-2H, AS 414-5-2H, AS 416-5-2H and AS 417-5-2H with two redundant CPUs, mounted on one common rack (UR2-H) or two separate racks (UR2)

Safety-related automation systems

Safety-related automation systems (F/FH systems) are available for safety-relevant applications in which an incident can result in danger to persons, plant damage or environmental pollution. These are based on the hardware of the high availability automation systems, which is expanded by safety functions with S7 F systems.

In accordance with the design variant, they are categorized as:

- **AS Single Stations**
  AS 412F, AS 414F, AS 416F, and AS 417F with only one CPU (safety-related)
- **AS Redundancy Stations**
  AS 412FH, AS 414FH, AS 416FH, and AS 417FH with two redundant CPUs (safety-related and high availability)

The safety-related F/FH systems collaborate with safety-related F modules of the ET 200 distributed I/O systems or fail-safe transmitters connected directly via the fieldbus to detect not only faults in the process, but also their own, internal faults. They automatically transfer the plant to a safe state in the event of a fault. The redundancy of the FH systems is only used to increase the availability. It is not relevant to processing of the safety functions and the associated fault detection.

All F/FH systems are TÜV-certified and comply with the safety requirements up to SIL 3 according to IEC 61508.

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Design

Racks

Automation systems based on only one CPU (AS Single Station) can be mounted on a UR1 rack (18 slots) or UR2 rack (9 slots).

The automation systems (AS Redundancy Station) consisting of two electrically isolated redundant subsystems can be mounted on a UR2-H compact rack with divided backplane bus or on two separate racks (UR1 or UR2). The design with two racks allows physical separation of the redundant subsystems, e.g. by a fireproof partition and over a distance of up to 10 km. As a result of the galvanic isolation, the system is insensitive to electromagnetic interferences.

Redundant power supply

If you have two separate power supplies for supplying your system, you can increase the availability of the automation systems with redundant power supplies (2 power supplies for one AS Single Station or 1 or 2 power supplies for each subsystem of an AS Redundancy Station).

Communication via the Industrial Ethernet (IE) plant bus

Each standard automation system is connected to the Industrial Ethernet plant bus by means of a CP 443-1 communication module.

If the PN/IE interface integrated in the CPUs of the high availability and safety-related automation systems is not used for PROFINET IO, it is available for the connection to the Industrial Ethernet plant bus. Otherwise, the 1H/F systems (AS Single Station) and the two subsystems of the 2H/FH systems (AS Redundancy Station) can be connected to the plant bus via one CP 443-1 communication module each.

I/O connection via PROFIBUS DP

The distributed process I/O can be integrated into a PROFIBUS DP segment either directly or via a lower-level fieldbus (PROFIBUS PA or FOUNDATION Fieldbus H1).

Several PROFIBUS DP segments with distributed process I/Os can be operated on a standard automation system, an 1H/F system (AS Single Station), or a 2H/FH system (AS Redundancy Station). The following table provides an overview of the number and type of configurable PROFIBUS DP interfaces.

Automation systems
Complementary S7-400 systems

■ **Design** (continued)

AS type	PROFIBUS interfaces							
	1	2	3	4	5	6	7	8
AS 412-5-1H/ AS 412F	MPI/DP	DP	CP	CP	CP	CP		
AS 412-5-2H/ AS 412FH	MPI/DP	DP	CP	CP	CP	CP		
AS 414-5-1H/ AS 414F	MPI/DP	DP	CP	CP	CP	CP		
AS 414-5-2H/ AS 414FH	MPI/DP	DP	CP	CP	CP	CP		
AS 416-5-1H/ AS 416F	MPI/DP	DP	CP	CP	CP	CP		
AS 416-5-2H/ AS 416FH	MPI/DP	DP	CP	CP	CP	CP		
AS 417-5-1H/ AS 417F	MPI/DP	DP	CP	CP	CP	CP		
AS 417-5-2H/ AS 417FH	MPI/DP	DP	CP	CP	CP	CP		
AS 416-2	MPI/DP	DP	CP	CP	CP	CP		
AS 414-3IE	MPI/DP	IF	CP	CP	CP	CP		
AS 416-3IE	MPI/DP	IF	CP	CP	CP	CP		
AS 414-3	MPI/DP	DP	IF	CP	CP	CP	CP	
AS 416-3	MPI/DP	DP	IF	CP	CP	CP	CP	
AS 417-4	MPI/DP	DP	IF	IF	CP	CP	CP	CP

Overview of number and type of configurable PROFIBUS interfaces

MPI/DP = integrated MPI/DP interface (for up to 32 PROFIBUS DP nodes)
DP = integrated PROFIBUS DP interface
IF = optional PROFIBUS DP interface module
CP = additive PROFIBUS DP interface module CP 443-5 Extended

I/O connection via PROFINET (PN)

Standard automation systems, high availability and safety-oriented automation systems (AS Single Stations and AS Redundancy Stations) can be networked simply and effectively with ET 200M remote I/O stations over PROFINET IO. If a PN/IE interface is integrated in the CPU of the automation system (AS 414-3IE, AS 416-3IE, and all H/F/FH systems), then it is to be used for connecting ET 200M remote I/O stations via PROFINET IO. In standard automation systems, the PN/IE interfaces of type CP 443-1 communication modules can also be used for PROFINET IO.

The maximum availability with minimum error handling times is achieved by the AS Redundancy Station (2 H/FH systems) in conjunction with the system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication where each I/O device establishes a communication connection to each of the two CPUs of an AS Redundancy Station over the topological network.

Runtime licenses

Each automation system is already provided as standard with the SIMATIC PCS 7 Industry Library Runtime and the SIMATIC PCS 7 AS Runtime license for 100 process objects (PO); safety-oriented automation systems additionally with the S7 F Systems RT license. The 100 POs of the SIMATIC PCS 7 AS Runtime license can be expanded by additional Runtime licenses for 100, 1 000 or 10 000 POs. The process objects of additional Runtime licenses can be added to process objects which already exist. The number and type (e.g. 100 or 1000) of additional Runtime licenses are irrelevant.

Individual configuration of AS bundles

The various versions of the SIMATIC PCS 7 automation systems AS 412 to AS 417 are available as AS bundles as follows:

* Individual components, combined per station in one consignment
* Preassembled and tested complete systems (no extra charge compared to delivery of individual components)

Typical combinations can be selected from tables in the section "Selection and ordering data".

The complete range is available to you via two configurators in the Industry Mall:

* SIMATIC PCS 7 AS Single Station configurator
* SIMATIC PCS 7 AS Redundancy Station configurator

Ordering notes

* For a redundant configuration based on 2 AS Single Stations, you additionally require 4 sync modules (up to 10 m or 10 km) and 2 fiber-optic sync cables. The selection depends on the distance between the two AS Single Stations.
* FO sync cables longer than 1 m must always be ordered separately (2 cables required in each case).

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■ Ordering data

Configuration tables for standard automation systems

AS 414-3 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 3 interfaces (MPI/DP, DP and slot for IF module) 2.8 MB RAM (1.4 MB each for program and data)	Article No. 6ES7654- ■ ■ ■ ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 2 MB RAM (up to approx. 100 POs)	B
• Memory card 4 MB RAM (up to approx. 210 POs)	C
CPU type	
• CPU 414-3 (up to approx. 200 POs)	C
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 x IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 2.

AS 416-2 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 interfaces (MPI/DP and DP) 5.6 MB RAM (2.8 MB each for program and data)	Article No. 6ES7654- ■ ■ ■ ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
CPU type	
• CPU 416-2 (up to approx. 600 POs)	G
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended	3
• 4 x CP 443-5 Extended[1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

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Automation systems
Complementary S7-400 systems

Standard automation systems

■ **Ordering data** (continued)

AS 416-3

	Article No. 6ES7654-
AS 416-3 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 3 interfaces (MPI/DP, DP and slot for IF module) 11.2 MB RAM (5.6 MB each for program and data)	■ ■ ■ ■ ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 416-3 (up to approx. 1 200 POs)	H
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 x IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended [1]	3
• 4 x CP 443-5 Extended [1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 2.

AS 417-4

	Article No. 6ES7654-
AS 417-4 with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 4 interfaces (MPI/DP, DP and 2 slots for IF modules) 30 MB RAM (15 MB each for program and data)	■ ■ ■ ■ ■ - ■ ■ F ■
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
• Memory card 64 MB RAM (> 2 100 POs)	G
CPU type	
• CPU 417-4 (up to approx. 1 800 POs)	K
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 x IF 964-DP	1
• 2 x IF 964-DP	2
Interface to Industrial Ethernet/PROFINET plant bus	
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended [1]	3
• 4 x CP 443-5 Extended [1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 2.

■ Ordering data (continued)

AS 414-3IE

	Article No.
AS 414-3IE with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 DP interfaces (MPI/DP and slot for IF module) 4 MB RAM (2 MB each for program and data)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ F ■

	Code
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 2 MB RAM (up to approx. 100 POs)	B
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
CPU type	
• CPU 414-3 PN/DP (up to approx. 350 POs)	D
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 x IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• Integrated, without CP 443-1	0
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended	3
• 4 x CP 443-5 Extended[1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

AS 416-3IE

	Article No.
AS 416-3IE with SIMATIC PCS 7 AS Runtime license for 100 POs CPU with 2 DP interfaces (MPI/DP and slot for IF module) 16 MB RAM (8 MB each for program and data)	**6ES7654-** ■ ■ ■ ■ ■ - ■ ■ F ■

	Code
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 416-3 PN/DP (up to approx. 1 200 POs)	J
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
• 1 x IF 964-DP	1
Interface to Industrial Ethernet/PROFINET plant bus	
• Integrated, without CP 443-1	0
• 1 x CP 443-1EX30	3
• 2 x CP 443-1EX30	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended	2
• 3 x CP 443-5 Extended	3
• 4 x CP 443-5 Extended[1]	4

[1] With the UR2 rack in combination with a redundant power supply, the number of additive CP 443-5 Extended is limited to 3.

Automation systems
Complementary S7-400 systems

Standard automation systems

■ **Ordering data**

	Article No.		Article No.
Individual components of standard automation systems			

	Article No.
CPU 414-3 RAM 2.8 MB (1.4 MB each for program and data); module occupies 2 slots	6ES7414-3XM05-0AB0
CPU 416-2 RAM 5.6 MB (2.8 MB each for program and data); module occupies 1 slot	6ES7416-2XN05-0AB0
CPU 416-3 RAM 11.2 MB (5.6 MB each for program and data); module occupies 2 slots	6ES7416-3XR05-0AB0
CPU 417-4 RAM 30 MB (15 MB each for program and data); module occupies 2 slots	6ES7417-4XT05-0AB0
CPU 414-3 PN/DP RAM 4 MB (2 MB each for program and data); module occupies 2 slots	6ES7414-3EM06-0AB0
CPU 416-3 PN/DP RAM 16 MB (8 MB each for program and data); module occupies 2 slots	6ES7416-3ES06-0AB0
Memory card RAM • 2 MB • 4 MB • 8 MB • 16 MB • 64 MB	6ES7952-1AL00-0AA0 6ES7952-1AM00-0AA0 6ES7952-1AP00-0AA0 6ES7952-1AS00-0AA0 6ES7952-1AY00-0AA0
Memory Card Flash-EPROM Only required to update firmware • 16 MB	 6ES7952-1KS00-0AA0
CP 443-1 Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO, and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7443-1EX30-0XE0
CP 443-5 Extended Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamping, electronic manual on CD; module occupies 1 slot	6GK7443-5DX05-0XE0

	Article No.
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	6ES7964-2AA04-0AB0
PS 407 power supply module; 10 A 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0KA02-0AA0
PS 407 power supply module; 10 A, optional redundancy 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0KR02-0AA0
PS 407 power supply module; 20 A 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0RA02-0AA0
PS 405 power supply module; 10 A 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0KA02-0AA0
PS 405 power supply module; 10 A, optional redundancy 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0KR02-0AA0
PS 405 power supply module; 20 A 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0RA02-0AA0
Backup battery Type AA, 2.3 Ah	6ES7971-0BA00

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Ordering data

	Article No.
Aluminum UR1 rack 18 slots	**6ES7400-1TA11-0AA0**
Aluminum UR2 rack 9 slots	**6ES7400-1JA11-0AA0**
Aluminum CR3 rack 4 slots	**6ES7401-1DA01-0AA0**
Steel UR1 rack 18 slots	**6ES7400-1TA01-0AA0**
Steel UR2 rack 9 slots	**6ES7400-1JA01-0AA0**

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	
SIMATIC PCS 7 **AS Runtime license** Independent of language, floating license for 1 user	

• Delivery form package
  (without SIMATIC PCS 7 Software
  Media Package)
  License key USB stick,
  certificate of license	

- 100 PO	**6ES7653-2BA00-0XB5**
- 1 000 PO	**6ES7653-2BB00-0XB5**
- 10 000 PO	**6ES7653-2BC00-0XB5**

• Delivery form online
  (without SIMATIC PCS 7 Software
  Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!	

- 100 PO	**6ES7653-2BA00-0XH5**
- 1 000 PO	**6ES7653-2BB00-0XH5**
- 10 000 PO	**6ES7653-2BC00-0XH5**

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Automation systems
Complementary S7-400 systems

Fault-tolerant automation systems

■ Ordering data (continued)

Configuration tables for fault-tolerant automation systems

	Article No.
AS 412-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**
	■ ■ ■ ■ ■ - ■ ■ F ■
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 1 MB RAM (512 KB each for program and data)	

Type of delivery									
• Individual components, not pre-assembled	7								
• Pre-assembled and tested	8								

Memory card									
• Memory card 1 MB RAM (up to approx. 30 POs)		A							
• Memory card 2 MB RAM (up to approx. 100 POs)		B							

CPU type									
• CPU 412-5H (up to approx. 30 POs)			A						

Additive IF 964-DP interface module									
• Without additive IF 964-DP				0					

Interface to Industrial Ethernet plant bus									
• Without interface module					0				
• 1 x CP 443-1EX30[1]					3				
• 2 x CP 443-1EX30 for redundant connection[1]					4				

Racks									
• UR2 (9 slots), aluminum						3			
• UR2 (9 slots), steel						4			
• UR1 (18 slots), aluminum						5			
• UR1 (18 slots), steel						6			

Power supply (without backup batteries)									
• 1 x PS 407, 10 A for 120/230 V AC/DC							B		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy							C		
• 1 x PS 407, 20 A for 120/230 V AC/DC							D		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)							E		
• 1 x PS 405, 10 A for 24 V DC							G		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy							H		
• 1 x PS 405, 20 A for 24 V DC							J		
• 2 x PS 405, 10 A for 24 V DC (redundant)							K		

Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									0
• 1 x CP 443-5 Extended									1
• 2 x CP 443-5 Extended[1]									2
• 3 x CP 443-5 Extended[1]									3
• 4 x CP 443-5 Extended[1]									4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

	Article No.
AS 414-5-1H (Single Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7654-**
	■ ■ ■ ■ ■ - ■ ■ F ■
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 4 MB RAM (2 MB each for program and data)	

Type of delivery									
• Individual components, not pre-assembled	7								
• Pre-assembled and tested	8								

Memory card									
• Memory card 2 MB RAM (up to approx. 100 POs)		B							
• Memory card 4 MB RAM (up to approx. 210 POs)		C							

CPU type									
• CPU 414-5H (up to approx. 350 POs)			E						

Additive IF 964-DP interface module									
• Without additive IF 964-DP				0					

Interface to Industrial Ethernet plant bus									
• Without interface module					0				
• 1 x CP 443-1EX30[1]					3				
• 2 x CP 443-1EX30 for redundant connection[1]					4				

Racks									
• UR2 (9 slots), aluminum						3			
• UR2 (9 slots), steel						4			
• UR1 (18 slots), aluminum						5			
• UR1 (18 slots), steel						6			

Power supply (without backup batteries)									
• 1 x PS 407, 10 A for 120/230 V AC/DC							B		
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy							C		
• 1 x PS 407, 20 A for 120/230 V AC/DC							D		
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)							E		
• 1 x PS 405, 10 A for 24 V DC							G		
• 1 x PS 405, 10 A for 24 V DC, optional redundancy							H		
• 1 x PS 405, 20 A for 24 V DC							J		
• 2 x PS 405, 10 A for 24 V DC (redundant)							K		

Additive PROFIBUS DP interfaces									
• Without CP 443-5 Extended									0
• 1 x CP 443-5 Extended									1
• 2 x CP 443-5 Extended[1]									2
• 3 x CP 443-5 Extended[1]									3
• 4 x CP 443-5 Extended[1]									4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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■ Ordering data (continued)

AS 416-5-1H (Single Station)	Article No. 6ES7654- ■■■■■■■F■
with SIMATIC PCS 7 AS Runtime license for 100 POs	
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 16 MB RAM (6 MB for program and 10 MB for data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 416-5H (up to approx. 1 200 POs)	P
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

AS 417-5-1H (Single Station)	Article No. 6ES7654- ■■■■■-■■F■
with SIMATIC PCS 7 AS Runtime license for 100 POs	
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch) 32 MB RAM (16 MB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 417-5H (up to approx. 2 000 POs)	M
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

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Automation systems
Complementary S7-400 systems

Fault-tolerant automation systems

Ordering data (continued)

	Article No.
AS 412-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	■ ■ ■ ■ ■ - ■ ■ F ■
2 x 1 MB RAM (512 KB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• 2 x memory card 1 MB RAM (up to approx. 30 POs)	A
• 2 x memory card 2 MB RAM (up to approx. 100 POs)	B
CPU type	
• 2 x CPU 412-5H (up to approx. 30 POs)	A
Sync modules and cables	
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m	3
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 x CP 443-1EX30 for redundant connection[1]	3
• 2 x 2 CP 443-1EX30 for 4-way connection[1]	4
Racks	
• 1 x UR2-H (2 x 9 slots), aluminum	1
• 1 x UR2-H (2 x 9 slots), steel	2
• 2 x UR2 (9 slots), aluminum	3
• 2 x UR2 (9 slots), steel	4
Power supply (without backup batteries)	
• 2 x PS 407, 10 A for 120/230 V AC/DC	B
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 2 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 2 x PS 405, 10 A for 24 V DC	G
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 x PS 405, 20 A for 24 V DC	J
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 x CP 443-5 Extended	1
• 2 x 2 CP 443-5 Extended[1]	2
• 2 x 3 CP 443-5 Extended[1]	3
• 2 x 4 CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

	Article No.
AS 414-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	■ ■ ■ ■ ■ - ■ ■ F ■
2 x 4 MB RAM (2 MB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• 2 x memory card 2 MB RAM (up to approx. 100 POs)	B
• 2 x memory card 4 MB RAM (up to approx. 210 POs)	C
CPU type	
• 2 x CPU 414-5H (up to approx. 350 POs)	E
Sync modules and cables	
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m	3
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing	4
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 x CP 443-1EX30 for redundant connection[1]	3
• 2 x 2 CP 443-1EX30 for 4-way connection[1]	4
Racks	
• 1 x UR2-H (2 x 9 slots), aluminum	1
• 1 x UR2-H (2 x 9 slots), steel	2
• 2 x UR2 (9 slots), aluminum	3
• 2 x UR2 (9 slots), steel	4
Power supply (without backup batteries)	
• 2 x PS 407, 10 A for 120/230 V AC/DC	B
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 2 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 2 x PS 405, 10 A for 24 V DC	G
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 x PS 405, 20 A for 24 V DC	J
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 x CP 443-5 Extended	1
• 2 x 2 CP 443-5 Extended[1]	2
• 2 x 3 CP 443-5 Extended[1]	3
• 2 x 4 CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

Ordering data (continued)

	Article No.									
AS 416-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**									
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	■	■	■	■	■	-	■	■	F	■
2 x 16 MB RAM (6 MB each for program and 10 MB each for data)										
Type of delivery										
• Individual components, not pre-assembled	7									
• Pre-assembled and tested	8									
Memory card										
• 2 x memory card 4 MB RAM (up to approx. 210 POs)		C								
• 2 x memory card 8 MB RAM (up to approx. 800 POs)		D								
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)		E								
CPU type										
• 2 x CPU 416-5H (up to approx. 1 200 POs)			P							
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m				3						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing				4						
Interface to Industrial Ethernet plant bus										
• Without interface module					0					
• 2 x CP 443-1EX30 for redundant connection[1]					3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]					4					
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum							1			
• 1 x UR2-H (2 x 9 slots), steel							2			
• 2 x UR2 (9 slots), aluminum							3			
• 2 x UR2 (9 slots), steel							4			
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC								B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C		
• 2 x PS 407, 20 A for 120/230 V AC/DC								D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E		
• 2 x PS 405, 10 A for 24 V DC								G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H		
• 2 x PS 405, 20 A for 24 V DC								J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										0
• 2 x CP 443-5 Extended										1
• 2 x 2 CP 443-5 Extended[1]										2
• 2 x 3 CP 443-5 Extended[1]										3
• 2 x 4 CP 443-5 Extended[1]										4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

	Article No.									
AS 417-5-2H (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**									
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	■	■	■	■	■	-	■	■	F	■
2 x 32 MB RAM (16 MB each for program and data)										
Type of delivery										
• Individual components, not pre-assembled	7									
• Pre-assembled and tested	8									
Memory card										
• 2 x memory card 4 MB RAM (up to approx. 210 POs)		C								
• 2 x memory card 8 MB RAM (up to approx. 800 POs)		D								
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)		E								
CPU type										
• 2 x CPU 417-5H (up to approx. 2 000 POs)			M							
Sync modules and cables										
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m				3						
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing				4						
Interface to Industrial Ethernet plant bus										
• Without interface module					0					
• 2 x CP 443-1EX30 for redundant connection[1]					3					
• 2 x 2 CP 443-1EX30 for 4-way connection[1]					4					
Racks										
• 1 x UR2-H (2 x 9 slots), aluminum							1			
• 1 x UR2-H (2 x 9 slots), steel							2			
• 2 x UR2 (9 slots), aluminum							3			
• 2 x UR2 (9 slots), steel							4			
Power supply (without backup batteries)										
• 2 x PS 407, 10 A for 120/230 V AC/DC								B		
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy								C		
• 2 x PS 407, 20 A for 120/230 V AC/DC								D		
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)								E		
• 2 x PS 405, 10 A for 24 V DC								G		
• 2 x PS 405, 10 A for 24 V DC, optional redundancy								H		
• 2 x PS 405, 20 A for 24 V DC								J		
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)								K		
Additive PROFIBUS DP interfaces										
• Without CP 443-5 Extended										0
• 2 x CP 443-5 Extended										1
• 2 x 2 CP 443-5 Extended[1]										2
• 2 x 3 CP 443-5 Extended[1]										3
• 2 x 4 CP 443-5 Extended[1]										4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

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Automation systems
Complementary S7-400 systems

Fault-tolerant automation systems

■ **Ordering data** | **Article No.** | | **Article No.**

Individual components of fault-tolerant automation systems

Individual components of the fault-tolerant SIMATIC PCS 7 automation systems		CP 443-1 Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7443-1EX30-0XE0
CPU 412-5H PN/DP 1 MB RAM (512 KB each for program and data) Module occupies 2 slots	6ES7412-5HK06-0AB0		
CPU 414-5H PN/DP 4 MB RAM (2 MB each for program and data) Module occupies 2 slots	6ES7414-5HM06-0AB0		
CPU 416-5H PN/DP 16 MB RAM (6 MB for program and 10 MB for data) Module occupies 2 slots	6ES7416-5HS06-0AB0	**CP 443-5 Extended** Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	6GK7443-5DX05-0XE0
CPU 417-5H PN/DP 32 MB RAM (16 MB each for program and data) Module occupies 2 slots	6ES7417-5HT06-0AB0		
Sync set For linking the two redundant 412-5H, 414-5H, 416-5H or 417-5H CPUs; for distances up to		**PS 407 power supply module; 10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0KA02-0AA0
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	6ES7656-7XX30-0XE0		
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	6ES7656-7XX40-0XE0	**PS 407 power supply module; 10 A, optional redundancy** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0KR02-0AA0
Sync module For linking the two 412-5H, 414-5H, 416-5H or 417-5H CPUs; 2 modules required per CPU For distances of up to		**PS 407 power supply module; 20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7407-0RA02-0AA0
• 10 m	6ES7960-1AA06-0XA0		
• 10 km	6ES7960-1AB06-0XA0		
Sync cable (fiber-optic cable) For connecting the two 412-5H, 414-5H, 416-5H or 417-5H CPUs; each redundant automation system requires 2 cables		**PS 405 power supply module; 10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0KA02-0AA0
• 1 m	6ES7960-1AA04-5AA0		
• 2 m	6ES7960-1AA04-5BA0		
• 10 m	6ES7960-1AA04-5KA0	**PS 405 power supply module; 10 A, optional redundancy** 24 V DC; 5 V DC/10 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0KR02-0AA0
Other lengths	On request		
Memory card RAM		**PS 405 power supply module; 20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A; with battery compartment for 2 backup batteries, module occupies 2 slots	6ES7405-0RA02-0AA0
• 1 MB	6ES7952-1AK00-0AA0		
• 2 MB	6ES7952-1AL00-0AA0		
• 4 MB	6ES7952-1AM00-0AA0		
• 8 MB	6ES7952-1AP00-0AA0		
• 16 MB	6ES7952-1AS00-0AA0		
• 64 MB	6ES7952-1AY00-0AA0		
Memory Card Flash-EPROM Only required to update firmware. Alternative: firmware update via the engineering system		**Backup battery** Type AA, 2.3 Ah	6ES7971-0BA00
• 16 MB	6ES7952-1KS00-0AA0		

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■ Ordering data

	Article No.
Aluminum UR1 rack 18 slots	**6ES7400-1TA11-0AA0**
Aluminum UR2 rack 9 slots	**6ES7400-1JA11-0AA0**
Aluminum UR2-H rack For divided central controllers; 2 x 9 slots	**6ES7400-2JA10-0AA0**
Steel UR1 rack 18 slots	**6ES7400-1TA01-0AA0**
Steel UR2 rack 9 slots	**6ES7400-1JA01-0AA0**
Steel UR2-H rack For divided central controllers; 2 x 9 slots	**6ES7400-2JA00-0AA0**

	Article No.
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	See "Individual components of standard automation systems", page 8/25

Automation systems
Complementary S7-400 systems

Safety-related automation systems

■ **Ordering data** (continued)

Configuration tables for safety-related automation systems

AS 412F (Single Station)	Article No. 6ES7654-
with SIMATIC PCS 7 AS Runtime license for 100 POs	■ ■ ■ ■ ■ - ■ ■ F ■
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)	
1 MB RAM (512 KB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 1 MB RAM (up to approx. 30 POs)	A
• Memory card 2 MB RAM (up to approx. 100 POs)	B
CPU type	
• CPU 412-5H with S7 F Systems RT license (up to approx. 30 POs)	B
Additive interface modules	
• Without additive interface module	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

AS 414F (Single Station)	Article No. 6ES7654-
with SIMATIC PCS 7 AS Runtime license for 100 POs	■ ■ ■ ■ ■ - ■ ■ F ■
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)	
4 MB RAM (2 MB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 2 MB RAM (up to approx. 100 POs)	B
• Memory card 4 MB RAM (up to approx. 210 POs)	C
CPU type	
• CPU 414-5H with S7 F Systems RT license (up to approx. 350 POs)	F
Additive interface modules	
• Without additive interface module	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

Ordering data (continued)

AS 416F (Single Station)

AS 416F (Single Station)	Article No. 6ES7654-
with SIMATIC PCS 7 AS Runtime license for 100 POs	▪ ▪ ▪ ▪ ▪ - ▪ ▪ F ▪
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)	
16 MB RAM (6 MB for program and 10 MB for data)	

	Pos.
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 416-5H with S7 F Systems RT license (up to approx. 1 200 POs)	Q
Additive IF 964-DP interface module	
• Without additive IF 964-DP	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

AS 417F (Single Station)

AS 417F (Single Station)	Article No. 6ES7654-
with SIMATIC PCS 7 AS Runtime license for 100 POs	▪ ▪ ▪ ▪ ▪ - ▪ ▪ F ▪
CPU with 2 PROFIBUS interfaces (MPI/DP master and DP master) and 1 PN/IE interface (2 port switch)	
32 MB RAM (16 MB each for program and data)	

	Pos.
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• Memory card 4 MB RAM (up to approx. 210 POs)	C
• Memory card 8 MB RAM (up to approx. 800 POs)	D
• Memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• CPU 417-5H with S7 F Systems RT license (up to approx. 2 000 POs)	N
Additive interface modules	
• Without additive interface module	0
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 1 x CP 443-1EX30[1]	3
• 2 x CP 443-1EX30 for redundant connection[1]	4
Racks	
• UR2 (9 slots), aluminum	3
• UR2 (9 slots), steel	4
• UR1 (18 slots), aluminum	5
• UR1 (18 slots), steel	6
Power supply (without backup batteries)	
• 1 x PS 407, 10 A for 120/230 V AC/DC	B
• 1 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 1 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 1 x PS 405, 10 A for 24 V DC	G
• 1 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 1 x PS 405, 20 A for 24 V DC	J
• 2 x PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 1 x CP 443-5 Extended	1
• 2 x CP 443-5 Extended[1]	2
• 3 x CP 443-5 Extended[1]	3
• 4 x CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged into the UR2 rack with a single power supply or up to 3 with a redundant power supply.

8

Automation systems
Complementary S7-400 systems

Safety-related automation systems

■ **Ordering data** (continued)

AS 412FH (Redundant Station)	Article No.
with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	▪ ▪ ▪ ▪ - ▪ ▪ F ▪
2 x 1 MB RAM (512 KB each for program and data)	

Type of delivery								
• Individual components, not pre-assembled	**7**							
• Pre-assembled and tested	**8**							

Memory card								
• 2 x memory card 1 MB RAM (up to approx. 30 POs)		**A**						
• 2 x memory card 2 MB RAM (up to approx. 100 POs)		**B**						

CPU type								
• 2 x CPU 412-5H with S7 F Systems RT license (up to approx. 30 POs)			**B**					

Sync modules and cables								
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m				**3**				

Interface to Industrial Ethernet plant bus								
• Without interface module					**0**			
• 2 x CP 443-1EX30 for redundant connection[1]					**3**			
• 2 x 2 CP 443-1EX30 for 4-way connection[1]					**4**			

Racks								
• 1 x UR2-H (2 x 9 slots), aluminum						**1**		
• 1 x UR2-H (2 x 9 slots), steel						**2**		
• 2 x UR2 (9 slots), aluminum						**3**		
• 2 x UR2 (9 slots), steel						**4**		

Power supply (without backup batteries)								
• 2 x PS 407, 10 A for 120/230 V AC/DC							**B**	
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**C**	
• 2 x PS 407, 20 A for 120/230 V AC/DC							**D**	
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)							**E**	
• 2 x PS 405, 10 A for 24 V DC							**G**	
• 2 x PS 405, 10 A for 24 V DC, optional redundancy							**H**	
• 2 x PS 405, 20 A for 24 V DC							**J**	
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)							**K**	

Additive PROFIBUS DP interfaces								
• Without CP 443-5 Extended								**0**
• 2 x CP 443-5 Extended								**1**
• 2 x 2 CP 443-5 Extended[1]								**2**
• 2 x 3 CP 443-5 Extended[1]								**3**
• 2 x 4 CP 443-5 Extended[1]								**4**

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

AS 414FH (Redundant Station)	Article No.
with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	▪ ▪ ▪ ▪ - ▪ ▪ F ▪
2 x 4 MB RAM (2 MB each for program and data)	

Type of delivery								
• Individual components, not pre-assembled	**7**							
• Pre-assembled and tested	**8**							

Memory card								
• 2 x memory card 2 MB RAM (up to approx. 100 POs)		**B**						
• 2 x memory card 4 MB RAM (up to approx. 210 POs)		**C**						

CPU type								
• 2 x CPU 414-5H with S7 F Systems RT license (up to approx. 350 POs)			**F**					

Sync modules and cables								
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m				**3**				
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing				**4**				

Interface to Industrial Ethernet plant bus								
• Without interface module					**0**			
• 2 x CP 443-1EX30 for redundant connection[1]					**3**			
• 2 x 2 CP 443-1EX30 for 4-way connection[1]					**4**			

Racks								
• 1 x UR2-H (2 x 9 slots), aluminum						**1**		
• 1 x UR2-H (2 x 9 slots), steel						**2**		
• 2 x UR2 (9 slots), aluminum						**3**		
• 2 x UR2 (9 slots), steel						**4**		

Power supply (without backup batteries)								
• 2 x PS 407, 10 A for 120/230 V AC/DC							**B**	
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy							**C**	
• 2 x PS 407, 20 A for 120/230 V AC/DC							**D**	
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)							**E**	
• 2 x PS 405, 10 A for 24 V DC							**G**	
• 2 x PS 405, 10 A for 24 V DC, optional redundancy							**H**	
• 2 x PS 405, 20 A for 24 V DC							**J**	
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)							**K**	

Additive PROFIBUS DP interfaces								
• Without CP 443-5 Extended								**0**
• 2 x CP 443-5 Extended								**1**
• 2 x 2 CP 443-5 Extended[1]								**2**
• 2 x 3 CP 443-5 Extended[1]								**3**
• 2 x 4 CP 443-5 Extended[1]								**4**

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

Ordering data (continued)

	Article No.
AS 416FH (Redundancy Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	▪ ▪ ▪ ▪ ▪ - ▪ ▪ F ▪
2 x 16 MB RAM (6 MB each for program and 10 MB each for data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• 2 x memory card 4 MB RAM (up to approx. 210 POs)	C
• 2 x memory card 8 MB RAM (up to approx. 800 POs)	D
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• 2 x CPU 416-5H with S7 F Systems RT license (up to approx. 1 200 POs)	Q
Sync modules and cables	
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m	3
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing	4
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 x CP 443-1EX30 for redundant connection[1]	3
• 2 x 2 CP 443-1EX30 for 4-way connection[1]	4
Racks	
• 1 x UR2-H (2 x 9 slots), aluminum	1
• 1 x UR2-H (2 x 9 slots), steel	2
• 2 x UR2 (9 slots), aluminum	3
• 2 x UR2 (9 slots), steel	4
Power supply (without backup batteries)	
• 2 x PS 407, 10 A for 120/230 V AC/DC	B
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 2 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 2 x PS 405, 10 A for 24 V DC	G
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 x PS 405, 20 A for 24 V DC	J
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces	
• Without CP 443-5 Extended	0
• 2 x CP 443-5 Extended	1
• 2 x 2 CP 443-5 Extended[1]	2
• 2 x 3 CP 443-5 Extended[1]	3
• 2 x 4 CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

	Article No.
AS 417FH (Redundant Station) with SIMATIC PCS 7 AS Runtime license for 100 POs	**6ES7656-**
2 x CPU with 2 PROFIBUS interfaces each (MPI/DP master and DP master) and 1 PN/IE interface each (2 port switch)	▪ ▪ ▪ ▪ ▪ - ▪ ▪ F ▪
2 x 32 MB RAM (16 MB each for program and data)	
Type of delivery	
• Individual components, not pre-assembled	7
• Pre-assembled and tested	8
Memory card	
• 2 x memory card 4 MB RAM (up to approx. 210 POs)	C
• 2 x memory card 8 MB RAM (up to approx. 800 POs)	D
• 2 x memory card 16 MB RAM (up to approx. 2 100 POs)	E
CPU type	
• 2 x CPU 417-5H with S7 F Systems RT license (up to approx. 2 000 POs)	N
Sync modules and cables	
• 2 x 2 sync modules for distances up to 10 m and 2 x FO sync cable, 1 m	3
• 2 x 2 sync modules for up to 10 km and 2 x FO sync cable, 1 m, for testing	4
Interface to Industrial Ethernet plant bus	
• Without interface module	0
• 2 x CP 443-1EX30 for redundant connection[1]	3
• 2 x 2 CP 443-1EX30 for 4-way connection[1]	4
Racks	
• 1 x UR2-H (2 x 9 slots), aluminum	1
• 1 x UR2-H (2 x 9 slots), steel	2
• 2 x UR2 (9 slots), aluminum	3
• 2 x UR2 (9 slots), steel	4
Power supply (without backup batteries)	
• 2 x PS 407, 10 A for 120/230 V AC/DC	B
• 2 x PS 407, 10 A for 120/230 V AC/DC, optional redundancy	C
• 2 x PS 407, 20 A for 120/230 V AC/DC	D
• 2 x 2 PS 407, 10 A for 120/230 V AC/DC (redundant)	E
• 2 x PS 405, 10 A for 24 V DC	G
• 2 x PS 405, 10 A for 24 V DC, optional redundancy	H
• 2 x PS 405, 20 A for 24 V DC	J
• 2 x 2 PS 405, 10 A for 24 V DC (redundant)	K
Additive PROFIBUS DP interfaces[1]	
• Without CP 443-5 Extended	0
• 2 x CP 443-5 Extended	1
• 2 x 2 CP 443-5 Extended[1]	2
• 2 x 3 CP 443-5 Extended[1]	3
• 2 x 4 CP 443-5 Extended[1]	4

[1] Up to 5 CPs can be plugged in per subsystem with a single power supply or up to 3 with a redundant power supply.

8

Automation systems
Complementary S7-400 systems

Safety-related automation systems

Ordering data   Article No.   Article No.

Individual components of safety-related automation systems

Individual components of the safety-related SIMATIC PCS 7 automation systems	
S7 F Systems RT License For processing safety-related user programs, for one AS 412F/FH, AS 414F/FH, AS 416F/FH or AS 417F/FH system	6ES7833-1CC00-6YX0
CPU 412-5H PN/DP 1 MB RAM (512 KB each for program and data) Module occupies 2 slots	6ES7412-5HK06-0AB0
CPU 414-5H PN/DP 4 MB RAM (2 MB each for program and data) Module occupies 2 slots	6ES7414-5HM06-0AB0
CPU 416-5H PN/DP 16 MB RAM (6 MB for program and 10 MB for data) Module occupies 2 slots	6ES7416-5HS06-0AB0
CPU 417-5H PN/DP 32 MB RAM (16 MB each for program and data) Module occupies 2 slots	6ES7417-5HT06-0AB0
Sync set For linking the two redundant 412-5H, 414-5H, 416-5H or 417-5H CPUs; for distances up to	
• 10 m, consisting of 4 sync modules for up to 10 m and 2 fiber-optic sync cables, 1 m each	6ES7656-7XX30-0XE0
• 10 km, consisting of 4 sync modules for up to 10 km Note: please order fiber-optic sync cables (2 units) in the required length separately.	6ES7656-7XX40-0XE0
Sync module For linking the two 412-5H, 414-5H, 416-5H or 417-5H CPUs; 2 modules required per CPU For distances of up to	
• 10 m	6ES7960-1AA06-0XA0
• 10 km	6ES7960-1AB06-0XA0
Sync cable (fiber-optic cable) For connecting the two 412-5H, 414-5H, 416-5H or 417-5H CPUs; each redundant automation system requires 2 cables	
• 1 m	6ES7960-1AA04-5AA0
• 2 m	6ES7960-1AA04-5BA0
• 10 m	6ES7960-1AA04-5KA0
Other lengths	On request
Memory card RAM	
• 1 MB	6ES7952-1AK00-0AA0
• 2 MB	6ES7952-1AL00-0AA0
• 4 MB	6ES7952-1AM00-0AA0
• 8 MB	6ES7952-1AP00-0AA0
• 16 MB	6ES7952-1AS00-0AA0
• 64 MB	6ES7952-1AY00-0AA0
Memory Card Flash-EPROM Only required to update firmware; alternative: firmware update via the engineering system	
• 16 MB	6ES7952-1KS00-0AA0

CP 443-1 Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 x RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	6GK7443-1EX30-0XE0
CP 443-5 Extended Communication module for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamp, electronic manual on CD; module occupies 1 slot	6GK7443-5DX05-0XE0
PS 407 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KA02-0AA0
• **10 A, redundant** 120/230 V AC/DC; 5 V DC/10 A, 24 V DC/1 A	6ES7407-0KR02-0AA0
• **20 A** 120/230 V AC/DC; 5 V DC/20 A, 24 V DC/1 A	6ES7407-0RA02-0AA0
PS 405 power supply module with battery compartment for 2 backup batteries, module occupies 2 slots	
• **10 A** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KA02-0AA0
• **10 A, redundant** 24 V DC; 5 V DC/10 A, 24 V DC/1 A	6ES7405-0KR02-0AA0
• **20 A** 24 V DC; 5 V DC/20 A, 24 V DC/1 A	6ES7405-0RA02-0AA0
Backup battery Type AA, 2.3 Ah	6ES7971-0BA00
Aluminum rack	
• UR1, 18 slots	6ES7400-1TA11-0AA0
• UR2, 9 slots	6ES7400-1JA11-0AA0
• UR2-H for divided central controllers; 2 x 9 slots	6ES7400-2JA10-0AA0
Steel rack	
• UR1, 18 slots	6ES7400-1TA01-0AA0
• UR2, 9 slots	6ES7400-1JA01-0AA0
• UR2-H for divided central controllers; 2 x 9 slots	6ES7400-2JA00-0AA0
Runtime licenses for SIMATIC PCS 7 automation systems (can be added to existing licenses)	See "Individual components of standard automation systems", page 8/25

■ Accessories

Backup batteries

Lithium backup batteries of type AA with 2.3 Ah are used in the power supply modules of all SIMATIC PCS 7 automation systems AS 412 to AS 417. Since lithium batteries are easily inflammable, more rigorous transport and storage regulations apply to them.

To avoid subjecting the AS bundles to these more rigorous transport and storage regulations, the backup batteries must be ordered and delivered separately (order no. 6ES7971-0BA00).

The following backup batteries are required depending on the configuration of the AS bundles:
- SIMATIC PCS 7 AS Single Station:
  - With 1 power supply module: 2 units
  - With 2 redundant power supply modules: 4 units
- SIMATIC PCS 7 AS Redundancy Station:
  - With 2 power supply modules: 4 units
  - With 2 x 2 redundant power supply modules: 8 units

Automation systems
SIPLUS automation systems

■ Overview

The SIMATIC PCS 7 automation systems are electrically and mechanically extremely rugged, but can only be used to a limited extent under extreme ambient conditions. The SIPLUS extreme bundles for SIMATIC PCS 7 are excellent alternatives if the environment of use is as follows:

- High humidity
- Condensation
- Chemically, mechanically or biologically active materials

SIPLUS extreme bundles are appropriately refined AS bundles based on recommended preferred types.

You can find an overview of the complete SIPLUS extreme range on the Internet at

www.siemens.com/siplus

The SIPLUS extreme bundles available for SIMATIC PCS 7 are listed under the link "Automation technology for extreme requirements". If the bundle configuration you require is not listed, you can check its feasibility under consideration of technical and economical aspects using the "Application form for new products".

8

Overview

SIMATIC PCS 7 AS mEC RTX

The SIMATIC PCS 7 AS mEC RTX equipped with a WinAC RTX software controller is a rugged automation system in compact S7-300 format, and is designed for the lower and medium performance ranges of SIMATIC PCS 7.

The SIMATIC PCS 7 AS mEC RTX is suitable for maintenance-free 24-hour continuous operation at ambient temperatures between 0 and 50 °C. Since it works without fans or rotating storage media, it is relatively insensitive to vibration and shock.

A particular advantage for users is the centralized expandability by means of adding up to eight S7-300 I/O modules on the same mounting rail. As a result, controller and I/Os are merged into a low-cost compact unit.

Application

As a result of its exceptional physical properties, small dimensions, and centralized expandability, the SIMATIC PCS 7 AS mEC RTX automation system is particularly suitable for small applications at plant level and as OEM products, e.g. in package units.

Design

The SIMATIC PCS 7 AS mEC RTX automation system is based on a system-specific SIMATIC S7 modular embedded controller EC31 with the following configuration:

- 1.2 GHz Intel Core Duo processor
- 1 GB RAM
- Integrated Ethernet interface 10/100 Mbps (1 port), can be used for connection to the SIMATIC PCS 7 plant bus
- Integral PROFINET interface 10/100 Mbit/s (2 ports)
- 2 USB interfaces
- 1 slot for multimedia card
- LEDs for status and error
- 4 GB flash memory with the following pre-installed software:
  - Windows Embedded Standard 2009 operating system
  - WinAC RTX 2010 controller software
- AS Runtime license for 100 POs

SIMATIC PCS 7 AS mEC RTX with S7-300 I/O modules

The SIMATIC PCS 7 AS mEC RTX can be mounted together with up to 8 S7-300 I/O modules on a horizontal DIN rail. The I/O modules are positioned on the right of the automation system.

The following S7-300 I/O modules can be used together with the SIMATIC PCS 7 AS mEC RTX:

Name		Article number
SM 321	DI 16, 24 V DC	6ES7321-1BH02-0AA0
	DI 32, 24 V DC	6ES7321-1BL00-0AA0
	DI 16, 24 to 48 V DC	6ES7321-1CH00-0AA0
	DI 16, 48 to 125 V DC	6ES7321-1CH20-0AA0
	DI 8, 120/230 V AC	6ES7321-1FF01-0AA0
	DI 16, 120/230 V AC	6ES7321-1FH00-0AA0
	DI 16, 24 V DC, for isochronous mode; diagnostics/hardware interrupt	6ES7321-7BH01-0AB0
SM 322	DO 8, 24 V DC, 2 A	6ES7322-1BF01-0AA0
	DO 16 x 24 V DC / 0.5 A	6ES7322-1BH01-0AA0
	DO 32 x 24 V DC / 0.5 A	6ES7322-1BL00-0AA0
	DO 16, 120/230 V AC, 1 A	6ES7322-1FH00-0AA0
	DO 8, relay contacts, 2 A	6ES7322-1HF01-0AA0
	DO 8, relay contacts, 5 A	6ES7322-1HF10-0AA0
	DO 16, relay contacts	6ES7322-1HH01-0AA0
SM 323	DI 8 / DO 8	6ES7323-1BH01-0AA0
SM 331	AI 8; diagnostics/hardware interrupt	6ES7331-7KF02-0AB0
	AI 8; enhanced resolution 16 bits	6ES7331-7NF00-0AB0
	AI 8; enhanced resolution 16 bits, 4-channel mode	6ES7331-7NF10-0AB0
	AI 8, for thermal resistors	6ES7331-7PF01-0AB0
	AI 8, for thermocouples	6ES7331-7PF11-0AB0
SM 332	AO 4; resolution 11/12 bits; diagnostics interrupt	6ES7332-5HD01-0AB0
	AO 8	6ES7332-5HF00-0AB0
	AO 4; resolution 16 bits	6ES7332-7ND02-0AB0

These I/O modules can be selected in the chapter "Process I/Os", section "ET 200M for SIMATIC PCS 7".

Sensors/actuators integrated via distributed ET 200SP and ET 200M remote I/O stations can be connected via PROFINET IO.

The SIMATIC PCS 7 AS mEC RTX can only be operated with 24 V DC. For example, a PS 305 or PS 307 load power supply can be used (see chapter "Process I/Os", section "ET 200M for SIMATIC PCS 7, Power Supply", page 11/17).

An additional uninterruptible power supply (UPS) permits data retentivity for all process values.

Automation systems
Embedded systems

mEC automation system

Configuration

The SIMATIC PCS 7 AS mEC RTX is configured using the SIMATIC PCS 7 engineering system. The supplied AS Runtime license for 100 POs that can be expanded with additional cumulative AS Runtime licenses up to a maximum of 2 000 POs.

Technical specifications

SIMATIC PCS 7 AS mEC RTX	
Design and equipment features	
Design	DIN rail mounting; horizontal
Degree of protection	IP20
Processor	Intel Pentium Core Duo 1.2 GHz
Main memory	1 GB RAM
Flash memory	4 GB
Interfaces • Ethernet • PROFINET • USB	 1 × 10/100 Mbit/s (RJ45) 2 × 10/100 Mbit/s (RJ45) 2 × USB 2.0/high-speed, 500 mA
Monitoring and diagnostics functions	
LED displays	Status
Short-term voltage dip	Up to 5 ms
Preinstalled software	
Operating system	Windows Embedded Standard 2009, preinstalled
Controller software	WinAC RTX 2010
Electromagnetic compatibility (EMC)	
Emission of radio interference acc. to EN 55011	Limit class A, for use in industrial areas
Climatic conditions	
Temperature • Operation • Storage/transport	 0 to +50 °C -40 to +70 °C
Mechanical environmental conditions	
Vibrations • Operation • Storage/transport	Tested according to IEC 60068-2-6 Yes Yes
Shock resistance • During operation • Storage/transport	Tested according to IEC 60068-2-27 / IEC 60068-2-29 Yes Yes
Standards, specifications, approvals	
CE Mark	Yes
cULus	Yes
CSA approval	Yes, contained in cULus
FM approval	Yes
ATEX approval	Yes
Power supply	
Supply voltage	24 V DC (20.4 to 28.8 V)
Short-term power and voltage failure backup	5 ms
Input current (rated value at 24 V DC)	800 mA (without backplane bus and USB supply)
Power loss, typically	34 W
Dimensions and weights	
Dimensions (W x H x D in mm)	160 × 125 × 115
Weight	Approx. 1.5 kg

Ordering data

	Article No.
SIMATIC PCS 7 AS mEC RTX Embedded automation system in S7-300 format with Windows Embedded Standard 2009 operating system and WinAC RTX 2010 controller software, preinstalled on 4 GB flash memory; can be used with SIMATIC PCS 7 V8.0 and higher SIMATIC PCS 7 AS Runtime License for 100 POs	**6ES7654-0MC23-0XX0**
Additional and expansion components	

SIMATIC PCS 7 AS Runtime license
(can be added to existing licenses)
 	
Independent of language, floating license for 1 user
• Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick,
  certificate of license	

- 100 POs	**6ES7653-2BA00-0XB5**
- 1 000 POs	**6ES7653-2BB00-0XB5**

• Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!	

- 100 POs	**6ES7653-2BA00-0XH5**
- 1 000 POs	**6ES7653-2BB00-0XH5**

For PS 305 and PS 307 load power supplies and I/O modules for centralized expansion of SIMATIC PCS 7 AS mEC RTX, see Section "Process I/Os", section "ET 200M for SIMATIC PCS 7", page 11/16.

8

Overview

SIMATIC PCS 7 AS RTX

With consideration of the scalable automation performance, the SIMATIC PCS 7 AS RTX Microbox automation system represents the starter system in the low to mid-performance range of SIMATIC PCS 7.

- Resistant to vibration and shock as result of:
  - Compact and robust design
  - Complete absence of fans and rotating storage media
- Maintenance-free 24-hour continuous operation at ambient temperatures up to 55 °C

It is therefore an excellent alternative particularly in small applications to standard automation systems of S7-400 design.

Application

As a result of its exceptional physical properties and small dimensions, the SIMATIC PCS 7 AS RTX Microbox automation system is exceptionally suitable for industrial use at plant level. Possible fields of application:

- Small production applications
- Package units
- Laboratory automation

SIMATIC PCS 7 AS RTX can also be combined with SIMATIC PCS 7 BOX or automation systems of S7-400 design within a plant.

Design
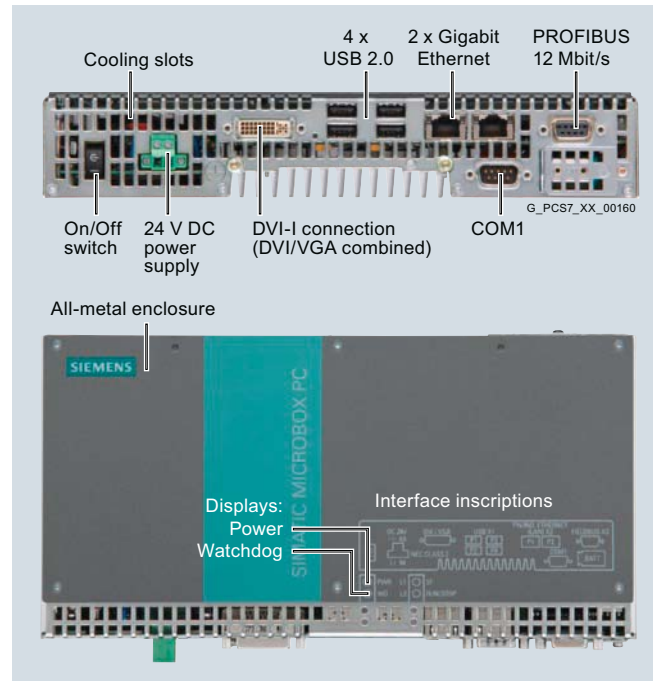
Design of the SIMATIC PCS 7 AS RTX

The SIMATIC PCS 7 AS RTX Microbox automation system is based on a SIMATIC IPC427C with system-specific configuration. The following are pre-installed on the 4-GB CompactFlash card also supplied:

- Windows Embedded Standard 2009 operating system
- WinAC RTX 2010 controller software
- SIMATIC IPC DiagMonitor diagnostics software

Microbox automation system with CompactFlash card

8

Automation systems
Embedded systems

■ Design (continued)

The SIMATIC PCS 7 AS RTX has an integral power supply with electrical isolation. Monitoring functions for parameter assignment (program execution/watchdog, processor and board temperatures) as well as enhanced diagnostics/messages (e.g. operating hours counter, system status) can be recorded via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Maintenance Station (PCS 7 Asset Management), and evaluated or signaled by LED (Power/Watchdog).

Two Ethernet interfaces 10/100/1000 Mbit/s (RJ45) are integrated in the SIMATIC PCS 7 AS RTX for plant bus communication with SIMATIC PCS 7 subsystems such as operator system, engineering system or maintenance station.

ET 200M, ET 200iSP, ET 200S and ET 200pro remote I/O stations can be linked over the integrated PROFIBUS DP interface to a comprehensive range of low-cost signal/function modules as well as intelligent field/process devices on the PROFIBUS PA. With this CP 5611-compatible interface, the SIMATIC PCS 7 AS RTX also supports routing from the engineering system up to the field devices connected via PROFIBUS.

The SIMATIC PCS 7 AS RTX is configured using the engineering system of the SIMATIC PCS 7 process control system.

The engineering system also administers the AS Runtime licenses of the SIMATIC PCS 7 AS RTX. The scope of delivery of the SIMATIC PCS 7 AS RTX already includes an AS Runtime license for 100 POs. This can be expanded by further AS Runtime licenses for 100 POs or 1 000 POs up to the limit of 2 000 POs. The process objects of additional AS Runtime licenses are then added to process objects which already exist.

■ Technical specifications

SIMATIC IPC427C (Microbox), SIMATIC PCS 7 AS RTX version

Design and equipment features	
Design	• DIN rail or wall mounting; horizontal (preferred) or vertical • Portrait assembly; vertical
Degree of protection to EN 60529 (front/rear)	IP20
CPU • Processor • Front Side Bus • Second Level Cache	Intel Pentium Core 2 Duo 1.2 GHz 800 MHz 3 MB
Chipset	Intel GM45/ICH9M
Main memory	2 GB DDR3-SDRAM SO-DIMM modules
Graphics • Graphics controller	Intel GMA4500 integrated in the chipset
• Graphics memory	32 ... 256 MB shared memory
• Resolutions, colors, frequencies	
- CRT - DVI	Up to 1920 x 1200, 60 to 120 Hz Up to 1920 x 1200, 60 Hz
Drives • Flash drive • CD-ROM, DVD-RW, diskette	For CompactFlash Card, 4 GB Connectable via USB (not included in scope of delivery)
Interfaces • PROFIBUS/MPI	1 x 12 Mbit/s (galvanically isolated, CP 5611-compatible), 9-contact Sub-D socket
• Ethernet	2 x Ethernet port (RJ45) Intel 82574L 10/100/1000 Mbps, isolated, two independent controllers, teaming-capable
• USB	4 x USB 2.0/high-speed
• Serial	1 x COM1 RS 232, 115 Kbit/s max., 9-pin Sub-D connector
• Parallel	-
• Graphics connection	1 x DVI-I (DVI/VGA combined) • DVI: digital • VGA: Analog
• Keyboard, Mouse	Connectable via USB (not included in scope of delivery)
LED displays	• Power • Watchdog

Preinstalled software	
Operating system	Windows Embedded Standard 2009, preinstalled
Controller software	WinAC RTX 2010
Monitoring and diagnostics functions	
Watchdog	• Monitoring of program execution • Restart can be configured following faults • Monitoring time adjustable in the software
Temperature	• Processor • Motherboard (via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Maintenance Station)
Operating hours counter	(via SIMATIC IPC DiagMonitor and SIMATIC PCS 7 Maintenance Station)
Safety	
Protection class	Protection class I in accordance with IEC 61140
Safety directives	EN 60950-1; UL 60950; CAN/CSA-C22.2 No. 60950-1; UL 508; CAN/CSA-C22.2 No. 142 or CAN/CSA-C22.2 No. 14-05
Noise level	
Operation	< 40 dB (A) to DIN 45635-1

Technical specifications (continued)

Electromagnetic compatibility (EMC)	
Interference emission	EN 61000-6-3 , EN 61000-6-4, CISPR22:2004 Class B; FCC Class A
Immunity to conducted interference on the supply lines	± 2 kV (according to IEC 61000-4-4; burst)
	± 1 kV (according to IEC 61000-4-5; symmetrical surge)
	± 2 kV (according to IEC 61000-4-5; asymmetrical surge)
Immunity to interference on signal lines	± 1 kV (according to IEC 61000-4-4; burst; length < 3 m)
	± 2 kV (according to IEC 61000-4-4; burst; length > 3 m)
	± 2 kV (according to IEC 61000-4-5; surge; length > 30 m)
Immunity to static discharge	± 6 kV contact discharge (according to IEC 61000-4-2)
	± 8 kV air discharge (according to IEC 61000-4-2)
Immunity to high frequency radiation	10 V/m, 80 to 1 000 MHz and 1.4 to 2 GHz, 80% AM (according to IEC 61000-4-3)
	1 V/m, 2 to 2.7 GHz, 80% AM (according to IEC 61000-4-3)
	10 V, 10 kHz to 80 MHz, 80% AM (according to IEC 61000-4-6)
Immunity to magnetic fields	100 A/m rms value 50/60 Hz according to IEC 61000-4-8

Climatic conditions	
Temperature	Tested according to IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14
• in operation with Flash drive	
- Horizontal mounting (preferred position)	• Operation with max. 3 expansion modules (max. load 9 W): 0 to +45 °C • Operation in RAL[1] with max. 3 expansion modules (max. load 9 W): 0 to +50 °C • Operation in RAL[1] without expansion modules 0 to +55 °C
- Vertical / portrait mounting position	• Operation without expansion modules: 0 to +45 °C • Operation in RAL[1] with max. 3 expansion modules (max. load 9 W): 0 to +50 °C
- Horizontal mounting position	• Operation without expansion modules: 0 to +40 °C
• Storage/transport	-40 to +70 °C
• Gradient	Operation: max. 10 °C/h; storage: 20 °C/h; no condensation
Relative humidity	Tested according to IEC 60068-2-78, IEC 60068-2-30
• Operation	5 ... 80% at 25 °C (no condensation)
• Storage/transport	5 ... 95% at 25 °C (no condensation)

Mechanical environmental conditions	
Vibrations • Operation • Storage/transport	Tested according to IEC 60068-2-6 5 ... 9 Hz: 3.5 mm 9 to 500 Hz: 9.8 m/s² 5 ... 9 Hz: 3.5 mm, 9 to 500 Hz: 9.8 m/s²
Shock resistance • Operation • Storage/transport	Tested according to IEC 60068-2-27 150 m/s², 11 ms 250 m/s², 6 ms

Standards, specifications, approvals	
Residential, business and commercial operations, and small businesses (CE) • Interference emission • Noise immunity	 EN 61000-6-3: 2007 EN 61000-6-1: 2007
Industrial environment (CE) • Interference emission • Noise immunity	 EN 61000-6-4: 2007 EN 61000-6-2: 2005
cULus	Underwriters Laboratories (UL) according to Standard UL 60950-1, File E115352 and Canadian National Standard CAN/CSA-C22.2 No. 60950-1 (I.T.E.) or according to UL 508, File E85972 and Canadian National Standard CAN/CSA-C22.2 No. 142 (IND.CONT.EQ.) or according to Canadian National Standard CAN/CSA-C22.2 No. 14-05

Special features	
Quality assurance	according to ISO 9001

Power supply (electrically isolated)	
Supply voltage	24 V DC (19.2 to 28.8 V)
Short-term voltage dip	Min. 15 ms (at 20.4 V)
	Max. 10 events per hour; recovery time of at least 1 s
Max. current consumption (at 24 V DC)	4 A

Dimensions and weights	
Dimensions (WxHxD) in mm	262 x 142 x 47
Weight	approx. 2 kg

[1] RAL = Restricted Access Location: Installation of device in operating environment with restricted access, e.g. a locked switchgear cabinet

8

Automation systems
Embedded systems

Microbox automation system

◼ Ordering data

Ordering data	Article No.
SIMATIC PCS 7 AS RTX Assembled and preinstalled automation system on the basis of the SIMATIC IPC427C with Windows Embedded Standard 2009 operating system, WinAC RTX 2010 controller software, and SIMATIC IPC DiagMonitor diagnostics software, pre-installed on a 4 GB CompactFlash card; suitable for SIMATIC PCS 7 V7.1 SP2 or higher and SIMATIC PCS 7 V8.0/V8.1	6ES7654-0UE13-0XX0
SIMATIC PCS 7 AS Runtime License for 100 PO	
Additional and expansion components	
SIMATIC PCS 7 AS Runtime license (can be added to existing licenses)	
Independent of language, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	
- 100 POs	6ES7653-2BA00-0XB5
- 1 000 POs	6ES7653-2BB00-0XB5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
- 100 POs	6ES7653-2BA00-0XH5
- 1 000 POs	6ES7653-2BB00-0XH5
Portrait assembly	
Portrait assembly kit for space-saving installation of the SIMATIC PCS 7 AS RTX (interfaces at front)	6ES7648-1AA20-0YB0
Fieldbus connection	
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet, insulation displacement	6GK1500-0FC10
Individual components (included in product package of SIMATIC PCS 7 AS RTX)	
SIMATIC PC CompactFlash card	
• 4 GB	6ES7648-2BF02-0XG0

◼ Accessories

Portrait assembly kit

SIMATIC PCS 7 AS RTX with portrait assembly kit, interfaces at front

The portrait assembly kit allows space-saving installation of the SIMATIC PCS 7 AS RTX in the control cabinet. The technical specifications correspond to those of a SIMATIC PCS 7 AS RTX mounted vertically on a DIN rail.

As a result of the portrait assembly, the mounting area required (WxH in mm) is reduced from 262 x 133 to 62 x 316. Together with the kit, the SIMATIC PCS 7 AS RTX occupies a mounting depth of 163 mm in the control cabinet. Since all interfaces of the SIMATIC PCS 7 AS RTX are accessible from the front, this type of assembly is very convenient for commissioning.

When using the portrait assembly kit for the SIMATIC PCS 7 AS RTX, please also observe the information on operation planning and device installation in the "SIMATIC IPC427C industrial PC" manual.

Compact systems

Compact systems
SIMATIC PCS 7 BOX

■ **Overview**

The compact systems for SIMATIC PCS 7 V8.1 will be available soon. This section will be updated following release.

9

Communication
Introduction

■ **Overview**

Through application of SIMATIC NET network components based on globally established standards, SIMATIC PCS 7 is provided with a powerful and rugged range of products for implementing integrated communications networks for reliable data exchange between all system components and levels of a plant.

The SIMATIC NET products specially developed for industrial applications provide optimum suitability for plants in all sectors. They are matched to one another, and satisfy maximum demands, especially in areas subject to extreme influences, such as:

• Electromagnetic interfering fields
• Corrosive liquids and atmospheres
• Danger of explosion
• High mechanical stress

The SIMATIC NET products guarantee expandability and the protection of investments as a result of compatible further developments, as well as uniformity from inbound logistics to outbound logistics and from field devices up to the management information system.

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■ **Design**

Incorporated in Totally Integrated Automation, the unique basis offered by Siemens for uniform automation of all sectors in the production, process or hybrid industries, the SIMATIC NET busses promote fast and reliable communication between the individual systems/applications of the SIMATIC PCS 7 process control systems such as:

- Automation systems, distributed I/Os and field components
- Engineering system, operator system and Maintenance Station
- SIMATIC BATCH and SIMATIC Route Control
- Web clients and Web servers for operator control and monitoring via Internet/Intranet as well as IT applications

Industrial Ethernet plant bus

Industrial Ethernet is used as the plant bus as well as terminal bus for multi-user systems with client/server architecture. For small systems, the "Basic Communication Ethernet" (BCE) integrated in the SIMATIC PCS 7 Industrial Workstations permits operation of single stations and servers on the plant bus even without a CP 1613/CP 1623/CP 1628 communications processor.

In medium and large plants characterized by high requirements, SIMATIC PCS 7 applies modern Gigabit and FastEthernet technology which combines the high security provided by redundant optical rings with the scalable performance provided by switching technology and high transmission rates up to 1 Gbit/s.

PROFINET

PROFINET is based on the international standards IEC 61158 and IEC 61784 and combines the advantages of the open network standard, Ethernet, and the PROFIBUS fieldbus system. It stands for maximum transparency, open IT communication, network security and real-time communication down to the field level. This makes PROFINET the basis for uniform automation network in the plant, into which existing fieldbuses implemented with PROFIBUS can be easily integrated.
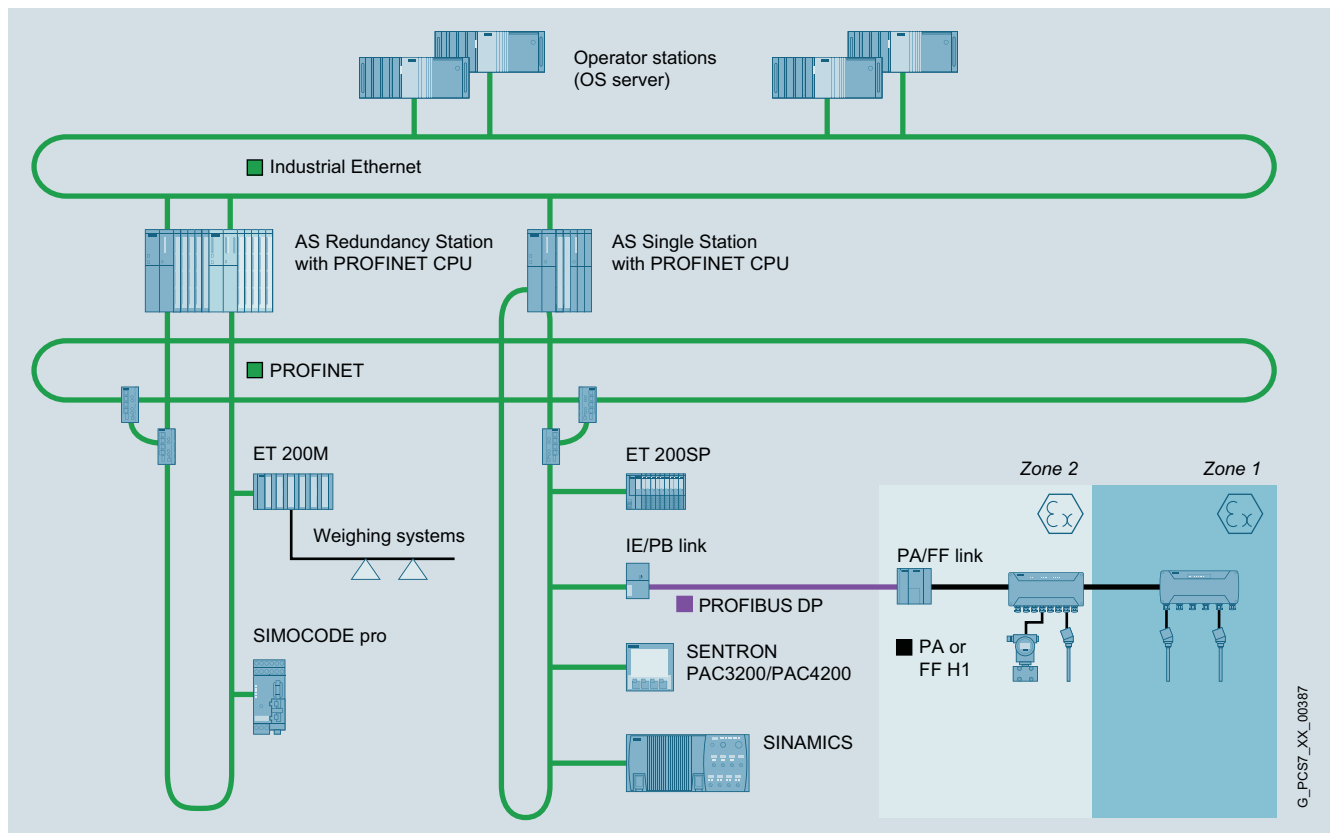
Example of PROFINET communication in the SIMATIC PCS 7 process control system

In the context of the SIMATIC PCS 7 process control system, PROFINET mainly focuses on communication between the automation systems (controllers) and the process I/O.

Communication
Introduction

■ **Design** (continued)

Fieldbus systems

PROFIBUS has become established as sturdy and reliable communications medium for connecting intelligent distributed I/O devices, transmitters and actuators to the controller level of the SIMATIC PCS 7 process control system. The universal, open fieldbus corresponds to the international standards IEC 61158 and IEC 61784.
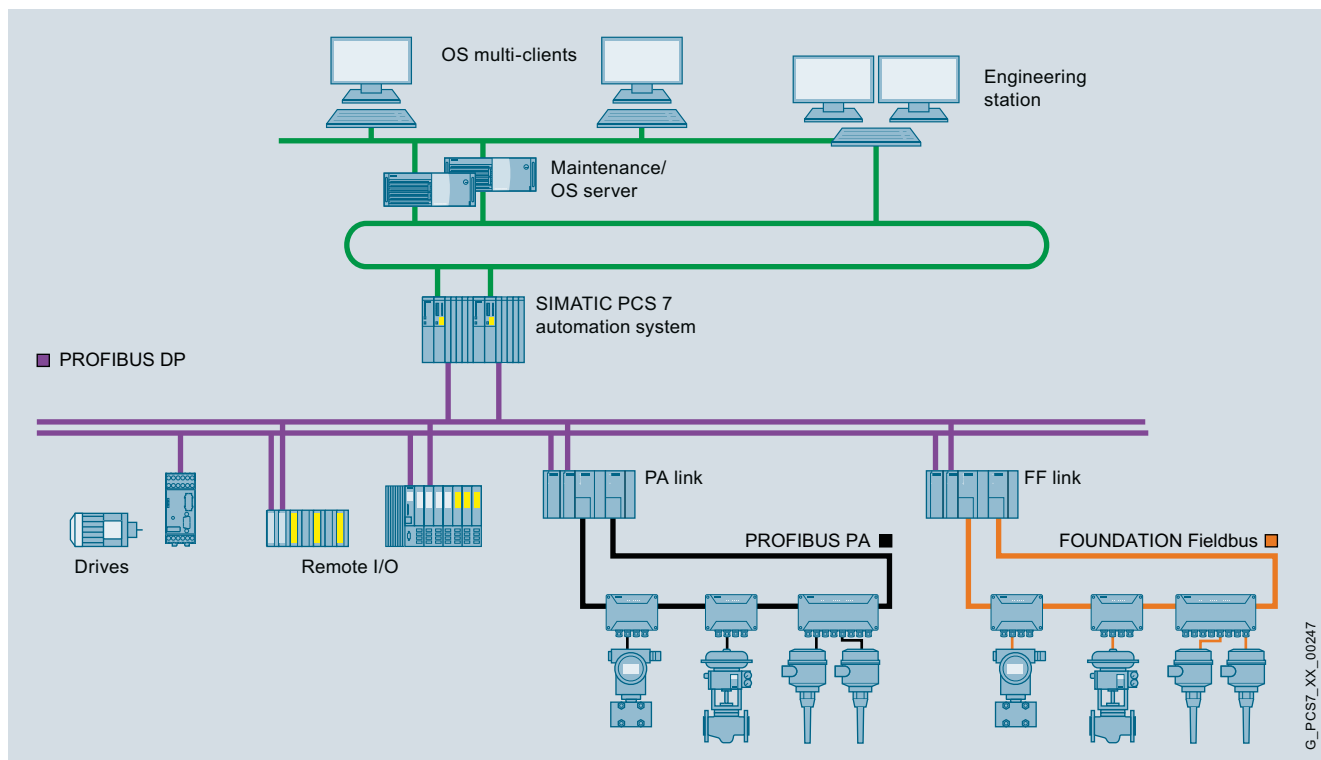
Integration of PROFIBUS PA and FOUNDATION Fieldbus H1

PROFIBUS DP

PROFIBUS DP is a system bus and simultaneously an open communications system, and it is designed for high data transmission rates and short response times. It is therefore optimally suitable for the control of the following devices:

- Directly connected field devices, e.g. drives, motor starters, analyzers, process controllers, or panels
- Distributed I/O devices such as the ET 200M, ET 200iSP, ET 200S or ET 200pro remote I/O stations
- Transmitters and actuators on a seamlessly integrated PROFIBUS PA fieldbus or FOUNDATION Fieldbus H1

Since it also supports the transmission of the HART protocol, HART field devices can also be integrated in a PROFIBUS DP communication network.

PROFIBUS PA and FOUNDATION Fieldbus H1

In addition to the direct connection of transmitters and actuators including power supply via the communication medium, the high information content of the communication as well as the diagnostics facilities are also of importance for the automation of industrial processes that frequently take place in corrosive, harmful, and hazardous environments.

Both the PROFIBUS PA fieldbus and the FOUNDATION Fieldbus H1 meet these requirements. Both are optimally suitable for directly integrating actuators and sensors in operating environments up to Ex zone 1/21 or 0/20 into the process system.

Their physical bus characteristics are based on the MBP transmission technology (Manchester Coded; Bus Powered) and are largely identical according to IEC 61158. Both fieldbuses can be integrated seamlessly in the SIMATIC PCS 7 process control system using PROFIBUS DP as link.

PROFIBUS PA and FOUNDATION Fieldbus H1 thus profit equally from the higher-level PROFIBUS architecture.

Overview
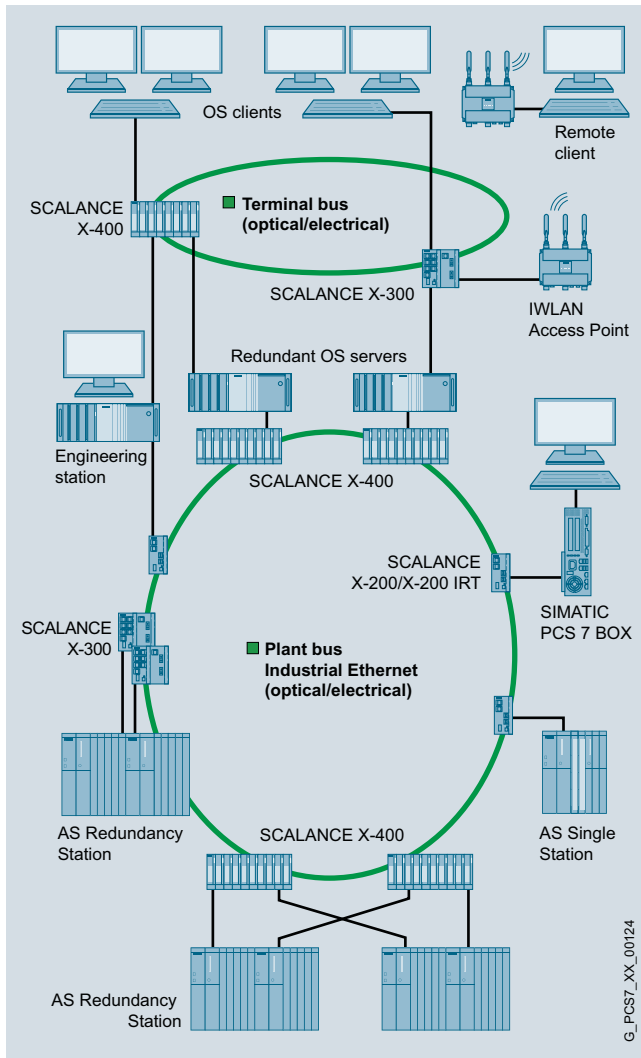
Industrial Ethernet, connection examples

The plant bus and the terminal bus for multi-user systems with client/server architecture are implemented with Industrial Ethernet, a powerful area and cell network for industrial applications in line with the international IEEE 802.3 standard (Ethernet). Bus structures with optical rings are particularly suitable for this because of their high noise immunity and high availability.

In medium-sized and large plants characterized by high requirements, SIMATIC PCS 7 applies modern Gigabit and FastEthernet technology. This combines the high reliability of optical rings with the scalable performance of switching technology and high transmission rates up to 1 Gbps.
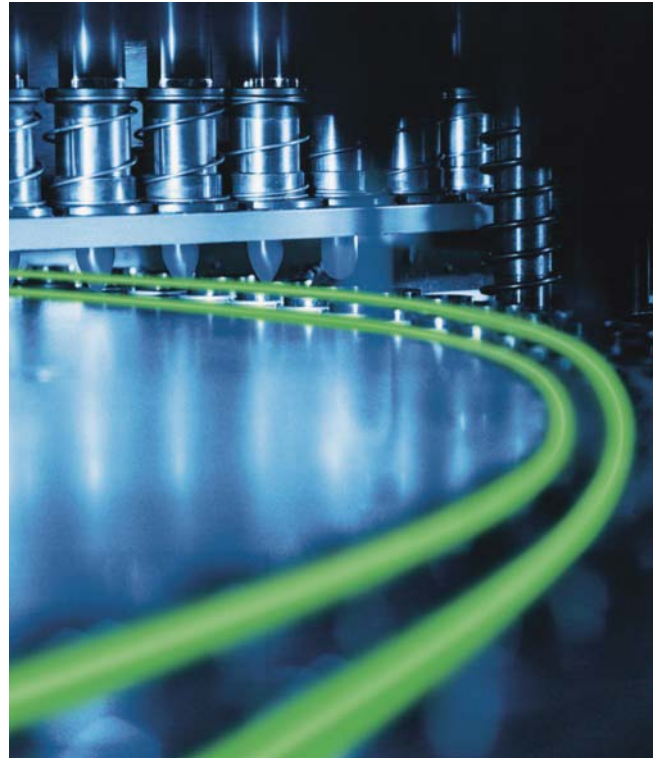
Benefits

Ethernet presently has a market share of over 80 % with a tendency to rise further, thus placing it in pole position in the global LAN landscape. Ethernet offers important characteristics that can give you significant advantages for your application:

- Fast commissioning through simple connections
- High flexibility since existing networks can be extended without any adverse effects
- High availability thanks to redundant network topologies
- Almost unlimited communications performance because scalable performance is available through switching technology if required
- Networking of different application areas such the office and production areas
- Investment security through continuous compatible further development
- Plant-wide clock system permits exact assignment of events within the complete plant

Ethernet technology for industrial environment

With Industrial Ethernet, SIMATIC NET expands the Ethernet technology by future-oriented network components with special properties and capabilities for use in industrial environments, e.g.:

- Rugged design, suitable for harsh industrial environments
- Fast local assembly using the FastConnect cabling system with RJ45 technology
- High fault tolerance through redundancy and fast switchover to redundant system (max. 300 ms)
- Continuous monitoring of network components through a simple yet effective signaling concept

10

Communication
Industrial Ethernet

Technical specifications

Plant bus / terminal bus	Industrial Ethernet
Number of stations	1 023 per network segment (IEEE 802.3 standard)
Number of switches	Up to 50
Length of the network	
Local network	Electrical up to approx. 5 km Optical up to approx. 150 km
WAN	Worldwide with TCP/IP
Topology	Line, tree, ring, star

Design

The following Ethernet communications interfaces are used in the various SIMATIC PCS 7 subsystems (ES, OS, AS etc.):

- Interfaces integrated onboard
- Simple network cards
- Special communication modules, e.g. CP 1613 A2, CP 1623, CP 1628

These are defined when selecting the respective system components depending on the requirements. For further information, see Section "System connection of PCS 7 systems", page 10/46.

The communication stations can be integrated in the terminal bus and the plant bus using Industrial Ethernet Switches of the SCALANCE X product family. These switches offer scalable performance at an attractive price and support a wide variety of configuration options.

Plant and terminal buses: Example configuration with two redundant rings

Terminal bus

Client-server and server-server communication is carried out on a dedicated Ethernet LAN. The communication network identified as terminal bus can be implemented with standard SIMATIC NET components such as switches, onboard interfaces, network cards, communications processors (CP), cables etc.

A ring design avoids communication failures if e.g. the line is damaged or opened at a particular point. To further increase the availability, it is also possible to distribute the communication over two redundant rings. Each PCS 7 station is connected to one of two Industrial Ethernet interfaces on both of the two separate rings. The SIMATIC NET SOFTNET-IE RNA communication software on the PCS 7 stations organizes communication processes based on the PRP. Non PRP-enabled devices that have only one Industrial Ethernet port, such as SICLOCK TC 400, can be integrated in the redundant terminal bus via SCALANCE X204RNA.

The **Parallel Redundancy Protocol (PRP)** according to IEC 62439-3 is based on double transmission of message frames over two separate networks (Ring 1, Ring 2). At the sender, the SOFTNET-IE RNA software or the SCALANCE X-200RNA network access point duplicates the message frame arriving from the sender and feeds one message frame to Ring 1 and the other to Ring 2. At the receiver, the software or the network access point forwards the first incoming message frame to the recipient. The second message frame from the second LAN is discarded. Transmission of the message frame is thus always ensured without delay even when an error occurs.

Industrial Ethernet plant bus

The automation systems (AS) communicate with one another and with the engineering system and operator systems (servers/single stations) over the Industrial Ethernet plant bus. This can be designed analogous to the terminal bus with standard SIMATIC NET components such as switches, network cards, communications processors (CP), cables etc. In the case of small plants with up to 8 standard automation systems per operator system, single stations and servers can be operated cost-effectively on the plant bus using "Basic Communication Ethernet" (BCE) and a FastEthernet network card. The CP 1613 A2/CP 1623/CP 1628 communication module is always required if more than 8 automation systems or redundant automation systems are used.

As far as availability is concerned, ring topologies are always the first choice for the plant bus. With particularly high availability requirements, the plant bus can also be configured as a redundant double ring (two CPs per AS CPU and OS server). Double faults such as a switch failure on ring 1 with a simultaneous interruption in the bus cable on ring 2 can then be tolerated. The two rings in such a configuration are physically separated. The coupling partners are linked together logically when configuring with NetPro over a fault-tolerant S7 connection (4-way redundancy). One switch each takes over the function of the redundancy manager for each ring. The current switches of the SCALANCE X-400, X-300, X-200 IRT and X-200 ranges can be used as the redundancy manager in a ring.

Note:

Detailed information on Industrial Ethernet and on the network components can be found in Catalog IK PI, in the Industry Mall, or in Catalog CA 01 under "Industrial Communication".
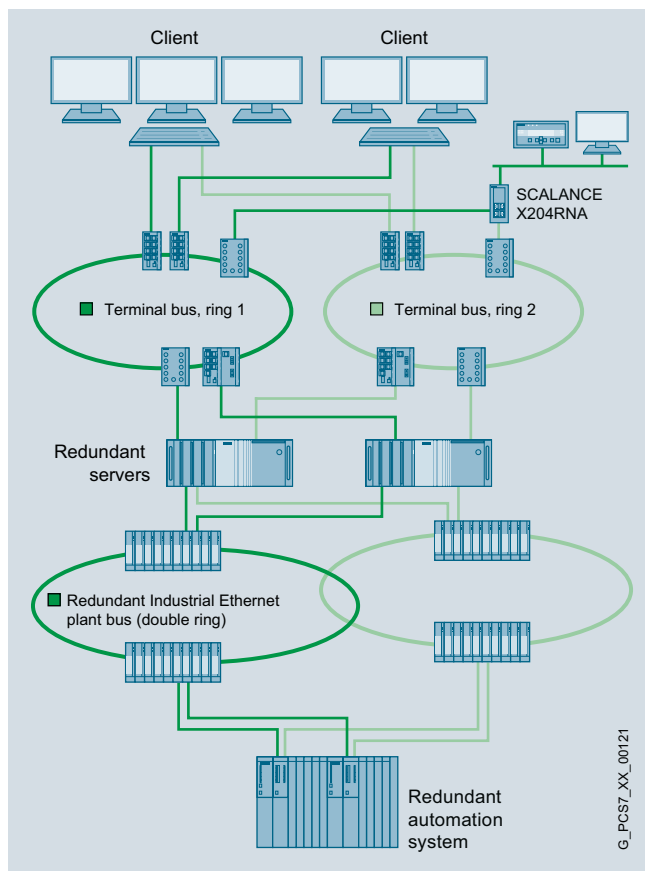
Overview

Switches are active network components that specifically distribute data to the relevant addressees. SCALANCE X is the modern range of Industrial Ethernet switches from SIMATIC NET. The SCALANCE X family comprises product lines that complement each other and are carefully tuned to the specific automation task.

Design

In the context of SIMATIC PCS 7, switches from the following SCALANCE X product lines can be used:

- SCALANCE X-000
- SCALANCE X-100
- SCALANCE X-200
- SCALANCE X-200 IRT
- SCALANCE X-300
- SCALANCE X-400/XM-400
- SCALANCE X-500

These product lines are specifically suited for electrical and/or optical networks based on linear, star and ring topologies.

They are characterized by the fact that the number of ports, modularity, flexibility and functionality increase with increasing numbers.

The designs of the switches differ not only among individual product lines, but also within a product line, for example:

- Compact design or flat design in the ET 200S format for X-200 and X-200 IRT
- Compact design or rack design for X-300

		Application areas / type of network / requirements	Office incorporation	Plant networking	Industry-related applications	Energy generation and distribution	Wind energy plants	Machine building and plant engineering	Plant subnetworking	High-volume machine building	Internal machine networking
X-500		High-performance backbone networks with very high emphasis on functionality/port density/availability and interface to IT network	●	●	●						
X-400/XM-400		High-performance plant network with high emphasis on functionality and availability	●	●	●						
X-300		Large networks with high emphasis on functionality and availability		●							
	X-300EEC/ XR-300EEC					●	●				
X-200		Networks with higher emphasis on functionality and availability						●	●		
	X204RNA			●					●		
	X204RNA EEC			●		●	●				
X-100		Networks with low emphasis on functionality						●		●	
X-000		Networks with low emphasis on functionality and robustness								●	●
		● applies									

Industrial Ethernet Switches SCALANCE X: Areas of application

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Communication
Industrial Ethernet

SCALANCE X Switches Product Overview

■ **Design** (continued)

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

● applies   1) with Gigabit version   2) with IRT version

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Industrial Ethernet Switches SCALANCE X: Function overview

■ **More information**

The following catalog sections provide you with information and ordering data for the individual SCALANCE X product lines.

For detailed information and technical specifications of the SCALANCE X Industrial Ethernet switches, see Catalog IK PI, section "PROFINET/Industrial Ethernet", subsection "Industrial Ethernet switches/media converters".

The SIMATIC NET Selection Tool provides you with support for selecting the right Industrial Ethernet switches as well as during configuration of the modular versions:

Online version:
www.siemens.com/snst

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

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Overview

SCALANCE XB004-1

The Industrial Ethernet SCALANCE X-000 switches that can be used in small SIMATIC PCS 7 plants are suitable for setting up low-cost line or star topologies with switching functionality.

Special features

- Box design
- LED diagnostics (power, port status, data traffic)
- Electrical ports with auto-crossover function

Product range for SIMATIC PCS 7

SCALANCE XB004-1

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

Design

The box enclosure type is designed for space-saving installation on a standard DIN rail in the control cabinet. Wall mounting is possible.

Boundary conditions for network configuration

- Length of the TP cable between two switches
  - max. 10 m via patch cables with TP Cord
  - Max. 100 m with Industrial Ethernet FastConnect products
- Length of the optical cables max. 5 km with Industrial Ethernet multi-mode FO cables

Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE X-000 for 10/100 Mbps, including operating instructions and Industrial Ethernet network manual on CD-ROM	
• **SCALANCE XB004-1** 4 x 10/100 Mbps RJ45 ports electrical 1x 100 Mbps SC port optical (multi-mode, glass), up to 5 km	6GK5004-1BD00-1AB2
Accessories	
IE TP Cord RJ45/RJ45 TP cable 4 x 2 with 2 RJ45 connectors	
• 0.5 m	6XV1870-3QE50
• 1 m	6XV1870-3QH10
• 2 m	6XV1870-3QH20
• 6 m	6XV1870-3QH60
• 10 m	6XV1870-3QN10
FO Standard Cable GP 50/125/1400[1][2] Multi-mode cable, sold by the meter max. length 1 000 m; minimum order 20 m	6XV1873-2A
SITOP compact 24 V/0.6 A 1-phase power supply with wide-range input 85 ... 264 V AC/ 110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	6EP1331-5BA00

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

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

More information

For detailed information and technical specifications on Industrial Ethernet switches and accessories (for example, cable material and connectors), as well as information about tools and materials for assembly, see Catalog IK PI.

Selection tools

The following tools will support you during the selection and configuration of Industrial Ethernet switches:

SIMATIC NET Selection Tool

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

TIA Selection Tool

www.siemens.com/tia-selection-tool

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Communication
Industrial Ethernet

SCALANCE X-100 Switches

Overview

SCALANCE X104-2

The SCALANCE X-100 Industrial Ethernet switches can be used to set up low-cost line or star topologies with switching functionality.

Special features

- Rugged compact enclosure (S7-300 format)
- LED diagnostics (power, port status, data traffic)
- Signaling contact can be configured locally using SET button
- Local display (SET button)
- Redundant power supply (2 x 24 V DC)
- Electrical ports with auto-crossover function

Product range for SIMATIC PCS 7

SCALANCE X104-2

- 4 x 10/100 Mbps RJ45 ports, electrical
- 2 x 100 Mbps BFOC ports, optical (multi-mode, glass), up to 5 km

Design

The rugged metal housing is designed for space-saving installation on a standard DIN rail or an S7-300 mounting rail in control cabinets. Direct wall mounting in various positions is also possible.

Boundary conditions for network configuration

- Length of the TP cable between two switches
  - Max. 100 m with Industrial Ethernet FastConnect products
- Length of the optical cables max. 5 km with Industrial Ethernet multi-mode FO cables

Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE X-100 for 10/100 Mbps, including operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
• SCALANCE X104-2 4 x 10/100 Mbps RJ45 ports, electrical 2 x BFOC ports, optical (multi-mode, glass) up to 5 km	6GK5104-2BB00-2AA3
Accessories	
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-wire, shielded TP installation cable for connecting to IE FC RJ45 outlet/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	6XV1840-2AH10
FO Standard Cable GP 50/125/1400[1][2) Multi-mode cable, sold by the meter; max. length 1 000 m; minimum order 20 m	6XV1873-2A
FC FO Standard Cable GP 62.5/200/230 FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter, max. length 1 000 m, minimum order 20 m	6XV1847-2A
IE FC RJ45 plug 180 2 x 2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	6GK1901-1BB10-2AA0
• 1 pack = 10 units	6GK1901-1BB10-2AB0
• 1 pack = 50 units	6GK1901-1BB10-2AE0
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	6GK1900-1GB00-0AC0
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	6GK1900-1GL00-0AA0
SITOP compact 24 V/0.6 A 1-phase power supply with wide-range input 85 ... 264 V AC/ 110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	6EP1331-5BA00

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

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

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Overview

SCALANCE X-200 switches in compact design

You can implement line and star topologies with the switches of the SCALANCE X-200 product line; it is also possible to implement low-cost electrical or optical ring topologies with transmission rates up to 100 Mbps.

The switches are available in two designs:

• Compact design X-200
  Rugged compact enclosure with
  - IP30 degree of protection, for installation in control cabinets
  - IP65 degree of protection, for installation outside control cabinets (X208PRO)
• Flat design XF200
  Flat enclosure in ET 200S format, IP20 degree of protection, for installation in control cabinets or small control boxes

Product range for SIMATIC PCS 7

Compact design

Switches with electrical ports for TP cables up to 100 M max. for line, star or ring topologies:

• SCALANCE X208
  - 8 electrical RJ45 ports (10/100BaseTX)
• SCALANCE X208PRO (for use outside the control cabinet)
  - 8 electrical M12 ports (10/100BaseTX)
• SCALANCE X216
  - 16 electrical RJ45 ports (10/100BaseTX)
• SCALANCE X224
  - 24 electrical RJ45 ports (10/100BaseTX)

Switches with electrical ports for TP cables up to 100 m max. and optical ports for glass multi-mode FOC up to 5 km:

• SCALANCE X204-2 for optical line or ring topologies
  - 4 electrical RJ45 ports (10/100BaseTX)
  - 2 optical BFOC ports (100BaseFX) for glass multi-mode FOC
• SCALANCE X206-1 for star topologies as well as for line or ring topologies with electrical and optical transmission paths
  - 6 electrical RJ45 ports (10/100BaseTX)
  - 1 optical BFOC port (100BaseFX) for glass multi-mode FOC
• SCALANCE X212-2 for optical line or ring topologies
  - 12 electrical RJ45 ports (10/100BaseTX)
  - 2 optical BFOC ports (100BaseFX) for glass multi-mode FOC

Switches with electrical ports for TP cables up to 100 m max. and optical ports for glass single-mode FOC up to 26 km:

• SCALANCE X204-2LD for optical line or ring topologies
  - 4 electrical RJ45 ports (10/100BaseTX)
  - 2 optical BFOC ports (100BaseFX) for glass single-mode FOC
• SCALANCE X206-1LD for star topologies as well as for line or ring topologies with electrical and optical transmission paths
  - 6 electrical RJ45 ports (10/100BaseTX)
  - 1 optical BFOC port (100BaseFX) for glass single-mode FOC
• SCALANCE X212-2LD for optical line or ring topologies
  - 12 electrical RJ45 ports (10/100BaseTX)
  - 2 optical BFOC ports (100BaseFX) for glass single-mode FOC

Flat design
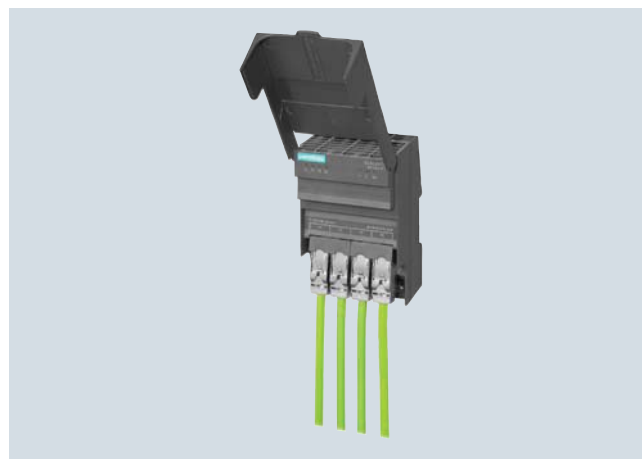
Switches with electrical ports for TP cables up to 100 M max. for line, star or ring topologies

• SCALANCE XF204
  - 4 electrical RJ45 ports (10/100BaseTX)
• SCALANCE XF208
  - 8 electrical RJ45 ports (10/100BaseTX)

Switches with electrical ports for TP cables up to 100 m max. and optical ports for glass multi-mode FOC up to 5 km

• SCALANCE XF204-2 for optical line or ring topologies
  - 4 electrical RJ45 ports (10/100BaseTX)
  - 2 optical BFOC ports (100BaseFX) for glass multi-mode FOC
• SCALANCE XF206-1 for star topologies as well as for line or ring topologies with electrical and optical transmission paths
  - 6 electrical RJ45 ports (10/100BaseTX)
  - 1 optical BFOC port (100BaseFX) for glass multi-mode FOC

Note:

Ordering data and information about the product versions SCALANCE X204RNA and SCALANCE X204RNA EEC for integration of non-PRP-enabled devices on a redundant terminal bus is available in the catalog section "System Connection of PCS 7 Systems", page 10/46.

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Communication
Industrial Ethernet

SCALANCE X-200 Switches

■ **Overview** (continued)

Special features

SCALANCE X-200 / Type of device	Hardware																	
	Connection to S7 backplane bus	Format module S7	PC module	Flat type of construction	Box type of construction	19" type of construction	Rugged, compact housing	Modular design	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 x 24 V DC)	External supply for integrated switch	Signal contact	Local display (SET pushbutton)	C-PLUG slot
X204-2							•					•	•	•		•	•	•
X204-2LD							•					•	•	•		•	•	•
X206-1							•					•	•	•		•	•	•
X206-1LD							•					•	•	•		•	•	•
X208							•					•	•	•		•	•	•
X208PRO							•					•	•	•		•	•	•
X212-2							•					•	•	•		•	•	•
X212-2LD							•					•	•	•		•	•	•
X216							•					•	•	•		•	•	•
X224							•					•	•	•		•	•	•
XF204				•								•	•	•		•	•	•
XF204-2				•								•	•	•		•	•	•
XF206-1				•								•	•	•		•	•	•
XF208				•								•	•	•		•	•	•

• applies

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SCALANCE X-200 features, hardware

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Overview (continued)

SCALANCE X-200 / Type of device	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface/Telnet	Web based Management	Configuration with STEP 7	SNMP	Ring redundancy incl. RM-functionality	Standby redundancy	IRT capability	VLAN (Virtual Local Area Network)	GVRP (Generic VLAN Registration Protocol)	STP/RSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol)	Passive Listening	IGMP Snooping/Querier (Internet Group Management Protocol)	GMRP (Generic Multicast Protocol)	Broadcast/Multicast/Unicast Limiter	Broadcast blocking	DHCP Option 82 (Dynamic Host Configuration Protocol)	IP Access List	Access Control List (MAC)	IEEE 802.1x (Radius)	Link Aggregation	Static Routing	RIPv2 (Dynamic Routing)	OSPFv2 (Dynamic Routing)	VRRP, Router Redundancy (Virtual Router Redundancy Protocol)
X204-2		•	•	•	•	•	•	•						•													
X204-2LD		•	•	•	•	•	•	•						•													
X206-1		•	•	•	•	•	•	•						•													
X206-1LD		•	•	•	•	•	•	•						•													
X208		•	•	•	•	•	•	•						•													
X208PRO					•	•	•																				
X212-2		•	•	•	•	•	•	•						•													
X212-2LD		•	•	•	•	•	•	•						•													
X216		•	•	•	•	•	•	•						•													
X224		•	•	•	•	•	•	•						•													
XF204		•	•	•	•	•	•	•						•													
XF204-2		•	•	•	•	•	•	•						•													
XF206-1		•	•	•	•	•	•	•						•													
XF208		•	•	•	•	•	•	•						•													

• applies

SCALANCE X-200 features, software

Design

Installation can performed on a standard DIN rail, on an S7-300 mounting rail or directly on the wall. The electrical ports support auto-crossover.

Boundary conditions for network configuration

- Length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with Industrial Ethernet FastConnect products (IE FC cable and IE FC RJ45 plug 180/IE FC M12 plug PRO)
  - Max. 10 m using patches with TP cord
- Length of the optical cables
  - Max. 5 km with Industrial Ethernet glass fiber-optic cables (multi-mode)
  - Max. 26 km with Industrial Ethernet glass fiber-optic cables (single-mode)

Summary of interfaces

Module type	Type and number of ports		
	Fast Ethernet 100 Mbps		
	Electrical (TP)		Optical (glass FOC)
	RJ45	M12	BFOC (ST socket)
X204-2	4	–	2 (multimode)
X204-2LD	4	–	2 (single-mode)
X206-1	6	–	1 (multimode)
X206-1LD	6	–	1 (single-mode)
X208	8	–	–
X208PRO	–	8	–
X212-2	12	–	2 (multimode)
X212-2LD	12	–	2 (single-mode)
X216	16	–	–
X224	24	–	–
XF204	4	–	–
XF204-2	4	–	2 (multimode)
XF206-1	6	–	1 (multimode)
XF208	8	–	–

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Communication
Industrial Ethernet

SCALANCE X-200 Switches

■ **Ordering data**   Article No.   Article No.

Description	Article No.
Industrial Ethernet Switches SCALANCE X-200 for 10/100 Mbps, including operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM	
Compact design	
With electrical ports	
SCALANCE X208 8 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5208-0BA10-2AA3
SCALANCE X208PRO 8 x 10/100 Mbps M12 ports (10/100BaseTX), including 11 x M12 dust covers, IP65 degree of protection	6GK5208-0HA10-2AA6
SCALANCE X216 16 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5216-0BA00-2AA3
SCALANCE X224 24 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5224-0BA00-2AA3
With electrical ports and optical ports for glass multi-mode FOC up to max. 5 km	
SCALANCE X204-2 4 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5204-2BB10-2AA3
SCALANCE X206-1 6 x 10/100 Mbps RJ45 ports (10/100BaseTX) 1 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5206-1BB10-2AA3
SCALANCE X212-2 12 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5212-2BB00-2AA3
With electrical ports and optical ports for glass single-mode FOC up to max. 26 km	
SCALANCE X204-2LD 4 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps single-mode BFOC ports (100BaseFX)	6GK5204-2BC10-2AA3
SCALANCE X206-1LD 6 x 10/100 Mbps RJ45 ports (10/100BaseTX) 1 x 100 Mbps single-mode BFOC ports (100BaseFX)	6GK5206-1BC10-2AA3
SCALANCE X212-2LD 12 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps single-mode BFOC ports (100BaseFX)	6GK5212-2BC00-2AA3

Description	Article No.
Flat design	
With electrical ports	
SCALANCE XF204 4 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5204-0BA00-2AF2
SCALANCE XF208 8 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5208-0BA00-2AF2
With electrical ports and optical ports for glass multi-mode FOC up to max. 5 km	
SCALANCE XF204-2 4 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5204-2BC00-2AF2
SCALANCE XF206-1 6 x 10/100 Mbps RJ45 ports (10/100BaseTX) 1 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5206-1BC00-2AF2
Accessories	
IE FC TP Standard Cable GP 2x2 (type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	6XV1840-2AH10
FO Standard Cable GP 50/125/1400[1][2] Multi-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1873-2A
FO Robust Cable GP 4E9/125/90[1][2] Single-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1843-2R
FC FO Standard Cable GP 62.5/200/230[1][2] FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1847-2A
IE FC RJ45 Plug 180 2x2 RJ45 plug connector for Industrial Ethernet with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	6GK1901-1BB10-2AA0
• 1 pack = 10 units	6GK1901-1BB10-2AB0
• 1 pack = 50 units	6GK1901-1BB10-2AE0

Ordering data

	Article No.
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	**6GK1900-1GB00-0AC0**
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors to FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	**6GK1900-1GL00-0AA0**
IE FC M12 Plug PRO M12 plug connector for connection of Industrial Ethernet FC installation cables; 4-pin, D-coded, metal enclosure, IP65 degree of protection, pin insert; 180° cable outlet; for network components and Industrial Ethernet nodes with IP65/IP67 degree of protection • 1 pack = 1 unit • 1 pack = 8 units	 **6GK1901-0DB20-6AA0** **6GK1901-0DB20-6AA8**
IE Connecting Cable M12-180/M12-180 Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two 4-pin M12 plugs, 4-pin, D-coded, IP65/IP67 degree of protection; Length: • 0.3 m • 0.5 m • 1.0 m • 1.5 m • 2.0 m • 3.0 m • 5.0 m • 10 m • 15 m	 **6XV1870-8AE30** **6XV1870-8AE50** **6XV1870-8AH10** **6XV1870-8AH15** **6XV1870-8AH20** **6XV1870-8AH30** **6XV1870-8AH50** **6XV1870-8AN10** **6XV1870-8AN15**
IE M12 Panel Feedthrough Control cabinet feedthrough for transition from 4-pin, D-coded M12 interface (IP65IP67) to RJ45 socket (IP20) • 1 pack = 5 units	 **6GK1901-0DM20-2AA5**

	Article No.
IE Power M12 Cable Connector PRO Socket for connecting SCALANCE W-700/SCALANCE X208PRO for 24 V DC supply voltage; 4-pin, A-coded, with installation instructions	**6GK1907-0DC10-6AA3**
Signaling Contact M12 Cable Connector PRO Socket for connecting SCALANCE X208PRO for signaling contact; 5-pin, B-coded, with installation instructions	**6GK1908-0DC10-6AA3**
SITOP compact 24 V/0.6 A 1-phase power supply with wide-range input 85 ... 264V AC/ 110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**
PS791-1PRO power supply AC/DC power supply, 10 W, IP65 (-20 to +60 °C) for SCALANCE X208PRO, input: 85 to 265 V AC, output: 24 V DC, metal housing, product package: AC power 3+PE cable connector, DC power cord M12, installation materials, manuals German/English	**6GK5791-1PS00-0AA6**
C-PLUG Removable medium for simple replacement of devices in event of fault; for saving of configuration and application data, can be used in SIMATIC NET products with C-PLUG slot	**6GK1900-0AB00**

[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

Note:

For further components and accessories, especially cable material and connectors as well as tools and supplementary material for assembly, refer to the sections "FastConnect", "ITP cables and connectors" and "Fiber-optic cables" (from page 10/40) as well as to Catalog IK PI.

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Communication
Industrial Ethernet

SCALANCE X-200 IRT Switches

■ **Overview**

SCALANCE X-200 IRT switches in compact design

You can implement line and star topologies with the switches of the SCALANCE X-200 IRT product line; it is also possible to implement low-cost electrical or optical ring topologies with transmission rates up to 100 Mbps.

The switches are available in two designs:

- Compact design X-200 IRT
  Rugged compact enclosure with
  - IP30 degree of protection, for installation in control cabinets
  - IP65/67 degree of protection, for installation outside control cabinets (PRO version)
- Flat design XF-200 IRT
  Flat enclosure in ET 200S format, IP20 degree of protection, for installation in control cabinets or small control boxes

Product range for SIMATIC PCS 7

Compact design

- SCALANCE X204 IRT
  - 4 electrical RJ45 ports (10/100BaseTX) for TP cables up to 100 m max.
- SCALANCE X204 IRT PRO (for use outside the control cabinet)
  - 4 electrical push-pull RJ45 ports (10/100BaseTX) for TP cables up to 100 m max.
- SCALANCE X202-2 IRT
  - 2 electrical RJ45 ports (10/100BaseTX) for TP cables up to 100 m max.
  - 2 optical BFOC ports (100BaseFX) for the connection of glass multi-mode FOC (up to 5 km)
- SCALANCE X202-2P IRT
  - 2 electrical RJ45 ports (10/100BaseTX) for TP cables up to 100 m max.
  - 2 optical SC RJ ports (100BaseFX) for the connection of Ethernet POF FOC (up to 50 m) and PCF FOC (up to 100 m) using SC RJ plug connectors
- SCALANCE X202-2P IRT PRO
  - 2 electrical push-pull RJ45 ports (10/100BaseTX) for TP cables up to 100 m max
  - 2 optical push-pull SC RJ ports (100BaseFX) for the connection of Ethernet POF FOC (up to 50 m) and PCF FOC (up to 100 m) using SC RJ Plug PRO connectors
- SCALANCE X201-3P IRT
  - 1 electrical RJ45 port (10/100BaseTX) for TP cables up to 100 m max
  - 3 optical SC RJ ports (100BaseFX) for the connection of Ethernet POF FOC (up to 50 m) and PCF FOC (up to 100 m) using SC RJ plug connectors
- SCALANCE X200-4P IRT
  - 4 optical SC RJ ports (100BaseFX) for the connection of Ethernet POF FOC (up to 50 m) and PCF FOC (up to 100 m) using SC RJ plug connectors

Flat design
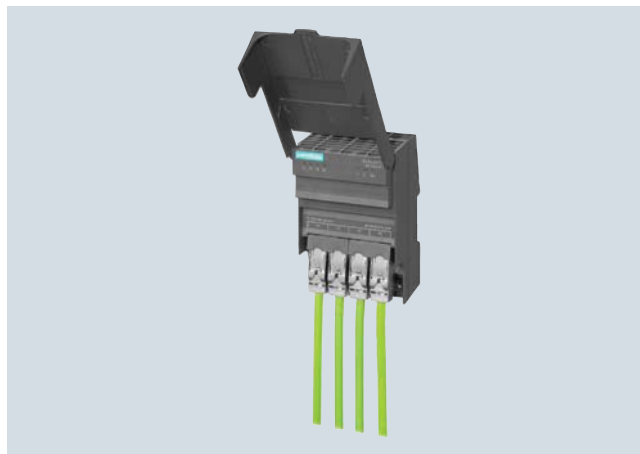
- SCALANCE XF204 IRT
  - 4 electrical RJ45 ports (10/100BaseTX) for TP cables up to 100 m max.

Overview (continued)

Special features

SCALANCE X-200IRT — Hardware

Type of device	Connection to S7 backplane bus	Format module S7	PC module	Flat type of construction	Box type of construction	19" type of construction	Rugged, compact housing	Modular design	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 x 24 V DC)	External supply for integrated switch	Signal contact	Local display (SET pushbutton)	C-PLUG slot
X200-4P IRT							•					•	•	•		•	•	•
X201-3P IRT							•					•	•	•		•	•	•
X202-2IRT							•					•	•	•		•	•	•
X202-2P IRT							•					•	•	•		•	•	•
X202-2P IRT PRO							•					•	•	•		•	•	•
X204IRT							•					•	•	•		•	•	•
X204IRT PRO							•					•	•	•		•	•	•
XF204IRT				•								•	•	•		•	•	•

• applies

SCALANCE X-200 IRT/XF-200 IRT features, hardware

G_PCS7_XX_00308

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SCALANCE X-200IRT — Software

Type of device	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface/Telnet	Web based Management	Configuration with STEP 7	SNMP	Ring redundancy incl. RM-functionality	Standby redundancy	IRT capability	VLAN (Virtual Local Area Network)	GVRP (Generic VLAN Registration Protocol)	STP/RSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol)	Passive Listening	IGMP Snooping/Querier (Internet Group Management Protocol)	GMRP (Generic Multicast Protocol)	Broadcast/Multicast/Unicast Limiter	Broadcast blocking	DHCP Option 82 (Dynamic Host Configuration Protocol)	IP Access List	Access Control List (MAC)	IEEE 802.1x (Radius)	Link Aggregation	Static Routing	RIPv2 (Dynamic Routing)	OSPFv2 (Dynamic Routing)	VRRP, Router Redundancy (Virtual Router Redundancy Protocol)
X200-4P IRT		•	•	•	•	•	•	•	•	•				•													
X201-3P IRT		•	•	•	•	•	•	•	•	•				•													
X202-2IRT		•	•	•	•	•	•	•	•	•				•													
X202-2P IRT		•	•	•	•	•	•	•	•	•				•													
X202-2P IRT PRO		•	•	•	•	•	•	•	•	•				•													
X204IRT		•	•	•	•	•	•	•	•	•				•													
X204IRT PRO		•	•	•	•	•	•	•	•	•				•													
XF204IRT		•	•	•	•	•	•	•	•	•				•													

• applies

SCALANCE X-200 IRT/XF-200 IRT features, software

G_PCS7_XX_00309

Communication
Industrial Ethernet

SCALANCE X-200 IRT Switches

■ Design

Installation can performed on a standard DIN rail, on an S7-300 mounting rail or directly on the wall. The electrical ports support auto-crossover.

Boundary conditions for network configuration

- Length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with Industrial Ethernet FastConnect products (IE FC cable and IE FC RJ45 plug 180/IE FC RJ45 plug PRO)
  - Max. 10 m using patches with TP cord
- Length of the optical cables
  - Max. 4 km with Industrial Ethernet glass FOC (62.5/125 µm)
  - Max. 5 km with Industrial Ethernet glass FOC (50/125 µm)
  - Max. 100 m with Industrial Ethernet PCF FOC
  - Max. 50 m with Industrial Ethernet POF FOC

Summary of interfaces

Module type	Type and number of ports				
	Fast Ethernet 100 Mbps				
	Electrical (TP)		Optical (FO)		
	RJ45	RJ45 push-pull	Plastic FO: (POF/PCF)		Glass fiber-optic cable
			SC RJ	SC RJ push-pull	BFOC (ST socket)
X200-4P IRT	–	–	4	–	–
X201-3P IRT	1	–	3	–	–
X202-2 IRT	2	–	–	–	2 (multimode)
X202-2P IRT	2	–	2	–	–
X202-2P IRT PRO	–	2	–	2	–
X204 IRT	4	–	–	–	–
X204 IRT PRO	–	4	–	–	–
XF204 IRT	4	–	–	–	–

■ Ordering data

	Article No.		Article No.
Industrial Ethernet Switches SCALANCE X-200 IRT for 10/100 Mbps, including operating instructions, Industrial Ethernet network manual and configuration software on CD-ROM		**Accessories**	
Compact design		**IE FC TP Standard Cable GP 2 x 2 (Type A)** 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter, max. length 1 000 m, minimum order 20 m	6XV1840-2AH10
SCALANCE X204 IRT 4 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5204-0BA00-2BA3		
SCALANCE X204 IRT PRO 4 x 10/100 Mbps RJ45 push-pull ports (10/100BaseTX)	6GK5204-0JA00-2BA6	**FO Standard Cable GP 50/125/1400**[1)][2)] Multi-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1873-2A
SCALANCE X202-2 IRT 2 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps multi-mode BFOC ports (100BaseFX)	6GK5202-2BB00-2BA3	**POF Standard Cable GP 980/1000** POF standard cable for fixed routing indoors with PVC sheath; sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1874-2A
SCALANCE X202-2P IRT 2 x 10/100 Mbps RJ45 ports (10/100BaseTX) 2 x 100 Mbps POF/PCF SC RJ ports (100BaseFX)	6GK5202-2BH00-2BA3	**PCF Standard Cable GP 200/230** Standard cable, may be split, sold by the meter, max. quantity 1 000 m; minimum order 20 m	6XV1861-2A
SCALANCE X202-2P IRT PRO 2 x 10/100 Mbps RJ45 push-pull ports (10/100BaseTX) 2 x 100 Mbps POF/PCF SC RJ push-pull ports (100BaseFX)	6GK5202-2JR00-2BA6	**IE FC RJ45 Plug 180 2 x 2** RJ45 plug connector for Industrial Ethernet with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
SCALANCE X201-3P IRT 1 x 10/100 Mbps RJ45 port (10/100BaseTX) 3 x 100 Mbps POF/PCF SC RJ ports (100BaseFX)	6GK5201-3BH00-2BA3	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
SCALANCE X200-4P IRT 4 x 100 Mbps POF/PCF SC RJ ports (100BaseFX)	6GK5200-4AH00-2BA3		
Flat design			
SCALANCE XF204 IRT 4 x 10/100 Mbps RJ45 ports (10/100BaseTX)	6GK5204-0BA00-2BF2		

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Ordering data

	Article No.		Article No.
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00	**Power Plug PRO** 1 plug (IP65/67) for on-site assembly (5-core)	6GK1907-0AB10-6AA0
IE FC RJ45 Plug PRO Field assembly FastConnect RJ45 plug connector; plastic housing, insulation/displacement technology, for SCALANCE X-200IRT PRO switches and SIMATIC ET 200pro; 1 connector (IP65/67) suitable for on-site assembly	6GK1901-1BB20-6AA0	**SITOP compact 24 V/0.6 A** 1-phase power supply with wide-range input 85 ... 264V AC/ 110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	6EP1331-5BA00
SC RJ POF Plug 20 plugs for on-site assembly	6GK1900-0MB00-0AC0	**C-PLUG** Removable medium for simple replacement of devices in event of fault; for saving of configuration and application data, can be used in SIMATIC NET products with C-PLUG slot	6GK1900-0AB00
SC RJ POF Plug PRO 1 plug (IP65/67) for on-site assembly	6GK1900-0MB00-6AA0		
SC RJ PCF Plug 10 plugs for on-site assembly	6GK1900-0NB00-0AC0		
SC RJ PCF Plug PRO 1 plug (IP65/67) for on-site assembly	6GK1900-0NB00-6AA0		
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors to FC FO standard cable; comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	6GK1900-1GL00-0AA0		
Termination Kit SC RJ POF Plug Assembly case for on-site assembly of SC RJ POF connectors; consisting of stripping tool, Kevlar cutters, SC RJ grinding plate, grinding paper, grinding base and microscope	6GK1900-0ML00-0AA0		
Termination Kit SC RJ PCF Plug Assembly case for on-site assembly of SC RJ PCF connectors, comprising a stripping tool, buffer stripping tool, Kevlar cutters, fiber breaking tool and microscope	6GK1900-0NL00-0AA0		

[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

Note:

For further components and accessories, especially cable material and connectors as well as tools and supplementary material for assembly, refer to the sections "FastConnect", "ITP cables and connectors" and "Fiber-optic cables" (from page 10/40) as well as to Catalog IK PI.

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Communication
Industrial Ethernet

SCALANCE X-300 Switches

■ Overview

Switches of the SCALANCE X-300 product line with compact design, standard version

Electrical and/or optical line, star or ring topologies can be implemented with the switches of the SCALANCE X-300 product line. Switches with Fast Ethernet and/or Gigabit Ethernet ports are available for this purpose.

The switches of the SCALANCE X-300 product line are available in different designs:

- Compact design
  - Standard version X-300
  - Partially modular version X-300 M

- Rack design: Modular rack for installation in 19" control cabinets
  - Standard version XR-300 M
  - PoE version XR-300 M PoE (Power over Ethernet)
  - EEC version XR-300 M EEC (Enhanced Environmental Conditions)

Product range for SIMATIC PCS 7

Compact design, standard version

Fast and Gigabit Ethernet ports

- SCALANCE X310
  - 3 electrical Gigabit Ethernet RJ45 ports (1000BaseTX)
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

- SCALANCE X308-2
  - 2 optical Gigabit Ethernet SC ports for glass multi-mode FOC (1000BaseSX) up to 750 m
  - 1 electrical Gigabit Ethernet RJ45 port (1000BaseTX)
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

- SCALANCE X308-2LD
  - 2 optical Gigabit Ethernet SC ports for glass single-mode FOC (1000BaseLX) up to 10 km
  - 1 electrical Gigabit Ethernet RJ45 port (1000BaseTX)
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

- SCALANCE X308-2LH
  - 2 optical Gigabit Ethernet SC ports for glass single-mode FOC (1000BaseLX) up to 40 km
  - 1 electrical Gigabit Ethernet RJ45 port (1000BaseTX)
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

- SCALANCE X308-2LH+
  - 2 optical Gigabit Ethernet SC ports for glass single-mode FOC (1000BaseLX) up to 70 km
  - 1 electrical Gigabit Ethernet RJ45 port (1000BaseTX)
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

- SCALANCE X307-3
  - 3 optical Gigabit Ethernet SC ports for glass multi-mode FOC (1000BaseSX) up to 750 m
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)
- SCALANCE X307-3LD
  - 3 optical Gigabit Ethernet SC ports for glass single-mode FOC (1000BaseLX) up to 10 km
  - 7 electrical Fast Ethernet RJ45 ports (10/100BaseTX)

Fast Ethernet ports

- SCALANCE X310FE
  - 10 electrical Fast Ethernet RJ45 ports (10/100BaseTX)
- SCALANCE X306-1LD FE
  - 6 electrical Fast Ethernet RJ45 ports (10/100BaseTX)
  - 1 optical Fast Ethernet SC port (100BaseFX) for glass single-mode FOC up to 26 km
- SCALANCE X320-1FE
  - 20 electrical Fast Ethernet RJ45 ports (10/100BaseTX)
  - 1 optical Fast Ethernet SC port (100BaseFX) for glass multi-mode FOC up to 5 km
- SCALANCE X320-3LD FE
  - 20 electrical Fast Ethernet RJ45 ports (10/100BaseTX)
  - 1 optical Fast Ethernet SC port (100BaseFX) for glass multi-mode FOC up to 5 km
  - 2 optical Fast Ethernet SC ports (100BaseFX) for glass single-mode FOC up to 26 km

Compact design, semi-modular version

Gigabit Ethernet ports

- SCALANCE X308-2M
  - 4 electrical Gigabit Ethernet RJ45 ports (1000BaseTX)
  - 2 slots for 2-port media modules 10/100/1000 Mbps, electrical or optical

SCALANCE X308-2M

Rack design, standard version

- SCALANCE XR324-12M (power supply connection and data cable outlet at front/back)
  with power supply unit 1×24 V DC or 1×110 to 230 V AC
  - 12 slots for 2-port media modules 10/100/1000 Mbps, electrical or optical

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Overview (continued)

SCALANCE XR324-12M

Rack design, PoE version

- SCALANCE XR324-4M PoE (power supply connection and data cable outlet at front/back)
  with power supply unit 1 × 24 V DC
  - 16 electrical Gigabit Ethernet RJ45 ports (1000BaseTX)
  - 4 slots for 2-port media modules 10/100/1000 Mbps, electrical or optical

SCALANCE XR324-4M PoE

Rack design, EEC version

- SCALANCE XR324-4M EEC (data cable outlet at front/back) with 24 V DC power supply or 100 to 240 V AC / 60 to 250 V DC, each single (1 ×) or redundant (2 ×)
  - 16 electrical Gigabit Ethernet RJ45 ports (1000BaseTX)
  - 4 slots for 2-port media modules 10/100/1000 Mbps, electrical or optical

Special features

SCALANCE X-300 Type of device	Hardware																	
	Connection to S7 backplane bus	Format module S7	PC module	Flat type of construction	Box type of construction	19" type of construction	Rugged, compact housing	Modular design	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 × 24 V DC)	External supply for integrated switch	Signal contact	Local display (SET pushbutton)	C-PLUG slot
X306-1LD FE							•					•	•	•		•	•	•
X307-3							•			•		•	•	•		•	•	•
X307-3LD							•			•		•	•	•		•	•	•
X308-2							•			•		•	•	•		•	•	•
X308-2LD							•			•		•	•	•		•	•	•
X308-2LH							•			•		•	•	•		•	•	•
X308-2LH+							•			•		•	•	•		•	•	•
X308-2M							•	•		•		•	•	•		•	•	•
X310							•			•		•	•	•		•	•	•
X310FE							•					•	•	•		•	•	•
X320-1FE							•					•	•	•		•	•	•
X320-3LD FE							•					•	•	•		•	•	•
XR324-12M						•		•		•		•	•	•		•	•	•
XR324-4M PoE						•		•		•	•	•	•	•		•	•	•
XR324-4M EEC						•		•		•		•	•	•		•	•	•

• applies

SCALANCE X-300 features, hardware

Communication
Industrial Ethernet

SCALANCE X-300 Switches

Overview (continued)

SCALANCE X-300 / Type of device	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface/Telnet	Web based Management	Configuration with STEP 7	SNMP	Ring redundancy incl. RM-functionality	Standby redundancy	IRT capability	VLAN (Virtual Local Area Network)	GVRP (Generic VLAN Registration Protocol)	STP/RSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol)	Passive Listening	IGMP Snooping/Querier (Internet Group Management Protocol)	GMRP (Generic Multicast Protocol)	Broadcast/Multicast/Unicast Limiter	Broadcast blocking	DHCP Option 82 (Dynamic Host Configuration Protocol)	IP Access List	Access Control List (MAC)	IEEE 802.1x (Radius)	Link Aggregation	Static Routing	RIPv2 (Dynamic Routing)	OSPFv2 (Dynamic Routing)	VRRP, Router Redundancy (Virtual Router Redundancy Protocol)
X306-1LD FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X307-3		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X307-3LD		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X308-2		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X308-2LD		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X308-2LH		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X308-2LH+		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X308-2M		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X310		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X310FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X320-1FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
X320-3LD FE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
XR324-12M		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
XR324-4M PoE		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•				
XR324-4M EEC		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•		•	•	•				

• applies

SCALANCE X-300 features, software

G_PCS7_XX_00307

■ **Design**

Summary of interfaces

Module type	Integrated ports, type and number				Number of media module ports (Port types, see table Overview of media modules)
	Gigabit Ethernet 1000 Mbps		Fast Ethernet 100 Mbps		
	Electrical (TP)	Optical (FO)	Electrical (TP)	Optical (FO)	
	RJ45 socket	SC socket	RJ45 socket	SC socket	
X-300 compact design					
X320-1FE	–	–	20	1 (multi-mode) for up to 5 km	–
X320-3LD FE	–	–	20	1 (multi-mode) for up to 5 km and 2 (single-mode) for up to 26 km	–
X310	3	–	7	–	–
X310FE	–	–	10	–	–
X308-2	1	2 (multi-mode) for up to 750 m	7	–	–
X308-2LD	1	2 (singlemode) for up to 10 km	7	–	–
X308-2LH	1	2 (singlemode) for up to 40 km	7	–	–
X308-2LH+	1	2 (singlemode) for up to 70 km	7	–	–
X307-3	–	3 (multi-mode) for up to 750 m	7	–	–
X307-3LD	–	3 (singlemode) for up to 10 km	7	–	–
X-306-1LD FE	–	–	6	1 (singlemode) for up to 26 km	–
X-308-2M	4	–	–	–	4 (2 x 2)
Rack design XR-300					
XR324-12M	–	–	–	–	24 (12 x 2)
XR324-4M PoE	16 (including 8 PoE)	–	–	–	8 (4 x 2)
XR324-4M EEC	16	–	–	–	8 (4 x 2)

Boundary conditions for network configuration

Network configuration X-300 compact design

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

Network configuration rack design XR-300

- Maximum line length between two modules for multi-mode fiber-optic cables:
  - 5 km at 100 Mbps
  - 750 m at 1 Gbps
- Maximum line length between two modules for single-mode fiber-optic cables:
  - 26 km to 70 km at 100 Mbps
  - 10 to 120 km at 1 Gbps
- Maximum cable length of the TP cable between two SCALANCE X switches:
  - Max. 100 m with IE FC Cable 2 × 2 and IE FC RJ45 Plug 180
  - Max. 100 m at 1 Gbps with IE FC Standard Cable 4 × 2 (90 m), IE FC RJ45 Modular Outlet and patch cable (10 m)
  - Max. 10 m using patches with TP cord

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SCALANCE X-300 Switches

Design (continued)

Media modules for SCALANCE X-300/XR-300

The use of 2-port media modules (electrical or optical) lets you:
- Expand the network by subsequent installation of additional media modules in free media module slots
- Change the cabling technology (e.g. conversion from copper to fiber-optic cables, or from multi-mode to single-mode FOC)

Product versions of media modules and SFP plug-in transceivers

	Type and quantity of ports					Max. distance
	Gigabit Ethernet			Fast Ethernet		
	10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s		
	Electrical	Optical		Optical		
Type of module	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	
Media modules						
MM992-2CUC	2x RJ45 [1]					100 m
MM992-2CUC (C)	2x RJ45 [1]					100 m
MM992-2CU	2x RJ45					100 m
MM992-2M12 (C)	2x M12 [4]					100 m
MM992-2VD	2x RJ45					depending on cable *
MM991-2				2x BFOC		5 km
MM991-2LD					2x BFOC	26 km
MM991-2				2x SC		5 km
MM991-2LD					2x SC	26 km
MM991-2LH+					2x SC	70 km
MM992-2		2x SC				750 m
MM992-2 (C)		2x SC				750 m
MM992-2LD			2x SC			10 km
MM992-2LH			2x SC			40 km
MM992-2LH+			2x SC			70 km
MM992-2ELH			2x SC			120 km
MM992-2SFP	2x LC [2]	2x LC [2]	2x LC [2]	2x LC [2]		
SFP modules [3]						
SFP991-1				1x LC		5 km
SFP991-1LD					1x LC	26 km
SFP991-1LH+					1x LC	70 km
SFP991-1ELH200					1x LC	200 km
SFP992-1	1x LC					750 m
SFP992-1LD			1x LC			10 km
SFP992-1LH			1x LC			40 km
SFP992-1LH+			1x LC			70 km
SFP992-1ELH			1x LC			120 km

1) with retaining collars	3) Can only be plugged into an MM392-2SFP slot module	(C) Conformal Coating
2) The MM392-2SFP SFP slot module can accommodate up to two 1-port SFP modules	4) M12 X-coded	* see media modules manual

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Overview of media modules and SFP plug-in transceivers for SCALANCE X-300

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■ **Design** (continued)

Optical
2-port media modules are
inserted into the device

Electrical
2-port media modules are
inserted into the device

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

SFP media modules
(two SFP slots) are
inserted into the device
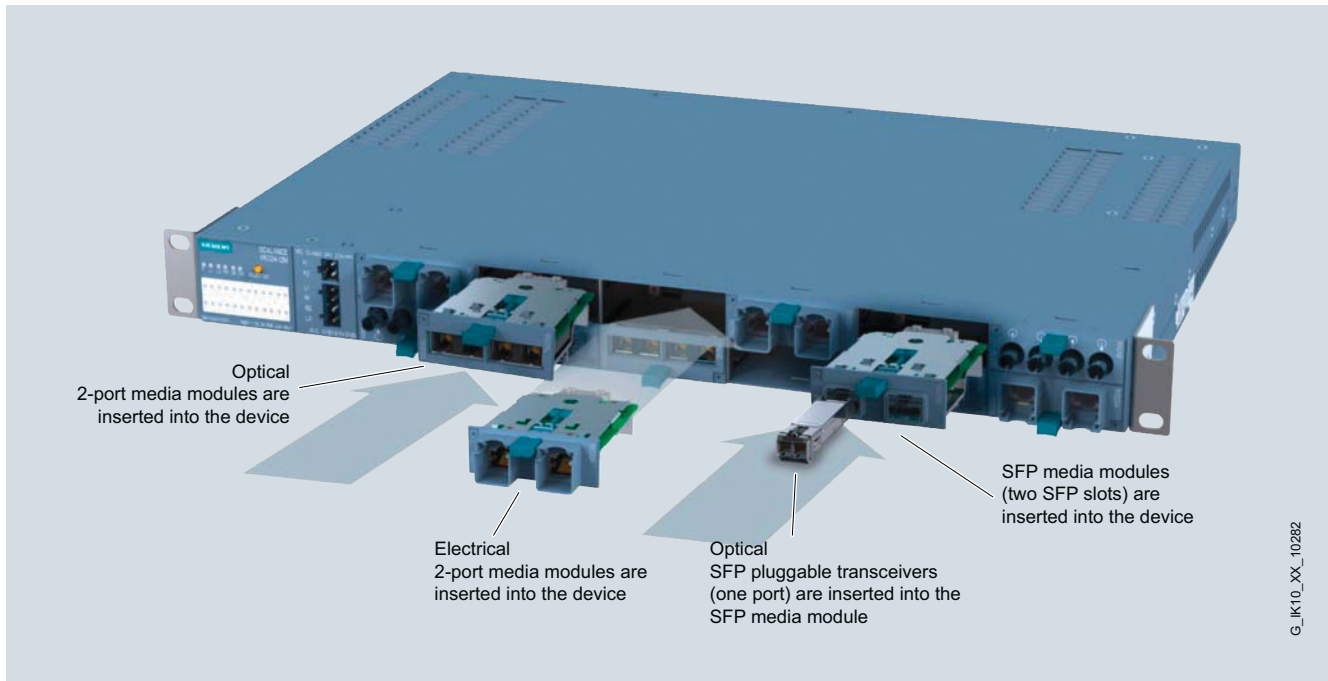
G_IK10_XX_10282

■ **Ordering data**

	Article No.		Article No.
Industrial Ethernet Switches SCALANCE X-300, compact design		**SCALANCE X307-3** 3 × 1000 Mbit/s multi-mode SC ports (1000BaseSX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5307-3BL10-2AA3
Standard design with Fast Ethernet and Gigabit Ethernet ports		**SCALANCE X307-3LD** 3 × 1000 Mbit/s single-mode SC ports (1000BaseLX) for up to 10 km 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5307-3BM10-2AA3
SCALANCE X310 3 × 10/100/1000 Mbit/s RJ45 ports (1000BaseTX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5310-0FA10-2AA3	Standard version with Fast Ethernet ports	
SCALANCE X308-2 2 × 1000 Mbit/s multi-mode SC ports (1000BaseSX) 1 × 10/100/1000 Mbit/s RJ45 port (1000BaseTX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5308-2FL10-2AA3	**SCALANCE X310FE** 10 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5310-0BA10-2AA3
		SCALANCE X306-1LD FE 1 × 100 Mbit/s single-mode SC port (100BaseFX) for up to 26 km 6 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5306-1BF00-2AA3
SCALANCE X308-2LD 2 × 1000 Mbit/s single-mode SC ports (1000BaseLX) for up to 10 km 1 × 10/100/1000 Mbit/s RJ45 port (1000BaseTX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5308-2FM10-2AA3	**SCALANCE X320-1FE** 1 × 100 Mbit/s multi-mode SC port (100BaseFX) for up to 5 km 20 × 10/100 Mbit/s RJ45-Ports (10/100BaseTX)	6GK5320-1BD00-2AA3
SCALANCE X308-2LH 2 × 1000 Mbit/s single-mode SC ports (1000BaseLX) for up to 40 km 1 × 10/100/1000 Mbit/s RJ45 port (1000BaseTX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5308-2FN10-2AA3	**SCALANCE X320-3LD FE** 1 × 100 Mbit/s multi-mode SC port (100BaseFX) for up to 5 km 2 × 100 Mbit/s single-mode SC port (100BaseFX) for up to 26 km 20 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5320-3BF00-2AA3
SCALANCE X308-2LH+ 2 × 1000 Mbit/s single-mode SC ports (1000BaseLX) for up to 70 km 1 × 10/100/1000 Mbit/s RJ45 port (1000BaseTX) 7 × 10/100 Mbit/s RJ45 ports (10/100BaseTX)	6GK5308-2FP10-2AA3	Partially modular version with Gigabit Ethernet ports	
		SCALANCE X308-2M 4 × 10/100/1000 Mbit/s RJ45 ports (1000BaseTX) 2 × slots for 2-port media modules 10/100/1000 Mbit/s, electrical or optical	6GK5308-2GG00-2AA2

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Communication
Industrial Ethernet

SCALANCE X-300 Switches

Ordering data	Article No.		Article No.
Industrial Ethernet Switches SCALANCE X-300, rack design (modular)		**Media modules**	
		Electrical media modules	
Standard version		**with 2 × 10/100/1000 Mbit/s RJ45 ports, electrical**	
SCALANCE XR324-12M 12 × slots for 2-port media modules 10/100/1000 Mbit/s, electrical or optical		• MM992-2CUC with retaining sleeve	6GK5992-2GA00-8AA0
		• MM992-2CU without retaining sleeve	6GK5992-2SA00-8AA0
24 V DC power supply		Optical media modules	
• Data cable outlet at front	6GK5324-0GG00-1AR2	**with 2 × 100 Mbit/s BFOC ports, optical**	
• Data cable outlet at rear	6GK5324-0GG00-1HR2	• MM991-2 multi-mode, glass, up to 5 km	6GK5991-2AB00-8AA0
110 to 230 V AC power supply		• MM991-2LD single-mode, glass, up to 26 km	6GK5991-2AC00-8AA0
• Data cable outlet at front	6GK5324-0GG00-3AR2		
• Data cable outlet at rear	6GK5324-0GG00-3HR2	**with 2 × 100 Mbit/s SC ports, optical**	
PoE version		• MM991-2 multi-mode, glass, up to 5 km	6GK5991-2AD00-8AA0
SCALANCE XR324-4M PoE		• MM991-2LD single-mode, glass, up to 26 km	6GK5991-2AF00-8AA0
16 × 10/100/1000 Mbit/s RJ45 ports (1000BaseTX) of which eight support PoE		• MM991-2LH+ single-mode, glass, up to 70 km	6GK5991-2AE00-8AA0
4 × slots for 2-port media modules 10/100/1000 Mbit/s, electrical or optical		**with 2 × 1000 Mbit/s SC ports, optical**	
24 V DC power supply		• MM992-2 multi-mode, glass, up to 750 m	6GK5992-2AL00-8AA0
• Data cable outlet at front	6GK5324-4QG00-1AR2	• MM992-2LD single-mode, glass, up to 10 km	6GK5992-2AM00-8AA0
• Data cable outlet at rear	6GK5324-4QG00-1HR2	• MM992-2LH single-mode, glass, up to 40 km	6GK5992-2AN00-8AA0
EEC version		• MM992-2LH+ single-mode, glass, up to 70 km	6GK5992-2AP00-8AA0
SCALANCE XR324-4M EEC		• MM992-2ELH single-mode, glass, up to 120 km	6GK5992-2AQ00-8AA0
16 × 10/100/1000 Mbps RJ45 ports (1000BaseTX)		**with 2 × 100/1000 Mbit/s for SFP plug-in transceiver, optical**	
4 × slots for 2-port media modules 10/100/1000 Mbit/s, electrical or optical		• MM992-2SFP for SFP plug-in transceivers with 1 × 100 Mbit/s or 1 × 1000 Mbit/s multi-mode or single-mode, glass	6GK5992-2AS00-8AA0
1 × 24 V DC power supply			
• Data cable outlet at front	6GK5324-4GG00-1ER2	**SFP plug-in transceiver, optical**	
• Data cable outlet at rear	6GK5324-4GG00-1JR2	**with 1 × 100 Mbit/s LC port, optical**	
1 × 100 to 240 V AC/60 to 250 V DC power supply		• SFP991-1 multi-mode, glass, up to 5 km	6GK5991-1AD00-8AA0
• Data cable outlet at front	6GK5324-4GG00-3ER2	• SFP991-1LD single-mode, glass, up to 26 km	6GK5991-1AF00-8AA0
• Data cable outlet at rear	6GK5324-4GG00-3JR2	• SFP991-1LH+ single-mode, glass, up to 70 km	6GK5991-1AE00-8AA0
2 × 24 V DC power supply			
• Data cable outlet at front	6GK5324-4GG00-2ER2	**with 1 × 1000 Mbit/s LC port, optical**	
• Data cable outlet at rear	6GK5324-4GG00-2JR2	• SFP992-1 multi-mode, glass, up to 750 m	6GK5992-1AL00-8AA0
2 × 100 to 240 V AC/60 to 250 V DC power supply		• SFP992-1LD single-mode, glass, up to 10 km	6GK5992-1AM00-8AA0
• Data cable outlet at front	6GK5324-4GG00-4ER2	• SFP992-1LH single-mode, glass, up to 40 km	6GK5992-1AN00-8AA0
• Data cable outlet at rear	6GK5324-4GG00-4JR2	• SFP992-1LH+ single-mode, glass, up to 70 km	6GK5992-1AP00-8AA0
		• SFP992-1ELH single-mode, glass, up to 120 km	6GK5992-1AQ00-8AA0

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Ordering data

	Article No.		Article No.
Accessory for Industrial Ethernet switches		**FC FO Standard Cable GP 62.5/200/230** FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1847-2A
SITOP compact 24 V/0.6 A For Industrial Ethernet switches in compact design 1-phase power supply with wide-range input 85 ... 264V AC/ 110 ... 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	6EP1331-5BA00	**IE FC RJ45 Plug 180 2×2** RJ45 plug connector for Industrial Ethernet with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
SITOP compact, 2.5 A for SCALANCE XR324-12M 1-phase power supply with wide-range input 85 ... 264V AC, stablized output voltage 24 V, output current rated value 2.5 A	6EP1332-5BA00	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
SIPLUS PS modular 5 A For SCALANCE XR324-4M PoE and SCALANCE XR324-4M EEC 1-phase and 2-phase power supply with wide-range input 85 ... 264 V AC/ 176 ... 550 V AC, stabilized output voltage 24 V, rated output current value 5 A, coating of the PCB and electronic components (conformal coating)	6AG1933-3BA00-2AA0	**IE FC RJ45 Plug 4×2** RJ-45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
IE FC TP Standard Cable GP 2×2 (type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter, max. length 1 000 m, minimum order 20 m	6XV1840-2AH10	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0
		FC SC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 duplex plugs + cleaning cloths)	6GK1900-1LB00-0AC0
IE FC TP Standard Cable GP 4×2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval; sold by the meter, max. quantity 1 000 m, minimum order 20 m	6XV1870-2E	**IE FC RJ45 Modular Outlet** FastConnect RJ45 Outlet for Industrial Ethernet with interface for insertion of a replaceable insert	
IE TP Cord RJ45/RJ45 TP cable 4×2 with two RJ45 connectors		• with 2FE insert; replaceable insert for 2 × 100 Mbit/s interface • with 1GE insert; replaceable insert for 1 × 1000 Mbit/s interface	6GK1901-1BE00-0AA1 6GK1901-1BE00-0AA2
• 0.5 m • 1 m • 2 m • 6 m • 10 m	6XV1870-3QE50 6XV1870-3QH10 6XV1870-3QH20 6XV1870-3QH60 6XV1870-3QN10	**IE FC Stripping Tool** Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00
FO Standard Cable GP 50/125/1400 [2] Multi-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1873-2A	**FC FO termination kit** Assembly case for on-site assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	6GK1900-1GL00-0AA0
FO Robust Cable GP 4E9/125/90 Single-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1843-2R		
Glass fiber-optic cable, pre-assembled with 4 SC connectors [1]			
• 80 m • 100 m • 150 m • 200 m • 300 m	6XV1873-6AN80 6XV1873-6AT10 6XV1873-6AT15 6XV1873-6AT20 6XV1873-6AT30		

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

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

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Communication
Industrial Ethernet

SCALANCE X-400 Switches

■ Overview

The switches of the SCALANCE X-400 range are discontinued products.

For further information on these products, please refer to Catalog IK PI.

■ Ordering data

	Article No.
Industrial Ethernet Switches SCALANCE X-400	
SCALANCE X414-3E 1 × 2 10/100/1000 Mbit/s RJ45 ports (1000BaseTX) 3 × 4 10/100 Mbit/s RJ45 ports (10/100BaseTX); 1 Gigabit Ethernet and 2 Fast Ethernet media module slots; 1 Extender interface	6GK5414-3FC10-2AA2
SCALANCE X408-2 2 × 2 10/100/1000 Mbit/s RJ45 ports (1000BaseTX) 1 × 4 10/100 Mbit/s RJ45 ports (10/100BaseTX); 2 Gigabit/Fast Ethernet media module slots	6GK5408-2FD00-2AA2
MM491/MM492 media modules	
Media modules with 2 ports; 1 Gbit/s, SC connection	
Media module MM492-2 1000BaseSX, multi-mode fiber-optic cable up to 750 m	6GK5492-2AL00-8AA2
Media module MM492-2LD 1000BaseLX, single-mode fiber-optic cable up to 10 km	6GK5492-2AM00-8AA2
Media module MM492-2LH 1000BaseLX, single-mode fiber-optic cable up to 40 km	6GK5492-2AN00-8AA2
Media module MM492-2LH+ 1000BaseLX, single-mode fiber-optic cable up to 70 km	6GK5492-2AP00-8AA2
Media module MM492-2ELH 1000BaseLX, single-mode fiber-optic cable up to 120 km	6GK5492-2AQ00-8AA2
Media modules with 2 ports; 100 Mbps, BFOC connection (ST sockets) or SC connection	
Media module MM491-2 100BaseFX, BFOC interface, multi-mode fiber-optic cable up to 5 km	6GK5491-2AB00-8AA2
Media module MM491-2LD 100BaseFX, BFOC interface, single-mode fiber-optic cable up to 26 km	6GK5491-2AC00-8AA2
Media module MM491-2LH+ 100BaseFX, SC interface, single-mode fiber-optic cable up to 70 km	6GK5491-2AE00-8AA2
EM495/EM496 extender modules for SCALANCE X414-3E	
Extender module EM495-8 With 8 x 10/100 Mbps TP ports	6GK5495-8BA00-8AA2
Extender module EM496-4 With 4 slots for 100 Mbps media modules	6GK5496-4MA00-8AA2

	Article No.
Accessories	
IE FC TP Standard Cable GP 2×2 (type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compliant; with UL approval; sold by the meter, max. length 1 000 m, minimum order 20 m	6XV1840-2AH10
IE FC TP Standard Cable GP 4×2 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval; sold by the meter, max. quantity 1 000 m, minimum order 20 m	6XV1870-2E
IE TP Cord RJ45/RJ45 TP cable 4×2 with two RJ45 connectors • 0.5 m • 1 m • 2 m • 6 m • 10 m	6XV1870-3QE50 6XV1870-3QH10 6XV1870-3QH20 6XV1870-3QH60 6XV1870-3QN10
FO Standard Cable GP 50/125/1400[1) 2)] Multi-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1873-2A
FO Robust Cable GP 4E9/125/90 Single-mode cable, sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1843-2R
FC FO Standard Cable GP 62.5/200/230FC FO standard cable for fixed routing indoors with PVC sheath; sold by the meter, max. length 1 000 m; minimum order 20 m	6XV1847-2A

■ Ordering data

	Article No.
IE FC RJ45 Plug 180 2×2 RJ45 plug connector for Industrial Ethernet with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	6GK1901-1BB10-2AA0
• 1 pack = 10 units	6GK1901-1BB10-2AB0
• 1 pack = 50 units	6GK1901-1BB10-2AE0
IE FC RJ45 Plug 4×2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbps) with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• 1 pack = 1 unit	6GK1901-1BB11-2AA0
• 1 pack = 10 units	6GK1901-1BB11-2AB0
• 1 pack = 50 units	6GK1901-1BB11-2AE0
FC BFOC Plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 20 units + cleaning cloths)	6GK1900-1GB00-0AC0
FC SC plug Screw connector for on-site assembly on FC fiber-optic cable; (1 pack = 10 duplex plugs + cleaning cloths)	6GK1900-1LB00-0AC0
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00

	Article No.
FC FO termination kit Assembly case for on-site assembly of FC SC and FC BFOC connectors to FC FO standard cable, comprising a stripping tool, Kevlar cutters, fiber breaking tool and microscope	6GK1900-1GL00-0AA0
IE FC RJ45 Modular Outlet FastConnect RJ45 Outlet for Industrial Ethernet with interface for insertion of a replaceable insert	
• **With 2FE insert** ; replaceable insert for 2 × 100 Mbit/s interfaces	6GK1901-1BE00-0AA1
• **With 1GE insert**; replaceable insert for 1 × 1000 Mbit/s interfaces	6GK1901-1BE00-0AA2
SITOP compact, 2.5 A 1-phase power supply with wide-range input 85 ... 264V AC, stablized output voltage 24 V, output current rated value 2.5 A	6EP1332-5BA00
C-PLUG Removable medium for simple replacement of devices in event of fault; for saving of configuration and application data, can be used in SIMATIC NET products with C-PLUG slot	6GK1900-0AB00

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

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

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Communication
Industrial Ethernet

SCALANCE XM-400 Switches

■ **Overview**

SCALANCE XM408-8C Industrial Ethernet switch

The switches of the SCALANCE XM-400 product line allow for the flexible design of electrical or optical Industrial Ethernet networks with high availability. They are ideally suited for configuring the plant bus and the terminal bus of the SIMATIC PCS 7 process control system in electrical or optical Gigabit ring technology (non-redundant and redundant rings). Network topology, type and number of ports can be adapted easily to the structure of the plant.

In the long-term, the SCALANCE XM-400 switches will supersede the switches of the SCALANCE X-400 range, SCALANCE X414-3E and X408-2.

Product range for SIMATIC PCS 7

• Basic devices with integrated Gigabit Ethernet twisted pair interfaces (10/100/1000 Mbit/s)
  - XM416-4C with 16 ports (of which 4 are combo ports)
  - XM408-8C with 8 combo ports
  - XM408-4C with 8 ports (of which 4 are combo ports)
• Port extender for flexible expansion of the basic device up to 24 ports (8 RJ45 ports, 8 RJ45 ports with Power over Ethernet or 8 slots for SFP plug-in transceiver)

Note:

A combo port consists of an electric port and a slot for a plug-in transceiver. Only one of the two can be active at any one time. Inserting a plug-in transceiver results in disabling of the electric port.

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Overview (continued)

Special features

SCALANCE X-400

Hardware

Type of device	Connection to S7 backplane bus	Format module S7	PC module	Flat type of construction	Box type of construction	19" type of construction	Rugged, compact housing	Modular design	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 x 24 V DC)	External supply for integrated switch	Signal contact	Local display (SET pushbutton)	PLUG slot
X408-2								•		•		•	•	•		•	•	•
X414-3E								•		•		•	•	•		•	•	•
XM416-4C	•							•		•		•	•	•		•	•	•
XM408-8C	•							•		•		•	•	•		•	•	•
XM408-4C	•							•		•		•	•	•		•	•	•
PE408	•							•		•						•	•	
PE400-8SFP	•							•		•		•				•	•	
PE408 PoE	•							•		•	•	•	•			•	•	

Software

Type of device	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	SNMP	Ring redundancy incl. RM-functionality	Standby redundancy	IRT capability	VLAN (Virtual Local Area Network)	GVRP (Generic VLAN Registaration Protocol)	STP/RSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol)	Passive Listening	IGMP Snooping/Querier (Internet Group Management Protocol)	GMRP (Generic Multicast Protocol)	Broadcast/Multicast/Unicast Limiter	Broadcast blocking	DHCP Option 82 (Dynamic Host Configuration Protocol)	Access Control List (IP)	Access Control List (MAC)	IEEE 802.1x (Radius)	Link Aggregation	Static Routing	RIPv2 (Dynamic Routing)	OSPFv2 (Dynamic Routing)	VRRP, Router Redundancy (Virtual Router Redundancy Protocol)
X408-2		•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•				
X414-3E	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
XM416-4C	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
XM408-8C	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
XM408-4C	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

• applies

SCALANCE X-400 and XM-400 features

G_IK10_XX_10309

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Communication
Industrial Ethernet

Design
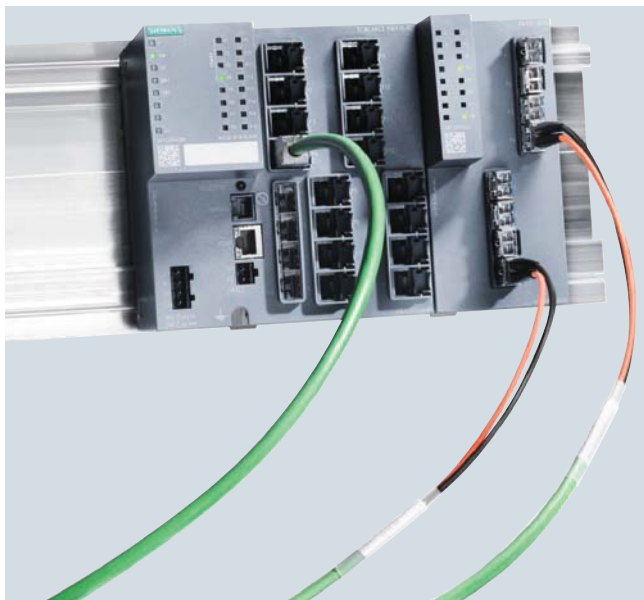
SCALANCE XM416-4C with PE400-8SFP port extender

The modular SCALANCE XM-400 Industrial Ethernet switches consist of various basic devices (8 or 16 ports) which can be expanded by port extenders and plug-in transceivers up to 24 ports (10/100/1000 Mbit/s). Depending on the configuration, they support both electrical and optical transmission media. The rugged, industry-compatible enclosure with IP20 protection is suitable for mounting on rails.

XM-400 basic devices

- XM416-4C with a total of 16 ports, of which
  - 12 × 10/100/1000 Mbit/s RJ45 ports with retaining collar
  - 4 combo ports (4 × 10/100/1000 Mbit/s RJ45 ports with retaining collar and 4 SFP slots 100 or 1000 Mbit/s for alternative use)
  - 1 port extender with 8 ports can be connected

- XM408-8C with a total of 8 ports, of which
  - 8 combo ports (8 × 10/100/1000 Mbit/s RJ45 ports with retaining collar and 8 SFP slots 100 or 1000 Mbit/s for alternative use)
  - 2 port extenders with 8 ports each can be connected

- XM408-4C with a total of 8 ports, of which
  - 4 × 10/100/1000 Mbit/s RJ45 ports with retaining collar
  - 4 combo ports (4 × 10/100/1000 Mbit/s RJ45 ports with retaining collar and 4 slots for ST plug-in transceiver 100 Mbit/s or SC plug-in transceiver 1000 Mbit/s for alternative use)
  - 2 port extenders with 8 ports each can be connected

All SCALANCE XM-400 basic devices are additionally equipped with:

- Console port (serial interface RJ11) and management port (100 Mbit/s, RJ45) for on-site parameterization/diagnostics and firmware update
- Slot for C-PLUG swap medium for simple device exchange (included in scope of delivery) or KEY-PLUG XM-400 (optional) for additional activation of Layer 3 functions
- Freely-configurable, floating signal outputs
- LEDs and selector for display of mode and status information
- Grounding bolts for defined ground connection
- Two power supplies for protection against power failure
- Connection for a port extender on the right (tool-free installation)

XM-400 port extender

- PE408 with 8 × 10/100/1000 Mbit/s RJ45 ports with retaining collar
- PE400-8SFP with 8 SFP slots 100 or 1000 Mbit/s
- PE408PoE with 8 × 10/100/1000 Mbit/s RJ45 ports, Power over Ethernet (PoE) according to IEEE 802.3at Type 2, and retaining collar; separate power supply required

SFP plug-in transceiver

The following SFP (Small Form-Factor Pluggable) transceivers can be used in the SFP slots:

- Optical SFP plug-in transceivers with 1 × 100 Mbit/s LC port
  - SFP991-1, multi-mode, glass, up to 5 km
  - SFP991-1LD, single-mode, glass, up to 26 km
  - SFP991-1LH+, single-mode, glass, up to 70 km
  - SFP991-1ELH200, single-mode, glass, up to 200 km
- Optical SFP plug-in transceivers with 1 × 1 Gbit/s LC port
  - SFP992-1, multi-mode, glass, up to 750 m
  - SFP992-1LD, single-mode, glass, up to 10 km
  - SFP992-1LH, single-mode, glass, up to 40 km
  - SFP992-1LH+, single-mode, glass, up to 70 km
  - SFP992-1ELH, single-mode, glass, up to 120 km

Plug-in transceiver for XM408-4C basic device

- ST plug-in transceiver, ST/BFOC connection, 100 Mbit/s
  - STP991-1, multi-mode FOC, up to 5 km
  - STP991-1LD, single-mode FOC, up to 26 km
- SC plug-in transceiver, SC connection, 1 Gbit/s
  - STP992-1, multi-mode FOC, up to 750 m
  - STP992-1LD, single-mode FOC, up to 10 km

Boundary conditions for network configuration with SCALANCE XM-400

- Maximum line length between 2 modules for multimode fiber-optic conductors:
  - 5 000 m at 100 Mbit/s
  - 750 m at 1 Gbit/s
- Maximum line length between 2 modules for single-mode fiber-optic conductors:
  - 200 km at 100 Mbit/s
  - 120 km at 1 Gbit/s
- Maximum length of installation cable:
  - 100 m at 100 Mbit/s with IE FC TP Cable 2 × 2 and IE FC Plug 180
  - Max. 90 m at 1 Gbit/s with IE FC TP cable 4 × 2, IE FC RJ45 modular outlet and patch cable (10 m)
  - 100 m at 1 Gbit/s with IE FC TP Cable 4 × 2 and IE FC Plug 4 × 2

Ordering data

	Article No.		Article No.

SCALANCE XM-400 Industrial Ethernet switches

Basic devices with 8 or 16 integrated Gigabit Ethernet twisted pair interfaces (10/100/1000 Mbit/s); can be expanded up to 24 × 1000 Mbit/s using port extenders

Integrated redundancy manager, IT functions (RSTP, VLAN,..), PROFINET IO-Device, network management via SNMP and Web server; including operating instructions, Industrial Ethernet manual and configuration software on CD

C-PLUG included in scope of supply

SCALANCE XM416-4C
Basic device with 16 × 10/100/1000 Mbit/s, of which 12 × RJ45 ports and 4 × RJ45/SFP combo ports
- IP routing in combination with KEY-PLUG — **6GK5416-4GS00-2AM2**
- IP routing integrated — **6GK5416-4GR00-2AM2**

SCALANCE XM408-8C
Basic device with 8 × 10/100/1000 Mbit/s, of which 8 × RJ45/SFP combo ports
- IP routing in combination with KEY-PLUG — **6GK5408-8GS00-2AM2**
- IP routing integrated — **6GK5408-8GR00-2AM2**

SCALANCE XM408-4C
Basic device with 8 × 10/100/1000 Mbit/s, of which 4 × RJ45 ports and 4 × RJ45/ST-pluggable/SC-pluggable combo ports
- IP routing in combination with KEY-PLUG — **6GK5408-4GP00-2AM2**
- IP routing integrated — **6GK5408-4GQ00-2AM2**

Port extender for SCALANCE XM-400

Port extender for SCALANCE XM-400 basic devices
- PE408; with 8 × 10/100/1000 Mbit/s TP ports (RJ45) — **6GK5408-0GA00-8AP2**
- PE400-8SFP; with 8 slots for 100/1000 Mbit/s SFP plug-in transceivers — **6GK5400-8AS00-8AP2**
- PE408PoE; with 8 × 10/100/1000 Mbit/s TP ports Power over Ethernet according to 802.3at Type 1/2 — **6GK5408-0PA00-8AP2**

Plug-in transceivers

SFP plug-in transceivers for XM-400
- with 1 × 100 Mbit/s LC port, optical
  - SFP991-1 multi-mode, glass, up to 5 km — **6GK5991-1AD00-8AA0**
  - SFP991-1LD single-mode, glass, up to 26 km — **6GK5991-1AF00-8AA0**
  - SFP991-1LH+ single-mode, glass, up to 70 km — **6GK5991-1AE00-8AA0**
  - SFP991-1ELH200 single-mode, glass, up to 200 km max. — **6GK5991-1AE30-8AA0**
- with 1 × 1000 Mbit/s LC port, optical
  - SFP992-1 multi-mode, glass, up to 750 m — **6GK5992-1AL00-8AA0**
  - SFP992-1LD single-mode, glass, up to 10 km — **6GK5992-1AM00-8AA0**
  - SFP992-1LH single-mode, glass, up to 40 km — **6GK5992-1AN00-8AA0**
  - SFP992-1LH+ single-mode, glass, up to 70 km — **6GK5992-1AP00-8AA0**
  - SFP992-1ELH single-mode, glass, up to 120 km — **6GK5992-1AQ00-8AA0**

ST and SC plug-in transceivers for XM408-4C basic device
- STP991-1 100 Mbit/s, ST/BFOC connection, multi-mode FOC up to 3 km — **6GK5991-1AB00-8AA0**
- STP991-1LD 100 Mbit/s, ST/BFOC connection, single-mode FOC up to 26 km — **6GK5991-1AC00-8AA0**
- SCP992-1; 1000 Mbit/s, SC connection, multi-mode FOC up to 750 m — **6GK5992-1AJ00-8AA0**
- SCP992-1LD; 1000 Mbit/s, SC connection, single-mode FOC up to 10 km — **6GK5992-1AK00-8AA0**

Power supply for SCALANCE XM-400

SIMATIC PM 1507
Stabilized 24-V power supply for SIMATIC S7-1500
- Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/3 A stabilized power supply for SIMATIC S7-1500; input: 120/230 V AC, output: 24 V DC/3 A — **6EP1332-4BA00**
- Power supply S7-1500 PM1507 SIMATIC PM 1507 24 V/8 A stabilized power supply for SIMATIC S7-1500; input: 120/230 V AC, output: 24 V DC/8 A — **6EP1333-4BA00**

Further accessories

KEY-PLUG XM-400 — **6GK5904-0PA00**
Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and for easy replacement of SCALANCE XM-400 in the event of a fault

2-pin spring-loaded terminal block — **6GK5980-0BB10-0AA5**
For connection of signaling contact (24 V DC) or for power supply with PoE (54 V DC); 5 units per pack

4-pin spring-loaded terminal block — **6GK5980-1DB10-0AA5**
For connection of 24 V DC power supply; 5 units per pack

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Communication
Industrial Ethernet

SCALANCE X-500 Switches

Overview

SCALANCE XR524-8C and SCALANCE XR552-12M

The high-performance, fully modular SCALANCE XR-500 Industrial Ethernet switches of the SCALANCE X-500 product line are suitable for designing electrical and optical line, ring and star topologies with high data transfer rates up to 10 Gbit/s.

The devices are designed for high system availability, and are suitable for networking system components and distributed field devices in an industrial network as well as for integrating the industrial network in a corporate network. They have extensive diagnostics facilities.

Hardware — SCALANCE X-500

Type of device	Connection to S7 backplane bus	Format module S7	PC module	Flat type of construction	Box type of construction	19" type of construction	Rugged, compact housing	Modular design	10 Gigabit Ethernet	Gigabit Ethernet	PoE (Power over Ethernet)	LED diagnosis	SIMATIC environment	Redundant power supply (2 x 24 V DC)	External supply	Signal contact	Local display (SET pushbutton)	PLUG slot
XR552-12M/ XR528-6M						•		•	•	•	•	•	•	•		•	•	•
XR524-8C						•		•		•	•	•	•	•		•	•	•

Software — SCALANCE X-500

Type of device	Security Integrated (Firewall/VPN)	PROFINET diagnosis	Topology support (LLDP)	Command Line Interface / Telnet	Web based Management	Configuration with STEP 7 / TIA	SNMP	Ring redundancy incl. RM-functionality	Standby redundancy	IRT capability	VLAN (Virtual Local Area Network)	GVRP (Generic VLAN Registaration Protocol)	STP/RSTP (Spanning Tree Protocol/Rapid Spanning Tree Protocol)	Passive Listening	IGMP Snooping/Querier (Internet Group Management Protocol)	GMRP (Generic Multicast Protocol)	Broadcast/ Multicast/ Unicast Limiter	Broadcast blocking	DHCP Option 82 (Dynamic Host Configuration Protocol)	Access Control List (IP)	Access Control List (MAC)	IEEE 802.1x (Radius)	Link Aggregation	Static Routing	RIPv2 (Dynamic Routing)	OSPFv2 (Dynamic Routing)	VRRP, Router Redundancy (Virtual Router Redundancy Protocol)
XR552-12M/ XR528-6M	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•
XR524-8C	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•

• applies

Functional overview of SCALANCE X-500

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Overview (continued)

To increase network availability, as many as 50 X-200, X-300, X-400 or X-500 switches cascaded in line can be connected into a ring (Ethernet with fast media redundancy). Several rings can be redundantly linked through the standby function. Up to 52 nodes or subnets can be electrically connected together by means of a SCALANCE XR-500 as star point in a star topology.

The modularity and scalability of the SCALANCE XR-500 enable application-specific adaptation and expansion of the device configuration.

SCALANCE XR-500 product overview

The basic types of SCALANCE XR-500 designed for installation in 19" control cabinets correspond to IP20 protection. The data ports are either at the front or rear depending on the device version. Further expansion of the ports is possible using SFP or SFP+ plug-in transceivers and 4-port media modules (electrical or optical).

The SCALANCE XR-500 devices differ as follows with regard to the number and type of slots:
- SCALANCE XR552-12M (ports at front/rear)
  4 integral SFP+ slots for optical SFP (1 Gbit/s) or SFP+ (10 Gbit/s) plug-in transceivers
  12 slots for 4-port media modules 10/100/1000 Mbit/s, electrical or optical
- SCALANCE XR528-6M (ports at front/rear)
  4 integral SFP+ slots for optical SFP (1 Gbit/s) or SFP+ (10 Gbit/s) plug-in transceivers
  6 slots for 4-port media modules 10/100/1000 Mbit/s, electrical or optical

The PS598 24 V DC power supply which is also optimized for the 19" control cabinet and provided with a wide-range input (85 to 264 V AC) can be used for single or redundant configuration. It can be mounted either directly on the rear of the SCALANCE XR-500 or connected via cables.

Design

Summary of interfaces

Type of module	Type and quantity of ports							Max. distance
	10 Gigabit Ethernet		Gigabit Ethernet			Fast Ethernet		
	10000 Mbit/s		10 / 100 / 1000 Mbit/s	1000 Mbit/s		100 Mbit/s		
	Optical		Electrical	Optical		Optical		
	Multimode	Singlemode	Twisted Pair	Multimode	Singlemode	Multimode	Singlemode	
Media modules								
MM992-4CUC			4x RJ45[1]					100 m
MM992-4CU			4x RJ45					100 m
MM992-4PoEC			4x RJ45[1]					100 km
MM992-4PoE			4x RJ45					100 km
MM991-4						4x BFOC		5 km
MM991-4LD							4x BFOC	26 km
MM992-4				4x SC				5 km
MM992-4LD					4x SC			10 km
MM992-4SFP			4x LC[2]	4x LC[2]	4x LC[2]	4x LC[2]	4x LC[2]	
SFP-Module								
SFP991-1[3]						1x LC		5 km
SFP991-1LD[3]							1x LC	26 km
SFP991-1LH+[3]							1x LC	70 km
SFP991-1ELH200[3]							1x LC	200 km
SFP992-1[3] [4]				1x LC				750 m
SFP992-1LD[3] [4]					1x LC			10 km
SFP992-1LH[3] [4]					1x LC			40 km
SFP992-1LH+[3] [4]					1x LC			70 km
SFP992-1ELH[3] [4]					1x LC			120 km
SFPplus-Module[4]								
SFP993-1	1x LC							300 m
SFP993-1LD		1x LC						10 km
SFP993-1LH		1x LC						40 km

[1] With retaining collars
[2] The MM992-4SFP SFP slot module can accommodate up to four 1-port SFP modules
[3] Can only be plugged into an MM992-4SFP slot module
[4] Puggable in XR-500 SFPplus slots only

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Communication
Industrial Ethernet

Design (continued)

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

- Maximum line length between two modules for multi-mode fiber-optic conductors
  - 5 km at 100 Mbit/s
  - 750 m at 1 Gbit/s
  - 300 m at 10 Gbit/s

- Maximum line length between two modules for single-mode fiber-optic conductors
  - 26 to 200 km at 100 Mbit/s
  - 10 to 120 km at 1 Gbit/s
  - 10 to 40 km at 10 Gbit/s

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

Optical SFP+ pluggable transceivers (one port) are inserted into the device

Optical 4-port media modules are inserted into the device

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

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

Electrical 4-port media modules are inserted into the device
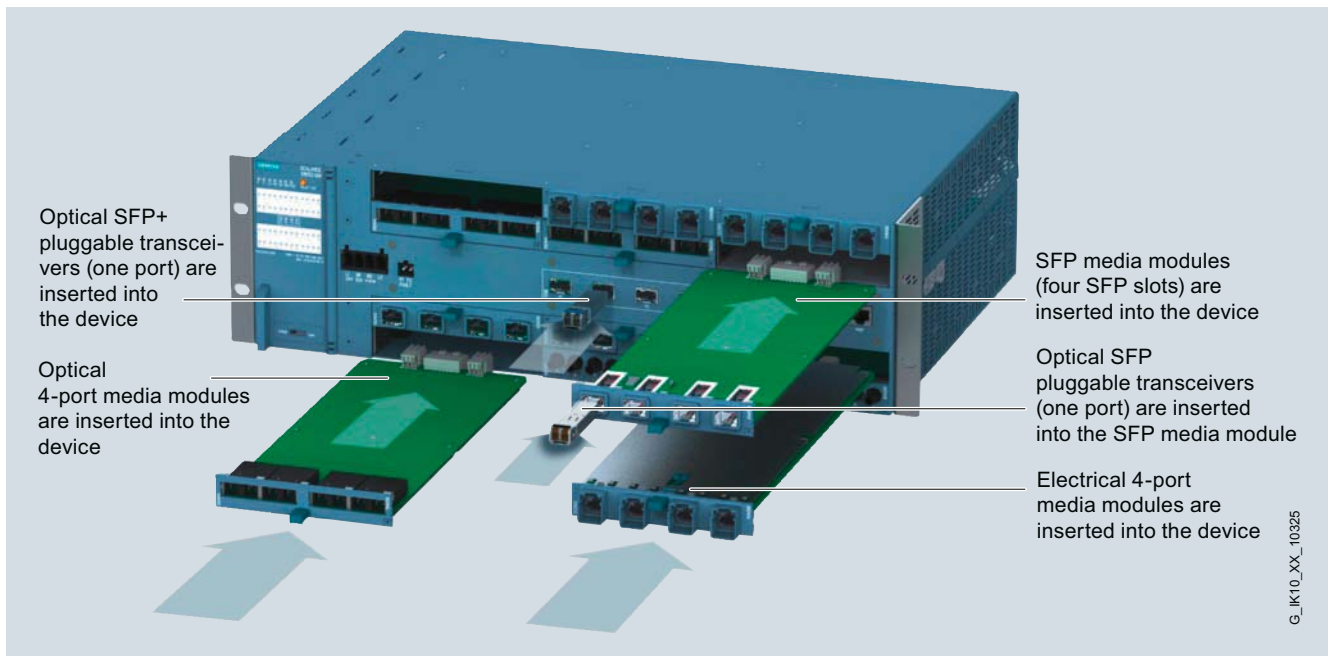
4-port media modules plugged into media module slot and SFP/SFP+ plug-in transceivers in SFP+ slots

Media modules for SCALANCE XR-500
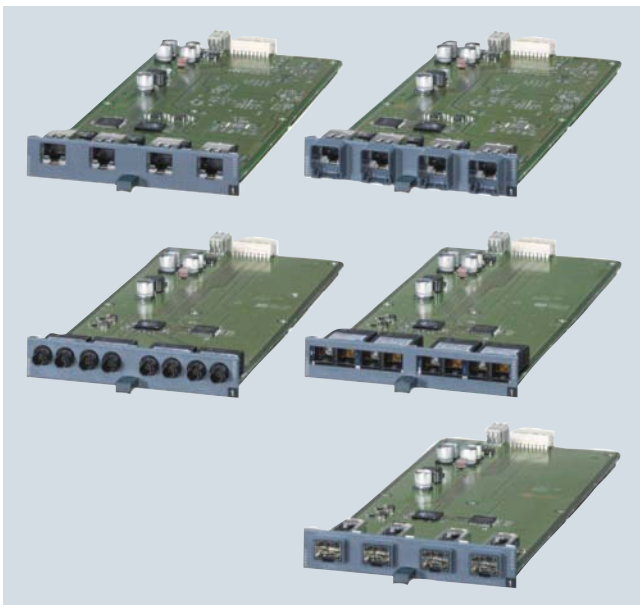
Media modules for modular SCALANCE XR-500 managed

The following types of media module are available for the SCALANCE XR-500 switches:

- Electrical media modules with 4 × 10/100/1000 Mbit/s RJ45 ports
  - MM992-4CUC with retaining collar
  - MM992-4CU without retaining collar

- Electrical media modules with 4 × 10/100/1000 Mbit/s RJ45 ports and PoE
  - MM992-4PoEC with retaining collar
  - MM992-4PoE without retaining collar

- Optical media modules with 4 × 100 Mbit/s BFOC ports
  - MM991-4, multi-mode, glass, up to 5 km
  - MM991-4LD, single-mode, glass, up to 26 km

- Optical media modules with 4 × 1000 Mbit/s SC ports
  - MM992-4, multi-mode, glass, up to 750 m
  - MM992-4LD, single-mode, glass, up to 10 km

- Optical media modules with 4 × 100/1000 Mbit/s for SFP plug-in transceiver
  - MM992-4SFP, for SFP plug-in transceivers with 1 × 100 Mbit/s or 1 × 1000 Mbit/s multi-mode or single-mode, glass

Design (continued)

Plug-in transceivers for SCALANCE XR-500

SFP product versions

The SFP plug-in transceivers (**S**mall **F**orm-factor **P**luggable) can be used together with the SFP media module MM992-4SFP, and in the integral SFP+ slots of the SCALANCE XR-500.

- Optical SFP plug-in transceivers with 1 × 100 Mbit/s LC port
  - SFP991-1; multi-mode, glass, up to 5 km
  - SFP991-1LD; single-mode, glass, up to 26 km
  - SFP991-1LH+; single-mode, glass, up to 70 km
  - SFP991-1ELH200; single-mode, glass, up to 200 km
- Optical SFP plug-in transceivers with 1 × 1 Gbit/s LC port
  - SFP992-1; multi-mode, glass, up to 750 m
  - SFP992-1LD; single-mode, glass, up to 10 km
  - SFP992-1LH; single-mode, glass, up to 40 km
  - SFP992-1LH+; single-mode, glass, up to 70 km
  - SFP992-1ELH; single-mode, glass, up to 120 km

SFP+ product versions

The SFP+ plug-in transceivers (**S**mall **F**orm-factor **P**luggable plus) can only be used in the integral SFP+ slots of the SCALANCE XR-500.

- Optical SFP+ plug-in transceivers with 1 × 10 Gbit/s LC port
  - SFP993-1; multi-mode, glass, up to 300 m
  - SFP993-1LD; single-mode, glass, up to 10 km
  - SFP993-1LH; single-mode, glass, up to 40 km

The preassembled electric IE Connecting Cable SFP+/SFP+ with SFP+ connectors at both ends permits low-cost connection of SCALANCE XR-500 switches over short distances at 10 Gbit/s. It is available in lengths of 1, 2 and 7 m.

Ordering data

	Article No.
SCALANCE XR-500 Industrial Ethernet switches	
SCALANCE XR552-12M 4 × integral 1/10 Gbit/s SFP+ slots for SFP or SFP+ plug-in transceivers 12 × 10/100/1000 Mbit/s slots for 4-port media modules, electrical or optical	
• Layer 2, upgrade to Layer 3 possible	
- Ports at front	6GK5552-0AA00-2AR2
- Ports at rear	6GK5552-0AA00-2HR2
• Layer 3	
- Ports at front	6GK5552-0AR00-2AR2
- Ports at rear	6GK5552-0AR00-2HR2
SCALANCE XR528-6M 4 × integral 1/10 Gbit/s SFP+ slots for SFP or SFP+ plug-in transceivers 6 × 10/100/1000 Mbit/s slots for 4-port media modules, electrical or optical	
• Layer 2, upgrade to Layer 3 possible	
- Ports at front	6GK5528-0AA00-2AR2
- Ports at rear	6GK5528-0AA00-2HR2
• Layer 3	
- Ports at front	6GK5528-0AR00-2AR2
- Ports at rear	6GK5528-0AR00-2HR2

	Article No.
Media modules	
Electrical media modules	
• with 4 × 10/100/1000 Mbit/s RJ45 ports, electrical	
- MM992-4CuC	6GK5992-4GA00-8AA0
- MM992-4CU	6GK5992-4SA00-8AA0
• with Power over Ethernet	
- MM992-4PoEC	6GK5992-4RA00-8AA0
- MM992-4PoE	6GK5992-4QA00-8AA0
Optical media modules	
• with 4 × 100 Mbit/s BFOC ports, optical	
- MM991-4; multi-mode, glass, up to 5 km	6GK5991-4AB00-8AA0
- MM991-4LD; single-mode, glass, up to 26 km	6GK5991-4AC00-8AA0
• with 4 × 1000 Mbit/s SC ports, optical	
- MM992-4; multi-mode, glass, up to 750 m	6GK5992-4AL00-8AA0
- MM992-4LD; single-mode, glass, up to 10 km	6GK5992-4AM00-8AA0
• with 4 × 100/1000 Mbit/s for SFP plug-in transceiver, optical	
- MM992-4SFP; for SFP plug-in transceivers with 1 × 100 Mbit/s or 1 × 1000 Mbit/s multi-mode or single-mode, glass	6GK5992-4AS00-8AA0

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Communication
Industrial Ethernet

SCALANCE X-500 Switches

■ **Ordering data**	**Article No.**		**Article No.**
Plug-in transceivers		**IE connecting cable SFP+/SFP+, electrical, 10 Gbit/s** Twinax copper cables	
SFP plug-in transceiver		Length:	
• with 1 × 100 Mbit/s LC port, optical		• 1 m	6GK5980-3CB00-0AA1
- SFP991-1; multi-mode, glass, up to 5 km	6GK5991-1AD00-8AA0	• 2 m	6GK5980-3CB00-0AA2
- SFP991-1LD; single-mode, glass, up to 26 km	6GK5991-1AF00-8AA0	• 7 m	6GK5980-3CB00-0AA7
- SFP991-1LH+; single-mode, glass, up to 70 km	6GK5991-1AE00-8AA0	**IE FC RJ45 Modular Outlet** FastConnect RJ45 Outlet for Industrial Ethernet with interface for insertion of a replaceable insert	
- SFP991-1ELH200; single-mode, glass, up to 200 km	6GK5991-1AE30-8AA0	• with insert 2FE; replaceable insert for 2 × 100 Mbit/s interface	6GK1901-1BE00-0AA1
• with 1 × 1 Gbit/s LC port, optical		• with 1GE insert; replaceable insert for 1 × 1000 Mbit/s interface	6GK1901-1BE00-0AA2
- SFP992-1; multi-mode, glass, up to 750 m	6GK5992-1AL00-8AA0	**IE FC TP Standard Cable GP 2 × 2 (Type A)** 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval	6XV1840-2AH10
- SFP992-1LD; single-mode, glass, up to 10 km	6GK5992-1AM00-8AA0		
- SFP992-1LH; single-mode, glass, up to 40 km	6GK5992-1AN00-8AA0		
- SFP992-1LH+; single-mode, glass, up to 70 km	6GK5992-1AP00-8AA0	Sold by the meter, max. length 1 000 m; minimum order 20 m	
- SFP992-1ELH; single-mode, glass, up to 120 km	6GK5992-1AQ00-8AA0	**IE FC TP standard cable GP 4 × 2** 8-core, shielded TP installation cable for connection to IE FC RJ45 Modular Outlet for universal application; with UL approval	6XV1870-2E
SFP+ plug-in transceiver			
• with 1 × 10 Gbit/s LC port, optical			
- SFP993-1; multi-mode, glass, up to 300 m	6GK5993-1AT00-8AA0	Sold by the meter; max. length 1 000 m, minimum order 20 m	
- SFP993-1LD; single-mode, glass, up to 10 km	6GK5993-1AU00-8AA0	**IE TP Cord RJ45/RJ45** TP cable 4 × 2 with two RJ45 plugs	
- SFP993-1LH; single-mode, glass, up to 40 km	6GK5993-1AV00-8AA0	• 0.5 m	6XV1870-3QE50
Accessories		• 1 m	6XV1870-3QH10
PS598-1 power supply 24 V DC power supply designed for installation in 19" control cabinets or for direct mounting on SCALANCE X-500 Industrial Ethernet switches; degree of protection IP20; output power 300 W, input voltage range from 85 to 264 V AC, operating temperature from 0 to +60 °C	6GK5598-1AA00-3AA0	• 2 m	6XV1870-3QH20
		• 6 m	6XV1870-3QH60
		• 10 m	6XV1870-3QN10
		IE FC RJ45 Plug 180 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
Appliance cable for PS598-1			
• Grounded Continental European plug, Region: D/F/NL/ESP/B/A/S/FIN	6ES7900-0AA00-0XA0		
• Grounded British plug; Region: UK	6ES7900-0BA00-0XA0		
• Grounded Swiss plug; Region: Switzerland	6ES7900-0CA00-0XA0		
• Grounded North American and Japanese plug; Region: USA	6ES7900-0DA00-0XA0	• 1 pack = 1 unit	6GK1901-1BB10-2AA0
• Grounded Italian plug; Region: Italy	6ES7900-0EA00-0XA0	• 1 pack = 10 units	6GK1901-1BB10-2AB0
• Grounded Chinese plug; Region: China	6ES7900-0FA00-0XA0	• 1 pack = 50 units	6GK1901-1BB10-2AE0
FAN597-1 Replacement fan slide-in unit for SCALANCE XR552-12M	6GK5597-1AA00-8AA0	**IE FC RJ45 Plug 4 × 2** RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
FAN597-2 Replacement fan slide-in unit for SCALANCE XR528-6M	6GK5597-2AA00-8AA0		
KEY-PLUG X-500 Swap medium for expansion of the device functions with IP routing (Layer 3), for integration of configuration data and for easy replacement of SCALANCE X-500 in the event of a fault	6GK5905-0PA00		
		• 1 pack = 1 unit	6GK1901-1BB11-2AA0
		• 1 pack = 10 units	6GK1901-1BB11-2AB0
		• 1 pack = 50 units	6GK1901-1BB11-2AE0

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Overview

SCALANCE X101-1 Industrial Ethernet media converter

The SCALANCE X101 Industrial Ethernet media converters are suitable for the implementation of various transmission media in Industrial Ethernet operating at 10/100 Mbit/s in line, star and ring topologies.

Common features of all product versions:

- Rugged metal enclosure, suitable for space-saving installation in control cabinets on a DIN rail or an S7-300 mounting rail as well as for wall mounting
- 4-pin terminal block for redundant power supply (2 × 24 V DC)
- LED diagnostics on the device (power, link status, data communication)
- Error signaling contact with easy adjustment using the SET button
- Electrical RJ45 socket with collar for strain relief

Product versions

SCALANCE X101-1

- An electric twisted-pair interface, 10/100BaseTX port type (10/100 Mbit/s, RJ45 socket), for connecting IE FC cables via IE FC RJ45 plugs over distances up to 100 m
- An optical interface, 100BaseFX port type (100 Mbit/s with BFOC connection technology), for connection to multimode glass fiber-optic cables up to 3 km

SCALANCE X101-1LD

- An electric twisted-pair interface, 10/100BaseTX port type (10/100 Mbit/s, RJ45 socket), for connecting IE FC cables via IE FC RJ45 plugs over distances up to 100 m
- An optical interface, 100BaseFX port type (100 Mbit/s with BFOC connection technology), for connection to singlemode glass fiber-optic cables up to 26 km

SCALANCE X101-1POF

- An electric twisted-pair interface, 10/100BaseTX port type (10/100 Mbit/s, RJ45 socket), for connecting IE FC cables via IE FC RJ45 plugs over distances up to 100 m
- An optical interface, 100BaseFX port type (100 Mbit/s with SC RJ connection technology), for connection to POF fiber-optic cables up to 50 m or PCF fiber-optic cables up to 100 m

Note:

For detailed information and further product variants, see Catalog IK PI, section "PROFINET/Industrial Ethernet, Industrial Ethernet Switches / Media Converters".

Ordering data

	Article No.
SCALANCE X101-1 Industrial Ethernet Media Converter For conversion from RJ45 TP to multimode fiber-optic cable (BFOC) with 100 Mbit/s; 1 x 10/100 Mbit/s RJ45 port and 1 x 100 Mbit/s multimode BFOC; redundant 24 V DC supply and signaling contact	**6GK5101-1BB00-2AA3**
SCALANCE X101-1LD Industrial Ethernet Media Converter For conversion from RJ45 TP to singlemode fiber optic cable (BFOC) with 100 Mbit/s; 1 x 10/100 Mbit/s RJ45 Port and 1 x 100 Mbit/s singlemode BFOC; redundant 24 V supply and signal contact	**6GK5101-1BC00-2AA3**
SCALANCE X101-1POF Industrial Ethernet Media Converter For conversion from RJ45 TP to POF or PCF fiber-optic cable (SC RJ) with 100 Mbit/s; 1 x 10/100 Mbit/s RJ45 port and 1 x 100 Mbit/s POF SC RJ; redundant 24 V DC supply and signaling contact	**6GK5101-1BH00-2AA3**

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Communication
Industrial Ethernet

Passive network components: FastConnect

■ Overview

Industrial Ethernet FastConnect (IE FC) is a fast assembly system with insulation displacement for easy assembly and wiring of 4-core and 8-core IE FC cables. Using the FC Stripping Tool it is possible to remove the outer casing and the woven shield of the IE FC cable accurately in a single step. The cable prepared in this manner is subsequently assembled on the contacts of the connection element.

■ Application

Linking elements

The Linking elements which can be used depend on whether the transmission rate is 10/100 Mbit/s or 1 000 Mbit/s:

- IE FC RJ45 Plug 2×2 90/180 (10/100 Mbit/s) in association with 4-core (2×2) IE FC cables
- IE FC RJ45 Plug 4×2 180 (10/100/1000 Mbit/s) in association with 8-core (4×2) IE FC cables
- IE FC Outlet RJ45 (10/100 Mbit/s) in association with 4-core (2×2) IE FC cables
- IE FC RJ45 Modular Outlet (10/100/1000 Mbit/s) with 8-core (4×2) IE FC cables

The following table provides an overview of the electric port types of the switches, the transmission rates they support, and the IE FC TP standard cables and IE FC linking elements which can be used. In addition to the IE FC TP standard cables, Catalog IK PI offers further IE FC TP cables with special properties.

Transmission rate	10/100 Mbit/s		1 000 Mbit/s	
Port type	10/100BaseTX		1000BaseTX	
Max. cable length	100 m	90 m (+ total of 10 m for TP Cord Patch cables)	90 m	90 m (+ total of 10 m for TP Cord Patch cables)
Cable type	IE FC TP Standard Cable 2×2	IE FC TP Standard Cable 4×2	IE FC TP Standard Cable 4×2 (AWG 24)	IE FC TP Standard Cable 4×2 (AWG 22)
Linking elements	IE FC RJ45 Plug 2×2 90/180, alternative: IE FC Outlet RJ45 + TP Cord	IE FC RJ45 Modular Outlet with insert 2FE + TP Cord	IE FC RJ45 Plug 4×2 180	IE FC RJ45 Modular Outlet with insert 1GE + TP Cord

SIMATIC PCS 7 components

IE FC RJ45 Plug 2×2

IE FC RJ45 Plug 2×2

IE FC Cable 2×2

IE FC TP Standard Cable GP 2×2 (Type A)
IE FC TP Flexible Cable GP 2×2 (Type B)
IE FC TP Trailing Cable GP 2×2 (Type C)
IE FC Torsion Cable 2×2 (Type C)
IE FC TP Trailing Cable 2×2 (Type C)
IE FC TP Marine Cable 2×2 (Type B)
IE FC TP Food Cable 2×2 (Type C)
IE FC TP FRNC Cable GP 2×2 (Type B)
IE FC TP Festoon Cable GP 2×2 (Type B)

SIMATIC PCS 7 components

Network component

Network component

If components that do not support autocrossing are used, an IE TP XP cord must be used between two network components or terminals.

G_PCS7_XX_00233

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

IE FC RJ45 Plug 2×2

The IE FC RJ45 Plugs 2×2 suitable for simple and fast on-site assembly of 4-core (2×2) twisted pair (TP) FastConnect installation cables are the ideal solution for Industrial Ethernet communication connections for transmission rates up to 100 Mbit/s. They can be used to implement point-to-point connections without patch technology between two terminal units/network components at distances up to 100 m. Since the IE FC RJ45 Plugs 2×2 have no parts which can be lost, assembly is also possible under difficult conditions. For alternatives to the IE FC TP Standard Cable according to the configuration graphics, see Catalog IK PI, section "Industrial Ethernet", subsection "Cabling systems".

■ **Application** (continued)
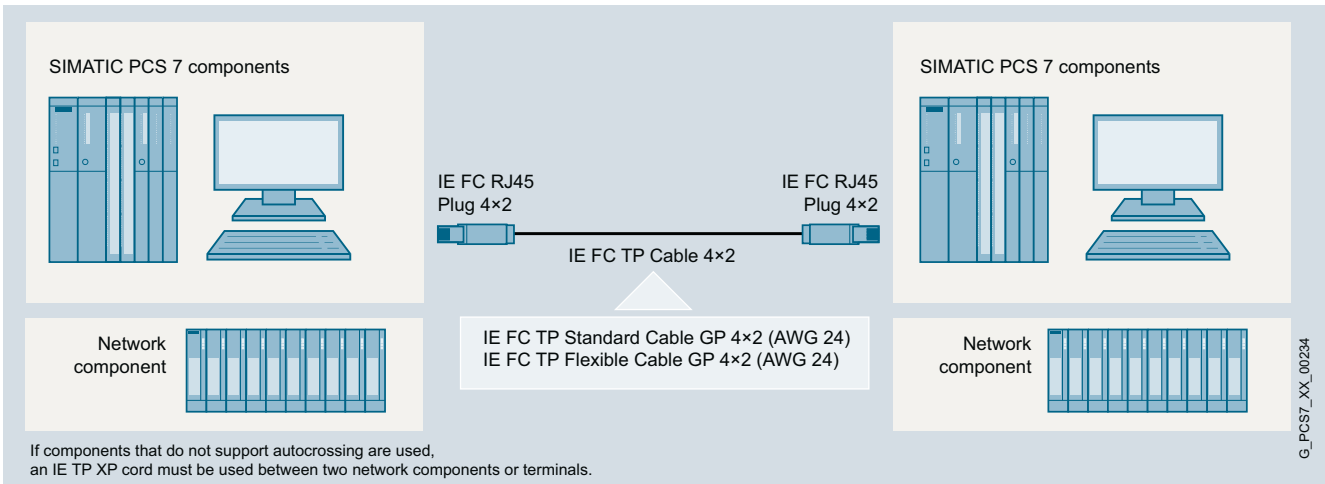
Use of FastConnect cables 4×2 with IE FC RJ45 Plug 4×2

IE FC RJ45 Plug 4×2

The IE FC RJ45 Plugs 4×2 with 180° (straight) outgoing cable are exceptionally suitable for simple and fast on-site assembly of 8-core (4×2) twisted pair (TP) FastConnect installation cables (AWG 24) on network components or terminal equipment. When using the IE FC TP Standard Cable, uncrossed 10/100/1000 Mbit/s Ethernet connections can thus be made at distances up to 90 m without patch technology. Crossed cables can also be implemented by swapping the transmit and receive pairs in a plug. As an alternative to the IE FC TP Standard Cable according to the configuration graphics, an IE FC Flexible Cable is also available for distances up to 60 m (for details see Catalog IK PI, section "Industrial Ethernet", subsection "Cabling systems").

IE FC Outlet RJ45 and IE FC RJ45 Modular Outlet

Alternatives for conversion from RJ45 to the insulation displacement system:

- IE FC Outlet RJ45 for 4-core TP (2×2) IE FC cables and transmission rates up to 100 Mbit/s
- IE FC RJ45 Modular Outlet for 8-core TP (4×2) IE FC cables and transmission rates up to 1 000 Mbit/s.

The latter has the advantage that the existing wiring can still be used if the communication is converted from 100 Mbit/s to 1 000 Mbit/s. It is only necessary to replace the 2FE insert by one of type 1GE. In contrast to the plugs, an RJ45 patch cable (TP Cord) is additionally required for each outlet which connects this to the network components or data terminal.

Detailed information on the FastConnect Outlets and the available TP cords can be found in Catalog IK PI and in the Industry Mall or in CA 01 under "Industrial Communication".

Further information on network structures is provided in the manual for TP and fiber-optic networks.
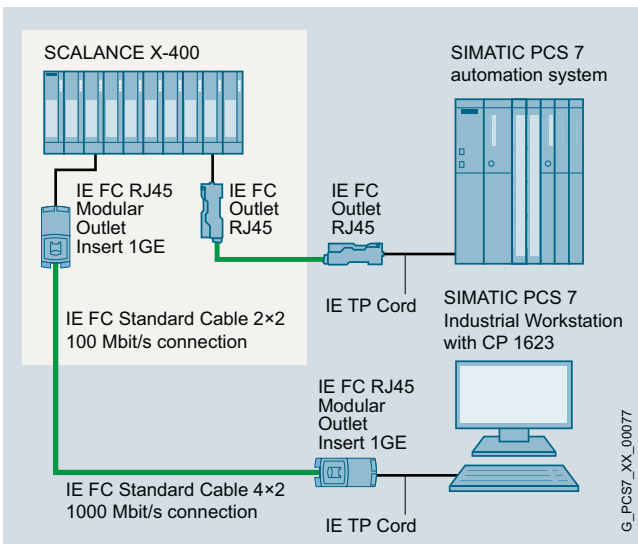
Configuration example with IE FC RJ45 Modular Outlet and IE FC Outlet RJ45

Communication
Industrial Ethernet

Passive network components: FastConnect

Design

IE FC RJ45 Plugs 4×2 and 2×2

IE FC RJ45 Plug 2×2 with 90° outgoing cable (left) and with 180° outgoing cable (right)

IE FC RJ45 Plug 4×2 with 180° outgoing cable

In contrast to the IE FC RJ45 Plug 4×2 which is only offered with a 180° (straight) outgoing cable, the IE FC RJ45 Plug 2×2 is also available with a 90° (angled) outgoing cable.

All IE FC RJ45 Plugs have a rugged, industry-compatible metal housing with integral strain relief that provides optimum protection for the data communication against EMC interferences. The integral insulation displacement contacts permit simple, fault-free contacting of the various types of FC cable. Following introduction of the stripped ends of the cables into the tipped-up barrel contacts, the latter are pressed down for secure contacting of the conductors.

With the housing open, colored marks on the contact cover identify correct connection of the cable cores. The transparent plastic material of the contact element allows visual inspection of the contacts.

Owing to their compact size, IE FC RJ45 Plugs can be used both on devices with individual jacks and on devices with multiple jacks (blocks).

Matching retaining collars on terminal equipment, e.g. on devices from the SCALANCE X and SCALANCE S families, permits additional protection of the plug connection against tension and bending stresses.

IE FC RJ modular outlet with insert 1GE

IE FC RJ45 Modular Outlet

The IE FC RJ45 Modular Outlet (Base Module) designed for transmission rates up to 1 000 Mbit/s consists of a rugged metal housing with IP40 degree of protection which is suitable for both DIN rail and wall mounting. It has 8 barrel contacts for connecting 8-core Industrial Ethernet FC installation cables (AWG 22) and an interface for the replaceable insert, for example:

- IE FC RJ45 Modular Outlet Insert 2FE with 2 × RJ45 sockets for 100 Mbit/s
- IE FC RJ45 Modular Outlet Insert 1GE with 1 × RJ45 socket for 1 000 Mbit/s
- IE FC RJ45 Modular Outlet Power Insert with 1 × RJ45 socket for 100 Mbit/s and 1 × 24 V DC connection (for details on use and ordering, see Section "Industrial Wireless LAN", page 10/50)

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◼ Ordering data

	Article No.		Article No.
Industrial Ethernet FC Standard Cable GP 2×2 For universal use, for connection to IE FC Outlet RJ45 or IE FC RJ45, 4-core (2×2), shielded		**IE FC RJ45 Plug 2×2 180** RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
• Cut-to-length; max. delivery length 1 000 m, minimum ordering length 20 m	**6XV1840-2AH10**	• 1 pack = 1 unit	**6GK1901-1BB10-2AA0**
• Preferred length 1 000 m	**6XV1840-2AU10**	• 1 pack = 10 units	**6GK1901-1BB10-2AB0**
		• 1 pack = 50 units	**6GK1901-1BB10-2AE0**
Industrial Ethernet FC Standard Cable GP 4×2 8-core, shielded TP installation cable for universal applications; with UL approval; sold by the meter; max. length 1000 m, minimum order 20 m		**Industrial Ethernet FC RJ45 Plug 2×2 90** RJ45 plug connector for Industrial Ethernet with a rugged metal housing and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 90° cable outlet	
• AWG 22, for connection to IE FC RJ45 Modular Outlet	**6XV1870-2E**	• 1 pack = 1 unit	**6GK1901-1BB20-2AA0**
• AWG 24, for connection to IE FC RJ45 Plug 4×2	**6XV1878-2A**	• 1 pack = 10 units • 1 pack = 50 units	**6GK1901-1BB20-2AB0** **6GK1901-1BB20-2AE0**
Industrial Ethernet FC TP Robust Standard Cable GP 2×2 (PROFINET type A) TPE outer sheath, fixed installation, for connection to IE FC RJ45 or IE FC Outlet RJ45, for universal use, 4-core, shielded, Cat. 5e Sold by the meter, max. length 2 000 m; minimum order 20 m	**6XV1841-2A**	**Industrial Ethernet FC RJ45 Plug 4×2 180** RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface	
Industrial Ethernet FC TP Robust Standard Cable GP 2×2 (PROFINET type B) TPE outer sheath, with flexible cores, for connection to IE FC RJ45 or IE FC Outlet RJ45, for universal use, 4-core, shielded, Cat. 5e Sold by the meter; max. length 2 000 m; minimum order 20 m	**6XV1841-2B**	• 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	**6GK1901-1BB11-2AA0** **6GK1901-1BB11-2AB0** **6GK1901-1BB11-2AE0**
Industrial Ethernet FC Stripping Tool Preadjusted stripping tool for fast stripping of Industrial Ethernet FC cables	**6GK1901-1GA00**	**Industrial Ethernet FC Outlet RJ45**	**6GK1901-1FC00-0AA0**
		IE FC RJ45 Modular Outlet with Insert 1GE FastConnect RJ45 Outlet for Industrial Ethernet with a replaceable insert for 1 × 1 000 Mbit/s interface	**6GK1901-1BE00-0AA2**
Industrial Ethernet FC Blade Cassettes Replacement blade cassette for the Industrial Ethernet stripping tool, 5 units; for use with IE FC RJ45 Plugs and Modular Outlet	**6GK1901-1GB00**	**IE FC RJ45 Modular Outlet with Insert 2FE** FastConnect RJ45 Outlet for Industrial Ethernet with a replaceable insert for 2 × 100 Mbit/s interface For further IE FC RJ45 Modular Outlet versions and replaceable inserts, see Catalog IK PI	**6GK1901-1BE00-0AA1**

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Communication
Industrial Ethernet

Passive network components: ITP cables and connectors

■ Overview

Electrical transmission media

Industrial twisted pair cable

Jacket

Industrial Twisted Pair

Foil shield around wire pair

Core Pair 1

Dummy Elements

Overall braided screen

Core Pair 2

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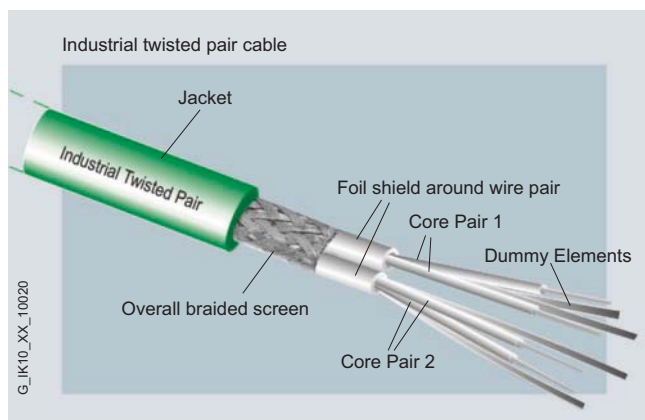
Terminals can be connected through industrial twisted pairs (ITPs). The preassembled ITP standard cable with Sub-D connectors is available for connection between stations and network components. Line lengths of up to 100 m can be achieved while saving on patch technology.

The ITP standard cable 9/15 is equipped with a 9-pin and a 15-pin connector. The cable is used for direct connection of terminals with ITP interface to Industrial Ethernet components with ITP interface.

The ITP XP standard cable 9/9 is equipped with two 9-pin connectors. This cable is crossed for direct connection of two Industrial Ethernet network components with ITP interface.

The ITP XP standard cable 15/15 is equipped with two 15-pin connectors. This cable is crossed for direct connection of two terminals with ITP interface.

The Industrial Ethernet ITP connectors have Sub-D connectors made of metal and are available in two versions:

- 9-pin plug with straight cable outlet
- 15-pin plug with variable cable outlet, for connection to terminals with ITP interface

Alternatively, the terminals can also be connected to twisted pair (TP cord) cables. Detailed information on the TP cords can be found in Catalog IK PI, in the Industry Mall, or in Catalog CA 01 under "Industrial Communication".

■ Ordering data

	Article No.
ITP Standard Cable for Industrial Ethernet Not preassembled, cut-to-length	
2 x 2-core, without connectors For connection of a terminal; for self-assembly of connectors or for the connection between patch panel and socket	6XV1850-0AH10
ITP Standard Cable 9/15 ITP installation cable for direct connection of terminals with ITP interface to Industrial Ethernet network components with ITP interface; with a 9-pin and a 15-pin Sub-D plug	
• 2 m	6XV1850-0BH20
• 5 m	6XV1850-0BH50
• 8 m	6XV1850-0BH80
• 12 m	6XV1850-0BN12
• 15 m	6XV1850-0BN15
• 20 m	6XV1850-0BN20
• 30 m	6XV1850-0BN30
• 40 m	6XV1850-0BN40
• 50 m	6XV1850-0BN50
• 60 m	6XV1850-0BN60
• 70 m	6XV1850-0BN70
• 80 m	6XV1850-0BN80
• 90 m	6XV1850-0BN88
• 100 m	6XV1850-0BT10
ITP XP Standard Cable 9/9 Crossed ITP installation cable for direct connection of two Industrial Ethernet network components with ITP interface; with two 9-pin Sub-D plugs	
• 2 m	6XV1850-0CH20
• 5 m	6XV1850-0CH50
• 8 m	6XV1850-0CH80
• 12 m	6XV1850-0CN12
• 15 m	6XV1850-0CN15
• 20 m	6XV1850-0CN20
• 30 m	6XV1850-0CN30
• 40 m	6XV1850-0CN40
ITP XP Standard Cable 15/15 Crossed ITP installation cable for direct connection of two terminals with ITP interface; with two 15-pin sub-D plugs	
• 2 m	6XV1850-0DH20
• 6 m	6XV1850-0DH60
• 10 m	6XV1850-0DN10
ITP Connector for Industrial Ethernet	
• 9-pin	6GK1901-0CA00-0AA0
• 15-pin, for connection to terminals with ITP interface	6GK1901-0CA01-0AA0

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Overview

Optical transmission media

Glass fiber-optic cables are preferably used as the optical transmission medium. The two types of cable offered are suitable for above-ground routing indoors or outdoors. They are available in fixed lengths, precut/preassembled with 2 x 2 BFOC connectors (FIBER OPTIC standard cable) or 2 x 2 SC-connectors (FO Standard Cable).

The FO Standard Cable with 2 x 2 SC connectors is required for optical networks in the Gigabit range.

Note:

You can order components supplementary to the SIMATIC NET cabling range from your local contact. For technical advice contact:
Siemens AG, Industry Sector, Fürth
J. Hertlein
Tel.: +49 911 750-4465
E-mail: juergen.hertlein@siemens.com

Further information on assembly is provided in the manual for TP and fiber-optic networks.

Ordering data

	Article No.
FO Standard Cable 50/125[1] Preferred lengths, pre-assembled with 2 x 2 SC connectors:	
• 1 m	**6XV1873-6AH10**
• 3 m	**6XV1873-6AH30**
• 5 m	**6XV1873-6AH50**
• 10 m	**6XV1873-6AN10**
• 20 m	**6XV1873-6AN20**
• 50 m	**6XV1873-6AN50**
• 100 m	**6XV1873-6AT10**
• 200 m	**6XV1873-6AT20**
• 300 m	**6XV1873-6AT30**
FIBER OPTIC CABLE standard cable 62.5/125, may be split [1] Preferred lengths, pre-assembled with 2 x 2 BFOC (ST) connectors:	
• 1 m	**6XV1820-5BH10**
• 3 m	**6XV1820-5BH30**
• 5 m	**6XV1820-5BH50**
• 10 m	**6XV1820-5BN10**
• 20 m	**6XV1820-5BN20**
• 50 m	**6XV1820-5BN50**
• 100 m	**6XV1820-5BT10**
• 200 m	**6XV1820-5BT20**
• 300 m	**6XV1820-5BT30**
BFOC (ST) connector set For FIBER OPTIC CABLE standard cable, 20 units	**6GK1901-0DA20-0AA0**

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

Specifications, other cable lengths and other fiber-optic cables can be found in catalog IK PI.

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More information

Various versions of the optical connections for fiber-optic cables are available with the network components or terminal equipment:

Design of optical connection	Description	
BFOC connection = ST (stick and twist)	BFOC connectors have a bayonet lock for glass fiber-optic cables. They are suitable for monomode and multimode fibers.	
SC connection	SC connectors are standard connectors for glass fiber-optic cables. The SC connector is usually in the duplex version. However, it can also be used as a simplex connector by separating it from the isolating piece.	
SC-RJ connection	SC RJ is the smallest SC duplex plug connection.	

Communication
Industrial Ethernet

■ **Design**

Connection of single stations, servers and clients

SIMATIC PCS 7 subsystems for engineering, operation and monitoring (also via Internet/Intranet), batch control, route control, asset management or IT applications are distributed between various SIMATIC PCS 7 Industrial Workstations of single station, server or client design depending on the configurationverteilt. Depending on their task and the associated integration into the entire plant, these SIMATIC PCS 7 Industrial Workstations are connected either only on the plant bus, only on the terminal bus or on both buses of the Industrial Ethernet network. The connection can be redundant or non-redundant, and is made using:

- Interfaces integrated onboard
- Simple network adapters
- Special communication modules, e.g. CP 1623, CP 1613 A2, CP 1628
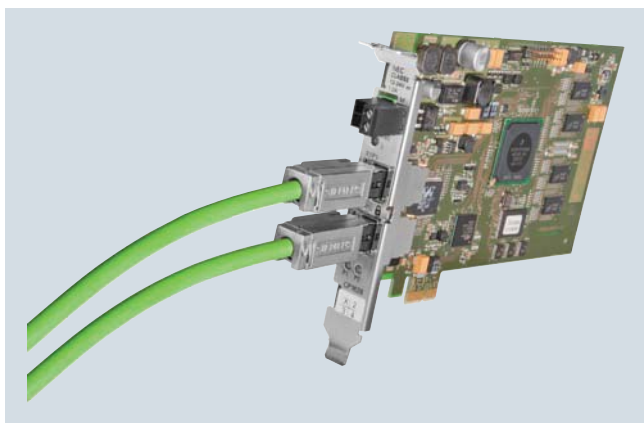
CP 1628 communication module

Connection to plant bus

A SIMATIC PCS 7 workstation, designed as single station or server, can be operated on the Industrial Ethernet plant bus per Ethernet network adapter (10/100/1000 Mbps) and BCE license or per CP 1623/CP 1613 A2/CP 1628 communication module and SIMATIC NET HARDNET-IE S7 or SIMATIC NET HARDNET-IE S7-REDCONNECT communication software.

The IE versions of the SIMATIC PCS 7 Industrial Workstation for single stations and servers are factory equipped with a CP 1623 communication module and SIMATIC NET HARDNET-IE S7 communication software, licensed for up to four CP 1623/CP 1613 A2/CP 1628 (license for 4 units).

CP 1623 and CP 1628 both have a PCI Express port x1 as well as a 2-port switch (RJ45) for connecting to Industrial Ethernet (10/100/1000 Mbps). CP 1628 also features security functions such as Firewall, VPN. CP 1613 A2 which operates on a conventional PCI slot has only one port (ITP/RJ45) for connection to Industrial Ethernet (10/100 Mbps).

An Ethernet card (10/100/1000 Mbps) with BCE license is integrated in the BCE versions of the SIMATIC PCS 7 Industrial Workstation. A separately available desktop adapter network adapter can also be used with this BCE license in a SIMATIC PCS 7 Industrial Workstation.

If you use alternative hardware instead of the SIMATIC PCS 7 Industrial Workstation, you require an additional BCE license for each station which communicates over the plant bus via BCE (Basic Communication Ethernet).

With BCE, AS communication is possible with up to 8 automation systems, with SIMATIC NET HARDNET-IE S7 communication via CP 1623/CP 1613 A2/CP 1628 with up to 64 automation systems (only AS single stations in each case, no AS redundancy stations).

Only the SIMATIC PCS 7 workstation with CP 1623/CP 1613 A2/CP 1628 can communicate with redundant automation systems. You require for this purpose SIMATIC NET HARDNET-IE S7-REDCONNECT (license for 4 units) communication software instead of the SIMATIC NET HARDNET-IE S7 communication software. SIMATIC NET HARDNET-IE S7-REDCONNECT Power-Pack (license for 4 units) can be used to upgrade the communications software.

Single stations and servers with BCE can be retro-upgraded to CP 1613/1623/1628 communication. Depending on the criteria mentioned above, this requires SIMATIC NET HARDNET-IE S7 or SIMATIC NET HARDNET-IE S7-REDCONNECT in addition to the CP 1623, CP 1613 A2 or CP 1628 communication module.

The communication software for CP 1623, CP 1613 A2 or CP 1628 is generally supplied with the SIMATIC PCS 7 software and is installed based on the operating system.

In order to activate this communications software, you may need additional licenses for the SIMATIC NET HARDNET-IE S7, SIMATIC NET HARDNET-IE S7-REDCONNECT, or SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack communication products.

Connection to terminal bus

SIMATIC PCS 7 Industrial Workstations in client, server or single station configurations are usually connected to the terminal bus via the onboard Industrial Ethernet interfaces. In the case of servers or single stations without a connection to the plant bus, the network adapter envisaged for BCE can be used as an alternative.

The terminal bus can also be configured redundantly. A configuration with two separate rings is recommended for the redundant, fault-tolerant terminal bus. The communication is performed in this case using the Parallel Redundancy Protocol (PRP) in accordance with IEC 62439-3. Each PCS 7 station should be connected to one of two Industrial Ethernet interfaces on each of the two separate rings. Industrial Ethernet interfaces are standard in all current SIMATIC PCS 7 Industrial Workstations.

The SIMATIC NET SOFTNET-IE RNA communication software on the redundantly connected PCS 7 stations organizes communication processes based on the PRP. Therefore, SIMATIC NET SOFTNET-IE RNA communication software is required on each of the redundantly connected PCS 7 stations.

■ **Design** (continued)

Connecting non-PRP-enabled devices

Up to 2 non-PRP-enabled devices that have only one Industrial Ethernet port, such as SICLOCK TC 400, a WLAN Access Point or an infrastructure computer, such as DNS, WINS, DHCP or a file server, can be integrated into a redundant, fault-tolerant terminal bus with PRP via a SCALANCE X204RNA.

SCALANCE X204RNA is available in two product versions:

- SCALANCE X204RNA
  Router in plastic housing with 4 electrical ports for connecting up to 2 non-PRP-enabled devices to redundant networks
- SCALANCE X204RNA EEC
  Router in metal housing with 2 electric terminal device ports and 2 optical/electrical combo ports for network connection of up to 2 non-PRP-enabled terminal devices to redundant networks

The following constraints must be observed:

- Length of the TP cable between the network and SCALANCE X-200RNA:
  - Max. 100 m with IE FC cable and IE FC RJ45 Plug 180
  - Max. 10 m using patches with TP cord
- Length of the optical cables between the network and SCALANCE X-200RNA
  - Max. 5 000 m with Industrial Ethernet glass fiber-optic cables (multi-mode)
  - Max. 26 000 m with Industrial Ethernet glass fiber-optic cables (singlemode)

SCALANCE X-200RNA is typically installed with the stations to be connected in a control cabinet.

For more information and technical specifications for the SCALANCE X204RNA, see Catalog IK PI.

Connection of automation systems

The SIMATIC PCS 7 automation systems communicate with other subsystems of the process control system (e.g. operator system or engineering system) via the Industrial Ethernet plant bus. The automation systems are connected to the plant bus using the CP 443-1 communications processor, also redundant in the case of fault-tolerant systems. Instead of the CP 443-1, the CP 443-1 Advanced with integrated security function (firewall and VPN) can also be used.

With the AS 410 modular automation systems, an additional layer is applied to the PCB of CPU 410-5H Process Automation (conformal coating). To match the AS 410, a CP 443-1 in the conformal coating version is therefore preferred (component of the AS bundle configuration).

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Communication
Industrial Ethernet

System connection PCS 7 systems

■ **Ordering data** | Article No. | | Article No.

Ordering data	Article No.
System connection of single stations, servers and clients	
Desktop adapter network card for BCE and as spare part for redundant terminal bus	
Intel network adapter for connection to Industrial Ethernet (10/100/1000 Mbps), with RJ45 connection	
• With conventional PCI interface	A5E00718412
• With PCI Express interface	A5E01579552
CP 1613 A2 PCI card with one port (ITP or RJ45) for connecting to Industrial Ethernet (10/100 Mbps)	6GK1161-3AA01
CP 1623 PCI Express x1 card for connection to Industrial Ethernet (10/100/1000 Mbps), with 2-port switch (RJ45)	6GK1162-3AA00
CP 1628 PCI Express x1 card for connecting to Industrial Ethernet (10/100/1000 Mbps), with 2-port switch (RJ45) and integrated security functions (firewall, VPN)	6GK1162-8AA00
Licenses required in some cases for activating the functionality of the CP 1623, CP 1613 A2 or CP 1628 (communication software is part of the SIMATIC PCS 7 software)	
Activation license if no redundant AS are used	
SIMATIC NET HARDNET-IE S7 V12 S7 communication software with license for up to 4 Industrial Ethernet CPs	6GK1716-1CB12-0AA0
Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	

Ordering data	Article No.
Activation licenses when using redundant AS	
• Alternative license for SIMATIC NET HARDNET-IE S7:	
SIMATIC NET HARDNET-IE S7-REDCONNECT V12 S7 communication software for fail-safe S7 communication over redundant networks with license for up to 4 Industrial Ethernet CPs	6GK1716-0HB12-0AA0
Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
• Additive license for SIMATIC NET HARDNET-IE S7	
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V12 For expansion of HARDNET-IE S7 communication software to HARDNET-IE S7-REDCONNECT, with license for up to 4 Industrial Ethernet CPs	6GK1716-0HB12-0AC0
Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
System connection for plant bus communication via standard network adapter and Basic Communication Ethernet for single stations and servers which are not based on a SIMATIC PCS 7 Industrial Workstation	
SIMATIC PCS 7 BCE V8.1 Runtime license for plant bus communication via standard network adapter and Basic Communication Ethernet; already integrated with SIMATIC PCS 7 Industrial Workstations	
3 languages (English, German, French), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7650-1CD18-2YB5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7650-1CD18-2YH5

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Ordering data

	Article No.			Article No.
Components for connecting SIMATIC PCS 7 stations to a redundant terminal bus with PRP			**SITOP compact 24 V/0.6 A** 1-phase power supply with wide-range input 85 … 264 V AC/ 110 … 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim-line design	6EP1331-5BA00
SIMATIC NET SOFTNET-IE RNA V12 Software for linking of PCS 7 stations to PRP-enabled networks with integrated SNMP	6GK1711-1EW12-0AA0			
			C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration or engineering and application data; can be used for SIMATIC NET products with C-PLUG slot	6GK1900-0AB00
Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation				
			System connection of automation systems	
Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick			**SIMATIC NET CP 443-1 (conformal coating)** for use in AS 410	6GK7443-1EX30-0XE1
Industrial Ethernet SCALANCE X204RNA router With integrated SNMP access, Web diagnostics and PROFINET diagnostics, for connecting to non-PRP-enabled terminal devices on PRP networks, with operating instructions, Industrial Ethernet network manual and configuration software on CD			Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO, and UDP; PROFINET IO controller, MRP; integrated real-time switch ERTEC with two ports; 2 × RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbit/s; with electronic manual on DVD	
• SCALANCE X204RNA with four 100 Mbps RJ45 ports	6GK5204-0BA00-2KB2			
• SCALANCE X204RNA EEC with two 100 Mbps RJ45 ports and two RJ45/SFP combo ports	6GK5204-0BS00-3LA3			
Accessories for Industrial Ethernet SCALANCE X-204RNA routers			**SIMATIC NET CP 443-1** Communication module for connecting SIMATIC S7-400 to Industrial Ethernet through TCP/IP, ISO and UDP; PROFINET IO Controller, MRP; integrated real-time switch ERTEC with 2 ports; 2 × RJ45 interface; S7 communication, open communication (SEND/RECEIVE) with FETCH/WRITE, with or without RFC 1006, DHCP, SNMP V2, diagnostics, multicast, access protection over IP access list, initialization over LAN 10/100 Mbps with electronic manual on DVD	6GK7443-1EX30-0XE0
IE FC TP Standard Cable GP 2×2 (type A) 4-wire, shielded TP installation cable for connecting to IE FC RJ45 outlet / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1000 m, minimum order 20 m	6XV1840-2AH10			
IE FC RJ45 Plug 180 2×2 RJ45 plug connector for Industrial Ethernet with a sturdy metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; with 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface			**SIMATIC NET CP 443-1 Advanced** With security functionality (firewall and VPN)	6GK7443-1GX30-0XE0
• 1 pack = 1 unit	6GK1901-1BB10-2AA0		Communication module for connection of SIMATIC S7-400 to Industrial Ethernet: 1 × 10/100/1000 Mbps; 4 × 10/100 Mbps (IE SWITCH); RJ45 ports; ISO; TCP; UDP; PROFINET IO controller, S7 communication; open communication (SEND/RECEIVE); S7 routing; IP configuration via DHCP/block; IP Access Control List; time synchronization; expanded Web diagnostics; Fast Startup; PROFIenergy support; IP routing; FTP; Web server; e-mail; PROFINET CBA	
• 1 pack = 10 units	6GK1901-1BB10-2AB0			
• 1 pack = 50 units	6GK1901-1BB10-2AE0			
SFP plug-in transceiver				
• SFP991-1 (multi-mode, glass, up to 3 km)	6GK5991-1AD00-8AA0			
• SFP991-1LH+ (singlemode, glass, up to 70 km, LH+)	6GK5991-1AE00-8AA0			
• SFP991-1LD (singlemode, glass, up to 26 km)	6GK5991-1AF00-8AA0			
LC Plug MM[2]	6GK1901-0RB10-2AB0			
LC Plug SM[2]	6GK1901-0SB10-2AB0			
FO Robust Cable GP 50/125/900[1]	6XV1873-2R			
FO Robust Cable GP 4x9/125/900[1]	6XV1843-2R			

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

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

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Communication
Industrial Ethernet

Industrial Wireless LAN

■ **Overview**
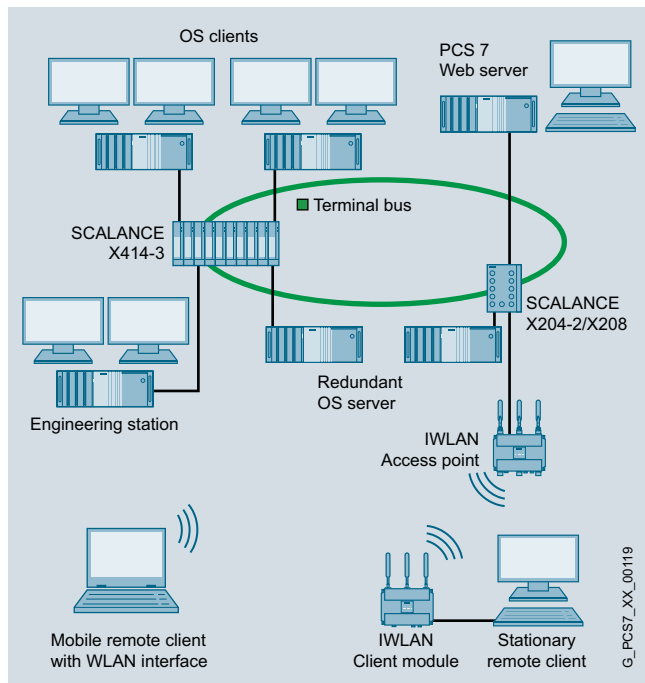
SIMATIC PCS 7 provides the option for integrating mobile or stationary remote clients via an Industrial Wireless LAN (IWLAN) Access Point of the SCALANCE W760, W770 or W780 product ranges into the terminal bus.

The following applications, for example, can be implemented in this manner:

- Configuration of additional remote OS clients (up to 2 on IWLAN)
- Linking of Web clients to a SIMATIC PCS 7 Web server (up to 2 Web clients on IWLAN)
- Remote access to an engineering station using the "RealVNC" software (Enterprise Edition), e.g., during commissioning

Mobile remote clients (e.g. notebooks) equipped with a WLAN interface can use it to communicate with the IWLAN access point. Stationary remote clients in a desktop/tower housing (SIMATIC PCS 7 Industrial Workstations) require an IWLAN client module of the SCALANCE W720, W730 or W740 client range for communication with the IWLAN access point.

The IWLAN client modules and the IWLAN access points of the SCALANCE W700 product family are very rugged, use state-of-the-art authentication and encryption procedures, and ensure high wireless channel reliability. By means of link aggregation and parallel use of several antennas (MIMO technology) in accordance with the international standard IEEE 802.11n you can achieve gross data transfer rates of up to **450 Mbit/s**.

Various designs are offered for the following operational environments:

- IWLAN client modules and access points for control cabinets
- IWLAN client modules and access points for indoor use
- IWLAN access points for outdoor use (also configurable as IWLAN client modules)

SCALANCE W access points and clients according to IEEE 802.11n

The C-PLUG swap medium for saving configuring data supports rapid exchange of equipment without specially trained personnel.

In addition to this, the KEY-PLUG swap medium can enable additional functions for products of the SCALANCE W700 family.

Note:

Note that Industrial Wireless LAN is not approved as terminal bus or plant bus of SIMATIC PCS 7.

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Design

Product categorization according to environment of use

IWLAN products for control cabinets

The IWLAN client modules and IWLAN access points intended for installation in control cabinets are a low-cost alternative for indoor areas with less harsh environmental conditions. They are particularly suited for setting up infrastructures in which great temperature differences and protection against dust and water are less important.

IWLAN products for indoor use

IWLAN client modules and IWLAN access points of this category can be installed at the location that is most favorable for the wireless link in indoor areas. The devices with IP65 protection offer exceptional protection against dust and water and tolerate large differences in temperature. The enclosure and the connectors are resistant to high levels of shock and vibration.

IWLAN products for outdoor use

The IWLAN access points designed for installation outdoors and in publicly accessible areas are extremely rugged devices for high climatic demands and can be installed at a location that is most favorable for the wireless link. They are resistant to condensation, UV radiation, and salt spray.

IWLAN client modules for control cabinets	
SCALANCE W721-1 RJ45	• A wireless card permanently installed in the device
	• Compact design for space-saving installation in control cabinets or boxes on a standard mounting rail
	• Implementation of simple and cost-effective wireless networking
	• Degree of protection IP20
	• For use at ambient temperatures from 0 to +55 °C
	• Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 150 Mbit/s
	• 1 × R-SMA socket for the connection of a remote antenna
	• 1 × RJ45 port for 10/100 Mbit/s
	• 1 × 24 V DC connection
	• Function LEDs for optical signaling of faults and operating states
	• SIMATIC design matches existing components in the control cabinet (e.g. ET 200SP)
SCALANCE W722-1 RJ45	• A wireless card is permanently installed in the device; suitable for establishing wireless connections with iFeatures, e.g. cyclic real-time data transfer and very fast roaming (iPCF, iPCF MC)
	• Further properties as described under SCALANCE W721-1 RJ45

IWLAN client modules for control cabinets	
SCALANCE W734-1 RJ45	• A wireless card is permanently installed in the device; functional scope can be expanded by using a KEY-PLUG W740 iFeatures
	• Low-profile, compact aluminum enclosure, shock and vibration-proof for high mechanical requirements
	• Implementation of simple and cost-effective wireless networking
	• Degree of protection IP20
	• For use at ambient temperatures from -20 to +60 °C
	• Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 300 Mbit/s
	• 2 × R-SMA sockets for the connection of direct mountable and remote antennas
	• Antenna placement optimized for the 2×2 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
	• 2 × RJ45 connector for 10/100/1000 Mbit/s, of which one connector with Power-over-Ethernet according to IEEE 802.3at
	• 2 × 24 V DC connection for redundant power infeed
	• 1 × PLUG compartment for KEY-PLUG/C-PLUG
	• Function LEDs for optical signaling of faults and operating states
	• Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail
	• SIMATIC design matches existing components in the control cabinet
SCALANCE W748-1 RJ45	• A wireless card is permanently installed in the device; functional scope can be expanded by using a KEY-PLUG W780 iFeatures
	• Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
	• Dust protection with IP30 degree of protection
	• For use at ambient temperatures from -20 to +60 °C
	• Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 450 Mbit/s
	• 3 × R-SMA sockets for the connection of directly mountable and remote antennas (6 × R-SMA sockets for the variants with 2 wireless modules)
	• Antenna placement optimized for the 3×3 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
	• 1 × RJ45 connector for 10/100/1 000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at
	• 2 × 24 V DC connection for redundant power infeed
	• 1 × PLUG compartment for KEY-PLUG/C-PLUG
	• Function LEDs for optical signaling of faults and operating states
	• Digital input for feeding in a signal (e.g. from a sensor) to an SNMP-based network management system
	• Digital output for converting a command received over SNMP into a signal and switching a hardware function
	• Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail

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Communication
Industrial Ethernet

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■ **Design** (continued)

IWLAN access points for control cabinets

SCALANCE W761-1 RJ45

- A wireless card permanently installed in the device
- Compact design for space-saving installation in control cabinets or boxes on a standard mounting rail
- Implementation of simple and cost-effective wireless networking
- Degree of protection IP20
- For use at ambient temperatures from 0 ... +55 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 150 Mbit/s
- 1 × R-SMA socket for the connection of a remote antenna
- 1 × RJ45 port for 10/100 Mbit/s
- 1 × 24 V DC connection
- Function LEDs for optical signaling of faults and operating states
- SIMATIC design matches existing components in the control cabinet (e.g. ET 200SP)

SCALANCE W774-1 RJ45

- A wireless card is permanently installed in the device; functional scope can be expanded by using a KEY-PLUG W780 iFeatures
- Low-profile, compact aluminum enclosure, shock and vibration-proof for high mechanical requirements
- Implementation of simple and cost-effective wireless networking
- Degree of protection IP20
- For use at ambient temperatures from -20 ... +60 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 300 Mbit/s
- 2 × R-SMA sockets for the connection of direct mountable and remote antennas
- Antenna placement optimized for the 2×2 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
- 2 × RJ45 connector for 10/100/1000 Mbit/s, of which one connector with Power-over-Ethernet according to IEEE 802.3at
- 2 × 24 V DC connection for redundant power infeed
- 1 × PLUG compartment for KEY-PLUG/C-PLUG
- Function LEDs for optical signaling of faults and operating states
- Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail
- SIMATIC design matches existing components in the control cabinet (e.g. ET 200SP)

IWLAN access points for control cabinets

SCALANCE W788 RJ45

- Two product versions; functional scope can be expanded by KEY-PLUG W780 iFeatures:
  - SCALANCE W788-1 RJ45 with one wireless card permanently installed
  - SCALANCE W788-2 RJ45 with two wireless cards permanently installed
- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- Dust protection with IP30 degree of protection
- For use at ambient temperatures from -20 to +60 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 450 Mbit/s
- 3 × R-SMA sockets for the connection of directly mountable and remote antennas (6 × R-SMA sockets for the variants with 2 wireless modules)
- Antenna placement optimized for the 3×3 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
- 1 × RJ45 connector for 10/100/1 000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at
- 2 × 24 V DC connection for redundant power infeed
- 1 × PLUG compartment for KEY-PLUG/C-PLUG
- Function LEDs for optical signaling of faults and operating states
- Digital input for feeding in a signal from a sensor, for example, to an SNMP-based network management system
- Digital output for converting a command received over SNMP into a signal and switching a hardware function
- Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail

IWLAN client modules for indoor use

SCALANCE W748-1 M12

- A wireless card is permanently installed in the device; functional scope can be expanded by using a KEY-PLUG W780 iFeatures
- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 to +60 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 450 Mbit/s
- 3 × N-Connect sockets for the connection of directly mountable and remote antennas (6 × N-Connect sockets for the variants with 2 wireless modules)
- Antenna placement optimized for the 3x3 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
- 1 × M12 connector for 10/100/1 000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at
- 1 × M12 socket for power supply (24 V DC)
- 1 × PLUG compartment (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail

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■ **Design** (continued)

IWLAN access points for indoor use

SCALANCE W788 M12

- Two product versions; functional scope can be expanded by KEY-PLUG W780 iFeatures:
  - SCALANCE W788-1 M12 with one wireless card permanently installed
  - SCALANCE W788-2 M12 with two wireless cards permanently installed
- Rugged aluminum enclosure, shock and vibration-proof, for high mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -20 to +60 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 450 Mbit/s
- 3 × N-Connect sockets for the connection of directly mountable and remote antennas (6 × N-Connect sockets for the variants with 2 wireless modules)
- Antenna placement optimized for the 3×3 MIMO technology; the antennas do not interfere with each other when they are mounted directly on the device
- 1 × M12 connector for 10/100/1 000 Mbit/s with Power-over-Ethernet according to IEEE 802.3at
- 1 × M12 socket for power infeed (24 V DC)
- 1 × PLUG compartment (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- Mounting on wall, S7-1500 rail, S7-300 rail, or 35 mm standard rail

SCALANCE W788-2 M12 EEC for extended environmental conditions

Main features like SCALANCE W788 M12. Deviating or additional features:

- Two wireless cards are permanently installed; functional scope can be expanded by KEY-PLUG W780 iFeatures
- For use at ambient temperatures from -40 to +70 °C
- 6 × N-Connect sockets for the connection of direct mountable and remote antennas
- Special coating of the printed circuit boards (conformal coating)
- Resistant to condensation
- Railroad approval in accordance with EN 50155

IWLAN access points for outdoor use

SCALANCE W786 RJ45

- Three product versions; functional scope can be expanded by KEY-PLUG W780 iFeatures:
  - SCALANCE W786-1 RJ45 with 1 wireless card permanently installed in the device; connections for 3 external antennas
  - SCALANCE W786-2 RJ45 with 2 radio cards permanently installed; connections for 6 external antennas
  - SCALANCE W786-2IA RJ45 with 2 radio cards permanently installed; 6 internal antennas
- Rugged, impact-resistant plastic enclosure, shock and vibration-proof for demanding mechanical requirements
- High IP65 degree of protection against dust and water jets
- For use at ambient temperatures from -40 to +60 °C
- Supports IEEE 802.11a/b/g/h/n; 2.4 GHz and 5 GHz frequency band; data transfer rate up to 450 Mbit/s
- Resistant to condensation
- Resistant to UV radiation and salt spray
- 3 × R-SMA sockets for the connection of remote antennas (6 × R-SMA sockets or 6 internal antennas for the variants with 2 wireless modules)
- 1 × RJ45 connector for 10/100/1 000 Mbit/s and Power-over-Ethernet according to IEEE 802.3at
- 1 × 24 V DC connection, optional operation with 12 to 24 V DC or 100 to 240 V AC with power supply integrated into device
- 1 × PLUG compartment (KEY-PLUG/C-PLUG)
- Function LEDs for optical signaling of faults and operating states
- Resistant to destruction through connections within the device
- Mounting on wall, with optional mounting set on S7 rail, 35 mm standard rail, or on a pole
- Can also be configured as client modules (max. 1 wireless module) using the web-based management system

SCALANCE W786-2 SFP

Main features like SCALANCE W786 RJ45. Deviating or additional features:

- Two wireless cards permanently installed in the device; can be expanded to establish wireless connections with KEY-PLUG W780 iFeatures
- Two slots for SFP plug-in transceivers (optical 2-port switch)
- For use at ambient temperatures from -40 °C to +60 °C (depending on the SFP plug-in transceiver used)
- 6 × R-SMA sockets for the connection of remote antennas

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Communication
Industrial Ethernet

Industrial Wireless LAN

◼ Ordering data

	Article No.		Article No.
IWLAN products for control cabinets		**SCALANCE W748-1 RJ45** IWLAN Ethernet client module with integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP30 degree of protection (-20 ... +60 °C)	
Client modules for control cabinets		Product package: Mounting hardware; 4-pin screw terminal for 24 V DC, 4-pin screw terminal for digital input and output; manual on CD, German/English	
SCALANCE W721-1 RJ45 IWLAN Ethernet client module with integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbit/s; WPA2/AES; IP20 degree of protection (0 ... +55 °C)		For administration of the radio link of up to eight devices with Industrial Ethernet connection; IP30 degree of protection	
Product package: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD; English/German		• National approvals for operation outside the U.S.	**6GK5748-1FC00-0AA0**
For administration of the wireless connection of one device with Industrial Ethernet connection		• National approvals for operation within the U.S.[1]	**6GK5748-1FC00-0AB0**
• National approvals for operation outside the U.S.	**6GK5721-1FC00-0AA0**	**Access points for control cabinets**	
• National approvals for operation within the U.S.[1]	**6GK5721-1FC00-0AB0**	**SCALANCE W761-1 RJ45** IWLAN access point with integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbit/s; WPA2/AES; IP20 degree of protection (0 ... +55 °C)	
SCALANCE W722-1 RJ45 IWLAN Ethernet client module with iFeatures support and integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 150 Mbit/s; WPA2/AES; IP20 degree of protection (0 ... +55 °C)		Product package: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD; English/German	
Product package: Mounting hardware, 3-pin screw terminal for 24 V DC; manual on CD; English/German		• National approvals for operation outside the U.S.	**6GK5761-1FC00-0AA0**
For administration of the wireless connection of one device with Industrial Ethernet connection; with iFeatures		• National approvals for operation within the U.S.[1]	**6GK5761-1FC00-0AB0**
• National approvals for operation outside the U.S.	**6GK5722-1FC00-0AA0**	**SCALANCE W774-1 RJ45** IWLAN access point with integrated wireless interface for establishing wireless connections with iFeatures; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbit/s; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20 ... +60 °C)	
• National approvals for operation within the U.S.[1]	**6GK5722-1FC00-0AB0**		
SCALANCE W734-1 RJ45 IWLAN Ethernet client module with integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 300 Mbit/s; WPA2/AES; integrated 2-port switch; Power over Ethernet (PoE), IP30 degree of protection (-20 ... +60 °C)		Product package: Mounting hardware, 4-pin screw terminal for 24 V DC; manual on CD; English/German	
Product package: Mounting hardware, 4-pin screw terminal for 24 V DC; manual on CD; English/German		• National approvals for operation outside the U.S.	**6GK5774-1FX00-0AA0**
For managing the wireless connection of up to eight linked devices with Industrial Ethernet connection;		• National approvals for operation within the U.S.[1]	**6GK5774-1FX00-0AB0**
• National approvals for operation outside the U.S.	**6GK5734-1FX00-0AA0**		
• National approvals for operation within the U.S.[1]	**6GK5734-1FX00-0AB0**		

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Ordering data

	Article No.
SCALANCE W788 RJ45	
IWLAN access points with integrated wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP30 degree of protection (-20 to +60 °C)	
Product package: Mounting hardware; 4-pin screw terminal for 24 V DC, 4-pin screw terminal for digital input and output; manual on CD, German/English	
• **SCALANCE W788-1 RJ45** IWLAN access point with one integrated wireless interface	
- National approvals for operation outside the U.S.	6GK5788-1FC00-0AA0
- National approvals for operation within the U.S.[1]	6GK5788-1FC00-0AB0
• **SCALANCE W788-2 RJ45** IWLAN access point with two integrated wireless interfaces	
- National approvals for operation outside the U.S.	6GK5788-2FC00-0AA0
- National approvals for operation within the U.S.[1]	6GK5788-2FC00-0AB0
IWLAN products for indoor use	
Client modules for indoor use	
SCALANCE W748-1 M12	
IWLAN Ethernet client module with integrated wireless interface; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 ... +60 °C)	
Product package: Mounting hardware; manual on CD, German/English	
For managing the wireless connection of up to eight linked devices with Industrial Ethernet connection	
• National approvals for operation outside the U.S.	6GK5748-1GD00-0AA0
• National approvals for operation within the U.S.[1]	6GK5748-1GD00-0AB0
Access points for indoor use	
SCALANCE W788 M12	
IWLAN access point with integrated wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-20 ... +60 °C)	
Product package: Mounting hardware; manual on CD, German/English	
• **SCALANCE W788-1 M12** IWLAN access point with one integrated wireless interface	
- National approvals for operation outside the U.S.	6GK5788-1GD00-0AA0
- National approvals for operation within the U.S.[1]	6GK5788-1GD00-0AB0
• **SCALANCE W788-2 M12** IWLAN access point with two integrated wireless interfaces	
- National approvals for operation outside the U.S.	6GK5788-2GD00-0AA0
- National approvals for operation within the U.S.[1]	6GK5788-2GD00-0AB0

	Article No.
SCALANCE W788 M12 EEC for extended environmental conditions	
IWLAN dual access point with two integrated wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; railway approval in accordance with EN 50155; conformal coating; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection	
Product package: Mounting hardware; manual on CD, German/English	
• National approvals for operation outside the U.S.	6GK5788-2GD00-0TA0
• National approvals for operation within the U.S.[1]	6GK5788-2GD00-0TB0
IWLAN products for outdoor use	
Access points for outdoor use	
SCALANCE W786	
IWLAN access points with integrated wireless interfaces; wireless networks IEEE 802.11a/b/g/h/n at 2.4/5 GHz up to 450 Mbit/s; WPA2/AES; Power over Ethernet (PoE), IP65 degree of protection (-40 to +60 °C)	
Product package: Mounting hardware, 2-pin screw terminal for 24 V DC; manual on CD; English/German	
• **SCALANCE W786-1 RJ45** IWLAN access point with one integrated wireless interface and RJ45 connection: Connections for three external antennas	
- National approvals for operation outside the U.S.	6GK5786-1FC00-0AA0
- National approvals for operation within the U.S.[1]	6GK5786-1FC00-0AB0
• **SCALANCE W786-2 RJ45** IWLAN access point with two integrated wireless interfaces and RJ45 connection: Six connections for external antennas	
- National approvals for operation outside the U.S.	6GK5786-2FC00-0AA0
- National approvals for operation within the U.S.[1]	6GK5786-2FC00-0AB0
• **SCALANCE W786-2IA RJ45** IWLAN access point with two integrated wireless interfaces and RJ45 connection: Six internal antennas	
- National approvals for operation outside the U.S.	6GK5786-2HC00-0AA0
- National approvals for operation within the U.S.[1]	6GK5786-2HC00-0AB0
• **SCALANCE W786-2 SFP** IWLAN access point with two integrated wireless interfaces and RJ45 connection: Six external antennas	
- National approvals for operation outside the U.S.	6GK5786-2FE00-0AA0
- National approvals for operation within the U.S.[1]	6GK5786-2FE00-0AB0

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Communication
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Ordering data

	Article No.
Accessories	
KEY-PLUG W740 iFeatures Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W client modules with PLUG compartment	6GK5907-4PA00
KEY-PLUG W780 iFeatures Swap medium for enabling additional iFeatures, for simple device replacement if a fault occurs and for storage of configuration data; can be used in SCALANCE W access points with PLUG compartment	6GK5907-8PA00
C-PLUG Swap medium for simple replacement of devices in the event of a fault; for storing configuration data; can be used in SIMATIC NET products with PLUG compartment	6GK1900-0AB00
DIN rail mounting adapter DIN rail mounting adapter for SCALANCE W788 M12 and SCALANCE W788 RJ45; screw fixing for mounting on a 35 mm DIN rail to EN 50022 Product package: 3 units per pack	6GK5798-8ML00-0AB3
MS1 mounting set Mounting set for fixing the SCALANCE W786 products onto an S7-300 rail or a 35 mm DIN rail	6GK5798-8MG00-0AA0
Power supply	
PS791-2DC power supply 24 V DC power supply for installation in SCALANCE W786 products; operating instructions in English/German	6GK5791-2DC00-0AA0
PS791-2AC power supply 110 to 230 V AC power supply for installation in SCALANCE W786 products; operating instructions in English/German	6GK5791-2AC00-0AA0
Connection components	
SFP plug-in transceiver for SCALANCE W786-2 SFP • SFP992-1 Gigabit, multimode, 750 m • SFP992-1LD Gigabit, singlemode, 10 km • SFP992-1LH Gigabit, singlemode, 40 km • SFP992-1LH+ Gigabit, singlemode, 70 km	6GK5992-1AL00-8AA0 6GK5992-1AM00-8AA0 6GK5992-1AN00-8AA0 6GK5992-1AP00-8AA0
Fiber-optic cables	See Catalog IK PI, Industrial Ethernet, cabling systems, glass fiber-optic cables

	Article No.
IE FC RJ45 Plug 180 2×2 RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation-displacement contacts for connecting Industrial Ethernet FC installation cables; with a 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB10-2AA0 6GK1901-1BB10-2AB0 6GK1901-1BB10-2AE0
IE FC Standard Cable GP 2×2 4-core, shielded TP installation cable for connection to IE FC outlet RJ45 plug / IE FC RJ45 plug; PROFINET-compliant; with UL approval; sold by the meter; max. quantity 1 000 m, minimum order 20 m	6XV1840-2AH10
IE FC RJ45 Plug 4×2 RJ45 plug connector for Industrial Ethernet (10/100/1000 Mbit/s) with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables; 180° cable outlet; for network components and CPs/CPUs with Industrial Ethernet interface • 1 pack = 1 unit • 1 pack = 10 units • 1 pack = 50 units	6GK1901-1BB11-2AA0 6GK1901-1BB11-2AB0 6GK1901-1BB11-2AE0
IE FC M12 Plug PRO 4×2 M12 plug-in connector suitable for on-site assembly (X-coded, IP65/IP67), metal enclosure, insulation/displacement fast connection method, for SCALANCE W • 1 unit • 8 units	6GK1901-0DB30-6AA0 6GK1901-0DB30-6AA8
IE FC Standard Cable GP 4×2 8-core (4×2), shielded TP installation cable for connection to IE FC RJ45 Plug 4×2 and IE M12 Plug PRO 4×2; PROFINET-compliant; with UL approval; sold by the meter; max. length 1 000 m, minimum order 20 m	6XV1878-2A
Power M12 Cable Connector PRO Socket for connection of SCALANCE W-700 for 24 V DC supply; 4-pole, a-coded, with mounting instructions, 3 units	6GK1907-0DC10-6AA3
Power cable 2×0.75 Connecting cable for Power M12 Cable Connector PRO, sold by the meter	6XV1812-8A
IE FC Stripping Tool Pre-adjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	6GK1901-1GA00
Antennas and miscellaneous IWLAN accessories for IWLAN access points and IWLAN client modules	See Catalog IK PI, Industrial Wireless LAN, accessories

[1] Please note national approvals under www.siemens.com/wireless-approvals

■ More information

For further information and detailed technical specifications on the IWLAN products for SIMATIC PCS 7, refer to Catalog IK PI, the Industry Mall or Catalog CA 01 under "Industrial Communication > Industrial Wireless Communication > Industrial Wireless LAN".

Selection tools

The following tools will help you to select your product:

SIMATIC NET Selection Tool
- Online version: www.siemens.com/snst
- Offline version: www.siemens.com/snst-download

TIA Selection Tool
- www.siemens.com/tia-selection-tool

Radio approvals

Current approvals can be found on the Internet:
- www.siemens.com/wireless-approvals

10

Communication
PROFINET

▪ Overview

Network standard Ethernet
▷ High transmission rate
▷ Wireless
▷ Flexible topologies

Fieldbus standard PROFIBUS
▷ Fast I/O communication
▷ Safety
▷ Diagnostics
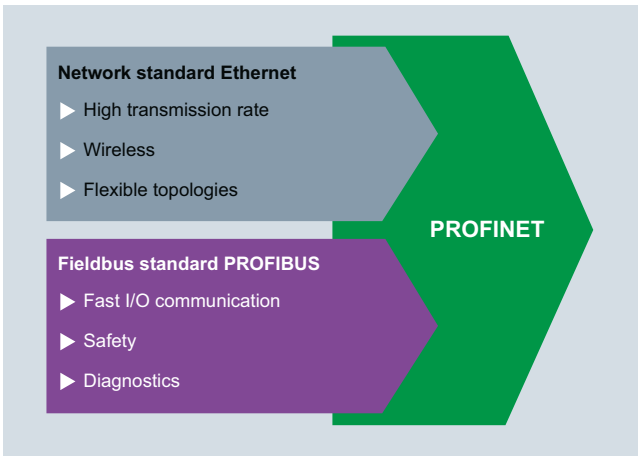
PROFINET

PROFINET – The Ethernet standard for automation

With currently more than 5.8 million nodes worldwide, PROFINET is the leading Industrial Ethernet Standard for automation (source: PROFIBUS & PROFINET International (PI) Edition 2013). Because it combines the advantages of the leading fieldbus PROFIBUS and of the Ethernet open network standard, it is characterized by very high flexibility, efficiency, and performance. These factors are essential for the acceleration of the information processes, increased plant availability, and increased productivity in a company.

▪ Benefits

- ▪ PROFINET is the open Industrial Ethernet standard for automation
- ▪ PROFINET is based on Industrial Ethernet
- ▪ PROFINET uses TCP/IP and IT standards
- ▪ PROFINET is Real-Time Ethernet
- ▪ PROFINET permits seamless integration of fieldbus systems
- ▪ PROFINET supports fail-safe communication via PROFIsafe
- ▪ PROFINET integrates HART communication for the configuration of HART field devices

▪ Function

Your advantages at a glance

Flexibility	Efficiency	Performance
Tailor-made plant concepts	Optimal use of resources	Increased productivity
▶ Industrial Wireless LAN	▶ One cable for all purposes	▶ Speed
▶ Safety	▶ Device/network diagnostics	▶ High precision
▶ Flexible topologies	▶ Energy efficiency	▶ Large quantity structures
▶ Open standard	▶ Easy cabling	▶ High transmission rate
▶ Web tools	▶ Fast device replacement	▶ Redundancy
▶ Expandability	▶ Ruggedness/stability	▶ Fast start-up

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■ **Function** (continued)

PROFINET aspects focused on process automation

Open standard

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

Due to its openness, PROFINET creates the basis for a uniform automation network in the plant to which all of the devices can be connected. Existing plant parts, for example those implemented with the PROFIBUS fieldbus, can be easily integrated.

Flexible topologies

In addition to a line topology, PROFINET also supports star, tree and ring topologies. This is made possible by switching technology, which is based on active network components (Industrial Ethernet switches and media converters) and field devices/components with integrated switch functionality. This all results in more flexibility for plant planning as well as savings in cabling.

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

Expandability

Integrating existing systems and networks is simple and requires little effort and expense. This enables you to protect your investments in plant units with communication via PROFIBUS and other fieldbuses (e.g. AS-Interface).

Additional PROFINET stations can be integrated at any time as well. The use of additional network components allows both wired and wireless network infrastructures to be expanded.

Safety

The PROFIsafe safety profile, which has been tried and tested with PROFIBUS and which permits the transmission of standard and safety-related data on a single bus cable, can also be used with PROFINET. No special network components are required for fail-safe communication, standard switches and standard network transitions can be used without restrictions.

Industrial Wireless LAN (IWLAN)

PROFINET also supports wireless communication with Industrial Wireless LAN and thus opens up new application fields.

Device and network diagnostics

Retaining the proven PROFIBUS model makes the same diagnostic information available for PROFINET. In addition, device diagnostics also includes read-out of module-specific and channel-specific data from the devices. This enables simple and fast location of faults. In addition to the availability of device information, the top priority in network management is to achieve reliable network operation. PROFINET uses the Simple Network Management Protocol (SNMP) for maintenance and monitoring of the network components and their functions.

Easy cabling

Industry-standard networks require no specialist knowledge and can be configured without problems in the shortest possible time. At the same time, stringent demands are placed on the installation of cables in the industrial environment.

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

The time required for connecting the terminal devices is minimized due to the easy installation using just one tool. The practical color coding helps avoid installation errors. Both copper cables and glass fiber-optic cables can be easily assembled on-site in this way.

Ruggedness/stability

An automation network must be extremely resistant to external sources of interference. Switched Ethernet prevents faults in one section of the network from influencing the entire plant network. Highly resistant fiber-optic cables can be used in particularly EMC-critical areas.

Speed and precision

PROFINET communication is fast, deterministic and precise. It is based on Real Time Ethernet (RT) with prioritization of the transmission and division of the bandwidth.

With PROFIdrive, the standardized drive profile, vendor-independent communication between CPUs and drives can be implemented as well.

Large quantity structures

A SIMATIC PCS 7 controller (automation system) can manage up to 256 devices in the field via PROFINET. The number of nodes in a PROFINET network is practically unlimited since the entire IP address range is available.

With 64 KB of user data per message frame, the transmittable volume of data on PROFINET is significantly greater than with PROFIBUS DP with 244 bytes.

High transmission rate

Based on Ethernet, PROFINET with 100 Mbit/s in full duplex mode achieves a significantly higher transmission rate than previous fieldbuses. The transmission of large volumes of data has no effect on the I/O data transfer.

Media redundancy

Higher plant availability can be achieved by means of a redundant installation (ring topology). Media redundancy can be implemented with both external switches and via integrated PROFINET interfaces. It prevents plant standstill should an interruption in the communication in part of the ring installation occur. Re-configuration times of 200 ms can be achieved. Required maintenance and repair work can thus be performed without time pressure.

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Communication
PROFINET

Architecture

Overview

When configuring PROFINET communication, it is generally recommendable to separate the field communication from the plant communication. In the context of the SIMATIC PCS 7 process control system, PROFINET mainly focuses on PROFINET IO communication between the automation systems (controllers) and the process I/O.

The integration of HART communication in PROFINET enables HART field devices on the PROFINET IO to be configured via SIMATIC PDM from a central engineering station.

The following list shows those SIMATIC PCS 7 system components and their PROFINET IO interfaces which are suitable for PROFINET IO communication:

- S7-400 standard automation systems (AS Single Stations) with
  - PROFINET interface in the CPU or
  - CP 443-1 communication module
- S7-400 fault-tolerant and safety-related automation systems (AS Single Stations/AS Redundancy Stations) with PROFINET interface in the CPU
- SIMATIC PCS 7 AS mEC RTX with PROFINET interface in the EC31 embedded controller
- ET 200M remote I/O stations with IM 153-4 PN High Feature interface module
- ET 200SP remote I/O stations with IM 155-6PN High Feature interface module

The ordering data for automation systems and their PROFINET components can be found in the sections "Modular AS 410 Systems", "Complementary S7-400 systems" and "Embedded Systems, mEC Automation System" of the "Automation Systems" chapter. The ordering data for the PROFINET interface modules of the ET 200M and ET 200SP remote I/O stations can be found in the "Process I/O" chapter (section "ET 200M for SIMATIC PCS 7" under "Interface modules", page 11/18 or section "ET 200SP for SIMATIC PCS 7" under "Interface modules and bus adapters", page 11/76).

In addition to specific PROFINET products, Industrial Ethernet products can also be used as network components, e.g. SCALANCE X switches and media converters, FastConnect connection elements, as well as electrical and optical transmission media (see the "Communication" chapter, section "Industrial Ethernet" or section "PROFINET/Industrial Ethernet" in the IK PI Catalog).

In addition to the SIMATIC PCS 7 system components for PROFINET communication included in this catalog, the ST PCS 7 AO catalog includes add-on products for SIMATIC PCS 7 which support the integration of further PROFINET IO stations, e.g.

- SIMOCODE pro block library for integration of the SIMOCODE pro V PN motor management system via PROFINET IO
- Drive ES PCS 7 APL with function blocks and faceplates for integration of variable-speed SINAMICS drives via PROFINET IO
- AS-Interface block library for integration of AS-i slaves (sensors/actuators) via the IE/AS-i LINK PN IO (single or double master) on the PROFINET IO

Design

Based on line, star, tree, and ring topologies, numerous network configurations can be implemented with PROFINET IO for the field communication of the SIMATIC PCS 7 process control system. The remote I/O stations can be connected directly via an interface module or using SCALANCE X switches.

The configuration settings available depend on the version of the automation system. PROFINET architectures with SIMATIC PCS 7 AS mEC RTX correspond to architectures with an S7-400 AS single station, in which the PROFINET IO-communication is performed via the CPU interface. PROFINET architectures for AS single stations and S7-400 AS redundant stations differ in principle.

The following configuration examples are also applicable to safety-related PROFINET IO architectures. However, this requires the use of safety-related system components from the "Safety Integrated for Process Automation" product range as a communication partner (for more information, see the "Safety Integrated for Process Automation" chapter). The PROFIsafe profile for the transmission of safety-related data is integrated in PROFINET as standard.

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■ **Design** (continued)

Typical PROFINET configurations with S7-400 AS single stations
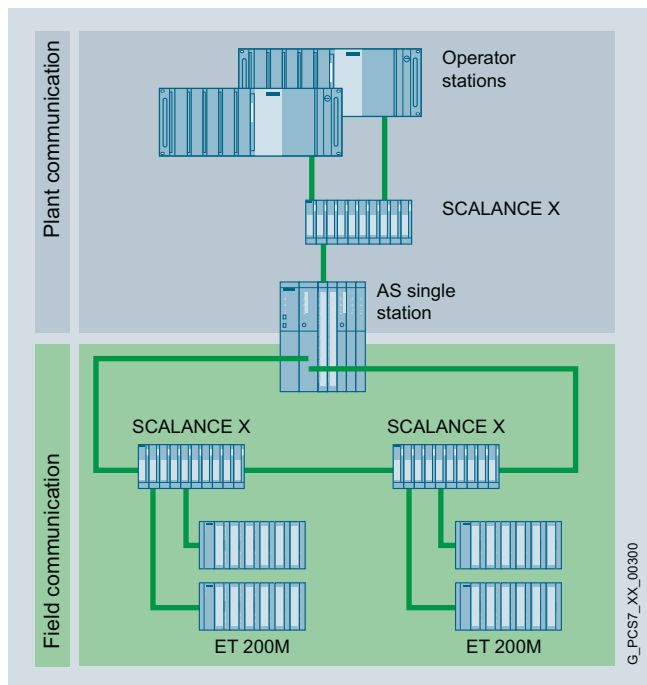
Networking of PROFINET IO stations via SCALANCE X switches
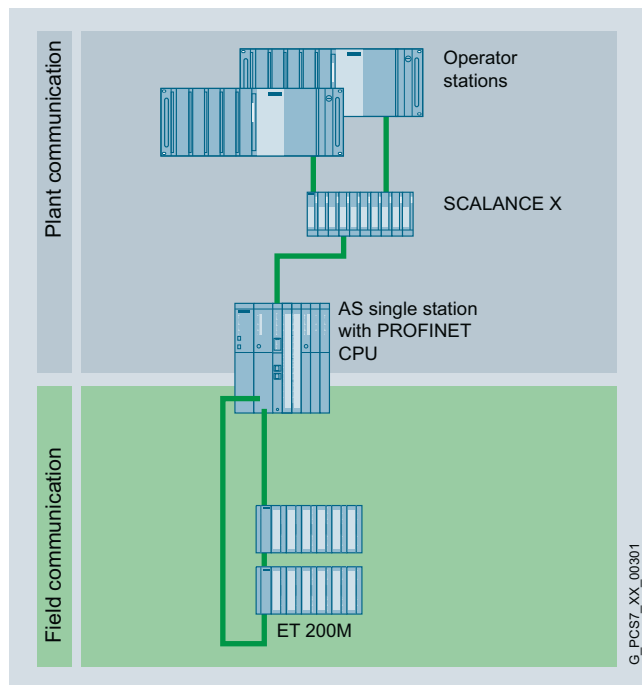
Direct networking of PROFINET IO stations via integrated interfaces

When using AS single stations, PROFINET IO configurations with ring topology and media redundancy ensure higher availability of the I/O devices than other configurations. If the ring wire is interrupted or if a station fails, the redundancy manager immediately activates an alternative communication path, thus preventing failure of the entire segment.
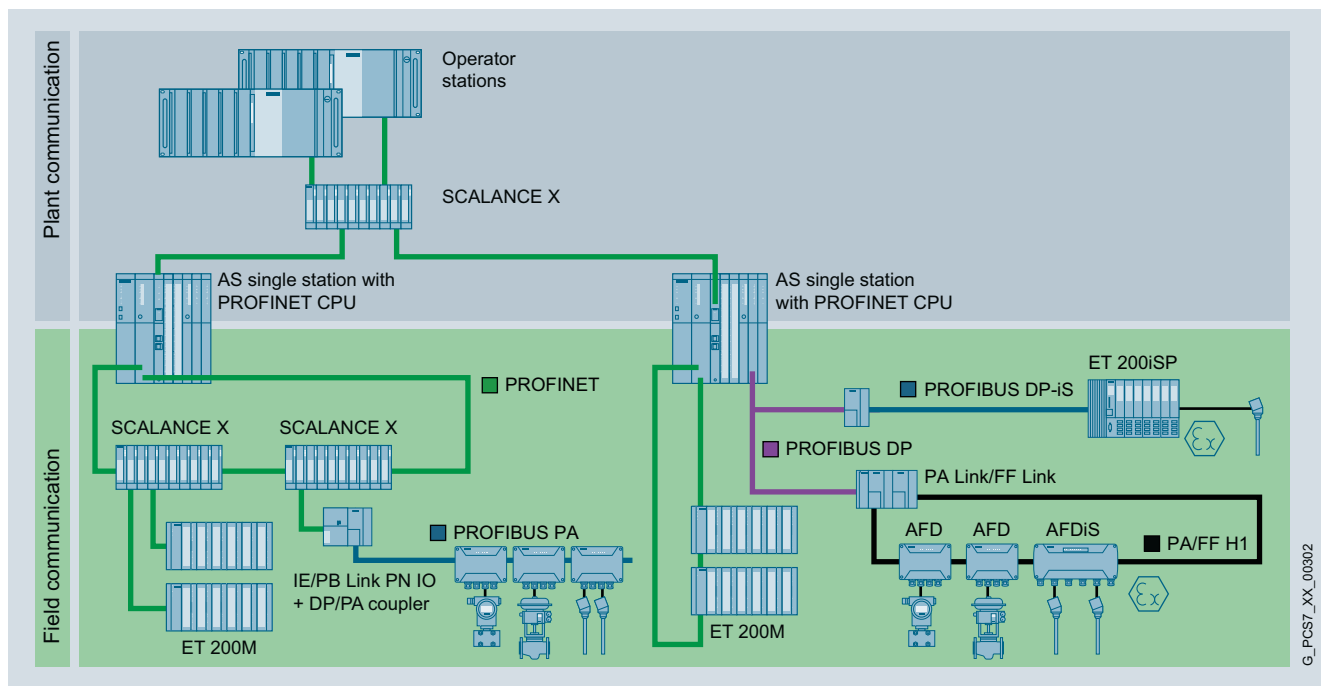
Fieldbus integration via network transition or fieldbus interface in the automation system

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Communication
PROFINET

Design (continued)

PROFIBUS DP and PROFIBUS PA fieldbus types can be integrated via an IE/PB Link PN IO network transition in PROFINET.

You can also integrate the PROFIBUS DP/PA or FOUNDATION Fieldbus H1 fieldbuses in the automation system via a PROFIBUS interface (for ordering data, see Automation systems chapter, Standard automation systems section, from page 8/7):

- PROFIBUS DP interface in the CPU
- CP 443-5 communication module

Typical PROFINET configurations with S7-400 AS single stations
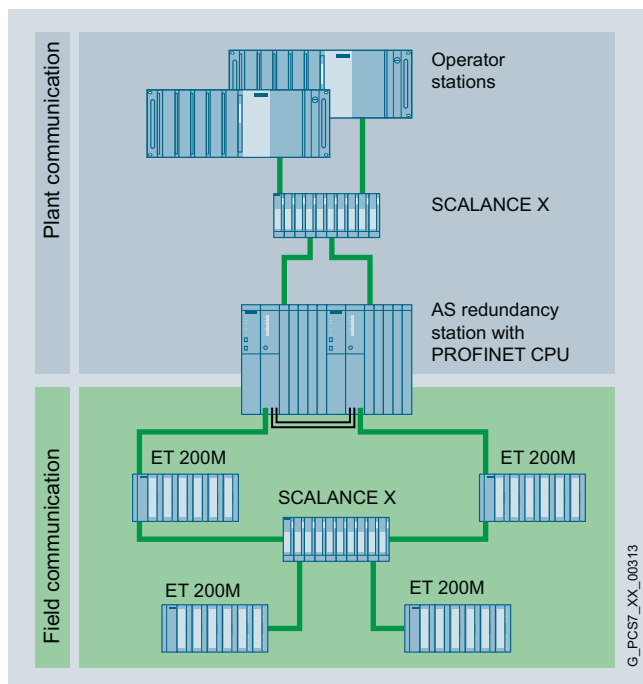
PROFINET IO ring configuration with AS redundancy station

The maximum availability with minimum error handling times is achieved by AS redundancy stations in conjunction with the system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication where each I/O device establishes a communication connection to each of the two CPUs of an AS redundancy station over the topological network. In contrast to the single-sided I/O device connection to only one CPU, failure of a CPU in this case does not automatically lead to failure of the connected I/O devices.

Ordering data

	Article No.
Network transition to fieldbus integration in PROFINET	
IE/PB LINK PN IO Network transition between Industrial Ethernet and PROFIBUS DP	6GK1411-5AB00

Overview
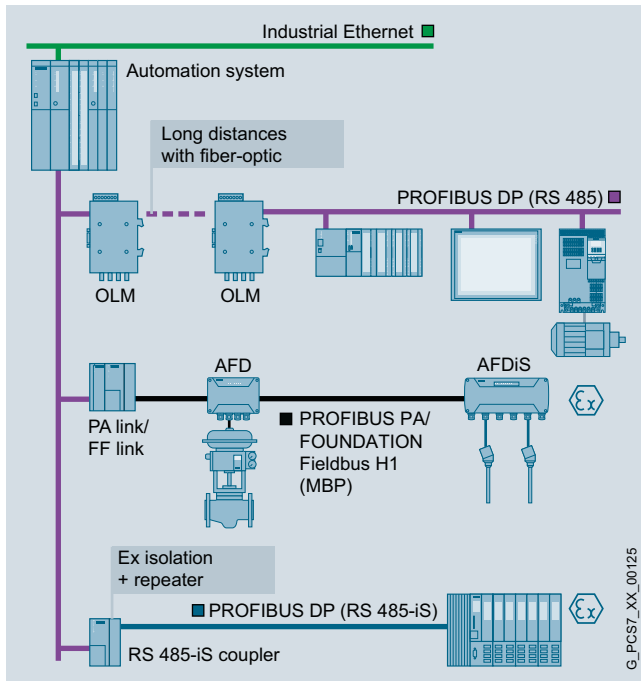
Communication at field level with PROFIBUS

Distributed peripherals such as remote I/O stations with their I/O modules, transmitters, drives, valves or operator terminals communicate with the automation systems (controllers) at field level through a powerful real-time bus system. This communication is characterized by:

• Cyclic transmission of process data

• Acyclic transfer of interrupts, parameters and diagnostics data

PROFIBUS is predestined for these tasks because it enables high-speed communication with the intelligent distributed I/Os by means of a communications protocol (PROFIBUS DP) as well as communication and simultaneous power supply for transmitters and actuators (PROFIBUS PA).

PROFIBUS is simple, rugged and reliable, can be expanded online by further distributed components, and can be used in both standard environments and hazardous areas. It supports the coexistence of field devices from different vendors on one line (interoperability) as well as the vendor-independent exchangeability of devices from one profile family.

Benefits

SIMATIC PCS 7 utilizes the benefits of the PROFIBUS from start to finish:

■ Small planning and engineering overheads as well as low commissioning costs

■ Optimum distributed system structure with low hardware and space requirements

■ Significantly reduced overhead for wiring, jumpering, distribution, power supply and field mounting

■ High-speed communication with high measurement accuracy

■ Efficient engineering, interoperability and replaceability of devices through vendor-independent device description

■ Short commissioning times through short loop tests, easy parameterization and the elimination of calibration work

■ Bidirectional communication and high amounts of information permit enhanced diagnostics functions for fast fault locating and troubleshooting

■ Optimum life cycle management thanks to processing and evaluation of diagnostics and status information by the Maintenance Station

Function

Users have numerous facilities for communication and line diagnostics, as well as for diagnostics of the intelligent field devices connected. Furthermore, the PROFIBUS is fully integrated into the global asset management with the Maintenance Station of the SIMATIC PCS 7 process control system.

For process automation, the following PROFIBUS functions are particularly relevant in addition:

• Integration of previously installed HART devices

• Redundancy

• Safety-related communication with PROFIsafe up to SIL 3 according to IEC 61508

• Time-of-day synchronization

• Time tagging

PROFIBUS transmission systems

PROFIBUS DP

• **RS 485**
Simple and low-cost electrical transmission system based on shielded two-wire cable.

• **RS 485-iS**
Intrinsically-safe electrical transmission system for hazardous areas up to Ex zone 1 or 21, implemented using a shielded two-wire cable with a transmission rate of 1.5 Mbps.

• **Fiber-optic**
Optical transmission system with glass or plastic fiber-optic cables, for fast transmission of large quantities of data in environments with high interferences or for covering long distances.

PROFIBUS PA

• **MBP (Manchester coded; bus powered)**
Intrinsically-safe transmission system which permits simultaneous transmission of digital data and powering of the field devices by means of a two-wire cable. It is suitable for direct connection of devices in environments up to Ex zone 1 or 21 and associated sensors/actuators in environments up to Ex zone 0 or 20.

10

Communication
PROFIBUS DP

Application

The PROFIBUS DP fieldbus enables the SIMATIC PCS 7 auto-mation systems (controllers) to communicate with distributed I/Os from the ET 200 range (remote I/Os) as well as with field/process devices, CPUs/CPs and operator terminals that have a PROFIBUS DP interface. With the aid of the fieldbus isolating transformer (RS 485-iS coupler) and the RS 485-iS transmission technology, PROFIBUS DP can be run as an intrinsically-safe fieldbus in all environments up to Ex zone 1 or 21.

Controller communication with intelligent distributed devices on PROFIBUS PA, FOUNDATION Fieldbus H1 or HART I/Os is also implemented via PROFIBUS DP.

In a SIMATIC PCS 7 automation system, PROFIBUS DP lines can be connected to distributed process I/O both via a PROFIBUS DP interface in the CPU and via a CP 443-5 Extended communication module. On a PROFIBUS DP line it is possible to operate up to 125 devices, and on a bus segment up to 31 devices with PROFIBUS DP interface (32 stations).

Electrical and optical transmission technologies offer many different configuration options for PROFIBUS DP networks. Electrical networks can span up to approx. 10 km. With optical transmission systems, the total size of the network is governed primarily by the cycle times as a result of the almost loss-free transmission.

With SIMATIC PCS 7, PROFIBUS DP topologies are always implemented through the standard electrical PROFIBUS DP connection on the automation system in the form of electrical or mixed (electrical/optical) networks. In the case of mixed networks, the transition between the two media is implemented by an optical link module (OLM). As regards communication between the stations, there is no difference between electrical two-wire technology and fiber-optic technology.

Electrical networks can be configured with a line or tree topology. Mixed electrical/optical networks with OLMs as routers can be configured with a line, ring or star topology.

Technical specifications

PROFIBUS DP			
Data transmission	**RS 485**	**RS 485-iS**	**Fiber-optic**
Transmission rate	9.6 kbit/s ... 12 Mbit/s	9.6 kbit/s ... 1.5 Mbit/s	9.6 kbit/s ... 12 Mbit/s
Cable	2-wire shielded	2-wire shielded	Plastic as well as multi-mode and single-mode glass-fiber
Type of protection		EEx(ib)	
Topology	Line, tree	Line	Ring, star, line
Nodes per segment	32	32[1]	–
Nodes per network (with repeater)	126	126	126
Cable length per segment dependent on transmission rate	1 200 m at max. 93.75 kbit/s 1 000 m at 187.5 kbit/s 400 m at 500 kbit/s 200 m at 1.5 Mbit/s 100 m at 12 Mbit/s	1 000 m at 187.5 kbit/s[1] 400 m at 500 kbit/s [1] 200 m at 1.5 Mbit/s [1]	Max. 80 m (plastic) 2 ... 3 km (multimode glass fiber) >15 km at 12 Mbit/s (single-mode glass-fiber)
Repeater for signal refreshing with RS 485 networks	Max. 9	Max. 9[1]	Not relevant

[1] According to PROFIBUS installation guideline 2.262

Overview

The simple and cost-effective two-wire RS 485 transmission technology is exceptionally suitable for networks with a linear/tree structure and high data transmission rates. Shielded, twisted pair cables are used as the transmission medium. The PROFIBUS DP nodes are connected to these bus cables using bus connectors.

Design
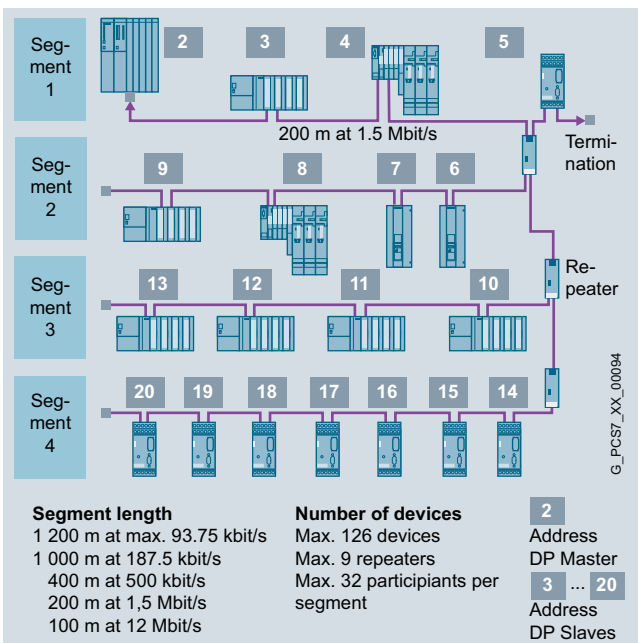
Configuration example of an electrical RS 485 network with linear/tree structure

Segment length
1 200 m at max. 93.75 kbit/s
1 000 m at 187.5 kbit/s
400 m at 500 kbit/s
200 m at 1,5 Mbit/s
100 m at 12 Mbit/s

Number of devices
Max. 126 devices
Max. 9 repeaters
Max. 32 participiants per segment

2 Address DP Master
3 ... **20** Address DP Slaves

The network size with an electrical RS 485 network is in total smaller than that with an optical network. However, by using segmenting and signal regeneration with up to 9 repeaters, distances from 1 km (at 12 Mbps) up to 10 km (at 187.5 kbit/s) can be achieved depending on the transmission rate.

A segment can have up to 32 participants (master/slaves), and the total network up to 126 participants. The start and end of each segment must be terminated by an active bus resistor which is typically pre-integrated in the device (e.g. repeater) or is available as an active RS 485 termination element.

The configuration example (figure at top right) shows a typical addressing scheme for a PROFIBUS DP network made up of multiple segments. Although repeaters are electrical participants on the PROFIBUS, they are not assigned a slave address since they are not directly addressed by the master.

FastConnect

FastConnect Stripping Tool

PROFIBUS FastConnect is a system for fast and easy assembly of PROFIBUS copper cables. The system comprises compatible components:

- FastConnect Standard Cable for fast assembly
- FastConnect Stripping Tool
  with FastConnect Blade Cassettes (spare blade cassettes for the stripping tool)
- FastConnect bus connector for PROFIBUS

Repeater for PROFIBUS

A repeater links the individual bus segments with RS 485 technology. Main applications are:

- Increase in number of nodes and distances
- Electrical isolation of segments

If diagnostics functions for physical cable diagnostics are desired in addition to the standard repeater functionality, a diagnostic repeater can be alternatively used. It monitors the copper bus cables in online mode. In the event of a fault it sends a diagnostic message with detailed information about the type and location of the fault to the DP master.

Active RS 485 terminating element

The active RS 485 terminating element is used to terminate bus segments. The component supplied with 24 V DC independent of the bus nodes provides a defined RS 485 signal level, and suppresses reflections on the line. Bus nodes (e.g. ET 200S) can be coupled and decoupled without feedback to/from PROFIBUS networks terminated by active RS 485 terminating elements.

10

Communication
PROFIBUS DP

Electrical networks

■ **Design** (continued)

RS 485-iS coupler

The RS 485-iS coupler is an isolating transformer with which the PROFIBUS DP fieldbus can be routed intrinsically-safe into the hazardous area.

The RS 485-iS coupler has the following functions:

- Connection of intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection
- Conversion of the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically-safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbps
- Suitable as a safety barrier
- Additional use as a repeater in the hazardous area.

The RS 485-iS coupler as an open resource can only be used in housings, cabinets or rooms for electrical equipment. It is assembled on a SIMATIC S7-300 rail which can be positioned horizontally or vertically.

The RS 485-iS coupler is integrated into the PROFIBUS as follows:

- Connection to standard PROFIBUS DP via standard Sub-D socket (at the bottom on the RS 485-iS coupler, behind the right front door).
- Connection of PROFIBUS DP with RS 485-iS transmission technology via screw terminals (at the top of the RS 485-iS coupler, behind the right front door)
- The last bus node on the intrinsically-safe PROFIBUS DP segment (not further RS 485-iS couplers) must be terminated by a selectable terminating resistor using the connector, order no. 6ES7972-0DA60-0XA0.

■ **Ordering data**

	Article No.		Article No.
PROFIBUS FastConnect Standard Cable, violet Standard type with special design for fast mounting, 2-core, shielded, cut-to-length	6XV1830-0EH10	**RS 485 Repeater for PROFIBUS** Data transfer rate max. 12 Mbit/s, 24 V DC, IP 20 housing	6ES7972-0AA02-0XA0
Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m		**RS 485 Diagnostic Repeater** For connection of 1 or 2 segments to PROFIBUS DP; with online diagnostics functions for monitoring of bus cables	6ES7972-0AB01-0XA0
Preferred lengths		**Active RS 485 Terminating Element for PROFIBUS** For terminating bus segments for data transfer rates from 9.6 kbit/s to 12 Mbit/s	6ES7972-0DA00-0AA0
- 20 m	6XV1830-0EN20		
- 50 m	6XV1830-0EN50		
- 100 m	6XV1830-0ET10		
- 200 m	6XV1830-0ET20	**RS 485-IS Coupler** Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	6ES7972-0AC80-0XA0
- 500 m	6XV1830-0ET50		
- 1 000 m	6XV1830-0EU10		
PROFIBUS FastConnect Standard Cable IS GP, blue Cable type for use in potentially explosive atmospheres, with special design for fast mounting, 2-core, shielded, cut-to-length	6XV1831-2A	**PROFIBUS connector with selectable terminating resistor** For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	6ES7972-0DA60-0XA0
Specify length in m Max. delivery unit 1 000 m, minimum order quantity 20 m		**S7-300 rails** Lengths:	
Further PROFIBUS cables with associated specifications	See Catalog IK PI	• 160 mm	6ES7390-1AB60-0AA0
PROFIBUS FastConnect Stripping Tool Preadjusted stripping tool for fast stripping of PROFIBUS FastConnect bus cables	6GK1905-6AA00	• 482 mm • 530 mm • 830 mm • 2 000 mm	6ES7390-1AE80-0AA0 6ES7390-1AF30-0AA0 6ES7390-1AJ30-0AA0 6ES7390-1BC00-0AA0
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for PROFIBUS FastConnect stripping tool, 5 units	6GK1905-6AB00		

Note:

For further information on electrical PROFIBUS networks as well as components and accessories, particularly cable material for special applications, refer to Catalog IK PI, Chapter "PROFIBUS", Section "Network components for PROFIBUS – electrical networks".

	Article No.
PROFIBUS FastConnect bus connector RS 485 with 90° cable outlet With insulation displacement system 15.8 x 59 x 35.6 mm (W x H x D) max. transmission rate 12 Mbit/s	
• No programming port	6ES7972-0BA52-0XA0
• With programming port	6ES7972-0BB52-0XA0
PROFIBUS FastConnect bus connector RS 485 Plug 180 With 180° cable outlet, with insulation displacement system, for connection of PC, PG, OP	6GK1500-0FC10
Other bus connectors See Catalog IK PI	

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Overview

Optical networks are more expensive than electrical RS 485 networks, but are insensitive to electromagnetic interference. In addition to purely optical networks, the combination of electrical and optical networks has been established in practice, providing users with the advantages of the respective transmission technologies.

Design
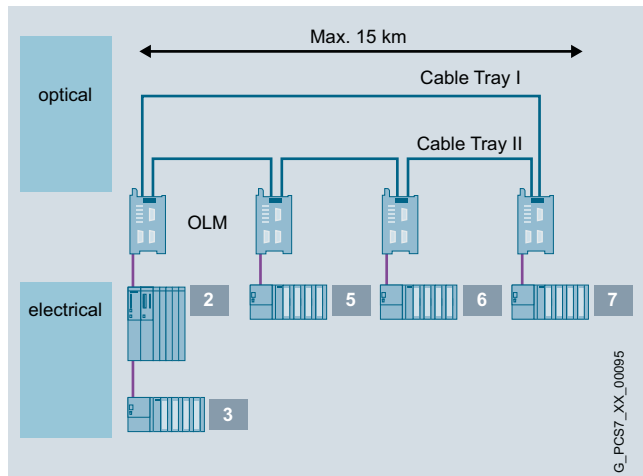
Length between 2 OLMs	Number of devices
Plastic: 80 m PCF: 400 m Glass: up to 3 km (singlemode: 15 km) Max. 12 Mbit/s	Max. 32 electrical participants per OLM Max. 122 OLMs per OLM Ring (depending on PROFIBUS DP bus parameters)

Configuration example of an optical ring combined with an electrical network

A ring structure of the optical network provides fault tolerance since communication is not interrupted in the event that the cable is damaged at one point or interrupted. Electrical bus segments are incorporated into the optical ring using up to 122 optical link modules (OLM). Depending on the version of the OLMs and the bus cable, the distance between two OLMs can be up to 15 km. A maximum of 32 electrical bus participants can be operated on one OLM.

The configuration example shows a typical addressing scheme with mixed transmission technologies. Although OLMs are electrical participants within their respective segment, they are not assigned a PROFIBUS slave address.

Optical Link Module OLM/G22

Optical Link Modules

Optical Link Modules (OLM) permit the construction of optical and hybrid (electrical/optical) networks in line, ring or star topology.

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 (P11/G11) or two (P12/G12/G22) fiber-optic (FO) interfaces with BFOC connections. Depending on the version, they are suitable for the following distances when combined with the correspondingly specified plastic/glass fiber-optic cables:

Distance	Fiber-optic conductors	OLM
Up to 80 m	POF-FOC	OLM/P11 or OLM/P12
Up to 400 m	PCF FOC	
Up to 3 km	Glass multimode FOC	Depending on ambient temperature • 0 ... +60 °C: OLM/G11, OLM/G12, or OLM/G22 • -25 ... +60 °C: OLM/G12-EEC
Up to 10 km	Glass multimode FOC	OLM/G11-1300 or OLM/G12-1300
Up to 15 km	Glass singlemode FOC	

We preferably recommend the OLM/G12 as the standard component for optical PROFIBUS networks indoors and outdoors.

The OLMs have a compact metal housing suitable for DIN rail assembly. They automatically recognize all PROFIBUS data transfer rates. Faults can be rapidly located as follows:

• Display of module status via floating signaling contact
• Checking of FO link quality (loss per section) via test output for optical receivers for logging and plausibility checks.

Further information and detailed technical specifications on the various OLM versions can be found in Catalog IK PI, chapter "PROFIBUS", section "Network components for PROFIBUS - Optical networks with OLM".

Bus cables

Suitable for the OLM/G12, fiber-optic cables (FOC) made of glass with 2 multi-mode fibers are preferably used for optical PROFIBUS networks indoors and outdoors.

The standard FIBER OPTIC CABLE is available in fixed lengths up to 2 000 m. It is preassembled with 4 BFOC connectors. A BFOC connector set with 20 connectors is available as an accessory.

Further fiber-optic cables as well as detailed technical specifications can be found in the IK PI Catalog, chapter "PROFIBUS", section "Network components for PROFIBUS - Optical networks".

10

Communication
PROFIBUS DP

Optical networks

■ **Ordering data** — Article No. | Article No.

	Article No.
FIBER OPTIC CABLE **Standard glass FO cable,** **splittable** Pre-assembled with 4 BFOC connectors	
Preferred lengths	
• 1 m	**6XV1820-5BH10**
• 5 m	**6XV1820-5BH50**
• 10 m	**6XV1820-5BN10**
• 20 m	**6XV1820-5BN20**
• 50 m	**6XV1820-5BN50**
• 100 m	**6XV1820-5BT10**
Other lengths and cables	See Catalog IK PI
BFOC connector set[1] For standard and trailing FIBER OPTIC CABLES, 20 units	**6GK1901-0DA20-0AA0**
PROFIBUS OLM/P11 V4.0 Optical link module with one RS 485 interface and one plastic fiber-optic interface (2 BFOC sockets), with signaling contact and measuring output, two BFOC plugs for plastic fiber-optic cables	6GK1503-2CA00
PROFIBUS OLM/P12 V4.0 Optical link module with one RS 485 interface and two plastic fiber-optic interfaces (4 BFOC sockets), with signaling contact and measuring output, four BFOC plugs for plastic fiber-optic cables	6GK1503-3CA00
PROFIBUS OLM/G11 V4.0 Optical link module with one RS 485 interface and one glass FOC interface (2 BFOC sockets), for standard distances up to 3 000 m, with signaling contact and measuring output	6GK1503-2CB00
PROFIBUS OLM/G12 V4.0 Optical link module with one RS 485 interface and two glass FOC interfaces (4 BFOC sockets), for standard distances up to 3 km, with signaling contact and measuring output	6GK1503-3CB00

	Article No.
PROFIBUS OLM/G22 V4.0 Optical link module with two RS 485 interfaces and two glass FOC interfaces (4 BFOC sockets), for standard distances up to 3 km, with signaling contact and measuring output	**6GK1503-4CB00**
PROFIBUS OLM/G12-EEC V4.0 Optical link module with one RS 485 interface and two glass FOC interfaces (4 BFOC sockets), for standard distances up to 3 km, suitable for extended temperature range from -25 °C to +60 °C, with signaling contact and measuring output	**6GK1503-3CD00**
PROFIBUS OLM/G11-1300 V4.0 Optical link module with one RS 485 interface and one glass FOC interface (2 BFOC sockets), 1 300 nm wavelength for long distances up to 15 km, with signaling contact and measuring output	**6GK1503-2CC00**
PROFIBUS OLM/G12-1300 V4.0 Optical link module with one RS 485 interface and two glass FOC interfaces (4 BFOC sockets), 1 300 nm wavelength for long distances up to 15 km, with signaling contact and measuring output	**6GK1503-3CC00**

[1] Additional components of the SIMATIC NET cabling range can be ordered from your local contact.
For technical advice contact:
Siemens AG, Industry Sector, Fürth
J. Hertlein
Tel.: +49 911 750-4465
E-mail: juergen.hertlein@siemens.com

10

Overview

In a SIMATIC PCS 7 automation system, PROFIBUS DP lines can be connected to distributed process I/O both via a PROFIBUS DP interface in the CPU and via a CP 443-5 Extended communication module.

If a module slot provided in the CPU for the PROFIBUS connection is still empty, an IF 964-DP interface module is required in addition.

With the AS 410 modular automation systems, an additional layer is applied to the PCB of CPU 410-5H Process Automation (conformal coating). A CP 443-5 Extended in the conformal coating version is therefore also preferred for the AS 410 (component of the AS bundle configuration).

For information on the type and number of configurable PROFIBUS DP interfaces, see chapter "Automation systems".

Benefits

Advantages of the CP 443-5 Extended communications module:

■ Compact design; 9-contact Sub-D socket for connection to PROFIBUS DP

■ Simple installation
Can be plugged into AS rack slot; connection to the other S7-400 modules via backplane bus

■ Operation without fan; backup battery or memory submodule are not required

■ With additional PBC coating option (conformal coating)

Ordering data

	Article No.
SIMATIC NET CP 443-5 Extended (conformal coating) for use in AS 410 Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamping, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE1**
SIMATIC NET CP 443-5 Extended Communications processor for connection of SIMATIC S7-400 to PROFIBUS as DP master or for S7 communication, for increasing the number of DP lines, for data set routing with SIMATIC PDM and for 10-ms time stamping, electronic manual on CD; module occupies 1 slot	**6GK7443-5DX05-0XE0**
IF 964-DP Interface module for connection of another PROFIBUS DP line, for plugging into a free DP module slot of the CPU	**6ES7964-2AA04-0AB0**

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Communication
PROFIBUS DP

Y-link

■ Overview

The Y-Link is a bus coupler for transition from a redundant PROFIBUS DP master system to a simple, single-channel PROFIBUS DP master system. It can be used to connect devices with only one PROFIBUS DP interface to the redundant PROFIBUS DP master system.

■ Design

Redundant automation system

Y-Link

redundant PROFIBUS DP

Connection of non-redundant PROFIBUS DP devices to redundant PROFIBUS DP

G_PCS7_XX_00127

The Y-link comprises:
- Two IM 153-2 High Feature interface modules for extended temperature range
- One Y-coupler incl. RS 485 repeater
- 1 BM IM 157 (IM/IM) bus module for 2 IM 153-2 High Feature modules, for extended temperature range
- One BM Y-coupler bus module

Evaluation of the Y-Link diagnostics (and hence indirectly of the connected DP standard slaves) is supported by driver blocks.

It is recommendable to have a redundant -24 V DC supply for the Y-Link, e.g. with two PS 307/PS 305 load power supplies.

■ Ordering data

	Article No.
Y-Link For connection of devices with only one PROFIBUS DP interface to a redundant automation system, comprising:	**6ES7197-1LA11-0XA0**
• 2 IM 153-2 High Feature interface modules	
• 1 Y-coupler	
• 1 BM IM 157 bus module (IM/IM)	
• One BM Y-coupler bus module	
PS 307 Load Power Supply Including connecting comb; 120/230 V AC; 24 V DC	
• 2 A; 40 mm wide	6ES7307-1BA01-0AA0
• 5 A; 60 mm wide	6ES7307-1EA01-0AA0
• 5 A, extended temperature range; 80 mm wide	6ES7307-1EA80-0AA0
• 10 A, 80 mm wide	6ES7307-1KA02-0AA0
PS 305 Load Power Supply 24/48/60/110 V DC; 24 V DC	
• 2 A, extended temperature range; 80 mm wide	6ES7305-1BA80-0AA0

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■ **Overview**

SIMATIC Fieldbus Calculator

Direct interfacing of the devices in the field, especially in the hazardous area, together with the information content of the communication, are of significant importance in the process industry. PROFIBUS PA, which permits both digital data transmission and the power supply on a two-wire line with the intrinsically-safe MBP transmission technology (Manchester Coded; Bus Powered) is tailored to these requirements. It is optimally suitable for direct integration of solenoid valves, sensors, and pneumatic actuators positioned in operating environments up to Ex zone 1/21 or 0/20 into the process control system.

The typical response time of a transmitter of approx. 10 ms indicates that short cycle times can be achieved with the PROFIBUS PA even in the case of a segment configuration with up to 31 devices. Practically all typical applications of the process industry can be implemented, both in small and large plants. Bidirectional communication and high information content allow enhanced diagnostics for fast and exact fault detection and elimination. The standardized communications services guarantee interoperability and replaceability between multi-vendor field devices and remote configuration of the field devices during operation.

Safety communication with the PROFIsafe profile

The PROFIsafe profile allows seamless integration of safety communication into the PROFIBUS PA. You need not configure a separate safety bus for your safety-related applications. The PROFIBUS PA with the PROFIsafe profile is incorporated in "Safety Integrated for Process Automation". This comprehensive range of products and services from Siemens for failsafe, fault-tolerant applications in the process industry offers you attractive and cost-effective alternatives to separate safety systems.

Redundant architectures

You can define the degree of redundancy separately for the controller, fieldbus and I/O levels of your plant depending on the automation task and the derived safety requirements, and match them to the field instrumentation (Flexible Modular Redundancy, FMR). You can find an overview of the redundant architectures of PROFIBUS PA under "Design".

Network transition PROFIBUS PA to PROFIBUS DP

The PA link is preferred as the gateway from PROFIBUS PA to PROFIBUS DP. When using the PA link, the transmission rate on the PROFIBUS DP is independent of the lower-level PROFIBUS PA segments. The configuration of the PA link depends on the fieldbus architecture. The types of coupler described in the section "PA routers" can be used for the configuration. With a small volume of data (small quantity structure) and low time requirements, the DP/PA coupler can also be operated in stand-alone mode as a gateway.

■ **Benefits**

Advantages provided by distributed field automation with application of the PROFIBUS PA profile included low hardware overhead, cost-effective engineering, increased operational safety and problem-free maintenance. These advantages are underlined by the following features:

• Modularity and uniformity from the sensor up to the control level permit new plant concepts
• Implementation of intrinsically-safe applications through use of the fieldbus in hazardous areas
• Redundant PROFIBUS PA architectures (ring and line topologies with coupler redundancy) support Flexible Modular Redundancy (FMR) from the automation system (controller) down to a PA field device
• Safety-related and fault-tolerant applications with low device and cabling requirements
• Reduced configuration costs through simple, central engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also cross-vendor)
• Simple installation using two wire cable for common power supply and data transmission
• Reduced commissioning costs through simplified loop check
• Low servicing costs thanks to simple wiring and comprehensive diagnostics facilities

10

Communication
PROFIBUS PA

■ Design
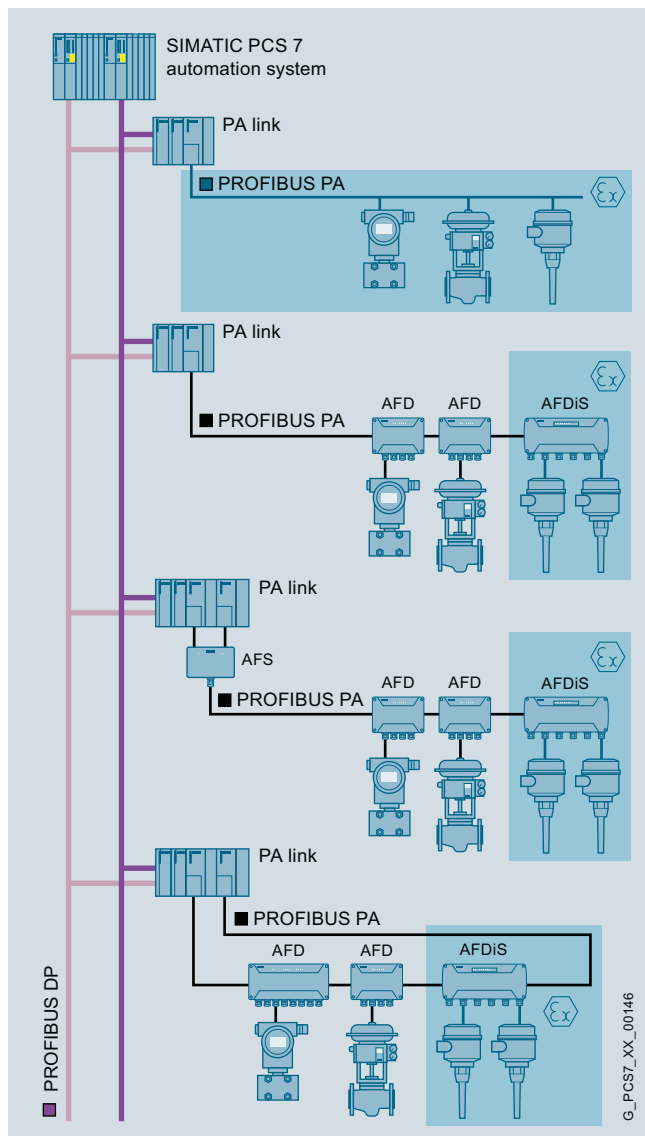
Basic PROFIBUS PA design versions when using the PA link as the PA router

Basic PROFIBUS PA design versions are shown at this point. The PA link is used as the PA router in these configuration examples.

However, the PA router can only be implemented per DP/PA coupler. The PROFIBUS DP connection is then directly on the coupler instead of per interface module.

The number of PROFIBUS PA devices is limited according to the specifications in section "Technical data".

Line architecture with single coupler

Max. 5 PROFIBUS PA lines (line segments) can be operated via single couplers (max. 3 for mixed configurations with ring or coupler redundancy) on a PA link as PA router, equipped with up to 5 DP/PA couplers.

In the line architecture with individual couplers, each line segment is connected to one DP/PA coupler of the PA router. The PA router can be connected to a single or redundant PROFIBUS DP.

The FDC 157-0 the first choice as the DP/PA coupler. When using this coupler, the PA devices can be integrated into the line segment via active field distributors AFD4 and AFD8 (approval for Ex zone 2/22) and AFDiS/AFDiSD (approval for Ex zone 1/21). The PA devices are connected to these field distributors via short-circuit-proof spur lines.

Up to 8 field distributors of type AFD4/AFD8, 5 field distributors of type AFDiS/AFDiSD, or 5 field distributors of both AFDiS and AFD4/AFD8 types combined can be optionally operated in a line segment. The last field distributor at the end of the line leading away from the DP/PA coupler automatically activates its bus terminating resistor.

Intrinsically-safe PA devices in hazardous areas in accordance with Ex zone 1/21 or 0/20 are primarily integrated into a bus segment by means of active field distributors AFDiS/AFDiSD. For PA devices in Ex zone 1/21, the connection via a line segment on the PA router with DP/PA coupler Ex [i] is a possible alternative. The devices are integrated separately into the line segment via SplitConnect Taps (via spur line or directly via SplitConnect M12 outlet). A SplitConnect terminator is required for the bus termination of the segment.

By grouping individual devices in different line segments, Flexible Modular Redundancy is possible at device level.

Line architecture with redundant coupler

The PA link operable as a PA router on a single or redundant PROFIBUS DP can only be equipped with one redundant DP/PA coupler pair (up to 3 single couplers can also be optionally configured). The redundant DP/PA coupler pair can be used either for a line architecture with Active Field Splitter (AFS) or for a ring architecture.

With a line architecture, the AFS is connected to the redundant DP/PA coupler pair (2 x FDC 157-0) in the PA router. It connects the line segment connected to it to the active of the two redundant DP/PA couplers. A DP/PA coupler can be replaced without interrupting the ongoing operation.

The PA devices are integrated in the line segment as for a line architecture with single couplers via active field distributors AFD4, AFD8 or AFDiS/AFDiSD. The limits with respect to the number of field distributors are also identical (up to 8 AFD4/AFD8, up to 5 AFDiS/AFDiSD or up to 5 AFDiS and AFD4/AFD8 in any combination).

Design (continued)

Ring architecture with coupler and media redundancy

With the redundant DP/PA coupler pair (2 x FDC 157-0) of a PA router, a ring segment with automatic bus termination can also be implemented instead of a line segment with AFS. Apart from the ring segment, only line segments with individual couplers can be configured on this PA router. The PA router can be connected to a single or a redundant PROFIBUS DP.

Integration of the PA field devices into the ring segment is carried out via active field distributors AFD4, AFD8 or AFDiS/AFDiSD, the number of which is limited as with the line architectures (up to 8 AFD4/AFD8, up to 5 AFDiS or up to 5 AFDiS/AFDiSD and AFD4/AFD8 in any combination). These field distributors have electrically decoupled, short-circuit-proof spur line connections for connecting the PA devices.

At the device level, flexible modular redundancy is possible by grouping individual devices on different field distributors.

Special advantages of the ring architecture:

- High availability
- Transparent redundancy management of the intelligent DP/PA couplers FDC 157-0 for the host system
- Active bus terminators for automatic bus termination in the DP/PA couplers FDC 157-0 and the active field distributors AFD4, AFD8 and AFDiS/AFDiSD enable:
  - Automatic, smooth isolation of faulty subsegments in the event of a short-circuit or open-circuit
  - Modification of the ring configuration or instrumentation during operation, including the addition or removal of ring segments
- Safety-related and fault-tolerant applications with low device and cabling requirements

Cable lengths of bus segments and spur lines

The PROFIBUS PA is based on electrical transmission components. A shielded two-wire cable is used for digital data transmission and for the power supply of the field devices.

With line, tree and ring topologies, bus segments up to approx. 1.9 km can be configured. If AFD4/AFD8 active field distributors are used, the length of the spur lines for connecting devices and the quality of the cable used must also be considered when calculating the total length of the bus segment. Spur lines on the AFDiS are not relevant to the total length of the bus segment.

For bus segments with active field distributors, the spur lines can have the following maximum lengths:

- Up to 120 m in accordance with IEC 61158-2
- Up to 60 m in accordance with IEC 60079-27 (FISCO)

With AFD4/AFD8 active field distributors, these maximum values may be reduced depending on the number of spur lines of the bus segment (for details, see section "Technical specification"). With the active field distributor AFDiS/AFDiSD, this reduction is canceled by the integrated repeater function.

The **SIMATIC Fieldbus Calculator** provides help in calculating and designing fieldbus segments:
http://support.automation.siemens.com/WW/view/de/53842953

Intrinsically-safe PA devices in hazardous areas are preferably integrated into a bus segment by means of active field distributors AFDiS/AFDiSD. For PA devices in Ex zone 1/21, the connection via a line segment on the PA router with DP/PA coupler Ex [i] is a possible alternative. In such a configuration the max. possible length per spur line is reduced to 30 m and per bus segment to 1 km.

Bus segments are terminated either automatically (with architectures with active field distributors AFD4, AFD8, AFDiS) or with the passive terminating element for PROFIBUS PA (SpliTConnect terminator).

10

Technical specifications

PROFIBUS PA	
Data transmission	MBP
Transmission rate	31.25 Kbps
Cable	2-wire shielded
Type of protection	EEx(ia/ib)
Topology	Line, tree, ring
Active field distributors per segment/coupler	
• AFD4/AFD8	8
• AFDiS/AFDiSD or combinations of AFDiS and AFD4/AFD8	5
PA devices per segment/coupler	31
PA devices per PA link	64
Max. current for all PA field devices of a segment (for PA gateways with FDC 157-0 coupler)	1 A
Cable length per segment, dependent on transmission rate	1 900 m: standard 1 900 m: EEx(ib) 1 000 m: EEx(ia)

Bus segments with AFD4/AFD8 Max. spur line length related to the total number of spur lines	
Number of spur lines (1 device per spur line)	
• 1 to 12 spur lines	120 m
• 13 to 14 spur lines	90 m
• 15 to 18 spur lines	60 m
• 19 to 24 spur lines	30 m
• 25 to 31 spur lines	1 m
Bus segments with AFDiS/AFDiSD Max. spur line length independent of total number of spur lines	
Number of spur lines (1 device per spur line)	
• 1 to 31 spur lines	
- Not intrinsically-safe	120 m
- Intrinsically-safe acc. to FISCO	60 m

Communication
PROFIBUS PA

■ Overview

PA link, consisting here of IM 153-2 High Feature and DP/PA coupler

To create a smooth network transition between PROFIBUS DP and PROFIBUS PA, the SIMATIC product range offers two versions: the DP/PA coupler and the PA link.

The following criteria can be applied when choosing the network transition:

- DP/PA coupler:
  For small quantity frameworks (volumes of data) and low timing requirements; data transfer rate on the PROFIBUS DP limited to 45.45 kbit/s

- PA link:
  For large number of stations and high cycle time requirements; data transfer rate on the PROFIBUS DP up to 12 Mbit/s

■ Application

The two PA routers are based on two versions of the DP/PA coupler:

- Ex [i] DP/PA coupler (max. output current 110 mA) for implementation of PROFIBUS PA networks with a line or tree topology in environments up to Ex zone 1/21, not for redundant architectures (coupler redundancy, ring)

- FDC 157-0 DP/PA coupler (max. output current 1 000 mA) for implementation of PROFIBUS PA networks with a line, tree or ring topology in environments up to Ex zone 2/22; can be used for the redundant architectures "Ring" and "Coupler redundancy"

DP/PA couplers are also integral components of the PA link (see design). The PA link connects PROFIBUS DP and PROFIBUS PA together, and decouples the transmission rates. In contrast to the DP/PA coupler which limits the data transmission rate on the PROFIBUS DP to 45.45 kbit/s, the PA link does not influence the performance of the PROFIBUS DP.

The PA link functions as a slave on the PROFIBUS DP and as a master on the PROFIBUS PA. From the viewpoint of the host PROFIBUS DP master, the PA link is a modular slave whose modules are the devices connected on the PROFIBUS PA. Addressing of these devices is carried out indirectly via the PA link that itself only requires one node address. The host PROFIBUS master can scan devices connected to the PA link all at once.

If the router is a DP/PA coupler, the nodes on the PROFIBUS PA are directly addressed by the PROFIBUS DP master (controller). The DP/PA coupler is an electrical node, but is transparent for communication between the master and PA field devices; it therefore does not require setting of parameters or addresses (exception: FDC 157-0 DP/PA coupler used as PROFIBUS diagnostics slave).

PROFIBUS diagnostics with FDC 157-0 DP/PA coupler, configured as PROFIBUS diagnostics slave

FDC 157-0 DP/PA couplers configured as PROFIBUS diagnostics slaves supply extensive diagnostic and status information via PROFIBUS for swift localization and correction of faults:

- I&M (Identification & Maintenance) data
- Current and voltage values on the main cable
- Redundancy status
- Wire breakage
- Short-circuit
- Signal level

To this end, each of these DP/PA couplers FDC 157-0 requires its own PROFIBUS address. This applies independent of use in a PA Link or as a PA router.

The PA link and DP/PA coupler approved for an extended temperature range are available for use in environments up to Ex zone 2/22. Both are operated with 24 V DC. Assembly is on an S7-300 rail with horizontal or vertical alignment.

■ **Design**

High Speed solution with PA link	Low-cost solution with direct addressing

High Speed solution with PA link

2 PROFIBUS master S7-400

up to 12 Mbit/s   4 5

3 PA link

2

31.25 kbit/s 1 3 4

■ PROFIBUS PA

PA link
• IM 153-2 interface module (single/redundant)
• DP/PA couplers (max. 5 per IM 153-2)
• Slave on DP side - master on PA side
• Max. 64 PA devices (244 bytes I/O data)

Low-cost solution with direct addressing

2

45.45 kbit/s ■ PROFIBUS DP

DP/PA coupler

■ PROFIBUS PA

3 4 5 6 7 8

DP/PA coupler
• transparent for communication
• Ex version 13.5 V, 110 mA
• Non-Ex version 31 V, 1 000 mA

G_PCS7_XX_00078

Configuration examples for PA link and DP/PA coupler

PA link

The PA link is a modular combination in S7-300 design consisting of the IM 153-2 High Feature PROFIBUS DP interface module (with optional redundancy) and up to 5 DP/PA couplers (FDC 157-0 or Ex [i]).

All components of the PA link are interconnected through the S7 backplane bus. The use of active bus modules as backplane bus allows hot swapping of individual modules and redundancy of the IM 153-2 High Feature PROFIBUS DP interface modules and the FDC 157-0 DP/PA coupler. If redundancy and changes during operation are not required, passive bus connectors can be used instead of active bus modules.

The PS 307 or PS 305 load power supply can be used for the 24 V DC. With a redundant IM 153-2 High Feature interface module for PROFIBUS DP, it is also recommendable to have a redundant 24 V DC supply, e.g. with two PS 307/PS 305 load power supplies.

The PROFIBUS PA bus segments designed with the DP/PA couplers are physically separated as regards current infeed, but form one bus system in communication terms. A PROFIBUS PA ring segment or a PROFIBUS PA line segment with coupler redundancy can be operated on a PA link. Further PROFIBUS PA line segments can be operated on this PA link using individual couplers. The FDC 157-0 DP/PA couplers provided for the ring coupling or coupler redundancy must always be located at the right-hand end of a sequence of up to 5 couplers.

The following basic components are available for configuring the PA link:

• IM 153-2 High Feature interface module for extended temperature range

• DP/PA coupler (Ex [i] and FDC 157-0)

• Components for redundant design and for hot swapping
  - Mounting rail for hot swapping (as an alternative to the standard mounting rail)
  - BM PS/IM for 1 load power supply and 1 IM 153-2 High Feature module, for extended temperature range
  - IM/IM (IM 157) bus module for two IM 153-2 High Feature modules, for redundant and non-redundant design and for extended temperature range
  - BM FDC for 1 DP/PA coupler Ex [i] or FDC 157-0, for extended temperature range (up to 5 DP/PA couplers possible per PA link)
  - BM FDC/FDC for 2 DP/PA couplers FDC 157-0, for extended temperature range

Additive option:

• PS 307 for 120/230 V AC; 24 V DC load power supply, version in 2, 5 or 10 A, or

• PS 305 load power supply for 24/48/60/110 V DC; 24 V DC, 2 A

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Communication
PROFIBUS PA

Technical specifications

DP/PA coupler	
Bus connection	
Connection for PROFIBUS PA	
• DP/PA coupler Ex [i]	2 terminals of a 4-pole screw-type terminal, integrated terminating resistor
• DP/PA coupler FDC 157-0	4-pole screw-type terminal for connection and looping through, selectable terminating resistor
Connection for PROFIBUS DP	9-pin Sub-D plug, contact assignment as described in IEC 61158/EN 50170
Module-specific data	
Degree of protection	IP20
Transmission rate on PROFIBUS DP	45.45 Kbps
Transmission rate on PROFIBUS PA	31.25 Kbps
Communication protocol	PROFIBUS DP
Voltages, currents, potentials	
Supply voltage	24 V DC (20.4 ... 28.8 V)
Reverse polarity protection	Yes
Overvoltage protection	Yes
Voltage at coupler output (PA)	
• DP/PA coupler Ex [i]	13 ... 14 V DC
• DP/PA coupler FDC 157-0	31 ± 1 V DC
Voltage monitoring	15.5 V
Overvoltage monitoring	U > 35 V; latching cutoff
Voltage failure bridging	Min. 5 ms
Current at coupler output (PA) for supplying the PA field devices	
• DP/PA coupler Ex [i]	max. 110 mA
• DP/PA coupler FDC 157-0	max. 1 A
Galvanic isolation 24 V DC	
• PROFIBUS DP/PROFIBUS PA	Yes
• PROFIBUS DP/supply	Yes
• PROFIBUS PA/supply	Yes
• All electric circuits/functional grounding	Yes
Power consumption of modules (24 V DC)	
• DP/PA coupler Ex [i]	Max. 400 mA
• DP/PA coupler FDC 157-0	max. 2.3 A
Power loss of the module	
• DP/PA coupler Ex [i]	Typ. 7 W
• DP/PA coupler FDC 157-0	Typ. 13.4 W
Status, interrupts, diagnostics	
Diagnostics displays DP/PA coupler Ex [i] and DP/PA coupler FDC 157-0	
• PROFIBUS DP bus monitoring	Yellow LED "DP"
• PROFIBUS PA bus monitoring	Yellow LED "PA"
• 24 V DC power supply monitoring	Green "ON" LED
Additive diagnostics displays of the DP/PA coupler FDC 157-0	
• Group error	Red LED "SF"
• Bus error	Red LED "BF"
• Monitoring DP/PA coupler (active coupler in redundant configuration)	Yellow LED "ACT"

Climatic conditions	
Permissible operating temperature DP/PA coupler Ex [i] and DP/PA coupler FDC 157-0	
• Horizontal installation	-25 ... +60 °C
• Vertical installation	-25 ... +40 °C
Dimensions and weight	
Dimensions (W × H × D) in mm	80 × 125 × 130
Weight	
• DP/PA coupler Ex [i]	approx. 550 g
• DP/PA coupler FDC 157-0	Approx. 515 g
IM 153-2 High Feature (for extended temperature range)	
Function	Linking of PROFIBUS DP (9.6 Kbps to 12 Mbps, slave functionality) and PROFIBUS PA (master functionality) with support of the "Configuration in Run" function
	The DP/PA link function is only implemented by extending the IM 153-2 High Feature with one or more DP/PA couplers. Stand-alone operation of the IM 153-2 High Feature is not possible.
	1 Y coupler, up to 5 DP/PA couplers or up to 64 slaves can be connected
	Isolation from the higher-level DP master system
Bus connection	
• Connection for PROFIBUS DP	9-pin Sub-D plug, contact assignment as described in IEC 61158/EN 50170, Vol. 2
Connectable lower-level components	
Number of couplers	
• DP/PA coupler	max. 5
• Y coupler	1
Number of PA devices on PROFIBUS PA	max. 64
Module-specific data	
Degree of protection	IP20
Transmission rate of the higher level DP master system	9.6; 19.2; 45.45; 93.75; 187.5; 500 Kbps; 1.5; 3; 6; 12 Mbps
Communication protocol	PROFIBUS DP
Frame length	
• I/O data	Max. 244 bytes
• Configuration frame	Max. 244 bytes
• Diagnostics frame	Max. 244 bytes
• Parameter assignment frame	Max. 244 bytes

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Technical specifications (continued)

Voltages, currents, potentials	
Supply voltage	24 V DC (20.4 ... 28.8 V)
Reverse polarity protection	Yes
Voltage failure bridging	20 ms
Galvanic isolation	
• to the higher-level DP master system	Yes
• to the DP/PA coupler or Y coupler	No
Power consumption of modules (24 V DC)	
• In the PA link	Max. 200 mA (at 20.4 V)
• In the Y link	Max. 400 mA (at 20.4 V)
Power loss of the module	
• In the PA link	Max. 2.6 W (at 28.8 V)
• In the Y link	Max. 3.6 W (at 28.8 V)
Infeed, mechanical design	4-pin screw terminal, short-circuiting link between PE and M24; the short-circuiting link must be removed for floating operation (independent of this, the DP interface is always floating)

Status, interrupts, diagnostics	
Diagnostic displays	
• Group error	Red LED "SF"
• Bus error on higher level DP master system	Red LED "BF 1"
• Bus error on underlying bus system	Red LED "BF 2"
• Module is active in redundancy mode	Yellow LED "ACT"
• 24 V DC power supply monitoring	Green "ON" LED

Climatic conditions	
Permissible operating temperature	
• Horizontal installation	-25 ... +60 °C
• Vertical installation	-25 ... +40 °C

Dimensions and weight	
Dimensions (W × H × D) in mm	40 × 125 × 130
Weight	approx. 360 g

Ordering data

	Article No.		Article No.
DP/PA coupler For transition from RS 485 to MBP		**Components for hot swapping and for redundant design**	
• DP/PA coupler Ex [i] Fieldbus coupler between PROFIBUS DP and PROFIBUS PA, EEx(ia) version, max. output current 110 mA; degree of protection IP20; for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7157-0AD82-0XA0**	**Active bus modules for hot swapping**	
		• BM PS/IM SIPLUS extreme for 1 load current supply and 1 IM 153-2 High Feature module; for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +70 °C	**6AG1195-7HA00-2XA0**
• DP/PA coupler FDC 157-0 Fieldbus coupler between PROFIBUS DP and PROFIBUS PA, with redundancy capability; integrated PROFIBUS diagnostics slave; max. output current 1 A; degree of protection IP20; for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7157-0AC83-0XA0**	• BM IM/IM for 2 IM 153-2 High Feature modules, for redundant and non-redundant configuration, for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7195-7HD80-0XA0**
IM 153-2 High Feature Interface module for PA Link and Y-Link; with redundancy capability; degree of protection IP20; for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7153-2BA82-0XB0**	• BM FDC for 1 DP/PA coupler Ex [i] or FDC 157-0, for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7195-7HF80-0XA0**
Accessories		• BM FDC/FDC for 2 DP/PA couplers FDC 157-0, for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +60 °C	**6ES7195-7HG80-0XA0**
PS 307 Load Power Supply Including connecting comb; 120/230 V AC; 24 V DC		**Mounting rail for hot swapping** For max. 5 active bus modules	
• 2 A; 40 mm wide	**6ES7307-1BA01-0AA0**	• 482 mm wide (19 inches)	**6ES7195-1GA00-0XA0**
• 5 A; 60 mm wide	**6ES7307-1EA01-0AA0**	• 530 mm wide	**6ES7195-1GF30-0XA0**
• 5 A, extended temperature range; 80 mm wide	**6ES7307-1EA80-0AA0**	• 620 mm wide	**6ES7195-1GG30-0XA0**
• 10 A, 80 mm wide	**6ES7307-1KA02-0AA0**	**Covers** 4 backplane bus covers and 1 cover for active bus module	**6ES7195-1JA00-0XA0**
PS 305 Load Power Supply 24/48/60/110 V DC; 24 V DC			
• 2 A, extended temperature range; 80 mm wide	**6ES7305-1BA80-0AA0**		
Standard profile rails (without hot swapping function)			
• 482 mm wide (19 inches)	**6ES7390-1AE80-0AA0**		
• 530 mm wide	**6ES7390-1AF30-0AA0**		

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Communication
PROFIBUS PA

Active field distributors

■ Overview

Active field distributor AFD4

Active field distributor AFD8

Active field distributor (AFD)

Active field distributors (AFD) can be operated in environments in accordance with Ex zone 2/22. They are offered in two versions which differ as follows:

- AFD4 with 4 spur line connections for 1 field device each
- AFD8 with 8 spur line connections for 1 field device each

An AFD4 can therefore connect up to 4 field devices, and an AFD8 can connect up to 8 field devices, via short-circuit proof spur line connections to a fieldbus segment (line/ring) with automatic bus termination. This applies to both PA (PROFIBUS PA) as well as FF (FOUNDATION Fieldbus H1) field devices.

The fieldbus segment can be connected to a single or redundant PROFIBUS DP via a PA or FF router and can thus be seamlessly integrated into the SIMATIC PCS 7 process control system.

Up to 8 active field distributors AFD4/AFD8 with a total of up to 31 connected field devices can be operated per fieldbus segment. The number of field devices is also limited by the current consumption of the field devices. A maximum of 60 mA per spur line and a maximum of 1 A per segment is available for the field devices.

An AFD in a ring segment can be replaced during operation without resulting in failure of the segment.

For compliance with IP66 protection, it is necessary to protect unused spur line connections using plugs.

Active field distributors AFDiS and AFDiSD

Active field distributors AFDiS/AFDiSD
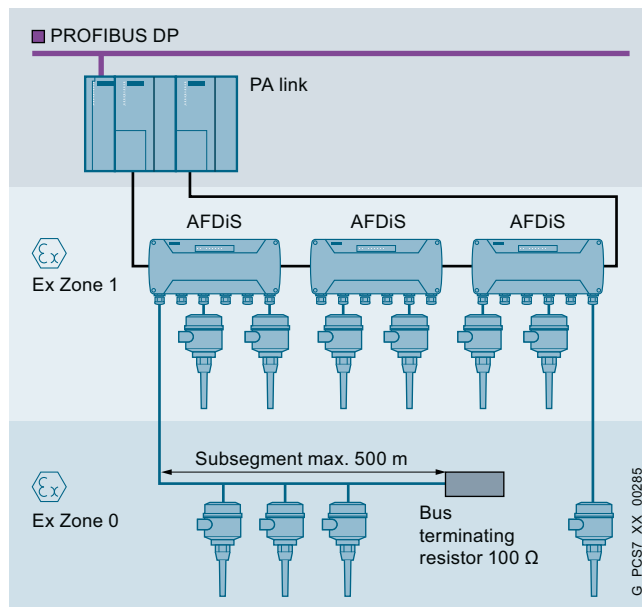
The following active field distributors are available for use in environments in accordance with Ex zones 1/21 and 2/22:

- AFDiS: Active Field Distributor intrinsically Safe for PROFIBUS PA or FOUNDATION Fieldbus H1
- AFDiSD: Active Field Distributor intrinsically Safe for PROFIBUS PA with enhanced fieldbus diagnostics (EFD)

The spare parts of the AFDiSD are compatible with those of the AFDiS. The enhanced fieldbus diagnostics can be optionally activated in the AFDiSD.

AFDiS and AFDiSD can integrate up to 6 intrinsically-safe field devices in each fieldbus segment (line/ring) via their intrinsically-safe, short-circuit proof spur line connections. Instead of the spur line, it is also possible to use a subsegment for 3 to 4 devices with a max. length of 500 m at connection S1. The spur lines with Ex [ia] type of protection as well as the subsegment can be routed into Zone 0/20.

◼ Overview (continued)

Up to 5 active field distributors AFDiS or AFDiSD with a total of up to 31 field devices can be operated in a fieldbus segment. The limitation of 5 active field distributors is also mandatory for mixed operation of AFD and AFDiS/AFDiSD (enhanced fieldbus diagnostics not activated).

The number of field devices per segment additionally depends on the current consumption of the devices and the cable lengths used. A current of 1 A is available for all field devices and the active field distributors of the segment.

With the integrated repeater function, the AFDiS and AFDiSD have the following advantages compared to the AFD:

- Spur line lengths are independent of the total number of spur lines in the bus segment
- Spur line lengths need not be be taken into account when determining the total length of the bus segment

Under the following conditions, an AFDiS or AFDiSD in a ring segment can be replaced during operation without failure of the segment: Installation in Zone 2/22 or in a non-hazardous area.

For compliance with IP66 protection, it is necessary to protect unused spur line connections using plugs.

Enhanced fieldbus diagnostics with AFDiSD in PROFIBUS PA

AFDiS diagnostics is limited to short-circuits, loss of redundancy, detection of chatter, and failure of field devices. On the other hand, the enhanced fieldbus diagnostics, which can be activated per mode switch, enables AFDiSD to carry out comprehensive diagnostics of the entire PROFIBUS PA segment.

This includes, among others, the detection, recording and monitoring of:

- Topology (DP/PA coupler, AFDiSD)
- Voltage and currents on the main and spur lines
- Signal and noise levels
- Capacitive unbalance to shield of main line

Configuration errors or defects can thus be rapidly detected and eliminated.

However, a prerequisite for application of the enhanced fieldbus diagnostics is that all active field distributors of the segment as well as the components of the PA link support this functionality. The following components satisfy this requirement:

- Active field distributor AFDiSD, Article No. 6ES7655-5DX60-1BB0
- Interface module IM 153-2 High Feature, Article No. 6ES7153-2BA70-0XB0
- DP/PA coupler FDC 157, Article No. 6ES7157-0AC85-0XA0

The interface module creates a topology model of the connected bus segment, and maps its status information. The DP/PA coupler and the locally installed active field distributor AFDiSD provide the interface module with the physical data of the bus segment for this purpose, as well as information on the status of the connected lines. The information provided by the interface module can be displayed on the PCS 7 Maintenance Station and evaluated by SIMATIC PDM.

When delivered from the factory, the enhanced fieldbus diagnostics is not activated in the AFDiSD. In this state, the functionality of the AFDiSD is equivalent to that of the AFDiS.

Active field splitter AFS

The active field splitter (AFS) connects a PA or FF line segment with a redundant coupler pair of a PA or FF router. The AFS interconnects the line segment with the respective active coupler.

The PA or FF line segment can be connected to the AFS via one or two (center feed) identical Y-connectors out of a total of 4. For the center feed, the line segment is connected via the two Y-connectors (bus termination switch on both FDC 157 couplers set to "OFF").

For compliance with IP66 protection, it is necessary to protect unused connections using plugs.

AFS: Active field distributor for PROFIBUS PA

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Communication
PROFIBUS PA

Active field distributors

Technical specifications

Active field distributor (AFD)	
General data	
Connection of field devices	• Standard-compliant field devices for PROFIBUS PA or FOUNDATION Fieldbus H1 • Max. 4 per AFD4 • Max. 8 per AFD8 • Max. 31 per fieldbus segment • Operating environment up to Zone 2 oder 22; Class I Zone 2/ Division 2 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes
Overvoltage protection	No
Current consumption	
• Current consumption at idle	AFD4: 24 mA
	AFD8: 34 mA
• Current consumption with connected field devices	AFD4: 24 mA + total current of all field devices
	AFD8: 34 mA + total current of all field devices
• Additional current consumption of the AFD at end of line (an open main line connection)	30 mA
• Current consumption at max. power output per spur line	AFD4: 264 mA
	AFD8: 514 mA
Power loss	AFD4: Min. 384 mW; max. 3.2 W
	AFD8: Min. 544 mW; max. 4.1 W
Grounding	Direct, via grounding rail
Electrical isolation between main line and spur lines	No

Active field distributor (AFD)	
Connections, interfaces	
Main line	
Number of connections	2
Interfaces	PROFIBUS PA and FOUNDATION Fieldbus H1
Automatic bus terminator	Yes
Spur cables	
Number of connections	
• AFD4	4
• AFD8	8
Short-circuit proof	Yes
Intrinsically-safe acc. to FISCO	No
Current I_{max} (DC) on spur lines 1 to 4 (AFD4) or 1 to 8 (AFD8)	60 mA
Short-circuit current (test current)	6 mA
Debounce logic	Yes
No-load voltage	< 30 V
Current output to field devices	
• AFD4	Max. 240 mA
• AFD8	Max. 480 mA
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95 %
Approvals for potentially explosive atmospheres	
• Gas	Zone 2
• Dust	Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm (without screwed glands)	
• AFD4	220 × 120 × 83
• AFD8	360 × 120 × 83
Weight	
• AFD4	2 000 g
• AFD8	3 000 g

Active field distributors AFDiS/AFDiSD	
General data	
Connection of field devices	• AFDiS: Standard-compliant field devices for PROFIBUS PA or FOUNDATION Fieldbus H1 • AFDiSD: Standard-compliant field devices for PROFIBUS PA • Max. 6 per AFDiS/AFDiSD • Max. 31 per fieldbus segment • Operating environment up to Zone 1 or 21; Class I Zone 1 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66

Active field distributors AFDiS/AFDiSD	
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes; up to 1 A
Overvoltage protection	No
Current consumption	
• At 28 V input voltage	≤ 64 mA + (0.838 × aggregate current of all field devices)
• At 24 V input voltage	≤ 67 mA + (1.008 × aggregate current of all field devices)
• At 20 V input voltage	≤ 74 mA + (1.246 × aggregate current of all field devices)

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■ Technical specifications (continued)

Active field distributors AFDiS/AFDiSD	
Power loss	Min. 1.4 W; max. 5.9 W
Grounding	Direct, via connecting bar
Electrical isolation between main line and spur lines	Yes
Test voltage	2550 V DC, 2 s
Connections, interfaces	
Main line	
Number of connections	2
Interfaces	
• AFDiS	PROFIBUS PA and FOUNDATION Fieldbus H1
• AFDiSD	PROFIBUS PA
Automatic bus terminator	Yes
Spur cables	
Number of connections	6
Short-circuit proof	Yes
Intrinsically-safe acc. to FISCO	Yes
Current I_{max}	
• on spur line S1	60 mA
• on spur lines S2 to S6	40 mA
• in total for all field devices	180 mA
Short-circuit current (test current)	5 mA
Debounce logic	Yes
No-load voltage	Max. 15.3 V
Current output to field devices	Max. 260 mA

Active field distributors AFDiS/AFDiSD	
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Enhanced fieldbus diagnostics in PROFIBUS PA (activation option)	• AFDiS: No • AFDiSD: Yes
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95 %
Approvals for potentially explosive atmospheres	
• Gas	Zone 1 and Zone 2 or Class I Zone 2/ Division 2 and Class I Zone 1
• Dust	Zone 21 and Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm, with screwed glands	380 × 170 × 85
Weight	4 500 g

Active field splitter AFS	
General data	
Connection of field devices	• 1 fieldbus segment with max. 31 field devices • Operating environment up to Zone 2 oder 22; Class I Zone 2/ Division 2 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes
Overvoltage protection	No
Current consumption at idle	54 mA
Power loss	Min. 864 mW; max. 2.13 W
Output current for supplying all field devices of the fieldbus segment (for dimensioning the device configuration)	1 A
Grounding	Direct, via connecting bar
Connections, interfaces	
Main lines to the FDC 157 couplers	
Number of connections	2
Automatic bus terminator	No
Maximum permissible continuous main line current	1 A

Active field splitter AFS	
Y-connectors for fieldbus line segment	
Number of connections	1 or 2 (with center feed)
Interfaces	PROFIBUS PA and FOUNDATION Fieldbus H1
Short-circuit proof (together with FDC 157)	Yes
Intrinsically-safe acc. to FISCO	No
Current I_{max} on Y (limited by FDC 157)	1 A
Debounce logic	No
Continuous output voltage	Max. 32 V
Current output to field devices	Max. 1 A
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95 %
Approvals for potentially explosive atmospheres	
• Gas	Zone 2
• Dust	Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm (without screwed glands)	220 × 120 × 83
Weight	2 000 g

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Communication
PROFIBUS PA

Active field distributors

Ordering data	Article No.		Article No.
Active field distributor (AFD) For integration of standard-compliant PA or FF field devices		**Accessories**	
• AFD4 with 4 short-circuit-proof spur line connections for 1 field device each	**6ES7157-0AG81-0XA0**	**Sealing plugs** for unused connections on AFS, AFD, AFDiS and AFDiSD	
• AFD8 with 8 short-circuit-proof spur line connections for 1 field device each	**6ES7157-0AG82-0XA0**	• 10 pcs. • 50 pcs.	**6ES7157-0AG80-1XA1** **6ES7157-0AG80-1XA5**
Active Field Distributor AFDiS (Active Field Distributor intrinsically Safe) with 6 short-circuit proof spur line connections for the integration of standard-compliant intrinsically-safe PA or FF field devices	**6ES7157-0AG83-0XA0**	Supplementary components required for enhanced fieldbus diagnostics with AFDiSD **IM 153-2 High Feature interface module** For PA link	**6ES7153-2BA70-0XB0**
Active Field Distributor AFDiSD (Active Field Distributor intrinsically Safe with enhanced fieldbus diagnostics) with 6 short-circuit-proof spur line connections for the integration of standard-compliant intrinsically-safe PA field devices	**6ES7655-5DX60-1BB0**	**DP/PA coupler FDC 157**	**6ES7157-0AC85-0XA0**
Active field splitter (AFS) For the interconnection of a bus line segment with the active coupler of a PA or FF network transition with redundant coupler pair	**6ES7157-0AG80-0XA0**		

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Overview

The following cables in different colors are offered for setting up PROFIBUS PA networks in accordance with IEC 61158-2 (for detailed information, refer to the IK PI Catalog, Industry Mall, or CA 01 Offline Mall under Network components for PROFIBUS, Electrical networks (PROFIBUS PA)):

- PROFIBUS FC Process Cable, 2-wire, shielded, black sheath: for applications in non-intrinsically safe areas

- PROFIBUS FC Process Cable, 2-wire, shielded, blue sheath: for applications in intrinsically safe areas
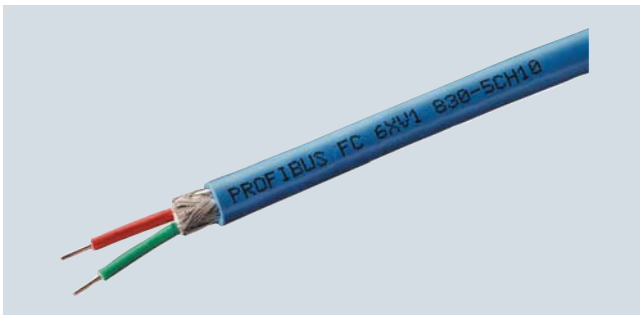
The FastConnect stripping tool can be used to strip the outer sheath and shield of the PROFIBUS FC Process Cables to the required lengths for PROFIBUS PA.

Design
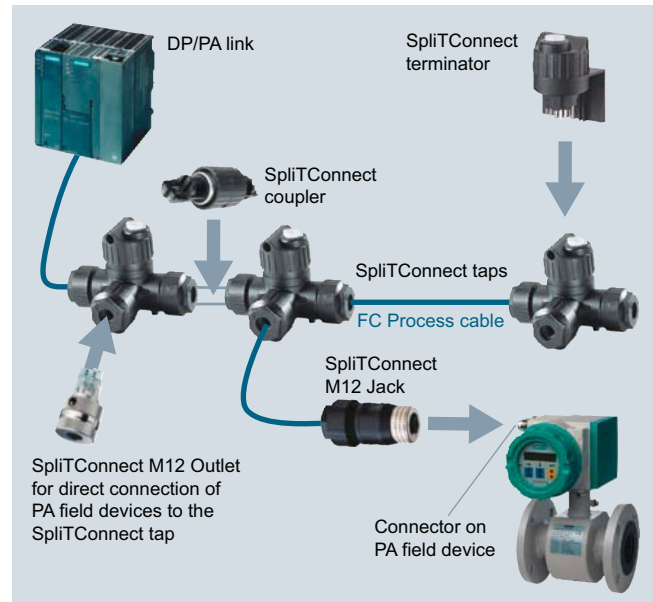
SpliTConnect

The SpliTConnect Tap enables the design of fieldbus segments according to IEC 61158-2 with field device connection points.

The SpliTConnect Coupler can be used to construct a PROFIBUS PA hub by connecting SpliTConnect Taps in series.

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

Terminal equipment can be connected directly through the FC Process Cable. Using the SpliTConnect M12 Outlet, PA field devices can also be connected to the SpliTConnect Tap by means of an M12 connection. The SpliTConnect M12 Jack is a connecting element between an FC Process Cable and an M12 connector on the PROFIBUS PA field device. For details on SpliTConnect network components, see Catalog IK PI.

Ordering data

	Article No.
PROFIBUS FC Process Cable 2-wire, shielded	
• Blue sheath color; for intrinsically safe applications	**6XV1830-5EH10**
• Black sheath color; for non-intrinsically safe applications	**6XV1830-5FH10**
Sold by the meter: max. length 1000 m, minimum order 20 m	
PROFIBUS FastConnect Stripping Tool Stripping tool for fast stripping of the PROFIBUS FastConnect bus cable	**6GK1905-6AA00**
PROFIBUS FastConnect Blade Cassettes Spare blade cassettes for PROFIBUS FastConnect Stripping Tool, 5 units	**6GK1905-6AB00**
SpliTConnect Tap for implementing PROFIBUS PA segments and attaching PA field devices, insulation displacement terminal, IP67, 10 units	**6GK1905-0AA00**

	Article No.
SpliTConnect M12 Outlet Element for direct attachment of PA field devices to the SpliTConnect Tap, 5 units	**6GK1905-0AB10**
SpliTConnect Coupler Connection element for cascading SpliTConnect Taps to create neutral points, 10 units	**6GK1905-0AC00**
SpliTConnect Terminator for connecting PROFIBUS PA segments, 5 units	
• Terminator (Ex); can be used in hazardous areas	**6GK1905-0AD00**
• Terminator (non-Ex); cannot be used in hazardous areas	**6GK1905-0AE00**
SpliTConnect M12 Jack Connecting element between an FC Process Cable and M12 connector on the PROFIBUS PA field device, 5 units	**6GK1905-0AF00**

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Communication
FOUNDATION Fieldbus H1

■ **Overview**

According to preference, FOUNDATION Fieldbus (FF) H1 can be used in addition to PROFIBUS PA as the fieldbus for the direct connection of transmitters and actuators to the SIMATIC PCS 7 process control system.

■ **Design**
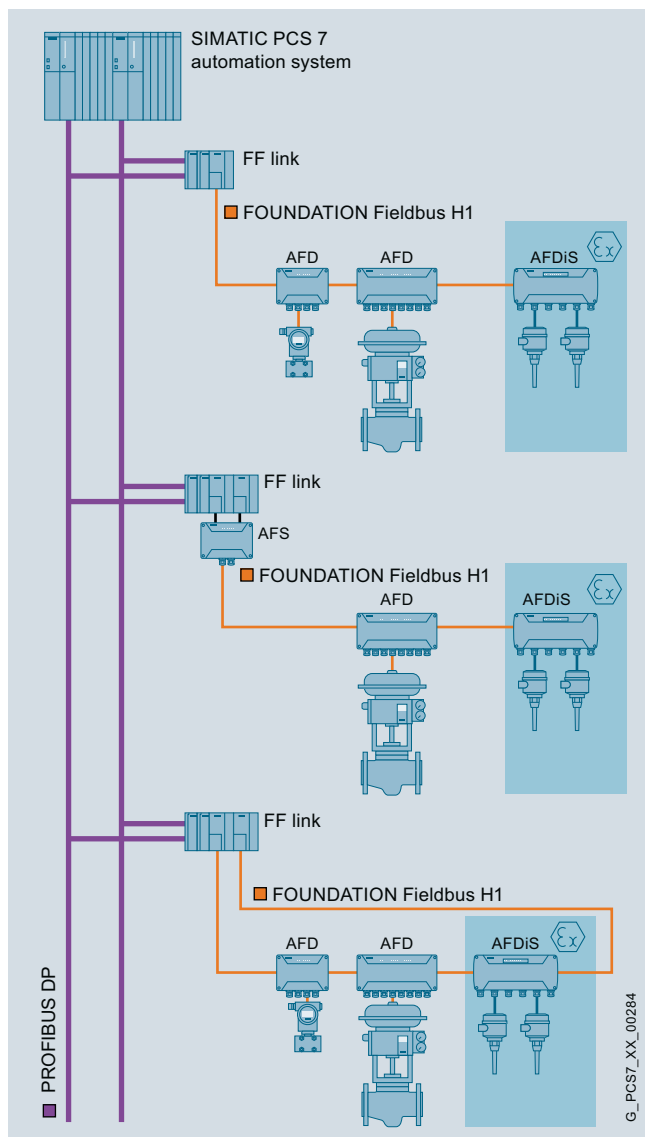
Design versions of the FOUNDATION Fieldbus H1

An FF fieldbus segment can be operated on the FF Link for the gateway between PROFIBUS DP and the FOUNDATION Fieldbus H1, and can be configured as described below.

Line architecture with single coupler

The FF field devices are integrated into a line segment via active field distributors AFD4 and AFD8 (approval for Ex zone 2/22) as well as AFDiS (approval for Ex zone 1/21). Connection to these field distributors is made via short-circuit-proof spur lines.

Up to 8 field distributors of type AFD4/AFD8, 5 field distributors of type AFDiS or 5 field distributors of both AFDiS and AFD4/AFD8 types combined can be optionally operated in a line segment. The last field distributor at the end of the line leading away from the FF Link automatically activates its bus terminating resistor. The line segment can be connected to a single or redundant PROFIBUS DP via the FF Link.

Line architecture with redundant coupler

The active field splitter (AFS) is connected with a redundant coupler pair (2 FDC 157) in the FF Link. This connects the line segment connected to it to the respective active coupler. A coupler can be replaced without interrupting the ongoing operation. The FF field devices are integrated in the line segment as described in the section "Line architecture with single coupler". The limits with respect to the number of field distributors are also identical (up to 8 AFD4/AFD8, up to 5 AFDiS or up to 5 AFDiS and AFD4/AFD8 in any combination).

The line segment on the AFS can be connected to a single or redundant PROFIBUS DP via the FF Link.

Ring architecture with coupler and media redundancy

Maximum availability can be achieved with a FOUNDATION Fieldbus H1 ring segment that is created by means of a redundant coupler pair (2 FDC 157) in the FF Link.

The FF field devices are integrated into the ring segment via the short-circuit-proof spur lines of the active field distributors AFD or AFDiS. The number of field distributors is limited as with the line architectures (up to 8 AFD4/AFD8, up to 5 AFDiS or up to 5 AFDiS and AFD4/AFD8 in any combination).

The bus is terminated automatically and is immediately adapted in the event of changes or faults on the bus. An extension on the fieldbus or replacement of a coupler during operation is possible.

The ring segment can be connected to a single or redundant PROFIBUS DP via the FF Link.

■ **Function**

Properties of the FOUNDATION Fieldbus H1

Just like PROFIBUS PA, the FOUNDATION Fieldbus H1 is based on the IEC 61158-2 standard. Using the MBP (Manchester Coded; Bus Powered) transmission method, digital data transmission and power supply of the bus nodes are combined on a shielded two-wire cable. The constant transmission rate is 31.25 Kbps.

Up to 32 bus nodes (1 coupler + field devices) can be operated on one fieldbus segment (typically 8 to 12 devices). The field devices are integrated into the fieldbus segment via active field distributors AFD4 and AFD8 (approval for Ex zone 2/22) as well as AFDiS (approval for Ex zone 1/21). Intrinsically-safe FF devices connected via active field distributors AFDiS can be installed in hazardous areas in accordance with Ex zone 1/21 or 0/20.

The total length of the fieldbus segment is restricted to 1 900 m. If AFD4/AFD8 are used, the length of the spur lines for connecting devices and the quality of the cable used must also be considered when calculating the total length of the bus segment. Spur lines on the AFDiS are not relevant to the total length of the bus segment.

The spur lines can have the following maximum lengths:
- Up to 120 m in accordance with IEC 61158-2
- Up to 60 m in accordance with IEC 60079-27 (FISCO)

With AFD4/AFD8 active field distributors, the maximum values may be reduced depending on the number of spur lines of the bus segment (for details, see section "Technical specification"). With the active field distributor AFDiS, this reduction is canceled by the integrated repeater function.

The **SIMATIC Fieldbus Calculator** provides help in calculating and designing fieldbus segments:
http://support.automation.siemens.com/WW/view/en/53842953

The FOUNDATION Fieldbus H1 combines cyclic and acyclic communication. Time-critical tasks such as the transfer of process data are executed cyclically according to an exact processing schedule. On the other hand, non-time-critical information such as maintenance/diagnostics data, configuration or configuration data is transferred acyclically.

Device management with EDD

The field device data for the following block types are distributed according to the block model:
- Device block (device-specific information)
- Function block (implemented functions)
- Transmission block (function for controlling input/output variables of a function block)

Fieldbus Foundation provides pre-defined device descriptions (standard DD) for the basic functions of specific field device types. The basic functions of the devices (e.g. analog input, digital output, etc.) are implemented by means of various standard function and transmission blocks.

The device descriptions are interpreted with SIMATIC PDM.

Control in the field

Function and transmission blocks can also be interconnected to form control loops. Together with suitable field devices, such a control application operates independent of the controller (automation system) of the control system.

Characteristic features at a glance

- Bus power supply to the field devices
- Topology: Line, tree, ring
- Integration of intrinsically safe field devices in hazardous areas with barriers
- Deterministic time response
- Interoperability due to standardized bus interface and device integration with standardized device descriptions
- Support of "Control in the field"

■ **Integration**

Integration in SIMATIC PCS 7

The FOUNDATION Fieldbus H1 can be integrated seamlessly in the SIMATIC PCS 7 process control system using PROFIBUS DP as link. A SIMATIC FF Link, which is equipped with one or two couplers depending on the selected bus architecture (see Setup section), serves as router between PROFIBUS DP and FOUNDATION Fieldbus H1.

Engineering of the FOUNDATION Fieldbus H1 segments is implemented as for PROFIBUS PA. Diagnostic information and configured maintenance information for FF Link and FF devices are made available via the SIMATIC PCS 7 Maintenance Station. SIMATIC PCS 7 generates the diagnostics screens automatically.

System requirements:
- System software SIMATIC PCS 7 V7.1+ SP2 or higher
- SIMATIC PDM with SIMATIC PDM Communication FOUNDATION Fieldbus

■ **Technical specifications**

FOUNDATION Fieldbus H1	
Data transmission	MBP
Transmission rate	31.25 Kbps
Cable	2-wire shielded
Topology	Line, tree, ring
FF devices per segment/FF Link	31
Active field distributors per segment/ FF Link	
• AFD4/AFD8	8
• AFDiS or combinations of AFDiS and AFD4/AFD8	5
Max. total current consumption of all FF field devices	1 A
Cable length per segment	1 900 m
Bus segments with AFD4/AFD8 Max. spur line length related to the total number of spur lines	
Number of spur lines (1 device per spur line)	
• 1 to 12 spur lines	120 m
• 13 to 14 spur lines	90 m
• 15 to 18 spur lines	60 m
• 19 to 24 spur lines	30 m
• 25 to 31 spur lines	1 m
Bus segments with AFDiS Max. spur line length independent of total number of spur lines	
Number of spur lines (1 device per spur line) • 1 to 31 spur lines	
- Not intrinsically-safe	120 m
- Intrinsically-safe acc. to FISCO	60 m

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Communication
FOUNDATION Fieldbus H1

FF routers

■ **Overview**
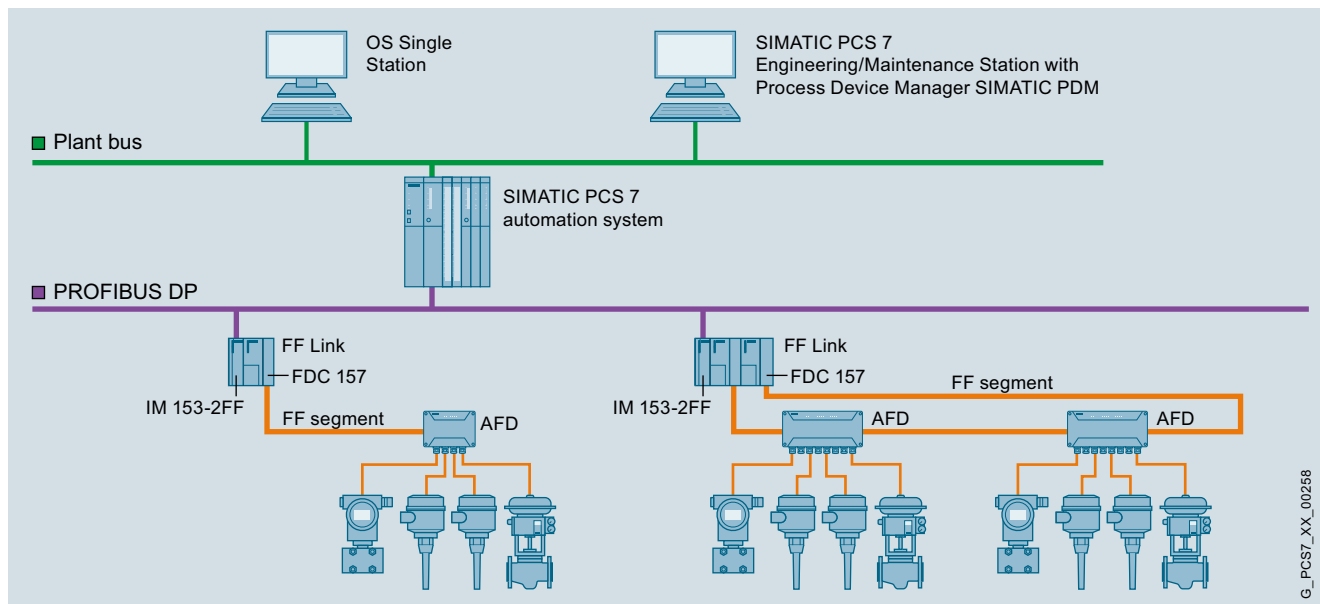
Examples of DP/FF routers with FF Link

With an FF Link as router between PROFIBUS DP and FOUNDATION Fieldbus H1 (FF), a fieldbus segment with up to 31 standard-compliant FF-H1 field devices can be integrated in the SIMATIC PCS 7 process control system. The modular FF Link can be configured differently depending on the design of PROFIBUS DP (single or redundant) and FOUNDATION Fieldbus H1 (for design versions, refer to the section FOUNDATION Fieldbus H1, introduction). One or two IM 153-2 FF interface modules are combined with one coupler or an FDC 157 coupler pair.

The FF Link is simultaneously slave on the PROFIBUS DP and master on the FOUNDATION Fieldbus H1. It decouples the LAN characteristics, communications protocols, and the time response of both bus systems.

An FF Link master is integrated in the IM 153-2 FF. Typically the IM 153-2 FF uses this to control the distributed communication of the FOUNDATION Fieldbus H1 segment as LAS (Link Active Scheduler). If it fails, the redundant M 153-2 FF partner module or a field device with the "Backup Link Master" feature takes over control of communication. This permits the implementation of closed-loop control functions by FF field devices (Control in the Field), independent of the higher-level controller.

■ **Design**

FF Link

The FF Link is a modular combination in S7-300 design consisting of the IM 153-2 FF PROFIBUS DP interface module and FDC 157 coupler (both either as single units or redundantly in pairs depending on the plant configuration).

The following design versions are thus possible (also refer to FOUNDATION Fieldbus H1 section, introduction):

- One PROFIBUS DP interface module (1 x IM 153-2 FF)
  - Line architecture with single coupler (1 x FDC 157)
  - Line architecture with coupler redundancy (2 x FDC 157) and AFS active field distributor
  - Ring architecture with coupler and media redundancy (2 x FDC 157)
- Redundant PROFIBUS DP interface modules (2 x IM 153-2 FF)
  - Line architecture with single coupler (1 x FDC 157)
  - Line architecture with coupler redundancy (2 x FDC 157) and AFS active field distributor
  - Ring architecture with coupler and media redundancy (2 x FDC 157)

In a minimum configuration consisting of one IM 153-2 FF and one FDC 157 coupler, the components can be connected via the S7 backplane bus by means of passive bus connectors.

For FF Link configurations with redundant components, active bus modules must be used for the backplane bus instead of passive bus connectors. Active bus modules permit "hot swapping" of individual modules.

If a 24 V DC infeed from the plant's central power supply is not possible, the PS 307 or PS 305 load power supplies can be used. A redundant 24 V DC power supply, e.g. by means of two PS 307/PS 305 load power supplies, is recommended for FF Link configurations with redundant IM 153-2 FF High Feature interface modules.

One FF fieldbus segment each can be operated with an FF Link. This can be a simple line segment with single coupler, a line segment with coupler redundancy, or a ring segment with coupler and media redundancy.

The following basic components are available for configuring the FF Link:

- IM 153-2 FF interface module
- FDC 157 coupler

■ Design (continued)

- Components for redundant design and for hot swapping
  - Mounting rail for hot swapping (as an alternative to the standard mounting rail)
  - BM PS/IM for 1 load power supply and 1 IM 153-2 FF module, for extended temperature range
  - BM IM/IM for 2 IM 153-2 FF modules, for redundant and non-redundant design and for extended temperature range
  - BM FDC for 1 FDC 157 coupler, for extended temperature range
  - BM FDC/FDC for 2 FDC 157 couplers, for extended temperature range

Additive option:

- PS 307 load power supply for 120/230 V AC; 24 V DC, version in 2, 5 or 10 A, or
  PS 305 load power supply for 24/48/60/110 V DC; 24 V DC, 2 A

■ Technical specifications

FDC 157 coupler	
Bus connection	
Connection for FOUNDATION Fieldbus H1	4-pole screw-type terminal for connection and looping through, selectable terminating resistor
Module-specific data	
Degree of protection	IP20
Transmission rate on backplane bus	45.45 Kbit/s
Transmission rate on FOUNDATION Fieldbus H1	31.25 Kbit/s
Communication protocol	FOUNDATION Fieldbus H1
Voltages, currents, potentials	
Rated supply voltage	24 V DC (20.4 V to 28.8 V)
Reverse polarity protection	Yes
Overvoltage protection	Yes
Voltage at coupler output (FF)	31 ± 1 V DC
Voltage monitoring	15.5 V
Overvoltage monitoring	U > 35 V; latching cutoff
Voltage failure bridging	Min. 5 ms
Current at coupler output (FF) (for supplying all FF field devices)	1 A
Galvanic isolation 24 V DC	
• Backplane bus / FF	Yes
• Backplane bus / supply	Yes
• FF / supply	Yes
• All electric circuits/functional grounding	Yes
Power consumption of modules (24 V DC)	max. 2.3 A
Power loss of the module	Max. 13.4 W
Status, interrupts, diagnostics	
Diagnostic displays	
• Group error	Red LED "SF"
• Backplane bus fault	Red LED "BF"
Ambient conditions	
Operating temperature	
• Horizontal installation	-25 ... +60 °C
• Vertical installation	-25 ... +40 °C
Dimensions and weight	
Dimensions (W x H x D) in mm	80 x 125 x 130
Weight	approx. 550 g

IM 153-2 FF	
Function	Linking of PROFIBUS DP (slave functionality) and FOUNDATION Fieldbus H1 (link master functionality) with support of the "Configuration in Run" function
	The FF link function is only implemented by extending the IM 153-2 FF with one coupler or one FDC 157 coupler pair. Stand-alone operation of the IM 153-2 FF is not possible.
Bus connection	
Connection for PROFIBUS DP	9-pin sub D connector
Module-specific data	
Degree of protection	IP20
Transmission rate of the higher level DP master system	9.6; 19.2; 45.45; 93.75; 187.5; 500 Kbit/s; 1.5; 3; 6; 12 Mbit/s
Communication protocol	PROFIBUS DP/FOUNDATION Fieldbus H1
Frame length	
• I/O data	Max. 244 bytes
• Configuration frame	Max. 244 bytes
• Diagnostics frame	Max. 244 bytes
• Parameter assignment frame	Max. 244 bytes
Voltages, currents, potentials	
Rated supply voltage	24 V DC (20.4 V to 28.8 V)
Reverse polarity protection	Yes
Voltage failure bridging	20 ms
Galvanic isolation	
• to the higher-level DP master system	Yes
• to the FDC 157 coupler	No
Power consumption of modules (24 V DC)	max. 100 mA
Power loss of the module	Typ. 2 W
Infeed, mechanical design	4-pole screw-type terminal, short-circuit bridge between PE and M24
	For non-grounded operation, the short-circuit bridge must be removed (independent of this, the DP interface is always ungrounded)
Status, interrupts, diagnostics	
Diagnostic displays	
• Group error	Red LED "SF"
• Bus error on higher-level DP master system	Red LED "BF 1"
• Bus error on underlying bus system	Red LED "BF 2"
• Module is active in redundancy mode	Yellow LED "ACT"
• 24 V DC power supply monitoring	Green "ON" LED
Ambient conditions	
Operating temperature	
• Horizontal installation	-25 ... +60 °C
• Vertical installation	-25 ... +40 °C
Dimensions and weight	
Dimensions (W x H x D) in mm	40 x 125 x 130
Weight	approx. 350 g

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Communication
FOUNDATION Fieldbus H1

FF routers

■ Ordering data

	Article No.		Article No.
IM 153-2 FF Interface module for SIMATIC FF Link, with redundancy capability; FOUNDATION Fieldbus Link Master; degree of protection IP20; for extended temperature range, permissible operating temperature -25 to +60 °C	On request	**Components for hot swapping and for redundant design**	
		Active bus modules for hot swapping	
		• BM PS/IM SIPLUS extreme for 1 load current supply and 1 IM 153-2 FF module; for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +70 °C	6AG1195-7HA00-2XA0
Field Device Coupler FDC 157 for SIMATIC FF Link, with redundancy capability; physical interface to the FOUNDATION Fieldbus H1 with integrated bus power supply up to 1 A and integrated diagnostics; degree of protection IP20; for extended temperature range, permissible operating temperature -25 to +60 °C	On request	• BM IM/IM for 2 IM 153-2 FF modules; for redundant and non-redundant configuration, for "hot swapping" function, for extended temperature range, permissible operating temperature -25 to +60 °C	6ES7195-7HD80-0XA0
Accessories			
PS 307 load power supply Including connecting comb; 120/230 V AC; 24 V DC		• BM FDC for 1 Field Device Coupler; for hot swapping function, for extended temperature range, permissible operating temperature -25 to +60 °C	6ES7195-7HF80-0XA0
• 2 A; 40 mm wide	6ES7307-1BA01-0AA0		
• 5 A; 60 mm wide	6ES7307-1EA01-0AA0		
• 5 A, extended temperature range; 80 mm wide	6ES7307-1EA80-0AA0		
• 10 A, 80 mm wide	6ES7307-1KA02-0AA0	• BM FDC/FDC for 2 Field Device Couplers; for redundant configuration; for hot swapping function, for extended temperature range, permissible operating temperature -25 to +60 °C	6ES7195-7HG80-0XA0
PS 305 load power supply 24/48/60/110 V DC; 24 V DC			
• 2 A, extended temperature range; 80 mm wide	6ES7305-1BA80-0AA0	**Mounting rail for hot swapping** For max. 5 active bus modules	
Standard profile rails (without hot swapping function)		• 482 mm wide (19 inches)	6ES7195-1GA00-0XA0
• 482 mm wide (19 inches)	6ES7390-1AE80-0AA0	• 530 mm wide	6ES7195-1GF30-0XA0
• 530 mm wide	6ES7390-1AF30-0AA0	• 620 mm wide	6ES7195-1GG30-0XA0
		• 2 000 mm wide	6ES7195-1GC00-0XA0
		Covers 4 backplane bus covers and 1 cover for active bus module	6ES7195-1JA00-0XA0

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Overview

Active field distributor AFD4

Active field distributor AFD8

Active field distributor (AFD)

Active field distributors (AFD) can be operated in environments in accordance with Ex zone 2/22. They are offered in two versions which differ as follows:

- AFD4 with 4 spur line connections for 1 field device each
- AFD8 with 8 spur line connections for 1 field device each

An AFD4 can therefore connect up to 4 field devices, and an AFD8 can connect up to 8 field devices, via short-circuit proof spur line connections to a fieldbus segment (line/ring) with automatic bus termination. This applies to both PA (PROFIBUS PA) as well as FF (FOUNDATION Fieldbus H1) field devices.

The fieldbus segment can be connected to a single or redundant PROFIBUS DP via a PA or FF router and can thus be seamlessly integrated into the SIMATIC PCS 7 process control system.

Up to 8 active field distributors AFD4/AFD8 with a total of up to 31 connected field devices can be operated per fieldbus segment. The number of field devices is also limited by the current consumption of the field devices. A maximum of 60 mA per spur line and a maximum of 1 A per segment is available for the field devices.

An AFD in a ring segment can be replaced during operation without failure of the segment.

For compliance with IP66 protection, it is necessary to protect unused spur line connections using plugs.

Active field distributor AFDiS

Active field distributor AFDiS

The active field distributor AFDiS (Active Field Distributor intrinsically Safe) can be operated in environments in accordance with Ex zone 1/21 and 2/22. It can integrate up to 6 intrinsically-safe PA or FF field devices into a fieldbus segment (line/ring) via its intrinsically-safe, short-circuit-proof spur line connections. Instead of the spur line, it is also possible to use a subsegment for 3 to 4 devices with a max. length of 500 m at connection S1 of the AFDiS. The spur lines with Ex [ia] type of protection as well as the subsegment can be routed into Zone 0/20.

Communication
FOUNDATION Fieldbus H1

Active Field Distributors

■ Overview (continued)

Up to 5 field distributors AFDiS with a total of up to 31 field devices can be operated in a fieldbus segment. The limitation to 5 field distributors is also mandatory for mixed operation of AFD and AFDiS.

The number of field devices per segment additionally depends on the current consumption of the devices. A current of 1 A is available for all field devices of the segment.

With the integrated repeater function, the AFDiS has the following advantages compared to the AFD:

- Spur line lengths are independent of the total number of spur lines in the bus segment
- Spur line lengths need not be be taken into account when determining the total length of the bus segment

Under the following conditions, an AFDiS in a ring segment can be replaced during operation without failure of the segment: Installation in Zone 2/22 or in a non-hazardous area.

For compliance with IP66 protection, it is necessary to protect unused spur line connections using plugs.

Active field splitter AFS

The active field splitter (AFS) connects a PA or FF line segment with a redundant coupler pair of a PA or FF router. The AFS interconnects the line segment with the respective active coupler.

The PA or FF line segment can be connected to the AFS via one or two (center feed) equivalent Y-connectors out of a total of 4. For the center feed, the line segment is connected via the two Y-connectors (bus termination switch on both FDC 157 couplers set to "OFF").

For compliance with IP66 protection, it is necessary to protect unused connections using plugs.
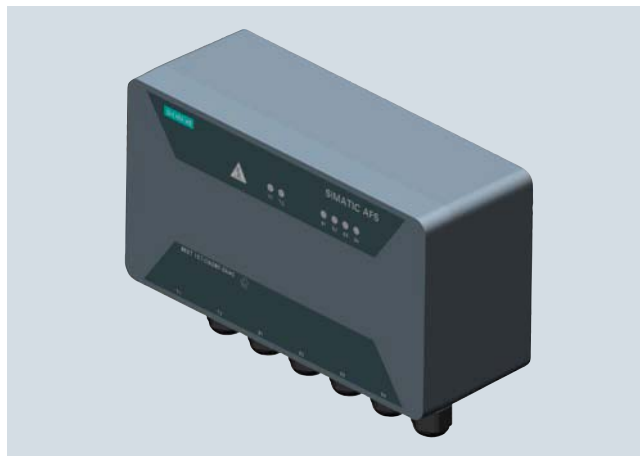
AFS: Active field distributor for FOUNDATION Fieldbus H1

■ Technical specifications

Active field distributor (AFD)	
General data	
Connection of field devices	• Standard-compliant field devices for PROFIBUS PA or FOUNDATION Fieldbus H1 • Max. 4 per AFD4 • Max. 8 per AFD8 • Max. 31 per fieldbus segment • Operating environment up to Zone 2 oder 22; Class I Zone 2/ Division 2 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes
Overvoltage protection	No
Current consumption • Current consumption at idle	AFD4: 24 mA AFD8: 34 mA
• Current consumption with connected field devices	AFD4: 24 mA + total current of all field devices AFD8: 34 mA + total current of all field devices
• Additional current consumption of the AFD at end of line (an open main line connection)	30 mA
• Current consumption at max. power output per spur line	AFD4: 264 mA AFD8: 514 mA
Power loss	AFD4: Min. 384 mW; max. 3.2 W AFD8: Min. 544 mW; max. 4.1 W
Grounding	Direct, via grounding rail
Electrical isolation between main line and spur lines	No

Active field distributor (AFD)	
Connections, interfaces	
Main line	
Number of connections	2
Interfaces	PROFIBUS PA and FOUNDATION Fieldbus H1
Automatic bus terminator	Yes
Spur cables	
Number of connections • AFD4 • AFD8	4 8
Short-circuit-proof	Yes
Intrinsically-safe acc. to FISCO	No
Current I_{max} (DC) on spur lines 1 to 4 (AFD4) or 1 to 8 (AFD8)	60 mA
Short-circuit current (test current)	6 mA
Debounce logic	Yes
No-load voltage	< 30 V
Current output to field devices • AFD4 • AFD8	Max. 240 mA Max. 480 mA
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95%
Approvals for potentially explosive atmospheres • Gas • Dust	 Zone 2 Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm (without screwed glands) • AFD4 • AFD8	 220 × 120 × 83 360 × 120 × 83
Weight • AFD4 • AFD8	 2 000 g 3 000 g

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Communication
FOUNDATION Fieldbus H1

Active Field Distributors

■ **Technical specifications** (continued)

Active field distributor AFDiS	
General data	
Connection of field devices	• Standard-compliant field devices for PROFIBUS PA or FOUNDATION Fieldbus H1 • Max. 6 per AFDiS • Max. 31 per fieldbus segment • Operating environment up to Zone 1 oder 21; Class I Zone 1 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes; up to 1 A
Overvoltage protection	No
Current consumption • At 28 V input voltage	$\leq$ 64 mA + (0.838 × aggregate current of all field devices)
• At 24 V input voltage	$\leq$ 67 mA + (1.008 × aggregate current of all field devices)
• At 20 V input voltage	$\leq$ 74 mA + (1.246 × aggregate current of all field devices)
Power loss	Min. 1.4 W; max. 5.9 W
Grounding	Direct, via connecting bar
Electrical isolation between main line and spur lines	Yes
Test voltage	2550 V DC, 2 s
Connections, interfaces	
Main line	
Number of connections	2
Interfaces	PROFIBUS PA and FOUNDATION Fieldbus H1
Automatic bus terminator	Yes
Spur cables	
Number of connections	6
Short-circuit proof	Yes
Intrinsically-safe acc. to FISCO	Yes
Current I_{max} • on spur line S1 • on spur line S2 to S6 • in total for all field devices	60 mA 40 mA 180 mA
Short-circuit current (test current)	5 mA
Debounce logic	Yes
No-load voltage	Max. 15.3 V
Current output to field devices	Max. 260 mA

Active field distributor AFDiS	
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95 %
Approvals for potentially explosive atmospheres • Gas • Dust	 Zone 1 and Zone 2 Zone 21 and Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm	380 × 85 × 170
Weight	4 500 g

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■ **Technical specifications** (continued)

Active field splitter AFS	
General data	
Connection of field devices	• 1 fieldbus segment with max. 31 field devices • Operating environment up to Zone 2 oder 22; Class I Zone 2/ Division 2 • The max. current consumption of all fieldbus components of the fieldbus segment is 1 A
Degree of protection	IP66
Voltages, currents, potentials	
Power supply	Via bus, no auxiliary power necessary
Rated supply voltage, permissible range	16 ... 32 V DC
Reverse polarity protection (together with FDC 157)	Yes
Overvoltage protection	No
Current consumption at idle	54 mA
Power loss	Min. 864 mW; max. 2.13 W
Output current for supplying all field devices of the fieldbus segment (for dimensioning the device configuration)	1 A
Grounding	Direct, via connecting bar
Connections, interfaces	
Main lines to the FDC 157 couplers	
Number of connections	2
Automatic bus terminator	No
Maximum permissible continuous main line current	1 A

Active field splitter AFS	
Y-connectors for fieldbus line segment	
Number of connections	1 or 2 (with center feed)
Interfaces	PROFIBUS PA and FOUNDATION Fieldbus H1
Short-circuit proof (together with FDC 157)	Yes
Intrinsically-safe acc. to FISCO	No
Current I_{max} on Y (limited by FDC 157)	1 A
Debounce logic	No
Continuous output voltage	Max. 32 V
Current output to field devices	Max. 1 A
Status, interrupts, diagnostics	
Status indicator	Yes
Diagnostics function	Yes
Diagnostics LED	Yes
Interrupts	No
Climatic conditions	
Permissible operating temperature	-40 ... +70 °C
Permissible storage/transport temperature	-40 ... +85 °C
Relative humidity during operation	Max. 95 %
Approvals for potentially explosive atmospheres • Gas • Dust	 Zone 2 Zone 22
Dimensions and weight	
Dimensions (W × H × D) in mm (without screwed glands)	220 × 120 × 83
Weight	2 000 g

■ **Ordering data**

	Article No.
Active field distributor (AFD) For integration of standard-compliant PA or FF field devices	
• AFD4 with 4 short-circuit-proof spur line connections for 1 field device each	**6ES7157-0AG81-0XA0**
• AFD8 with 8 short-circuit-proof spur line connections for 1 field device each	**6ES7157-0AG82-0XA0**
Active Field Distributor AFDiS (Active Field Distributor intrinsically safe) with 6 short-circuit-proof spur line connections for the integration of standard-compliant intrinsically-safe PA or FF field devices	**6ES7157-0AG83-0XA0**
Active field splitter (AFS) for the interconnection of a bus line segment with the active coupler of a PA or FF router with redundant coupler pair	**6ES7157-0AG80-0XA0**

	Article No.
Accessories	
Sealing plugs for unused connections on AFS, AFD and AFDiS (10 units)	**6ES7157-0AG80-1XA1**

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Communication
FOUNDATION Fieldbus H1

Passive FF components

| ■ **Overview** | ■ **Ordering data** | **Article No.** |

■ **Overview**

Depending on the field of application, cables in different colors are offered for setting up FOUNDATION Fieldbus H1 networks in accordance with IEC 61158-2:

• FOUNDATION Fieldbus Cable, 2-wire, shielded, yellow sheath:
for applications in a non-intrinsically safe area

• FOUNDATION Fieldbus Cable, 2-wire, shielded, blue sheath:
for applications in an intrinsically safe area

■ **Ordering data**   **Article No.**
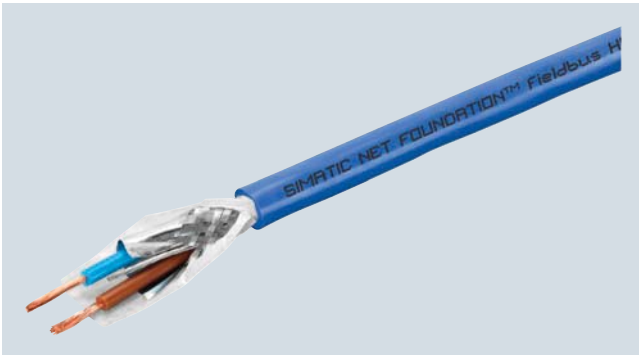
FOUNDATION Fieldbus Cable
Bus cable according to IEC 61158-2, 2-wire, shielded; stranded filler wires

• Yellow sheath color; for non-intrinsically safe applications	**6XV1830-5HH10**
• Blue sheath color; for intrinsically safe applications	**6XV1830-5GH10**

Sold by the meter:
max. length 1000 m, minimum order 20 m

Overview
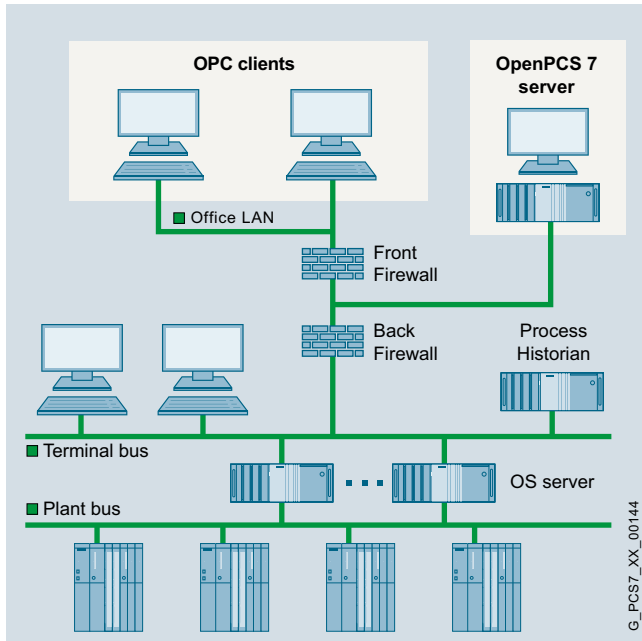
Use the OpenPCS 7 interface to directly integrate the SIMATIC PCS 7 process control system into host systems for production planning, process data evaluation and management. These higher-level systems (OPC clients) can access SIMATIC PCS 7 process data by means of the OpenPCS 7 server. However, access to the SIMATIC BATCH data is not possible.

The OpenPCS 7 server collects data for the OPC clients. Depending on the system configuration, these data may be distributed across different SIMATIC PCS 7 stations (OS server, central archive server). It covers the distribution of data with respect to

- period (OS1/OS2/…/CAS)
- location (OS1/OS2/...)
- redundancy (OS1 master/OS1 standby …)

Design

The OpenPCS 7 server can be operated in two different configurations:

- Autonomous OpenPCS 7 server based on a SIMATIC PCS 7 Industrial Workstation in the client version (recommended preferred configuration)
- Multi-functional SIMATIC PCS 7 Industrial Workstation, client version, with OpenPCS 7 server and OS client functionalities (OpenPCS 7 server/OS client)

Function

The OpenPCS 7 interface is based on various OPC specifications (openness, productivity, collaboration). In addition to Microsoft's DCOM technology (Distributed Component Object Model), it also supports the more sophisticated OPC UA (Unified Architecture) protocol for communication between applications.

Special features of OPC UA:

- Data transfer combined with machine-readable semantic data description
- Platform independence
- Access via firewalls and over the Internet
- Communication reliability
- Security implementation

Access facilities of OPC clients

OPC DA/OPC UA DA (data access server)

For read and write access to process values

As an OPC DA or OPC UA DA server, the OpenPCS 7 server provides other applications with current data from the OS data management. The OPC client can log itself onto ongoing changes and also write values.

OPC HDA (historical data access server)

For read access to archived process values

As an OPC HDA server, the OpenPCS 7 server provides other applications with historical data from the OS archive system. The OPC client, e.g. a reporting tool, can specifically request the required data by defining the start and end of a time interval. Numerous aggregate functions, e.g. variance, mean value or integral, already permit preprocessing by the HDA server and thus contribute toward reduction of the communications load.

OPC A&E (alarm & events server)

For read access to messages, alarms and events

As an OPC A&E server, the OpenPCS 7 server passes on OS messages together with all accompanying process values to the subscribers at the production and corporate management levels. They can of course also be acknowledged there. Filter mechanisms and subscriptions ensure that only selected, modified data are transmitted.

OPC "H" A&E (Historical Alarm & Events Server)

For read access to archived alarms and messages

Thanks to a Siemens extension of the OPC standard interface, the OpenPCS 7 server is able to transmit historic alarms and messages from the archive to subscribers in the production control and corporate control level.

OLE-DB

Simple, standardized direct access to the archive data in the Microsoft SQL server database of the operator system is possible with the OLE-DB. It makes all OS archive data accessible with the accompanying process values, message and user texts.

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Communication
OpenPCS 7

Ordering data	Article No.		Article No.
Multi-functional OpenPCS 7 Server/OS Client		**Autonomous OpenPCS 7 server**	

SIMATIC PCS 7 OpenPCS 7/OS Client V8.1
OpenPCS 7 software for expansion of an existing OS client with OpenPCS 7 server functionality

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-0GX18-2YB0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required! — **6ES7658-0GX18-2YH0**

SIMATIC PCS 7 OpenPCS 7 V8.1
OpenPCS 7 software for a separate OpenPCS 7 server, based on the hardware of the SIMATIC PCS 7 Workstation, client version

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-0HX18-2YB0**

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required! — **6ES7658-0HX18-2YH0**

More information

To ensure safe operation of the plant, you need to take suitable security measures that also include IT security (e.g. network segmentation). For more information on the topic of industrial security, go to:
www.siemens.com/industrial-security

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Overview

IE/AS-i LINK PN IO (single master and double master)

The actuator/sensor interface (AS-Interface) is a heterogeneous bus system for networking simple, usually binary actuators and sensors at the lowest field level. It is then possible to replace a cable harness with parallel wiring by a simple two-wire cable for simultaneous transmission of data and power.

The AS interface operates according to the master/slave principle. The AS-i master module (DP/AS-i Link Advanced, CP 343-2, CP 343-2P or IE/AS-i LINK PN IO) controls the slaves (sensors/actuators) connected per AS-i cable. Up to 62 AS-Interface slaves can be operated on an AS-Interface master module.

Note:

AS-Interface is integrated as a *subordinate* bus in SIMATIC PCS 7. For further information on the AS-Interface, see Catalogs IK PI and IC 10.

Design

The AS-Interface can be integrated into the SIMATIC PCS 7 process control system as follows:

- Direct connection on the PROFIBUS DP via DP/AS-i LINK Advanced (AS-i single or double master)
- Connection via a CP 343-2 or CP 343-2P AS-i master module in an ET 200M remote I/O station on the PROFIBUS DP
- Direct connection on the PROFINET IO via IE/AS-i LINK PN IO (AS-i single or double master)
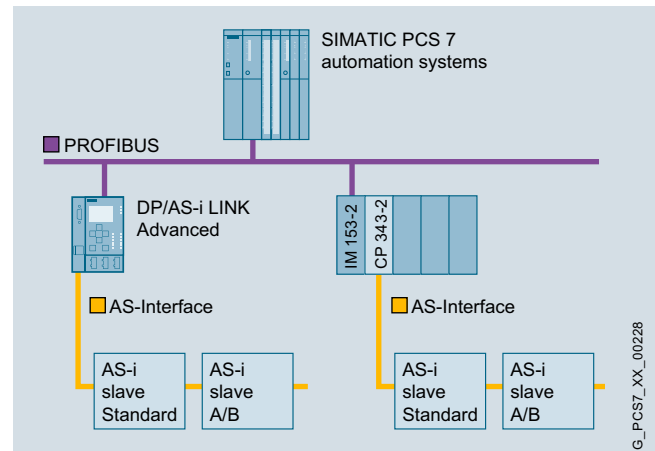
AS-i integration in SIMATIC PCS 7 via PROFIBUS DP
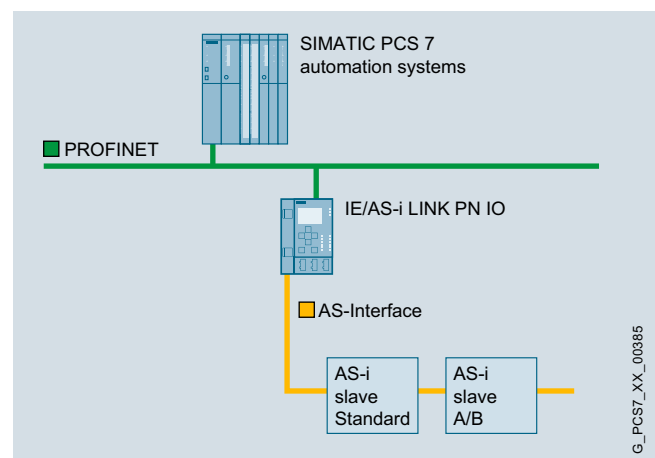
AS-i integration in SIMATIC PCS 7 via PROFINET IO

Communication
Other communication

Design (continued)

System components

The basic components of a system installation are:

- AS-Interface master (alternatives):
  - DP/AS-i Link Advanced (AS-i single or double master)
  - CP 343-2 or CP 343-2P (both can be operated in an ET 200M remote I/O station)
  - IE/AS-i LINK PN IO (AS-i single or double master)
- AS-Interface block library for SIMATIC PCS 7 (add-on product, see catalog "Add-ons for SIMATIC PCS 7", section "Libraries/Blocks/Tools")
- AS-Interface shaped cable (use of round cable also possible if preferred)
- Modules for connecting standard sensors/actuators
- Power supply unit for powering the slaves
- Actuators and sensors with an integrated slave ASIC
- Address programming device for setting the slave address

AS-i slaves

You can use all digital AS-i standard slaves as well as digital AS-i A/B slaves in accordance with the AS-i specification V3.0. Analog AS-i slaves can also be integrated via the DP/AS-i Link Advanced or the IE/AS-i LINK PN IO.

Ordering data

	Article No.
DP/AS-i LINK Advanced Network transition between PROFIBUS DP and AS-Interface; master profiles M3 and M4, enhanced AS-Interface specification V3.0; IP20 degree of protection; manual on CD (English, German, French, Spanish, Italian)	
• Single master with display	**6GK1415-2BA10**
• Dual master with display	**6GK1415-2BA20**
CP 343-2 Communications module for the connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network by means of SET key; including manual on CD (English, German, French, Spanish, Italian); without front panel connector	**6GK7343-2AH01-0XA0**
CP 343-2P Communications module for the connection of SIMATIC S7-300 and ET 200M to AS-Interface; configuration of the AS-i network by means of SET key or HW-Config (STEP 7 V5.2 and higher); including manual on CD (English, German, French, Spanish, Italian); without front connector	**6GK7343-2AH11-0XA0**
Front Connector 20-pin, with screw contacts	**6ES7392-1AJ00-0AA0**
IE/AS-i LINK PN IO Network transition between PROFINET/Industrial Ethernet and AS-Interface with IP20 degree of protection; including COMBICON plug-in screw-type terminals for connecting the AS-Interface cable	
• Single master with display	**6GK1411-2AB10**
• Dual master with display	**6GK1411-2AB20**
Further accessories For cable material, plugs, and further accessories, see Catalog IC 10 or Industry Mall/CA 01 under "Automation engineering – Industrial Controls – Industrial Communication – AS-Interface"	

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■ **Overview**

CP 341 communication module

Modbus is connected to PROFIBUS DP using an ET 200M with a CP 341 communication module. The latter enables the fast and efficient exchange of data through point-to-point coupling.

The CP 341 communications module is available in 3 versions with different transmission physics:

- RS 232C (V.24)
- 20 mA (TTY)
- RS 422/RS 485 (X.27)

The Modbus Master or Modbus Slave loadable drivers are needed for the Modbus coupling.

■ **Ordering data**

	Article No.
CP 341 communication module with one RS 232 C (V.24) interface	**6ES7341-1AH02-0AE0**
RS 232 connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7902-1AB00-0AA0**
• 10 m	**6ES7902-1AC00-0AA0**
• 15 m	**6ES7902-1AD00-0AA0**
CP 341 communication module with one 20 mA (TTY) interface	**6ES7341-1BH02-0AE0**
20 mA (TTY) connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7902-2AB00-0AA0**
• 10 m	**6ES7902-2AC00-0AA0**
• 50 m	**6ES7902-2AG00-0AA0**
CP 341 communication module with one RS 422/485 (X.27) inter-face	**6ES7341-1CH02-0AE0**
RS 422/485 connecting cable for linking to SIMATIC S7	
• 5 m	**6ES7902-3AB00-0AA0**
• 10 m	**6ES7902-3AC00-0AA0**
• 50 m	**6ES7902-3AG00-0AA0**
Loadable drivers for CP 341	
Modbus master (RTU format)	
• Single license	**6ES7870-1AA01-0YA0**
• Single license, without software or documentation	**6ES7870-1AA01-0YA1**
Modbus slave (RTU format)	
• Single License	**6ES7870-1AB01-0YA0**
• Single license, without software or documentation	**6ES7870-1AB01-0YA1**

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Communication

Process I/O
Introduction

■ Overview

SIMATIC ET 200 remote I/O stations for SIMATIC PCS 7

The SIMATIC PCS 7 process control system offers a variety of possibilities for detecting and outputting process signals via sensors and actuators as well as for connecting process I/O to the automation systems:

- Signal and function modules in remote I/O stations on the fieldbus
  - PROFIBUS DP (ET 200M, ET 200iSP, ET 200S, ET 200pro)
  - PROFINET IO (ET 200M, ET 200SP)
- Intelligent, distributed field/process devices and operator terminals directly on the PROFIBUS DP, PROFIBUS PA or FOUNDATION Fieldbus H1
- Analog and digital I/O modules of the SIMATIC S7-400 operated centrally in the automation system

SIMATIC S7-400 signal modules used centrally in the automation system are suitable for small applications or plants with few remote locations.

In practice, however, distributed process I/Os are mainly used which, depending on the type, also support redundant configurations or operation in explosive gas/dust atmospheres:
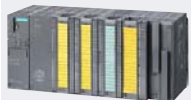
- SIMATIC ET 200 remote I/Os in conjunction with classic field/process devices and HART field devices
- Intelligent field/process devices for direct fieldbus connection

Especially convincing arguments for distributed process I/O include:

- Modularity and consistency
- Flexible adaptability to the plant structure
- Minimum cabling and engineering requirements
- Low commissioning, servicing and lifecycle costs
- Wide technical bandwidth

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■ **Design**

Comparison of distributed I/O systems for SIMATIC PCS 7

I/O system	ET 200M	ET 200iSP	ET 200SP	ET 200S	ET 200pro
Design					
Degree of protection	IP20	IP30	IP20	IP20	IP65/IP66/IP67
Design	Modular	Modular	Discretely scalable	Bit modular, expandable block	Modular
Assembly	Mounting rail	Mounting rail	Standard mounting rail	Standard mounting rail	Mounting rail
Connection system for sensors/actuators	Single-wire connection Cage-clamp/screw-type connection, FastConnect, TopConnect	Multi-wire connection Cage-clamp/screw-type connection	Single/multi-conductor connection Push-in terminals	Multi-wire connection Cage-clamp/screw-type connection, FastConnect	M8, M12, M23
Special applications					
Safety engineering	●	●	–	●	●
For use in hazardous areas	Zones 2, 22	Zones 1, 21	Zones 2, 22	Zones 2, 22	–
Increased availability	Switched, redundant	Switched, redundant	–	–	–
Temperature range	0 … +60 °C[1]	-20 … +70 °C	0 … +60 °C[1] (horizontal)	0 … +60 °C[1]	-25 … +55 °C
Vibration resistance (continuous)	1 g	1 g	Up to 5 g	2 g	5 g (module-dependent)
Communication					
PROFIBUS (Cu/FO)	● / – (12 Mbit/s)	● / – (1.5 Mbit/s)	– / –	● / ● (12 Mbit/s)	● / ● (12 Mbit/s)
PROFINET (Cu/FO)	● / –	– / –	● / –	– / –	– / –
System functions					
Permanent wiring	● (plugging and removal)	●	●	●	–
Hot swapping	● (with active backplane bus)	●	●	●	●
Expansion/ configuration during ongoing operation	● / ●	● / ●	– / –	● / –	– / –
Diagnostics (module-dependent)	Channel-discrete	Channel-discrete	Channel-discrete	Channel-discrete	Channel-discrete
functions					
Digital channels	●	●	●	●	●
Analog channels	●	●	●	●	●
incl. HART	●	●	–	–	–
Motor starters	–	–	–	●	–
Pneumatic interface	–	●	–	–	–
Technological functions	Counting/measuring, controlling, weighing	Counting, frequency measuring	–	Counting/measuring	–

[1] Also available as SIPLUS component for expanded temperature range -25/-40 … +60/+70 °C and corrosive atmosphere/condensation (exact details at www.siemens.com/siplus)

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Process I/O
Introduction

■ **Design** (continued)

Integration of process I/O in the hazardous area
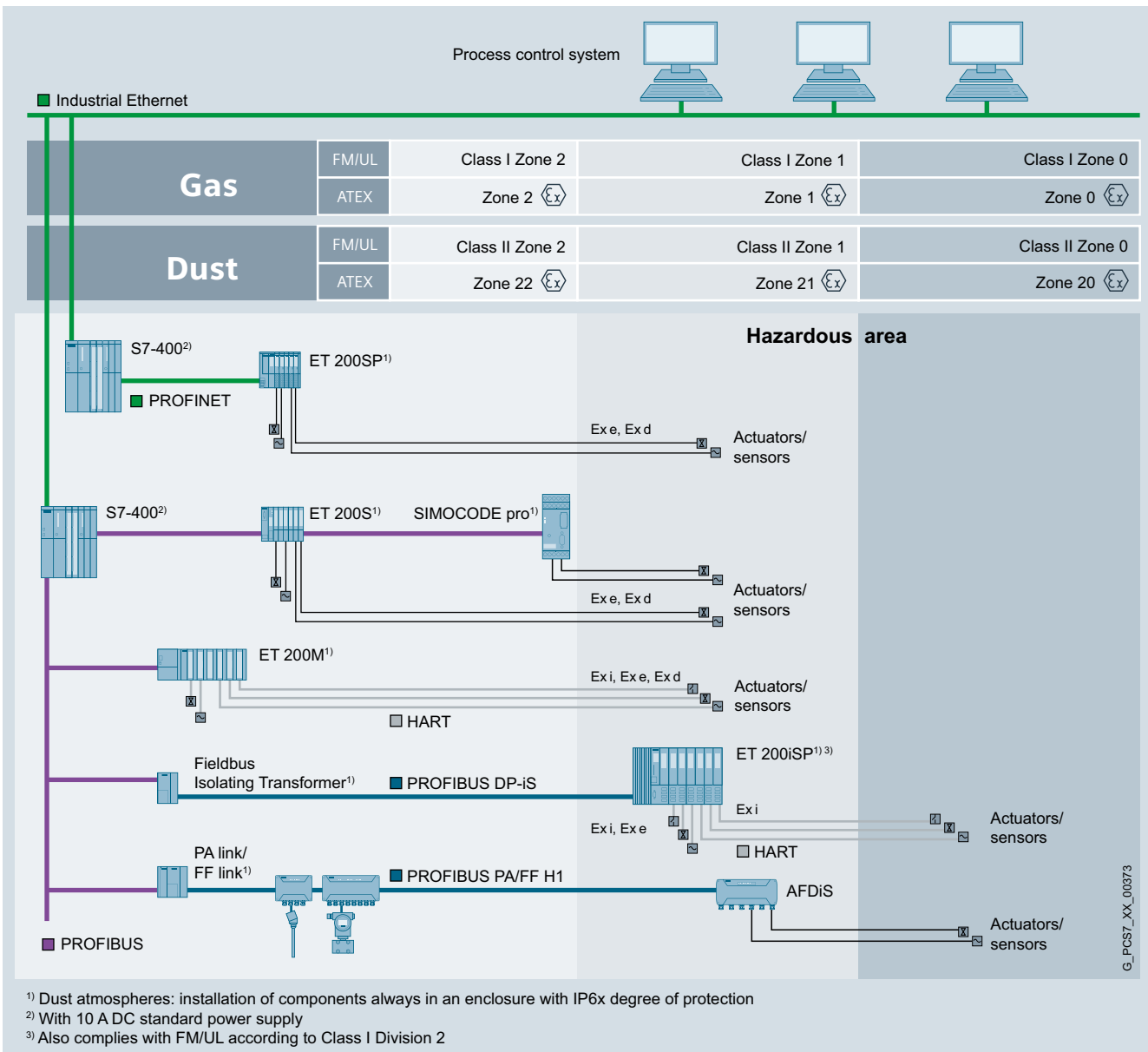
Process I/O in explosive gas and dust atmospheres

[1] Dust atmospheres: installation of components always in an enclosure with IP6x degree of protection
[2] With 10 A DC standard power supply
[3] Also complies with FM/UL according to Class I Division 2

The figure shows the possible applications for the SIMATIC PCS 7 process I/O with consideration of different environmental conditions.

Field/process devices on the PROFIBUS PA or FOUNDATION Fieldbus H1

Actuators/sensors located in Ex zones 0, 1, 2, 20, 21 or 22 can be integrated in SIMATIC PCS 7 via various active field distributors on the PROFIBUS PA or FOUNDATION Fieldbus H1. The active field distributor AFDiS/AFDiSD is required for sensors/actuators in Ex zones 0, 1, 20 or 21.

ET 200iSP distributed I/O

In accordance with ATEX directive 94/9/EC, ET 200iSP remote I/O stations suitable for gas/dust atmospheres can be installed directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically-safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

ET 200M, ET 200SP and ET 200S distributed I/O

ET 200M, ET 200SP and ET 200S remote I/O stations can be used in Ex zone 2 or 22 as well as in non-hazardous areas. The actuators/sensors can also be positioned in Ex zone 1 or 21. Special Ex I/O modules are available for this in the ET 200M product range.

ET 200pro distributed I/O

ET 200pro remote I/O stations are designed for use in non-hazardous areas.

Intrinsically-safe operator panel

An intrinsically-safe operator panel can be used in hazardous areas, zone 1, 2, 21 or 22, if required. For further information on this operator panel, see under SIMATIC HMI Thin Client Ex in the Catalog "Add-ons for the SIMATIC PCS 7 process control system", Section "Operator control and monitoring".

Function

Possible online modifications among the process I/Os	
ET 200M	• Adding of ET 200M stations • Adding of I/O modules to the station • Changing the parameter settings of I/O modules • Parameterization of connected HART field devices with SIMATIC PDM
ET 200iSP	• Adding of ET 200iSP stations • Adding of modules for the station • Re-configuration of modules • Parameterization of connected HART field devices using SIMATIC PDM
ET 200S	• Adding of ET 200S stations
ET 200pro	• Adding of ET 200pro stations
PROFIBUS DP, PROFIBUS PA, FOUNDATION Fieldbus H1	• Adding of PROFIBUS DP stations • Adding of PA links and PA field devices • Parameterization of PA or FF field devices with SIMATIC PDM

More information

For special blocks and block libraries for integration of field/process devices in SIMATIC PCS 7, e.g. devices from drive and weighing systems, see the Industry Mall as well as Catalog ST PCS 7 AO, "Add-ons for the SIMATIC PCS 7 Process Control System".

For information and ordering data on field/process devices, drive and motor management systems from Siemens, see the Industry Mall as well as the PDF versions of the corresponding catalogs on the Internet.

You will find the Industry Mall on the Internet at:

www.siemens.com/industrymall

The PDF versions of the catalogs are available on the Internet at:

www.siemens.com/automation/infocenter

Process I/O
Central I/O for SIMATIC PCS 7

Central I/O modules

◾ Overview

Signal modules from the SIMATIC S7-400 range can be used in the SIMATIC PCS 7 automation system if necessary. These are primarily an alternative to use of distributed I/Os in the case of small applications or systems with a small distributed configuration.

For SIMATIC PCS 7, the I/O modules listed in the Ordering data have been selected from the range of S7-400 signal modules.

Notes:

Apart from these selected modules it is also possible to use - with limitations in functions - all other I/O modules from the current range of S7-400 signal modules.

All process data from the I/O are available for PCS 7 engineering in the CFC, and can be graphically interconnected to the signal name in the signal list. Diagnostics information is generated automatically when using the I/O modules listed here.

When using other I/O modules, integration in SIMATIC PCS 7 is limited to the process data, i.e. the full scope of diagnostics functions is not automatically available. These modules can therefore only be used meaningfully in SIMATIC PCS 7 if the diagnostics capability can be omitted.

Online modifications and redundancy are not supported by the central I/O.

◾ Technical specifications

You can find the detailed technical data of the S7-400 modules at the following points:

- Catalog ST 70 or
- Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – Controllers – SIMATIC S7 modular controllers"

◾ Ordering data

	Article No.
SM 421 Digital Input Modules	
• 32 inputs, 24 V DC	6ES7421-1BL01-0AA0
• 32 inputs, 120 V AC/DC	6ES7421-1EL00-0AA0
• 16 inputs, 24 V DC, with process/diagnostics interrupt	6ES7421-7BH01-0AB0
• 16 inputs, 24 to 60 V AC/DC, with process/diagnostics interrupt	6ES7421-7DH00-0AB0
• 16 inputs, 120/230 V AC/DC, inputs according to IEC 1131-2 Type 2	6ES7421-1FH20-0AA0
SM 422 Digital Output Modules	
• 32 outputs; 24 V DC, 0.5 A	6ES7422-1BL00-0AA0
• 32 outputs; 24 V DC, 0.5 A; with diagnostics	6ES7422-7BL00-0AB0
• 16 outputs; 24 V DC, 2 A	6ES7422-1BH11-0AA0
• 16 outputs; relay contacts	6ES7422-1HH00-0AA0
• 16 outputs; 120/230 V AC, 2 A	6ES7422-1FH00-0AA0
SM 431 Analog Input Modules	
• 16 inputs, non-floating, 13 bit	6ES7431-0HH00-0AB0
• 8 inputs, floating, 13 bit	6ES7431-1KF00-0AB0
• 8 inputs, floating, 14 bit, with linearization (RTD/TC)	6ES7431-1KF10-0AB0
• 8 inputs, floating, 14 bit	6ES7431-1KF20-0AB0
• 16 inputs, floating, 16 bit; hardware interrupt capability, with diagnostics interrupt	6ES7431-7QH00-0AB0
• 8 inputs, floating, 16 bit; hardware interrupt capability, for thermocouples, with diagnostics interrupt	6ES7431-7KF00-0AB0
• 8 inputs, floating, 16 bit; hardware interrupt capability, for thermal resistors, with diagnostics interrupt	6ES7431-7KF10-0AB0
SM 432 Analog Output Modules	
• 8 outputs, floating, 13 bit; for ± 10 V, 0 to 10 V, 1 to 5 V, ± 20 mA, 0 to 20 mA, 4 to 20 mA	6ES7432-1HF00-0AB0
Front Connector (1 unit)	
• With screw contacts	6ES7492-1AL00-0AA0
• With spring clamps	6ES7492-1BL00-0AA0
• With crimp contacts	6ES7492-1CL00-0AA0

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■ Overview

IM 460-x

Central controller

IM 461-x

Expansion units

IM 461-x

I/O modules,
CP and FM

G_P CS7_XX_00131
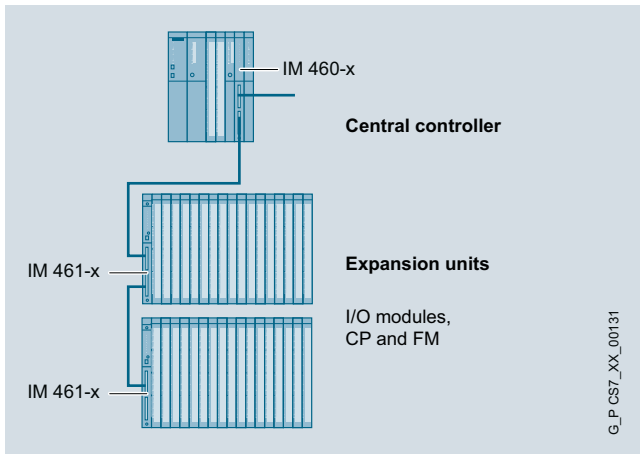
Expansion units can be used for the distributed expansion of the SIMATIC S7-400. The IM 460-x interface modules are used as the interface for these expansion units.

Restrictions compared to standard I/O modules from the ET 200M range

• No redundant interfacing of expansion units

• No configuration during operation

Racks

The universal racks (UR) are used for SIMATIC PCS 7. They can be used as central racks and as expansion racks. Other racks: see Catalog ST 70.

■ Ordering data

	Article No.
IM 460-0 interface module	**6ES7460-0AA01-0AB0**
• Transmitter module for central controller	
• Without transmission of voltage to the expansion unit	
• Cable up to 5 m long	
• With K-bus for communication with CPs and FMs in the expansion unit	
• For connecting as many as 8 expansion units	
IM 461-0 Interface Module Corresponding receiver module for the expansion unit	**6ES7461-0AA01-0AA0**
IM 460-1 Interface Module	**6ES7460-1BA01-0AB0**
• Transmitter module for central controller	
• With transmission of the 5 V supply for I/O modules	
• Cable up to 1.5 m long	
• Without transmission of the K-bus, hence solely for communication from I/O modules	
IM 461-1 Interface Module Corresponding receiver module for the expansion unit	**6ES7461-1BA01-0AA0**
IM 460-3 Interface Module	**6ES7460-3AA01-0AB0**
• Transmitter module for central controller	
• Without transmission of voltage to the expansion unit	
• Cable up to 100 m long	
• With K-bus for communication with CPs and FMs in the expansion unit	
• For connecting as many as 8 expansion units	
IM 461-3 Interface Module Corresponding receiver module for the expansion unit	**6ES7461-3AA01-0AA0**
UR1 rack for central and expansion units • 18 slots • Suitable for redundant power supply	**6ES7400-1TA01-0AA0**
UR2 rack for central and expansion units • 9 slots • Suitable for redundant power supply	**6ES7400-1JA01-0AA0**
Accessories	
468-1 Connecting Cable for connecting IM 460-0 and IM 461-0; IM 460-3 and IM 461-3	
• 0.75 m	**6ES7468-1AH50-0AA0**
• 1.5 m	**6ES7468-1BB50-0AA0**
• 5 m	**6ES7468-1BF00-0AA0**
Additional lengths for connecting IM 460-3 and IM 461-3	
• 10 m	**6ES7468-1CB00-0AA0**
• 25 m	**6ES7468-1CC50-0AA0**
• 50 m	**6ES7468-1CF00-0AA0**
• 100 m	**6ES7468-1DB00-0AA0**
Terminator for IM 461-0	**6ES7461-0AA00-7AA0**
468-3 Connecting Cable for connecting IM 460-1 and IM 461-1	
• 0.75 m	**6ES7468-3AH50-0AA0**
• 1.5 m	**6ES7468-3BB50-0AA0**

11

Process I/O
Power Supplies

Overview

SITOP PSU100M and PSU300M

Efficient operation of a process control system requires a reliable, constant power supply. With their compact, rugged design and high overload capability, the fanless 24 V DC power supplies of the SITOP modular series are ideally suited for industrial use. The wide voltage input range and the international approvals mean that it can be used in almost all networks worldwide.

The high efficiency over the entire load range and low no-load loss are the best conditions for energy-efficient operation. Due to the precisely stablized output voltage, even sensitive consumers can be connected, for example, sensors.

To increase availability, the 1-phase and 3-phase SITOP modular power supplies can be extended with expansion modules (message, redundancy, buffering and selectivity modules) or with an uninterruptible DC UPS power supply.

Design
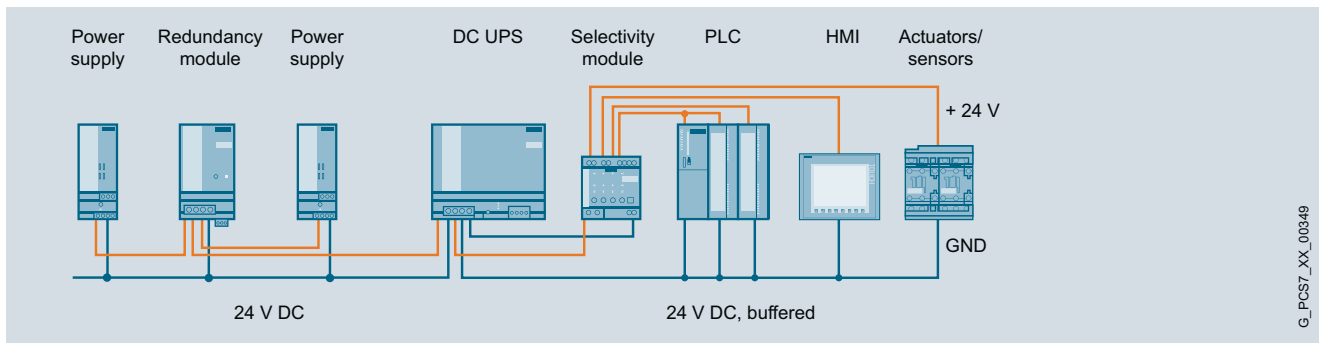
24 V DC power supply with expansion modules and DC UPS

Product overview

Modules	Versions	Input	Output
1-phase and 3-phase power supplies			
SITOP modular, 1-phase, 24 V DC	5 A	120/230 ... 500 V AC	24 V DC, 5 A
	10 A	120/230 ... 500 V AC	24 V DC, 10 A
	PSU100M, 20 A	120 ... 230 V AC/DC	24 V DC, 20 A
	40 A	120/230 V AC	24 V DC, 40 A
SITOP modular, 3-phase, 24 V DC	PSU300M, 20 A	3 400 ... 500 V AC	24 V DC, 20 A
	PSU300M, 40 A	3 400 ... 500 V AC	24 V DC, 40 A
Add-on modules			
SITOP modular signaling module	--	--	--

■ Design (continued)

Modules		Versions	Input	Output
	SITOP redundancy module PSE202U	24 V DC, 40 A	24 V DC	U_e – approx. 0.5 V
	SITOP modular buffer module	--	24 V DC	Ue - approx. 1 V
	SITOP selectivity module PSE200U, 4-channel, 4 x 3 A Adjustable output current: 0.5 ... 3 A	Without single-channel signaling (common signaling contact)	24 V DC	Ue - approx. 0.2 V
		With single-channel signaling		
	SITOP selectivity module PSE200U, 4-channel, 4 x 10 A Adjustable output current: 3 ... 10 A	Without single-channel signaling (common signaling contact)	24 V DC	Ue - approx. 0.2 V
		With single-channel signaling		

Uninterruptible 24 V DC power supplies

DC UPS with capacitor

	SITOP DC UPS basic device UPS500S with capacitor, 15 A	Power 2.5 KW	24 V DC	24 V DC
		Power 5 KW		
	SITOP DC UPS expansion module UPS501S, 7 A	Power 5 KW	24 V DC	24 V DC

DC UPS for battery modules

	SITOP DC UPS module for battery modules, 6 A	Serial interface	24 V DC	24 V DC
		USB interface		
	SITOP DC UPS module for battery modules, 15 A	Serial interface	24 V DC	24 V DC
		USB interface		
	SITOP DC UPS module for battery modules, 40 A	USB interface	24 V DC	24 V DC

Battery modules

	Battery module for DC UPS module 6 A	24 V DC, 1.2 Ah	--	24 V DC
	Battery module for DC UPS modules 6 A and 15 A	24 V DC, 3.2 Ah	--	24 V DC
	Battery module for DC UPS modules 6 A, 15 A and 40 A	24 V DC, 7 Ah	--	24 V DC
		24 V DC, 12 Ah		

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Process I/O
Power Supplies

■ **Design** (continued)

1-phase and 3-phase power supply SITOP modular

- Stabilized; with wide-range input for connection to 1-phase or 3-phase networks worldwide
- Output currents 24 V DC with 5 to 40 A
- Efficiency up to 93%; 50% extra power for up to 5 s
- Settings for operational overload:
  - Constant current with automatic restart
  - Latching shutdown
- "Soft characteristic curve" for optimal load distribution with parallel connection
- Power boost for short-term 3x rated current for tripping protective devices
- Signaling of operating status via 3 LEDs and signaling contact

Add-on modules

Signaling module

- Provision of alarm signals for the operating status of the power supply
- Can be combined with SITOP modular power supply, 6EP1x3x3-3BA00

Redundancy module

- Decoupling of two power supplies in parallel operation via diodes
- 24 DC power supply is maintained in the event of power failure
- Message display via LED and floating relay contact

Back-up module

- Buffering the load current during brief power interruptions
- Wiring parallel to the output of the power supply
- Buffer time of 200 ms with 40 A, up to 1.6 s with 5 A load current

Selectivity module

- Distribution of the load current over up to 4 current circuits
- Monitoring of individual partial currents
- Selective cutoff of all circuit currents at overload or short-circuit
- Signaling via LEDs (channel-by-channel) and, depending on the version, common signaling contact or single-channel message
- Selectivity modules with single-channel message output the status of the 4 current circuits by means of a code that can be read by a digital controller input and evaluated with function blocks.
  For more information and to download function blocks, see:
  http://support.automation.siemens.com/WW/view/en/61450284

Uninterruptible 24 V DC power supplies

SITOP DC UPS with capacitor

- Buffering of 24 V DC up to 15 A
- Buffering of power failures for up to several minutes enables data backup and controlled shutdown
- Status messages via LEDs and floating signaling contacts
- Communication with controller/IPC via USB
- Extension of the backup time with up to 3 expansion modules

SITOP DC UPS with battery modules

- Buffering of 24 V DC up to 40 A with battery modules (1.2 Ah, 3.2 Ah, 7 Ah, 12 Ah)
- Buffering of power failures for up to several hours enables uninterrupted continuation of the process
- Permanent monitoring of operational readiness, battery feed, battery charge level and battery aging
- Signaling of operational status via LEDs and floating signaling contacts
- Integrated battery management for optimal charge and discharge protection
- Communication with controller/IPC via USB or RS 232 interface

SITOP DC UPS software tool

- Free software for the integration of SITOP DC UPS in PC-based systems; download at: www.siemens.com/sitop-usv
- Supports further processing of status messages, safe shutdown, correct restart, and execution of a customized power failure program

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Ordering data

	Article No.
1-phase and 3-phase power supplies	
SITOP modular, 1-phase, 24 V DC, 5 A Stabilized power supply Input: 120/230 … 500 V AC Output: 24 V DC/5 A	6EP1333-3BA00
SITOP modular, 1-phase, 24 V DC, 10 A Stabilized power supply Input: 120/230 … 500 V AC Output: 24 V DC/10 A	6EP1334-3BA00
SITOP modular PSU100M, 1-phase, 24 V DC, 20 A Stabilized power supply Input: 120 ... 230 V AC/DC Output: 24 V DC/20 A	6EP1336-3BA10
SITOP modular, 1-phase, 24 V DC, 40 A Stabilized power supply Input: 120/230 V AC Output: 24 V DC/40 A	6EP1337-3BA00
SITOP modular PSU300M, 3-phase, 24 V DC, 20 A Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/20 A	6EP1436-3BA10
SITOP modular PSU300M, 3-phase, 24 V DC, 40 A Stabilized power supply Input: 3 AC 400 … 500 V Output: 24 V DC/40 A	6EP1437-3BA10
Add-on modules	
SITOP modular signaling module For SITOP modular, 1-phase, 24 V DC, 5A, 10 A and 40 A (6EP1XXX-3BA00) Signaling contacts: Output voltage OK, operational availability OK, remote ON/OFF	6EP1961-3BA10
Redundancy module SITOP PSE202U, 24 V DC/40 A Suitable for decoupling two SITOP power supplies each with a maximum of 20 A output current Input: 24 V DC Output: Ue - approx. 0.5 V	6EP1961-3BA21
SITOP modular buffer module For 6EP1X3X-3BAX0 Backup time 100 ms up to 10 s, depending on load current Input: 24 V DC Output: Ue - approx. 1 V	6EP1961-3BA01
Selectivity module SITOP PSE200U, 4-channel, 4 x 3 A Input: 24 V DC Output: Ue – approx. 0.2 V Adjustable output current 0.5 to 3 A • Without single-channel signaling (common signaling contact) • With single-channel signaling	 6EP1961-2BA11 6EP1961-2BA31
Selectivity module SITOP PSE200U, 4-channel, 4 x 10 A Input: 24 V DC Output: Ue – approx. 0.2 V Adjustable output current 3 to 10 A • Without single-channel signaling (common signaling contact) • With single-channel signaling	 6EP1961-2BA21 6EP1961-2BA41

	Article No.
Uninterruptible 24 V DC power supplies	
DC UPS with capacitor	
DC UPS basic device SITOP UPS500S with capacitor, 15 A Input: 24 V DC; Output: 24 V DC • Power 2.5 KW • Power 5 KW	 6EP1933-2EC41 6EP1933-2EC51
DC UPS expansion module SITOP UPS501S, 7 A For connection to the basic device; Input: 24 V DC; Output: 24 V DC; power 5 KW	6EP1935-5PG01
DC UPS for battery modules	
SITOP DC UPS module for battery modules, 6 A Input: 24 V DC; Output: 24 V DC • With serial interface • With USB interface	 6EP1931-2DC31 6EP1931-2DC42
SITOP DC UPS module for battery modules, 15 A Input: 24 V DC; Output: 24 V DC • With serial interface • With USB interface	 6EP1931-2EC31 6EP1931-2EC42
SITOP DC UPS module for battery modules, 40 A Input: 24 V DC; Output: 24 V DC • With USB interface	 6EP1931-2FC42
Battery modules	
Battery module 24 V/1.2 Ah for DC UPS module 6 A	6EP1935-6MC01
Battery module 24 V/3.2 Ah for DC UPS module 6 A and 15 A	6EP1935-6MD11
Battery module 24 V/7 Ah for DC UPS module 6 A, 15 A and 40 A	6EP1935-6ME21
Battery module 24 V/12 Ah for DC UPS module 6 A, 15 A and 40 A	6EP1935-6MF01

More information

You can find detailed information and technical specifications for the 1-phase and 3-phase SITOP modular power supplies, for the expansion modules such as message, redundancy, buffer and selectivity modules as well as for appropriate 24 V DC uninterruptible power supplies in the Catalog KT 10.1.

Additional information is available via the Internet at:
• SITOP power supplies: www.siemens.com/sitop
• CAx data (2D, 3D, circuit diagram macros): www.siemens.com/sitop-cax
• Operating instructions: www.siemens.com/sitop/manuals

SITOP Selection Tool

The SITOP Selection Tool helps you select the right power supply easily and quickly: www.siemens.com/sitop-selection-tool

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Process I/O
Terminal modules

■ Overview
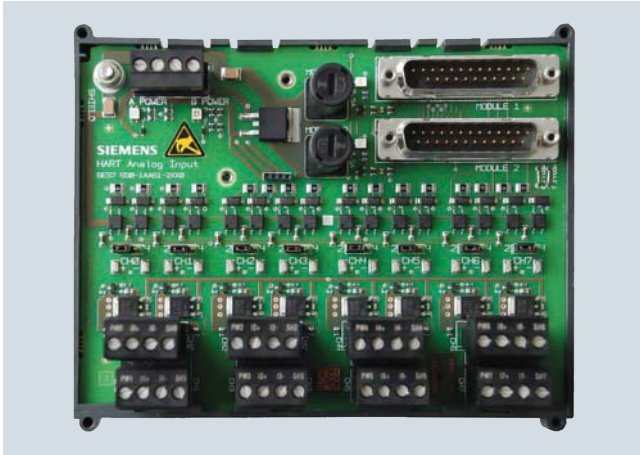
MTA AI HART terminal module, 8-channel

MTA terminal modules (Marshalled Termination Assemblies) can be used to connect field devices, sensors and actuators to the I/O modules of the ET 200M remote I/O stations simply, rapidly and reliably. They can be used to significantly reduce the costs and required work for cabling and commissioning, and prevent wiring errors.

The individual MTA terminal modules are each tailored to specific I/O modules from the ET 200M range (see design for assignment table, page 11/13). MTA versions are available for standard I/O modules as well as for redundant and safety-related I/O modules.

The MTA terminal modules are connected to the I/O modules using 3 m or 8 m long preassembled cables.

The MTA terminal module for 24 V DC power supply features sixteen 24 V DC, 0.5 A outputs protected against short-circuit for redundant power supply of field devices that are no longer supplied via signal cables from a number of new MTAs (see product overview table), e.g. 4-wire transmitters. If 0.5 A is insufficient, you can also connect two or more outputs in parallel.

■ Design
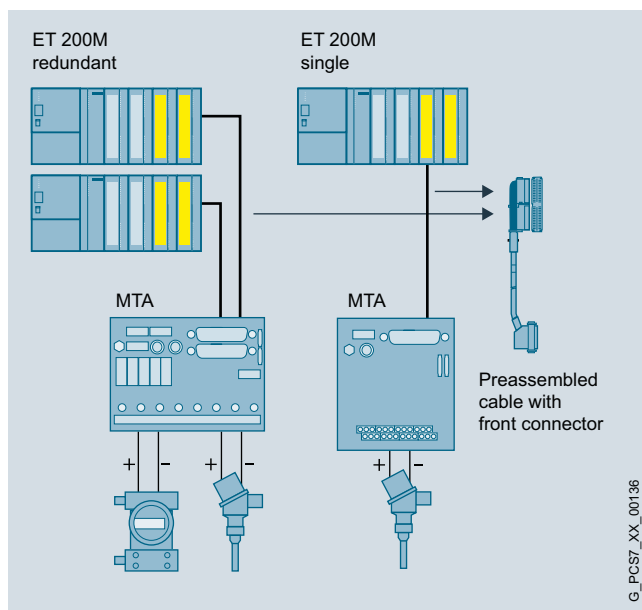
- MTA terminal modules in versions for standard, redundant and safety-related I/O modules of the ET 200M distributed I/O system
- Redundant 24 V DC supply
- Power Monitor Board for diagnostics of the redundant power supply (partially integrated or can be ordered as option)
- 3 or 8 m long preassembled cables for connecting MTA terminal module and ET 200M module, in each case with:
  - 50/25-contact Sub-D socket or 25-contact Sub-D plug, for connection to MTA terminal
  - 40/20-pole Siemens front connector, female version, for connection to ET 200M module
- Screw terminals for the 1:1 connection of field devices, sensors and actuators
- Protection of channels frequently by fuse or electronic current limitation, partially with LED display
- Test and release as SIMATIC PCS 7 system component with corresponding approvals (FM, UL, CE, ATEX, TÜV)

■ **Design** (continued)

Product overview with information on combinable ET 200M modules and connection cables

MTA type	Input/output area	Article No. of MTA and accessories	Article No. of ET 200M module	Article No. of connecting cable	I/O redundancy
8 channels, AI	1 ... 5 V; ± 5 V; ± 10 V; 0 ... 20 mA; 4 ... 20 mA; ± 20 mA	6ES7 650-1AA52-2XX0[1]	6ES7 331-7NF00-0AB0 (from product version 5)	6ES7 922-3BD00-0BA0 (3 m) 6ES7 922-3BJ00-0BA0 (8 m)	Yes
8 channels, AI	1 ... 5 V; ± 5 V; ± 10 V; 0 ... 20 mA; 4 ... 20 mA; ± 20 mA	6ES7 650-1AA52-2XX0[1]	6ES7 331-7NF10-0AB0 (from product version 8)	6ES7 922-3BD00-0BB0 (3 m) 6ES7 922-3BJ00-0BB0 (8 m)	Yes
8 channels, AO	0 ... 20 mA; 4 ... 20 mA	6ES7 650-1AB51-2XX0	6ES7 332-5HF00-0AB0 (from product version 3)	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	Yes
8 channels, AI HART	0 ... 20 mA (without use of HART) 4 ... 20 mA (with/without use of HART)	6ES7 650-1AA61-2XX0[1]	6ES7 331-7TF01-0AB0	6ES7 922-3BD01-0AM0 (3 m) 6ES7 922-3BJ01-0AM0 (8 m)	Yes
8 channels, AO HART	0 ... 20 mA (with/without use of HART) 4 ... 20 mA (with/without use of HART)	6ES7 650-1AB61-2XX0	6ES7 332-8TF01-0AB0	6ES7 922-3BD01-0AM0 (3 m) 6ES7 922-3BJ01-0AM0 (8 m)	Yes
8 channels, AI TC	Thermocouple types B, C, N, E, R, S, J, L, T, K, U	6ES7 650-1AF51-2XX0	6ES7 331-7PF10-0AB0 (from product version 4) or 6ES7 331-7PF11-0AB0	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	No
8 channels, AI RTD	Resistance thermometers Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10	6ES7 650-1AG51-2XX0	6ES7 331-7PF00-0AB0 (from product version 8) or 6ES7 331-7PF01-0AB0	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	No
16 channels, DO	24 V DC, 0.5 A	6ES7 650-1AD11-2XX0	6ES7 322-8BH10-0AB0	6ES7 922-3BD00-0AT0 (3 m) 6ES7 922-3BJ00-0AT0 (8 m)	Yes
6 channels F-AI HART (safety-related)	0 ... 20 mA (without use of HART); 4 ... 20 mA (with/without use of HART)	6ES7 650-1AH62-5XX0[1]	6ES7 336-4GE00-0AB0	6ES7 922-3BD00-0AU0 (3 m) 6ES7 922-3BJ00-0AU0 (8 m)	Yes
16 channels, DI	24 V DC	6ES7 650-1AC11-3XX0	6ES7 321-7BH01-0AB0 (from product version 2)	6ES7 922-3BD01-0AM0 (3 m) 6ES7 922-3BJ01-0AM0 (8 m)	Yes
24 channels F-DI (safety-related)	24 V DC	6ES7 650-1AK11-7XX0	6ES7 326-1BK00-0AB0, 6ES7 326-1BK01-0AB0 or 6ES7 326-1BK02-0AB0	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	Yes
10 channels F-DO (safety-related)	24 V DC, 2 A	6ES7 650-1AL11-6XX0	6ES7 326-2BF01-0AB0 (from product version 2) or 6ES7 326-2BF10-0AB0	6ES7 922-3BD00-0AN0 (3 m) 6ES7 922-3BJ00-0AN0 (8 m)	Yes
16 channels DO relay	120 … 230 V AC, 5 A; 24 V DC, 5 A	6ES7 650-1AM30-3XX0	6ES7 322-8BH01-0AB0 or 6ES7 322-8BH10-0AB0	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	Yes
10 channels F DO relays (safety-related)	120 … 230 V AC, 5 A; 24 V DC, 5 A	6ES7 650-1AM31-6XX0	6ES7 326-2BF01-0AB0 (from product version 2) or 6ES7 326-2BF10-0AB0	6ES7 922-3BD00-0AS0 (3 m) 6ES7 922-3BJ00-0AS0 (8 m)	Yes

[1] These new terminal modules can no longer deliver a 24 V DC current for feeding 4-wire transmitters. You require an additive terminal module MTA power supply 24 V DC (Order No. 6ES7 650-1BE10-3XX0) if you wish to continue supplying 4-wire transmitters centrally per MTA and redundant with 24 V DC.

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Process I/O
Terminal modules

MTA terminal modules

■ **Ordering data**

	Article No.		Article No.
MTA terminal modules for SIMATIC PCS 7		**MTA F-AI HART terminal module, 6-channel** Terminal module for connection of field devices/sensors to a single or two redundant safety-related ET 200M analog input modules 6ES7336-4GE00-0AB0 Input range: 0 ... 20 mA (without use of HART), 4 ... 20 mA (with/without use of HART) Note: 4-wire devices must be supplied separately with current.	6ES7650-1AH62-5XX0
MTA AI terminal module, 8-channel Terminal module for connection of field devices/sensors to a single or two redundant ET 200M analog input modules 6ES7331-7NF00-0AB0 or 6ES7331-7NF10-0AB0 Input range: 1 to 5 V; ± 5 V; ± 10 V und 0/4 ... 20 mA; ± 20 mA Note: 4-wire devices must be supplied separately with current.	6ES7650-1AA52-2XX0		
MTA AO terminal module, 8-channel Terminal module for connection of field devices/actuators to a single or two redundant ET 200M analog output modules 6ES7332-5HF00-0AB0 Output range: 0/4 ... 20 mA	6ES7650-1AB51-2XX0	**MTA DI terminal module, 16-channel** Terminal module for connection of field devices/sensors to a single or two redundant ET 200M digital input modules 6ES7321-7BH01-0AB0 Input range: 24 V DC	6ES7650-1AC11-3XX0
MTA AI HART terminal module, 8-channel Terminal module for connection of field devices/sensors to a single or two redundant ET 200M analog input modules 6ES7331-7TF01-0AB0 Input range: 0 ... 20 mA (without use of HART), 4 ... 20 mA (with/without use of HART) Note: 4-wire devices must be supplied separately with current.	6ES7650-1AA61-2XX0	**MTA F-DI terminal module, 24-channel** Terminal module for connection of field devices/sensors to a single or two redundant safety-related ET 200M digital input modules 6ES7326-1BK00-0AB0, 6ES7326-1BK01-0AB0 or 6ES7326-1BK02-0AB0 Input range: 24 V DC	6ES7650-1AK11-7XX0
MTA AO HART terminal module, 8-channel Terminal module for connection of field devices/actuators to a single or two redundant ET 200M analog output modules 6ES7332-8TF01-0AB0 Output range: 0 to 20 mA (with/without use of HART), 4 ... 20 mA (with/without use of HART)	6ES7650-1AB61-2XX0	**MTA F-DO terminal module, 10-channel** Terminal module for connection of field devices/actuators to a single or two redundant safety-related ET 200M digital output modules 6ES7326-2BF01-0AB0 or 6ES7326-2BF10-0AB0 Output range: 24 V DC, 2A	6ES7650-1AL11-6XX0
MTA AI TC terminal module, 8-channel Terminal module for connection of field devices/sensors to a single ET 200M analog input module 6ES7331-7PF10-0AB0 or 6ES7331-7PF11-0AB0 Input range: Thermocouple types B, C, N, E, R, S, J, L, T, K, U	6ES7650-1AF51-2XX0	**MTA DO Relay terminal module, 16-channel** Terminal module for connection of field devices/actuators to a single or two redundant ET 200M digital output modules 6ES7322-8BH01-0AB0 or 6ES7322-8BH10-0AB0 Output range: 120 to 230 V AC, 5 A; 24 V DC, 5 A	6ES7650-1AM30-3XX0
MTA AI RTD terminal module, 8-channel Terminal module for connection of field devices/sensors to a single ET 200M analog input module 6ES7331-7PF00-0AB0 or 6ES7331-7PF01-0AB0 Measuring range: Resistance thermometers Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10	6ES7650-1AG51-2XX0	**MTA F-DO Relay terminal module, 10-channel** Terminal module for connection of field devices/actuators to a single or two redundant safety-related ET 200M digital output modules 6ES7326-2BF01-0AB0 or 6ES7326-2BF10-0AB0 Output range: 120 to 230 V AC, 5 A; 24 V DC, 5 A	6ES7650-1AM31-6XX0
MTA DO terminal module, 16-channel Terminal module for connection of field devices/actuators to a single or two redundant ET 200M digital output modules 6ES7322-8BH10-0AB0 Output range: 24 V DC, 0.5 A	6ES7650-1AD11-2XX0		

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Ordering data

	Article No.
Separate power supply for field devices, for example 4-wire transmitter	
MTA terminal module 24 V DC power supply, 16-channel Terminal module for the redundant power supply of field devices separated from the signal transmission Output range: 24 V DC, 0.5 A	6ES7650-1BE10-3XX0
Pre-assembled cable for connection of ET 200 module and MTA terminal module	
Connecting cable with 40-pin front connector for ET 200M and 50-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0AS0 6ES7922-3BJ00-0AS0
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0BA0 6ES7922-3BJ00-0BA0
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0BB0 6ES7922-3BJ00-0BB0
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D plug for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0AT0 6ES7922-3BJ00-0AT0

	Article No.
Connecting cable with 40-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0AN0 6ES7922-3BJ00-0AN0
Connecting cable with 20-pin front connector for ET 200M and 25-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD01-0AM0 6ES7922-3BJ01-0AM0
Connecting cable with 20-pin front connector for ET 200M and 50-pin Sub-D socket for MTA Lengths: • 3 m • 8 m	6ES7922-3BD00-0AU0 6ES7922-3BJ00-0AU0
Accessories	
Power monitor board (PMB) for display of status of redundant MTA power supply	6ES7650-1BA02-0XX0

More information

Detailed information on the MTA terminal modules can be found in the manual "ET 200M Marshalled Termination Assemblies Remote I/O Modules".

Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Overview

Within the SIMATIC ET 200 range, ET 200M represents the main series of distributed I/O systems for process control applications with SIMATIC PCS 7.

The ET 200M I/O system offers a comprehensive range of I/O modules of S7-300 design, including ones with special I&C functions:

- Standard analog and digital modules
- Redundant I/O modules
- I/O modules with enhanced diagnostics capability
- Ex I/O modules
- Controller and counter modules
- HART modules
- F-modules for safety-related applications

When using active bus modules, faulty I/O modules can be replaced while the plant is in operation (RUN) without influencing adjacent modules (hot swapping function).

The following actions are possible with the automation system in RUN:

- Adding new modules to the station
- Re-configuration of modules
- Addition of ET 200M stations
- Configuration of connected HART field devices with SIMATIC PDM

Note:

Apart from these selected modules, it is also possible to use - with limitations in functions - all other I/O modules from the current range of S7-300 signal modules.

Design

An ET 200M remote I/O station comprises:

- 1 or 2 (redundant) power supply modules (can be omitted in the case of a central 24 V DC supply for the plant)
- Up to 2 interface modules:
  - 1 or 2 (redundant) IM 153-2 High Feature for PROFIBUS DP connection or
  - 1 IM 153-4 PN High Feature for PROFINET connection
- Up to 12 I/O modules for connection of sensors/actuators

All I/O modules have optical electrical isolation from the backplane bus. Up to 12 I/O modules can connected to an IM 153-2 High Feature or IM 153-4 PN High Feature interface module. The IM 153-2 High Feature interface modules can also be configured redundantly.

In addition to the standard SIMATIC S7 I/O modules, special I/O modules with diagnostics capability offer the following functions, among others:

- Channel-based diagnostics, e.g. open-circuit, short-circuit, limit violations
- Internal module monitoring, e.g. configuration error, RAM error, tripped fuse
- Flatter monitoring for sensors
- Pulse stretching
- Output of a selectable substitute value on failure of the central processing unit

In the event of a fault, the modules with diagnostics capability automatically pass on the corresponding message to the operator station, permitting fast and simple troubleshooting.

The ET 200M stations can be used in standard environments and also in Ex zone 2/22. The actuators/sensors can be positioned in Ex zone 1/21 when suitable Ex input/output modules are used. Hot swapping of I/O modules within Ex zone 2 is allowed with the right permit (e.g. fire certificate).

Technical specifications

You can find detailed technical data on the ET 200M and S7-300 I/O modules in the following places:

- Catalog ST 70 or
- Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"

Options

SIPLUS extreme range for extended temperature ranges and corrosive environments

The "standard" properties of an individual device or system are often insufficient for harsh environmental conditions, applications in corrosive environments or extreme temperature ranges. Depending on the location of use, the result could be limitations in functionality or operational safety or even total failure of the plant.

The SIPLUS extreme range offers individually adapted standard products which permit retention of the functionality of your plant or process even under extreme conditions of use. These include:

- Ambient temperature range from -25 to +60/+70 °C
- Condensation, high humidity
- Increased mechanical stress
- Extreme loading by media, e.g. toxic atmospheres
- Voltage ranges deviating from the standard
- Increased degree of protection (dust, water)

You can find a summary of the available range of products classified according to their special properties on the Internet. The corresponding SIPLUS product is assigned there to the standard product:

www.siemens.com/siplus

Note:

SIPLUS products are also included in the ST 70 Catalog.

Overview

You can use the PS 307 or PS 305 load power supplies as the power supply module for the ET 200M. You can select different input voltages and output currents (120/230 V AC with 2 A, 5 A or 10 A or 24 to 110 V DC with 2 A) depending on the application.

With a redundant ET 200M configuration, it is also recommendable to have a redundant 24 V DC supply, e.g. with two PS 307 / PS 305 load power supplies.

Ordering data

	Article No.
PS 307 load power supply with power connector	
• 120/230 V AC; 24 V DC	
- 2 A; 40 mm wide	**6ES7307-1BA01-0AA0**
- 5 A; 60 mm wide	**6ES7307-1EA01-0AA0**
- 5 A, extended temperature range; 80 mm wide	**6ES7307-1EA80-0AA0**
- 10 A, 80 mm wide	**6ES7307-1KA02-0AA0**
PS 305 load power supply with power connector	
• 24/48/60/110 V DC; 24 V DC	
- 2 A, extended temperature range; 80 mm wide	**6ES7305-1BA80-0AA0**

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Interface modules

Overview

IM 153-2 High Feature interface module for PROFIBUS connection

Interface module for the PROFIBUS connection

The IM 153-2 High Feature interface module (electrical PROFIBUS DP transmission mode) is available for connecting the ET 200M remote I/O station to the PROFIBUS DP fieldbus. Depending on the fieldbus configuration (single/redundant), the ET 200M remote I/O station can be connected via one single or two redundant interface modules.

IM 153-4 High Feature interface module for PROFINET connection

Interface module for PROFINET connection

The IM 153-4 PN High Feature interface module is used to connect the ET 200M remote I/O station to PROFINET via copper cables (RJ45). It autonomously handles communication between the I/O modules and the higher-level PROFINET I/O controller.

Function

IM 153-2 High Feature

The IM 153-2 High Feature supports the following functions:
- HART configuring of intelligent field devices
- Configuration of ET 200M I/Os in RUN mode of the automation system
- Connection to redundant automation systems
- Use of ET 200M function modules (controller and counter modules)
- Operation of up to 12 I/O modules per remote I/O station
- Time stamping (SOE) with the safety-related SM 326F digital input module (F-DI24)
- Transmission of additional values with HART secondary variables of the HART SM 331 and SM 332 analog modules (up to 4 per channel or up to 8 per module)

IM 153-4 PN High Feature

- Integrated 2-port switch
- Baud rate 10 Mbps / 100 Mbps (Autonegotiation/Full Duplex)
- Operation of up to 12 I/O modules per remote I/O station
- I&M functions in accordance with PROFIBUS International Guidelines, order no. 3.502, version V1.1

Note:

In order to be able to use the hot swapping function, use of the active bus module and the mounting rail for hot swapping is necessary (see under the following section "Accessories", page 11/19).

Ordering data

	Article No.
Interface module for the PROFIBUS connection	
IM 153-2 High Feature Slave interface module for connection of an ET 200M station to PROFIBUS DP, with time stamp (accuracy 1 ms), support of HART functionality, F modules, FM modules, "Configuration in RUN" function; also for use in redundant systems	6ES7153-2BA02-0XB0
Interface module for PROFINET connection	
IM 153-4 PN High Feature Interface for connecting an ET 200M station to PROFINET	6ES7153-4BA00-0XB0

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Overview

Following components are available as accessories for the ET 200M:

- Bus modules for connection/disconnection of modules during operation (hot swapping)
- DIN rail for connection and disconnection of modules during operation
- Covers for backplane bus and bus modules
- Front connectors
- Ex partition for ET 200M
- LK 393 cable duct
- DM 370 dummy module

Ex partition

A mechanical isolation is required between the IM 153 interface module and the first Ex I/O module. For the hot swapping function, an Ex partition is installed which guarantees the prescribed isolation distance between non-intrinsically-safe and intrinsically-safe areas of an ET 200M remote I/O station.

LK 393 cable duct

The LK 393 cable duct provides the prescribed isolation between the load voltage input and the intrinsically safe inputs/outputs. The cable duct is easy to fit following insertion of the load voltage inputs L+.

DM 370 dummy module

DM 370 dummy module

- Reservation of slots for unconfigured I/O modules
- Retention of design and address assignment when replacing by I/O module

Design
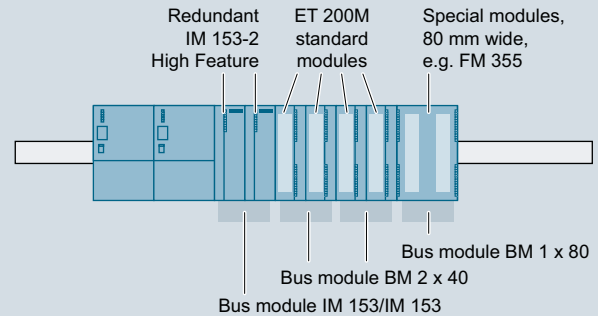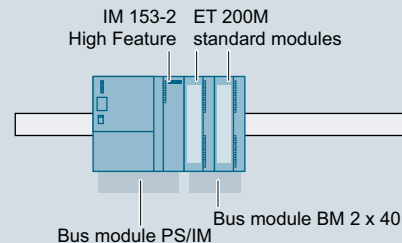
The figure shows the use of the various bus modules for hot swapping modules - at the top for a redundant connection, at the bottom for a non-redundant connection.

Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Accessories

Ordering data	Article No.
Bus modules for hot swapping	
• BM PS/IM for load power supply and IM 153, incl. 1 bus module cover	6ES7195-7HA00-0XA0
• BM 2x40 for 2 modules, each 40 mm wide	6ES7195-7HB00-0XA0
• BM 1x80 for 1 module, 80 mm wide	6ES7195-7HC00-0XA0
• BM IM/IM for two IM 153-2/-2 FOs for design of redundant systems	6ES7195-7HD10-0XA0
DIN rail for hot swapping	
• 482 mm long (19 inches)	6ES7195-1GA00-0XA0
• 530 mm long	6ES7195-1GF30-0XA0
• 620 mm long	6ES7195-1GG30-0XA0
• 2 000 mm long, for vertical installation	6ES7195-1GC00-0XA0
Covers Pack with 4 backplane bus covers and 1 bus module cover	6ES7195-1JA00-0XA0
Front connector (1 unit)	
• 20-pin, with screw contacts	6ES7392-1AJ00-0AA0
• 20-pin, with spring contacts	6ES7392-1BJ00-0AA0
• 40-pin, with screw contacts	6ES7392-1AM00-0AA0
• 40-pin, with spring contacts	6ES7392-1BM01-0AA0

	Article No.
Front connector for Ex analog input module 6ES7331-7SF00-0AB0 (1 unit)	6ES7392-1AJ20-0AA0
• 20-pin, with screw contacts	
Enables an accuracy of ± 1.5 °K for the internal cold junction temperature when taking thermocouple temperature measurements in the measuring mode "internal compensation" at ambient temperatures of 0 to 60 °C	
Ex partition for ET 200M	6ES7195-1KA00-0XA0
• Separation of IM 153 and downstream Ex modules within an ET 200M line	
• Mixed operation of non-Ex and Ex modules within an ET 200M line	
• For supporting the Insert and Remove function in connection with IM 153-2	
LK 393 cable duct [EEx ib] IIC-conform routing of load voltage cable in front plug, 5 units	6ES7393-4AA00-0AA0
DM 370 dummy module including bus connector, labeling strips	6ES7370-0AA01-0AA0

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Overview

The following pre-assembled bundles are available for the ET 200M:

- I/O subsystem for ET 200M stations with up to 8 I/O modules suitable for hot swapping, comprising:
  - DIN rail for active bus modules, 482 mm long (19 inches)
  - PS/IM bus module
  - PROFIBUS DP IM 153-2 High Feature interface module
- I/O subsystem extended for ET 200M stations with up to 12 I/O modules suitable for hot swapping, comprising:
  - DIN rail for active bus modules, 620 mm long
  - PS/IM bus module
  - PROFIBUS DP IM 153-2 High Feature interface module
- IM 153 redundancy bundle for operation of the ET 200M on a fault-tolerant automation system, comprising
  - 2 PROFIBUS DP IM 153-2 High Feature interface modules
  - 1 IM/IM active bus module

Ordering data

	Article No.
I/O subsystem for ET 200M for ET 200M stations with up to 8 I/O modules, suitable for hot swapping, comprising: • DIN rail for active bus modules, 482 mm long (19 inches) • PS/IM bus module • PROFIBUS DP IM 153-2 High Feature interface module	6ES7654-0XX08-1XA0
I/O subsystem extended for ET 200M for ET 200M stations with up to 12 I/O modules, suitable for hot swapping, comprising: • DIN rail for active bus modules, 620 mm long • PS/IM bus module • PROFIBUS DP IM 153-2 High Feature interface module	6ES7654-0XX08-1XB0
IM 153 redundancy bundle for operation of an ET 200M station on the AS 412H, AS 414H, AS 416H or AS 417H fault-tolerant automation system, comprising: • 2 PROFIBUS DP IM 153-2 High Feature interface modules • 1 IM/IM active bus module	6ES7153-2AR03-0XA0

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Digital modules

▉ Overview

Digital input modules
- Simple signal modules for DC and AC voltage
- Modules with diagnostics capability that automatically output a corresponding message to the operator system in the event of a fault

Digital output modules
- Simple signal modules for DC and AC voltage with different output currents per channel, where various relay modules are available for larger output currents and voltages
- Modules with diagnostics capability which provide information for fault diagnosis and also permit parameterizable reactions to failure of the automation system

Digital input/output modules
- Standard signal module for DC voltage (24 V DC) with 8 digital inputs and 8 digital outputs
- For connection of switches, 2-wire proximity switches (BERO), solenoid valves, contactors, signal lamps

▉ Ordering data   Article No.   Article No.

Digital input modules

	Article No.		Article No.
SM 321 for floating contacts (supply with DC voltage)		**SM 321 for floating contacts (supply with DC/AC voltage)**	
16 inputs, 24 V DC Redundancy optional (module-granular redundancy) • Isolated in groups of 16 • Front connector required: 20-pin	6ES7321-1BH02-0AA0	**16 inputs, 24...48 V AC/DC** • Isolated in groups of 1 • Front connector required: 40-pin	6ES7321-1CH00-0AA0
16 inputs, 24 V DC • Isolated in groups of 16; active low • Front connector required: 20-pin	6ES7321-1BH50-0AA0	**SM 321 for floating contacts (supply with AC voltage)**	
16 inputs, 24 V DC, high-speed • Isolated in groups of 16 • 0.05 ms input delay • Front connector required: 20-pin	6ES7321-1BH10-0AA0	**32 inputs, 120 V AC** • Isolated in groups of 8 • Front connector required: 40-pin	6ES7321-1EL00-0AA0
32 inputs, 24 V DC Redundancy optional (module-granular redundancy) • Isolated in groups of 16 • Front connector required: 40-pin	6ES7321-1BL00-0AA0	**8 inputs, 120/230 V AC Redundancy optional** (module-granular redundancy) • Isolated in groups of 2 • Front connector required: 20-pin	6ES7321-1FF01-0AA0
16 inputs, 48 ... 125 V DC • Isolated in groups of 8 • Front connector required: 20-pin	6ES7321-1CH20-0AA0	**16 inputs, 120/230 V AC** • Isolated in groups of 4 • Front connector required: 20-pin	6ES7321-1FH00-0AA0
64 inputs, 24 V DC • Isolated in groups of 16; active high/low	6ES7321-1BP00-0AA0	**SM 321 for non-floating contacts (supply with AC voltage)**	
Note: 2 connection cables 6ES7392-4B..0-0AA0 and 2 terminal blocks 6ES7392-1.N00-0AA0 required per module.		**8 inputs, 120/230 V AC** • Isolated in groups of 1 • Front connector required: 40-pin	6ES7321-1FF10-0AA0
S7-300 cable for 64-channel modules; 2 units			
• 1 m	6ES7392-4BB00-0AA0		
• 2.5 m	6ES7392-4BC50-0AA0		
• 5 m	6ES7392-4BF00-0AA0		
Terminal block for 64-channel modules; 2 units			
• With screw contacts	6ES7392-1AN00-0AA0		
• With spring-loaded contacts	6ES7392-1BN00-0AA0		

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Ordering data

	Article No.
SM 321 modules with diagnostics capability (IM 153-2 High Feature interface module required) for isolated contacts (supplied with DC voltage)	
16 inputs, 24 V DC Redundancy optional (channel-granular redundancy) • Isolated in groups of 16 • Time stamping in association with IM 153-2 High Feature, accuracy 1 ms, rising or falling edge, can be configured channel-granular • Two short-circuit-proof sensor supplies for 8 channels each • Sensor supply by the module, additional external redundant sensor supply possible • Diagnostics of missing sensor supply for channel group (8 channels) • Diagnostics inside module • Channel-granular wire break monitoring • Front connector required: 20-pin	6ES7321-7BH01-0AB0
16 inputs, NAMUR Redundancy optional (channel-granular redundancy) • Isolated in groups of 8 • Time stamping in association with IM 153-2 High Feature, accuracy 10 ms, rising or falling edge, can be configured channel-granular • Two sensor supplies (8.2 V DC or 18 V DC each) • Connection of NAMUR sensors or contacts with resistor circuit • Pulse stretching • Channel-granular diagnostics (short-circuit, open-circuit, chatter monitoring, discrepancy with changeover contacts) • Diagnostics inside module • Front connector required: 40-pin	6ES7321-7TH00-0AB0
16 inputs, 24 to 125 V DC • Isolated in groups of 16 • Time stamping in association with IM 153-2 High Feature, accuracy 1 ms, rising or falling edge, can be configured channel-granular • Diagnostics inside module • Channel-granular wire break monitoring • Front connector required: 40-pin	6ES7321-7EH00-0AB0

Digital output modules

	Article No.
SM 322 for DC voltage Suitable for solenoid valves, contactors, indicator lights, etc.	
8 outputs, 24 V DC / 2 A Redundancy optional (channel-granular redundancy) • Isolated in groups of 4 • Front connector required: 20-pin	6ES7322-1BF01-0AA0
16 outputs, 24 V DC, 0.5 A • Isolated in groups of 8 • Front connector required: 20-pin	6ES7322-1BH01-0AA0
16 outputs, 24 V DC / 0.5 A, high speed • Isolated in groups of 8 • Output delay max. 0.2 ms • Front connector required: 20-pin	6ES7322-1BH10-0AA0
32 outputs, 24 V DC / 0.5 A Redundancy optional (module-granular redundancy) • Isolated in groups of 8 • Front connector required: 40-pin	6ES7322-1BL00-0AA0
8 outputs, 48 ... 125 V DC / 1.5 A • Isolated in groups of 4 • Front connector required: 20-pin	6ES7322-1CF00-0AA0
64 outputs, 24 V DC, 0.3 A, source output • Isolated in groups of 16 Note: 2 connection cables 6ES7392-4B..0-0AA0 and 2 terminal blocks 6ES7392-1.N00-0AA0 required per module.	6ES7322-1BP00-0AA0
64 outputs, 24 V DC, 0.3 A, sink output • Isolated in groups of 16 Note: 2 connection cables 6ES7392-4..0-0AA0 and 2 terminal blocks 6ES7392-1.N00-0AA0 required per module.	6ES7322-1BP50-0AA0
S7-300 cable for 64-channel modules; 2 units • 1 m • 2.5 m • 5 m	6ES7392-4BB00-0AA0 6ES7392-4BC50-0AA0 6ES7392-4BF00-0AA0
Terminal block for 64-channel modules; 2 units • With screw contacts • With spring-loaded contacts	6ES7392-1AN00-0AA0 6ES7392-1BN00-0AA0

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Digital modules

▪ Ordering data

	Article No.		Article No.
SM 322 for AC voltage Suitable for AC solenoid valves, contactors, motor starters, small-power motors and indicator lights		**For AC voltage** Suitable for AC solenoid valves, contactors, motor starters, small-power motors and indicator lights	
8 outputs, 120/230 V AC / 2 A Redundancy optional (module-granular redundancy) • Isolated in groups of 4 • Front connector required: 20-pin	6ES7322-1FF01-0AA0	**8 outputs, 120/230 V AC, 2 A** • Isolated in groups of 1 • Connection of a default value per channel in the event of CPU stop (configurable) • Module-internal diagnostics functions • Front connector required: 40-pin	6ES7322-5FF00-0AB0
16 outputs, 120/230 V AC, 1 A • Isolated in groups of 8 • Front connector required: 20-pin	6ES7322-1FH00-0AA0	**16 outputs, 24/48 V DC, 0.5 A** • Isolated in groups of 1 • Connection of a default value per channel in the event of CPU stop (configurable) • Module-internal diagnostics functions • Front connector required: 40-pin	6ES7322-5GH00-0AB0
32 outputs, 120/230 V AC, 1 A • Isolated in groups of 8 • Front connector required: 2 x 20-pin	6ES7322-1FL00-0AA0		
SM 322 for relay output Suitable for AC/DC solenoid valves, contactors, motor starters, small-power motors, and indicator lights		**For relay output** Suitable for AC/DC solenoid valves, contactors, motor starters, small-power motors and indicator lights	
8 outputs, 24 ... 120 V DC, 48 ... 230 V AC, max. 2 A • Isolated in groups of 2 • Front connector required: 20-pin	6ES7322-1HF01-0AA0	**8 outputs, 24...120 V DC, 24...230 V AC / max. 5 A** • Isolated in groups of 1 • With RC suppressor element for protection of contacts per channel • Connection of a default value per channel in the event of CPU stop (configurable) • Module-internal diagnostics functions • Front connector required: 40-pin	6ES7322-5HF00-0AB0
8 outputs, 24 ... 120 V DC, 48 ... 230 V AC, max. 5 A • Isolated in groups of 1 • Front connector required: 40-pin	6ES7322-1HF10-0AA0		
16 outputs, 24 ... 120 V DC, 48 ... 230 V AC, max. 2 A • Isolated in groups of 8 • Front connector required: 20-pin	6ES7322-1HH01-0AA0		
SM 322 modules with diagnostics capability (with channel and module diagnostics) for DC voltage Suitable for solenoid valves, DC contactors and indicator lights		*Digital input/output modules*	
8 outputs, 24 V DC / 0.5 A Redundancy optional (module-granular redundancy) • Isolated in groups of 8 • 2 connections per output (with and without series diode) • Connection of a default value per channel in the event of CPU stop (configurable) • Wire break monitoring per channel • Load voltage monitoring per channel • Short-circuit monitoring to M/L+ per channel • Module-internal diagnostics functions • Front connector required: 20-pin	6ES7322-8BF00-0AB0	**SM 323 for DC voltage** Suitable for switches, BERO proximity switches, solenoid valves, contactors, indicator lights, etc. • 8 inputs 24 V DC - Suitable for connection of 2-wire proximity switches (BERO) as sensors • 8 outputs, 24 V DC, 0.5 A • Inputs and outputs electrically isolated in groups of 8 • Front connector required: 20-pin	6ES7323-1BH01-0AA0
16 outputs, 24 V DC / 0.5 A Redundancy optional (module-granular redundancy) • Isolated in groups of 4 • Connection of a default value per channel in the event of CPU stop (configurable) • Wire break monitoring per channel (with 0 and 1 signals) • Signaling of output overload • Discrepancy error monitoring • Load voltage monitoring or ground monitoring per channel group • Short-circuit monitoring to M/L+ per channel group • Module-internal diagnostics functions • Front connector required: 40-pin	6ES7322-8BH10-0AB0		

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■ Overview

Analog input modules

- Multi-function modules for current, voltage and temperature measurements
- Special, highly accurate modules for current and voltage measurements or temperature measurements

All modules automatically supply channel-specific and module-internal diagnostics data, except module 6ES7 331-1KF02-0AB0. With this module, a channel failure is detected by the SIMATIC PCS 7 analog driver block.

The channels of the analog input modules can be parameterized in groups independent of each other.

Analog output modules

- Modules with 12-bit resolution and different numbers of channels
- Highly accurate module with 15-bit resolution

The analog output modules can be parameterized in groups independent of each other, and automatically provide all channel-specific and module-internal diagnostics information.

■ Ordering data

	Article No.		Article No.

Analog input modules

	Article No.		Article No.
SM 331 modules for current, voltage and temperature measurements		**2 inputs in 1 channel group** • Changeover of measurement type by range module • Adjustable resolution per channel group: 9/12/14 bits + sign • Current measurement (2 channels) 0 ... 20 mA, ±3.2 mA, ±10 mA, ±20 mA (4 wires) or 4 ... 20 mA (2 or 4 wires) • Voltage measurement (2 channels) 1 ... 5 V, ±80 mV, ±250 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V • Resistance thermometer Pt100, Ni100 (1 channel, 2 or 4 wires) • Thermocouples type E, N, J, K, L (2 channels), internal compensation or external compensation with compensating box or 0 °C cold junction • Wire break monitoring • Internal module diagnostics • Front connector required: 20-pin	**6ES7331-7KB02-0AB0**
8 inputs, individually configurable • Resolution 12 bit + sign • Current measurement (8 channels) 0/4 ... 20 mA, ±20 mA (2 wires with external supply or 4 wires) • Voltage measurement (8 channels) 1 ... 5 V, 0 ... 10 V, ±50 mV, ±500 mV, ±1 V, ±5 V, ±10 V • Resistance thermometer Pt100, Ni100, Ni1000, LG-Ni1000 (8 channels; 2, 3 or 4 wires) • Front connector required: 40-pin	**6ES7331-1KF02-0AB0**		
8 inputs in 4 channel groups Redundancy optional (module-granular redundancy) • Changeover of measurement type by range module per channel group • Resolution 14 bit + sign • Current measurement (8 channels) 0 ... 20 mA, ±3.2 mA, ±10 mA, ±20 mA (4 wires) or 4 ... 20 mA (2 or 4 wires) • Voltage measurement (8 channels) 1 ... 5 V, 0 ... 10 V, ±50 mV, ±500 mV, ±1 V, ±5 V, ±10 V • Resistance thermometer Pt100, Ni100 (4 channels, 2 or 4 wires) • Thermocouples type E, N, J, K, L (8 channels), internal compensation or external compensation with compensating box or 0 °C cold junction • Wire break monitoring • Internal module diagnostics • Front connector required: 20-pin	**6ES7331-7KF02-0AB0**		

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Analog modules

■ **Ordering data**

	Article No.		Article No.
SM 331 modules for current and voltage measurements		**SM 331 modules for temperature measurement**	
8 inputs in 4 channel groups, high speed • Resolution 13 bit + sign • Measurement type and range selection adjustable per channel group • Current measurement 0 ... 20 mA, ±20 mA (4 wires) or 4 ... 20 mA (2 or 4 wires) • Voltage measurement 1 ... 5 V, ±1 V, ±5 V, ±10 V • Limit monitoring adjustable for 2 channels • Fast updating of measured value • Supporting of isochronous mode • Internal module diagnostics • Front connector required: 20-pin	6ES7331-7HF01-0AB0	**8 inputs in 4 channel groups** • Resolution 15 bit + sign • Resistance thermometer Pt100 ... 1000, Ni100 ... 1000, Cu10 (8 channels; 2, 3 or 4 wires) • Resistance measurement 150 Ω, 300 Ω, 600 Ω • Measuring mode (temperature or resistance) and measuring range adjustable per channel group • Short-circuit-proof • Wire break monitoring • Internal module diagnostics • Front connector required: 40-pin	6ES7331-7PF01-0AB0
8 inputs in 4 channel groups Redundancy optional (channel-granular redundancy) • Resolution 15 bit + sign • Current measurement 0/4 ... 20 mA, ±20 mA (8 channels; 2 or 4 wires) • Voltage measurement 1 ... 5 V, ±5 V, ±10 V (8 channels) • Wire break monitoring with 4 ... 20 mA and 1 ... 5 V • Internal module diagnostics • Front connector required: 40-pin	6ES7331-7NF00-0AB0	**8 inputs in 4 channel groups** • Resolution 15 bit + sign • Thermocouples type B, C, N, E, R, S, J, L, T, K, U (8 channels), internal compensation; external compensation with Pt100 through separate inputs possible • Measuring range adjustable per channel group • Fast module cycle (10 ms for 4 channels) • Short-circuit-proof • Wire break monitoring • Internal module diagnostics • Front connector required: 40-pin	6ES7331-7PF11-0AB0
8 inputs in 4 channel groups Redundancy optional (channel-granular redundancy) • Resolution 15 bit + sign • Fast module cycle (min. 10 ms for 4 channels) • Current measurement 0/4 ... 20 mA, ±20 mA (8 channels, 2 wires with external supply or 4 wires) • Voltage measurement 1 ... 5 V, ±5 V, ±10 V (8 channels) • Wire break monitoring with 4 ... 20 mA and 1 ... 5 V, ±5 V, ±10 V • Short-circuit-proof • Electrical isolation between channel groups • Internal module diagnostics • Front connector required: 40-pin	6ES7331-7NF10-0AB0	**6 inputs in 6 channel groups Redundancy optional** (channel-granular redundancy) • Resolution 15 bit + sign • Electrical isolation up to 250V AC between the channels • Measuring mode (temperature or voltage) and measuring range adjustable per channel • Temperature measurement with thermocouple type B, C, N, E, R, S, J, L, T, K, U, TxK/ XK (L); internal compensation; external compensation possible with Pt100 • Voltage measurement 25 mV, ±50 mV, ±80 mV, ±250 mV, ±500 mV, ±1 V • Input impedance 10 MΩ each • Programmable diagnostics and diagnostics alarm • Programmable process alarm on limit violation • Calibration possible using SIMATIC PDM • Front connector required: 40-pin	6ES7331-7PE10-0AB0

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■ Ordering data

	Article No.		Article No.
Analog output modules			

	Article No.
SM 332 modules for current and voltage outputs	
2 outputs in 2 channel groups • Resolution 12 bit/11 bit + sign • Voltage 1 ... 5 V, 0 ... 10 V; ±10 V (2 channels; 2 or 4 wires) • Current 0/4 ... 20 mA; ±20 mA (2 channels; 2 wires) • Configurable substitute value output in case of CPU stop • Wire break monitoring (only for current) • Short circuit monitoring (only for voltage) • Internal module diagnostics • Front connector required: 20-pin	6ES7332-5HB01-0AB0
4 outputs in 4 channel groups **Redundancy optional** (channel-granular redundancy) • Resolution 12 bit/11 bit + sign • Voltage 1 ... 5 V, 0 ... 10 V; ±10 V (4 channels; 4 wires) • Current 0/4 ... 20 mA; ±20 mA (4 channels; 2 wires) • Configurable substitute value output in case of CPU stop • Wire break monitoring (only for current) • Short circuit monitoring (only for voltage) • Internal module diagnostics • Front connector required: 20-pin	6ES7332-5HD01-0AB0

	Article No.
8 outputs in 8 channel groups **Redundancy optional** (channel-granular redundancy) • Resolution 12 bit/11 bit + sign • Voltage 1 ... 5 V, 0 ... 10 V; ±10 V (8 channels; 4 wires) • Current 0/4 ... 20 mA; ±20 mA (8 channels; 2 wires) • Configurable substitute value output in case of CPU stop • Wire break monitoring (only for current) • Short circuit monitoring (only for voltage) • Internal module diagnostics • Front connector required: 40-pin	6ES7332-5HF00-0AB0
4 outputs in 4 channel groups • Resolution 14/15/16 bit • Voltage 1 ... 5 V, 0 ... 10 V; ±10 V (4 channels; 4 wires) • Current 0/4 ... 20 mA; ±20 mA (4 channels; 2 wires) • Configurable substitute value output in case of CPU stop • Isolated by channel • Internal module diagnostics • Front connector required: 20-pin	6ES7332-7ND02-0AB0

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Analog modules with HART

Overview

The modules with HART (Highway Addressable Remote Transducer) which can be used in ET 200M remote I/O stations (with IM 153-2 High Feature interface module) permit connection of HART devices to the SIMATIC PCS 7 automation system.

Transmitters and HART actuators that are certified for digital communication with the HART protocol can be connected through these modules.

With 0/4 to 20 mA technology, conventional transmitters/actuators without HART protocol can also be connected.

All modules with HART come with diagnostics capability (channel and module diagnostics). The diagnostics and monitoring functions are directly available in SIMATIC PCS 7. They require no additional engineering. Plain text messages output on the operator station provide information on faults or changes in the HART parameter settings.

Homogenous integration in the SIMATIC Process Device Manager (PDM) and the PCS 7 Asset Management permit intuitive online diagnostics and parameterization of all connected field devices from a central position.

Function

HART is a serial transmission procedure with which additional parameter data such as measuring ranges, attenuation etc. can be sent to transmitters and actuators over a 4 to 20-mA current loop. The HART jobs for each channel can be remotely initiated over the PROFIBUS DP. This usually takes place from the central engineering system of the SIMATIC PCS 7 process control system per SIMATIC PDM.

The modules with HART have the following features:
- Connections compatible with the conventional analog modules of the ET 200M
- Additional communications possibility over the current loop
- Up to 8 analog channels per module (2 analog channels with Ex modules; 6 analog channels with safety-related SM 336 F-AI HART module)
- Each channel is a primary master of the HART protocol
- Selectable input range per channel (AI):
  - 0 to 20 mA (without HART function)
  - ± 20 mA (without HART function, not with Ex module or SM 336 F-AI HART module)
  - 4 to 20 mA (with/without HART function)
- Selectable output range per channel (AO):
  - 0 to 20 mA (with/without HART function; in the case of Ex module, only without HART function)
  - 4 to 20 mA (with/without HART function)

Additional functions of the HART analog modules 6ES7331-7TF01-0AB0 and 6ES7332-8TF01-0AB0:
- Supplementary HART variables (up to 4 per channel, up to 8 per module) allow the transmission of additional values from/to the HART devices
- Modules can be used redundant (channel-granular redundancy)

Additional functions of the SM 336 F-AI HART module:
- Modules can be used redundant (channel-granular redundancy)
- HART communication can be activated safety-related in online mode, or switched off

Parameterization
- For the analog input modules (AI), it is possible to parameterize e.g. conversion time, input range, limits, alarms, smoothing of measured values
- For the analog output modules (AO), it is possible to parameterize e.g. output range, response on stoppage of AS (CPU), diagnostics
- Remote parameterization (per PROFIBUS DP) of the HART transmitters and actuators with SIMATIC PDM
- It is still possible to parameterize the HART devices using an operator terminal (handheld).

Ordering data

	Article No.
Analog input module SM 331 HART Redundancy optional (channel-granular redundancy) 8 inputs, 0/4 ... 20 mA or ±20 mA • Resolution: 15 bit + sign • Connection of 2-wire or 4-wire transmitters possible • HART (2-wire or 4-wire) • Wire break monitoring • Short-circuit-proof • Front connector required: 20-pin	**6ES7331-7TF01-0AB0**
Analog output module SM 332 HART Redundancy optional (channel-granular redundancy) 8 outputs, 0/4 ... 20 mA • Resolution: 15 bit + sign • For 2-wire actuators • HART (2-wire) • Wire break monitoring • Front connector required: 20-pin	**6ES7332-8TF01-0AB0**

	Article No.
SM 331 HART Ex analog input module [EEx ib] 2 inputs, 0/4 ... 20 mA in 2 channel groups • Individual electrically isolated channels • Resolution: 15 bit + sign • Connection of 2-wire or 4-wire transmitters possible • Wire break monitoring • Short-circuit-proof • HART (2-wire or 4-wire) • Front connector required: 20-pin	**6ES7331-7TB00-0AB0**
SM 332 HART Ex analog output module [EEx ib] 2 outputs, 0/4 ... 20 mA in 2 channel groups • Individual electrically isolated channels • Resolution: 12 bit + sign • For 2-wire actuators • Wire break monitoring • HART • Front connector required: 20-pin	**6ES7332-5TB00-0AB0**
SM 336 F-AI HART safety-related analog input module Redundancy optional (channel-granular redundancy) 6 inputs, 0/4 ... 20 mA	For detailed ordering data, see the section "F digital/analog modules", page 11/32

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Ex digital/analog modules

■ **Overview**

The following analog and digital input and output modules are suitable for use in hazardous plants. They separate the non-intrinsically safe electrical circuits of the automation system and the intrinsically safe electrical circuits of the process. Sensors and actuators suitable for placing in zone 1 or 21 and 2 or 22 hazardous areas as well as intrinsically safe equipment compliant with DIN 50020 and [EEx ib] IIC can be operated on these modules.

All Ex modules come with diagnostics capability (channel and module diagnostics).

Ex modules identified by "redundant design possible" (6ES7321-7RD00-0AB0, 6ES7322-5SD00-0AB0, 6ES7331-7RD00-0AB0, 6ES7332-5RD00-0AB0) can also be configured redundant when used in non-hazardous plants.

■ **Ordering data**   **Article No.**   **Article No.**

Ex digital input modules	
4 NAMUR inputs in 4 channel groups **Redundancy optional** (channel-granular redundancy) • Voltage supply to sensors 8.2 V • Individual electrically isolated channels • Time stamping in association with IM 153-2 High Feature, accuracy 10 ms, rising or falling edge, can be configured channel-granular • Wire break and short-circuit monitoring (directly at the contact for contacts with external resistor circuit) • Internal module diagnostics • Front connector required: 20-pin	6ES7321-7RD00-0AB0
Ex digital output modules	
4 outputs, 24 V DC, 10 mA in 4 channel groups **Redundancy optional** (channel-granular redundancy) • Individual electrically isolated channels • Wire break monitoring • Short-circuit monitoring • Internal module diagnostics • Front connector required: 20-pin	6ES7322-5SD00-0AB0
4 outputs, 15 V DC / 20 mA in 4 channel groups • Individual electrically isolated channels • Wire break monitoring • Short-circuit monitoring • Internal module diagnostics • Front connector required: 20-pin	6ES7322-5RD00-0AB0

Ex analog input modules	
4 inputs, 0/4 ... 20 mA in 4 channel groups **Redundancy optional** (channel-granular redundancy) • Individual electrically isolated channels • Resolution 15 bit + sign • Connection of 2-wire or 4-wire transmitters possible • Wire break monitoring • Measurement range monitoring • Short-circuit-proof • Internal module diagnostics • Front connector required: 20-pin	6ES7331-7RD00-0AB0
8 inputs in 4 channel groups • Resolution 15 bit + sign • Thermocouples type T, U, E, J, L, K, N, R, S, B (8 channels) Internal compensation; external compensation with Pt100 (2 channels), compensating box or 0/50 °C cold junction • Resistance thermometer Pt100, Pt200, Ni100 (4 channels; 2-wire or 4-wire, 3-wire Pt100 on request) • Wire break monitoring • Internal module diagnostics • Front connector required: 20-pin	6ES7331-7SF00-0AB0

Note:
A special front connector for the Ex analog input module 6ES7331-7SF00-0AB0 enables greater accuracy when making thermocouple temperature measurements in "Internal compensation" measuring mode (see the section "Accessories", page 11/20).

Ex analog output modules	
4 outputs, 0/4 ... 20 mA in 4 channel groups **Redundancy optional** (channel-granular redundancy) • Individual electrically isolated channels • Resolution 15 bit • For 2-wire transmitters • Wire break monitoring • Internal module diagnostics • Front connector required: 20-pin	6ES7332-5RD00-0AB0

For additional Ex modules, refer to the "Analog modules with HART" section, page 11/28.

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Overview

The safety functions of the safety-related automation systems are matched to the safety-related I/O modules (F-modules) of the ET 200M distributed I/O system. The F-signal modules (DI/DO/AI) in the ET 200M remote I/O stations comply with safety requirements up to SIL 3 (IEC 61508). They can diagnose both internal and external faults. To this end, they carry out self-tests, e.g. for short-circuit or open-circuit, and automatically monitor the discrepancy time defined in the parameter settings. They are able to guarantee plant safety even if there is a CPU failure in the automation system.

Depending on the version, the input modules support 1oo1 and 1oo2 evaluation on the module. 2oo3 evaluation of three sensors is possible using the corresponding voter block (component of the S7 F block library) within the safety program.

In the event of a faulty output, the digital output modules allow a safe shutdown via a second shutdown path.

Note:

The SM 326 F-DI NAMUR safety-related digital input module, article no. 6ES7326-1RF00-0AB0, is not PROFINET-enabled.

Design

SM 336 F-AI HART analog input module

The safety-related SM 336 F-AI HART analog input module has 6 inputs for current measurements in the range from 0 to 20 mA or 4 to 20 mA, all of which are designed for SIL 3. The compact width of 40 mm means that a relatively high packing density can be achieved for F modules, allowing a design which saves space and costs.

The module can also handle HART communication with appropriate HART field devices. HART communication can be activated safety-related in online mode, or switched off.

Digital output module SM 326 F-DO

The 40-mm wide safety-related SM 326 F-DO digital output module with 10 outputs (24 V DC, 2 A) and parameterizable redundancy extends the range of compact F-modules commenced with the SM 336 F-AI HART. The module features short response times, and can be used in SIL 3 applications even without an isolating module. It supports the "Keep last valid value" function as well as channel-selective passivation.

Options
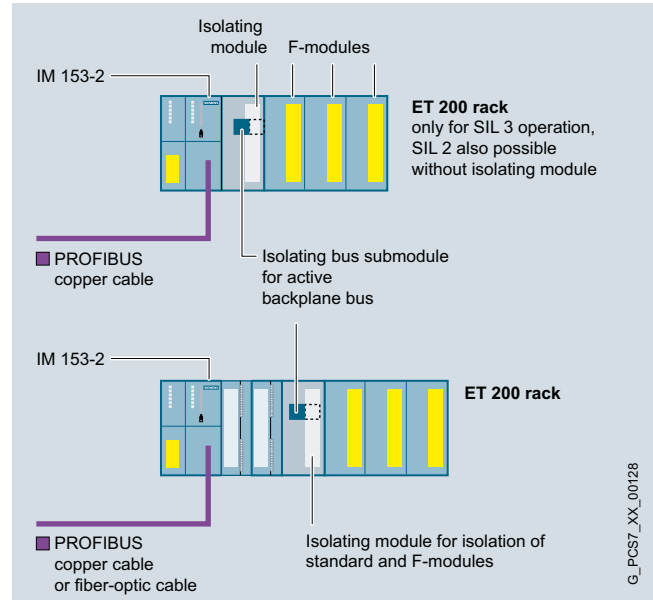
Isolating module

The following components are available as accessories for the F modules:

- Isolating module
  - Isolation of F and standard modules in an ET 200M remote I/O station
  - Signal isolation when using a copper bus connection (only F modules in an ET 200M remote I/O station with IM 153-2)
- Isolating bus submodule for isolating module, when using an active backplane bus

The isolating module is required in SIL 3 applications with F signal modules SM 326; AI 6 x 13 bit, SM 326; DI 8 x NAMUR and SM 326; DO 10 x DC 24 V/2 A (width 80 mm) in the following cases:

- Design of PROFIBUS DP with copper cables
- Design of PROFIBUS DP with fiber-optic cables and joint operation of the mentioned F signal modules with standard modules in an ET 200M station

Note:

The isolating module for F modules and the isolating bus submodule can only be used together. The 40-mm wide gap cannot be used for other modules.

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

F digital/analog modules

Ordering data

	Article No.		Article No.
SM 326 F-DI safety-related digital input module, for floating contacts		**SM 336 F-AI HART safety-related analog input module**	
24 inputs, 24 V DC 80 mm wide Isolated in groups of 12 **Redundancy optional** (channel-granular redundancy) • 4 short-circuit-proof sensor power supplies, each for 6 channels, isolated in groups of 3 • External sensor power supply possible • SIL 2: 1oo1 evaluation, 24 channels • SIL 3: 1oo2 evaluation on the module, 12 channels (adjustable discrepancy time) • SIL 3 achievable without isolating module • Short-circuit monitoring to L+ • Discrepancy monitoring • Supports 20 ms time stamping (SOE) • Module internal diagnostics • PROFIsafe telegram • Front connector required: 40-pin	6ES7326-1BK02-0AB0	**6 inputs, 0 ... 20 mA or 4 ... 20 mA** 40 mm wide Electrically isolated in groups of 3 **Redundancy optional** (channel-granular redundancy) • Resolution: 15 bits + sign • 2-wire or 4-wire connection • 6 short-circuit-proof sensor supplies for 1 channel each • External sensor power supply possible • SIL 3: 1oo1 evaluation (6 channels) and 1oo2 evaluation (3 channels) on the module • SIL 3 achievable without isolating module • Discrepancy monitoring with 1oo2 evaluation (adjustable discrepancy time) • Wire break monitoring • Module and channel diagnostics • HART communication in measuring range 4 ... 20 mA (can be switched on/off online) • HART status display • PROFIsafe telegram • Front connector required: 20-pin	6ES7336-4GE00-0AB0
8 inputs, NAMUR [EEx ib][1] 80 mm wide Isolated by channel **Redundancy optional** (channel-granular redundancy) • 8 short-circuit-resistant sensor power supplies, each for 1 channel, mutually isolated • SIL 2: 1oo1 evaluation, 8 channels • SIL 3: 1oo2 evaluation on the module, 4 channels (adjustable discrepancy time) • Wire break and short-circuit monitoring (for contacts with external resistor circuit) • Discrepancy monitoring • Module internal diagnostics • PROFIsafe telegram • Front connector required: 40-pin	6ES7326-1RF01-0AB0	**Options**	
		Isolating module For F modules, 40 mm wide • For isolation of F and standard modules in an ET 200M rack • For signal isolation when using a copper bus connection (only F modules in a rack with IM 153-2)	6ES7195-7KF00-0XA0
Safety-related digital output module SM 326 F-DO Suitable for solenoid valves, DC contactors and indicator lights		**Isolating bus module** 80 mm wide, for isolating module, when using an active backplane bus	6ES7195-7HG00-0XA0
10 outputs, 24 V DC, 2 A 40 mm wide Isolated in groups of 5 (outputs with internal diode) **Redundancy optional** (channel-granular redundancy) • 10 outputs, isolated in groups of 5 • SIL 3 achievable without isolating module • P/P-switching (for non-floating loads; ground and earth connected together) • Wire break and short-circuit monitoring • Configurable diagnostics • "Keep last valid value" parameter • Channel-selective passivation • PROFIsafe telegram • Front connector required: 40-pin	6ES7326-2BF10-0AB0	[1] Module is not PROFINET-enabled	
8 outputs, 24 V DC, 2 A 80 mm wide Electrically isolated in groups of 4 • SIL 2, SIL 3 configurable (8 channels) • SIL 3 achievable without isolating module • P/M-switching (for floating loads; ground and earth separate) • Wire break and short-circuit monitoring • Module internal diagnostics • PROFIsafe telegram • Front connector required: 40-pin	6ES7326-2BF41-0AB0		

11

Overview

The FM 355 is an intelligent 4-channel controller module for universal control tasks. It can be used to control temperature, pressure and flow.

The following versions of the FM 355 are available:

- FM 355 C
  Continuous-action controller with 4 analog outputs for controlling analog actuators

- FM 355 S
  Step or pulse controller with 8 digital outputs for controlling motor-driven (integrating) actuators or binary controlled actuators (e.g. electrical heating strips and cartridges)

- FM 355-2 C/S
  Specially optimized for temperature controls with user-friendly online self-optimization integrated

Function

The FM 355 and FM 355-2 modules have four separate control channels. The controllers have the following features:

- Predefined controller structures for
  - Fixed setpoint control
  - Cascade controller
  - Ratio control
  - 3-component control

- Different operating modes
  - Automatic mode
  - Manual mode
  - Safety mode
  - Follow-up mode
  - Backup mode

- Sampling time (depending on the resolution of the analog inputs and the compensation input):
  - At 12 bits: 20 ms to 100 ms (FM 355-2 only)
  - At 14 bits: 100 ms to 500 ms (depending on the number of released analog inputs)

- 2 control algorithms:
  - Self-optimizing temperature control algorithm
  - PID algorithm

- Integrated online self-optimization without configuration (FM 355-2 only)
  - Faster adjustment to the operating point

- Convenient controller optimization

- Backup mode
  The controller can continue to control independently in the event of CPU failure or CPU stop. To this end, configurable safety setpoints or safety manipulated variables are set.

- Feed forward control
  The analog inputs can optionally be used for feed forward control in addition to actual value recording.

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Process I/O
SIMATIC ET 200M for SIMATIC PCS 7

Control modules

■ Integration

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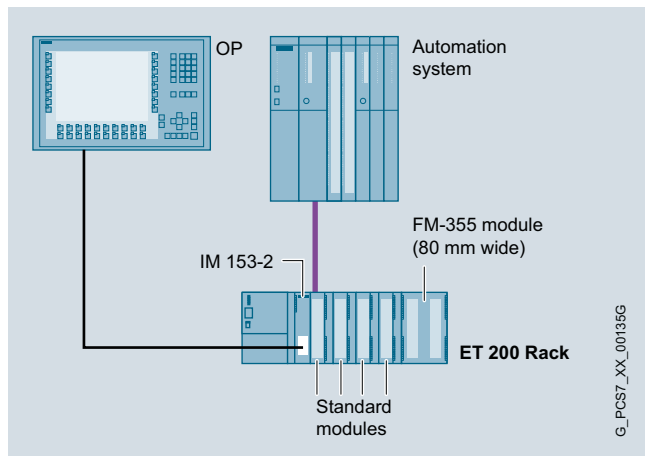
Use in SIMATIC PCS 7

The FM 355/FM 355-2 modules can be used to implement control tasks outside the SIMATIC PCS 7 automation system. The modules have not only controller structures but also analog and digital channels, thus eliminating the need for additional modules to detect the setpoint/actual value or to control the actuator.

On the one hand this reduces the work load for the CPU, on the other hand it enables backup mode with which the control system continues to work even if the CPU fails. In this case the FM 355 module can be operated further with an OP operator panel (does not apply to FM 355-2).

The operator panel is connected to the PROFIBUS DP fieldbus for this purpose. The CPU of the automation system can surrender input privilege to the operator panel in normal operation as well. The parameters that can be accessed with the operator panel are the setpoint and manipulated variable. If the FM 355 module is operated from the operator panel, the automation system reads back the values accessible from the operator panel after the input privilege is withdrawn or recovered again. Bumpless continuation of the operations is thus assured.

IM 153-2 High Feature interface modules are needed for the PROFIBUS DP connection when the FM 355/FM 355-2 controller modules are used in ET 200M.

SIMATIC PCS 7 blocks

CFC blocks with OS faceplates for all FM 355 modules are included in the scope of supply of the standard SIMATIC PCS 7 library (part of engineering software). These blocks are integrated into the SIMATIC PCS 7 driver concept. This guarantees homogenous system integration (including automatic diagnostics messages).

Parameterization in HW-Config

A configuration package containing all parameterization masks required for configuring, parameterizing and commissioning is included in the scope of supply of the FM 355 controller modules.

■ Ordering data

	Article No.
FM 355 C controller module With 4 analog outputs for 4 continuous-action controllers Front connector required: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (English, German, French, Italian) on CD-ROM	6ES7355-0VH10-0AE0
FM 355 S controller module With 8 digital outputs for 4 step or pulse controllers Front connector required: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (English, German, French, Italian) on CD-ROM	6ES7355-1VH10-0AE0
FM 355-2 C temperature controller module with 4 analog outputs for 4 continuous-action controllers Front connector required: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (English, German, French, Italian) on CD-ROM	6ES7355-2CH00-0AE0
FM 355-2 S temperature controller module With 8 digital outputs for 4 step or pulse controllers Front connector required: 2 x 20-pin Incl. multi-lingual configuration package, manual and Getting Started (English, German, French, Italian) on CD-ROM	6ES7355-2SH00-0AE0

Note:

In the case of the FM 355 C and FM 355 S controller modules, the channels are not electrically isolated from one another

11

■ Overview

The FM 350-1 counter module is a single-channel intelligent counter module for simple counting tasks, suitable for the direct connection of incremental encoders. It provides a comparison function with 2 preselectable reference values, as well as integrated digital outputs for outputting a reaction upon reaching the reference value.

The FM 350-2 counter module is an eight-channel intelligent counter module for universal counting and measuring tasks, as well as for simple positioning jobs (max. 4 axes).

■ Ordering data

	Article No.
FM 350-1 counter module Counting functions up to 500 kHz 1 channel for the connection of 5 V and 24 V incremental encoders Front connector required: 1 x 20-pin incl. configuration package on CD	**6ES7350-1AH03-0AE0**
FM 350-2 counter module 8 channels with maximum 20 kHz counting frequency; for 24 V encoders, for the following tasks: counting, frequency measurement, speed measurement, period measurement, dosing Front connector required: 1 x 40-pin incl. configuration package on CD	**6ES7350-2AH01-0AE0**

11

Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Overview

The ET 200iSP is a modular, intrinsically-safe I/O system with IP30 degree of protection which can be operated in gas and dust atmospheres at ambient temperatures from -20 to +70 °C.

In accordance with ATEX directive 94/9/EC, the ET 200iSP remote I/Os stations can be installed directly in the Ex zones 1, 2, 21 or 22 as well as in non-hazardous areas. The intrinsically-safe sensors, actuators and HART field devices can also be located in zone 0 or 20 if necessary.

The modular design of the ET 200iSP makes it possible to optimally adapt the remote I/O stations to the respective automation task through individual configuration and flexible expansion. To increase plant availability, the pressure-encapsulated power supply and the intrinsically-safe PROFIBUS DP connection (RS 485-iS) of the stations can also be of redundant design.

The modern architecture with independent wiring and automatic slot coding supports simple and reliable hot swapping of individual modules without a fire certificate.

In addition to analog and digital I/O modules for the automation of the technological functions of the process (Basic Process Control), the range of electronics modules also includes safety-related F-I/O modules for implementing safety applications. The various types of electronics module can be arranged mixed within a station.

Design
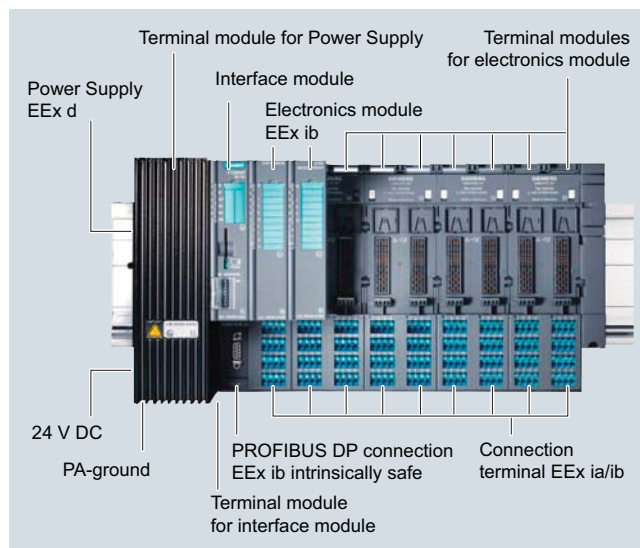
Main components of the ET 200iSP distributed I/O system:
- Terminal modules
  mounted on an S7-300 rail; for connecting power supply, interface, electronics, watchdog and reserve modules and for prewiring
  - with blue screw-type or spring-loaded terminals for hazardous environments
  - with black screw-type terminals for non-hazardous environments
- Power supply unit
  1 or 2 (redundant) power supply modules PS with pressurized enclosure for feeding 24 V DC or 120/230 V AC
- Interface module
  1 or 2 (redundant) IM 152 interface modules for connecting the station to the PROFIBUS DP
- Electronics modules (2/4/8 channels): Up to 32 in any combination
  - Digital electronics modules (DI, DO)
  - Analog electronics modules (AI, AO)
  - Safety-related electronics modules (F-DI, F-DO and F-AI)
  - Watchdog module
- Accessories
  - Reserve module for reserving a slot for any electronics module
  - Terminating module (included in scope of delivery of terminal modules for the PROFIBUS interface)
  - Labeling sheets with printable labeling strips
  - Inscription labels for slot numbering

Assembly

Assembly is quick and easy:
- Latching of terminal modules onto the S7-300 rail
- Prewiring of process signal cables on the terminal modules using spring-loaded or screw-type connections
- Plugging-in of power supply, interface and electronics modules without the need for additional tools

11

■ Design (continued)

Expansion limits

The station width is 107 cm in the maximum configuration with 32 electronic modules.

The maximum number of electronics modules which can be used per station may be limited depending on the current consumption of the modules required to solve the automation task. However, up to 16 electronics modules can be used without limitation.

Stainless steel wall enclosure

If the ET 200iSP is used in a hazardous area, it must be installed in an appropriate Ex housing which at least corresponds to the IP54 degree of protection. Appropriate versions of an IP65 housing are offered in the Section "Stainless steel wall housings".

Outstanding design features

- Installation and testing of the wiring is possible in advance without the electronics module (independent wiring).
- Isolation of the mechanical and electronic systems, in conjunction with the independent process wiring, permits fast and easy replacement of the electronics modules
- Mechanical coding which is carried out when an electronics module is plugged onto a terminal module for the first time prevents the connection of incorrect replacement modules
- Hot swapping of the power supply modules and electronics modules is possible without a fire certificate.

■ Integration

Distributed ET 200iSP stations are connected to the SIMATIC PCS 7 automation systems (controllers) via the PROFIBUS DP, which can be routed intrinsically-safe into Ex zone 1 using an isolating transformer (RS485-iS coupler) as barrier. Data transfer rates of up to 1.5 Mbit/s are possible.

The ET 200iSP is integrated into SIMATIC PCS 7 using standard driver blocks. You can therefore configure the ET 200iSP in the SIMATIC Manager of the engineering system extremely simply using HW-Config. The system function CiR (Configuration in Run) is also supported, and permits the following changes to be made to the configuration during runtime:

- Adding ET 200iSP stations
- Adding modules to the ET 200iSP station
- Re-configuration of modules
- Parameterization of connected HART field devices with SIMATIC PDM

Vendor-specific information and maintenance data are saved powerfail-proof on the electronics modules.

The existing standard diagnostics drivers preprocess the diagnostics messages generated by internal or external faults (e.g. wire breakage or short-circuit) as well as status messages of the connected HART field devices for the host operator system and the Maintenance Station of the PCS 7 asset management.

The ET 200iSP and the HART field devices can also be configured using SIMATIC PDM (process device manager). With SIMATIC PDM you can directly access the HART field devices on the ET 200iSP by routing via PROFIBUS DP.

■ Technical specifications

ET 200iSP – general	
Degree of protection	IP30
Ambient temperature	
• Horizontal mounting position	-20 to +70 °C
• Other mounting positions	-20 to +50 °C
Loading of media	According to ISA-S71.04 severity level G1; G2; G3 (except for NH3, only level G2 in this case)
EMC	Electromagnetic compatibility according to NE21
Vibration resistance	0.5 g continuously, 1 g periodically
Approvals, standards		
• ATEX	II 2 G (1) GD I M2	Ex de [ia/ib] IIC T4 Ex de [ia/ib] I
• IECEx	Zone 1	Ex de [ia/ib] IIC T4
• INMETRO	Zone 1	BR-Ex de [ia/ib] IIC T4
• cFMus	Class I, II, III	NI Division 2, Groups A, B, C, D, E, F, G T4 AIS Division 1, Groups A, B, C, D, E, F, G
• cULus	Class I	Zone 1, AEx de [ia/ib] IIC T4
	Class I, II, III	Division 2, Groups A, B, C, D, E, F, G T4 providing int. safe circuits for Division 1, Groups A, B, C, D, E, F, G
	Class I	Zone 1, AEx de [ia/ib] IIC T4
• NEPSI	Ex de ib[ia] IIC T4 Ex de [ia/ib] IIC T4	
• PROFIBUS	EN 50170, Volume 2	
• IEC	IEC 61131, Part 2	
• CE	According to 94/9/EC (previously ATEX 100a), 2004/108/EC and 2006/95/EC	
• KCC	Korea Certification	
• Marine approval	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRS (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)	

For detailed technical specifications, especially on individual components such as power supply module, interface module or electronics modules, see:

- ST 70 catalog, section "SIMATIC ET 200 Distributed I/O"
- Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200 Distributed I/O"

11

Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Power supply unit

Overview

An ET 200iSP power supply unit consists of a TM-PS terminal module (A or B) and a PS power supply module which is plugged onto this. Terminal modules and power supply modules can be ordered separately.

The power supply modules are suitable for both individual operation (standard) and redundant operation. Depending on the operating mode, they must be combined with the terminal modules as follows:

- Standard: 1 x PS on TM-PS-A
- Redundancy: 1 x PS on TM-PS-A (left) plus 1 x PS on TM-PS-B (right)

Power supply modules are available for supplies of 24 V DC and 120/230 V AC. These can only be used together with the matching terminal module versions.

The operating state of the power supply modules is indicated by two LEDs on the IM 152 interface module (one for each module).

Application

Functions of the power supply modules

- Supply of ET 200iSP with safely isolated operating voltages for
  - Power bus
  - Backplane bus
  - Interface module (IM 152-1)
- Safety-related limiting of output voltages

Design

Depending on the operating mode (standard or redundant), one or two power supply modules are plugged onto the corresponding terminal modules. In standard mode, a PS power supply module is combined with a TM-PS-A terminal module. In redundant mode, a second power supply unit is provided on the right of the first one. This consists of a PS power supply module and a TM-PS-B terminal module.

The power supply modules can also be used in hazardous areas. The explosion protection is guaranteed by an explosion-proof metal enclosure (explosion protection EEx d).

The power source (24 V DC or 120/230 V AC) may be used in the safe area. It is connected to the terminal module of the power supply unit via EX e terminals. The power source must not be connected or disconnected in the hazardous area, but only in a safe environment.

The power supply module is moved into its working position by means of a slide system, and manually fixed there by means of a mechanical lock. Replacement through disconnection of the existing power supply module and insertion of a new module is also permissible in the hazardous area. To replace the module, the mechanical lock must first be released to remove the module from its working position using the slide.

Ordering data

Ordering data	Article No.
Power supply units for 24 V DC supply	
PS 24 V DC power supply module for ET 200iSP	6ES7138-7EA01-0AA0
TM-PS-A terminal module for standard operation	6ES7193-7DA10-0AA0
TM-PS-B terminal module Additional terminal module for redundant operation	6ES7193-7DB10-0AA0
Power supply units for 120/230 V AC supply	
PS 120/230 V AC power supply module for ET 200iSP	6ES7138-7EC00-0AA0
TM-PS-A UC terminal module For standard operation	6ES7193-7DA20-0AA0
TM-PS-B UC terminal module Additional terminal module for redundant operation	6ES7193-7DB20-0AA0

11

Overview

The IM 152 interface module connects the ET 200iSP to the PROFIBUS DP with intrinsically-safe RS 485-iS transmission technology with transmission rates up to 1.5 Mbit/s. A redundant connection is also possible. In this case the ET 200iSP is connected via two interface modules to two redundant PROFIBUS DP segments of a fault-tolerant automation system.

The IM 152 is plugged onto a special terminal module (to be ordered separately). The following terminal modules are available:

- TM-IM/IM terminal module for two interface modules (for redundant PROFIBUS DP connection)
- TM-IM/EM60 terminal module for one interface module and one watchdog, reserve or electronics module (except 2 DO relay)
  - with blue screw-type or spring-loaded terminals for hazardous environments
  - with black screw-type terminals for non-hazardous environments

Tasks of the IM 152 interface module

- Connection of ET 200iSP to the intrinsically-safe PROFIBUS DP
- Autonomous communication with the host automation system
- Preparation of data for the fitted electronic modules
- Saving of parameters of the electronics modules
- Time stamping of digital process signals with an accuracy of 20 ms

The maximum address space of the interface module is 244 bytes for inputs, and 244 bytes for outputs.

Design

The terminal module of the IM 152 (TM-IM/EM or TM-IM/IM) is connected directly next to the power supply unit on the DIN rail. The PROFIBUS DP connection of the IM 152 is made using the standard Sub-D socket on the terminal module. The matching connection element we provide is a special terminating plug with selectable terminating resistance. The terminating resistance must be activated on the last ET 200iSP station of each PROFIBUS DP segment.

Hot swapping of the IM 152 and the PROFIBUS connector is permissible under hazardous conditions.

A terminating module is provided together with the IM 152, and must be fitted at the right end of each ET 200iSP station following the last electronics module.

The IM 152 has a slot for micro memory cards (MMC). The firmware can therefore be updated either via the PROFIBUS DP or using MMCs.

The PROFIBUS addresses can be set using DIL switches at the front which are protected by a cover.

LEDs on the front of the IM 152 signal the supply voltage, group faults, bus faults, the active IM with redundant operation, and the operating state of the fitted power supply modules.

Ordering data

	Article No.
ET 200iSP interface module IM 152-1	6ES7152-1AA00-0AB0
ET 200iSP terminal module TM-IM/EM60 for an IM 152 and a watchdog, reserve or electronic module (except 2 DO relay), including terminating module	
• for hazardous environments	
- TM-IM/EM60S (blue screw-type terminals)	6ES7193-7AA00-0AA0
- TM-IM/EM60C (blue spring-loaded terminals)	6ES7193-7AA10-0AA0
• for non-hazardous environments	
- TM-IM/EM60S (black screw-type terminals)	6ES7193-7AA20-0AA0
ET 200iSP terminal module TM-IM/IM for two IM 152 modules (redundant operation), including terminating module	6ES7193-7AB00-0AA0
Accessories	
PROFIBUS connector with selectable terminating resistor for connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	6ES7972-0DA60-0XA0
RS 485-IS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	6ES7972-0AC80-0XA0
S7-300 rails	
• 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box	6ES7390-1AF85-0AA0
• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	6ES7390-1AJ85-0AA0

For additional accessories such as labeling strips or plates, see Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200iSP distributed I/O" or Catalog ST 70

11

Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Digital electronics modules

Overview

Digital input modules

- 8-channel digital input module DI NAMUR EEx i, for evaluation of NAMUR sensors, connected and non-connected contacts, as well as for use as counter or frequency meter
  Parameterizable connections:
  - NAMUR sensor on/off
  - NAMUR changeover contact
  - Single contact connected (mechanical NO contact)
  - Changeover contact connected (mechanical changeover contact)
  - Single contact non-connected (mechanical NO contact with single contact)
  - Changeover contact non-connected (mechanical changeover contact)
  - Counting function: optional use of 2 channels for recording counter pulses or for frequency measurement
  - Short-circuit and wire break monitoring

Digital output modules

- 4-channel digital output modules DO EEx i, 23.1 V DC/20 mA, 17.4 V DC/27 mA , 17.4 V DC/40 mA or 25.5 V DC/22 mA, with external actuator switch-off via High or Low signal (H/L switch-off)
  - Load-free switching of outputs via external intrinsically-safe signal
  - Power boosting through parallel connection of two outputs for one actuator with 4 DO 17.4 V DC/27 mA or 4 DO 17.4 V DC/40 mA
  - Short-circuit and wire break monitoring
- 2-channel digital output module DO Relay EEx e, e.g. for switching solenoid valves, DC contactors or signaling lamps
  - Can be plugged onto TM-RM/RM terminal module
  - Output current up to 2 A with 60 V AC/DC for each of the two relay outputs
  - Installation up to Ex zone 1
  - Intrinsically-safe and non-intrinsically-safe signals can be mixed in a station

Extra functions

Actuator switch-off function of the 4-DO EEx i modules

The 4-DO EEx i modules are equipped with a switch-off function. This permits implementation of an external switch-off independent of the automation system (controller).

As soon as the intrinsically-safe switch-off signal (High or Low) is present at the actuator switch-off input of the electronics module, its outputs are deactivated.

You can also combine several DO modules into a switch-off group. The intrinsically-safe power supply for the switch-off device is either via the watchdog module or a separate intrinsically-safe source.

Design

- The digital electronics modules are installed on terminal modules which must be ordered separately.
  - TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see section Interface module, page 11/39)
  - TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics module (except 2 DO relay), with blue screw-type or spring-loaded terminals for hazardous environments or with black screw-type terminals for non-hazardous environments
  - TM-RM/RM 60 terminal modules with two slots for relay or reserve modules
- The digital electronics module 2 DO Relays must be plugged onto the terminal module TM-RM/RM 60S (screw-type connection system). All other digital electronics modules are plugged as planned onto terminal modules using screw-type systems (TM-EM/EM60S) or spring-loaded systems (TM-EM/EM60C).
- Using a spare module plugged onto a terminal module TM-EM/EM60S, TM-EM/EM60C or TM-RM/RM 60S, you can reserve a slot for a digital electronics module or close a gap resulting from the design. The spare module can be simply replaced by the envisaged electronics module at a later point in time.
- The mechanical coding of the terminal module which is carried out when an electronics module is plugged on for the first time prevents the connection of incorrect replacement modules.
- Hot swapping of individual modules is possible under hazardous conditions.
- The process signals are connected to the terminals of the terminal modules assigned according to the plan, using either conventional screw-type or spring-loaded systems (conductor cross-sections 0.14 mm^2 to max. 2.5 mm^2) depending on the type of module.

11

Ordering data

	Article No.		Article No.
Digital input modules		**4 DO DC 17.4 V/40 mA**	6ES7132-7GD21-0AB0
Digital input modules EEx i		• 4 channels with 40 mA each or	
8 DI NAMUR	6ES7131-7RF00-0AB0	• 2 outputs connected in parallel with 80 mA each	
For evaluation of NAMUR sensors, connected/non-connected contacts, as well as for recording counter pulses or measuring frequencies		• Short-circuit monitoring	
• 8 x NAMUR (NAMUR sensor on/off, NAMUR changeover contact) or connected/non-connected inputs (single/changeover contact)		• Wire break monitoring	
		• Configurable connection of substitute value in the event of CPU failure	
• 2 channels optionally usable as counters (max. 5 kHz) or frequency meters (1 Hz ... 5 kHz)		• Load-free switching of outputs via external intrinsically-safe signal	
• Time tagging 20 ms, rising or falling edge		**4 DO DC 25.5 V/22 mA[1]**	6ES7132-7GD30-0AB0
• Wire break monitoring		• 4 channels with 22 mA each	
• Short-circuit monitoring		• Short-circuit monitoring	
• Sensor power supply monitoring		• Wire break monitoring	
• Flutter monitoring		• Configurable connection of substitute value in the event of CPU failure	
Digital output modules		• Load-free switching of outputs via external intrinsically-safe signal	
Digital output modules EEx i with H switch-off		Digital output module EEx e	
(external actuator switch-off via H-signal); for switching of solenoid valves, DC relays, signal lamps, actuators		For switching of solenoid valves, DC contactors or indicator lights	
4 DO DC 23.1 V/20 mA	6ES7132-7RD01-0AB0	**2 DO Relay, 60 V AC/DC, 2 A**	6ES7132-7HB00-0AB0
• 4 channels with 20 mA each		• Can be plugged onto TM-RM/RM terminal module	
• Short-circuit monitoring		• Output current up to 2 A with 60 V AC/DC for each of the two relay outputs	
• Wire break monitoring		• Installation up to Ex zone 1	
• Configurable connection of substitute value in the event of CPU failure		• Configurable connection of substitute value in the event of CPU failure	
• Load-free switching of outputs via external intrinsically-safe signal		**Terminal modules**	
4 DO DC 17.4 V/27 mA	6ES7132-7RD11-0AB0	**ET 200iSP terminal module TM-EM/EM60**	
• 4 channels with 27 mA each or		For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in)	
• 2 outputs connected in parallel with 54 mA each		• For hazardous environments	
• Short-circuit monitoring		- TM-EM/EM60S (blue screw-type terminals)	6ES7193-7CA00-0AA0
• Wire break monitoring			
• Configurable connection of substitute value in the event of CPU failure		- TM-EM/EM60C (blue spring-loaded terminals)	6ES7193-7CA10-0AA0
• Load-free switching of outputs via external intrinsically-safe signal		• For non-hazardous environments	
4 DO DC 17.4 V/40 mA	6ES7132-7RD22-0AB0	- TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA20-0AA0
• 4 channels with 40 mA each or			
• 2 outputs connected in parallel with 80 mA each		**ET 200iSP terminal module TM-RM/RM 60**	
• Short-circuit monitoring		For two modules (electronics module 2 DO Relay and reserve module can be plugged-in)	
• Wire break monitoring		• TM-RM/RM 60S (screw-type terminals)	6ES7193-7CB00-0AA0
• Configurable connection of substitute value in the event of CPU failure			
• Load-free switching of outputs via external intrinsically-safe signal		**Accessories**	
Digital output modules EEx i with L switch-off		**Reserve module**	6ES7138-7AA00-0AA0
(external actuator switch-off via L-signal); for switching of solenoid valves, DC relays, signal lamps, actuators		For any electronics module	
4 DO DC 23.1 V/20 mA	6ES7132-7GD00-0AB0	**S7-300 rails**	
• 4 channels with 20 mA each		• 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box	6ES7390-1AF85-0AA0
• Short-circuit monitoring			
• Wire break monitoring		• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	6ES7390-1AJ85-0AA0
• Configurable connection of substitute value in the event of CPU failure			
• Load-free switching of outputs via external intrinsically-safe signal			
4 DO DC 17.4 V/27 mA	6ES7132-7GD10-0AB0		
• 4 channels with 27 mA each or			
• 2 outputs connected in parallel with 54 mA each			
• Short-circuit monitoring			
• Wire break monitoring			
• Configurable connection of substitute value in the event of CPU failure			
• Load-free switching of outputs via external intrinsically-safe signal			

[1] Can be used with SIMATIC PCS 7 V7.1+SP2 or higher

For additional accessories such as labeling strips or plates, see Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200 distributed I/O" or Catalog ST 70

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Analog electronics modules

■ Overview

Analog input modules

- 4-channel analog input module AI 2 WIRE HART EEx i for current measurement in the range 4 to 20 mA, suitable for connection of two-wire transmitters (with/without HART functionality)
  - Resolution 12 bit + sign
  - Max. load of transmitter 750 Ω
  - Short-circuit and wire break monitoring

- 4-channel analog input module AI 4 WIRE HART EEx i for current measurement in the range 0/4 to 20 mA, suitable for connection of 4-wire transmitters (with/without HART functionality)
  - Resolution 12 bit + sign
  - Max. load of transmitter 750 Ω
  - Wire break monitoring

- 4-channel analog input module AI RTD EEx i for resistance measurement and for temperature measurement per Pt100/Ni100 resistance thermometer
  - Resolution 15 bit + sign
  - 2-wire, 3-wire or 4-wire connection possible
  - Resistance measurements 600 Ω absolute and 1 000 Ω absolute
  - Wire break monitoring

- 4-channel analog input module AI TC EEx i for thermoelectric EMF measurements and for temperature measurement per thermocouple, type B, E, N, J, K, L, S, R, T, U
  - Resolution 15 bit + sign
  - Internal temperature compensation possible using TC sensor module (included in scope of delivery of module)
  - External temperature compensation by means of a temperature value acquired at an analog module of the same ET 200iSP station
  - Wire break monitoring

Analog output modules

- 4-channel analog output module AO I HART EEx i for output of current signals in the range 0/4 to 20 mA to field devices (with/without HART functionality)
  - Resolution 14 bit
  - Parameterizable substitute value in case of CPU failure
  - Short-circuit and wire break monitoring

Extra functions

Temperature compensation

A TC sensor module for internal temperature compensation is provided with the 4 AI TC module, and is fitted on the corresponding terminals of the associated terminal module.

External temperature compensation is possible via a Pt100 on a 4-AI-RTD module.

■ Design

- The analog electronics modules are installed on terminal modules which must be ordered separately:
  - TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see section Interface module, page 11/39)
  - TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics module (except 2 DO relay), with blue screw-type or spring-loaded terminals for hazardous environments or with black screw-type terminals for non-hazardous environments

- The analog electronics modules are plugged as planned onto terminal modules using screw-type systems (TM-EM/EM60S) or spring-loaded systems (TM-EM/EM60C).

- Using a spare module plugged onto a terminal module TM-EM/EM60S or TM-EM/EM60C, you can reserve a slot for an analog electronics module or close a gap resulting from how the modules were placed. The spare module can be simply replaced by the envisaged electronics module at a later point in time.

- The mechanical coding of the terminal module which is carried out when an electronics module is plugged on for the first time prevents the connection of incorrect replacement modules.

- Hot swapping of individual modules is possible under hazardous conditions.

- The process signals are connected to the terminals of the terminal modules assigned according to the plan, using either conventional screw-type or spring-loaded systems (conductor cross-sections 0.14 mm² to max. 2.5 mm²) depending on the type of module.

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Ordering data

	Article No.
Analog input modules	
Analog input modules EEx i	
4 AI I 2 WIRE HART For measuring currents with 2-wire transmitters with/without HART functionality • 4 x 4 ... 20 mA, HART, 2-wire transmitter • Transmitter load: max. 750 Ω • Resolution 12 bit + sign • Short-circuit monitoring • Wire break monitoring	6ES7134-7TD00-0AB0
4 AI I 4 WIRE HART For measuring currents with 4-wire transmitters with/without HART functionality • 4 x 0/4 ... 20 mA, HART, 4-wire transmitter • Transmitter load: max. 750 Ω • Resolution 12 bit + sign • Wire break monitoring	6ES7134-7TD50-0AB0
4 AI RTD For measuring resistances as well as for temperature measurements with resistance thermometers • 4 x RTD, resistance thermometer Pt100/Ni100 • 2-, 3-, 4-wire • Resolution 15 bit + sign • Short-circuit monitoring • Wire break monitoring	6ES7134-7SD51-0AB0
4 AI TC For measuring thermal e.m.f. as well as for temperature measurements with thermocouples • 4 x TC (thermocouples) • Type B [PtRh-PtRh] • Type N [NiCrSi-NiSi] • Type E [NiCr-CuNi] • Type R [PtRh-Pt] • Type S [PtPh-Pt] • Type J [Fe-CuNi] • Type L [Fe-CuNi] • Type T [Cu-CuNi] • Type K [NiCr-Ni] • Type U [Cu-CuNi] • Resolution 15 bit + sign • Internal compensation of cold junction temperature possible using TC sensor module (included in scope of delivery of module) • External temperature compensation via Pt100, connected to RTD module of same ET 200iSP station • Wire break monitoring	6ES7134-7SD00-0AB0

	Article No.
Analog output modules	
Analog output modules EEx i	
4 AO I HART For output of currents to field devices with/without HART functionality • 4 x 0/4 ... 20 mA, HART (max. load 750 Ω) • Resolution 14 bit • Short-circuit monitoring • Wire break monitoring • Parameterizable substitute value in case of CPU failure	6ES7135-7TD00-0AB0
Terminal modules	
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) • For hazardous environments	
- TM-EM/EM60S (blue screw-type terminals)	6ES7193-7CA00-0AA0
- TM-EM/EM60C (blue spring-loaded terminals)	6ES7193-7CA10-0AA0
• For non-hazardous environments	
- TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA20-0AA0
Accessories	
Reserve module For any electronics module	6ES7138-7AA00-0AA0
S7-300 mounting rails • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box	6ES7390-1AF85-0AA0
• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	6ES7390-1AJ85-0AA0

For additional accessories such as labeling strips or plates, see Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200 distributed I/O" or Catalog ST 70

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Safety-related electronics modules

■ Overview

The electronics modules of the SIMATIC ET 200iSP distributed I/O system equipped with safety functions can be used together with the safety-related automation systems of the SIMATIC PCS 7 process control system for the implementation of safety applications. The input modules record the process signals, evaluate them, and prepare them for addional processing by the automation system. The output modules convert the safety-related signals output by the automation systems so that they are suitable for controlling the connected actuators.

F digital input modules

- 8 F-DI Ex NAMUR
  Safety-related digital input module for evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas
  - SIL 3/Cat. 3/PLe with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)
  - 8 short-circuit-proof sensor supplies (8 V DC) for 1 channel each
  - Inputs and sensor supplies electrically isolated from power bus and backplane bus
  - Diagnostics evaluation (deactivated for non-connected mechanical contacts)
  - Internal diagnostics buffer
  - Programmable diagnostics interrupt
  - Support of time stamping
  - Channel-selective passivation
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors and channel status/fault

F digital output modules

- 4 F-DO Ex DC 17.4 V/40 mA
  Safety-related digital output module for controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps
  - SIL 3/Cat. 3/PLe with 4 outputs, P/P-switching
  - Electrical isolation from power bus and backplane bus
  - Rated load voltage 17.4 V DC
  - Max. output current 40 mA
  - Performance enhancement through parallel connection of two digital outputs for one actuator
  - Short-circuit, overload and wire-break monitoring
  - Configurable diagnostics
  - Internal diagnostics buffer
  - Programmable diagnostics interrupt
  - Channel-selective passivation
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors and channel status/fault

F analog input modules

- 4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA)
  Safety-related digital input module for evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices
  - SIL 3/Cat. 3/PLe with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation)
  - Measuring ranges: 0 ... 20 mA or 4 ... 20 mA
  - Resolution 15 bit + sign
  - HART communication in measuring range 4 ... 20 mA
  - 4 short-circuit-proof sensor supplies (min. 12 V DC; max. 26 V DC) for 1 channel each
  - Inputs and sensor supplies electrically isolated from backplane bus
  - Configurable diagnostics
  - Programmable diagnostics interrupt
  - Internal diagnostics buffer
  - Firmware update using HW Config possible
  - Exclusively for safety mode
  - LED displays for safety mode, group errors, channel faults and HART status per channel

■ Design

- The safety-related electronics modules are installed on terminal modules which must be ordered separately:
  - TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see section Interface module, page 11/39)
  - TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics module (except 2 DO relay), with blue screw-type or spring-loaded terminals for hazardous environments or with black screw-type terminals for non-hazardous environments

- The safety-related electronics modules are plugged as planned onto terminal modules using screw-type systems (TM-EM/EM60S) or spring-loaded systems (TM-EM/EM60C).

- Using a spare module plugged onto a terminal module TM-EM/EM60S or TM-EM/EM60C, you can reserve a slot for an safety-related electronics module or close a gap resulting from the design. The spare module can be simply replaced by the envisaged electronics module at a later point in time.

- The mechanical coding of the terminal module which is carried out when an electronics module is plugged on for the first time prevents the connection of incorrect replacement modules.

- Hot swapping of individual modules is possible under hazardous conditions.

- The process signals are connected to the terminals of the terminal modules assigned according to the plan, using either conventional screw-type or spring-loaded systems (conductor cross-sections 0.14 mm^2 to max. 2.5 mm^2) depending on the type of module.

■ Ordering data

	Article No.
Safety-related electronics modules	
F digital input modules	
8 F-DI Ex NAMUR For evaluating the signals from IEC 60947-5-6/NAMUR sensors and connected/non-connected mechanical contacts in hazardous and non-hazardous areas • SIL3/Cat.3/PLe with 8 inputs (1-channel/1oo1 evaluation) or 4 inputs (2-channel/1oo2 evaluation)	**6ES7138-7FN00-0AB0**
F digital output modules	
4 F-DO Ex 17.4 V DC/40 mA For controlling actuators in hazardous and non-hazardous areas, e.g. solenoid valves, DC current relays or indicator lamps • SIL 3/Cat. 3/PLe with 4 outputs, P/P-switching	**6ES7138-7FD00-0AB0**
F analog input modules	
4 F-AI Ex HART (0 ... 20 mA or 4 ... 20 mA) For evaluating the signals from current sensors in hazardous and non-hazardous areas, e.g. 2-wire transmitters and HART field devices • SIL 3/Cat. 3/PLe with 4 inputs of one module (1-channel/1oo1 evaluation) or 4 inputs of two modules (2-channel/1oo2 evaluation) • Resolution 15 bit + sign • HART communication in measuring range 4 ... 20 mA	**6ES7138-7FA00-0AB0**
Terminal modules	
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in) • For hazardous environments	
- TM-EM/EM60S (blue screw-type terminals)	**6ES7193-7CA00-0AA0**
- TM-EM/EM60C (blue spring-loaded terminals)	**6ES7193-7CA10-0AA0**
• For non-hazardous environments	
- TM-EM/EM60S (black screw-type terminals)	**6ES7193-7CA20-0AA0**
Accessories	
Reserve module For any electronics module	**6ES7138-7AA00-0AA0**
S7-300 mounting rails • 585 mm long, suitable for assembly of ET 200iSP in a 650 mm wide wall box	**6ES7390-1AF85-0AA0**
• 885 mm long, suitable for assembly of ET 200iSP in a 950 mm wide wall box	**6ES7390-1AJ85-0AA0**

For additional accessories such as labeling strips or plates, see Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200 distributed I/O" or Catalog ST 70.

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Watchdog module

Overview

The watchdog module has two fundamental functions:

- Monitoring of the ET 200iSP remote I/O station for hardware failures (hardware lifebeat); external, applicative failure monitoring is also possible via an I/O address area of the module

- Intrinsically-safe power supply for external actuator switch-off

The watchdog module must be plugged onto a terminal module (order separately). The following terminal modules are suitable for this:

- TM-IM/EM60 terminal modules for one interface module and one watchdog, reserve or electronics module (for versions, see section Interface module, page 11/39)

- TM-EM/EM60 terminal modules with two slots for watchdog module, reserve module or electronics modules (except 2 DO relay):
  - with blue screw-type or spring-loaded terminals for hazardous environments
  - with black screw-type terminals for non-hazardous environments

The first slot directly next to the interface module is provided for the watchdog module.

Ordering data

	Article No.
Watchdog module	
Watchdog module For failure monitoring and for the intrinsically-safe power supply of an external actuator switch-off	6ES7138-7BB00-0AB0
Terminal modules	
ET 200iSP terminal module TM-EM/EM60 For two modules (reserve module, watchdog module and all electronics modules except 2 DO Relay can be plugged in)	
• For hazardous environments	
- TM-EM/EM60S (blue screw-type terminals)	6ES7193-7CA00-0AA0
- TM-EM/EM60C (blue spring-loaded terminals)	6ES7193-7CA10-0AA0
• For non-hazardous environments	
- TM-EM/EM60S (black screw-type terminals)	6ES7193-7CA20-0AA0

Overview

Tasks of the RS 485-iS coupler

- Conversion of the electrical PROFIBUS DP RS 485 transmission technology into the intrinsically-safe RS 485-iS transmission technology with a transmission rate of 1.5 Mbit/s

- Required to connect intrinsically-safe PROFIBUS DP stations, e.g. ET 200iSP or devices from other vendors with Ex i DP connection

- Functionality as a safety barrier

- Additional use as a repeater in the hazardous area

- Passive bus station (no configuration necessary)

- Certified according to ATEX 100a

Design

- The RS 485-iS coupler is an open unit; assembly is only permissible in housings, cabinets or rooms for electrical equipment.

- The RS 485-iS coupler is approved for use in Zone 2 hazardous areas. For this purpose, it must be fitted in an enclosure complying at least with degree of protection IP54. A manufacturer's declaration for zone 2 (according to EN 50021) is required for the housing and the necessary cable glands.

- The RS 485-iS coupler can be used in a horizontal or vertical position.

- Installation is on a SIMATIC S7-300 rail.

- Diagnostics LEDs on the front panel signal the operating status.

Connection to PROFIBUS DP

- Connection to standard PROFIBUS DP via standard Sub-D socket (at the bottom on the RS 485-iS coupler, behind the right front door).

Integrated bus connection for PROFIBUS DP with RS 485-iS transmission technology

- Connection of PROFIBUS DP with RS 485-iS transmission technology via screw terminals (at the top of the RS 485-iS coupler, behind the right front door)

- The last bus station on the intrinsically-safe PROFIBUS DP segment (not further RS 485-iS couplers) must be terminated by a selectable resistance using the connector, Order no. 6ES7 972-0DA60-0XA0.

Ordering data

	Article No.
RS 485-IS coupler Isolating transformer for connection of PROFIBUS DP segments with RS 485 and RS 485-iS transmission technologies	**6ES7972-0AC80-0XA0**
Accessories	
PROFIBUS connector with selectable terminating resistor For connection of IM 152 to PROFIBUS DP with RS 485-iS transmission technology	**6ES7972-0DA60-0XA0**
S7-300 rails Lengths:	
• 160 mm	**6ES7390-1AB60-0AA0**
• 482 mm	**6ES7390-1AE80-0AA0**
• 530 mm	**6ES7390-1AF30-0AA0**
• 830 mm	**6ES7390-1AJ30-0AA0**
• 2 000 mm	**6ES7390-1BC00-0AA0**
PROFIBUS **Fast Connect bus cable** Standard type with special design for fast mounting, 2-core, shielded, cut-to-length; max. delivery unit 1 000 m, minimum ordering quantity 20 m	**6XV1830-0EH10**

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Stainless steel wall enclosure

Design
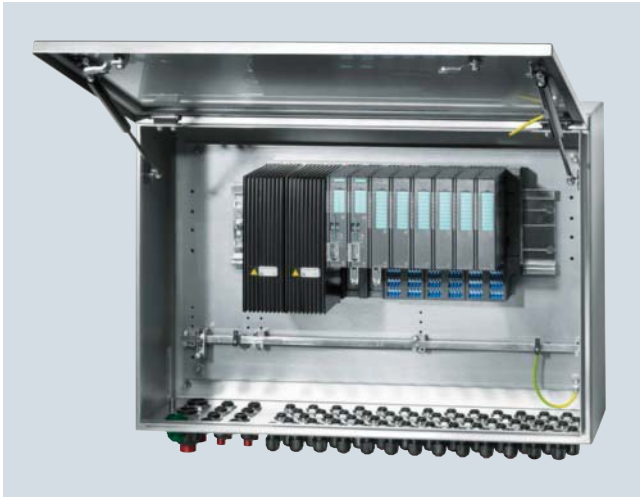
ET 200iSP modules can also be installed in stainless steel wall housings designed to meet more exacting protection requirements. The enclosures are available in various sizes. They comply with degree of protection IP65 and can be used in Ex zones 1 and 21.

Delivery is possible as an empty enclosure (6DL2804-0….) or including components (6DL2804-1…. or 6DL2804-2….), depending on the order. The ET 200iSP components and AirLINE Ex components (see Catalog "Add-ons for SIMATIC PCS 7") envisaged for installation must be ordered separately and delivered to the following address with reference to the enclosure order:

Siemens AG
I IA CE SE MF_PLAN _CEN
Ms. Vala
(please enter a project name at this position)
Siemensallee 84
D-76187 Karlsruhe, Germany

Ordering data

	Article No.		Article No.
Stainless steel enclosure IP65, protection class Ex e, suitable for Ex zones 1 and 21		• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-0AD52
Empty enclosure without installation of modules, for use in gas area (zones 1 and 2), IP65		• 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-0AD62
Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:		**Enclosure with hinged cover 950 × 450 × 230** For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:	
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-0AD30	• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-0AE30
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines, and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C	6DL2804-0AD31	• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines, and 2 rows of blanking plugs, all cable inlets of metal, for extended temperature range -40 to +70 °C	6DL2804-0AE31
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-0AD32	• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-0AE32
• 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-0AD42	• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-0AE42
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-0AD50	• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-0AE50
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 … +70 °C	6DL2804-0AD51	• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, for extended temperature range -40 … +70 °C	6DL2804-0AE51

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Ordering data

Description	Article No.		Description	Article No.
• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	**6DL2804-0AE52**		**Enclosure with hinged cover 950 × 450 × 230** For the installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:	
• 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	**6DL2804-0AE62**		• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	**6DL2804-0DE30**
Empty enclosure without installation of modules, for use in dust area (zones 21 and 22), IP65			• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	**6DL2804-0DE32**
Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:			• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	**6DL2804-0DE42**
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	**6DL2804-0DD30**		• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	**6DL2804-0DE50**
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	**6DL2804-0DD32**		• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	**6DL2804-0DE52**
• 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	**6DL2804-0DD42**		• 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	**6DL2804-0DE62**
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic	**6DL2804-0DD50**		**Empty enclosure without installation of modules, for use in mining (Cat. M2), IP65**	
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	**6DL2804-0DD52**		**Enclosure with hinged cover 650 × 450 × 230** For the installation of max. 15 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:	
• 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	**6DL2804-0DD62**		• 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal	**6DL2804-0MD16**
			• 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal	**6DL2804-0MD26**
			Enclosure with hinged cover 950 × 450 × 230 For the installation of max. 25 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:	
			• 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal	**6DL2804-0ME16**
			• 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal	**6DL2804-0ME26**

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Stainless steel wall enclosure

■ **Ordering data**

	Article No.		Article No.
Enclosure with installation of ET 200iSP modules, for use in gas area (zones 1 and 2), IP65[1]		**Enclosure with hinged cover 950 × 450 × 230** For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:	
Enclosure with hinged cover 650 × 450 × 230 For installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:		• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-1AE30
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-1AD30	• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines, and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE31
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines, and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AD31	• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AE32
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AD32	• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines, and 2 rows of blanking plugs, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE41
• 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AD42	• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AE42
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-1AD50	• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-1AE50
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AD51	• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE51
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AD52	• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic	6DL2804-1AE52
• 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AD62	• 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately)	6DL2804-1AE61
		• 2 × M32 for infeed, 4 × M20 for bus cables, 90 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-1AE62

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Ordering data

	Article No.		Article No.

Enclosure with installation of ET 200iSP modules, for use in dust area (zones 21 and 22), IP65[1)]

Enclosure with hinged cover 650 × 450 × 230
For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic — **6DL2804-1DD30**
- 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DD32**
- 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DD42**
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic — **6DL2804-1DD50**
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of metal, minimum ambient operating temperature -30 °C (heater must be ordered separately) — **6DL2804-1DD51**
- 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DD52**
- 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DD62**

Enclostrure with hinged cover 950 × 450 × 230
For the installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:

- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic — **6DL2804-1DE30**
- 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DE32**
- 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DE42**
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic — **6DL2804-1DE50**
- 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, cable inlets M20 and M16 of blue plastic, M32 of black plastic — **6DL2804-1DE52**
- 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic — **6DL2804-1DE62**

Enclosure with installation of ET 200iSP modules, for use in mining (Cat. M2), IP65

Enclosure with hinged cover 650 × 450 × 230
For the installation of max. 15 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:

- 6 × M25 for infeed, 6 × M32 (1 row) for signal lines, all cable inlets of metal — **6DL2804-1MD16**
- 6 × M25 for infeed, 12 × M32 (2 rows) for signal lines, all cable inlets of metal — **6DL2804-1MD26**

Enclosure with hinged cover 950 × 450 × 230
For the installation of max. 25 ET 200iSP modules, for use in mining (Cat. M2), for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:

- 6 × M25 for infeed, 9 × M32 (1 row) for signal lines, all cable inlets of metal — **6DL2804-1ME16**
- 6 × M25 for infeed, 18 × M32 (2 rows) for signal lines, all cable inlets of metal — **6DL2804-1ME26**

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Process I/O
SIMATIC ET 200iSP for SIMATIC PCS 7

Stainless steel wall enclosure

■ **Ordering data**

	Article No.		Article No.
Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in gaseous area (zones 1 and 2), IP65[2)]		**Enclosure with installation of ET 200iSP and AirLINE Ex modules, for use in dusty area (zones 21 and 22), IP65[2)]**	
Enclosure with hinged cover 650 × 450 × 230 For the installation of max. 15 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:		**Enclosure with hinged cover 650 × 450 × 230** For the installation of max. 15 ET 200iSP modules, for use in dust area, for temperature range -20 to +70 °C, with equipotential bonding rail and cable inlets:	
• 2 × M32 for infeed, 4 × M20 for bus cables, 39 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-2AD30	• 2 × M32 for infeed, 4 × M20 for bus cables, 36 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-2DD40
• 2 × M32 for infeed, 4 × M20 for bus cables, 65 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-2AD50	**Enclosure with hinged cover 950 × 450 × 230** For installation of max. 25 ET 200iSP modules, for use in dust area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:	
• 2 × M32 for infeed, 4 × M20 for bus cables, 60 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-2AD62	• 2 × M32 for infeed, 4 × M20 for bus cables, 57 × M20 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-2DE40
Enclosure with hinged cover 950 × 450 × 230 For the installation of max. 25 ET 200iSP modules, for use in gas area, for temperature range -20 … +70 °C, with equipotential bonding rail and cable inlets:		• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-2DE50
• 2 × M32 for infeed, 4 × M20 for bus cables, 66 × M16 (3 rows) for signal lines and 2 rows of blanking plugs, all cable inlets of black plastic	6DL2804-2AE30	**Special configurations** See the section "Options".	
• 2 × M32 for infeed, 4 × M20 for bus cables, 110 × M16 (5 rows) for signal lines, all cable inlets of black plastic	6DL2804-2AE50		
• 2 × M32 for infeed, 4 × M20 for bus cables, 95 × M20 (5 rows) for signal lines, cable inlets M20 of blue plastic, M32 of black plastic	6DL2804-2AE62		

[1)] The ET 200iSP components must be ordered separately.

[2)] The AirLINE Ex components (see catalog "Add-ons for SIMATIC PCS 7") and the ET 200iSP components must be ordered separately.

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■ **Options**

Special configurations

For all configurations which deviate from the described standard configurations the order no. **6DL5 711-8AB** must be listed as an additional order number alongside one of the specified basic order numbers.

The following additional information must be appended to the order number:

• Specification/description of the supplementary service and/or
• Reference to an offer

Overview

SIMATIC ET 200S with safety-related and standard I/O

The SIMATIC ET 200S is a bit-modular distributed I/O system in IP 20 degree of protection and is approved for operation in Ex zone 2 or 22 (except for operation with motor starters). It is designed with independent wiring that supports the hot swapping of I/O modules (with fire certificate).

The range of I/Os that can be used with SIMATIC PCS 7 includes power modules for electronics modules and motor starters, analog and digital signal modules, and motor starters up to 7.5 kW.

The implementation of safety engineering applications is supported by:

- Safety-related F-components which are integrated in the SIMATIC Safety Integrated System, e.g. terminal, power and electronics modules as well as motor starters
- SIGUARD safety engineering for motor starter applications with conventional safety logic in plants of safety categories 2 to 4 (EN 954-1)

Note:

In addition to the selected modules, all other current ET 200S electronics modules can be used, but with limited functionality. Use of components from the SIPLUS extreme range in extended temperature ranges and under medial loading on request.

Design
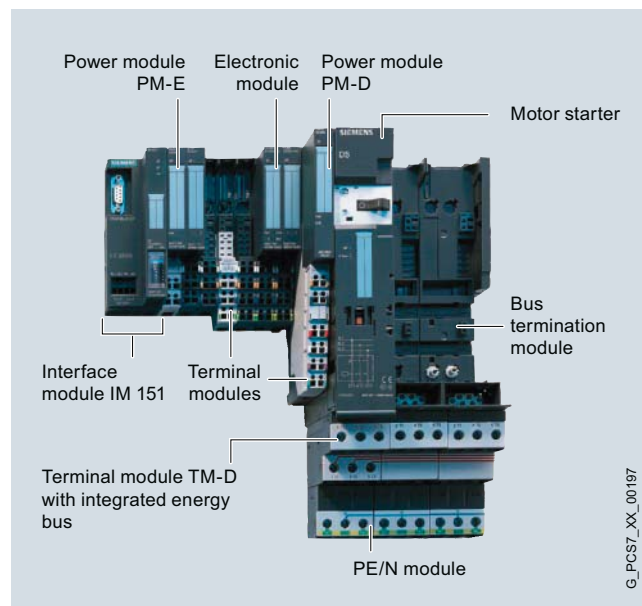
Main components of the ET 200S distributed I/O system:

- **Terminal modules** enable the electrical and mechanical connection of the I/O modules and they house the terminals for the process wiring
  - TM-P terminal modules for power modules
  - TM-E terminal modules for electronics modules
  - TM-DS/TM-RS terminal modules for motor starters and TM-xB expansion modules
- **IM 151 interface module** for connecting the PROFIBUS DP to the ET 200S station. The terminal module is included in the scope of delivery.
- **Power modules** for PM-E electronics modules and PM-D motor starters
  - Individual grouping of load and sensor supply voltages and their monitoring, as well as for the safe shutting down of digital output modules
  - Supplying and monitoring the auxiliary voltages for motor starters, as well as for the shutting down of a complete group of motor starters
- **Electronic modules** for process data exchange
  - Digital electronics modules for connecting digital sensors and actuators
  - Analog electronics modules for connecting analog sensors and actuators
- **Technology modules**
  - 1 COUNT 24 V/100 kHz counter module
- **Motor starter modules** for switching and protecting any three-phase loads
- **Accessories**
  - Reserve module for reserving a slot for any electronics module
  - Label sheets for printing ID labels on a laser printer
  - Shield connection: shield connecting element, shield terminal, ground terminal, copper voltage bus 3×10 mm; components for the low-impedance connection of cable shielding with low installation costs

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

■ Design (continued)

Assembly

The terminal modules that can be mounted on a DIN rail
(35 × 15 × 7.5 or 15 mm) form the carrier system for the
I/O modules. They are used for the process wiring and enable
the electrical and mechanical connection of the I/O modules.
The terminal modules can be prewired and tested without the
I/O modules. The I/O modules are simply plugged in place later.
Terminal modules are available with screw connections, spring-
loaded terminals or FastConnect design for fast mounting.

The automatic coding of the I/O modules reliably prevents the
risk of injury to persons and/or destruction of modules through
accidental mounting of the wrong module.

Expansion limits

Depending on the IM 151 interface module used, the expansion
of an ET 200S station is subject to the following limits:

- A maximum total of 63 I/O modules per station can be inserted
  between interface module and terminating module
- The maximum permissible width of an ET 200S station is 2 m
- The maximum address volume of all the inserted I/O modules
  is 244 byte for input data and 244 byte for output data
- The maximum number of parameters is restricted to 244 byte
  per station

ET 200S configuration

The SIMATIC ET 200 configurator can be used to compile an
ET 200S station rapidly and simply. It knows the configuration
rules, and supports selection of all components and associated
accessories in interactive mode. The SIMATIC ET 200 configu-
rator is available in the current interactive Catalog CA 01 and on
the Internet.

Additional information is available on the Internet at:

www.siemens.com/et200

■ Technical specifications

For detailed technical specifications on ET 200S refer to:

- ST 70 catalog, section "SIMATIC ET 200 Distributed I/O"
- Industry Mall/CA 01 under "Automation engineering –
  Automation systems – SIMATIC industrial automation systems
  – SIMATIC ET 200 Distributed I/O"

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Overview

- Terminal modules are mechanical modules for integrating the power and electronics modules as well as the motor starters and expansion modules (order data for the terminal modules for motor starters and expansion modules can be found under "Motor starters", page 11/66)
- For constructing the independent wiring using self-assembling voltage buses
- Alternatively with screw-type or spring-loaded terminals and Fast Connect design
- Replaceable terminal box
- Automatic coding of the electronics modules
- Self-assembling shielding of the backplane bus for high data security
- Optional plug-in shield connection
- Color coding facility for the terminals and for identifying the slot numbers

Ordering data

	Article No.
TM-P terminal modules for power modules	
TM-P15S23-A1 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 item	6ES7193-4CC20-0AA0
TM-P15C23-A1 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 item	6ES7193-4CC30-0AA0
TM-P15N23-A1 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 1 item	6ES7193-4CC70-0AA0
TM-P15S23-A0 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals Ordering unit 1 item	6ES7193-4CD20-0AA0
TM-P15C23-A0 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals Ordering unit 1 item	6ES7193-4CD30-0AA0
TM-P15N23-A0 terminal module 2 x 3 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, Fast Connect Ordering unit 1 item	6ES7193-4CD70-0AA0
TM-P15S22-01 terminal module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 item	6ES7193-4CE00-0AA0
TM-P15C22-01 terminal module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 item	6ES7193-4CE10-0AA0
TM-P15N22-01 terminal module 2 x 2 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 1 item	6ES7193-4CE60-0AA0
TM-P30S44-A0 terminal module 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, screw-type terminals for PM-E F PROFIsafe Ordering unit 1 item	6ES7193-4CK20-0AA0
TM-P30C44-A0 terminal module 7 x 2 terminals, terminal access to AUX1 bus, AUX1 interrupted to the left, spring-loaded terminals for PM-E F PROFIsafe Ordering unit 1 item	6ES7193-4CK30-0AA0

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Terminal modules

Ordering data

	Article No.		Article No.
TM-E terminal modules for electronic modules		**TM-E30S44-01 terminal module** 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 item	6ES7193-4CG20-0AA0
TM-E15S24-A1 terminal module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 items	6ES7193-4CA20-0AA0	**TM-E30C44-01 terminal module** 4 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 item	6ES7193-4CG30-0AA0
TM-E15C24-A1 terminal module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 items	6ES7193-4CA30-0AA0	**TM-E30S46-A1 terminal module** 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 1 item	6ES7193-4CF40-0AA0
TM-E15N24-A1 terminal module 2 x 4 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 items	6ES7193-4CA70-0AA0	**TM-E30C46-A1 terminal module** 4 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 1 item	6ES7193-4CF50-0AA0
TM-E15S24-01 terminal module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 items	6ES7193-4CB20-0AA0	**TM-E15S24-AT terminal module** For internal temperature compensation with 2AI TC High Feature, screw-type terminals Ordering unit 1 item	6ES7193-4CL20-0AA0
TM-E15C24-01 terminal module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 items	6ES7193-4CB30-0AA0	**TM-E15C24-AT terminal module** For internal temperature compensation with 2AI TC High Feature, spring-loaded terminals Ordering unit 1 item	6ES7193-4CL30-0AA0
TM-E15N24-01 terminal module 2 x 4 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 items	6ES7193-4CB70-0AA0		
TM-E15S23-01 terminal module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 items	6ES7193-4CB00-0AA0		
TM-E15C23-01 terminal module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 items	6ES7193-4CB10-0AA0		
TM-E15N23-01 terminal module 2 x 3 terminals, no terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 items	6ES7193-4CB60-0AA0		
TM-E15N26-A1 terminal module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, Fast Connect Ordering unit 5 items	6ES7193-4CA80-0AA0		
TM-E15S26-A1 terminal module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, screw-type terminals Ordering unit 5 items	6ES7193-4CA40-0AA0		
TM-E15C26-A1 terminal module 2 x 6 terminals, terminal access to AUX1 bus, AUX1 interconnected to the left, spring-loaded terminals Ordering unit 5 items	6ES7193-4CA50-0AA0		

For accessories for the terminal modules, see Catalog ST 70, Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"

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■ Overview

- IM 151-1 High Feature (RS 485)
- Interface module for electrical connection of the ET 200S to PROFIBUS DP using copper bus cables
- Handles all data exchange with the PROFIBUS DP master
- Delivery including terminating module

■ Ordering data

	Article No.
IM151-1 interface module for ET 200S, High Feature	**6ES7151-1BA02-0AB0**

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Power modules

■ Overview

PM-E power module

- For all types of electronics modules (including safety-related electronics modules); limitations resulting from the supply voltage for PM-E DC 24 V

- For monitoring and – depending on the version – fusing the power supply for electronics modules provided via the TM-P terminal module (load and sensor power supply)

- Diagnostics signals for voltage and blown fuse (can be switched off in the configuration)

- Three versions with different supply voltages:
  - PM-E 24 V DC (not for 2 DI 120 V AC Standard, 2 DI 230 V AC Standard, and 2 DO 24 to 230 V AC)
  - PM-E 24 V DC High Feature with extended status information (not for 2 DI 120 V AC Standard, 2 DI 230 V AC Standard, and 2 DO 24 to 230 V AC)
  - PM-E DC 24 to 48 V; AC 24 to 230 V; with additional fuse

PM-E F power module

- For all non-safety-related types of electronics modules with 24 V DC power supply

- For monitoring the power supply for electronics modules provided via the TM-P terminal module (load and sensor power supply)

- For safe switching off of series-connected digital output modules 24 V DC (up to 10 A; not safety-related) via relay contacts (up to Cat. 3 in accordance with EN 954 or SIL 2 in accordance with IEC 61508);
  released output modules are specified on the Internet at:
  http://support.automation.siemens.com/WW/view/en/39198632

- Design **PM-E F pm DC 24 V PROFIsafe for floating loads** (ground and earth separated); with two additional safety-related digital outputs (switching to high/low, up to SIL 3)
  Diagnostics functions:
  - Channel: short-circuit, overload, wire break, safety-related shutdown
  - Module: overtemperature, internal fault, parameter assignment error, sensor/load voltage missing, communication fault

- Design **PM-E F pp DC 24 V PROFIsafe for non-floating loads** (ground and earth connected), e.g. actuators for connection to a central ground (switching to high/high, up to SIL 3)
  Diagnostics functions:
  - Channel: short-circuit, safety-related shutdown
  - Module: overtemperature, internal fault, parameter assignment error, sensor/load voltage missing, communication fault

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Design

Depending on the possible combinations listed in the table, the power modules are plugged onto corresponding TM-P terminal modules. Power modules are suitable for dividing the ET 200S into potential groups. A power module must be plugged in at the beginning of each potential group. In addition, the first module following the IM 151-1 High Feature interface module must always be a power module.

The TM-P terminal module of the power module interrupts the voltage buses (P1/P2) and therefore opens up a new potential group. All sensor and load supplies of the downstream electronics modules are fed from the TM-P and monitored by the power module. The total current of all modules of a potential group is limited by the maximum current carrying capacity of the power module, which is up to 10 A, depending on the voltage and temperature range; for details, refer to the technical specifications of the power modules in the ST 70 Catalog.

Possible combinations of the TM-P terminal modules and PM-E power modules

	TM-P terminal modules for power modules			
Screw terminal	**TM-P15S23-A1**	**TM-P15S23-A0**	**TM-P15S22-01**	**TM-P30S44-A0**
6ES7 193-...	...4CC20-0AA0	...4CD20-0AA0	...4CE00-0AA0	...4CK20-0AA0
Spring terminal	**TM-P15C23-A1**	**TM-P15C23-A0**	**TM-P15C22-01**	**TM-P30C44-A0**
6ES7 193-...	...4CC30-0AA0	...4CD30-0AA0	...4CE10-0AA0	...4CK30-0AA0
Fast Connect	**TM-P15N23-A1**	**TM-P15N23-A0**	**TM-P15N22-01**	
6ES7 193-...	...4CC70-0AA0	...4CD70-0AA0	...4CE60-0AA0	
Power modules				
PM-E 24 V DC	●	●	●	
PM-E 24 V DC High Feature	●	●	●	
PM-E 24 ... 48 V DC, 24 ... 230 V AC	●	●	●	
PM-E F 24 V DC PROFIsafe				●

Ordering data

	Article No.		Article No.

PM-E power module for electronics modules

PM-E power module
- 24 V DC / 10 A
  - Monitoring of the load voltage — **6ES7138-4CA01-0AA0**
- 24 V DC/10 A High Feature
  - Monitoring of the load voltage
  - Additional status information about voltage and reverse polarity voltage — **6ES7138-4CA60-0AB0**
- 24 ... 48 V DC; 24 ... 230 V AC
  - Monitoring of the fuse
  - Monitoring of the load voltage — **6ES7138-4CB11-0AB0**

PM-E F power module
- PM-E F pm DC 24 V PROFIsafe
  - 1 × relay 24 V DC/10 A, switching to high/low, for switching off series-connected standard digital output modules (up to SIL 3)
  - 2 × 24 V DC/2 A, switching to high/low
  - Safe monitoring of communication with PROFIsafe
  - Channel-specific diagnostics: short-circuit, overload, wire break, safety-related shutdown
  - Module diagnostics: overtemperature, internal fault, parameter assignment error, sensor/load voltage missing, communication fault — **6ES7138-4CF03-0AB0**
- PM-E F pp DC 24 V PROFIsafe
  - 1 × relay 24 V DC/10 A, switching to high/high, for switching off series-connected standard digital output modules (up to SIL 3)
  - Safe monitoring of communication with PROFIsafe
  - Channel-specific diagnostics: short-circuit, safety-related shutdown
  - Module diagnostics: overtemperature, internal fault, parameter assignment error, sensor/load voltage missing, communication fault — **6ES7138-4CF42-0AB0**

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Digital electronics modules

■ Overview

- 2, 4 and 8-channel digital inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding.
- High-feature versions for enhanced plant availability, additional functions and comprehensive diagnostics
- Hot swapping of modules possible
- Safety-related digital input module 4/8 F-DI PROFIsafe
- Safety-related digital output module 4 F-DO PROFIsafe 24 V DC/2 A
- Isolated from the backplane bus

■ Design

Possible combinations of the TM-E terminal modules and digital modules

	TM-E terminal modules for electronic modules						
Screw terminal	**TM-E15S26-A1**	**TM-E15S24-A1**	**TM-E15S24-01**	**TM-E15S23-01**	**TM-E15S24-AT**	**TM-E30S44-01**	**TM-E30S46-A1**
Article No. 6ES7193-…	…4CA40-0AA0	…4CA20-0AA0	…4CB20-0AA0	…4CB00-0AA0	…4CL20-0AA0	…4CG20-0AA0	…4CF40-0AA0
Spring terminal	**TM-E15C26-A1**	**TM-E15C24-A1**	**TM-E15C24-01**	**TM-E15C23-01**	**TM-E15C24-AT**	**TM-E30C44-01**	**TM-E30C46-A1**
Article No. 6ES7193-…	…4CA50-0AA0	…4CA30-0AA0	…4CB30-0AA0	…4CB10-0AA0	…4CL30-0AA0	…4CG30-0AA0	…4CF50-0AA0
Fast Connect	**TM-E15N26-A1**	**TM-E15N24-A1**	**TM-E15N24-01**	**TM-E15N23-01**	-	-	-
Article No. 6ES7193-…	…4CA80-0AA0	…4CA70-0AA0	…4CB70-0AA0	…4CB60-0AA0			
Electronics modules							
2 DI 24 V DC Standard	●	●	●	●			
2 DI 24 V DC High Feature							
4 DI 24 V DC Standard							
4 DI 24 V DC High Feature							
4 DI 24 … 48 V AC/DC High Feature	●	●	●	●			
4 DI NAMUR	●	●	●	●			
8 DI 24 V DC Standard	●	●	●	●			
2 DI 120 V AC Standard	●	●	●	●			
2 DI 230 V AC Standard	●	●	●	●			
2 DO 24 V DC/0.5 A Standard	●	●	●	●			
2 DO 24 V DC/0.5 A High Feature							
4 DO 24 V DC/0.5 A Standard							
4 DO 24 V DC/0.5 A High Feature							
8 DO 24 V DC/0.5 A Standard	●		●				
8 DO 24 V DC/0.5 A High Feature							
2 DO 24 V DC/2 A Standard	●	●	●	●			
2 DO 24 V DC/2 A High Feature							
4 DO 24 V DC/2 A Standard							
4 DO 24 V DC/2 A High Feature							
2 DO 24 … 230 V AC/2 A	●	●	●	●			
2 RO, 24 … 120 V DC/5 A, 24 … 230 V AC/5 A	●	●	●	●			
2 RO, 24 … 48 V DC/5 A, 24 … 230 V AC/5 A							
4/8 failsafe DI 24 V DC[1]						●	●
4 failsafe DO 24 V DC/2 A[1]						●	●
Reserve (width 15 mm)	●	●	●	●	●		
Reserve (width 30 mm)						●	●

[1] See Manual "ET 200S Failsafe Modules" in the documentation packages "S7 F Systems" and "S7 Distributed Safety"

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■ Ordering data

	Article No.		Article No.
Digital inputs for floating contacts		**Digital outputs for DC voltage (suitable for solenoid valves, DC contactors, indicator lights etc.)**	
DI 2 × 24 V DC, Standard	6ES7131-4BB01-0AA0	**DO 2 × 24 V DC/0.5 A, Standard**	6ES7132-4BB01-0AA0
Ordering unit 5 items		Ordering unit 5 items	
DI 4 × 24 V DC, Standard	6ES7131-4BD01-0AA0	**DO 2 × 24 V DC/2 A, Standard**	6ES7132-4BB31-0AA0
Ordering unit 5 items		Ordering unit 5 items	
DI 2 × 24 V DC, High Feature; with diagnostics • Short-circuit monitoring	6ES7131-4BB01-0AB0	**DO 2 × 24 V DC/0.5 A, High Feature, with diagnostics** • Connection of a default value per channel in the event of CPU failure (configurable) • Short-circuit monitoring by channel • Broken wire monitoring by channel (when "1" signal)	6ES7132-4BB01-0AB0
Ordering unit 5 items			
DI 4 × 24 V DC, High Feature; with diagnostics • Short-circuit monitoring	6ES7131-4BD01-0AB0		
Ordering unit 5 items		Ordering unit 5 items	
DI 4 × 24 ... 48 V AC/DC, High Feature; with configurable diagnostics • Wire break monitoring (external resistance circuit required) • Monitoring of the fuse • Monitoring of the load voltage	6ES7131-4CD02-0AB0	**DO 2 × 24 V DC/2 A, High Feature, with diagnostics** • Connection of a default value per channel in the event of CPU failure (configurable) • Short-circuit monitoring by channel • Broken wire monitoring by channel (when "1" signal)	6ES7132-4BB31-0AB0
Ordering unit 5 items			
DI 4 × 24 V DC, NAMUR, with diagnostics • Adjustable diagnostics interrupt	6ES7131-4RD02-0AB0		
Ordering unit 1 item		Ordering unit 5 items	
DI 8 × 24 V DC, High Speed	6ES7131-4BF00-0AA0	**DO 4 × 24 V DC/0.5 A, Standard**	6ES7132-4BD02-0AA0
Ordering unit 1 item		Ordering unit 5 items	
DI 2 × 120 V AC, Standard	6ES7131-4EB00-0AB0	**DO 4 × 24 V DC/0.5 A, High Feature** • Diagnostics: Short-circuit	6ES7132-4BD00-0AB0
Ordering unit 5 items			
DI 2 × 230 V AC, Standard	6ES7131-4FB00-0AB0	Ordering unit 5 items	
Ordering unit 5 items		**DO 8 × 24 V DC/0.5 A, Standard**	6ES7132-4BF00-0AA0
Safety-related digital input		Ordering unit 1 item	
4/8 F-DI 24 V DC PROFIsafe 8 DI safety-related SIL 2 (1oo1) or 4 DI safety-related SIL 3 (1oo2), with diagnostics • Cyclic short-circuit test • Discrepancy monitoring of 2 channels for SIL 3 (adjustable discrepancy time) • Safe monitoring of communication with PROFIsafe	6ES7138-4FA05-0AB0	**DO 8 × 24 V DC/0.5 A, High Feature** • Connection of a default value per channel in the event of CPU failure (configurable) • Diagnostics: Short-circuit	6ES7132-4BF00-0AB0
		Ordering unit 1 item	
		DO 4 × 24 V DC/2 A, Standard	6ES7132-4BD32-0AA0
		Ordering unit 5 items	
Ordering unit 1 item		**DO 4 × 24 V DC/2 A, High Feature** • Diagnostics: Short-circuit	6ES7132-4BD30-0AB0
		Ordering unit 5 items	

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Digital electronics modules

Ordering data	Article No.		Article No.
Digital output for AC voltage (suitable for solenoid valves, AC contactors, indicator lights etc.)		**Safety-related digital output**	
DO 2 × 24...230 V AC, 2 A • Connection of a default value per channel in the event of CPU failure (configurable) Ordering unit 5 items	6ES7132-4FB01-0AB0	**4 F-DO 24 V DC/2 A PROFIsafe** Safety-related up to SIL 3, with diagnostics, switching to low/high • Channel-specific diagnostics: short-circuit, overload, wire break (with "1" signal), safety-related shutdown • Module diagnostics: overtemperature, internal fault, parameterization error, sensor/load voltage missing, communication fault • Safe monitoring of communication with PROFIsafe Ordering unit 1 item	6ES7138-4FB04-0AB0
Relay output (suitable for solenoid valves, contactors, motor starters, miniature motors and indicator lights)		**Accessories**	
2 × RO, NO contact 24 ... 120 V DC/5 A 24 ... 230 V AC/5 A • Connection of a default value per channel in the event of CPU failure (configurable) Ordering unit 5 items	6ES7132-4HB01-0AB0	**Reserve modules for ET 200S** for reserving unused slots for any electronics module • 15 mm wide (Ordering unit 5 items) • 30 mm wide (Ordering unit 1 item) Further accessories, e.g. for inscription	6ES7138-4AA01-0AA0 6ES7138-4AA11-0AA0 See Catalog ST 70
2 × RO, changeover contact 24 ... 48 V DC/5 A 24 ... 230 V AC/5 A • Connection of a default value per channel in the event of CPU failure (configurable) Ordering unit 5 items	6ES7132-4HB12-0AB0		

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Overview

- Analog inputs and outputs for the ET 200S
- Can be plugged onto TM-E terminal modules with automatic coding.
- High-feature variants with enhanced accuracy and resolution
- Hot swapping of modules possible

Design

Possible combinations of the TM-E terminal modules and analog modules

	TM-E terminal modules for electronic modules				
Screw terminal	**TM-E15S26-A1**	**TM-E15S24-A1**	**TM-E15S24-01**	**TM-E15S23-01**	**TM-E15S24-AT**
Article number 6ES7 193…	…4CA40-0AA0	…4CA20-0AA0	…4CB20-0AA0	…4CB00-0AA0	…4CL20-0AA0
Spring terminal	**TM-E15C26-A1**	**TM-E15C24-A1**	**TM-E15C24-01**	**TM-E15C23-01**	**TM-E15C24-AT**
Article number 6ES7 193…	…4CA50-0AA0	…4CA30-0AA0	…4CB30-0AA0	…4CB10-0AA0	…4CL30-0AA0
Fast Connect	**TM-E15N26-A1**	**TM-E15N24-A1**	**TM-E15N24-01**	**TM-E15N23-01**	--
Article number 6ES7 193…	…4CA80-0AA0	…4CA70-0AA0	…4CB70-0AA0	…4CB60-0AA0	
Electronic modules					
2AI U Standard 2AI U High Feature	●	●	●	●	
2AI I 2WIRE Standard	●	●	●	●	
2AI I 2/4WIRE High Feature	●		●		
2 AI I 4WIRE Standard	●		●		
2AI RTD Standard	●		●		
2AI RTD High Feature	●	●	●	●	
2 AI TC Standard	●	●	●	●	
2 AI TC High Feature					●
2AO U Standard 2AO U High Feature	●		●		
2 AO I Standard 2AO I High Feature	●	●	●	●	
Reserve (width 15 mm)	●	●	●	●	●

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Analog electronics modules

Ordering data

	Article No.		Article No.
Analog input		**Analog output**	
• AI 2 x U (± 5 V, 1 ... 5 V, ± 10 V) / 13 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics	6ES7134-4FB01-0AB0	• AO 2 x U (1 to 5 V / 12 bit, ±10 V / 13 bit), standard - Diagnostics inside module - Connection of substitute value in event of CPU stop (parameterizable) - Short-circuit monitoring	6ES7135-4FB01-0AB0
• AI 2 x I, 2-wire transmitter (4 ... 20 mA) / 13 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	6ES7134-4GB01-0AB0	• AO 2 x I (± 20 mA, 4 ... 20 mA) / 13 bit, standard - Diagnostics inside module - Connection of substitute value in event of CPU stop (parameterizable) - Wire break monitoring	6ES7135-4GB01-0AB0
• AI 2 x I, 4-wire transmitter (± 20 mA, 4 ... 20 mA) / 13 bit, standard - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	6ES7134-4GB11-0AB0	• AO 2 x U (1 ... 5 V, ± 10 V) / 15 bit, High Feature - Diagnostics inside module - Connection of substitute value in event of CPU stop (parameterizable) - Short-circuit monitoring	6ES7135-4LB02-0AB0
• AI 2 x TC standard for thermocouple or voltage measurement - Resolution 15 bit + sign - Temperature measurement with thermocouple type E, N, J, K, L, S, R, B, T - Voltage measurement ± 80 mV - Module diagnostics: Overflow/underflow, internal faults, parameterization errors - Wire break monitoring per channel for measurement with thermocouple - Compensation through external Pt100 in the same station with AI 2/4 x RTD standard - Extended temperature range from 0 to 50 °C when installed vertically	6ES7134-4JB01-0AB0	• AO 2 x I (± 20 mA, 4 ... 20 mA) / 15 bit, High Feature - Diagnostics inside module - Connection of substitute value in event of CPU stop (parameterizable) - Wire break monitoring	6ES7135-4MB02-0AB0
		Accessories	
		Reserve module for ET 200S for reserving unused slots for any electronics module • 15 mm wide (5 units)	6ES7138-4AA01-0AA0
• AI 2/4 x RTD standard for resistance thermometer or resistance measurement - 2 inputs (3-wire and 4-wire connection)/4 inputs (2-wire connection) - Max. resolution 15 bits + sign - Resistance thermometer Pt100, Ni100 - Module diagnostics: Overflow/underflow, internal faults, parameterization errors - Wire break monitoring per channel	6ES7134-4JB51-0AB0	For further accessories, e.g. for labeling, see Catalog ST 70	
• AI 2 x U (1 ... 5 V, ± 5 V, ± 10 V) / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics	6ES7134-4LB02-0AB0		
• AI 2 x I, 2/4-wire transmitter (± 20 mA, 4 ... 20 mA) / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring	6ES7134-4MB02-0AB0		
• AI 2 x TC / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Internal temperature compensation with TM-E15S24-AT or TM-E15C24-AT terminal module	6ES7134-4NB01-0AB0		
• AI 2 x RTD / 15 bit, High Feature - Diagnostics inside module - Overflow/underflow diagnostics - Wire break monitoring - Resistance thermometer Pt100/200/500/1 000, Ni100/1 000 (2, 3 or 4 wires) - Temperature in Celsius or Fahrenheit	6ES7134-4NB51-0AB0		

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Overview

1 COUNT 24 V/100 kHz counter module

- Single-channel, intelligent 32 bit counter module for universal counting and time-based measuring tasks (frequency, speed and period measurements)
- For direct connection of 24 V DC incremental encoders or initiators
- Comparison functions with definable comparison values
- Integrated digital output for output of the response on reaching the comparison value
- Can be plugged onto TM-E terminal modules with automatic coding
- Hot swapping of modules possible
- Simple parameterization without additional software

Design

Possible combinations of the TM-E terminal modules and technology modules

	TM-E terminal modules for electronic modules	
Screw terminal	**TM-E15S26-A1**	**TM-E15S24-01**
Article number 6ES7193…	…4CA40-0AA0	…4CB20-0AA0
Spring terminal	**TM-E15C26-A1**	**TM-E15C24-01**
Article number 6ES7193…	…4CA50-0AA0	…4CB30-0AA0
Fast Connect	**TM-E15N26-A1**	**TM-E15N24-01**
Article number 6ES7193…	…4CA80-0AA0	…4CB70-0AA0
Technology modules		
1 COUNT 24 V/100 kHz	●	●

Function

1 COUNT 24 V/100 kHz counter module

- 1 channel for counting up and down; counting range ± 31 bits
- Counting frequency up to 100 kHz
- 6 different operating modes:
  - Continuous counting
  - Single counting
  - Periodic count
  - Frequency measurement
  - Speed measurement
  - Period measurement
- Gate control via level at digital input (HW gate) as well as software control (SW gate)
- 1-, 2- or 4-fold evaluation
- Response on reaching a comparison value or on exceeding a range
- Loading of counter with defined starting value
- Once-only or periodic synchronization
- Latch function: saving of current counter values through setting of digital input
- Parameterizable response in case of CPU failure: abort, continue, connection of substitute value, holding of last value

Ordering data	Article No.
1 COUNT 24 V/100 kHz counter module For universal counting and measuring tasks with ET 200S	**6ES7138-4DA04-0AB0**
Accessories	
For SIMODRIVE sensor incremental encoders, signal lines, shield clamps and connections as well as further accessories, e.g. labeling sheets, see "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200S distributed I/O" in the Industry Mall or in the Catalogs ST 70 and CA 01.	

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Motor starters

■ Overview

- Completely factory-wired motor starters for switching and protecting any three-phase loads
- High Feature motor starter with a combination comprising starter circuit-breaker, solid-state overload protection and contactor or soft starter up to 7.5 kW
- Safety-related motor starters based on the High Feature motor starters (direct-on-line and reversing starters) with integral redundancy function for shutdown reliability up to Category 4 (EN 954-1)
- With self-assembling 50 A power bus, i.e. the load current is only supplied once for a group of motor starters
- Hot swapping is permissible
- Inputs and outputs for activating and signaling the states have been integrated
- Diagnostics capability for active monitoring of the switching and protection functions
- Can be combined with brake control module for controlling electromechanical brakes in three-phase motors

■ Design

Power modules and motor starters are operated on the terminal modules which are assigned to them in the tables in the sections "High Feature motor starters" and "Safety-related motor starters". The terminal modules form a carrier system which is simultaneously used for the power supply to the motor starters (electronics: 24 V DC and load: 400 V AC).

24 V DC for the electronics is provided by the power module inserted to the left of the first motor starter. The power module and the downstream motor starters constitute a potential group whose scope is limited by the current carrying capacity of the power module. When this limit is reached, a new potential group must be established with a further power module.

The load current is applied to the first (left) TM-xxxxS32 motor starter terminal module, and reaches the other motor starters via the power bus of the adjacent TM-xxxxS31 terminal modules. The power bus is designed for loads up to 50 A. When this limit is reached, a new load group must be started with a further TM-xxxxS32 terminal module, and provided with load current.

Brake control modules for motor starters

High Feature and safety-related motor starters can be expanded by a brake control module for controlling electromechanical brakes in three-phase motors. The following modules are available:

- For brakes with external supply 24 V DC/4 A:
  - xB3 (with two optional inputs for special functions)
  - xB1
- For brakes with internal supply 500 V DC/0.7 A:
  - xB4 (with two optional inputs for special functions)
  - xB2

The externally supplied 24 V DC brakes can be released independently of the switching status of the motor starter. The 500 V DC brakes, on the other hand, are generally supplied directly from the junction plate of the motor via a rectifier module and cannot be released if the motor starter is switched off. These brakes cannot be used in conjunction with the DSS1e-x motor starter (direct soft starter).

The outputs of the brake control modules can also be used for other purposes e.g. for controlling DC valves. Autonomous special functions can be implemented with the help of two optional inputs each on a brake control module xB3 or xB4 and a control module 2DI of the High Feature motor starter. These operate independently of the bus and higher-level control, e.g. to implement rapid stop functions for slide controls.

Brake control modules are operated on different terminal modules depending on the design:

Brake control module	Terminal modules for Brake Control Module	
xB1 or xB2	**TM-xB15S24-01** 3RK1903-0AG00	--
xB3 or xB4	--	**TM-xB215S24-01** 3RK1903-0AG01

High Feature motor starters

The High Feature motor starters are used together with the PM-D power module. Combined with a terminal module according to the table, a PM-D power module opens up a new potential group. The scope of the group is limited in that the value specified for the current carrying capacity of the power module (10 A for PM-D) must not be exceeded by the aggregate current of all modules in a potential group.

The PM-D handles the following tasks for the motor starters of a potential group:

- Supply of voltages for the electronics via the voltage buses of the terminal modules
- Monitoring of voltages for the electronics and contactors

Design (continued)

	Terminal modules for motor starters and power modules		
With power bus supply for one load group, including 3 caps for termination of power bus	**TM-DS65-S32** 3RK1903-0AK00	**TM-RS130-S32** 3RK1903-0AL00	--
With power bus bushing	**TM-DS65-S31** 3RK1903-0AK10	**TM-RS130-S31** 3RK1903-0AL10	--
with screw-type terminals	--	--	**TM-P15-S27-01** 3RK1903-0AA00
Power module			
PM-D 24 V DC			●
Motor starters			
DSS1e-x High Feature direct soft starter	●		
RS1e-x High Feature reversing starter		●	

Safety-related motor starters

In EMERGENCY STOP applications, safety-related motor starters can be shut down selectively by means of the upstream PM-D F PROFIsafe power module. Up to 6 shutdown groups can be formed per power module. The PM-D F PROFIsafe obtains the shutdown signal from the F/FH automation system via the interface module of the ET 200S.

Combined with a terminal module according to the table, a PM-D F PROFIsafe power module opens up a new potential group. The scope of the group is limited in that the total current of all modules in a potential group must not exceed the current carrying capacity of the power module (with PM-D F PROFIsafe: inrush current 10 A; continuous current 5 A).

	Terminal modules for motor starters, power modules and supplementary/expansion modules		
With power bus supply for one load group, including 3 caps for termination of power bus	**TM-FD65-S32** 3RK1903-3AC00	**TM-FRS130-S32** 3RK1903-3AD00	--
With power bus bushing	**TM-FD65-S31** 3RK1903-3AC10	**TM-FRS130-S31** 3RK1903-3AD10	--
with screw-type terminals	--	--	**TM-PF30S47-F0** 3RK1903-3AA00
Power module			
PM-D F PROFIsafe			●
Motor starters			
F-DS1e-x High Feature direct starter	●		
F-RS1e-x High Feature reversing starter		●	

Supplementary/expansion modules for safety-related motor starter applications

The PM-D F X1 power/expansion module permits selective shutdown of 1 to 6 shutdown groups through external safety devices (e.g. safety relay or AS-i safety monitor). The PM-D F X1 uses the safety-related shutdown signals connected to the module to trigger the downstream failsafe motor starters which then safely switch off the assigned motors.

In addition, external safety devices can also be powered by a safe 24 V DC voltage V_1 via the safety-related PM-D F X1 power/expansion module.

The F-CM contact multiplier equipped with four safe floating contacts (NO contacts) can be used together with the PM-D F PROFIsafe or the PM-D F X1 as an interface to plants with conventional safety engineering. It has internal diagnostics functions and can be set to one of 6 shutdown groups.

	Terminal modules for supplementary/expansion modules	
Without supply from left (as power module)	**TM-PFX30 S47-G1** 3RK1903-3AE00	--
With supply from left (for expansion)	**TM-PFX30 S47-G0** 3RK1903-3AE10	--
	--	**TM-FCM30-S47** 3RK1903-3AB10
Additional/expansion modules		
PM-D F X1 safety-related power/expansion module	●	
F-CM safety-related contact multiplier		●

Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

Motor starters

Ordering data

	Article No.
High Feature motor starters With diagnostics, expandable with brake control module	
DSS1e-x soft starters Electronic switching, electronic overload protection • Up to 1.1 kW/400 V; 0.3 ... 3.0 A	**3RK1301-0AB20-0AA4**
RS1e-x reversing starters Mechanical switching, electronic overload protection • Up to 3.0 kW/400 V; 2.4 ... 8.0 A	**3RK1301-0BB10-1AA4**
Accessories	
Terminal modules for motor starters • TM-DS65-S32 for DS1e-x, DSS1e-x direct starters with supply connection for power bus, incl. 3 caps for terminating the power bus	**3RK1903-0AK00**
• TM-DS65-S31 for DS1e-x, DSS1e-x direct starters without supply connection for power bus	**3RK1903-0AK10**
• TM-RS130-S32 for RS1e-x reversing starter with supply connection for power bus, incl. 3 caps for connecting the power bus	**3RK1903-0AL00**
• TM-RS130-S31 for RS1e-x reversing starter without supply connection for power bus	**3RK1903-0AL10**
PM-D power module for direct and reversing starters; 24 V DC, with diagnostics	**3RK1903-0BA00**
Terminal module for PM-D power module TM-P15-S27-01	**3RK1903-0AA00**

	Article No.
Jumper modules • M15-PEN Terminal block PE/N, for jumpering a gap in the PE/N bus, 15 mm wide	**3RK1903-0AH00**
• M30-PEN Terminal block PE/N, for jumpering a gap in the PE/N bus, 30 mm wide	**3RK1903-0AJ00**
• M15-L123 Terminal block L1/L2/L3, for jumpering a gap in the power bus, 15 mm wide	**3RK1903-0AE00**
• M30-L123 Terminal block L1/L2/L3, for jumpering a gap in the power bus, 30 mm wide	**3RK1903-0AF00**
Control modules • Control module 2DI COM DC 24 V Digital input module with two inputs for parameterizable motor starters, for mounting on front of motor starter, with PC connection (LOGO! PC cable 6ED1057-1AA00-0AB0 required)	**3RK1903-0CH10**
• Control module 2DI LC COM DC 24 V Like control module 2DI COM, plus input for switching to manual local mode	**3RK1903-0CH20**
M65-PEN-F infeed module 65 mm wide, incl. two caps, in combination with TM-DS65-32/TM-RS130-S32	**3RK1903-2AC00**
M65-PEN-S connection module 65 mm wide, in combination with TM-DS65-31/TM-RS130-S31	**3RK1903-2AC10**
Brake control expansion module For motors with mechanical brake • xB1 24 V DC/4 A	**3RK1903-0CB00**
• xB2 500 V DC / 0.7 A	**3RK1903-0CC00**
• xB3 24 V DC / 4 A, DI 2 x 24 V DC with two optional inputs	**3RK1903-0CE00**
• xB4 500 V DC / 0.7 A, DI 2 x 24 V DC with two optional inputs	**3RK1903-0CF00**
Terminal modules for brake control expansion module • TM-xB15S24-01 for xB1 or xB2	**3RK1903-0AG00**
• TM-xB215S24-01 for xB3 or xB4	**3RK1903-0AG01**

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Ordering data

	Article No.
Safety-related motor starters With diagnostics, expandable with brake control module	
F-DS1e-x safety-related direct starter Mechanical switching, electronic overload protection	
• Up to 1.1 kW/400 V; 0.3 ... 3.0 A	**3RK1301-0AB13-0AA4**
• Up to 3.0 kW/400 V; 2.4 ... 8.0 A	**3RK1301-0BB13-0AA4**
• Up to 7.5 kW/400 V; 2.4 ... 16.0 A	**3RK1301-0CB13-0AA4**
F-RS1e-x safety-related reversing starter Mechanical switching, electronic overload protection	
• Up to 1.1 kW/400 V; 0.3 ... 3.0 A	**3RK1301-0AB13-1AA4**
• Up to 3.0 kW/400 V; 2.4 ... 8.0 A	**3RK1301-0BB13-1AA4**
• Up to 7.5 kW/400 V; 2.4 ... 16.0 A	**3RK1301-0CB13-1AA4**
Accessories	
Terminal modules for safety-related motor starters	
• For F-DS1e-x direct starter, with coding	
- **TM-FDS65-S32** with supply connection for power bus	**3RK1903-3AC00**
- **TM-FDS65-S31** without supply connection for power bus	**3RK1903-3AC10**
• For F-RS1e-x reversing starter, with coding	
- **TM-FRS130-S32** with supply connection for power bus	**3RK1903-3AD00**
- **TM-FRS130-S31** without supply connection for power bus	**3RK1903-3AD10**
PM-D F PROFIsafe power module for direct and reversing starters; 24 V DC, with diagnostics	**3RK1903-3BA02**
Terminal module for PM-D F PROFIsafe power module TM PF30 S47-F0	**3RK1903-3AA00**
Jumper modules and control modules See under High Feature motor starters, page 11/68	
M65-PEN-F infeed module 65 mm wide, incl. two caps, in combination with TM-DS65-32 / TM-RS130-S32	**3RK1903-2AC00**
M65-PEN-S connection module 65 mm wide, in combination with TM-DS65-31 / TM-RS130-S31	**3RK1903-2AC10**

	Article No.
Brake control expansion module For motors with mechanical brake	
• **xB3** 24 V DC / 4 A, DI 2 x 24 V DC with two optional inputs	**3RK1903-0CE00**
• **xB4** 500 V DC / 0.7 A, DI 2 x 24 V DC with two optional inputs	**3RK1903-0CF00**
Terminal modules for brake control expansion module TM-xB215S24-01 for xB3 or xB4	**3RK1903-0AG01**
PM-D F X1 power module For power supply of emergency stop signals of external safety units; for 6 switch-off groups, 24 V DC;	**3RK1903-3DA00**
Terminal module for PM-D F X1 power module	
• **TM-PFX30 S47-G0** with infeed on left	**3RK1903-3AE10**
• **TM-PFX30 S47-G1** without infeed on left	**3RK1903-3AE00**
F-CM contact multiplexer With 4 safe floating contacts	**3RK1903-3CA00**
Terminal module for F-CM contact multiplexer TM-FCM30 S47-F01	**3RK1903-3AB10**

Note:

For color-coded labels and further accessories for ET 200S configurations with High Feature motor starters and for ET 200S configurations with safety-related motor starters, refer to "Automation engineering – automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O" in Industry Mall/Catalog CA 01 or Catalog ST 70.

11

Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

SIGUARD safety technology

■ Overview
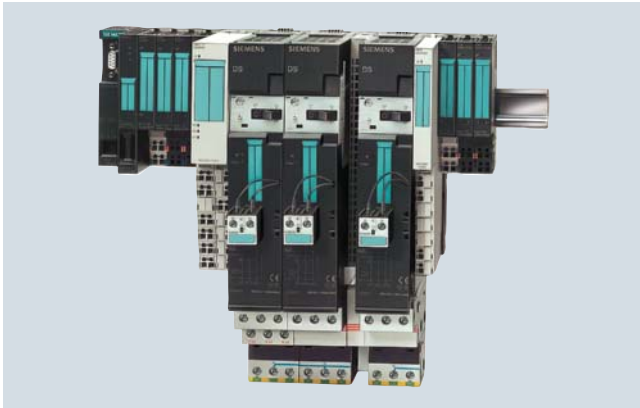
The SIGUARD safety system based on the PM-D F1, F2, F3, F4, F5 and PM-X safety modules can be combined with ET 200S motor starters to enable local safety applications up to category 4 in accordance with EN 954-1, independent of the safety-related control carried out by the PLC. The costs involved in the configuration and wiring of conventional safety systems are no longer incurred.

The safety sensors are directly connected to the safety modules. Instead of the safety relays which are otherwise essential, the safety modules available with functions for evaluating emergency stop circuits, for monitoring protective doors or for implementation of time-delayed shut-downs safely switch off downstream motor starters. In addition, they monitor their auxiliary voltages.

■ Application

The following ET 200S motor starters can be combined with the safety modules of the SIGUARD safety system:

- Standard motor starter (see Catalog ST 70) with additive failsafe kit 1 or 2
- High Feature motor starters

This results in versatile options for use. Several safety circuits can be designed without problem. Typical application examples are presented in the manual "SIMATIC ET 200S motor starters".
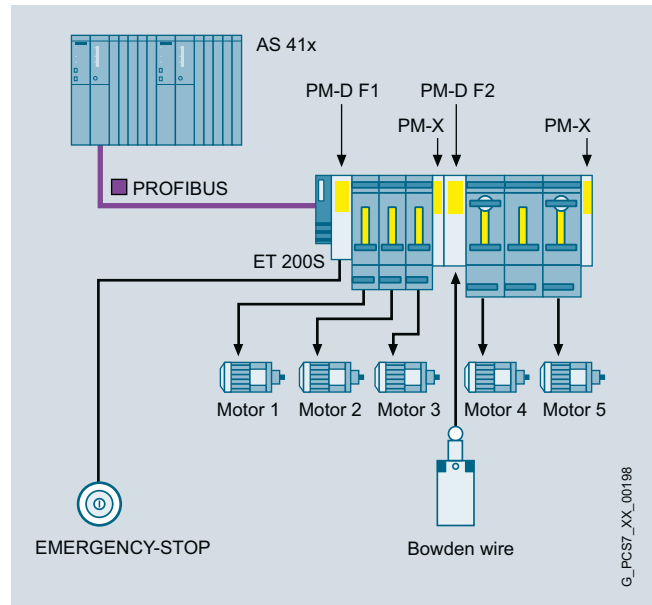
Example of safety application with 2 safety circuits (switch-off groups)

■ Design

Components required in relation to safety requirement

Components required	Safety category acc. to EN 954-1		
	2	**3**	**4**
PM-D F1...5	●	●	●[1]
TM-PF30 S47-..	●	●	●
F kit 1/2	●[2]	●[2]	●[2]
PM-X	●	●	●
TM-X15 S27-01	●	●	●
Redundantly switching, external infeed contactor		●	●

[1] PM-D F3 power module only approved up to Category 3

[2] F kit required for Standard motor starter only; already integrated into High Feature motor starter

Possible combinations of safety and terminal modules

	PM-D F1	**PM-D F2**	**PM-D F3**	**PM-D F4**	**PM-D F5**	**PM-X**
TM-PF30 S47-B1[3]	●	●				
TM-PF30 S47-B0[4]	●	●				
TM-PF30 S47-C1[5]			●	●		
TM-PF30 S47-C0[6]			●	●		
TM-PF30 S47-D0					●	
TM-X15 S27-01						●

[3] For F1 or F2 in higher-level or individual safety group (potential group)

[4] For F1 or F2 in lower-level cascaded safety group (partial potential group)

[5] For expansion with F3 or F4 in separate ET 200S station (potential group)

[6] For expansion with F3 or F4 in the same ET 200S station (partial potential group)

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■ **Design** (continued)

Safety modules PM-D F1/F2/F3/F4/F5

In the case of safety applications with SIGUARD systems, the following safety modules are used individually or combined instead of the PM-D standard power module:

- PM-D F1 for evaluating emergency stop circuits with the function "Monitored start"
- PM-D F2 for monitoring of protective doors with the function "Automatic start"
- PM-D F3 as expansion for PM-D F1/F2 for time-delayed tripping
- PM-D F4 for expanding safety circuits with other ET 200S motor starters, e.g. in a different tier (station)
- PM-D F5 for transmitting the status of PM-D F1...4 over four floating relay circuits to external safety devices (contact multipliers)

These serve as safety relays for downstream ET 200S motor starters.

The PM-D F1 and PM-D F2 safety modules can be combined with the PM-D F3 or PM-D F4 modules. A PM-D F5 can be arranged in any position between a PM-D F1...4 and a PM-X.

Every safety circuit starting with a PM-D F1 ... 4 must be terminated by a PM-X. An additional PM-D power module is not required.

The PM-D F1 ... F4 safety modules monitor the auxiliary voltages U_1 and U_2. A voltage failure is communicated in the form of a diagnostics message via bus.

Failsafe kit

Every standard motor starter in a safety segment has to be supplemented by the failsafe kit (F-kit) in order to monitor the switching function. F-Kit 1 supplements the DS1-x direct-on-line starter, F-Kit 2 the RS1-x reversing starter.

The F-kits comprise:

- Contact carriers for the terminal modules
- 1 or 2 auxiliary switch blocks for the contactor(s) of the motor starter
- Connecting lines

High Feature motor starters and their terminal modules come equipped with the F-Kit functions.

TM-PF30 terminal modules for PM-D F1 ... F5 safety modules

The TM-PF30 terminal modules are used to accommodate the PM-D F1 ... F5 safety modules (see table for possible combinations, page 11/70). Depending on the version, they are suitable for:

- Supply of 24 V DC for the electronics (U_1) and the contactors of the motor starters (U_2)
- Sensor connection: connection of 2-channel sensor circuit (e.g. emergency stop button) and a reset button
- Design of separate safety circuits
- Cascading of safety circuits

Summary of product range with important differences in features:

- TM-PF30 S47-B1
  - Carrier for PM-D F1 or PM-D F2 safety module
  - Creates a safety circuit
  - Supply of U_1 and U_2
  - Sensor connection
- TM-PF30 S47-B0
  - Carrier for PM-D F1 or PM-D F2 safety module
  - Creates a subordinate (cascaded) safety circuit
  - No separate supply of U_1 and U_2; (U_1 and U_2 are present on the voltage buses)
  - Sensor connection
- TM-PF30 S47-C1
  - Carrier for PM-D F3 or PM-D F4 safety module
  - Creates the expansion of a safety circuit in a new station
  - Supply of U_1 and U_2
  - Control input IN+/IN-
  - No sensor connection
- TM-PF30 S47-C0
  - Carrier for PM-D F3 or PM-D F4 safety module
  - Creates a subordinate (cascaded) safety circuit
  - Separate supply of U_2 (U_1 is present on the voltage buses)
  - No sensor connection
- TM-PF30 S47-D0
  - Carrier for PM-D F5 safety module
  - Arrangement between a TM-PF30 S47-B0, B1, C0 or C1 and a TM-X
  - No sensor connection

TM-X terminal module for PM-X safety module

The TM-X 15 S27-01 terminal module (TM-X) is a carrier for the PM-X safety module. It must be positioned on the right next to the last motor starter of a safety circuit.

The TM-X is suitable for connecting an external supply contactor (second switch-off possibility). It has terminals for connecting the contactor coil and the feedback contact.

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Process I/O
SIMATIC ET 200S for SIMATIC PCS 7

SIGUARD safety technology

Ordering data

SIGUARD safety modules	Article No.
PM-D F1 Safety module with diagnostics; for emergency stop applications with the function "Monitored start"; 2-channel	3RK1903-1BA00
PM-D F2 Safety module with diagnostics; for protective door monitoring with the function "Automatic start"; 2-channel	3RK1903-1BB00
PM-D F3 Safety module with diagnostics; for expansion of PM-D F1/2 for an additional potential group; time delay 0 to 15 s	3RK1903-1BD00
PM-D F4 Safety module with diagnostics; for expansion of PM-D F1/2 for an additional potential group	3RK1903-1BC00
PM-D F5 Expansion to PM-D F1 up to PM-D F4, contact multiplier	3RK1903-1BE00
Accessories	
PM-X Safety module with diagnostics; for connecting a safety group and for connecting an external incoming-feeder contactor or for connecting an external safety circuit	3RK1903-1CB00
F-Kit 1 Failsafe kit for DS1-x standard motor starter (not necessary for High Feature motor starter)	3RK1903-1CA00
F-Kit 2 Failsafe kit for RS1-x standard motor starter (not necessary for High Feature motor starter)	3RK1903-1CA01

SIGUARD terminal modules	Article No.
TM-PF30 S47-B1 terminal module For PM-D F1/2 safety modules; with incoming supply U1/U2 and sensor connection	3RK1903-1AA00
TM-PF30 S47-B0 terminal module For PM-D F1/2 safety modules; with sensor connection	3RK1903-1AA10
TM-PF30 S47-C1 terminal module For PM-D F3/4 safety modules; with incoming supply U1/U2 and control input IN+/IN-	3RK1903-1AC00
TM-PF30 S47-C0 terminal module For PM-D F3/4 safety modules; with incoming supply U2	3RK1903-1AC10
TM-PF30 S47-D0 terminal module For PM-D F5 safety module	3RK1903-1AD10
TM-X15 S27-01 terminal module For PM-X safety module	3RK1903-1AB00

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Overview

SIMATIC ET 200SP is a highly flexible and scalable I/O system with IP20 protection which can communicate with SIMATIC PCS 7 automation systems (controllers) via PROFINET IO. Designed for installation in enclosures or control cabinets, it convinces with a particularly compact design, exceptional usability, and impressive performance.

The comprehensive, channel-specific and easy-to-program diagnostics with plain text messages means that faults can be located and eliminated in an extremely short time.

Summary of main features

- Remote I/O stations with IP20 protection, can be networked via PROFINET IO
- Free selection of PROFINET connection system using bus adapters (BA 2xRJ45 or BA 2xFC)
- Up to 64 I/O modules (digital/analog); up to 1024 signals
- Compact, rugged, and easy-to-service design with permanent wiring:
  - Shielded backplane bus, designed as module rack using BaseUnits
  - Push-in terminals for quick, one-handed wiring without the use of tools
  - Excellent accessibility of terminals arranged in rows
  - I/O module and terminal box can be replaced during operation (hot swapping)
  - Automatic coding of the I/O modules prevents destruction of the electronics due to faulty equipping
  - Simple retrofitting of modules at the station end without reconfiguration
  - Unambiguous inscription and color concept helps avoid faults
  - Consistent shielding of conductor via terminal box and backplane bus to the PROFINET cable
  - Low space requirement allows high packing density in the control cabinet
- Significant system functions
  - Self-assembling potential groups without external wiring or jumpers
  - Individual load groups can be formed without extra power modules
  - Partial commissioning: Tolerating of gaps in the design through reservation of slots for further configuration
  - Electronic rating plate (I&M data 0...3)
  - Extensive diagnostics, channel-specific

Design
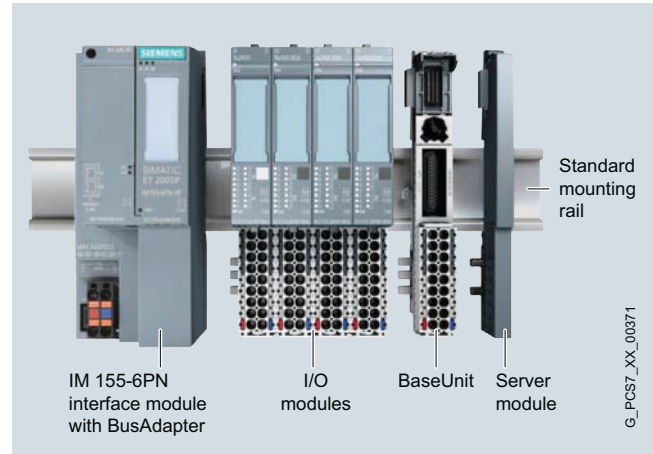
ET 200SP for SIMATIC PCS 7, design

Main components of the SIMATIC ET 200SP distributed I/O system

- IM 155-6PN High Feature interface module with BusAdapter (removable part for definition of connection system: BA 2xRJ45 or BA 2xFC) for communication with the SIMATIC PCS 7 automation system (controller) via PROFINET IO
- I/O modules
  4, 8 or 16 digital channels (DI, DQ, RQ) and 4 analog channels (AI, AQ); up to 64 I/O modules can be plugged in any combination onto passive BaseUnits
- BaseUnits
  Supports for the plug-in I/O modules and the terminal box; for construction of the backplane bus and for the mechanical/ electrical connections
- Server module
  for connection of ET 200SP station
- Standard mounting rail
  for latching-in of interface module, BaseUnits and server module; for installation of ET 200SP station in control cabinet

The extremely compact design allows a high packing density. With a depth of approx. 75 mm, the overall height is e.g.:

- 117 mm with 16 channels and 1-wire connection (without AUX terminals)
- 141 mm with 8 channels and 3-wire connection and AUX terminals

Replaceable bus adapters enable free selection of the PROFINET connection system from the following versions:

- BA 2xRJ45: Connection via standard RJ45 connectors
- BA 2xFC: Large-area shielded connection of bus cables; resistant to vibrations and high EMC loads

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Process I/O
SIMATIC ET 200SP for SIMATIC PCS 7

■ **Design** (continued)

The BaseUnits mounted on a standard rail can already be wired and tested prior to connection of the I/O modules (permanent wiring).

Hot swapping of the I/O modules and terminal boxes plugged onto the BaseUnits is possible. Mechanical coding prevents the use of an incorrect slot and the resulting destruction of the module electronics.

A BU cover is available for reserved, unequipped slots (BaseUnit without I/O module) as protection for the BaseUnit connectors. It can be provided with a reference ID label.

For the connection of cable shields that is both space-saving as well as optimized in terms of EMC, a shield connection is available that is quick and easy to mount. This consists of a shield connection element that can be plugged onto the BaseUnit and a shield terminal.

An inscription and color identification system with the following components facilitates orientation:
- Labeling strips for insertion in interface and I/O modules
- Color-coded labels for cable assignment and identification of the potentials of an I/O module
- Reference ID labels for identification of system components

Installation

Installation of an ET 200SP station is quick and easy:
- Latching-in of interface module, BaseUnits and server module on a standard mounting rail (35x15x7.5 mm or 35x15x15 mm)
- Connection of the cables for the 24 V DC power supply on the interface module
- Plugging-on and screwing tight of the bus adapter
- Prewiring of the 24 V DC power supply and process signal cables on the BaseUnits
- Plugging-on of the I/O modules

The ET 200SP station can be installed in any orientation. However, the first choice is horizontal installation in enclosures or control cabinets.

Configuration limits and guidelines
- Up to 64 I/O modules (digital/analog) with a data volume of up to 1440 bytes; up to 1024 signals
- A light BaseUnit must always be configured as the first BaseUnit of an ET 200SP station.
- The thermal continuous current for the load or encoder supply can be a maximum of 10 A per potential group.
- The I/O modules can be mixed in any manner within a load group.

■ **Technical specifications**

Selected technical specifications of the ET 200SP in the context of SIMATIC PCS 7:

Design	
Degree of protection	IP20
Design	Discretely scalable
Installation	DIN rail (standard mounting rail)
Connection system for sensors/actuators	Single-conductor or multi-conductor connection; push-in terminals
Power supply	
Rated voltage	24 V DC; tolerance range: 19.2 ... 28.8 V DC (static); 18.5 ... 30.2 V DC (dynamic)
Relevant properties	
Safety engineering	No
For use in hazardous areas	Zones 2, 22
Increased availability	No
Temperature range • Horizontal installation • Vertical installation	 0 ... +60 °C [1] 0 ... +50 °C [1]
Resistance to vibration	Up to 1 g with BA 2×RJ45; up to 5 g with BA 2×FC
Electromagnetic compatibility (EMC)	In accordance with NAMUR directive NE21
Communications	
PROFIBUS (Cu/FO)	No/No
PROFINET (Cu/FO)	Yes/No
System functions	
Permanent wiring	Yes
Hot swapping	Yes
Expansion/configuration during ongoing operation	No
Diagnostics (module-dependent)	Channel-discrete

Functions	
Digital channels	Yes
Analog channels	Yes
HART	No
Motor starters	No
Pneumatic interface	No
Technological functions	No
Approvals, standards	
• CE for industrial applications	According to 94/9/EC, 2004/108/EC and 2006/95/EC
• Interference emission	EN 61000-6-4:2007
• Noise immunity	EN 61000-6-2:2005
• ATEX in accordance with EN 60079-15 and EN 60079-0	II 3 G Ex nA IIC Tx Gc DEKRA 12ATEX0038X
• IECEx in accordance with EN 60079-15 and EN 60079-0	Ex nA IIC Tx Gc IECEx DEK 13.0011X
• AS/NZS for Australia and New Zealand	AS/NZS CISPR 16
• cULus in accordance with UL 508, CSA C22.2 No. 142 and No. 213, ANSI/ISA 12.12.01	Class I, Division 2, Groups A, B, C, D, Tx Class I, Zone 2, Group IIC Tx
• PROFIBUS	IEC 61784-1:2010 Ed3 CP 3/1
• IEC	IEC 61131-2
• CE	According to 94/9/EC, 2004/108/EC and 2006/95/EC
• KCC	Korean Certification KCC-REM-S49-ET200SP
• Shipbuilding approval	Classification companies • ABS (American Bureau of Shipping) • BV (Bureau Veritas) • DNV (Det Norske Veritas) • GL (Germanischer Lloyd) • LRS (Lloyds Register of Shipping) • Class NK (Nippon Kaiji Kyokai)

[1] Also available in SIPLUS version for extended temperature range (up to -40 … +70 °C) and corrosive atmosphere/condensation (for details, see www.siemens.com/siplus and in the Catalog ST 70).

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■ **Technical specifications** (continued)

For detailed technical specifications, especially on individual components such as interface module, BaseUnits or I/O modules, see:

- Catalog ST 70, Section "SIMATIC ET 200 Distributed I/O" - "ET 200SP"
- Industry Mall/CA 01 under "Automation engineering - Automation systems - SIMATIC industrial automation systems - SIMATIC ET 200 Distributed I/O" - "ET 200 systems for control cabinets" – "ET 200SP"
- SIMATIC ET 200SP system manual

■ **More information**

General information

www.siemens.com/et200sp

TIA Selection Tool

Note:

Please note when working with the TIA Selection Tool that the applications and product range of ET 200SP are limited in the context of SIMATIC PCS 7!

www.siemens.com/tia-selection-tool

Brochures

Information material for downloading can be found on the Internet:

www.siemens.com/simatic/printmaterial

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Process I/O
SIMATIC ET 200SP for SIMATIC PCS 7

Interface modules and BusAdapters

■ Overview

IM 155-6PN High Feature interface module, with reference ID label

IM 155-6PN HF interface module (High Feature)

- Interface module for linking the ET 200SP station to PROFINET IO
- 24 V DC supply for interface module and backplane bus
- Integrated 2-port switch for line configuration
- Handling of complete data transfer with the controller
- Data exchange with the I/O modules via the backplane bus
- Support of identification data I&M0 to I&M4
- Delivery including server module
- Bus adapters for individual selection of the PROFINET IO connection system can be ordered separately

BusAdapter BA 2xRJ45

BusAdapter BA 2xFC

BusAdapter (BA)

A bus adapter can be used to adapt the universal PROFINET IO interface of the interface module to the specific requirements of the environment of use. The following bus adapters are available:

- **BA 2xRJ45**
  with two sockets for commercially available RJ45 plugs; suitable for standard applications with moderate mechanical and EMC loading

- **BA 2xFC**
  with two FastConnect terminals for direct connection of the bus cables; suitable for applications with higher mechanical and/or EMC loading (5-times higher loading through vibrations and EMC interferences)

It is only necessary to replace the bus adapter if a connection socket is faulty or when subsequently changing the connection system.

■ Design

The IM 155-6PN High Feature interface module is snapped directly onto the standard mounting rail.

Device features:

- Diagnostics displays for errors (ERROR and MAINT), operation (RUN) and power supply (PWR) as well as 1 link LED per port
- Optional inscription with labeling strips (light gray), available as:
  - Foil and roll with 500 strips, for thermal transfer roll printer
  - DIN A4 paper sheet (280 g/m^2) with 100 strips each, for laser printer
- Optional equipping with a reference ID label

The selected bus adapter is simply plugged onto the interface module and secured with a screw. It can be equipped with a reference ID label.

■ Ordering data

	Article No.
IM 155-6PN High Feature interface module including server module, without bus adapter	**6ES7155-6AU00-0CN0**
Accessories	
BusAdapter BA 2xRJ45	**6ES7193-6AR00-0AA0**
BusAdapter BA 2xFC	**6ES7193-6AF00-0AA0**
Reference ID labels 10 sheets of 16 labels	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips DIN A4, light gray	**6ES7193-6LA10-0AA0**
IE FC RJ45 plugs RJ45 plug connector for Industrial Ethernet with a rugged metal enclosure and integrated insulation displacement contacts for connecting Industrial Ethernet FC installation cables	
• IE FC RJ45 Plug 180, 180° cable outlet	
- 1 unit	**6GK1901-1BB10-2AA0**
- 10 units	**6GK1901-1BB10-2AB0**
- 50 units	**6GK1901-1BB10-2AE0**
DIN rail 35 mm	
• Length: 483 mm for 19" cabinets	**6ES5710-8MA11**
• Length: 530 mm for 600 mm cabinets	**6ES5710-8MA21**
• Length: 830 mm for 900 mm cabinets	**6ES5710-8MA31**
• 2 m long	**6ES5710-8MA41**
Spare parts	
Server module	**6ES7193-6PA00-0AA0**
Power supply connector for interface module For 24 V DC supply	
• with push-in terminals (10 units)	**6ES7193-4JB00-0AA0**
• with screw-type terminals (10 units)	**6ES7193-4JB50-0AA0**

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Process I/O
SIMATIC ET 200SP for SIMATIC PCS 7

BaseUnits and I/O modules

■ Overview

BaseUnits

- Type A0 BaseUnits with 16 process terminals
  - Terminal box light
  - Terminal box light, with 10 additional AUX terminals (internally jumpered)
  - Terminal box dark
  - Terminal box dark, with 10 additional AUX terminals (internally jumpered)
- Type A1 BaseUnits for analog modules for temperature detection with 16 process terminals
  - Terminal box light
  - Terminal box light, with 2 x 5 internally jumpered additional terminals
  - Terminal box dark
  - Terminal box dark, with 2 x 5 internally jumpered additional terminals
- Type B0 BaseUnit for digital output module with relays, terminal box dark; 12 process terminals and 4 internally jumpered AUX terminals

I/O modules

- Digital I/O modules
  - Digital input modules, 8 or 16 channels
  - Digital output modules, 4, 8 or 16 channels, including relay module
- Analog I/O modules
  - Analog input modules, 4 channels
  - Analog output module, 4 channels

Supplementary material

- BU cover
- Labeling strips
- Reference ID labels
- Color-coding labels
- Shield connection

■ Design

ET 200SP BaseUnit

BaseUnits

The I/O modules are plugged onto BaseUnits (BU). All BaseUnit versions are suitable for this which correspond to the BU type (A0/A1/B0) of the selected I/O module.

The BaseUnits provide electrical and mechanical connections between the I/O modules. To this end, the BaseUnits are mounted on a standard rail and latched into each other from the side.

The module slot also has a position for a coding element. The coding element defines the type of I/O module when the latter is inserted for the first time, and prevents connection of a different type of module.

Each BaseUnit has a replaceable terminal box. In addition to the process terminals, this has two terminals (L+ and M) for the 24 V DC supply for the I/O modules and sensors. The plug-in terminals are designed to be space-saving and easy to fit.

BaseUnits are available with light or dark terminal boxes. BaseUnits with a light terminal block (light BUs) separate the self-assembling voltage buses (P1, P2, and AUX) from the adjacent module on the left and thus open up a new load group. The 24 V DC supply for the I/O modules and sensors of this load group (max. thermal continuous load 10 A) is connected to P1 (+) and P2 (-) via the terminals at the bottom with red and blue spring NC contacts. The first BaseUnit next to the interface module must always be a light BU.

BaseUnits with dark terminal box (dark BUs) are connected onto the right of a light BU. Contrary to the light BUs, they link the voltage buses P1, P2 and AUX to the adjacent module on the left and thus extend the voltage group. A new power supply is therefore only necessary at the next light BU.

Certain BaseUnits additionally have internally jumpered AUX terminals. Potentials of up to 24 V DC or protective earth (PE) conductors can be connected to the AUX rails.

The BaseUnits of type A1 which can be connected to analog modules for temperature detection enable recording of the terminal temperature using an integrated sensor for automatic temperature compensation, e.g. when connecting thermocouples. These BaseUnits are also available with 2 x 5 additional terminals (internally jumpered).

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■ Design (continued)

Supplementary material for I/O modules and BaseUnits

BU cover

Unequipped BaseUnit slots reserved for later use can be protected by a BU cover. A 15 or 20 mm wide BU cover must be selected depending on the type of BaseUnit. It can be provided with a reference ID label.

Labeling strips

Appropriate light gray labeling strips for insertion in I/O modules are available in two different materials:

- Foil and roll with 500 strips, for thermal transfer roll printer
- DIN A4 paper sheet (280 g/m^2) with 100 strips each, for laser printer

Reference ID labels

The reference ID labels delivered as a package comprising 10 sheets with 16 strips each are used to identify bus adapters and BaseUnits as well as interface and I/O modules. The labels suitable for printing with commercially available thermal transfer printers can be simply inserted into the corresponding module.

Color-coding labels

To prevent wiring faults, the potentials at the terminals of the BaseUnits can be coded using color-coded labels. The color-coded labels are simply attached to the terminal box. The following versions are available:

- Module-specific color-coded labels for process terminals. Selection is made depending on the color code (CCxx) printed on the front of the I/O module. The color code CC00 means that a color-coded label is not available for the process terminals of this I/O module.
- Color-coded labels for the 10 AUX terminals of BaseUnit type A0 in red, blue, and yellow/green.
- Color-coded labels for the 2 x 5 additional terminals of the BaseUnit type A1 in red/blue.
- Color-coded labels for the 4 AUX terminals of BaseUnits type B0 in red, blue, and yellow/green.

Shield connection

A shield connection that is quick and easy to mount, comprising a shield connection element (can be plugged into the BaseUnit) and a shield terminal, permit the connection of cable shields that is both space-saving as well as optimized in terms of EMC. The shielded cable is fixed to the shield connecting element by means of the shield terminal. The low-impedance connection to the functional ground (standard mounting rail) does not require any additional wiring by the user.

The shield connection is delivered as a package with 5 shield connection elements and 5 shield terminals.

■ Ordering data

Refer to the I/O modules for ordering data of the BaseUnits, page 11/80 and page 11/82

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Process I/O
SIMATIC ET 200SP for SIMATIC PCS 7

Digital I/O modules

Overview

ET 200SP I/O module

- Can be plugged into type A0 BaseUnits (BU) with automatic coding
- LED display for error, operation, power, and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
  - Color code CC for module-specific color coding of the potentials at the BU terminals
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code CC

Design

Digital input modules

- 8 or 16 channels
- Color coding of the module type DI: White
- Usable types:
  - DI 8x24 V DC Standard for BU type A0, color code CC01
  - DI 8x24 V DC High Feature for BU type A0, color code CC01
  - DI 16x24 V DC Standard for BU type A0, color code CC00

Digital output modules

- 4, 8 or 16 channels
- Color coding of module types DQ and RQ: Black
- Usable types:
  - DQ 4x24VDC/ 2A Standard for BU type A0, color code CC02
  - DQ 8x24 V DC / 0.5A Standard for BU type A0, color code CC02
  - DQ 8x24 V DC / 0.5A High Feature for BU type A0, color code CC02
  - DQ 16x24 V DC / 0.5A Standard for BU type A0, color code CC00
  - RQ NO 4x120 V DC - 230 V AC / 5A Standard, BU type B0, color code CC00

Ordering data

	Article No.
Digital input modules	
Digital input modules	
• DI 8x24 V DC Standard, BU type A0, color code CC01	**6ES7131-6BF00-0BA0**
• DI 16x24 V DC Standard, BU type A0, color code CC00	**6ES7131-6BH00-0BA0**
• DI 8x24 V DC High Feature, BU type A0, color code CC01	**6ES7131-6BF00-0CA0**
Usable BaseUnits	
BU15-P16+A0+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA0**
BU15-P16+A0+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals to the module; for continuing the load group	**6ES7193-6BP00-0BA0**
BU15-P16+A10+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for starting a new load group (max. 10 A)	**6ES7193-6BP20-0DA0**
BU15-P16+A10+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for continuing the load group	**6ES7193-6BP20-0BA0**
Accessories	
Reference ID labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips DIN A4, light gray	**6ES7193-6LA10-0AA0**
BU cover for covering empty slots (gaps), 15 mm wide; 5 units	**6ES7133-6CV15-1AM0**
Shield connection Pack with 5 shield supports and 5 shield terminals	**6ES7193-6SC00-1AM0**
Color-coded labels, 15 mm wide	
• Color code CC01, module-specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units	**6ES7193-6CP01-2MA0**
• Color code CC71, for 10 AUX terminals 1A to 10A, yellow/green; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP71-2AA0**
• Color code CC72, for 10 AUX terminals 1A to 10A, red; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP72-2AA0**
• Color code CC73, for 10 AUX terminals 1A to 10A, blue; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP73-2AA0**

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■ Ordering data

Digital output modules

	Article No.
Digital output modules	
• DQ 4x24VDC/2A Standard, BU type A0, color code CC02	**6ES7132-6BD20-0BA0**
• DQ 8x24VDC/0.5A Standard, BU type A0, color code CC02	**6ES7132-6BF00-0BA0**
• DQ 8x24 V DC/0.5 A High Feature, BU type A0, color code CC02	**6ES7132-6BF00-0CA0**
• DQ 16x24 V DC/0.5 A Standard, BU type A0, color code CC00	**6ES7132-6BH00-0BA0**
• Relay module RQ NO 4x120 V DC - 230 V AC/5A Standard, normally-open, BU type B0, color code CC00	**6ES7132-6HD00-0BB0**
Usable BaseUnits	
BU15-P16+A0+2D	**6ES7193-6BP00-0DA0**
BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals to the module; for starting a new load group (max. 10 A)	
BU15-P16+A0+2B	**6ES7193-6BP00-0BA0**
BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals to the module; for continuing the load group	
BU15-P16+A10+2D	**6ES7193-6BP20-0DA0**
BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for starting a new load group (max. 10 A)	
BU15-P16+A10+2B	**6ES7193-6BP20-0BA0**
BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for continuing the load group	
BU20-P12+A4+0B	**6ES7193-6BP20-0BB0**
BU type B0; BaseUnit (dark), 20 mm wide, with 12 process terminals (1...12) to the module and an additional 4 internally jumpered AUX terminals (1A to 4A); for continuing the load group	

	Article No.
Accessories	
Reference ID labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips DIN A4, light gray	**6ES7193-6LA10-0AA0**
BU cover for covering empty slots (gaps); 5 units	
• 15 mm wide	**6ES7133-6CV15-1AM0**
• 20 mm wide	**6ES7133-6CV20-1AM0**
Shield connection Pack with 5 shield supports and 5 shield terminals	**6ES7193-6SC00-1AM0**
Color-coding labels	
• 15 mm wide	
- Color code CC02, for 16 push-in terminals; for BU type A0, A1; terminals 1 to 8 gray, terminals 9 to 16 blue, 10 units	**6ES7193-6CP02-2MA0**
- Color code CC71, for 10 AUX terminals 1A to 10A, yellow/green; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP71-2AA0**
- Color code CC72, for 10 AUX terminals 1A to 10A, red; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP72-2AA0**
- Color code CC73, for 10 AUX terminals 1A to 10A, blue; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP73-2AA0**
• 20 mm wide	
- Color code CC81, for 4 AUX terminals 1A to 4A, yellow/green, for BU type B0; 10 units	**6ES7193-6CP81-2AB0**
- Color code CC82, for 4 AUX terminals 1A to 4A, red, for BU type B0; 10 units	**6ES7193-6CP82-2AB0**
- Color code CC83, for 4 AUX terminals 1A to 4A, blue, for BU type B0; 10 units	**6ES7193-6CP83-2AB0**

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Process I/O
SIMATIC ET 200SP for SIMATIC PCS 7

Analog I/O modules

◾ Overview

ET 200SP I/O module

- Can be plugged into type A0 or A1 BaseUnits (BU) with automatic coding
- LED display for error, operation, power, and status
- Clear labeling on front of module
  - Plain text identification of the module type and function class
  - 2D matrix code (article and serial number)
  - Connection diagram
  - Hardware and firmware version
  - Color code CC for module-specific color coding of the potentials at the terminals of the BU
  - Complete Article No.
- Optional labeling accessories
  - Labeling strips
  - Reference identification label
- Optional module-specific color identification of the terminals according to the color code CC

◾ Design

Analog input modules

- Color coding of the module type AI: Light blue
- Usable types:
  - AI 4xU/I 2-wire Standard for BU type A0 or A1, color code CC03
  - AI 4xI 2-, 4-wire Standard for BU type A0 or A1, color code CC03
  - AI RTD/TC 2-, 3-, 4-wire High Feature for BU type A0 or A1, color code CC00
  - AI Energy Meter Standard for BU type D0, color code CC00

Analog output modules

- Color coding of the module type AQ: Dark blue
- Usable types:
  - AQ 4xU/I Standard for BU type A0 or A1, color code CC00

◾ Ordering data

Analog input modules

	Article No.
Analog input modules	
• AI 4xU/I 2-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	**6ES7134-6HD00-0BA1**
• AI 4xI 2-, 4-wire Standard, BU type A0 or A1, color code CC03, 16 bit, ± 0.3%	**6ES7134-6GD00-0BA1**
• AI 4xRTD/TC 2-, 3-, 4-wire High Feature BU type A0 or A1, color code CC00, 16 bit, ± 0.1%	**6ES7134-6JD00-0CA1**
• AI Energy Meter Standard, BU type D0, color code CC00	**6ES7134-6PA00-0BD0**
Usable type A0 BaseUnits	
BU15-P16+A0+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA0**
BU15-P16+A0+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals to the module; for continuing the load group	**6ES7193-6BP00-0BA0**
BU15-P16+A10+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for starting a new load group (max. 10 A)	**6ES7193-6BP20-0DA0**
BU15-P16+A10+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for continuing the load group	**6ES7193-6BP20-0BA0**
Usable type A1 BaseUnits (temperature detection)	
BU15-P16+A0+2D/T BU type A1; BaseUnit (light), 15 mm wide, with 16 process terminals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA1**
BU15-P16+A0+2B/T BU type A1; BaseUnit (dark), 15 mm wide, with 16 process terminals to the module; for continuing the load group	**6ES7193-6BP00-0BA1**
BU15-P16+A0+12D/T BU type A1; BaseUnit (light), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 2 x 5 internally jumpered additional terminals (1B to 5B and 1C to 5C); for starting a new load group (max. 10 A)	**6ES7193-6BP40-0DA1**
BU15-P16+A0+12B/T BU type A1; BaseUnit (dark), 15 mm wide, with 16 process terminals (1...16) to the module and an additional 2 x 5 internally jumpered additional terminals (1B to 5B and 1C to 5C); for continuing the load group	**6ES7193-6BP40-0BA1**
Usable type D0 BaseUnits	
BU20-P12+A0+0B BU type D0; BaseUnit with 12 push-in terminals, without AUX terminals, bridged to the left	**6ES7193-6BP00-0BD0**

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■ Ordering data

	Article No.
Accessories	
Reference ID labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips DIN A4, light gray	**6ES7193-6LA10-0AA0**
BU cover for covering empty slots (gaps), 15 mm wide; 5 units	
Shield connection Pack with 5 shield supports and 5 shield terminals	**6ES7193-6SC00-1AM0**
Color-coded labels, 15 mm wide	
• Color code CC03, module- specific, for 16 push-in terminals; for BaseUnit type A0, A1; 10 units	**6ES7193-6CP03-2MA0**
• Color code CC71, for 10 AUX terminals 1A to 10A, yellow/green; for BU type A0 with push-in termi- nals; 10 units	**6ES7193-6CP71-2AA0**
• Color code CC72, for 10 AUX terminals 1A to 10A, red; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP72-2AA0**
• Color code CC73, for 10 AUX terminals 1A to 10A, blue; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP73-2AA0**
• Color code CC74, for 2 x 5 additional terminals, 5 x red, 5 x blue; for BU type A1, with push-in terminals; 10 units	**6ES7193-6CP74-2AA0**

Analog output modules

	Article No.
Analog output modules	
• AQ 4xU/I Standard, BU type A0 or A1, color code CC00, 16 bit, ± 0.3%	**6ES7135-6HD00-0BA1**
Usable type A0 BaseUnits	
BU15-P16+A0+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process termi- nals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA0**
BU15-P16+A0+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process termi- nals to the module; for continuing the load group	**6ES7193-6BP00-0BA0**
BU15-P16+A10+2D BU type A0; BaseUnit (light), 15 mm wide, with 16 process termi- nals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for starting a new load group (max. 10 A)	**6ES7193-6BP20-0DA0**
BU15-P16+A10+2B BU type A0; BaseUnit (dark), 15 mm wide, with 16 process termi- nals (1...16) to the module and an additional 10 internally jumpered AUX terminals (1A to 10 A); for con- tinuing the load group	**6ES7193-6BP20-0BA0**

	Article No.
Usable type A1 BaseUnits **(temperature detection)**	
BU15-P16+A0+2D/T BU type A1; BaseUnit (light), 15 mm wide, with 16 process termi- nals to the module; for starting a new load group (max. 10 A)	**6ES7193-6BP00-0DA1**
BU15-P16+A0+2B/T BU type A1; BaseUnit (dark), 15 mm wide, with 16 process termi- nals to the module; for continuing the load group	**6ES7193-6BP00-0BA1**
BU15-P16+A0+12D/T BU type A1; BaseUnit (light), 15 mm wide, with 16 process termi- nals (1...16) to the module and an additional 2 x 5 internally jumpered additional terminals (1B to 5B and 1C to 5C); for starting a new load group (max. 10 A)	**6ES7193-6BP40-0DA1**
BU15-P16+A0+12B/T BU type A1; BaseUnit (dark), 15 mm wide, with 16 process termi- nals (1...16) to the module and an additional 2 x 5 internally jumpered additional terminals (1B to 5B and 1C to 5C); for continuing the load group	**6ES7193-6BP40-0BA1**
Accessories	
Reference ID labels 10 sheets with 16 strips each	**6ES7193-6LF30-0AW0**
Labeling strips	
• 500 labeling strips on roll, light gray	**6ES7193-6LR10-0AA0**
• 1 000 labeling strips DIN A4, light gray	**6ES7193-6LA10-0AA0**
BU cover for covering empty slots (gaps), 15 mm wide; 5 units	
Shield connection Pack with 5 shield supports and 5 shield terminals	**6ES7193-6SC00-1AM0**
Color-coded labels, 15 mm wide	
• Color code CC71, for 10 AUX terminals 1A to 10A, yellow/green; for BU type A0 with push-in termi- nals; 10 units	**6ES7193-6CP71-2AA0**
• Color code CC72, for 10 AUX terminals 1A to 10A, red; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP72-2AA0**
• Color code CC73, for 10 AUX terminals 1A to 10A, blue; for BU type A0 with push-in terminals; 10 units	**6ES7193-6CP73-2AA0**
• Color code CC74, for 2 x 5 additional terminals, 5 x red, 5 x blue; for BU type A1, with push-in terminals; 10 units	**6ES7193-6CP74-2AA0**

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Process I/O
SIMATIC ET 200pro for SIMATIC PCS 7

■ Overview

SIMATIC ET 200pro is a modular I/O system with high IP65/66/67 protection suitable for use at machine level outside the control cabinet. As a result of the innovative design, the ET 200pro has a relatively small size and can be flexibly adapted to the requirements of the respective automation task with regard to the connection system and I/Os. Summary of the most important features of the SIMATIC ET 200pro:

- Distributed I/O system with IP65/67 protection for use without a control cabinet at machine level
- Small, multi-functional complete solution: analog and digital I/O modules as well as safety-related digital I/O modules
- Communication over PROFIBUS DP, transmission rate up to 12 Mbit/s
- Mixed arrangement of safety-oriented and standard modules in the same station possible
- Free selection of connection system: direct, ECOFAST or M12 7/8"
- Power module for simple implementation of load groups
- Hot swapping of modules
- Simple assembly and independent wiring
- Comprehensive diagnostics: exact to the module or channel

■ Design

The architecture of the ET 200pro is based on the proven separation of modules from the bus/power supply connection system. This permits the T functionality for bus and 24 V DC power supply for the interface module, and prewiring of sensor/actuator connections for the electronics modules (independent wiring). When servicing, the independent wiring permits hot swapping of an electronics module without having to switch off the remaining station. This can continue without interruption during the replacement. When replacing an electronics module, the complete I/O wiring remains on the connection module, and need be neither labeled nor removed.

Up to 16 electronics modules can be arranged in any order between the interface module (left) and the terminating module (right limit).

Modules of an ET 200pro station

The ET 200pro modules are usually designed in two or three parts. Interface and power modules as well as digital and analog electronics modules comprise:

- Bus module as mechanical and electrical connection element of the individual ET 200pro modules (they form the backplane bus of the system)
- Electronics or interface module
- Connection module

The ET 200pro modules are fitted when delivered on the associated bus module.

An ET 200pro station comprises:
- Module support
- Interface module for PROFIBUS DP
- Connection module for the PROFIBUS DP interface module
  - CM IM DP direct with up to 6 M20 cable glands
  - CM IM DP ECOFAST Cu
  - CM IM DP M12 7/8"
- Max. 16 electronics modules with associated connection modules which may be assembled up to a station width of 1 m
- Terminating module (included in scope of delivery of interface module)

Expansion modules

The following expansion modules are available:
- Digital electronics modules
- Analog electronics modules
- Safety-related electronics modules
- I/O connection modules
  - CM IO 4 x M12 for digital or analog electronics modules
  - CM IO 8 x M12 for digital electronics modules
  - CM IO 12 x M12 for 4/8 F-DI/4 F-DO
  - CM IO 16 x M12 for 8/16 F-DI
- Power module electronics PM-E
- Connection modules for power module
  - CM PM-E direct with up to 2 M20 cable glands
  - CM PM-E ECOFAST Cu
  - CM PM-E 7/8"

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■ Design (continued)

Module support

Various module fervsupports are available for mounting the ET 200pro:

- Narrow module support
  The narrow module support permits complete preassembly on a workbench as a result of two mounting flanges outside the ET 200pro station.

- Compact-narrow module support
  The compact-narrow module support permits the most space-saving design.

Expansion limits

- Number of electronics modules per station (between interface module and terminating module): up to 16
- Max. width (without module support): 1 m
- Electronics/sensor supply 1L+ max. 5 A per ET 200pro station
- Load voltage supply 2L+ max. 10 A per potential group
- Maximum address range of an ET 200pro station: 244 bytes for inputs and 244 bytes for outputs

ET 200pro configuration

The SIMATIC ET 200 configurator can be used to compile an ET 200pro station quickly and simply. It knows the configuration rules, and supports selection of all components and associated accessories in interactive mode. The SIMATIC ET 200 is available in the current Catalog CA 01 and on the Internet:

www.siemens.com/et200

■ Integration

The distributed ET 200pro system is connected to SIMATIC PCS 7 automation systems (controllers) over PROFIBUS DP. Data transfer rates of up to 12 Mbit/s are possible.

The ET 200pro is integrated into SIMATIC PCS 7 using standard driver blocks. You can therefore configure and parameterize the ET 200pro in the SIMATIC Manager of the engineering system extremely simply using HW-Config.

■ Technical specifications

General technical specifications	
Electronics modules	• Digital inputs/outputs • Analog inputs/outputs • Safety-related digital inputs/outputs
Connection system for actuator/sensor	M12 round plug connection with standard assignments for actuator/sensor
Data transfer rate, max.	12 Mbit/s (PROFIBUS DP)
Supply voltage	24 V DC
Current consumption of an ET 200pro (internal and sensor supply, non-switched voltage), up to 55 °C, max.	≤ 5 A
Load current for ET 200pro per incoming supply (IM, PM, switched voltage), up to 55 °C, max.	10 A
For total configuration with looping through (several ET 200pro), up to 55 °C, max.	16 A (with direct connection module)
Degree of protection	IP65/66/IP67 for interface, digital and analog modules
Material	Thermoplast (glass-fiber reinforced)
Ambient conditions	
Temperature	0 ... 55 °C (-25 °C on request)
Relative humidity	5 ... 100 %
Atmospheric pressure	795 ... 1 080 hPa
Mechanical stress	
Vibrations	Vibration test according to IEC 60068, Part 2-6 (sinusoidal) • Constant acceleration 5 g, occasionally 10 g, for interface, digital and analog modules • 2 g for motor starters
Shock	• Shock test according to IEC 680068 Part 2-27, half-sine, 30 g, 18 ms duration, for interface, digital and analog modules • 15 g, 11 ms duration for motor starters
Approvals	UL, CSA and cULus

For detailed technical specifications, especially for individual components such as interface module, power module and electronics modules, see:

- ST 70 catalog, section "SIMATIC ET 200 Distributed I/O"
- Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 Distributed I/O"

Process I/O
SIMATIC ET 200pro for SIMATIC PCS 7

IM 154-2 DP High Feature interface module

Overview

The IM 154-2 DP High Feature interface module is responsible for PROFIBUS communication between the ET 200pro station and the host automation system (controller) as PROFIBUS DP master. The scope of delivery of the interface module also includes a terminating module which is plugged in following the last electronics module of the station.

Function

Features of the IM 154-2 DP High Feature interface module
- Mounted on delivery on the bus module
- Connects the ET 200pro station to the PROFIBUS DP via the connection module
- Prepares the data for the connected electronics modules
- Max. 16 electronics modules can be operated on an interface module - also safety-related
- PROFIBUS DP address of the ET 200pro station can be set on the connection module
- Terminating resistor of the PROFIBUS DP can be switched on and off on the connection module
- Maximum address range: 244 bytes for inputs and 244 bytes for outputs
- Powers the ET 200pro station via the connection module with the sensor/electronics supply 1L+ and the load power supply 2L+
- Integral power module for the load power supply 2L+
- Can be operated as DP-V1 slave on Y link

Ordering data

	Article No.
IM154-2 High Feature interface module for ET 200pro; for communication between ET 200pro and host masters over PROFIBUS DP; support of PROFIsafe	**6ES7154-2AA01-0AB0**
Connection module for IM154-2 High Feature interface module	
• CM IM DP ECOFAST connection module for connection of PROFIBUS DP and 24 V DC power supply to PROFIBUS interface modules, 2 ECOFAST Cu connections	**6ES7194-4AA00-0AA0**
• CM IM DP direct connection module for direct connection of PROFIBUS DP and 24 V DC power supply to PROFIBUS interface modules, up to six M20 cable glands	**6ES7194-4AC00-0AA0**
• CM IM DP M12 7/8" connection module for connection of PROFIBUS DP and 24 V DC power supply to PROFIBUS interface modules, 2 x M12 and 2 x 7/8"	**6ES7194-4AD00-0AA0**
Cables and further accessories	
For cables and further accessories for CM IM DP ECOFAST, CM IM DP direct and CM IM DP M12 7/8" connection modules, see Catalog ST 70 or Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"	
General accessories	
ET 200pro module support	
• Narrow, for interface, electronics and power modules	
- 500 mm	**6ES7194-4GA00-0AA0**
- 1 000 mm	**6ES7194-4GA60-0AA0**
- 2 000 mm, can be cut to length	**6ES7194-4GA20-0AA0**
• Compact-narrow, for interface, electronics and power modules	
- 500 mm	**6ES7194-4GC70-0AA0**
- 1 000 mm	**6ES7194-4GC60-0AA0**
- 2 000 mm, can be cut to length	**6ES7194-4GC20-0AA0**
Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack	**6ES7194-4HB00-0AA0**

Accessories

Connection modules

The connection module for the IM 154-2 DP High Feature interface module (to be ordered separately) is available in three different connection versions:
- CM IM DP direct
- CM IM DP ECOFAST Cu
- CM IM DP M12 7/8"

The PROFIBUS address can be set on the connection module per DIL switch. The segmenting terminating resistor can be connected using a further DIL switch.

Overview

The following digital electronics modules can be used for connecting actuators/sensors in the context of SIMATIC PCS 7:

Digital input modules

- EM 8 DI DC 24 V High Feature
  - Digital electronics module with eight inputs
  - Suitable for standard switches and proximity switches (BEROs)
  - Rated input voltage 24 V DC
  - Diagnostics "Short-circuit of sensor supply to ground" per channel
  - Diagnostics "Open-circuit" per channel
  - Process alarm
  - Parameterizable input delay

Digital output modules

- EM 4 DO DC 24 V; 2 High Feature
  - Digital electronics module with four outputs
  - Suitable for solenoid valves, DC contactors and indicator lights
  - Output current 2 A per output
  - Rated load voltage 24 V DC
  - Diagnostics "Short-circuit of outputs to ground" per channel
  - Diagnostics "Short-circuit of outputs to P" per channel
  - Diagnostics "Open-circuit in outputs" per channel
  - Diagnostics "Load voltage missing" per module
  - Parameterizable substitute value

Ordering data

Digital electronics modules	
Digital input modules	
Digital input module 8 DI High Feature 24 V DC, with channel diagnostics, including bus module. Connection module must be ordered separately	**6ES7141-4BF00-0AB0**
Digital output modules	
Digital output module 4 DO High Feature 24 V DC, 2 A, with channel diagnostics, including bus module. Connection module must be ordered separately	**6ES7142-4BD00-0AB0**
Accessories	
Connection module CM IO 4 x M12 4 M12 sockets for connecting digital or analog sensors/actuators to ET 200pro	**6ES7194-4CA00-0AA0**
Connection module CM IO 8 x M12 8 M12 sockets for connecting digital sensors/actuators to ET 200pro	**6ES7194-4CB00-0AA0**
Module labels for color-coded identification of the CM IOs in white, red, blue and green; pack with 100 units of each color	**6ES7194-4HA00-0AA0**
Further accessories	
For plugs, cables and further accessories, see Catalog ST 70 or Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"	

Accessories

Connection modules

Actuators and sensors are connected using commercially-available 5-contact M12 plugs on the connection module. The connection module is plugged onto the electronics module, and screwed to the latter. The following connection modules (to be ordered separately) are available for the above-mentioned electronics modules:

- CM IO 4x M12 (for EM DI and EM DO)
- CM IO 8x M12 (for EM DI)

Depending on the selected connection module, each plug for the 8-channel digital input module has one or two channels:

- 4 x M12 round plug connections with 2 channels per plug (double assignment)
- 8 x M12 round plug connections with 1 channel per plug (single assignment)

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Process I/O
SIMATIC ET 200pro for SIMATIC PCS 7

Analog electronics modules EM 144, EM 145

■ **Overview**

The following analog electronics modules can be used for connecting actuators/sensors in the context of SIMATIC PCS 7:

Analog input modules

EM 4 AI U High Feature

- 4 inputs for voltage measurements
- Input ranges:
  - ± 10 V, resolution 15 bit + sign
  - ± 5 V, resolution 15 bit + sign
  - 0 to 10 V, resolution 15 bit
  - 1 to 5 V, resolution 15 bit
- Electrically isolated from load voltage 2L+
- Diagnostics "Short-circuit of sensor supply to M" per module
- Diagnostics "Short-circuit, open-circuit" per channel (depending on measuring range)
- Hardware interrupt with limit violation on channel 0
- Permissible common mode voltage 5 V AC pp

EM 4 AI I High Feature

- 4 inputs for current measurements
- Input ranges:
  - ± 20 mA, resolution 15 bit + sign
  - 0 to 20 mA, resolution 15 bit
  - 4 to 20 mA, resolution 15 bit
- Two-wire and four-wire transmitters can be connected
- Electrically isolated from load voltage 2L+
- Diagnostics "Short-circuit of sensor supply to M" per module
- Diagnostics "Short-circuit, open-circuit" per channel (depending on measuring range)
- Hardware interrupt with limit violation on channel 0
- Permissible common mode voltage 5 V AC pp

EM 4 AI RTD High Feature

- 4 inputs for isolated (floating) resistance measurements or resistance thermometers with 2-, 3- and 4-wire connections
- Input ranges:
  - Resistance measurement: 150 Ω; 300 Ω; 600 Ω; 3000 Ω; resolution 15 bit
  - Resistance thermometer: Pt100; Ni100; Ni120; Pt200; Ni200; Pt500; Ni500; Pt1000; Ni1000; resolution 15 bit + sign
- Automatic compensation of line resistances with 3-wire and 4-wire connections
- Parameterizable temperature coefficient with resistance-type sensors
- Electrically isolated from load voltage supply 1L+ and 2L+
- Linearization of sensor characteristics
- Diagnostics "Open-circuit" per channel (terminals 1 and 3 are monitored for open-circuit)
- Permissible common mode voltage 10 V AC pp

EM 4 AI TC High Feature

- 4 inputs for isolated/non-isolated thermocouples or voltage measurement; resolution 15 bits + sign
- Input ranges:
  - Voltage measurement ± 80 mV
  - Thermocouples: Type B, E, J, K, L, N, R, S, T
- Inputs are isolated from the encoder voltage supply 1L+ and load voltage supply 2L+
- Linearization of the voltage characteristic (conversion of the thermoelectric voltage to a temperature value)
- Smoothing
- Interference frequency suppression
- Various options to compensate for the reference temperature
- Overflow and underflow diagnostics

Analog output modules

EM 4 AO U High Feature

- 4 outputs for voltage output
- Output ranges:
  - ± 10 V, resolution 15 bits + sign
  - 1 to 5 V, resolution 14 bit
  - 0 to 10 V, resolution 15 bit
- Electrically isolated from sensor supply voltage 1L+
- Diagnostics "Short-circuit of sensor supply to M" per module
- Diagnostics "Open-circuit in outputs" per channel
- Substitute value output

EM 4 AO I High Feature

- 4 outputs for current output
- Output ranges:
  - ± 20 mA, resolution 15 bit + sign
  - 4 to 20 mA, resolution 14 bit
  - 0 to 20 mA, resolution 15 bit
- Electrically isolated from sensor supply voltage 1L+
- Diagnostics "Short-circuit of sensor supply to M" per module
- Diagnostics "Open-circuit" per channel
- Substitute value output

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Ordering data	Article No.
Analog electronics modules	
Analog input modules	
Analog input module 4 AI U High Feature, ±10 V; ±5 V; 0 to 10 V; 1 to 5 V, channel diagnostics, including bus module. The connection module must be ordered separately.	**6ES7144-4FF01-0AB0**
Analog input module 4 AI I High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel diagnostics, including bus module. The connection module must be ordered separately.	**6ES7144-4GF01-0AB0**
Analog input module 4 AI RTD High Feature; resistances: 150, 300, 600 and 3 000 Ohm; resistance thermometers: Pt100, 200, 500, 1000, Ni100, 120, 200, 500 and 1000; channel diagnostics, including bus module. The connection module must be ordered separately.	**6ES7144-4JF00-0AB0**
Analog input module 4 AI TC High Feature; thermocouples: Type B, E, J, K, L, N, R, S, T; voltage measurement ± 80 mV; channel diagnostics, includes bus module. The connection module must be ordered separately.	**6ES7144-4PF00-0AB0**
Analog output modules	
Analog output module 4 AO U High Feature, ±10 V; 0 to 10 V; 1 to 5 V, channel diagnostics, including bus module. The connection module must be ordered separately.	**6ES7145-4FF00-0AB0**
Analog output module 4 AO I High Feature, ±20 mA; 0 to 20 mA; 4 to 20 mA, channel diagnostics, including bus module. The connection module must be ordered separately.	**6ES7145-4GF00-0AB0**
Accessories	
Connection module CM IO 4 x M12 4 M12 sockets for connecting digital or analog sensors/actuators to ET 200pro	**6ES7194-4CA00-0AA0**
Module labels for color-coded identification of the CM IOs (white, red, blue, green); pack with 100 units of each color	**6ES7194-4HA00-0AA0**
Further accessories	
For plugs, cables and further accessories, see Catalog ST 70 or Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"	

Accessories

Connection modules

Actuators and sensors are connected using commercially-available 5-contact M12 plugs on the connection module. The connection module is plugged onto the electronics module, and screwed to the latter. The connection module CM IO 4 x M12 (to be ordered separately) is available for the electronics modules.

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Process I/O
SIMATIC ET 200pro for SIMATIC PCS 7

Safety-related electronics modules

■ Overview

In combination with the safety-related automation systems of the SIMATIC PCS 7 process control system, the safety-related electronics modules of SIMATIC ET 200pro can be used to implement safety applications. The safety-related digital inputs record the signal statuses from safety-related sensors, and generate corresponding safety telegrams for the automation system. Depending on the safety telegrams of the automation system, the safety-related digital outputs trigger safe shut-down procedures. They are also responsible for monitoring short-circuits and cross-circuits up to the actuator. The safe communication with the automation systems is carried out over PROFIBUS with PROFIsafe.

All modules are certified up to SIL 3 (IEC 61508) and Cat. 4 (EN954-1).

■ Design

The following modules are available:

Safety-related digital input module EM 8/16 F-DI PROFIsafe

- 16 inputs (SIL2/Cat.3) or 8 inputs (SIL3/Cat.3 or Cat.4)
- Suitable for standard switches and 3/4-wire proximity switches (BEROs)
- Rated input voltage 24 V DC
- 4 short-circuit-proof sensor supplies for 4 inputs each
- External sensor power supply possible
- Group fault display (SF; red LED)
- Fault display for each sensor power supply (Vs1F to Vs4F) is output on the VsF LED and the associated channels
- Status and fault displays per input (dual-color green/red LED)
- Identification data
- Configurable diagnostics
- Can only be operated in safety mode

Safety-related digital input/output module EM 4/8 F-DI, 4 F-DO 2 A

- Inputs
  - 8 inputs (SIL 2/Cat. 3) or 4 inputs (SIL 3/Cat. 3 or Cat. 4)
  - Suitable for standard switches and 3/4-wire proximity switches (BEROs)
  - Rated input voltage 24 V DC
  - 2 short-circuit-proof sensor supplies for 4 inputs each
  - External sensor power supply possible
- Outputs
  - 4 outputs, current sourcing/sinking
  - Output current 2 A
  - Rated load voltage 24 V DC
  - Suitable for solenoid valves, DC contactors and indicator lights

- Group fault display (SF; red LED)
- Fault display for each sensor power supply (Vs1F to Vs2F) is output on the VsF LED and the associated channels
- Status and fault displays per input/output (dual-color green/red LED)
- Identification data
- Configurable diagnostics
- Achievable safety class SIL 3
- Can only be operated in safety mode

■ Ordering data

	Article No.
Safety-related electronics modules	
Safety-related digital input module	
Safety-related digital input module 8/16 F-DI PROFIsafe 24 V DC, including bus module. Connection module must be ordered separately	**6ES7148-4FA00-0AB0**
Safety-related digital input/output module	
Safety-related digital input/output module 4/8 F-DI, 4 F-DO 2 A 24 V DC, including bus module. Connection module must be ordered separately	**6ES7148-4FC00-0AB0**
Accessories	
Connection module	
• CM IO 16 x M12 for the electronics module 8/16 F-DI, 24 V DC/2 A	**6ES7194-4DD00-0AA0**
• CM IO 12 x M12 for the electronics module 4/8 F-DI/4 F-DO, 24 V DC/2 A	**6ES7194-4DC00-0AA0**
Further accessories	
For plugs, cables and further accessories, see Catalog ST 70 or Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"	

■ Accessories

Connection modules

Actuators and sensors are connected using commercially available 5-pin M12 plugs on the connection module. The connection module is plugged onto the electronics module, and screwed to the latter. One of the following connection modules (to be ordered separately) is required for each of the above-mentioned electronics modules:

- Connection module CM IO 16 x M12 for the electronics module 8/16 F-DI, 24 V DC/2 A
- Connection module CM IO 12 x M12 for the electronics module 4/8 F-DI/4 F-DO, 24 V DC/2 A

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Overview

The power module PM-E DC 24 V is used within an ET 200pro station when generating 24 V DC load voltage groups for electronics modules.

You can position power modules in an ET 200pro station anywhere to the right of the interface module. The first power module is already integrated in the interface module.

Each power module which you install in the ET 200pro station interrupts the load voltage busbar, and opens up a new potential group (common potential) for the load voltage supply 2L+. All subsequent load voltages of the electronics modules are fed from this power module. Each power module has a replaceable fuse for protecting the device. Only line protection according to DIN VDE 0100 need be provided externally in addition.

The electronics/sensor supply 1L+ is not interrupted by the power module, it is looped through.

The power module is fitted on the associated bus module when delivered.

Ordering data

	Article No.
Power module	
Power module PM-E DC 24 V For generating 24 V DC load voltage groups for electronics modules within an ET 200pro station.	6ES7148-4CA00-0AA0
Accessories	
Connection modules for power module	
• Connection module CM PM-E ECOFAST for supply of 24 V DC load voltage, 1 ECOFAST Cu connection	6ES7194-4BA00-0AA0
• Connection module CM PM-E direct for supply of 24 V DC load voltage, up to two M20 cable glands	6ES7194-4BC00-0AA0
• Connection module CM PM-E 7/8" for supply of 24 V DC load voltage, 1 x 7/8"	6ES7194-4BD00-0AA0
Spare fuse 12.5 A fast-blow, for interface and power modules, 10 units per pack	6ES7194-4HB00-0AA0
Further accessories	
For plugs, cables and further accessories, see Catalog ST 70 or Industry Mall/CA 01 under "Automation engineering – Automation systems – SIMATIC industrial automation systems – SIMATIC ET 200 distributed I/O"	

Accessories

Connection module

The connection module for the power module PM-E is used to connect the load voltage 2L+. It is fitted on the power module.

The module must be ordered separately, and is available with the following types of connection:

• CM PM-E direct
• CM PM-E ECOFAST
• CM PM-E 7/8"

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Process I/O
SIMATIC ET 200pro for SIMATIC PCS 7

Power Supply for ET 200pro

Overview

SIMATIC ET 200pro PS, 24 V, 8 A

The SIMATIC ET 200pro PS is a power supply with IP67 degree of protection which features the same technology and design as the ET 200pro distributed I/O system.

It is suitable for single-line installation on the ET 200pro module rack, but can also be mounted directly on a mounting plate.

Locating the power supply away from the electronics cabinet/enclosure reduces the thermal load and the required size for the cabinet/enclosure.

The power is supplied at connector X1. The X2 connector allows the mains voltage to be looped to other modules.

The cable for the 24 V DC supply of the ET 200pro is connected via ECOFAST standard connectors to the SIMATIC ET 200pro PS. The other cable end is left open, enabling it to be fitted with an ECOFAST connector, 7/8" round connector or a programming device screw connector and individually adapted to the various connection systems of power module terminal modules of the ET 200pro.

SIMATIC ET 200pro PS reports its status via signaling contacts for "24 V DC OK" and "Overtemperature".

Ordering data

	Article No.
SIMATIC ET 200pro PS, 8 A Stabilized power supply in the technology and design of the ET 200pro distributed I/O system, permitting the loop-through of energy to further modules; with degree of protection IP67	**6ES7148-4PC00-0HA0**
Input: 3 400 ... 480 V AC Output: 24 V DC, 8 A	
Accessories	
Cable connectors for power connection	
• For X1 (power input); Socket insert HAN Q4/2, angled, with screw; 5 contact sockets 6 mm², 2 auxiliary contacts 0.5 mm²	**3RK1911-2BE30**
• For X2 (looping mains voltage) Pin insert HAN Q4/2, angled, with screw; 4 contact pins 4 mm²	**3RK1911-2BF10**
Sealing cap For 9-pole power sockets	
• X2 (1 unit)	**3RK1902-0CJ00**
• X2 (10 units)	**3RK1902-0CK00**

More information

For more information and technical specifications of the SIMATIC ET 200pro PS power supply, see "SITOP Power Supplies in SIMATIC Design" in the Catalog KT 10.1.

Additional information is available via the Internet at:

- SITOP power supplies:
  www.siemens.de/sitop
- CAx data (2D, 3D, circuit diagram macros):
  www.siemens.com/sitop-cax
- Operating instructions:
  www.siemens.com/sitop/manuals
- SITOP Selection Tool for selecting power supplies:
  www.siemens.com/sitop-selection-tool

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Batch automation
SIMATIC BATCH

■ Overview

In the process industry, discontinuous processes – so-called batch processes – are of great significance. Permanently shorter product lifecycles as well as the versatility required by consumers are two of the reasons for this.

Product quality that stays the same even in the umpteenth batch, quick response to changed market conditions, traceability for production (FDA compliance), fulfillment of legal standards, as well as the economic and technical necessity to utilize production plants flexibly and optimally – all of this places high demands on plant automation.

The SIMATIC PCS 7 process control system with the SIMATIC BATCH software package offers the right solution for low-cost and effective automation of batch processes.

SIMATIC BATCH is completely integrated in SIMATIC PCS 7, both in the visualization and in the engineering system. Thanks to the modular design and the flexible scaling, it can be used in small test centers as well as in production plants of any size.

■ Design
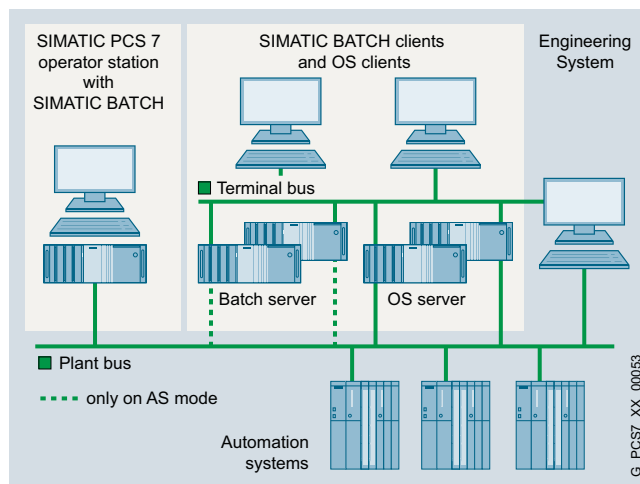
SIMATIC BATCH, scalable from single-user up to client/server system

Scalability

SIMATIC BATCH is configured as a single station system or as a client/server system and can be used in plants of any size due to its modular architecture and scalability in cumulative SIMATIC BATCH UNITs (sets of 1, 10 and 50 plant unit instances).

Single-user system for small applications

For small batch applications, SIMATIC BATCH can be installed together with the OS software on a single station system. Both the SIMATIC PCS 7 ES/OS Single Station and the SIMATIC PCS 7 BOX are suitable as a single station. Both can be combined with modular automation systems from the S7-400 series as well as with compact SIMATIC PCS 7 AS RTX and SIMATIC PCS 7 AS mEC RTX.

Client/server configuration

However, characteristic for the automation of batch processes using SIMATIC BATCH are client/server architectures with which one Batch server and multiple Batch clients running a plant project in unison. The batch server in such a configuration can also be configured with redundancy in order to increase availability.

BATCH clients and OS clients can run on separate or common basic hardware. In addition to the SIMATIC PCS 7 Industrial Workstations, the more compact SIMATIC PCS 7 OS clients 627D and 427D can be used as batch clients.

The Batch server software provided for configuration of a Batch server (SIMATIC BATCH Basic or SIMATIC BATCH server) usually runs on dedicated server hardware (Batch server). Depending on the load on the operator system, the OS Server and Batch Server software can also be run on shared server hardware (OS/Batch Server).

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■ Design (continued)

The hardware configuration of the batch server depends on the SIMATIC BATCH operating mode:

- In **PC mode**, the complete recipe logic is executed in the Batch server. If SIMATIC BATCH is only executed in PC mode, the Batch server does not require a connection to the plant bus. Communication with the automation system is via the operator system.

- In **AS mode**, the recipe unit logic is executed in the automation system. Mixed operation with PC operating mode is also possible within a batch where recipe units are run on both the batch server and on the automation system. In AS mode, the batch server requires a connection to the plant bus for communication with the automation system.

System connection

Batch Single Station and Batch Server can be connected to the Industrial Ethernet plant bus via a CP 1623/CP 1628/ CP 1613 A2 communication module or via a simple Fast Ethernet network adapter with BCE (suitable for communication with up to 8 automation systems; not redundant systems).

The IE versions of the SIMATIC PCS 7 Workstation for single stations and servers are equipped with a CP 1623 communication module with the SIMATIC NET HARDNET-IE S7 communications software. When using redundant automation systems, the SIMATIC PCS 7 workstation requires SIMATIC NET HARDNET-IE S7-REDCONNECT communications software instead of the SIMATIC NET HARDNET-IE S7 communication software. The SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack is suitable for upgrading the communications software (for ordering data, see section "Communication", section "Industrial Ethernet, System Connection of PCS 7 systems", page 10/46).

The 10/100/1000 Mbps Ethernet RJ45 port is already onboard and can be used for connecting to the terminal bus.

Redundancy

SIMATIC BATCH supports the Batch server redundancy. The two batch servers in a redundant pair of servers have identical configurations. A separate redundant connection between these servers is used to optimize the internal communication. This must always be provided as an Ethernet connection. This also applies if SIMATIC BATCH software and SIMATIC PCS 7 OS software are installed together on the redundant pair of servers. The serial RS 232 connection described in the section "OS redundancy" is not possible in this case.

A redundant optical or electrical connection can be used depending on the environmental conditions and the distance between the two batch servers, e.g. up to 100 m per crossover network cable (RJ45 connectors). For details, refer to Manual "Fault-tolerant process control systems"; for appropriate cable material and further accessories, refer to Catalog IK PI.

For information and components for the redundant bus connection (plant bus and terminal bus), see "Communication, Industrial Ethernet" in the Sections "Introduction", page 10/6, and "System connection of PCS 7 systems", page 10/46.

Basic hardware

The modularity and flexibility of SIMATIC BATCH are optimally supported by the hardware available. The basic hardware from the section "Industrial Workstation/IPC" as well as the SIMATIC PCS 7 BOX from the section "Compact systems" can be used for SIMATIC BATCH. Please note that the operating system and the ES/OS software of the SIMATIC PCS 7 process control system are pre-installed as standard on the SIMATIC PCS 7 Industrial Workstations of version Single Station, Server and Client. If these basic devices are used for SIMATIC BATCH, it is possible to extend or reject the existing SIMATIC PCS 7 installation, and restore it for the operating system using the restore DVD.

Expansion options

OS/Batch Single Station and OS/Batch Client are expandable for multi-monitor mode with up to 4 monitors.

Using the multi-monitor mode, the visualization of the plant/unit can be divided among 2 to 4 process monitors per operator station by using different views. These plant sections can all be operated using just one keyboard and one mouse.

Note:

Since all messages from SIMATIC BATCH are processed in the operator system's message system, the use of a signal module is only recommendable with multi-function OS/batch stations (clients, single stations).

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Batch automation
SIMATIC BATCH
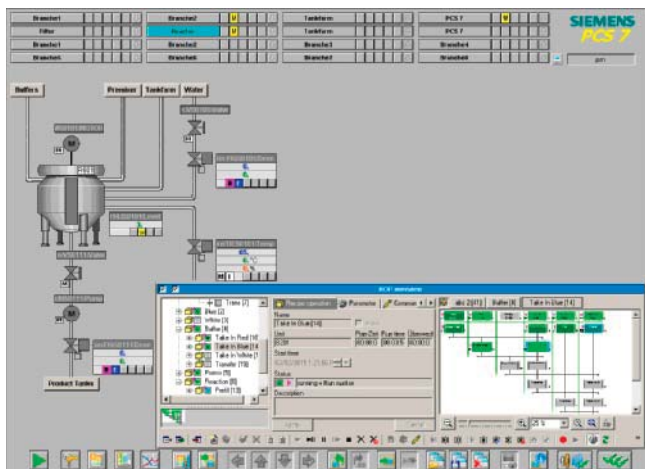
Process display with integrated OS Control

Integration in SIMATIC PCS 7

SIMATIC BATCH is fully integrated in SIMATIC PCS 7. Connection to the production control level is supported by direct communication with SIMATIC IT or by an open interface to any manufacturing execution systems (MES).

The plant data can be configured entirely using the engineering system. The engineering system transfers all data required for creating recipes to the batch server. It is therefore possible to edit recipes separate from the engineering system. Changes to the configuration which are made on the engineering system can be transferred to the batch server using an update function (online/offline).

SIMATIC BATCH supports the operation and monitoring of batch processes by means of standard faceplates (faceplates and OS controls integrated in the process picture).

The SIMATIC Logon integrated in SIMATIC PCS 7 uses SIMATIC BATCH for the following functions:
- Central user administration with access control
- "Electronic Signature" function
  This means that actions cannot be performed until enabled by authorized users/user groups.

A smart card reader suitable as a logon device is offered in section "Industrial Workstation/IPC", under "Expansion components, smart card reader".

Operating modes for recipe processing
- PC mode: Processing of the recipe logic in the batch server
- AS mode: Execution of recipe logic in the automation system
- Mixed operation: Parallel application of PC and AS modes in one batch (unit recipe-granular)

SIMATIC BATCH works as standard in PC mode. The complete control recipe is executed in the batch server. In the alternative AS operating mode, the control recipe logic can be executed in the automation system unit recipe-granular.

Advantages of AS mode are:
- Very fast step changing times
- Improved deterministics during execution of a batch
- Enhanced availability

Communication with the automation systems

Depending on the operating mode, SIMATIC BATCH communicates with the automation systems via the operator system or directly via S7-DOS.

SFC instances derived from a SFC type template are generally used as the interface to the subordinate automation level. The properties of the SFC type can be defined in a properties dialog, including:
- Control strategies
- Setpoint/actual value
- Instance parameters
- Timers

In addition to the SFC instances, individual unit parameters can be described by parameter steps of the recipe.

■ Overview

The product structure of the SIMATIC BATCH software is optimized for configuration of client-server systems and single station systems. SIMATIC BATCH Basic and SIMATIC BATCH Server are two alternative software products for the server installation and differ in their functional scope.

Additional functions of SIMATIC BATCH Server compared to SIMATIC BATCH Basic are, for example:

• ROP Library

• Separation Procedures/Formulas

• Electronic signature

• MES High Level Synchronization

• Route Control Integration

In exceptional cases, the SIMATIC BATCH client software can also be operated on the Batch server. However, the preferred target system for the SIMATIC BATCH client software is the standalone Batch client.

The SIMATIC BATCH Single Station package is intended for the Batch single station. The SIMATIC BATCH recipe system already integrated in the SIMATIC BATCH Single Station package must be ordered separately for the stations of the client/server system. The SIMATIC BATCH API can be optionally used in both the Batch Single Station and in batch servers.

The SIMATIC BATCH project can be matched quantitatively to the plant size using SIMATIC BATCH UNITs (cumulative quantity options for instances of plant units).

Software products/licenses	Batch Single Station	Batch Server	Redundant pair of batch servers		Batch Client
			Server A	Server B	
Basic software					
SIMATIC BATCH Single Station Package	●	–	–	–	–
SIMATIC BATCH Basic[1]	–	●	●	●	–
SIMATIC BATCH Server[1]	–	●	●	●	–
SIMATIC BATCH Client	–	o	o	o	●
SIMATIC BATCH Recipe System	–	o	o	o	o[2]
SIMATIC BATCH API	o	o	o	o	–
Quantity options: Cumulative SIMATIC BATCH UNITs[3]					
1 UNIT	o	o	o	o	–
10 UNITs	o	o	o	o	–
50 UNITs	o	o	o	o	–

SIMATIC BATCH software products/licenses for Batch Single Station, Batch Server and BATCH Client

[1] Alternative Batch Server software: SIMATIC BATCH Server with full functionality or SIMATIC BATCH Basic with reduced range of functions

[2] A client/server system is required on at least one client.

[3] Instances of units; at least one SIMATIC BATCH UNIT license is required per project.

● Software product/license required
o Software product/license optional
– Software product/license not required or not available

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Batch automation
SIMATIC BATCH

■ Function

Recipe editor
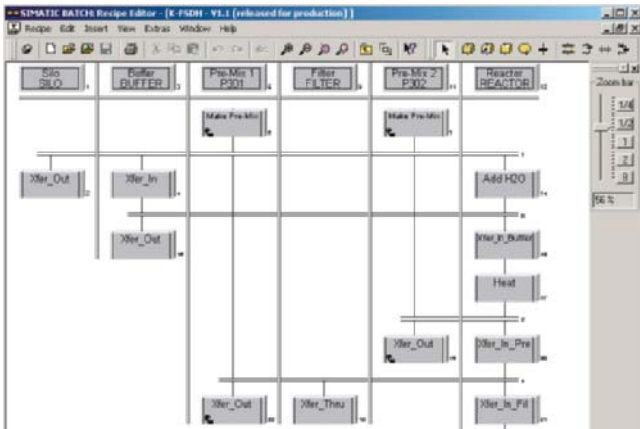
The recipe editor is integrated in the SIMATIC BATCH Single Station Package and can be installed as a functional expansion component of the SIMATIC BATCH Recipe System on a batch client and batch server.

It is used for easy, intuitive creation and modification of master recipes and library operations. The basis for recipe creation are the batch objects created from the plant configuration using the SIMATIC PCS 7 Engineering System, e.g. units and equipment phases.

The Batch Recipe Editor can be started individually, but can also be launched from the Batch Control Center (BatchCC). It possesses a GUI, processing functions typical to Microsoft Windows for individual and grouped objects, and a structural syntax check.

The recipe editor offers powerful functions for the following tasks:

- Creation of new master recipes and library operations
- Definition of user interface in the project settings
- Modification of existing master recipes and library operations (changes in structure or parameters)
- Querying the states of recipe objects and process values in transition conditions
- Assignment of route control locations as transfer parameters (source, target, via) to the transport phases, in order to direct products of one batch to other units (local or external)
- Configuration of arithmetic expressions for calculating setpoints for transitions and recipe parameters from recipe variables and constants
- Documentation of master recipes and library operations
- Validation under inclusion of user-specific plausibility checks
- Selection of unit candidates via a class-based view or limitation of the equipment properties
- Releasing master recipes and library operations for test or production

Hierarchical recipes according to ISA-88.01
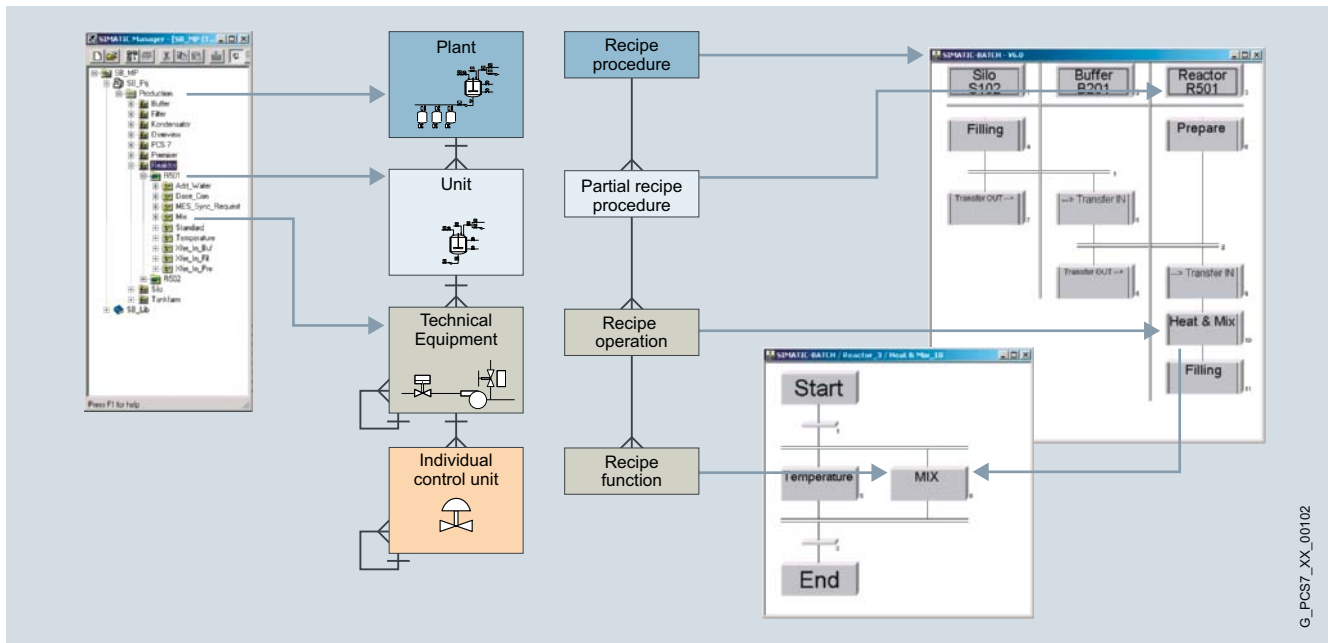
Hierarchical recipes according to ISA-88.01

■ **Function** (continued)

SIMATIC BATCH supports hierarchical recipes in accordance with the ISA-88.01 standard. SIMATIC BATCH and SIMATIC PCS 7 form a functional unit that fully covers the models described in the standard.

The hierarchical recipe structure is mapped on the plant module as follows:

• Recipe procedure for controlling the process or the production in a plant
• Recipe unit procedure for controlling a process step in a plant unit
• Recipe operation/function for the process engineering task/ function in an equipment module

Recipe elements for handling of exceptions

Monitoring of process states is possible during runtime by marking freely selectable recipe sections. It is then possible to automatically react to evaluated events or faults using a command block or jump function in a special container.

ROP Library

Recipe operations managed in a user library (ROP library) can be installed in the recipe procedures of hierarchical recipes as a reference and thus modified centrally.

This reduces the requirements for engineering and validation. If the reference link is broken, the recipe operation becomes a fixed component of the recipe procedure, and is thus independent of further central modifications.

Separation Procedures/Formulas
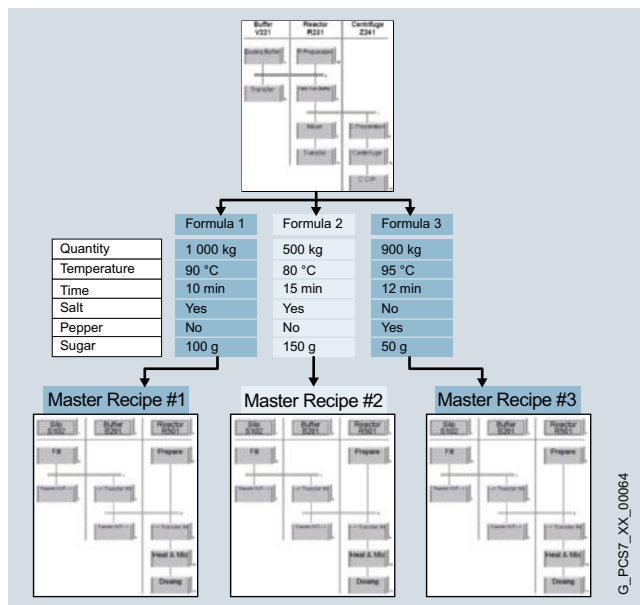
The flexibility achieved by recipes which are independent of specific units can be increased even further if the procedure and parameter sets (formulas) are separated from one another. Various master recipes can be created by linking several formulas using a recipe procedure. This enables central modification of procedures. The formula structure is determined by the formula category defined by the user.

Batch Control Center (BatchCC)
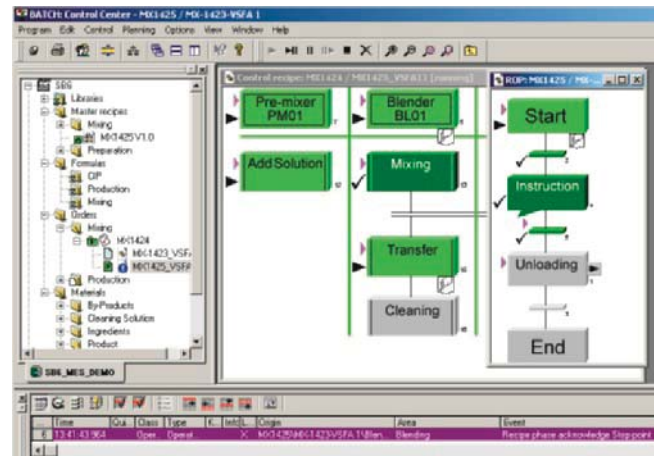
The SIMATIC BATCH Batch Control Center (BatchCC) is the "command center" for monitoring and controlling batch processes with SIMATIC BATCH. Using BatchCC you can manage all data relevant to SIMATIC BATCH through a graphical user interface.

BatchCC also has a viewer for batches archived in XML format. This allows either local batch data or batch data saved on a network drive or central archive server (Process Historian) to be displayed again as a control recipe. It is insignificant whether the connected batches originate from a single SIMATIC BATCH plant or from several plants.

BatchCC offers powerful functions for the following tasks:

• Reading in and updating the plant data of the basic automation
• Definition of user privileges for all functions, for clients, or for plant units of SIMATIC BATCH
• Definition of material names and codes
• Management of master recipes
• Management of libraries with recipe elements (library operations)
• Editing of formula categories and management of associated formulas (parameter sets)
• Creation of master recipes from control recipe
• Exporting and importing of master recipes, formulas and library objects
• Creation of batches with master recipes
• Starting of batch processing and controlling of batches
• Monitoring and diagnostics of batch processing
• Allocation strategy for recipe creation and unit allocation at batch runtime
• Online modification, deletion or insertion of objects (RPH, ROP, RUP) and structure elements (loops, transitions, etc.) of the recipe (special privileges and explicit authorization required)
• Recording and archiving of recipes and batch data
• Calling of SFC visualization directly from the control recipe

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Batch automation
SIMATIC BATCH

▮ Function (continued)

Batch OS Control
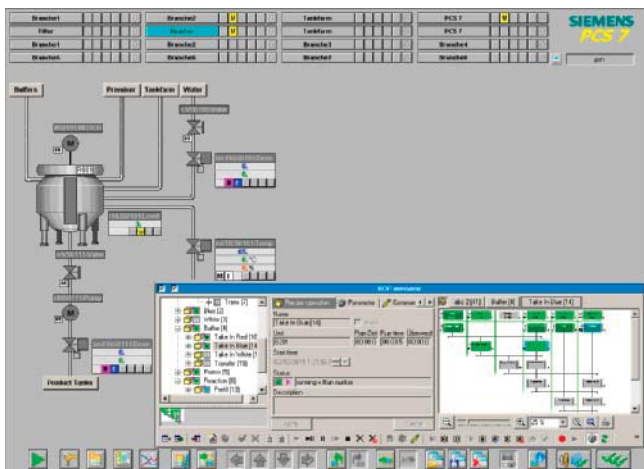
BATCH OS Control

OS Controls which can be directly superimposed on the process display provide you with a practical alternative to BatchCC for the operation and monitoring of batch processes.

Batch planning
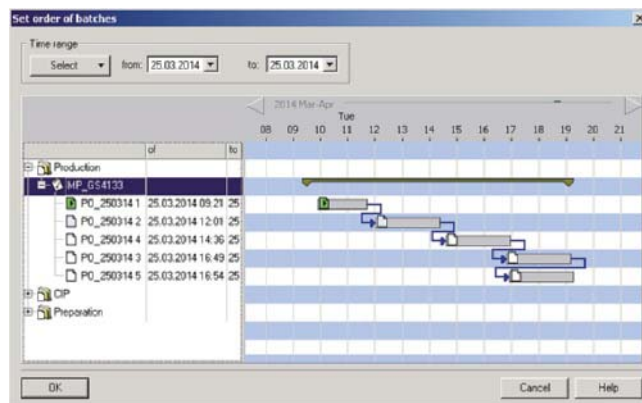
Batch Control Center enables the creation of individual production orders and batches. However, Batch Planning offers significantly more planning functions. The batches for a large number of production orders can then be planned in advance.

The functional scope not only includes planning, but also modification, cancellation, deletion and release of batches. Creation and distribution of the batches for a production order are possible manually, but can also be carried out automatically depending on the definition of the batch number or production quantity.

The following batch properties can be set and changed:

- Quantity
- Start mode (immediately, following operator input, or time-driven)
- Unit allocation
- Formula (parameter set)
- Run sequence (chaining to previous or subsequent batch)
- Displaying the runtime of a batch
- Definition of minimum time interval for batch chaining

Batch planning and control are supported in a user-friendly manner and simplified, thanks to special displays such as the order category list, production order list, batch planning list, batch status list, or batch results list.

All batches including their unit allocation can be clearly presented in a combination of Gantt diagram and table. Time conflicts or those resulting from multiple allocation of units are identified by symbols. Time conflicts can be eliminated simply by shifting the associated batches in the Gantt diagram.

SIMATIC Batch API

The SIMATIC BATCH API Application Programming Interface, which is offered as an expansion component, is an open interface for customer-specific extensions. It provides users with access to data and functions of SIMATIC BATCH and enables programming of special applications for specific sectors or projects.

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Ordering data

	Article No.		Article No.

**Basic software for
Batch Single Station,
Batch Server and Batch Client**

**SIMATIC BATCH Single Station
Package V8.1**
6 languages (English, German,
French, Italian, Spanish, Chinese),
software class A, runs with
Windows 7 Ultimate 64-bit or
Windows Server 2008 R2 Standard
64-bit, single license for
1 installation

- Delivery form package **6ES7657-0UX18-0YB0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key USB stick,
  certificate of license
- Delivery form online **6ES7657-0UX18-0YH0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

SIMATIC BATCH Basic V8.1
Batch server software with reduced
functionality

6 languages (English, German,
French, Italian, Spanish, Chinese),
software class A, runs with
Windows 7 Ultimate 64-bit or
Windows Server 2008 R2 Standard
64-bit, single license for
1 installation

- Delivery form package **6ES7657-0YX18-0YB0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key USB stick,
  certificate of license
- Delivery form online **6ES7657-0YX18-0YH0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

SIMATIC BATCH Server V8.1
6 languages (English, German,
French, Italian, Spanish, Chinese),
software class A, runs with
Windows 7 Ultimate 64-bit or
Windows Server 2008 R2 Standard
64-bit, single license for
1 installation

- Delivery form package **6ES7657-0TX18-0YB0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key USB stick,
  certificate of license
- Delivery form online **6ES7657-0TX18-0YH0**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

SIMATIC BATCH Client V8.1
6 languages (English, German,
French, Italian, Spanish, Chinese),
software class A, runs with
Windows 7 Ultimate 32/64-bit or
Windows Server 2008 R2 Standard
64-bit, floating license for 1 user

- Delivery form package **6ES7657-0VX18-0YB5**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key USB stick,
  certificate of license
- Delivery form online **6ES7657-0VX18-0YH5**
  (without SIMATIC PCS 7 Software
  Media Package)
  License key download,
  online certificate of license
  Note:
  E-mail address required!

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Batch automation
SIMATIC BATCH

Ordering data

	Article No.
Functional add-on components	

SIMATIC BATCH Recipe System V8.1
For recipe creation; installation on at least one client of a client/server system (alone or in combination with the SIMATIC BATCH Client software)

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7657-0AX18-0YB5**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required! — **6ES7657-0AX18-0YH5**

SIMATIC BATCH API V8.1
1 language (English), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7657-0MX18-2YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required! — **6ES7657-0MX18-2YH0**

	Article No.
Quantity options for Batch Single Station and Batch Server (cumulative)	

SIMATIC BATCH UNITs[1]
For SIMATIC BATCH Single Station Package/SIMATIC BATCH Server software

Independent of language, software class A, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 1 UNIT — **6ES7657-0XA00-0YB0**
  - 10 UNITs — **6ES7657-0XB00-0YB0**
  - 50 UNITs — **6ES7657-0XC00-0YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required!
  - 1 UNIT — **6ES7657-0XA00-0YH0**
  - 10 UNITs — **6ES7657-0XB00-0YH0**
  - 50 UNITs — **6ES7657-0XC00-0YH0**

[1] Instances of plant units

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Route control
SIMATIC Route Control

Overview
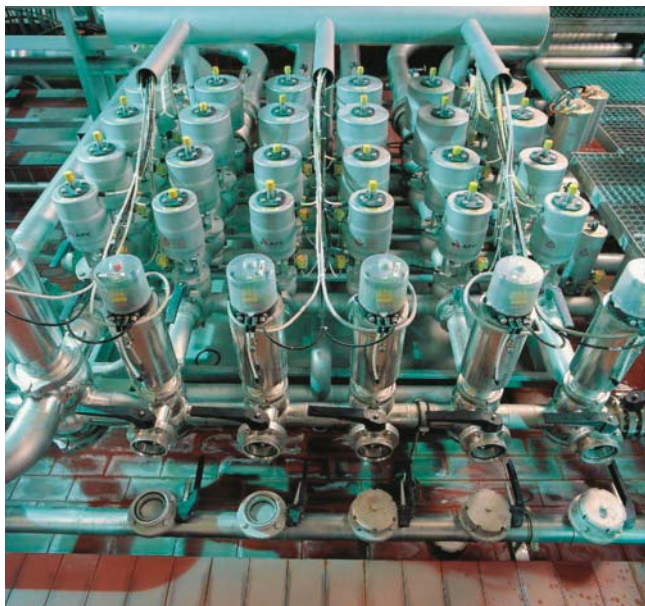
SIMATIC Route Control expands the SIMATIC PCS 7 process control system with a sector-independent tool for the configuration, control, monitoring and diagnostics of material transport in pipeline networks or on conveyor belts.

With this integrated route control, SIMATIC PCS 7 can also automate the connecting material transports in addition to the production processes and the associated stores. In this case SIMATIC Route Control can also be combined with SIMATIC BATCH.

In particular SIMATIC Route Control is perfect for plants with a multitude of complex route combinations or extensive tank farms such as are found above all in the chemical, petrochemical and food and drinks industries.

Application

The possible applications of SIMATIC Route Control extend from small plants with simple/static lines up to plants in the medium and upper performance range which have an extensive network of routes/pipes.

SIMATIC Route Control is particularly predestined for the following requirements:

- Frequent conversions and extensions of the transport network including actuators and sensors
- Transport routes with high flexibility, characterized by:
  - Regularly changing materials
  - Dynamic selection of the origin and destination of the material transport (including reversal of direction on bidirectional transport routes)
- Numerous simultaneous material transports
- Plant projects in combination with SIMATIC BATCH

When transporting solid materials on conveyor belts, the sequence for switching actuators on and off can be cascaded using WAIT elements.

Design
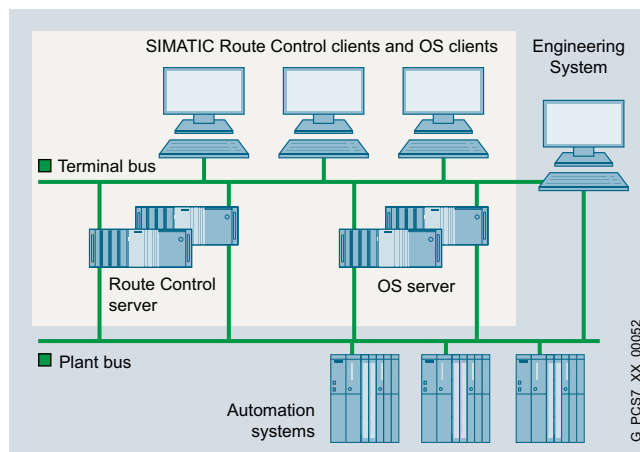
The modularity and flexibility of SIMATIC Route Control are optimally supported by the hardware available. The SIMATIC PCS 7 Industrial Workstations from the "Industrial Workstation/IPC" section can be used for SIMATIC Route Control.

Hardware for small plants

For small plants, SIMATIC Route Control can be installed either alone or together with the OS software on a single station system. You can select the hardware for this OS/RC single station from the section "Industrial Workstation/IPC", subsection "SIMATIC Rack PC".

Client/server configuration

Distributed multi-user systems with client-server architecture, expandable with up to 32 clients per server, are typical for the automation of material transports with SIMATIC Route Control. Basically it is possible to operate an RC Server, Batch Server and OS Server on shared basic hardware. However, availability will be higher and performance better if each component has its own server hardware. The availability of the RC server can be increased further by a redundant design of the server hardware. SIMATIC PCS 7 supports a Route Control server or pair of Route Control servers in the multiuser system which is limited to 12 servers/pairs of servers.

The Route Control client (RC Client) is represented by the Route Control Center (RCC). The RCC can be installed on an OS Client, a Batch Client or separate client hardware.

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■ Design (continued)

System connection

RC server and OS/RC single stations can be connected to the Industrial Ethernet plant bus via a CP 1613 A2/1623/1628 communication module or via a simple Fast Ethernet network adapter with BCE (suitable for communication with up to 8 automation systems; not redundant systems).

The IE versions of the SIMATIC PCS 7 Workstation for single stations and servers are equipped with a CP 1623 communication module with the SIMATIC NET HARDNET-IE S7 communications software. When using redundant automation systems, the SIMATIC PCS 7 workstation requires SIMATIC NET HARDNET-IE S7-REDCONNECT communications software instead of the SIMATIC NET HARDNET-IE S7 communication software. The SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack is suitable for upgrading the communications software (for ordering data, see section "Communication", section "Industrial Ethernet, System Connection of PCS 7 systems").

Redundancy

The SIMATIC Route Control Server software supports the RC server redundancy. Further software components or a separate connection between the two servers as is the case with the OS server redundancy or batch server redundancy are not required.

With the assistance of the SIMATIC Route Control Server software, the two redundant RC servers carry out mutual monitoring during operation. If the active RC server fails, the redundant partner immediately becomes the master and takes over operation. The RC clients are automatically switched over to the new master in this case. Following the return of the failed RC server, data matching is carried out with the active RC server with the latter remaining the master.

For information and components for the redundant bus connection (plant bus and terminal bus), see "Communication, Industrial Ethernet" in the Sections "Introduction" and "System connection of PCS 7 systems".

Expansion options

OS/RC Single Station and RC Clients are expandable for multi-monitor mode with p to 4 monitors.

Using the multi-monitor mode, the visualization of the plant/unit can be divided among 2 to 4 process monitors per operator station by using different views. These plant sections can all be operated using just one keyboard and one mouse.

Note:

Since all messages from SIMATIC Route Control are processed in the operator system's message system, it is not necessary to use a signal module.

Requirements for selection of the automation systems

SIMATIC Route Control supports standard automation systems, fault-tolerant and safety-related automation systems of the S7-400 range based on to the following CPU types:

- CPU 416-3 (up to 30 simultaneous material transports)
- CPU 410-5H, CPU 417-4 and CPU 417-4H (up to 300 simultaneous material transports)

■ Configuration

SIMATIC Route Control, which is fully integrated in SIMATIC PCS 7, is modular and scalable. It can be flexibly adapted to various sizes of plants by cumulatively adding SIMATIC Route Control routes (in sets of 10 and 50 for the number of simultaneous material transports) up to a project limit of 300 routes. SIMATIC Route Control provides graded user privileges for engineering, operating and maintenance personnel who are integrated into the user administration with SIMATIC logon. SIMATIC Logon is an integral component of SIMATIC PCS 7.

Route Control in the engineering system

The Route Control Engineering tool, the Route Control Library and the Route Control Wizard are concentrated together with the other engineering tools of the SIMATIC PCS 7 process control system in the central engineering system.

In SIMATIC PCS 7, blocks from a SIMATIC PCS 7 library are inserted into CFC plans and connected to plant control blocks in accordance with the technological requirements in order to control and monitor the elements of a plant. These individual connections are omitted with SIMATIC Route Control (RC). You adapt the standard blocks of the technological elements relevant to RC (RC elements) using standardized interface blocks from the RC library, and allow RC to control and monitor the elements during operation. This is of course also possible with existing plantswithout an increased overhead.

The blocks of the RC library support redundancy at the controller level, i.e. they can be used with standard automation systems or even with fault-tolerant automation systems or mixed configurations. The changes in the engineering system can be recorded (Change log), both in the SIMATIC PCS 7 project and in the RC project.

Route Control wizard

The Route Control Assistant functions as the interface between the PCS 7 basic configuration expanded by RC components and the RC engineering tool. It analyzes the hardware and software configuration of the SIMATIC PCS 7 (multi-)project, and generates a database which serves as the basis for further, RC-specific configuration with the RC engineering tool.

During the RC-specific configuration, the elements imported from the SIMATIC PCS 7 project by the Route Control Assistant must be inserted into a sub-route structure. These sub-routes divide the plant. The complete routes will be subsequently "joined together" from them during the automatic route searching. The response of the sub-routes in a particular function are already defined when inserting the elements into them. Functions represent the technological requirements when operating the plant (e.g. "Open source", "Pumps" etc.).

As a rule: the more finely divided the sub-route structure, the more flexible the subsequent automatic route searching. With purely static routes, a sub-route can already be a complete route.

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■ **Configuration** (continued)

Route Control Server/Route Control Center

Following configuration of the route network and testing of the material transport versions, the Route Control configuration data is transferred to the Route Control server. There they can be activated via the Route Control Center at a suitable point in time from the process engineering viewpoint. From this time onwards, the new data are included in route searches.

If a material transport is pending during operation, a route (material transport) is requested by the controller (e.g. using an adapted RC SFC type) or by the operator on the Route Control Center. In addition to selection of the origin and destination as well as up to 10 intermediate plant points (*synonyms: nodes, locations*), this also includes the application of a start signal on the route control block RC_IF_ROUTE in the automation system (AS). The AS "informs" the RC Server which then starts searching for the route and – if possible – combines the statically defined sub-routes into a complete transport route. From this point onward, the Route Control takes over control and monitoring of all RC elements involved in the transport route. If faults occur, detailed diagnostics information is provided concerning the cause, e.g. why the search for a suitable transport route was unsuccessful. The plant control program only switches the individual technological functions, everything else is handled by the Route Control.

The Route Control Server (RC Server) supplies the Route Control Clients (Route Control Center) with the necessary data and transfers their operations to the automation systems.

For maintenance purposes, an automation system can be specifically set to "in maintenance" (out of service). The material transports being carried out by this automation system are still continued until finished. However, new material transports are no longer permitted.

RC block symbols and faceplates

In the process displays of the SIMATIC PCS 7 operator systems, each route block is represented by an RC block symbol and an RC faceplate. Through a route block's RC block symbol it is possible to select its RC faceplate, and through a route block's RC faceplate it is possible to select the Route Control Center.

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Overview

The Route Control Software is structured such that SIMATIC Route Control can be flexibly adapted to different plant sizes and architectures (single/multi-user systems):

- Route Control Engineering (component of the SIMATIC PCS 7 Engineering System)
- Route Control Server
- Route Control Center (RCC)

SIMATIC Route Control works closely with the operator system, hence where small plants are concerned it is possible for the Route Control Center and Route Control Server to be installed not only on their own but also together with the OS software on a single station. The ordering data for the OS software can be found in the section "Operator system".

In the case of multi-user systems with small quantity frameworks it is also possible to operate the Route Control Server, Batch Server and OS Server on shared basic hardware. However, availability will be higher and performance better if they are installed on separate server hardware.

The Route Control Center (RCC) can be installed on an OS client, a batch client, or on separate RC client hardware.

Software components (runtime)	RC single station	RC server single	RC server redundant		RC client
			Server A	Server B	
SIMATIC Route Control Server	●	●	●	●	–
SIMATIC Route Control Center	●	–	–	–	●

Quantity options: cumulative SIMATIC Route Control Routes[1]

• 10 routes[1]	o	o	o	o	–
• 50 routes[1]	o	o	o	o	–

SIMATIC Route Control software for RC single station, RC server, and RC client

[1] Number of simultaneous material transports; at least one "SIMATIC Route Control Routes" license (for sets of 10/50) is required per project, total project limit: 300 routes

● Software product/license required
o Software product/license optional
– Software product/license not required or not available

In addition to the SIMATIC Route Control Server and SIMATIC Route Control Center runtime software, for a Route Control project you require separately available SIMATIC Route Control Routes (cumulative sets of 10 and 50 for the number of simultaneous material transports). Several sets of 10 and 50 SIMATIC Route Control Routes licenses can be combined up to a total project limit of 300 routes.

Function

Route Control Server

The Route Control Server supplies the RC Clients (Route Control Center) with the necessary data and transfers their operations to the automation systems. When a material transport is requested through the Route Control Center, it is the job of the RC Server to dynamically compile a suitable transport route from the partial routes which were configured using a map of the automation systems on the basis of the selected parameters (source, destination and intermediate locations) and with due consideration of other parameters (e.g. function catalogs, function IDs or material IDs). Configuration changes can be taken immediately into account in the determination of a suitable transport route after transfer from the Route Control Engineering Tool to the Route Control Server and subsequent activation through the Route Control Center (online loading).
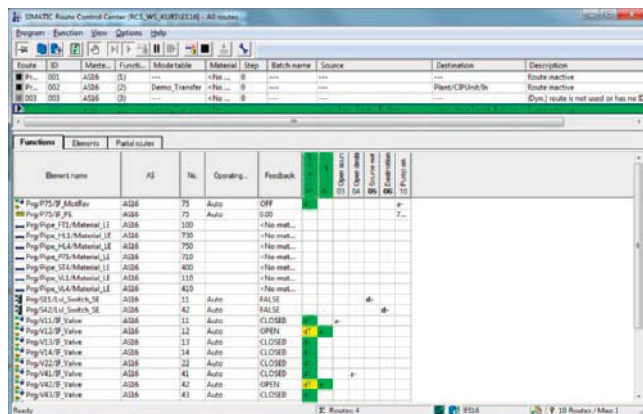
Route Control Center

Route Control Center (RCC)

The RCC can be called either from the faceplate of a route block or from the keyset on the operator station. It displays all of a material transport's relevant route data and error information in several coordinated views

Key functional features are:

- Overview of all RC elements, partial routes and request details
- Operation of the selected material transport:
  - Selection of operating mode: Manual/automatic
  - Request, start, stop, continue and terminate material transport in manual mode
  - Set/modify request parameters (origin, destination, intermediate points) as well as general properties (function catalog, function ID, material ID and "ignore fault") in manual mode
  - Enable/disable sequence functions in manual mode
- Diagnostics of material transport request errors caused by locked RC elements, locked partial routes, inconsistent actuations or prohibited sequential material
- Diagnostics of currently running material transports: color and text display of transport route status in the route view of the RCC; detailed analyses by evaluation of feedback signals from RC elements
- Server functions: select RC Server, display RC Server status, update view (read in data again from the RC Server)
- Display of the operator who has logged on
- Definition of route parameters (source, destination, material, function ID etc.), and saving and loading these settings with names
- Switchover between "AS in maintenance" and "AS in operation"

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Route control
SIMATIC Route Control

Ordering data	Article No.		Article No.

**SIMATIC
Route Control Server V8.1
for single station or client-server configuration**
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-7FX18-0YB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required! — **6ES7658-7FX18-0YH0**

Quantity options for single station/server (cumulative)

SIMATIC Route Control Routes[1]
For expansion of the SIMATIC Route Control Server software for single station or client/server configuration, cumulative

Independent of language, software class A, single license for 1 installation
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license
  - 10 routes[1] — **6ES7658-7FF00-0XB0**
  - 50 routes[1] — **6ES7658-7FG00-0XB0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required!
  - 10 routes[1] — **6ES7658-7FF00-0XH0**
  - 50 routes[1] — **6ES7658-7FG00-0XH0**

**SIMATIC
Route Control Center V8.1**
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7658-7EX18-0YB5**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note: E-mail address required! — **6ES7658-7EX18-0YH5**

[1] Number of simultaneous material transports; total project limit: 300 routes

13

Overview
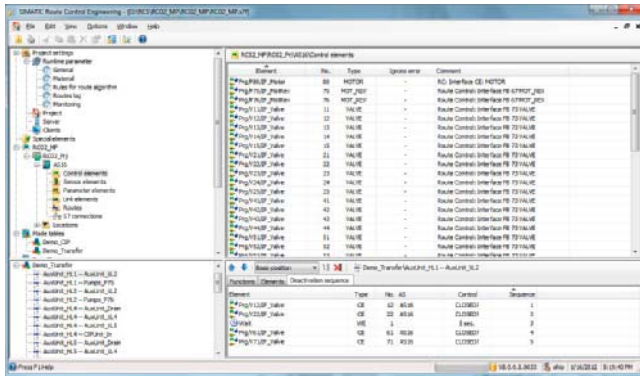
The Route Control (RC) configuration supplements the basic SIMATIC PCS 7 plant configuration with blocks from the PCS 7 standard library. Existing plants are then also easy to upgrade with SIMATIC Route Control. Technological elements of relevance for control of the material transport (RC elements) are adapted in the CFC Editor using uniform interface blocks from the Route Control Library. The RC elements include:

- Control elements (actuators)
- Sensor elements (sensors)
- Parameter elements (setpoints)
- Connection elements (material information related to partial route)

Function

Locations (synonym: nodes) of partial or complete routes are configured in the SIMATIC Manager as "Equipment properties of plant units" and transferred to the RC project together with the other RC-relevant basic data of the SIMATIC PCS 7 project. The configuration requirements caused by many repeated sequences can be minimized by exporting locations in CSV format, duplicating and modifying them using a spreadsheet program, and then importing them again.

Nodes are parameters for requesting a material transport (source, destination, intermediate locations/via) and which mark the start and end of each partial route, and thus also the source and destination of a material transport.

In addition to the basic tools (SIMATIC Manager, CFC, etc.) of the SIMATIC PCS 7 engineering system, the following configuration components of the SIMATIC Route Control Engineering program package are available for configuration of the route control applications:

Route Control library

The Route Control library contains blocks for RC and transport route configuration and interface blocks for RC elements. It is provided in the catalog of the CFC editor.

Route Control wizard

The Route Control wizard is the interface between the SIMATIC PCS 7 basic configuration supplemented with RC interface blocks and the actual RC configuration in the RC engineering tool. The wizard, which can be called up from the SIMATIC Manager menu, accepts the RC-specific configuration data of the SIMATIC PCS 7 project into the Route Control engineering. In doing so, it carries out plausibility checks, defines the AS-OS and AS-AS communication connections (NetPro and CFC), and configures the RC server signals.

Route Control Engineering tool

Following importing of the RC-relevant data of a SIMATIC PCS 7 project into an RC project, the RC-specific objects are configured using the Route Control Engineering tool:

- Partial routes:
  division of the transport paths into partial routes is used to increase the flexibility and minimize the configuring overhead by means of repeated application. Relevant partial route parameters: "bidirectional" and "priority" (lowest total of partial route priorities is decisive when searching for the overall route).
- Interconnections:
  Through inclusion in a partial route, the RC elements receive additional properties depending on the type, and these can be edited using configuration dialogs (e.g. in the basic setting: "close valve").
- Function catalogs:
  The partial routes can be assigned to function catalogs depending on technological and product-specific aspects, e.g. "cleaning" or "product transport". In the route search, function catalogs permit restriction of the resulting quantity to the type of material transport.
- Function steps/sequence functions:
  Function catalogs contain as many as 32 configurable technological sequence functions which define the sequence of material transport by means of the RC elements connected in the partial routes, e.g. base position of the control elements, open transport valves, open origin valve, switch on pump).

Configuration of the partial routes and assignment of the RC elements to the partial routes are performed in a matrix of the Route Control Engineering tool. With the aid of generic elements, objects or blocks generated on a user-specific basis can be integrated into the RC project and handled like RC elements.

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Route control
SIMATIC Route Control

■ **Function** (continued)

Graphical offline route search

Graphical offline route search to determine all possible route combinations

Similarly to a navigation system, the graphically visualized offline route search determines all possible route combinations. Errors in the route network or undesired routes can be detected in advance. A preferred route can be selected from the results of the offline route search, and saved as a static route. An active route can also be saved for re-use via the Route Control Center. A saved route takes priority in a route request.

Special configuration functions

Special configuration functions make it easier to perform repetitive routine work and extend the range of options for controlling material transport, e.g.:

• Exporting configuration data in the form of CSV files to Microsoft Excel, copying and editing the data there, and then re-importing the files into Route Control

• Controlling the joint use of partial routes by configurable function IDs

• Checking material compatibilities and interlocking partial routes in case of incompatible material sequences based on the material ID saved in the connection element of the partial route

• Injection of dynamic (external) setpoints coming from the process at runtime into the route block (e.g. weighed quantity)

■ **Ordering data**   **Article No.**

SIMATIC
Route Control Engineering V8.1
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license   **6ES7658-7DX18-0YB5**

• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license
Note:
E-mail address required!   **6ES7658-7DX18-0YH5**

Safety Integrated for Process Automation

14

Safety Integrated for Process Automation
Introduction

■ **Overview**

The process industry frequently features complex technological sequences with high safety demands, and faults and failures in the process automation could have fatal consequences for personnel, machines, plants and the environment. The safety technology used must reliably detect dangerous states in the process and also its own internal errors, and automatically set the plant/application to a safe state.

Safety Integrated for Process Automation is the comprehensive range of products and services from Siemens for safe, fault-tolerant applications in the process industry. This is characterized by:

- Safety-related F/FH automation systems of the S7-400 series (see Chapter "Automation systems")

- Failsafe communication with the PROFIsafe profile via PROFIBUS (see Section "Communication", PROFIBUS) or PROFINET (see Section "Communication", PROFINET)

- Failsafe transmitters (SITRANS P DS III) on the PROFIBUS PA with PROFIsafe (see Catalog FI 01, Field devices for process automation)

- ET 200M, ET 200iSP, ET 200S and ET 200pro distributed I/O systems with safety-oriented F-I/O modules/submodules (see section "Process I/O")

- Failsafe process instruments/devices for connection to ET 200 distributed I/O systems (see Catalog FI 01, Field devices for process automation)

- SIMATIC Safety Integrated software for implementation and operation of safety applications, with additional components for the engineering system and the operator systems: S7 F Systems, SIMATIC Safety Matrix

- Special applications, for example, Partial Stroke Test

- Safety lifecycle management with support by highly qualified solution partners: services for all phases in the lifecycle of a safety instrumented system (analysis, implementation, and operation)

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Benefits

Safety Integrated for Process Automation enables full integration of safety engineering into the SIMATIC PCS 7 process control system. The Basic Process Control System (BPCS) and Safety Instrumented System (SIS) combine seamlessly to form a uniform and innovative complete system. The advantages of this fusion are quite clear:

- One common controller platform
- One common engineering system
- No separate safety bus – standard and safety-related communication take place on the same fieldbus (PROFIBUS/ PROFINET with PROFIsafe)
- Mixed operation of standard and safety-related I/O modules in ET 200M, ET 200iSP, ET 200S and ET 200pro remote I/O stations

- Integrated data management – no complex data exchange between BPCS and SIS
- Integration of safety-related applications into process visualization on the operator station
- Automatic integration of safety-related fault messages with time tagging into the process control system
- Integration of safety-related hardware into the asset management with the SIMATIC PCS 7 Maintenance Station for diagnostics and preventive maintenance

Design

The PROFIsafe profile allows safety-related communication between the automation system (controller) and the process I/O via either PROFIBUS or PROFINET. The decision for choosing either PROFINET IO or the PROFIBUS DP/PA fieldbuses has a significant influence on the architecture of the safety-related system.

Safety-related design versions with PROFIBUS

In the case of a safety-related system with PROFIBUS communication integrated into SIMATIC PCS 7, a distinction is made across all architecture levels between two design versions:

- Single-channel, non-redundant design
- Redundant, fault-tolerant design

Both design versions are extremely variable, and offer a large scope for different customer requirements. Standard automation (basic process control) and safety-related functions can be combined flexibly, not only in the area of distributed I/O. Even at the controller level, they can be combined in one system or separated. In addition, there are numerous possibilities arising from the use of flexible modular redundancy.
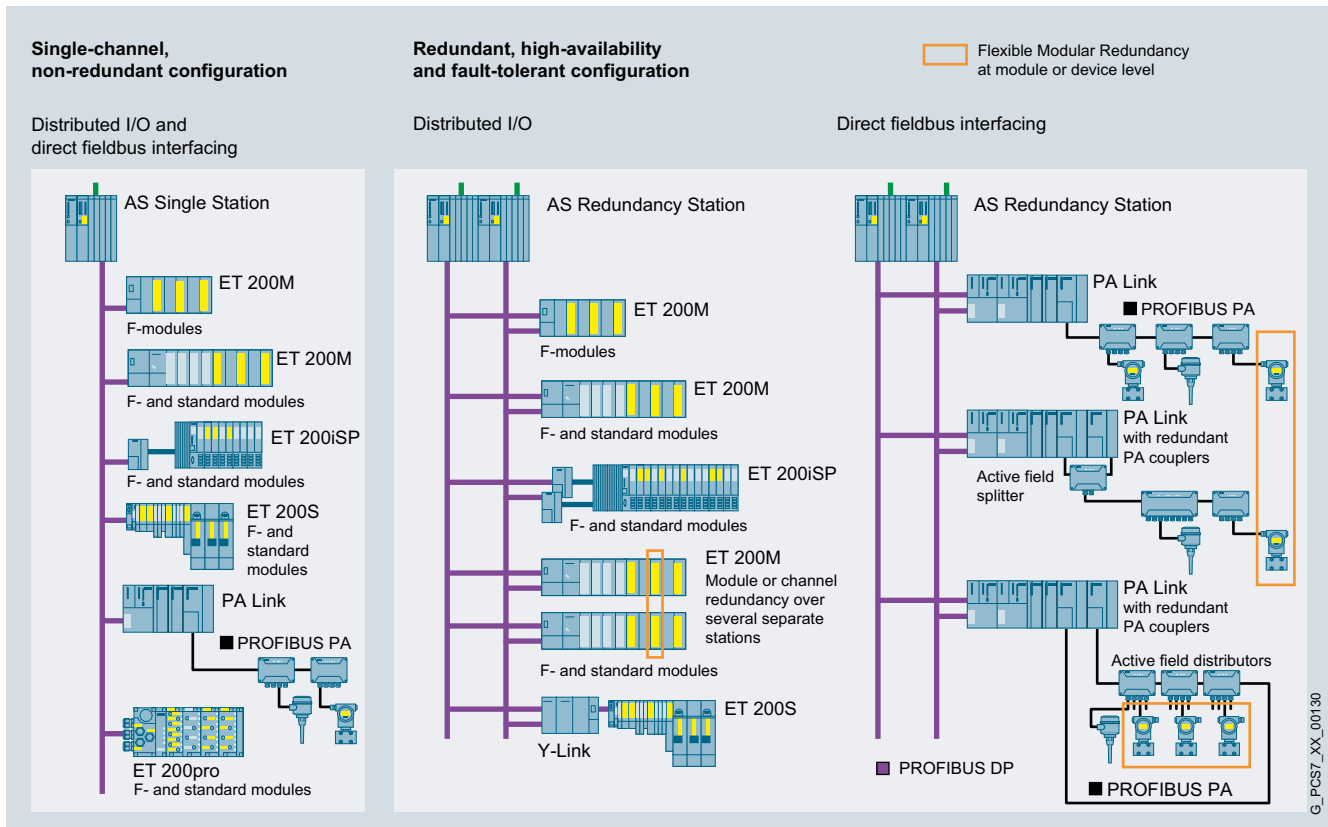
Safety-related design versions with PROFIBUS

Safety Integrated for Process Automation
Introduction

■ **Design** (continued)

At the individual architectural levels (controller, fieldbus, distributed I/O), the configuration alternatives shown in the figure are available depending on the distributed I/O used (ET 200M, ET 200iSP, ET 200S, ET 200pro remote I/O stations or PROFIBUS PA devices with PA-Profile 3.0 or higher).

Safety-related design versions with PROFINET

Safety-related AS Single Stations (F systems) and AS Redundancy Stations (FH systems) from the S7-400 range can be networked simply and effectively with ET 200M remote I/O stations via PROFINET IO. The PN/IE interface integrated in the CPU is available for this on the side of the automation systems, and the IM 153-4 PN High Feature interface module in the ET 200M remote I/O stations.

The availability of the I/O devices on an AS Single Station (F systems) can be increased by a ring topology with media redundancy. If the transmission link in the ring is interrupted at one point, for example, due to a break in the ring cable or the failure of a station, the redundancy manager then immediately activates the alternative communication path.
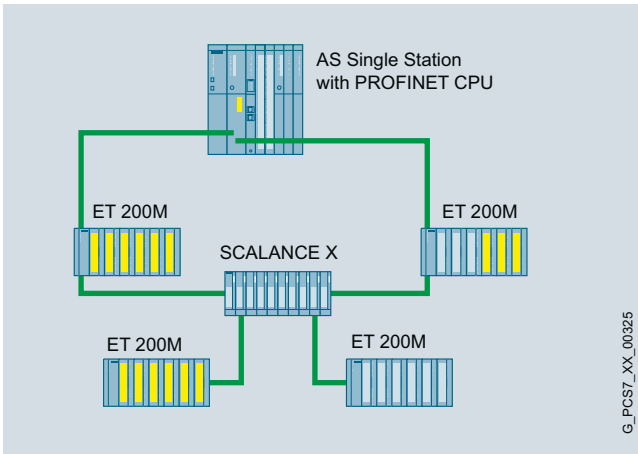
The maximum availability with minimum error handling times is achieved by the AS Redundancy Station (FH system) in conjunction with the system redundancy of the I/O devices. System redundancy refers to a type of PROFINET IO communication where each I/O device establishes a communication connection to each of the two CPUs of an AS Redundancy Station over the topological network. In contrast to the single-sided I/O device connection to only one CPU, failure of a CPU in this case does not automatically lead to failure of the connected I/O devices.

Safety-related PROFINET IO communication with system redundancy

Safety-related PROFINET IO communication with media redundancy

14
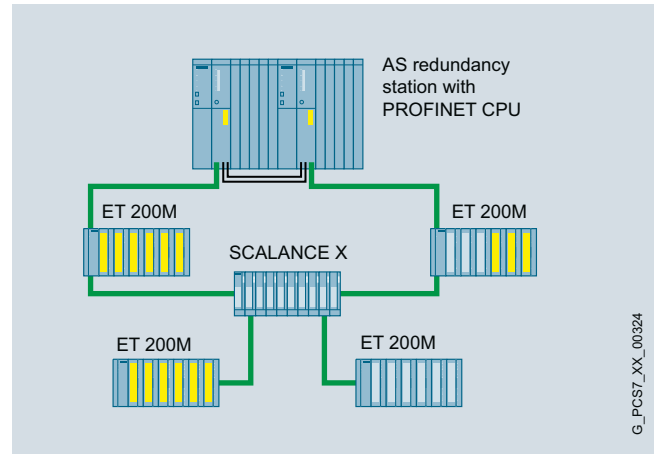
Overview
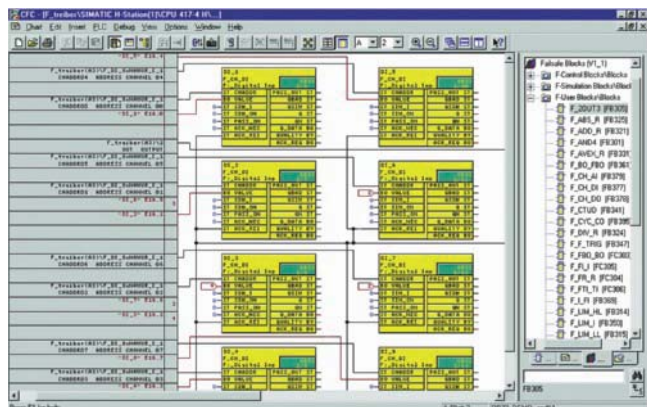
The S7 F Systems engineering tool for configuration of safety-related SIMATIC PCS 7 automation systems and safety-related F-modules from the ET 200 range is integrated in the SIMATIC Manager. The following functions are available with S7 F Systems based on preconfigured and TÜV-approved blocks:

• Parameterization of CPU and F signal modules
• Creation of safety-related applications in the CFC

Configuration

S7 F Systems supports configuration by means of functions for:

• Comparison of safety-related F-programs
• Recognition of changes in the F-program using the checksum
• Separation of safety-related and standard functions.

Access to the F functions can be password-protected.

The F-block library integrated in S7 F Systems contains predefined function blocks for generation of safety-related applications with the CFC or the SIMATIC Safety Matrix based on it. The certified F-blocks are extremely robust and intercept programming errors such as division by zero or out-of-range values. They avoid the need for diverse programming tasks for detecting and reacting to errors.

Notes:
• Depending on the software requirements of the SIMATIC PCS 7 version, S7 F systems can be operated under the Microsoft Windows operating systems Windows XP Professional 32-bit (SP2/SP3), Windows Server 2003 32-bit (SP2), Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit.
• The SIMATIC S7 F Systems RT license for processing safety-related user programs is already integrated in the "AS bundles" of the safety-related automation systems. The article number for ordering further licenses can be found in the section "Automation systems" under "Modular AS 410 systems", "Safety-related automation systems" (page 8/14) and under "Complementary S7-400 systems" (from page 8/19).

Ordering data | Article No.

SIMATIC S7 F Systems	
S7 F Systems V6.1 Programming and configuration environment for creating and using safety-related STEP 7 programs 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC S7 F Systems Software Media Package per ordering position	**6ES7833-1CC02-0YA5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 F Systems Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC S7 F Systems Software Media Package.	**6ES7833-1CC02-0YH5**
SIMATIC S7 F Systems Software Media Package	
SIMATIC S7 F Systems Software Media Package V6.1 (incl. SP) Installation software without license, 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit Note: Can only be used in conjunction with a valid license.	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) Software on DVD	**6ES7833-4CC16-0YT8**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) Software download Note: E-mail address required.	**6ES7833-4CC16-0YG8**
Upgrades for S7 F Systems See "Upgrades Process Safety Software" in Chapter "Update/upgrade packages", Section "Updates/upgrades asynchronous to the PCS 7 version", page 16/30. Note: With a S7 F Systems Upgrade from V5.x to V6.0/V6.1, the type of S7 F Systems license changes from single license to floating license.	

Options

S7 F ConfigurationPack

When using the ET 200 safety-related I/O modules, an S7 F ConfigurationPack is required for engineering. This is included in S7 F Systems, and is also available on the Internet for downloading:

http://support.automation.siemens.com/WW/view/en/15208817

Safety Integrated for Process Automation
SIMATIC Safety Integrated

SIMATIC Safety Matrix

Overview
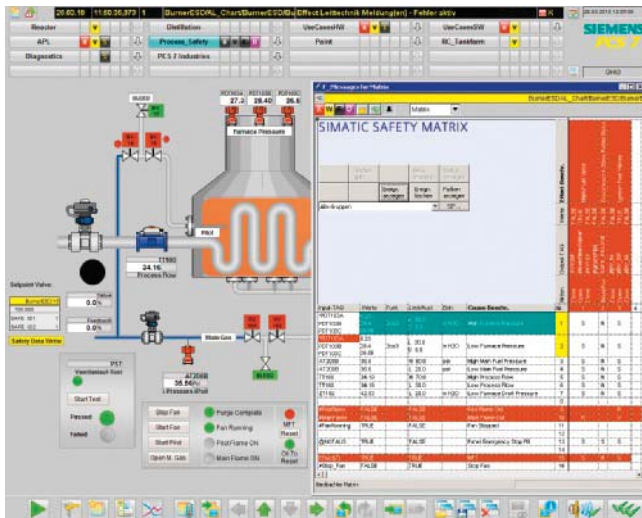
Process image of an operator station with Safety Matrix Viewer displayed

The SIMATIC Safety Matrix which can be used in addition to the CFC is an innovative safety lifecycle tool from Siemens that can be used not only for user-friendly configuration of safety applications, but also for their operation and service. The tool, which is based on the proven principle of a cause & effect matrix, is ideally suited to processes where defined statuses require specific safety reactions.

The SIMATIC Safety Matrix not only means that programming of the safety logic is significantly simpler and more convenient, but also much faster than in the conventional manner. During the risk analysis of a plant, the configuration engineer can assign exactly defined reactions (effects) to events (causes) which may occur during a process.

Benefits

Advantages of the Safety Matrix in the implementation and operation phase

Implementation phase
- Direct further processing of safety specification possible
- Simple programming using Cause&Effect method
- No programming knowledge required
- Preprocessing of input values
- Alarm generation and provision of diagnostic information for each individual cause and effect
- Prealarm for analog values
- Free color selection for alarms and messages
- Automatic generation of CFCs including driver blocks
- Matrix comparison on basis of created CFC charts
- Automatic version tracking
- integrated change tracking
- 1-to-1 printout of Cause&Effect matrix

Operating phase
- Complete integration in SIMATIC PCS 7
- All relevant information can be seen at a glance in the template
- Cause & Effect-dependent matrix and alarm display
- Tag display in the alarm
- Sequence of event display and saving
- First-up alarm display and saving
- Integral operating functions such as reset, override, and parameter modification
- Automatic saving of operating interventions for the safety life-cycle management
- Integral maintenance functions such as bypass and simulation
- Display of all relevant process values, also during mainte-nance
- Automatic version tracking
- Automatic documentation of modifications

Design

In the context of SIMATIC PCS 7, the following individual products are offered for the SIMATIC Safety Matrix:

Safety Matrix Tool

For the SIMATIC PCS 7 engineering system; for creating, config-uring and compiling the Safety Matrix as well as for loading, operator control and monitoring of the safety-related CFC program.

The application covers the complete safety lifecycle from anal-ysis through implementation up to operation and maintenance.

Safety Matrix Editor

For creating, configuring, testing and documenting the Safety Matrix logic on an external computer independent of the SIMATIC PCS 7 engineering system (can optionally be used together with the Safety Matrix Tool).

The application is focused on planning and configuring in the analysis and implementation phases.

The Safety Matrix Editor runs on a computer with Windows XP Professional 32-bit (from SP2), Windows Server 2003/2003 R2 32-bit (SP1 and higher), Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit operating systems. It also enables the Safety Matrix to be set up, configured, checked for plausibility and documented, independently of the engi-neering system of the SIMATIC PCS 7 process control system. However, generation of the safety-related CFC program, the compilation and downloading to the automation system and the procedural test are only possible with the Safety Matrix Tool on the SIMATIC PCS 7 Engineering System.

Safety Matrix Viewer for SIMATIC PCS 7

For the SIMATIC PCS 7 operator system; for operator control and monitoring of the SIMATIC Safety Matrix in the operational phase.

With the Safety Matrix Viewer that can be installed on the SIMATIC PCS 7 Operator Station, single station or client version, the safety application can be operated and monitored simply and intuitively during operation.

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Function

Safety Matrix: intersections define the linking of causes and effects

The matrix table is comparable with a spreadsheet program, and the configuration engineer first enters the possible process events (inputs) in the horizontal lines, and then configures their type and number, logical links, possible delays and interlocks, and any tolerable faults. The reactions (outputs) to a particular event are then defined in the vertical columns.

The events and reactions are linked by simply clicking the cell at the intersection of the row and column. Using these data, the SIMATIC Safety Matrix automatically generates complex, safety-related CFC programs. No special programming knowledge is required of the configuration engineer, and he can completely concentrate on the safety requirements of the plant.

Input window for configuration of analog "causes" with process value preprocessing

Each input value can be combined with a freely configurable preprocessing if necessary without giving up the simulation option.

The alarm management is supported by collective alarms, alarm prioritization and individually adjustable acknowledgement.

In addition to the alarms derived from process values, alarms can also be generated and diagnostics information can be provided for each individual cause and effect. Priorities and response behavior can be defined in various profiles here. The color scheme for the alarms and messages can be adapted on a customer- or country-specific basis.

For the Safety Life-cycle Management, functions are integrated for the version management and for the documentation of program changes and operator interventions.

During plant operation, the operator has direct access to the relevant data with the viewer of the SIMATIC Safety Matrix. From the overall view it can change directly to cause or effect related detailed views and return from there. In the detailed views, alarm indications corresponding with the respective cause or effect can be called up.

Tag display in online mode with process value, simulation value and active value

The signal status is indicated online in the Cause&Effect matrix. The process value, simulation value and active value are indicated on the tag display in each case.

The Safety Matrix viewer enables the operator to display and save first value messages as well as to record safety-relevant events. Changes in parameters are supported, as are bypass, reset and override functions.

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Safety Integrated for Process Automation
SIMATIC Safety Integrated

SIMATIC Safety Matrix

Technical specifications

	Safety lifecycle support	Operating modes	Hardware requirements	Software requirements
Safety Matrix Tool	Complete lifecycle: Analysis phase Implementation phase Operation and maintenance phase	Offline, online	SIMATIC PCS 7 with safety-related automation systems (S7 F systems RT license integrated) Installation basis: SIMATIC PCS 7 Engineering Station	Alternative SIMATIC PCS 7 versions: • V7.0 SP3 and higher/V7.1 HF1 and higher • V8.0/V8.1 Microsoft Windows operating system (depending on the software requirements of the SIMATIC PCS 7 version): • Windows XP Professional 32-bit (SP2/SP3) • Windows Server 2003 or 2003 R2, each 32-bit (SP1/SP2) • Windows 7 Ultimate 32/64-bit • Windows Server 2008 R2 Standard 64-bit For offline testing: S7-PLCSIM, depending on the installed S7 F System version S7 F Systems as of V5.2+SP1 with F-library "Failsafe Blocks" V1_2 or "S7 F Systems Lib" V1_3 (depending on S7 F Systems version); S7 F Lib V1_3 in combination with SIMATIC PCS 7 as of V6.1+SP2
Safety Matrix Editor	Analysis phase Partial implementation phase (planning and configuration of a Safety Matrix only, no program generation and commissioning)	Offline	PC, independent from SIMATIC PCS 7	Operating system alternatives: • Windows XP Professional 32-bit (SP2/SP3) • Windows Server 2003 or 2003 R2, each 32-bit (SP1/SP2) • Windows 7 Ultimate 32/64-bit • Windows Server 2008 R2 Standard 64-bit
Safety Matrix Viewer	Operating phase (control and monitoring)	Online	SIMATIC PCS 7 with safety-related automation systems (S7 F systems RT license integrated) Installation basis: SIMATIC PCS 7 Operator Station, single station or client version	Alternative SIMATIC PCS 7 versions: • V7.0 SP3 and higher/V7.1 HF1 and higher • V8.0/V8.1 Microsoft Windows operating system (depending on the software requirements of the SIMATIC PCS 7 version): • Windows XP Professional 32-bit (SP2/SP3) • Windows Server 2003 or 2003 R2, each 32-bit (SP1/SP2) • Windows 7 Ultimate 32/64-bit • Windows Server 2008 R2 Standard 64-bit

System requirements

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Safety Integrated for Process Automation
SIMATIC Safety Integrated

■ **Ordering data**	Article No.		Article No.

SIMATIC S7 Safety Matrix

Safety Matrix Tool V6.2
Creation, configuration, compilation and loading of the Safety Matrix as well as operator control and monitoring in a SIMATIC PCS 7 environment

2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, packaged with 1 × SIMATIC S7 Safety Matrix Software Media Package per ordering position
  6ES7833-1SM02-0YA5

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 Safety Matrix Software Media Package)
  License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC S7 Safety Matrix Software Media Package.
  6ES7833-1SM02-0YH5

Safety Matrix Editor V6.2
Creation, configuration, debugging and documentation of the Safety Matrix logic on an external computer without a SIMATIC PCS 7 / STEP 7 environment

2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, packaged with 1 × SIMATIC S7 Safety Matrix Software Media Package per ordering position
  6ES7833-1SM42-0YA5

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 Safety Matrix Software Media Package)
  License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC S7 Safety Matrix Software Media Package.
  6ES7833-1SM42-0YH5

Safety Matrix Viewer V6.2
Operator control and monitoring of the SIMATIC Safety Matrix per OS single station/OS client

Runtime software, 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, bundled with 1 × SIMATIC S7 Safety Matrix Software Media Package per ordering position
  6ES7833-1SM62-0YA5

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 Safety Matrix Software Media Package)
  License key download and online certificate of license
  Note:
  E-mail address required; installation software also available separately as SIMATIC S7 Safety Matrix Software Media Package.
  6ES7833-1SM62-0YH5

SIMATIC S7 Safety Matrix Software Media Package

SIMATIC S7 Safety Matrix Software Media Package V6.2 (incl. SP)
Installation software without license, 2 languages (English, German), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Note: Can only be used in conjunction with a valid license.

- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  Software on DVD
  6ES7833-4SM26-0YT8

- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  Software download
  Note:
  E-mail address required!
  6ES7833-4SM26-0YG8

Upgrades for Safety Matrix Tool and Safety Matrix Viewer
See "Upgrades Process Safety Software" in chapter "Update/upgrade packages", section "Updates/upgrades asynchronous to the PCS 7 version", page 16/30

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Safety Integrated for Process Automation

Notes

14

IT Security

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IT security
Introduction

■ Overview

Example of a staggered security architecture

The progressive standardization, opening and networking of control systems has been accompanied by an enormous increase in security risks. The potential dangers arising from destructive programs such as computer viruses, worms or trojans or from access by unauthorized personnel range from network overloads or failures, theft of passwords and data, to unauthorized access to the process automation. Apart from material damage, specifically targeted sabotage can also have dangerous consequences for personnel and the environment.

■ Function

With its pioneering security concept, SIMATIC PCS 7 offers comprehensive solutions for protecting a process engineering plant which are based on a staggered security architecture (defense in depth). The speciality of this concept is to be found in its holistic approach. It is not just limited to the application of individual security methods (e.g. encryption) or devices (e.g. firewalls). Its strengths are rather to be found in the interaction of a wide variety of security measures in the plant network.

The SIMATIC PCS 7 security concept provides information and recommendations (best practices) on topics which are described in detail in the manual "PCS 7 & WinCC security concept, basic document" and the further detailed documents:

- Generation of a network architecture with staggered security (defense in depth), combined with segmenting of the plant into security cells
- Network administration, assignment of IP addresses, and division into subnetworks
- Operation of plants in Windows domains (active directory)
- Administration of Windows operator privileges and SIMATIC PCS 7 operator privileges; integration of SIMATIC PCS 7 operator privileges into the Windows administration

- Reliable control of time synchronization
- Management of security patches for Microsoft products
- Use of virus scanners, whitelisting software, and firewalls
- Establishment and operation of support and remote access (VPN, IPSec)

The manual "PCS 7 & WinCC security concept, basic document" is accessible on the Internet under "SIMATIC Technical Documentation" - "SIMATIC PCS 7 Manuals" - "SIMATIC PCS 7 V8.1 Manuals".

www.siemens.com/simatic-docu

Overview

On the system side, SIMATIC PCS 7 supports implementation of guidelines and recommendations of the security concept by means of:

- Compatibility with the current versions of the following virus scanners: Trend Micro OfficeScan, Symantec Norton AntiVirus and McAfee Virusscan
- Use of the local Windows firewall
- Automatic setting of safety-related parameters during the setup, e.g. in DCOM, registry and Windows firewall
- Operator administration and authentication using SIMATIC Logon (for details, see Section "SIMATIC Logon", page 15/6)
- CP 1628 communication module with integrated security features (firewall, VPN) as alternative to the Industrial Ethernet connection of SIMATIC PCS 7 Industrial Workstations
- Integration of Industrial Security Modules SCALANCE S602, S612, S623 and S627-2M
- Automation firewall
- Application whitelisting

Design
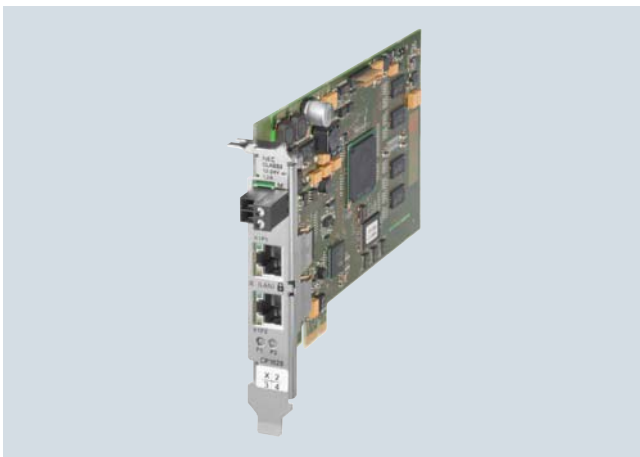
CP 1628 communication module

CP 1628 communication module

The CP 1628 is a PCI Express card (PCIe x1) with its own micro-processor and integrated 2-port switch (2 x RJ45 connection, 10/100/1000 Mbps) for the connection of SIMATIC PCS 7 work-stations to Industrial Ethernet.

In contrast to the comparable CP 1623, it has additional security features:

- Stateful Inspection Firewall for filtering communication based on their IP/port addresses
- Limiting bandwidth to avoid communication overload
- Secure communication through virtual private network (VPN) over IPsec tunnel
- Secure transmission of network analysis information to the network management system (SNMP V3)
- Secure transfer of the time (NTP V3)
- Monitoring through log files and their analysis using a syslog server

With the built-in security mechanisms, the CP 1628 can protect PCS 7 stations as well as their data communication within an automation network and remote access over the Internet. It enables secure access to individual stations or entire automation cells that are protected by security modules. Different security measures, such as firewall and VPN over IPsec tunnel, can also be combined.

For more information and technical specifications for the CP 1628 communication module, refer to the Catalog IK PI, section Industrial Ethernet, under System Utilities, System connection for PG/PC/IPC.

SCALANCE S industrial security modules

SCALANCE S industrial security modules

The SCALANCE S industrial security modules provide scalable security features, such as firewall, port filter, NAT and NAPT address translation, DHCP server (S602, S612 and S623) as well as authentication and data encryption with virtual private network (VPN) over IPsec tunnel (S612 and S623). They can be used, for example, to safeguard the cross-cell data exchange between components of automation and process control systems. Since they can be operated in bridge mode as well as router mode, they can therefore also be used directly at IP subnet boundaries.

The SCALANCE S industrial security modules have a rugged industrial design. For connection to Industrial Ethernet, they have 2 (S602 and S612) or 3 (S623) 10/100/1000 Mbps ports (RJ45).

The following SCALANCE S industrial security modules can be used:

- SCALANCE S602 industrial security module protects against unauthorized access with a Stateful Inspection Firewall
- SCALANCE S612 industrial security module protects against unauthorized access, data manipulation and spying with Stateful Inspection Firewall and VPN (Virtual Private Network) for up to 128 simultaneous IPsec tunnels
- SCALANCE S623 industrial security module protects against unauthorized access, data manipulation and spying with Stateful Inspection Firewall and VPN (Virtual Private Network) for up to 128 simultaneous IPsec tunnels; suitable for setting up a "Demilitarized Zone" (DMZ)

Note:

Using the supplied Security Configurations Tool (SCT), it is easy to create and configure the security modules that can communicate securely with one another. You do not require any special IT knowledge.

The complete configuration can be saved on the optional swap medium C-PLUG (order separately) and transmitted to another security module. This permits easy and fast replacement of modules in the event of a fault.

For detailed information and technical specifications of the SCALANCE S security modules, see Catalog IK PI, section "Industrial Ethernet", "Industrial Ethernet Security".

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IT security
Industrial Security

■ **Design** (continued)

Automation firewall

The automation firewall (see Catalog ST PCS 7 AO, section "Architecture and Configuration") features Stateful Inspection packet filter, application layer firewall, VPN gateway functionality, URL filtering, Web proxy, virus scanning, and intrusion prevention. Depending on the plant size, it can be used as a front and back firewall or in a three-homed configuration. It thus protects the access point to the production environment, e.g. from the office or intranet networks. The automation firewall is supplied preinstalled.

The value of the Automation Firewall is increased even further by integrated services, e.g.:

• Hotline support

• Replacement service

• Software Update Service

Additive services complete the offerings, for example, customized firewall solutions or integration of firewalls in customer systems.

Application whitelisting

Whitelisting protection mechanisms guarantee that only trustworthy applications and programs are executed on a station of the SIMATIC PCS 7 process control systems. They prevent the execution of illegal software and the modification of installed applications, and thus offer additional protection against malware (malicious software). This protection can be implemented by means of additionally installed security applications, e.g. the McAfee Application Control V5.1.

Industrial security services
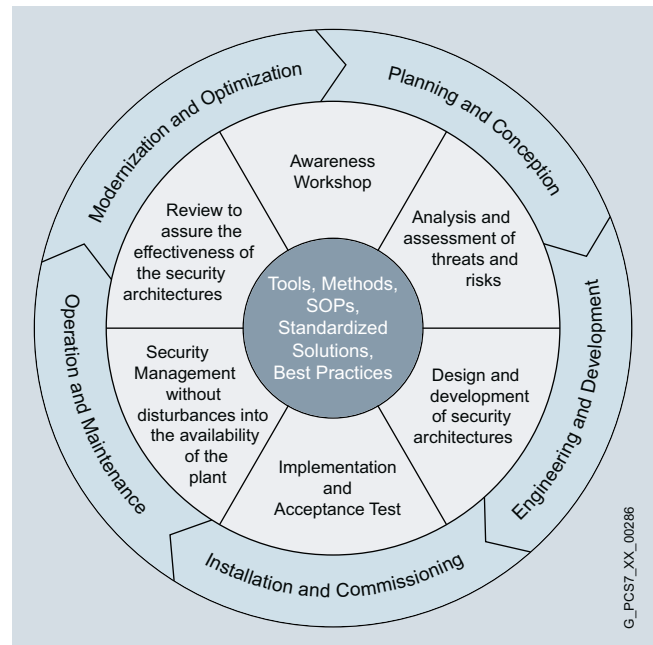
Siemens Industry Automation not only offers products and systems but also professional services and solutions for protection of industrial plants against the manifold threats to IT security. These industrial security services are not only oriented according to individual phases but are provided for the complete lifecycle of the plant.

The "Awareness Workshop" and "Assessment" services can be used to identify spheres of activity for an holistic security program. Specific consulting concerning secure plant configurations and concepts support customers in the individual planning of their I&C plant.

Services for implementing and acceptance test support the protective measures. These also include the service for setting up and updating the automation firewall as well as for implementation of the application whitelisting concept.

See here for further information on industrial security services:
:E-mail: industrialsecurity.i@siemens.com
Internet: www.siemens.com/industrial-security

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■ Ordering data

Ordering data	Article No.
SCALANCE S **industrial security modules**	
SCALANCE S602[1] Industrial Security module with Stateful Inspection Firewall; 2 ports 10/100/1000 Mbps	6GK5602-0BA10-2AA3
SCALANCE S612[1] Industrial Security module with Stateful Inspection Firewall and VPN (Virtual Private Network); up to 128 simultaneous IPsec tunnels; 2 ports 10/100/1000 Mbps	6GK5612-0BA10-2AA3
SCALANCE S623[1] Industrial Security module with Stateful Inspection Firewall and VPN (Virtual Private Network); up to 128 simultaneous IPsec tunnels; 3 ports 10/100/1000 Mbps of which 1 is a DMZ port	6GK5623-0BA10-2AA3
SCALANCE S627-2M[1] up to 128 VPN tunnels simultaneously; additional RJ45 DMZ port; two additional slots for one 2-port media module each	6GK5627-2BA10-2AA3
Communication module	
CP 1628 PCI Express x1 card for connecting to Industrial Ethernet (10/100/1000 Mbps), with 2-port switch (RJ45) and integrated security functions (firewall, VPN)	6GK1162-8AA00
Accessories	
C-PLUG Swap medium for simple replacement of devices in event of fault; for saving of configuration and application data, can be used in SIMATIC NET products with C-PLUG slot	6GK1900-0AB00
SITOP compact 24 V / 0.6 A 1-phase power supply with wide-range input 85 to 264 V AC; 110 to 300 V DC; stabilized output voltage 24 V, rated output current value 0.6 A, slim design	6EP1331-5BA00

[1] Shipment without individual export license is restricted to certain countries. Export to other countries requires an individual export license that must be obtained from BIS (Bureau of Industry and Security).
Note: Check the current country list:
http://support.automation.siemens.com/WW/view/en/66627157

Note:

For further components and accessories, especially cable material and connectors as well as tools and supplementary material for assembly, see "Communication - Industrial Ethernet - Passive network components" in the Sections "FastConnect", "ITP cables and connectors" and "Fiber-optic cables" (from page 10/40) as well as Catalog IK PI.

■ More information

Siemens provides automation and drive products with industrial security functions that support the secure operation of plants or machines. They are an important component in a holistic industrial security concept. With this in mind, our products undergo continuous development. We therefore recommend that you keep yourself informed with respect to our product updates. Please find further information and newsletters on this subject at: http://support.automation.siemens.com

To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account. Please find further information at:
www.siemens.com/industrialsecurity

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IT security
SIMATIC Logon

Overview
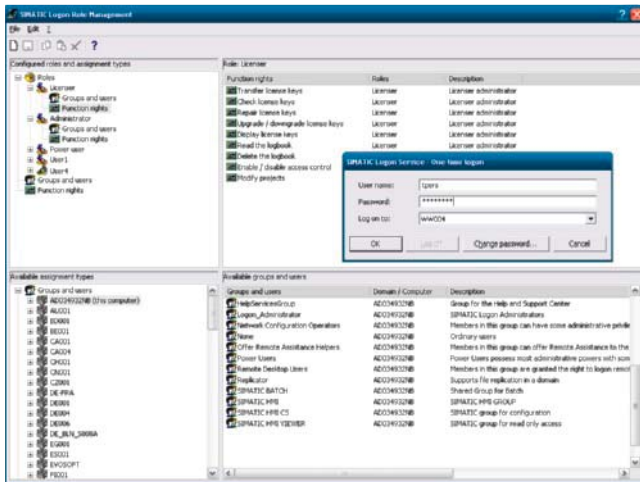
Centralized user administration with access control and electronic signature

SIMATIC Logon is a centralized user administration system with access control that also supports an electronic signature. It is in a position to work with applications in which roles have already been created or can be defined.

SIMATIC Logon facilitates the validation of plants in compliance with FDA 21 CFR Part 11.

Application

SIMATIC Logon V1.5 incl. SP is already integrated in the following systems:

- SIMATIC PCS 7 process control system V8.0 and V8.1
- SIMATIC WinCC V7.0+SP3, V7.2 and V7.3
- SIMATIC WinCC Runtime Professional Edition V13

Further application examples in the SIMATIC environment include:

- SIMATIC STEP 7 V5.5+SP4
- SIMATIC WinCC flexible from Version 2007 in conjunction with Logon Remote Access
- SIMATIC WinCC Runtime Advanced Edition V13 in conjunction with Logon Remote Access

SIMATIC Logon V1.5 incl. SP can also easily be integrated in other applications based on a programming example (Development Kit).

Note:

The products listed here in the ordering data are not relevant for SIMATIC PCS 7. SIMATIC Logon V1.5 incl. SP software and licenses are already integrated in the SIMATIC PCS 7 process control system V8.0 and V8.1 system software.

Design

Logon devices

The following logon devices are supported by SIMATIC Logon:

- Keyboard
- Smart card reader (see "Industrial Workstation/IPC" chapter under "Expansion components", page 3/43)
- Logon devices which can be operated with a Microsoft device driver for the respective operating system, e.g. logon devices on a USB interface

The "Device Manager for SIMATIC Logon" supports low-cost connection of devices which support various identification technologies, e.g.:

- Biometric features
- Smart card
- Electronic key

The Device Manager for SIMATIC Logon can be found in the ST PCS 7 AO (Add-ons for SIMATIC PCS 7) catalog, "Operator control and monitoring" section.

Number of licenses

If SIMATIC Logon is not integrated on the system side, you require the same number of SIMATIC Logon licenses as the number of clients/single stations accessing the application for which the SIMATIC Logon is used as access protection.

SIMATIC Logon Upgrade

All previous versions can be upgraded to the current version.

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■ Function

Access management

A logon dialog is opened to verify access authorization when applications managed with SIMATIC Logon are launched. The user receives their specific privileges after correctly entering the user name, password and domain. The user is rejected if the input is incorrect. Dialogs for logging off, changing user or password may be opened from the application.

Role management

The users, classified into groups at the operating system level, are associated by groups with the roles defined in the application and are assigned authorizations.

Event display

The Event Log Viewer records and displays the events for an application.

Electronic signature

The electronic signature means that operations cannot be performed until enabled by a previously authorized user. Authorization is assigned in the application by linking the users grouped at operating system level via the group with operations.

Note:

At the moment this function is implemented as a system function only on SIMATIC BATCH. The electronic signature can, however, also be flexibly implemented for specific applications.

Development Kit

The Development Kit uses an example to show the programmer how to embed SIMATIC Logon into a customer application.

■ Ordering data

	Article No.		Article No.
Only for TIA applications		**SIMATIC Logon** **Upgrade to V1.5 (incl. SP)** Single license for 1 installation	6ES7658-7BX51-0YE0
SIMATIC Logon V1.5 (incl. SP) Single license for 1 installation	6ES7658-7BX51-0YA0		
7 languages (English, German, French, Italian, Spanish, Chinese, Japanese), software class A, runs with • Windows XP Professional SP2/SP3 32-bit • Windows Server 2003 SP1/SP2 32-bit • Windows Server 2003 R2/2003 R2 SP2 32-bit • Windows Vista (Business/Enterprise/Ultimate) up to to SP2 32/64-bit • Windows 7 (Professional/Enterprise/Ultimate) up to SP1 32/64-bit • Windows Server 2008 (Standard/Enterprise/Datacenter) up to SP2 32/64-bit • Windows Server 2008 R2 (Standard/Enterprise/Datacenter) up to SP1 64-bit		7 languages (English, German, French, Italian, Spanish, Chinese, Japanese), software class A, runs with • Windows XP Professional SP2/SP3 32-bit • Windows Server 2003 SP1/SP2 32-bit • Windows Server 2003 R2/2003 R2 SP2 32-bit • Windows Vista (Business/Enterprise/Ultimate) up to to SP2 32/64-bit • Windows 7 (Professional/Enterprise/Ultimate) up to SP1 32/64-bit • Windows Server 2008 (Standard/Enterprise/Datacenter) up to SP2 32/64-bit • Windows Server 2008 R2 (Standard/Enterprise/Datacenter) up to SP1 64-bit	
Delivery form: Software and electronic documentation on CD, license key on USB stick, certificate of license		Delivery form package: Software and electronic documentation on CD, license key on USB stick, certificate of license	
Note: This product is not for SIMATIC PCS 7 applications!		Note: This product is not for SIMATIC PCS 7 applications!	
		Supplementary components for SIMATIC Logon with SIMATIC WinCC flexible	
		SIMATIC Logon **Remote Access (3 clients)** Remote access for 3 WinCC flexible clients starting with version 2007, single license for 1 installation	6ES7658-7BA00-2YB0
		Delivery form: License key on USB stick, certificate of license	
		SIMATIC Logon **Remote Access (10 clients)** Remote access for 10 WinCC flexible clients starting with version 2007, single license for 1 installation	6ES7658-7BB00-2YB0
		Delivery form: License key on USB stick, certificate of license	

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IT security

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IT security

Update/upgrade packages

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Engineering System

■ Overview

Engineering Upgrade Package V8.0 to V8.1

SIMATIC PCS 7 engineering systems with Engineering Software V8.0 can be upgraded to Version 8.1 using the SIMATIC PCS 7 Engineering Upgrade Package.

The licenses included in the Engineering Upgrade Package V8.0 to V8.1 apply to the following software products of SIMATIC PCS 7 Version 8.0:

- PCS 7 ES Single Station, PCS 7 AS Engineering Software, PCS 7 AS/OS Engineering Software
- PCS 7 Import-Export Assistant
- SIMATIC Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- PCS 7 Management Console
- Industrial Ethernet communication software for CP

Engineering Upgrade Package V7.1 to V8.1

SIMATIC PCS 7 engineering systems with Engineering Software V7.1 can be upgraded in two steps, initially to V8.0 and then to V8.1. Depending on the starting point, one of the two following versions of the SIMATIC PCS 7 Engineering Upgrade Package can be used:

- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, unlimited POs
  (with OS Runtime license for productive operation), for classic engineering station without limitation of engineering.
- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, 250 to 2 000 POs
  (with OS Runtime license for productive operation), for combined engineering/operator station in small applications

Any existing OS Runtime license is converted to a cumulative "Count Relevant License" during the course of the upgrade from V7.1 to V8.0. The number of OS Runtime POs is retained.

The licenses included in the Engineering Upgrade Package V7.1 to V8.1 apply to the following software products of SIMATIC PCS 7 Version 7.1:

- PCS 7 Engineering AS, OS, AS/OS (250 POs to 2 000 POs) or PCS 7 Engineering AS, OS, AS/OS (unlimited POs), each including redundancy
- PCS 7 Import-Export Assistant
- SIMATIC Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- Industrial Ethernet communication software for CP

SIMATIC Version Cross Manager Upgrade

The SIMATIC Version Cross Manager remains available in the version 7.1, and can be used in both SIMATIC PCS 7 V7.1 and in SIMATIC PCS 7 V8.0 and V8.1. Since upgrading is not essential, it is not included in the SIMATIC PCS 7 Engineering Upgrade Packages AS/OS V7.1/V8.0 to V8.1.

Advanced Engineering System Upgrade

The SIMATIC PCS 7 Advanced Engineering System Upgrade is offered as a separate product in addition to the SIMATIC PCS 7 Engineering Upgrade Package.

Since the SIMATIC PCS 7 Advanced Engineering System V8.0 (incl. SP1) can be used both in SIMATIC PCS 7 V8.0 and SIMATIC PCS 7 V8.1, only an upgrade from V7.1 to V8.0 (incl. SP1) is available.

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■ Ordering data	Article No.		Article No.

Engineering software

Engineering Software Upgrade from V8.0 auf V8.1, based on the existing number of POs		**Engineering Software Upgrade from V7.1 to V8.1**	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.0 to V8.1 Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		**SIMATIC PCS 7 Engineering Upgrade Package AS/OS V7.1 to V8.1** Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user; comprising: • SIMATIC PCS 7 Engineering Upgrade Package AS/OS V7.1 to V8.0 • SIMATIC PCS 7 Engineering Upgrade Package AS/OS V8.0 to V8.1	
5 languages (English, German, French, Italian, Spanish) • Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1	**6ES7651-5AX18-0YE5**	5 languages (English, German, French, Italian, Spanish) • Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1	
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7651-5AX18-0YK5**	- 250 to 2 000 POs (with OS Runtime license for productive operation)	**6ES7651-7AC18-0YE5**
		- Unlimited POs (without OS Runtime license for productive operation)	**6ES7651-7AF18-0YE5**
ASIA, 2 languages (English, Chinese) • Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1	**6ES7651-5AX18-0CE5**	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	
		- 250 to 2 000 POs (with OS Runtime license for productive operation)	**6ES7651-7AC18-0YK5**
		- Unlimited POs (without OS Runtime license for productive operation)	**6ES7651-7AF18-0YK5**

Advanced Engineering

SIMATIC PCS 7 Advanced Engineering System Upgrade V7.1 to V8.0 (incl. SP) 2 languages (English, German), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user • Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7658-1GX08-2YE5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-1GX08-2YK5**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

■ **Overview**

Upgrades combined in packages enable upgrading of existing Operator Systems V7.1/V8.0 to V8.1 with consideration of the number of existing process objects and archive variables.

OS Software Upgrades V8.0 from V8.1

The following Upgrade Packages for upgrading to V8.1 are offered for SIMATIC PCS 7 operator stations with OS Software V8.0:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

Two Upgrade Packages of type OS Single Station or OS Server are required in each case for redundant SIMATIC PCS 7 operator stations.

OS Software Upgrades V7.1 from V8.1

SIMATIC PCS 7 operator stations with OS Software V7.1 can be upgraded in two steps, initially to V8.0 and then to V8.1. Depending on the starting point, the following Upgrade Packages are available:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Server Redundancy Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

The OS Runtime licenses are converted to cumulative "Count Relevant Licenses" during the upgrade. The number of existing OS Runtime POs is retained.

The following table shows the number of Upgrade Packages required for upgrading the individual types of station.

Upgrade Package	Version	OS Single Station		OS server		OS Client
		Separate	Redundant	Separate	Redundant	
PCS 7 OS Single Station	V8.0 to V8.1	**1**	**2**	–	–	–
	V7.1 to V8.1	**1**	–	–	–	–
PCS 7 OS Single Station Redundancy	V7.1 to V8.1	–	**1**	–	–	–
PCS 7 OS Server	V8.0 to V8.1	–	–	**1**	**2**	–
	V7.1 to V8.1	–	–	**1**	–	–
PCS 7 OS Server Redundancy	V7.1 to V8.1	–	–	–	**1**	–
PCS 7 OS Client/SFC Visualization	V8.0 to V8.1	–	–	–	–	**1**
	V7.1 to V8.1	–	–	–	–	**1**

In addition to the licenses for the PCS 7 OS Software Single Station or Server, the Upgrade Packages for OS Single Station and OS Server include upgrade licenses for:

- SIMATIC PCS 7 SFC Visualization
- SIMATIC PCS 7 BCE
- Industrial Ethernet communication software for CP
- SIMATIC PCS 7 OpenPCS 7 and SIMATIC PCS 7 OpenPCS 7/OS Client

The upgrade license for SIMATIC PCS 7 SFC Visualization is furthermore part of the Upgrade Package SIMATIC PCS 7 OS Client/SFC Visualization.

Upgrade of the Web Option for OS

Using the SIMATIC PCS 7 OS Web Server Upgrade Package, you can upgrade the SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server and SIMATIC PCS 7 Web diagnostics clients from V7.1 or V8.0 to V8.1. When upgrading from V7.1 to V8.1 it is first necessary to upgrade to V8.0 and subsequently to V8.1.

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Ordering data	Article No.		Article No.

OS Software

OS Software Upgrade from V8.0 auf V8.1, based on the existing number of POs

SIMATIC PCS 7 OS Single Station Upgrade Package V8.0 to V8.1
For OS Single Station, software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
  (with SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-5AX18-0YE0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-5AX18-0YK0**

ASIA, 2 languages (English, Chinese)
- Delivery form package
  (with SIMATIC PCS 7 Software Media Package ASIA)
  ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7652-5AX18-0CE0**

SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1
For OS Server, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
  (with SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-5BX18-0YE0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-5BX18-0YK0**

ASIA, 2 languages (English, Chinese)
- Delivery form package
  (with SIMATIC PCS 7 Software Media Package ASIA)
  ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.1 — **6ES7652-5BX18-0CE0**

SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V8.0 to V8.1
Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license — **6ES7652-5CX18-0YF5**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-5CX18-0YK5**

ASIA, 2 languages (English, Chinese)
- Delivery form package
  (without SIMATIC PCS 7 Software Media Package ASIA)
  ASIA license key USB hardlock, certificate of license — **6ES7652-5CX18-0CF5**

OS Software Upgrade from V7.1 auf V8.1, based on the existing number of POs

SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.1
For OS Single Station, software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 1 installation; comprising:
- SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.0
- SIMATIC PCS 7 OS Single Station Upgrade Package V8.0 to V8.1

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
  (with SIMATIC PCS 7 Software Media Package)
  License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-8AX18-0YE0**
- Delivery form online
  (without SIMATIC PCS 7 Software Media Package)
  License key download, online certificate of license
  Note:
  E-mail address required! — **6ES7652-8AX18-0YK0**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

Ordering data	Article No.		Article No.

SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package V7.1 to V8.1
For OS Single Station Redundancy, software class A, runs with Windows 7 Ultimate 32/64-bit; single license for 2 installations; comprising:
- SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package V7.1 to V8.0
- 2 x SIMATIC PCS 7 OS Single Station Upgrade Package V8.0 to V8.1

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
(with SIMATIC PCS 7 Software Media Package)
License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-3AX18-2YE0**
- Delivery form online
(without SIMATIC PCS 7 Software Media Package)
License key download, online certificate of license
Note:
E-mail address required! — **6ES7652-3AX18-2YK0**

SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.1
For OS Redundancy Server, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 2 installations; comprising:
- SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.0
- 2 x SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
(with SIMATIC PCS 7 Software Media Package)
License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-3BX18-2YE0**
- Delivery form online
(without SIMATIC PCS 7 Software Media Package)
License key download, online certificate of license
Note:
E-mail address required! — **6ES7652-3BX18-2YK0**

SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.1
For OS Server, software class A, runs with Windows Server 2008 R2 Standard 64-bit; single license for 1 installation; comprising:
- SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.0
- SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
(with SIMATIC PCS 7 Software Media Package)
License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.1 — **6ES7652-8BX18-0YE0**
- Delivery form online
(without SIMATIC PCS 7 Software Media Package)
License key download, online certificate of license
Note:
E-mail address required! — **6ES7652-8BX18-0YK0**

SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.1 to V8.1
Software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user; comprising:
- SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.1 to V8.0
- SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V8.0 to V8.1

5 languages (English, German, French, Italian, Spanish)
- Delivery form package
(without SIMATIC PCS 7 Software Media Package)
License key USB stick, certificate of license — **6ES7652-8CX18-0YF5**
- Delivery form online
(without SIMATIC PCS 7 Software Media Package)
License key download, online certificate of license
Note:
E-mail address required! — **6ES7652-8CX18-0YK5**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Operator System incl. OpenPCS 7 and Web Option for OS

■ **Ordering data** | Article No. | | Article No.

Web option for OS

PCS 7 Web Server Upgrade from V8.0 to V8.1	
SIMATIC PCS 7 Web Server Upgrade Package V8.0 to V8.1 For SIMATIC PCS 7 Web Server, SIMATIC PCS 7 Web Diagnostics Server, SIMATIC PCS 7 Web Diagnostics Client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit (Web Server/Web Diagnostics Server) or Windows 7 Ultimate 32/64-bit (Web Diagnostics Client), single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7652-5DX18-0YF0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-5DX18-0YK0**

PCS 7 Web Server Upgrade from V7.1 to V8.1	
SIMATIC PCS 7 Web Server Upgrade Package V7.1 to V8.1 For SIMATIC PCS 7 Web Server, SIMATIC PCS 7 Web Diagnostics Server, SIMATIC PCS 7 Web Diagnostics Client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2008 R2 Standard 64-bit (Web Server/Web Diagnostics Server) or Windows 7 Ultimate 32/64-bit (Web Diagnostics Client), single license for 1 installation; comprising: • SIMATIC PCS 7 Web Server Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 Web Server Upgrade Package V8.0 to V8.1	
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7652-8DX18-0YF0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-8DX18-0YK0**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for Process Historian and Information Server

Overview

The upgrade licenses for Process Historian and Information Server are embedded in the SIMATIC PCS 7 OS Server Upgrade Package V8.0 to V8.1. The following table shows the number of SIMATIC PCS 7 OS Server Upgrade Packages V8.0 to V8.1 required for upgrading the various types of station.

A separate upgrade package is not required for a separate information server.

Upgrade Package	Single Server			Server Redundancy
	Process Historian plus Information Server	**Information Server**	**Process Historian**	**Process Historian**
PCS 7 OS Server Upgrade Package V8.0 to V8.1	1	–	1	2

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■ Overview

Maintenance Station Upgrade Package

Using the SIMATIC PCS 7 Maintenance Station Upgrade Packages, you can upgrade the SIMATIC PCS 7 Maintenance Station Runtime Basic Package as well as the SIMATIC PCS 7 Maintenance Station Engineering from V7.1 or V8.0 to V8.1. The SNMP OPC Server license is also involved.

When upgrading from V7.1 to V8.1 it is first necessary to upgrade to V8.0 and subsequently to V8.1.

The cumulative SIMATIC PCS 7 Maintenance Station Runtime licenses are independent of the version. Existing asset TAGs of these licenses are therefore completely available following the upgrade.

■ Ordering data

	Article No.
PCS 7 Maintenance Station Upgrade from V8.0 to V8.1	
SIMATIC PCS 7 Maintenance Station Upgrade Package V8.0 to V8.1 For installation on SIMATIC PCS 7 BOX, single station or server	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-5FX18-0YF0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-5FX18-0YK0
PCS 7 Maintenance Station Upgrade from V7.1 to V8.1	
SIMATIC PCS 7 Maintenance Station Upgrade Package V7.1 to V8.1 For installation on SIMATIC PCS 7 BOX, single station or server	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-8FX18-0YF0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-8FX18-0YK0

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1/V8.0 to V8.1

Upgrades for SIMATIC BATCH

Overview

SIMATIC BATCH Upgrade Packages

Upgrades combined in packages enable upgrading of existing SIMATIC BATCH systems from V7.x or V8.0 to V8.1:

SIMATIC BATCH Server Upgrade Package

With upgrade licenses for:
- SIMATIC BATCH Server
- SIMATIC BATCH Basic
- SIMATIC BATCH Single Station User
- SIMATIC BATCH Single Station System
- SIMATIC BATCH API
- PCS 7 BCE
- Industrial Ethernet communication software for CP

SIMATIC BATCH Client upgrade package

With upgrade licenses for:
- SIMATIC BATCH Client
- SIMATIC BATCH Recipe System

SIMATIC BATCH V7.0 and SIMATIC BATCH V7.1 are identical in their functions. When upgrading from V7.0/V7.1 to V8.1 it is first necessary to upgrade to V8.0 and subsequently to V8.1.

The cumulative SIMATIC BATCH UNITs are independent of the version. Existing UNITs are completely available following the upgrade.

Ordering data

	Article No.		Article No.
SIMATIC BATCH Upgrade from V8.0 to V8.1		**SIMATIC BATCH Upgrade from V7.0 or V7.1 to V8.1**	
SIMATIC BATCH Server Upgrade Package V8.0 to V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation		**SIMATIC BATCH Server Upgrade Package V7.x to V8.1** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7657-5XX18-0YF0	• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7657-8XX18-0YF0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7657-5XX18-0YK0	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7657-8XX18-0YK0
SIMATIC BATCH Client Upgrade Package V8.0 to V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		**SIMATIC BATCH Client Upgrade Package V7.x to V8.1** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7657-5XX18-0YF5	• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7657-8XX18-0YF5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7657-5XX18-0YK5	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7657-8XX18-0YK5

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■ Overview

SIMATIC Route Control Upgrade Package

With SIMATIC Route Control Upgrade Packages you can upgrade Route Control Engineering, Route Control Server and Route Control Center from V7.x or V8.0 to V8.1. The number of existing "Routes" (quantity option for number of simultaneous material transports) is retained when upgrading.

SIMATIC Route Control V7.0 and SIMATIC Route Control V7.1 are identical in their functions. When upgrading from V7.0/V7.1 to V8.1 it is first necessary to upgrade to V8.0 and subsequently to V8.1. When upgrading to V8.0, the "Routes" are converted into cumulative "Count Relevant Licenses".

SIMATIC Route Control Center Upgrades which are only available online allow separate upgrading of the Route Control Center software from V7.0 or V7.1 to V8.0 and V8.0 to V8.1.

■ Ordering data

	Article No.		Article No.
SIMATIC Route Control Upgrade from V8.0 to V8.1		**SIMATIC Route Control Upgrade from V7.0 or V7.1 to V8.1**	
SIMATIC Route Control Upgrade Package V8.0 to V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation		**SIMATIC Route Control Upgrade Package V7.x to V8.1** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-5XX18-0YF0	• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-8XX18-0YF0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-5XX18-0YK0	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-8XX18-0YK0
SIMATIC Route Control Center Upgrade V8.0 to V8.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		**SIMATIC Route Control Center Upgrade** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-7EX18-0YK0	• V7.x to V8.0, delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-7EX08-0YK5
		• V8.0 to V8.1, delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-7EX18-0YK0

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1 to V8.0

Upgrades for engineering system

■ Overview

Engineering Upgrade Package

SIMATIC PCS 7 engineering systems with Engineering Software V7.1 can be upgraded to Version 8.0 using the SIMATIC PCS 7 Engineering Upgrade Package. One of the following two versions of the SIMATIC PCS 7 Engineering Upgrade Packages can be used depending on the starting configuration:

- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, unlimited POs
  (with OS Runtime license for productive operation), for classic engineering station without limitation of engineering.
- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, 250 to 2 000 POs
  (with OS Runtime license for productive operation), for combined engineering/operator station in small applications

Any existing OS Runtime license is converted to a cumulative "Count Relevant License" during the course of upgrade. The number of OS Runtime POs is retained.

The licenses included in the Engineering Upgrade Package V7.1 to V8.0 apply to the following software products of SIMATIC PCS 7 Version 7.1:

- PCS 7 Engineering AS, OS, AS/OS (250 POs to 2 000 POs) or PCS 7 Engineering AS, OS, AS/OS (unlimited POs), each including redundancy
- PCS 7 Import-Export Assistant
- Version Cross Manager
- Version Trail
- PCS 7 SFC Visualization
- PCS 7 BCE
- SIMATIC HARDNET-IE S7

Advanced Engineering Upgrade

Additive to the SIMATIC PCS 7 Engineering Upgrade Package AS/OS, a separate upgrade for V8.0 is available for the SIMATIC PCS 7 Advanced Engineering System V7.1.

■ Ordering data

	Article No.		Article No.
Engineering software			
Engineering Software Upgrade from V7.1 to V8.0		ASIA, 2 languages (English, Chinese)	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V7.1 to V8.0 Software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		• Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.0	
5 languages (English, German, French, Italian, Spanish)		- 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC08-0CE5
• Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.0		- Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF08-0CE5
- 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC08-0YE5	**Advanced Engineering**	
- Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF08-0YE5	**SIMATIC PCS 7 Advanced Engineering System Upgrade V7.1 to V8.0** 2 languages (English, German), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!		• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-1GX08-2YE5
- 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC08-0YK5	• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-1GX08-2YK5
- Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF08-0YK5		

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■ Overview

Upgrades combined in packages enables upgrading of existing V7.1 operator systems to V8.0.

Upgrades of OS software

The upgrade of the SIMATIC PCS 7 OS Software V7.1 to V8.0 is included on the following OS Software Upgrade Packages:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Server Redundancy Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

This permits archiving according to the number of existing process objects and archive variables.

The OS Runtime licenses are converted to cumulative "Count Relevant Licenses" during the upgrade. The number of existing OS Runtime POs is retained.

The following table shows which and how many products are upgraded with the various upgrade packages.

	OS Single Stations		OS Server		OS Clients
	Separate	Redundant	Separate	Redundant	
Upgrade Package	**OS Single Station**	**OS Single Station Redundancy**	**OS Server**	**OS Server Redundancy**	**OS Client/ SFC Visualization**
PCS 7 OS Software Single Station (all PO versions)	1	–	–	–	–
PCS 7 OS Software Single Station with WinCC Redundancy (all PO variants)	–	2	–	–	–
PCS 7 OS Software Server (all PO versions)	–	–	1	–	–
PCS 7 OS Software Server with WinCC Redundancy (all PO variants)	–	–	–	2	–
PCS 7 OS Software Client	–	–	–	–	1
Central Archive Server (CAS)	–	–	0	0	–
PCS 7 StoragePlus	1	2	1	2	–
PCS 7 SFC Visualization	1	2	1	2	1
PCS 7 BCE	1	2	1	2	–
SIMATIC NET S7-1613 for Industrial Ethernet	1	2	1	2	–
PCS 7 OpenPCS 7 Server/OS Client (multi-functional)	1	2	1	2	–
PCS 7 OpenPCS 7 Server (stand-alone)	1	2	1	2	–

OS Archiving Upgrades

StoragePlus Upgrade

The SIMATIC PCS 7 StoragePlus Upgrade from StoragePlus V7.1 to V8.0 is part of the following OS software upgrade packages:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Server Redundancy Upgrade Package

Central Archive Server (CAS) Upgrade

A separate Central Archive Server Basic Upgrade Package enables the upgrade of the Central Archive Server (CAS) from V7.1 to V8.0. If the CAS has a redundant configuration, two Central Archive Server Basic Upgrade Packages are required for the upgrade.

Upgrade of the Web Option for OS

Using the SIMATIC PCS 7 OS Web Server Upgrade Package, you can upgrade the SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server and SIMATIC PCS 7 Web diagnostics clients from V7.1 to V8.0.

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1 to V8.0

Upgrades for operator system

■ Ordering data	Article No.		Article No.

OS software

		SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.0	
OS software upgrade from V7.1 to V8.0, based on the existing number of POs		For OS Server, software class A, runs with Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.0 For OS Single Station, software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, single license for 1 installation		• 5 languages (English, German, French, Italian, Spanish)	
• 5 languages (English, German, French, Italian, Spanish)		- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.0	**6ES7658-2BX08-0YE0**
- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.0	**6ES7658-2AX08-0YE0**		
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-2AX08-0YK0**	- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-2BX08-0YK0**
• ASIA, 2 languages (English, Chinese)		• ASIA, 2 languages (English, Chinese)	
- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.0	**6ES7658-2AX08-0CE0**	- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.0	**6ES7658-2BX08-0CE0**
SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package V7.1 to V8.0 For OS Single Station Redundancy, software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, single license for 2 installations		**SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.0** For OS Server Redundancy, software class A, runs with Windows Server 2003 R2 Standard 32-bit, Windows 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, single license for 2installations	
• 5 languages (English, German, French, Italian, Spanish)		• 5 languages (English, German, French, Italian, Spanish)	
- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.0	**6ES7652-3AX08-2YE0**	- Delivery form package (with SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package V8.0	**6ES7652-3BX08-2YE0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-3AX08-2YK0**	- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-3BX08-2YK0**
• ASIA, 2 languages (English, Chinese)		• ASIA, 2 languages (English, Chinese)	
- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) 2 x ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.0	**6ES7652-3AX08-2CE0**	- Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA) 2 x ASIA license key USB hardlock, certificate of license, software DVDs and certificate of license for SIMATIC PCS 7 Software Media Package ASIA V8.0	**6ES7652-3BX08-2CE0**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1 to V8.0

Ordering data	Article No.
SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.1 to V8.0 Software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• 5 languages (English, German, French, Italian, Spanish)	
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-5CX08-0YF5
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-5CX08-0YK5
• ASIA, 2 languages (English, Chinese)	
- Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license	6ES7652-5CX08-0CF5

OS archiving

	Article No.
StoragePlus	
Note: The SIMATIC PCS 7 StoragePlus Upgrade from StoragePlus V7.1 to V8.0 is part of the following upgrade packages: • SIMATIC PCS 7 OS Single Station Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 OS Single Station Redundancy Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 OS Server Upgrade Package V7.1 to V8.0 • SIMATIC PCS 7 OS Server Redundancy Upgrade Package V7.1 to V8.0	
Central Archive Server (CAS)	
SIMATIC PCS 7 Central Archive Server Basic Upgrade Package V7.1 to V8.0 Software class A, runs with Windows Server 2003 R2 Standard 32-bit, single license for 1 installation	
• 5 languages (English, German, French, Italian, Spanish)	
- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7658-2FX08-2YF0
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7658-2FX08-2YK0
• ASIA, 2 languages (English, Chinese)	
- Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA) ASIA license key USB hardlock, certificate of license	6ES7658-2FX08-2CF0

Web option for OS

	Article No.
SIMATIC PCS 7 Web Server Upgrade Package V7.1 to V8.0 For SIMATIC PCS 7 Web Server, SIMATIC PCS 7 Web Diagnostics Server, SIMATIC PCS 7 Web Diagnostics Client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit (Web Server/Web Diagnostics Server) or Windows XP Professional 32-bit or Windows 7 Ultimate 32/64-bit (Web Diagnostics Client), single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	6ES7652-5DX08-0YF0
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	6ES7652-5DX08-0YK0

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V7.1 to V8.0

Upgrades for maintenance station, upgrades for SIMATIC BATCH

Overview

Maintenance Station Upgrade Package

Using the SIMATIC PCS 7 Maintenance Station Upgrade Package, you can upgrade the SIMATIC PCS 7 Maintenance Station Runtime Basic Package as well as the SIMATIC PCS 7 Maintenance Station Engineering from V7.1 to V8.0. The SNMP OPC Server license is also involved.

The SIMATIC PCS 7 Maintenance Station Runtime licenses introduced with SIMATIC PCS 7 V7.1 are no longer associated with a specific SIMATIC PCS 7 version. The cumulative asset TAGs of existing SIMATIC PCS 7 Maintenance Station Runtime licenses therefore continue to be available following the upgrade.

Ordering data | Article No.

SIMATIC PCS 7 Maintenance Station Upgrade Package V7.1 to V8.0 For installation on SIMATIC PCS 7 BOX, single station or server 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7652-5FX08-0YF0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7652-5FX08-0YK0**

Overview

SIMATIC BATCH Upgrade Packages

Upgrades combined in two packages enable upgrading of existing SIMATIC BATCH systems from V7.0 or V7.1 to V8.0.

Note:

SIMATIC BATCH V7.0 and SIMATIC BATCH V7.1 are identical in their functions. Therefore, both versions can be upgraded with the following upgrade packages.

SIMATIC BATCH Server Upgrade Package

The SIMATIC BATCH Server Upgrade Package contains upgrade licenses for

- SIMATIC BATCH Server (including all UNIT options and PowerPacks)
- SIMATIC BATCH Recipe System
- SIMATIC BATCH Hierarchical Recipe
- SIMATIC BATCH Separation Procedures/Formulas
- SIMATIC BATCH ROP Library
- SIMATIC BATCH BatchCC
- SIMATIC BATCH API

SIMATIC BATCH Client Upgrade Package

The SIMATIC BATCH Client Upgrade Package contains upgrade licenses for:

- SIMATIC BATCH Recipe System
- SIMATIC BATCH Batch Planning
- SIMATIC BATCH BatchCC

The SIMATIC BATCH UNITs (instances of plant units) are converted to cumulative "Count Relevant Licenses" during the upgrade. The number of the existing UNITs is retained in this case.

Ordering data | Article No.

SIMATIC BATCH Server Upgrade Package V7.x to V8.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7657-5XX08-0YF0**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7657-5XX08-0YK0**
SIMATIC BATCH Client Upgrade Package V7.x to V8.0 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license	**6ES7657-5XX08-0YF5**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7657-5XX08-0YK5**

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■ Overview

SIMATIC Route Control Upgrade Package

You can use the SIMATIC Route Control Upgrade Package V7.x to V8.0 to upgrade the Route Control Engineering, Route Control Server and Route Control Center from V7.0 or V7.1 to V8.0. The SIMATIC Route Control Center Upgrade V7.x to V8.0 (only available online) allows separate upgrading of the Route Control Center software from V7.0 or V7.1 to V8.0.

Note:

Since SIMATIC Route Control V7.0 and SIMATIC Route Control V7.1 are functionally identical, the SIMATIC Route Control Upgrade Package V7.x to V8.0 and SIMATIC Route Control Center Upgrade V7.x to V8.0 can be used for both versions.

During the upgrade, the "Routes" (quantity option for the number of simultaneous material transports) are converted in cumulative "Count Relevant Licenses". The number of the existing "Routes" is retained in this case.

■ Ordering data

SIMATIC Route Control Upgrade Package V7.x to V8.0
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation

- Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license — **6ES7652-5BX08-0YF0**
- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required! — **6ES7652-5BX08-0YK0**

SIMATIC Route Control Center Upgrade V7.x to V8.0
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, Windows Server 2008 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user

- Delivery form online (without SIMATIC PCS 7 Software Media Package) License key download, online certificate of license Note: E-mail address required! — **6ES7658-7EX08-0YK5**

■ Overview

SIMATIC PCS 7 TeleControl Upgrade Package

You can use the SIMATIC PCS 7 TeleControl Upgrade Package V7.1 to V8.0 to upgrade the SIMATIC PCS 7 TeleControl software included in the software products of the SIMATIC PCS 7 TeleControl V7.1 product range to V8.0.
The SIMATIC PCS 7 ES and OS Software V7.1 combined in certain software products can be upgraded separately to V8.0 using the upgrade packages in the chapters "Upgrades for engineering system" and "Upgrades for operator system".

■ Ordering data

SIMATIC PCS 7 TeleControl Upgrade Package V7.1 to V8.0
Software package without SIMATIC PCS 7 ES/OS Software V8.0

2 languages (English, German), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit; single license for 1 installation

Note: SIMATIC PCS 7 ES and OS software V7.1 included in certain software packages must be upgraded to V8.0 using separate upgrade packages.

- Delivery form package (without SIMATIC PCS 7 Software Media Package) DVD "PCS 7 TeleControl V8.0", license key on USB stick, certificate of license and product information — **6ES7652-5GX08-0YE0**

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V6.x/V7.0 to V7.1

Upgrades for engineering system

■ Overview

SIMATIC PCS 7 engineering systems with Engineering Software V6.x or V7.0 can be upgraded to Version 7.1 using the SIMATIC PCS 7 Engineering Upgrade Package. The SIMATIC PCS 7 Engineering Upgrade Packages V6.x to V7.1 and V7.0 to V7.1 are each available in two versions:

- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, 250 to 2 000 POs (with OS Runtime license for productive operation)
- SIMATIC PCS 7 Engineering Upgrade Package AS/OS, unlimited POs (with OS Runtime license for productive operation)

Engineering Upgrade Package V7.0 to V7.1

The licenses included in the Engineering Upgrade Package V7.0 to V7.1 apply to the following software components of SIMATIC PCS 7 version 7.0:

- PCS 7 Engineering AS, OS, AS/OS (250 POs to 2 000 POs)[1] or
  PCS 7 Engineering AS, OS, AS/OS (POs unlimited)[1]
- PCS 7 Import/Export Assistant
- Version Cross Manager
- Version Trail
- PCS 7 SFC Visualization
- WinCC Redundancy
- PCS 7 AS Runtime License (AS Runtime PO)
- PCS 7 BCE
- SIMATIC NET S7-1613 for Industrial Ethernet

Engineering Upgrade Package V6.x to V7.1

The licenses included in the Engineering Upgrade Package V6.x to V7.1 apply to the following software components of SIMATIC PCS 7 version 6.0/6.1:

- PCS 7 Engineering AS, OS, AS/OS (250 POs to 2 000 POs) or PCS 7 Engineering AS, OS, AS/OS (unlimited POs)
- PCS 7 Import/Export Assistant
- Version Cross Checker
- Version Trail
- PCS 7 PID-Tuner
- PCS 7 SFC Visualization
- WinCC Redundancy
- PCS 7 BCE
- SIMATIC NET S7-1613 for Industrial Ethernet

Note:

The PO Upgrade licenses included in the SIMATIC PCS 7 Engineering Upgrade Package V6.x to V7.1 convert the POs of the CFC licenses counted in SIMATIC PCS 7 V6.x into AS Runtime licenses. Corresponding to the scope of the CFC license of your PCS 7 Engineering Software V6.x (250 POs, 1 000 POs, 2 000 POs, 3 000 POs, 5 000 POs or 8 500 POs), you have the identical number of AS Runtime POs in each case for AS Runtime operation following the upgrade to V7.1.

[1] The SIMATIC PCS 7 engineering upgrade packages AS/OS V7.0 to V7.1, order no. 6ES7651-5AC17-0YH5 and 6ES7651-5AF17-0YH5, require that the licenses of the existing AS runtime POs have already been updated in accordance with SIMATIC PCS 7 V7.0+SP1. If this requirement is not met, you can order a "License Upgrade Package" for upgrading your AS runtime PO using Order no. S79220-A9438-P:

AS Runtime POs corresponding with SIMATIC PCS 7 V7.0+SP1 are also valid for SIMATIC PCS 7 V7.1. These AS Runtime POs can be used in SIMATIC PCS 7 V7.1 without a license upgrade.

■ Ordering data — Article No.

Engineering software

Ordering data	Article No.
Engineering software upgrade from V7.0 to V7.1	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V7.0 to V7.1 Software class A, runs with Windows XP Professional, floating license for 1 user	
5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	
• 250 to 2 000 POs[1] (with OS Runtime license for productive operation)	6ES7651-5AC17-0YH5
• Unlimited POs[1] (without OS Runtime license for productive operation)	6ES7651-5AF17-0YH5
ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	
• 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC17-0CH5
• Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF17-0CH5
Upgrade of engineering software from V6.0/V6.1 to V7.1	
SIMATIC PCS 7 Engineering Upgrade Package AS/OS V6.x to V7.1 Software class A, runs with Windows XP Professional, floating license for 1 user	
5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	
• 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC17-0YE5
• Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF17-0YE5
ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	
• 250 to 2 000 POs (with OS Runtime license for productive operation)	6ES7651-5AC17-0CE5
• Unlimited POs (without OS Runtime license for productive operation)	6ES7651-5AF17-0CE5

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■ Overview

Upgrades combined in packages permit upgrading of existing operator systems V6.x or V7.0 to V7.1.

Upgrades of OS software

The upgrade of the SIMATIC PCS 7 OS Software V6.x to V7.1 and V7.0 to V7.1 is divided on the following OS Upgrade Packages in each case:

- SIMATIC PCS 7 OS Single Station Upgrade Package
- SIMATIC PCS 7 OS Server Upgrade Package
- SIMATIC PCS 7 OS Client/SFC Visualization Upgrade Package

This permits archiving according to the number of existing process objects and archive variables.

Upgrade packages	SIMATIC PCS 7 OS Single Station Upgrade Package	SIMATIC PCS 7 OS Server Upgrade Package	SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package
Content	for OS Single Stations	for OS Server and central archive server	for OS clients
PCS 7 OS Software Single Station (all PO versions)	●		
PCS 7 OS Software Server (all PO versions)		●	
PCS 7 OS Software Client			●
Central archive server basic package		●	
PCS 7 Archive (archive TAGs)	●	●	
PCS 7 StoragePlus	●	●	
PCS 7 SFC Visualization	●	●	●
WinCC Redundancy	●	●	
PCS 7 BCE	●	●	
SIMATIC NET S7-1613 for Industrial Ethernet	●	●	
PCS 7 OpenPCS 7 Server/OS Client (multi-functional)	●	●	
PCS 7 OpenPCS 7 Server (stand-alone)	●	●	

Upgrade of OS long-term archiving

SIMATIC PCS 7 Upgrade StoragePlus

- The SIMATIC PCS 7 Upgrade StoragePlus V1.0/V1.1 to V1.3 is part of the SIMATIC PCS 7 OS Single Station Upgrade Package V6.x to V7.1 and the SIMATIC PCS 7 OS Server Upgrade Package V6.x to V7.1.
- The SIMATIC PCS 7 Upgrade StoragePlus V1.2 to V1.3 is part of the SIMATIC PCS 7 OS Single Station Upgrade Package V7.0 to V7.1 and the SIMATIC PCS 7 OS Server Upgrade Package V7.0 to V7.1.

Central Archive Server (CAS) Upgrade

The upgrade of the central archive server (CAS) based on OS software servers and additive PCS 7 archive licenses (archive variables) is, depending on the initial version, part of the SIMATIC PCS 7 OS Server Upgrade Package V6.x to V7.1 or V7.0 to V7.1.

SIMATIC PCS 7 OS Web upgrade

Using the SIMATIC PCS 7 OS Web Server Upgrade Package, you can upgrade the SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server and SIMATIC PCS 7 Web diagnostics clients from V6.1 to V7.1 or from V7.0 to V7.1.

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V6.x/V7.0 to V7.1

Upgrades for operator system

■ **Ordering data**   Article No.   Article No.

OS software

OS Software Upgrade from V7.0 to V7.1, based on the existing number of POs	Article No.	OS Software Upgrade from V6.0/ V6.1 to V7.1, based on the existing number of POs	Article No.
SIMATIC PCS 7 OS Single Station Upgrade Package V7.0 to V7.1 for OS Single Station, software class A, runs with Windows XP Professional, single license for 1 installation		**SIMATIC PCS 7 OS Single Station Upgrade Package V6.x to V7.1** for OS Single Station, software class A, runs with Windows XP Professional, single license for 1 installation	
• 5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	6ES7658-2AX17-0YH0	• 5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	6ES7658-2AX17-0YE0
• ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	6ES7658-2AX17-0CH0	• ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	6ES7658-2AX17-0CE0
SIMATIC PCS 7 OS Server Upgrade Package V7.0 to V7.1 for OS Server and archive server, software class A, runs with Windows Server 2003, single license for 1 installation		**SIMATIC PCS 7 OS Server Upgrade Package V6.x to V7.1** for OS Server and archive server, software class A, runs with Windows Server 2003, single license for 1 installation	
• 5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	6ES7658-2BX17-0YH0	• 5 languages (English, German, French, Italian, Spanish) Delivery form package (with SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license as well as SIMATIC PCS 7 Software Media Package V7.1	6ES7658-2BX17-0YE0
• ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	6ES7658-2BX17-0CH0	• ASIA, 2 languages (English, Chinese) Delivery form package (with SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license as well as SIMATIC PCS 7 Software Media Package ASIA V7.1	6ES7658-2BX17-0CE0
SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V7.0 to V7.1 Software class A, runs with Windows XP Professional, floating license for 1 user		**SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V6.x to V7.1** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional, floating license for 1 user	
• 5 languages (English, German, French, Italian, Spanish) Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license	6ES7652-5CX17-0YH5	• 5 languages (English, German, French, Italian, Spanish) Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license	6ES7652-5CX17-0YE5
• ASIA, 2 languages (English, Chinese) Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license	6ES7652-5CX17-0CH5	• ASIA, 2 languages (English, Chinese) Delivery form package (without SIMATIC PCS 7 Software Media Package ASIA): ASIA license key USB hardlock, certificate of license	6ES7652-5CX17-0CE5

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■ **Ordering data**	Article No.		Article No.

OS long-term archiving

SIMATIC PCS 7 Upgrade StoragePlus

Note:
- The SIMATIC PCS 7 Upgrade StoragePlus V1.0/V1.1 to V1.3 is part of the SIMATIC PCS 7 OS Single Station Upgrade Package V6.x to V7.1 and the SIMATIC PCS 7 OS Server Upgrade Package V6.x to V7.1.
- The SIMATIC PCS 7 Upgrade StoragePlus V1.2 to V1.3 is part of the SIMATIC PCS 7 OS Single Station Upgrade Package V7.0 to V7.1 and the SIMATIC PCS 7 OS Server Upgrade Package V7.0 to V7.1.

Upgrade of Central Archive Server (CAS)

Note:
- The upgrade of the central archive server (CAS) from V6.0/V6.1 to V7.1 is part of the SIMATIC PCS 7 OS Server Upgrade Package V6.x to V7.1.
- The upgrade of the central archive server (CAS) from V7.0 to V7.1 is part of the SIMATIC PCS 7 OS Server Upgrade Package V7.0 to V7.1.

OS Web Upgrade Package

OS Web Upgrade Package V7.0 to V7.1

SIMATIC PCS 7 OS Web Server Upgrade Package V7.0 to V7.1 — 6ES7652-5DX17-0YJ0
for SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server, SIMATIC PCS 7 Web diagnostics client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2003 or Windows XP Professional (web diagnostics client), single license for 1 installation

Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license

OS Web Upgrade Package V6.1 to V7.1

SIMATIC PCS 7 OS Web Server Upgrade Package V6.1 to V7.1 — 6ES7652-5DX17-0YF0
for SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server, SIMATIC PCS 7 Web diagnostics client, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows Server 2003 or Windows XP Professional (web diagnostics client), single license for 1 installation

Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V6.x/V7.0 to V7.1

Upgrades for SIMATIC BATCH

■ Overview

SIMATIC BATCH Upgrade from V6.x to V7.1

The following two SIMATIC BATCH Upgrade Packages permit upgrading of the SIMATIC BATCH Software V6.x to V7.1 depending on the number of existing batch process objects (Batch POs):

SIMATIC BATCH Client Upgrade Package

The SIMATIC BATCH Client Upgrade Package contains upgrade licenses for:

- SIMATIC BATCH Recipe System
- SIMATIC BATCH Batch Planning
- SIMATIC BATCH BatchCC

SIMATIC BATCH Server Upgrade Package

The SIMATIC BATCH Server Upgrade Package contains upgrade licenses for

- SIMATIC BATCH Server (including all PO options and Power-Packs)
- SIMATIC BATCH Hierarchical Recipe
- SIMATIC BATCH ROP Library
- SIMATIC BATCH Separation Procedures/Formulas
- SIMATIC BATCH API

When upgrading, the existing Batch POs are converted into UNITs (instances of plant units). One UNIT corresponds to 15 Batch POs.

SIMATIC BATCH Upgrade from V7.0 to V7.1

You do not require any special upgrade packages for upgrading from SIMATIC BATCH V7.0 to V7.1. Since SIMATIC BATCH is completely integrated in SIMATIC PCS 7, the SIMATIC BATCH V7.1 software is available anyway with the SIMATIC PCS 7 Software Media Packages of the ES/OS upgrade packages.

In addition to the V7.1 licenses, the existing V7.0 licenses are also authorized for licensing of the SIMATIC BATCH V7.1 software.

The Certificate of License for SIMATIC BATCH V7.0 is also valid for SIMATIC BATCH V7.1.

■ Ordering data

	Article No.
SIMATIC BATCH Upgrades V7.0 to V7.1	
No special upgrade packages are required for upgrading from SIMATIC BATCH V7.0 to V7.1. The SIMATIC BATCH V7.1 software is available with the SIMATIC PCS 7 Software Media Packages of the ES/OS upgrade packages. The existing V7.0 licenses are authorized for licensing.	
SIMATIC BATCH Upgrade Packages V6.0/V6.1 to V7.1, based on the existing number of POs	
SIMATIC BATCH Client Upgrade Package V6.x to V7.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional or Windows Server 2003, floating license for 1 user Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license	6ES7657-5XX17-0YF5
SIMATIC BATCH Server Upgrade Package V6.x to V7.1 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package): License key on USB stick, certificate of license	6ES7657-5XX17-0YF0

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■ **Overview**

SIMATIC Route Control Upgrade from V6.x to V7.1

You can use the SIMATIC Route Control Upgrade Package V6.x to V7.1 to upgrade the Route Control Engineering, Route Control Server and Route Control Client software components from V6.0 or V6.1 to V7.1. The BCE license PCS 7 BCE and SIMATIC NET S7-1613 for Industrial Ethernet are also involved in the Upgrade Package.

SIMATIC Route Control Upgrade from V7.0 to V7.1

You do not require any special upgrade packages for upgrading from SIMATIC Route Control V7.0 to V7.1. Since SIMATIC Route Control is completely integrated in SIMATIC PCS 7, the SIMATIC Route Control V7.1 software is available anyway with the SIMATIC PCS 7 Software Media Packages of the ES/OS upgrade packages.

In addition to the V7.1 licenses, the existing V7.0 licenses are also authorized for licensing of the SIMATIC Route Control V7.1 software.

The Certificate of License for SIMATIC Route Control V7.0 is also valid for SIMATIC Route Control V7.1.

■ **Ordering data**   **Article No.**

SIMATIC Route Control Upgrade Package V7.0 to V7.1	
No special upgrade packages are required for upgrading from SIMATIC Route Control V7.0 to V7.1. The SIMATIC Route Control V7.1 software is available with the SIMATIC PCS 7 Software Media Packages of the ES/OS upgrade packages. The existing V7.0 licenses are authorized for licensing.	
SIMATIC Route Control Upgrade Package V6.0/6.1 to V7.1	
SIMATIC Route Control Upgrade Package V6.x to V7.1 for Route Control Engineering, Route Control Server and Route Control Center, suitable for single station and client/server configuration	**6ES7652-5BX17-0YF0**
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional or Windows Server 2003, single license for 1 installation	
Delivery form package (without SIMATIC PCS 7 Software Media Package) License key on USB stick, certificate of license	

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Update/upgrade packages
Upgrades from SIMATIC PCS 7 V6.x/V7.0 to V7.1

Upgrades for Maintenance Station

■ Overview

SIMATIC PCS 7 Maintenance Station Upgrade

With a SIMATIC PCS 7 Maintenance Station Upgrade Package matching the initial version, you can upgrade SIMATIC PCS 7 Asset Engineering as well as all TAG versions of SIMATIC PCS 7 Asset Runtime from V6.1 or V7.0 to V7.1. The respective SNMP OPC server license is also involved.

SIMATIC PCS 7 Maintenance Station Upgrade V7.0 to V7.1

The SIMATIC PCS 7 Maintenance Station Runtime licenses introduced with SIMATIC PCS 7 V7.1 are no longer associated with a specific SIMATIC PCS 7 version. However, they cannot be used retrospectively with SIMATIC PCS 7 V6.1 and V7.0.

In the case of a Maintenance Station upgrade from V7.0 to V7.1, you must convert the Runtime licenses for 10/100/1000 asset TAGs (Count Relevant Licenses) purchased with the "SIMATIC PCS 7 Asset Runtime Basic Package V7.0" and "SIMATIC PCS 7 Asset Runtime V7.0" products into corresponding SIMATIC PCS 7 Maintenance Station Runtime licenses. We offer the Maintenance Station RT update package, order no. S79220-B1454-P, for this conversion. With a Maintenance Station RT update package, you can convert 10 x 10, 10 x 100 and 10 x 1 000 asset TAGs respectively.

SIMATIC PCS 7 Maintenance Station Upgrade V6.1 to V7.1

The Update Package Maintenance Station RT, Order no. S79220-B1454-P, is not relevant to the Maintenance Station Upgrade from V6.1 to V7.1. Since the runtime licenses of SIMATIC PCS 7 Asset Runtime V6.1 are not of the Count Relevant License type, their conversion can be carried out using the "SIMATIC PCS 7 Maintenance Station Upgrade Package V6.1 to V7.1".

■ Ordering data

	Article No.
SIMATIC PCS 7 Maintenance Station Upgrade V7.0 to V7.1	
SIMATIC PCS 7 Maintenance Station Upgrade Package V7.0 to V7.1 for Asset Engineering and Asset Runtime, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) License key on USB stick, certificate of license	6ES7652-5FX17-0YJ0
SIMATIC PCS 7 Maintenance Station Update Package RT For converting the runtime licenses for 10/100/1000 asset TAGs (Count Relevant Licenses) supplied with the SIMATIC PCS 7 Asset Runtime Basic Package V7.0 and SIMATIC PCS 7 Asset Runtime V7.0 products, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) License key on USB stick, certificate of license	S79220-B1454-P
SIMATIC PCS 7 Maintenance Station Upgrade V6.1 to V7.1	
SIMATIC PCS 7 Maintenance Station Upgrade Package V6.1 to V7.1 for Asset Engineering and Asset Runtime, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs on Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) License key on USB stick, certificate of license	6ES7652-5FX17-0YF0

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■ **Overview**

SIMATIC PCS 7 engineering systems with Engineering Software V6.0 or V6.1 can be upgraded to Version 7.0 using the SIMATIC PCS 7 Engineering Upgrade Package.

Engineering Upgrade Package V6.x to V7.0

The licenses included in the Engineering Upgrade Package V6.x to V7.0 apply to the following software components of SIMATIC PCS 7 version 6.0/6.1:

- PCS 7 Engineering AS (all PO versions)
- PCS 7 Engineering OS (all PO versions)
- Version Cross Checker
- Version Trail
- Import/Export Assistant
- PCS 7 PID-Tuner
- WinCC Redundancy
- SFC Visualization
- BCE License
- SIMATIC NET S7-1613 for Industrial Ethernet

Note:

The PO Upgrade licenses included in the SIMATIC PCS 7 Engineering Upgrade Package V6.x to V7.0 convert the POs of the CFC licenses counted in SIMATIC PCS 7 V6.x into AS Runtime licenses. Corresponding to the scope of the CFC license of your PCS 7 Engineering Software V6.x (250 POs, 1 000 POs, 2 000 POs, 3 000 POs, 5 000 POs or 8 500 POs), you thus have the identical number of AS RT POs in each case for AS Runtime operation following the upgrade to V7.0.

■ **Ordering data**   **Article No.**

Upgrade of engineering software from V6.0/V6.1 to V7.0

SIMATIC PCS 7 Engineering Upgrade Package V6.x to V7.0 for AS/OS engineering
3 languages (English, German, French), software class A, runs with Windows XP Professional, floating license for 1 user

6ES7651-5AX07-0YE5

Delivery form package:
License key disks, certificate of license with terms and conditions; PCS 7 V7.0 Toolset DVDs, Microsoft SQL Server 2005 including EULA and supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)

Update/upgrade packages
SIMATIC PCS 7 upgrades V6.x to V7.0

Upgrades for operator system

■ Overview

Upgrades combined in packages permit upgrading of existing operator systems V6.0 or V6.1 to V7.0.

Upgrades of OS software

The upgrades for all PO versions of the OS software from V6.0/V6.1 to V7.0 are distributed between the following two OS upgrade packages:

SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0

for OS single stations/OS servers (including archive servers), with:

• PCS 7 OS Software Single Station (all PO versions)
• PCS 7 OS Software Server (all PO versions as well as archives)
• PCS 7 SFC Visualization
• StoragePlus
• WinCC Redundancy
• PCS 7 BCE
• SIMATIC NET S7-1613 for Industrial Ethernet

SIMATIC PCS 7 OS Client / SFC Visualization Upgrade Package V6.0/V6.1 to V7.0

for OS Clients, with:

• PCS 7 OS Software Client
• PCS 7 SFC Visualization

Upgrade of OS long-term archiving

SIMATIC Upgrade StoragePlus V1.0/V1.1 to V1.2

The SIMATIC Upgrade StoragePlus V1.0/V1.1 to V1.2 is part of the SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0

Central Archive Server (CAS) Upgrade V6.0/V6.1 to V7.0

The upgrade of the central archive server (CAS) based on OS software servers and additive OS Archive PowerPacks from V6.0/V6.1 to V7.0 is part of the SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0

SIMATIC PCS 7 OS Web upgrade

Using the SIMATIC PCS 7 OS Web Server Upgrade Package, you can upgrade the SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server and SIMATIC PCS 7 Web diagnostics clients from V6.1 to V7.0.

■ Ordering data — Article No.

OS Software

Upgrades of OS software from V6.0/V6.1 to V7.0	
OS upgrade packages for upgrading all PO versions from V6.0/V6.1 to V7.0	
SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0 for OS single station, OS server and archive server, 5 languages (English, German, French, Italian, Spanish), software class A, executes under Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package: License key disk, certificate of license, with terms and conditions; PCS 7 V7.0 Toolset DVDs, Microsoft SQL Server 2005 with EULA and supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	6ES7652-5AX07-0YE0
SIMATIC PCS 7 OS Client/ SFC Visualization Upgrade Package V6.0/V6.1 to V7.0 5 languages (English, German, French, Italian, Spanish), software class A, runs under Windows XP Professional, floating license for 1 user Delivery form package: License key disks, certificate of license with terms and conditions; PCS 7 V7.0 Toolset DVDs, Microsoft SQL Server 2005 including EULA and supplementary CDs/DVDs (e.g. Microsoft ServicePacks and Tools)	6ES7652-5CX07-0YE5

OS long-term archiving

SIMATIC Upgrade StoragePlus V1.0/V1.1 to V1.2 Note: The SIMATIC Upgrade StoragePlus V1.1 to V1.2 is part of the SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0	
Central Archive Server (CAS) Upgrade V6.0/V6.1 to V7.0 Note: The upgrade of the central archive server (CAS) from V6.0/V6.1 to V7.0 is part of the SIMATIC PCS 7 OS Runtime Upgrade Package V6.0/V6.1 to V7.0	

OS Web Upgrade Package

SIMATIC PCS 7 OS Web Server Upgrade Package V6.1 to V7.0 For SIMATIC PCS 7 Web server, SIMATIC PCS 7 Web diagnostics server, SIMATIC PCS 7 Web diagnostics client, 3 languages (English, German, French), software class A, runs with Windows Server 2003, single license for 1 installation Delivery form package: License key disk, certificate of license with terms and conditions	6ES7652-5DX07-0YF0

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■ Overview

SIMATIC BATCH packages for upgrading from V6.0/V6.1 to V7.0

The upgrades for all PO versions of the SIMATIC BATCH software from V6.0/V6.1 to V7.0 are distributed between the following two SIMATIC BATCH upgrade packages:

SIMATIC BATCH Client upgrade package

The SIMATIC BATCH Client upgrade package contains upgrade licenses for:

- SIMATIC BATCH Recipe System
- SIMATIC BATCH Batch Planning
- SIMATIC BATCH BatchCC

SIMATIC BATCH Server Upgrade Package

The SIMATIC BATCH Server Upgrade Package contains upgrade licenses for

- SIMATIC BATCH Server (including all PO options and PowerPacks)
- SIMATIC BATCH Hierarchical Recipe
- SIMATIC BATCH ROP Library
- SIMATIC BATCH Separation Procedures/Formulas
- SIMATIC BATCH API

SIMATIC PCS 7 Maintenance Station Upgrade

With the SIMATIC PCS 7 Asset upgrade package you can upgrade SIMATIC PCS 7 Asset Engineering as well as all TAG versions of SIMATIC PCS 7 Asset Runtime from V6.1 to V7.0. The SNMP OPC server license is also involved.

■ Ordering data

	Article No.
SIMATIC BATCH Upgrade Packages	
SIMATIC BATCH Client Upgrade Package V6.0/V6.1 to V7.0 3 languages (English, German, French), software class A, runs with Windows XP Professional or Windows Server 2003, floating license for 1 user Delivery form package: License key disk, certificate of license with terms and conditions	**6ES7657-5XX07-0YF5**
SIMATIC BATCH Server Upgrade Package V6.0/V6.1 to V7.0 3 languages (English, German, French), software class A, runs with Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package: License key disk, certificate of license with terms and conditions	**6ES7657-5XX07-0YF0**
SIMATIC PCS 7 Asset Upgrade	
SIMATIC PCS 7 Asset Upgrade Package V6.1 to V7.0 For Asset Engineering and Asset Runtime, 3 languages (English, German, French), software class A, runs with Windows XP Professional or Windows Server 2003; single license for 1 installation Delivery form package: License key disk, certificate of license with terms and conditions	**6ES7652-5FX07-0YF0**

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Update/upgrade packages
Updates/upgrades asynchronous to the PCS 7 version

Upgrades for SIMATIC Logon

■ Overview

SIMATIC Logon is a central user administration system with access control which was introduced into the process control system as of SIMATIC PCS 7 V6.0. Up to and including V6.1, SIMATIC Logon was offered in the form of separate products whose version cycle was asynchronous to the version cycle of SIMATIC PCS 7.

As of SIMATIC PCS 7 V7.0, the SIMATIC Logon software and licenses are fully integrated in the process control system. Since then, updating is carried out synchronous with SIMATIC PCS 7.

System-specific compatibility lists on the Internet show the SIMATIC Logon versions that are suitable for the various SIMATIC PCS 7 versions:

http://support.automation.siemens.com/WW/view/en/2334224

■ Ordering data

	Article No.
SIMATIC Logon Upgrade to V1.5	**6ES7658-7BX51-0YE0**
7 languages (English, German, French, Italian, Spanish, Chinese and Japanese), software class A, runs on Windows XP Professional SP2/SP3 32-bit operating system, Windows Server 2003 SP1/SP2 32-bit, Windows Server 2003 R2/2003 R2 SP2 32-bit, Windows Vista (Business/Enterprise/Ultimate) up to SP2 32/64-bit, Windows 7 (Professional/Enterprise/Ultimate) up to SP1 32/64-bit, Windows Server 2008 (Standard/Enterprise/Datacenter) up to SP2 32/64-bit, Windows Server 2008 R2 (Standard/Enterprise/Datacenter) up to SP1 64-bit; Single license for 1 installation	
Delivery form package: License key USB stick, certificate of license, software and electronic documentation on CD	
SIMATIC Logon Upgrade to V1.4	**6ES7658-7BX41-2YE0**
7 languages (English, German, French, Italian, Spanish, Chinese, Japanese), software class A, runs with Windows 2000 Professional, Windows 2000 Server, Windows XP Professional, Windows Server 2003, single license for 1 installation	
Delivery form package: License key USB stick, certificate of license with terms and conditions; software and electronic documentation on CD	

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Overview

SIMATIC PDM can be integrated in the engineering system, i.e. in the configuration environment of SIMATIC PCS 7, or operated in stand-alone mode. The version cycle of SIMATIC PDM is asynchronous to the version cycle of SIMATIC PCS 7.

The SIMATIC PDM versions currently offered are compatible with the following SIMATIC PCS 7 versions:

SIMATIC PDM version	Compatible SIMATIC PCS 7 version
V8.2	V8.x
V8.1	V8.0, including PROFINET Communication V8.0+SP1
V6.1	V6.1, V7.1 and V8.0

System-specific compatibility lists on the Internet provide detailed information on how the various SIMATIC PCS 7 versions correlate to the versions of SIMATIC PDM:

http://support.automation.siemens.com/WW/view/en/2334224

Ordering data

	Article No.
SIMATIC PDM upgrade/update service	
SIMATIC PDM upgrade from V6.x to V8.2 for product packages and optional product components of SIMATIC PDM V6.0/V6.1 with the exception of SIMATIC PDM Single Point and SIMATIC PDM via standard HART multiplexer 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 ×SIMATIC PDM Software Media Package per ordering position	6ES7651-5CX28-0YE5
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	6ES7651-5CX28-0YK5
SIMATIC PDM upgrade from V8.x to V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	6ES7651-5EX28-0YE5
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	6ES7651-5EX28-0YK5

	Article No.
SIMATIC PDM upgrade from V7.0 to V8.0 For product configurations based on SIMATIC PDM PCS 7, SIMATIC PDM PCS 7-FF or SIMATIC PDM S7 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit, or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM Software V8.0 and device library on DVD, license key USB stick, certificate of license	6ES7651-5DX08-0YE5
• Delivery form online (without SIMATIC PCS 7 Software Media Package) Software image download (SIMATIC PDM and device library), license key download, online certificate of license Note: E-mail address required!	6ES7651-5DX08-0YK5
SIMATIC PDM Software Update Service Subscription delivery form package for 1 year with automatic renewal Requirement: current software version	6ES7658-3XX00-0YL8

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Update/upgrade packages
Updates/upgrades asynchronous to the PCS 7 version

Upgrades for Process Safety Software

■ Overview

S7 F Systems and SIMATIC Safety Matrix software products can be optionally integrated in the process control system for the implementation and operation of safety applications.

The version cycle of these software components is not synchronous with that of SIMATIC PCS 7, however.

S7 F Systems and SIMATIC Safety Matrix are compatible with SIMATIC PCS 7 V8.1 as follows:

- S7 F Systems as of V6.1+SP2
- Safety Matrix Tool and Safety Matrix Viewer as of V6.2+SP2

System-specific compatibility lists on the Internet provide additional information about the versions of S7 F Systems und SIMATIC Safety Matrix that are suitable for the various previous versions of SIMATIC PCS 7:

http://support.automation.siemens.com/WW/view/en/2334224

■ Ordering data

	Article No.		Article No.
S7 F Systems		**Safety Matrix Tool, upgrade from V5.x to V6.1** Engineering and runtime software, 2 languages (English, German), software class A, runs with Windows XP Professional/Server 2003 or Windows 2000 Professional/2000 Server, floating license for 1 user Delivery form package (without SIMATIC PCS 7 Software Media Package) Certificate of license as well as software and electronic documentation on CD	6ES7833-1SM01-0YE5
S7 F Systems V6.1 Upgrade S7 F Systems upgrade from V5.x/ V6.0 to V6.1 (incl. SP) 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user Note: In the case of an S7 F Systems upgrade from V5.x to V6.1, the type of S7 F Systems license changes from single license to floating license.			
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC S7 F Systems Software Media Package per ordering position	6ES7833-1CC02-0YE5	**Safety Matrix Viewer**	
		Safety Matrix Viewer for SIMATIC PCS 7, upgrade from V6.x to V6.2 (including SP) 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form online (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 F Systems Software Media Package) License key download and online certificate of license Note: E-mail address required; installation software also available separately as SIMATIC S7 F Systems Software Media Package.	6ES7833-1CC02-0YK5	• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC S7 Safety Matrix Software Media Package per ordering position	6ES7833-1SM62-0YE5
Safety Matrix Tool		• Delivery form online (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 Safety Matrix Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC S7 Safety Matrix Software Media Package.	6ES7833-1SM62-0YK5
Safety Matrix Tool, upgrade from V5.x/V6.1 to V6.2 (including SP) 2 languages (German, English), software class A, runs with Windows XP Professional 32-bit, Windows Server 2003/2003 R2 Standard 32-bit, Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user			
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, packaged with 1 × SIMATIC S7 Safety Matrix Software Media Package per ordering position	6ES7833-1SM02-0YE5	**Safety Matrix Viewer for SIMATIC PCS 7, upgrade from V6.0 to V6.1** Runtime software, 2 languages (English, German), software class A, runs with Windows XP Professional/Server 2003 or Windows 2000 Professional/2000 Server, floating license for 1 user Delivery form package (without SIMATIC PCS 7 Software Media Package) Certificate of license as well as software and electronic documentation on CD	6ES7833-1SM61-0YE5
• Delivery form online (without SIMATIC PCS 7 Software Media Package and SIMATIC S7 Safety Matrix Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC S7 Safety Matrix Software Media Package.	6ES7833-1SM02-0YK5		

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■ Overview

The S7-PLCSIM software used for simulation of SIMATIC PCS 7 automation systems when debugging CFC/SFC user programs can be integrated into the engineering system, i.e. into the configuration environment of SIMATIC PCS 7. The version cycle of S7-PLCSIM is asynchronous to the version cycle of SIMATIC PCS 7.

S7-PLCSIM as of V5.4+SP5 is compatible with SIMATIC PCS 7 V8.1

System-specific compatibility lists on the Internet provide additional information about the versions of S7-PLCSIM that are suitable for the various previous versions of SIMATIC PCS 7:

http://support.automation.siemens.com/WW/view/en/2334224

■ Ordering data

	Article No.
S7-PLCSIM upgrade from V3.x, V4.x, V5.0, V5.2 or V5.3 to V5.4 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user Delivery form (without SIMATIC PCS 7 Software Media Package) License key USB stick, certificate of license; software and electronic documentation on CD	6ES7841-0CC05-0YE5
S7-PLCSIM Upgrade from V3.x, V4.x, V5.0 or V5.2 to V5.3 5 languages (English, German, French, Italian, Spanish), software class A, runs with Windows 2000 Professional or Windows XP Professional, floating license for 1 user Delivery form package Authorization diskette, certificate of license with terms and conditions; software and electronic documentation on CD	6ES7841-0CC04-0YE5
S7-PLCSIM Software Update Service Subscription for 1 year with automatic extension; requirement: current software version	6ES7841-0CA01-0YX2

Update/upgrade packages
Updates/upgrades asynchronous to the PCS 7 version

System communication via Industrial Ethernet

Overview

With SIMATIC PCS 7, communications software and licenses of SIMATIC NET are used for the system communication via Industrial Ethernet. Their version cycle is not usually synchronous with that of SIMATIC PCS 7.

The SIMATIC PCS 7 versions correspond to the SIMATIC NET products as follows:

- SIMATIC PCS 7 V8.1 with SIMATIC NET products V12
- SIMATIC PCS 7 V8.0 with SIMATIC NET products:
  - V8.1 (operating system Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit)
  - V7.1 (Windows XP Professional 32-bit or Windows Server 2003 R2 Standard 32-bit operating system)

- SIMATIC PCS 7 V7.1 with SIMATIC NET products V7.1 (2008 edition)
- SIMATIC PCS 7 V7.0 with SIMATIC NET products V6.4 (2006 edition)

When upgrading SIMATIC PCS 7, a separate upgrade is only required for the S7-REDCONNECT and SOFTNET-IE RNA communications software. For the other SIMATIC NET products, the version upgrade is implemented during the SIMATIC PCS 7 upgrade with SIMATIC PCS 7 Upgrade Packages.

Ordering data

	Article No.		Article No.
Communication products for SIMATIC PCS 7 V8.1		**SIMATIC NET SOFTNET-IE RNA V12** Software for linking of PCS 7 stations to PRP-enabled networks with integrated SNMP Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1711-1EW12-0AA0
SIMATIC NET HARDNET-IE S7 V12 S7 communication software with license for up to 4 Industrial Ethernet CPs, e.g. CP 1613 A2/CP 1623/CP 1628 Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-1CB12-0AA0		
SIMATIC NET HARDNET-IE S7-REDCONNECT V12 S7 communication software for fail-safe S7 communication over redundant networks with license for up to 4 Industrial Ethernet CPs, e.g. CP 1613 A2/CP 1623/CP 1628 Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-0HB12-0AA0	Upgrades for communication software **SIMATIC NET HARDNET-IE S7-REDCONNECT Upgrade** Software Upgrade for S7-REDCONNECT Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick • As of 2006 edition (V6.4) • For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	 6GK1716-0HB00-3AE0 6GK1716-0HB00-3AE1
SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V12 For expansion of HARDNET-IE S7 communication software to HARDNET-IE S7-REDCONNECT, with license for up to 4 Industrial Ethernet CPs, e.g. CP 1613 A2/CP 1623/CP 1628 Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-0HB12-0AC0	**SIMATIC NET SOFTNET-IE RNA Upgrade** Upgrade for SIMATIC NET SOFTNET-IE RNA as of V8.1 Runtime software, 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1711-1EW00-3AE0

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Ordering data	Article No.		Article No.
BCE license **SIMATIC PCS 7 BCE V8.1** Runtime license for plant bus communication via standard network adapter and Basic Communication Ethernet; already integrated in SIMATIC PCS 7 Industrial Workstations 3 languages (English, German, French), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user		**SIMATIC NET HARDNET-IE S7-REDCONNECT PowerPack V8.1** For expansion of HARDNET-IE S7 communication software to HARDNET-IE S7-REDCONNECT, runtime software 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation	**6GK1716-0HB08-1AC0**

• Delivery form package
   (without SIMATIC PCS 7 Software Media Package)
   License key USB stick, certificate of license
	6ES7650-1CD18-2YB5	Delivery form package
		(without SIMATIC PCS 7 Software Media Package)
		Software and electronic manual on CD, license key on USB stick	

• Delivery form online
   (without SIMATIC PCS 7 Software Media Package)
   License key download,
   online certificate of license
   Note:
   E-mail address required!
	6ES7650-1CD18-2YH5	Upgrade of S7-REDCONNECT communication software
		SIMATIC NET HARDNET-IE S7-REDCONNECT Upgrade
		Software upgrade for S7-REDCONNECT, runtime software
		
		2 languages (English, German), single license for 1 installation	

Communication products for SIMATIC PCS 7 V8.0		Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	
SIMATIC NET HARDNET-IE S7 V8.1 S7 communication software for CP 1613 A2/CP 1623/CP 1628, runtime software 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit; single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	**6GK1716-1CB08-1AA0**	• As of 2006 edition (V6.4) • For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	**6GK1716-0HB00-3AE0** **6GK1716-0HB00-3AE1**
SIMATIC NET HARDNET-IE S7-REDCONNECT V8.1 Software for fail-safe S7 communication via redundant networks, for CP 1613 A2/CP 1623/CP 1628, runtime software 2 languages (English, German), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	**6GK1716-0HB08-1AA0**	BCE license **PCS 7 BCE V8.0** Runtime license for plant bus communication via standard network adapter and Basic Communication Ethernet; already integrated in SIMATIC PCS 7 Industrial Workstations 3 languages (English, German, French), software class A, runs with Windows XP Professional 32-bit, Windows 7 Ultimate 32/64-bit, Windows Server 2003 R2 Standard 32-bit or Windows Server 2008 R2 Standard 64-bit; floating license for 1 user	

		• Delivery form package
		   (without SIMATIC PCS 7 Software Media Package)
		   License key USB stick, certificate of license
			6ES7650-1CD08-2YB5

		• Delivery form online
		   (without SIMATIC PCS 7 Software Media Package)
		   License key download,
		   online certificate of license
		   Note:
		   E-mail address required!
			6ES7650-1CD08-2YH5

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Update/upgrade packages
Updates/upgrades asynchronous to the PCS 7 version

System communication via Industrial Ethernet

▪ **Ordering data**   **Article No.**   **Article No.**

Ordering data	Article No.		Article No.
Communication products for SIMATIC PCS 7 V7.1		BCE license	
SIMATIC NET S7-1613/2008 (V7.1) for Industrial Ethernet S7 communication software for CP 1613 A2/CP 1623, runtime software 2 languages (English, German), software class A, runs with Windows XP Professional or Windows Server 2003; single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-1CB71-3AA0	**PCS 7 BCE V7.1 (for SIMATIC PCS 7 V7.1)** Runtime license for plant bus communication via standard network adapter and Basic Communication Ethernet; already integrated in SIMATIC PCS 7 Industrial Workstations, 3 languages (English, German, French), software class A, runs with Windows XP Professional or Windows Server 2003, floating license for 1 user Delivery form package (without SIMATIC PCS 7 Software Media Package) License key on USB stick, certificate of license	6ES7650-1CD17-2YB5
SIMATIC NET S7-REDCONNECT/ 2008 (V7.1) Software for fail-safe S7 communication via redundant networks, for CP 1613 A2/CP 1623, runtime software 2 languages (English, German), software class A, runs with Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-0HB71-3AA0	**Communication products for SIMATIC PCS 7 V7.0**	
		SIMATIC NET S7-1613/2006 (V6.4) for Industrial Ethernet S7 communication software for CP 1613, runtime software 2 languages (English, German), runs with Windows 2000 Professional, 2000 Server, XP Professional, Server 2003; single license for 1 installation Delivery form package Software and electronic manual on CD, license key diskette	6GK1716-1CB64-3AA0
SIMATIC NET PowerPack S7-RED-CONNECT/2008 (V7.1) Software for expansion of S7-1613 to S7-REDCONNECT, runtime software 2 languages (English, German), software class A, runs with Windows XP Professional or Windows Server 2003, single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick	6GK1716-0HB71-3AC0	**SIMATIC NET S7-REDCONNECT/ 2006 (V6.4)** Software for fail-safe S7 communication via redundant networks, for CP 1613, runtime software 2 languages (English, German), software class A, runs with Windows 2000 Professional/ 2000 Server/ XP Professional/ Server 2003, single license for 1 installation Delivery form package Software and electronic manual on CD, license key diskette	6GK1716-0HB64-3AA0
Upgrade of S7-REDCONNECT communication software		**SIMATIC NET S7-REDCONNECT/ 2006 (V6.4) Upgrade** Software for expansion of S7-1613 to S7-REDCONNECT, runtime software 2 languages (English, German), software class A, runs with Windows 2000 Professional, 2000 Server, XP Professional, Server 2003; single license for 1 installation Delivery form package Software and electronic manual on CD, license key diskette	6GK1716-0HB64-3AC0
SIMATIC NET HARDNET-IE S7-REDCONNECT Upgrade Software upgrade for S7-REDCONNECT, runtime software 2 languages (English, German), single license for 1 installation Delivery form package (without SIMATIC PCS 7 Software Media Package) Software and electronic manual on CD, license key on USB stick • As of 2006 edition (V6.4) • For V6.0, V6.1, V6.2, and 2005 edition (V6.3)	 6GK1716-0HB00-3AE0 6GK1716-0HB00-3AE1		

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■ **Ordering data**	Article No.		Article No.
Upgrade of S7-REDCONNECT communication software V6.3 (2005 edition) to V6.4 (2006 edition)		BCE license	
SIMATIC NET S7-REDCONNECT Upgrade from V6.3 to V6.4 Software for upgrade of S7-REDCONNECT, runtime software, 2 languages (English, German), software class A, runs with Windows 2000 Professional, 2000 Server, XP Professional, Server 2003; single license for 1 installation Delivery form package Software and electronic manual on CD, license key diskette	**6GK1716-0HB64-3AE0**	**PCS 7 BCE V7.0** Runtime license for plant bus communication via standard network adapter and Basic Communication Ethernet; already integrated with SIMATIC PCS 7 Industrial Workstations	**6ES7650-1CD07-2YB5**
		3 languages (English, German, French), software class A, runs with Windows XP Professional or Windows Server 2003; floating license for 1 user	
		Delivery form package License key disk, certificate of license with terms and conditions	

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Update/upgrade packages

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Update/upgrade packages

Appendix

Appendix
Siemens Industry Training

Faster and more applicable know-how:
Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with Siemens Industry Training

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally.

Siemens Industry Training Customer Support Germany:

Phone: +49 911 895-7575

Fax: +49 911 895-7576

E-Mail: info@sitrain.com

Highlights Siemens Industry Training

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" is a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.

At Siemens Industry we are resolutely pursuing the same goal: long-term improvement of your competitive ability.
We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation/partner

You start by selecting a

- Product group,
- Country,
- City,
- Service.

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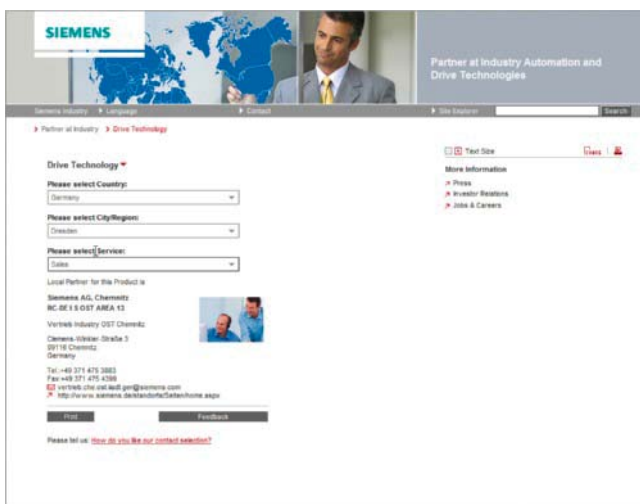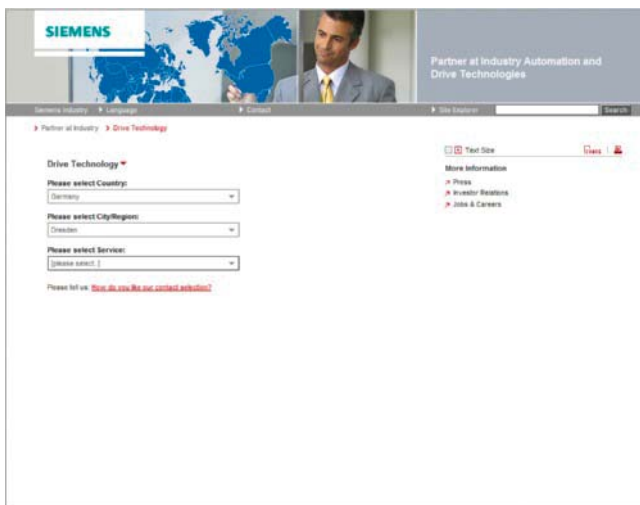
Appendix
Partner at Industry

Siemens Solution Partner Automation Drives

■ **Overview**

Siemens Solution Partner Automation Drives

Partner Finder

Solution Partner: Highest quality - guaranteed

The products and systems from Siemens Industry Automation and Drive Technologies offer the ideal platform for all automation applications.

Under the name of Siemens Solution Partner Automation Drives, selected system integrators around the world act as uniformly qualified solution providers for the Siemens range of products and services in the fields of automation and drives. Day after day, they utilize their qualified product and system know-how as well as their excellent industry expertise to your advantage – for all requirements.

The partner emblem is the guarantee and indicator of proven quality. The basis for this are defined quality features that identify Solution Partners as reliable and competent solution providers:

● Solution quality
  Always a good result with tried and tested solutions expertise.
● Expert quality
  Certified technical competence ensures maximum efficiency.
● Project quality
  With proven project experience straight to the target.
● Portfolio quality
  Comprehensive portfolio for state-of-the-art solutions from a single source.

The Siemens Solution Partner Program helps you to find the optimum partner for your specific requirements.

Support is provided by the Partner Finder, a comprehensive online platform that showcases the profiles of all our solution partners. You can convince yourself of the competence of the respective Solution Partner by means of the references provided. Various search criteria are available for this purpose.

Once you have located a partner, you are only one small step away from contacting them.

Find the right partner here for your specific task and convince yourself of the solution competence provided:

www.siemens.com/automation/partnerfinder

Additional information on the Siemens Solution Partner Program is available online at:

www.siemens.com/solutionpartner

■ **Comprehensive teaching support for educational institutions**

Siemens Automation Cooperates with Education (SCE)
offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

Training curriculums for your lessons

Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:

- With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.

- The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

www.siemens.com/sce/documents

Trainer packages for hands-on learning

Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offers more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/SIMOTION
- CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

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Siemens Industry Automation and Drive Technologies in the WWW

A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalog CA 01 of Industry

Detailed information together with convenient interactive functions:
The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall
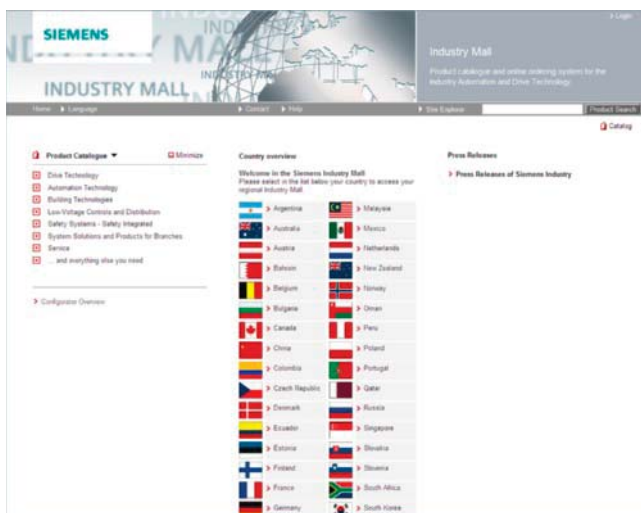
The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking and tracing of the order to be carried out. Availability checks, customer-specific discounts and preparation of quotes are also possible.

Numerous additional functions are available to support you.

For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

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Appendix
Online Services

■ Downloading Catalogs

In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter "MD 3" for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter "ST 70" both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

www.siemens.com/industry/infocenter

■ Social Media
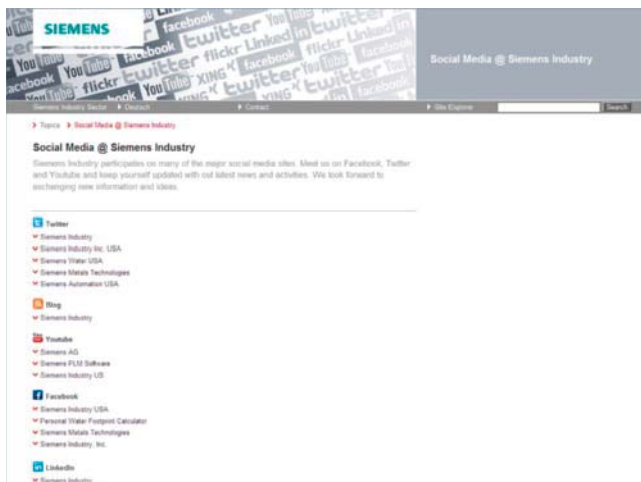
Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

www.siemens.com/industry/socialmedia

Or via our product pages at:

www.siemens.com/automation

or

www.siemens.com/drives

To find out more about Siemens' current social media activities visit us at:

www.siemens.com/socialmedia

■ Mobile Media

Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

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Your machines and plant can do more – with Industry Services.

Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:
www.siemens.com/industry-services
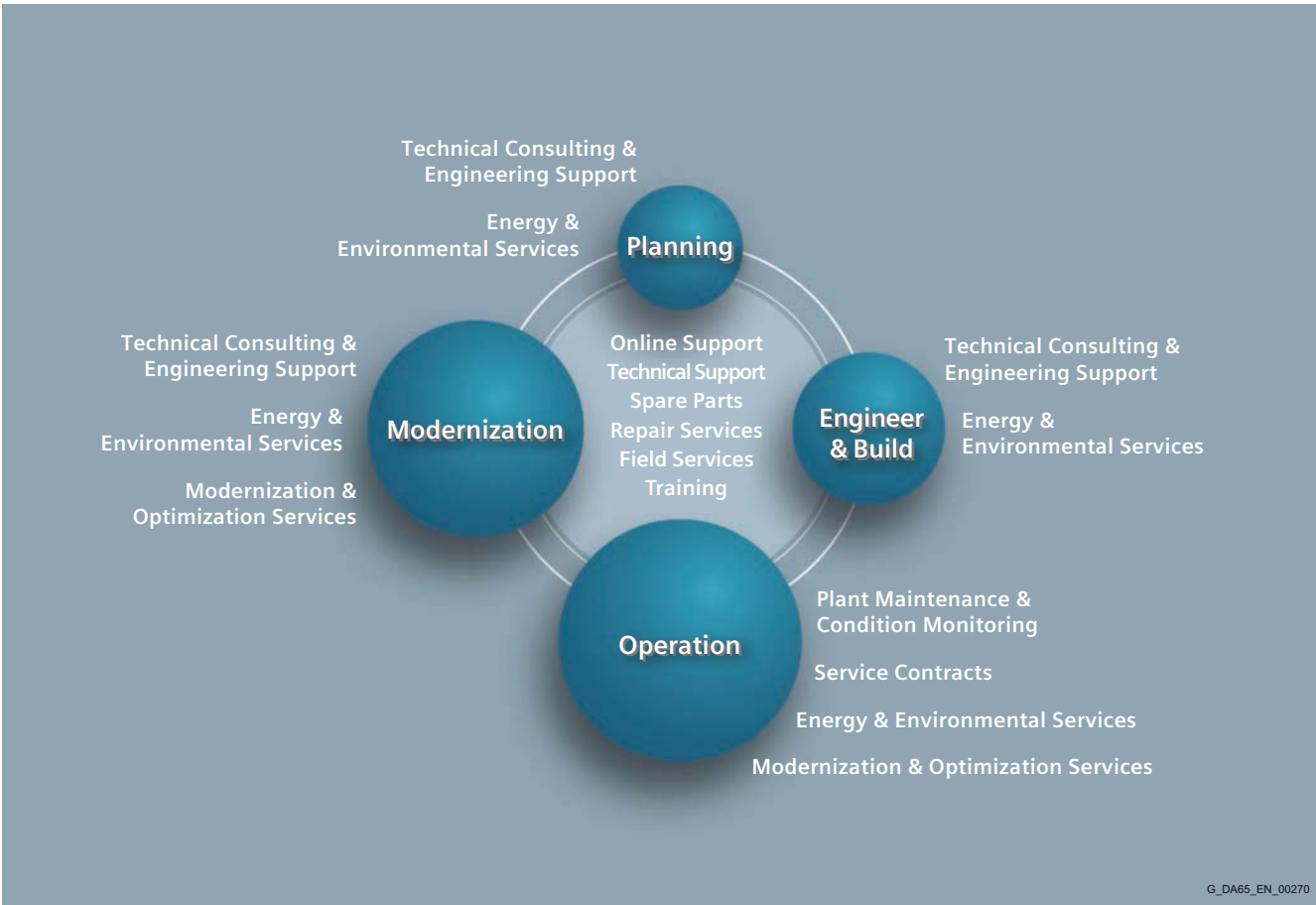
Siemens supports its clients with technology based Services across a plants entire life cycle.

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Appendix
Industry Services

Industry Services for the entire life cycle

Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediabased – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.

www.siemens.com/industry/onlinesupport

Online Support App

Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code for information on our Online Support app.

The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

www.siemens.com/industry/onlinesupportapp

Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.

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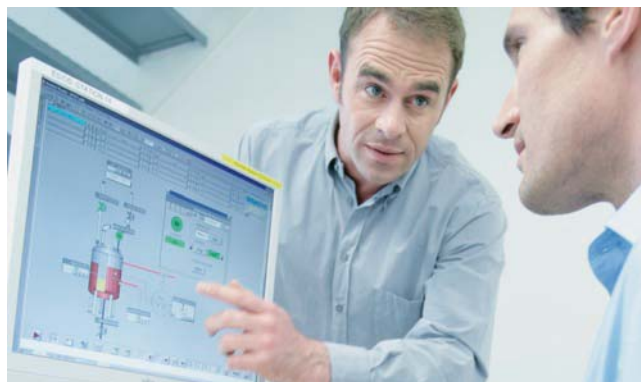
Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.

Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.

Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.

Appendix
Industry Services

Industry Services for the entire life cycle

Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.

Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.

Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.

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Industry Services for the entire life cycle

Modernization & Optimization Services

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.

Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.

Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.

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Appendix
Services

Overview

SIMATIC PCS 7 Life Cycle Services
Contract modules which build upon each other

Extended
Life Cycle Service

Modernization, updates/upgrades

Basic Life
Cycle Service

Software Update Service

Spare parts inventory (option)

Maintenance service

Obsolescence management (information service)

Standard service

Inspection and maintenance

Standby service repair

Basic services

Options

• Extended service time 24/7
• Software update services
• Extended exchange option

• Asset optimization
• Agreed technical support
• Remote services

Tailored life cycle service packages

Service program SIMATIC PCS 7 Life Cycle Services

Service requirements are just as specific as the uniqueness of each process engineering plant. Based on many years of experience, the service specialists from Siemens have identified four fundamental requirement profiles and developed appropriate service modules which build upon each other:

• Standard service: Service and support, standby service, repair
• Maintenance service: Inspection and maintenance
• Basis life cycle service: Spare parts supply plus obsolescence management
• Expanded life cycle service: Update and upgrade service

These service modules can be expanded flexibly, e.g. by:

• Extended service times, e.g. 24/7 servicing
• Software Update Service
• Asset optimization
• Prioritized technical support
• Remote service

The scope of services agreed individually on the basis of service modules and additive supplementary services is stipulated in a contract. The contracts are flexible enough to allow adaptation in the event of plant modifications. The service contract management includes documentation, planning of measures, and performance controlling.

More information

For detailed information on our service program SIMATIC PCS 7 Life Cycle Services please contact:

Tel.: +49 721 595 7174

http://support.automation.siemens.com/WW/view/en/42347016

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■ Overview
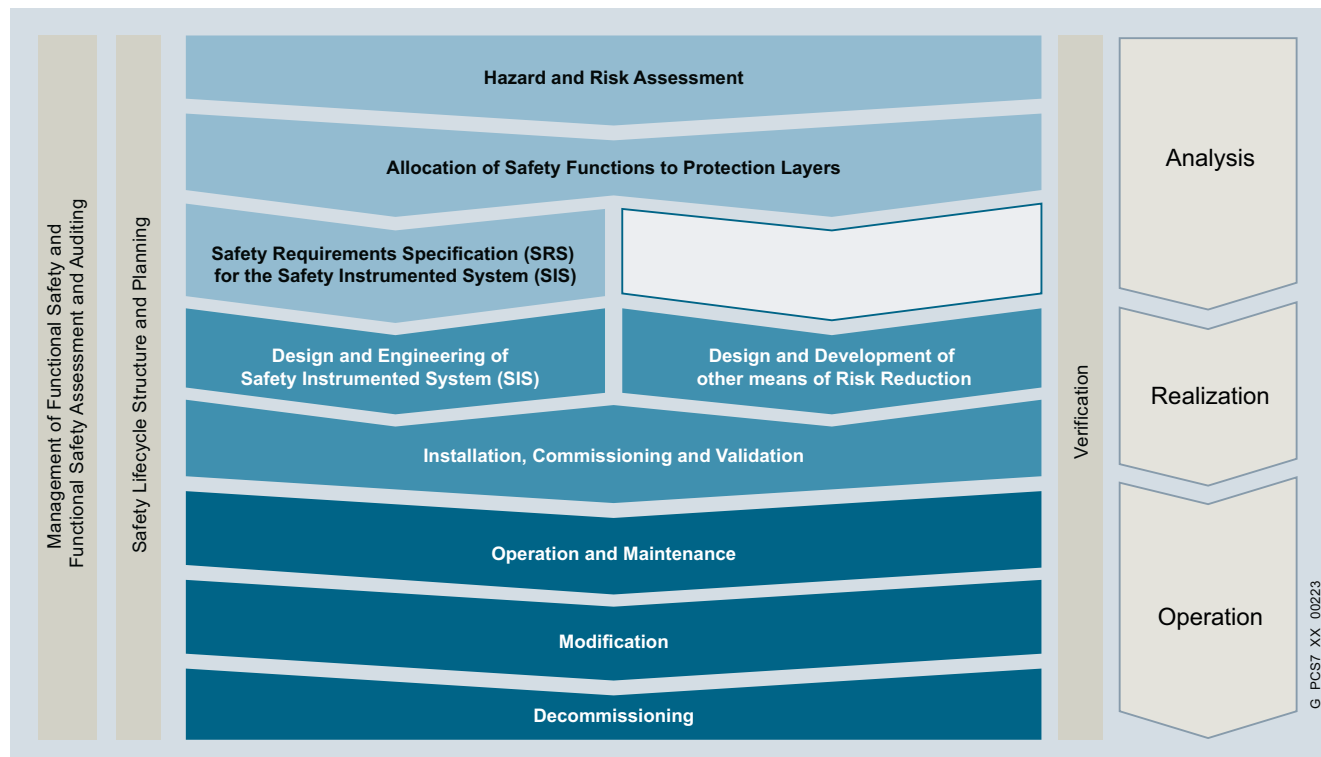
Simplified representation of the safety lifecycle (IEC 61511)

Safety Life Cycle Service for the process industry (IEC 61511)

The functional safety topic covers much more than the Installation SIL-certified hardware and software components. It requires expert knowledge, always aware of latest directives and technologies.

Plant operators, PLT protective devices for risk reduction - this includes operators of almost all chemical plants, refineries, distillation and combustion plants - must implement a system for management of functional safety. Operators are obliged to verify sufficient risk reduction.

In addition to the correct hardware and software, applied planning, operating, and change processes are decisive in ensuring that these systems effectively maintain their intended function throughout the complete lifecycle of the plant.

The basis for these processes are:
- Safety Life Cycle (SLC)
- Safety Integrity Level (SIL)

The safety lifecycle reflects the lifecycle of process plants and is divided into separate phases: Risk assessment, specification of the safety requirements, planning, installation and commissioning, operation, change as well as decommissioning. Errors in the early stages of the project can be often only be correct later at great effort and cost. We systematically prevent errors in all project phases using our standardized engineering guidelines and verification templates.

Appendix
Services

Functional Safety Services

Benefits

■ Standardized processes for faster and safer project implementation and commissioning

■ Uniform verification and validation documents

■ Reduction of development time and costs through interdisciplinary team of experts with process and automation expertise

■ Acceleration of the acceptance of plants by means of customized safety concepts

Application

• Plant operators that use PLT protective equipment to reduce risks - this includes the operators of almost all chemical plants, all refineries, distillation and combustion plants.

• SIMATIC PCS 7 plants with integrated safety technology using S7 F systems and SIMATIC Safety Matrix, in which processing must be performed according to IEC 61511 or a specific safety integrity level (SIL).

Design

The following service modules are offered as a service:

• Management, evaluation of "functional safety" and audits

• Configuration and planning of the SLC (Safety Plan)

• Hazard and safety assessment

• Assignment of the safety functions to the protection levels

• Safety Requirement Specification (SRS)

• Verification and validation (e.g. SIL verification, hardware/software audit)

• Modification

• Training

More information

Siemens AG
Industry Sector

Engineering & Consulting

Team-ec.industry@siemens.com
Tel.: +49 (69) 797-84500

Additional information is available on the Internet at:
www.siemens.com/processsafety

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Overview
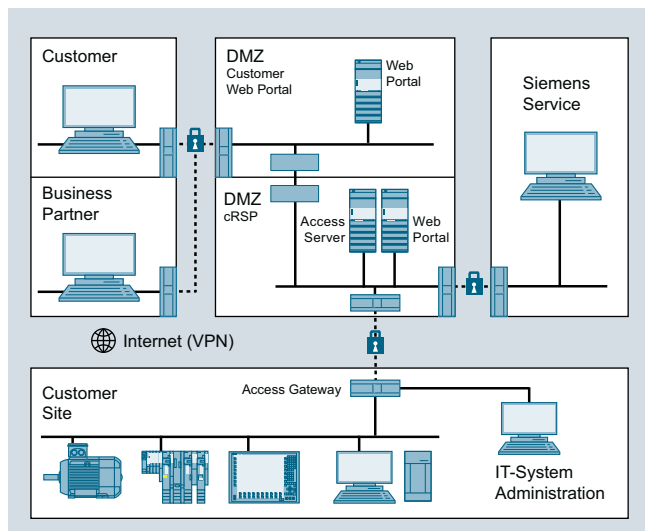
Siemens Remote Service platform

Fast, reliable and expert support is extremely important both during commissioning as well as in active operation.

Using modern IT structures and secure Internet connections, SIMATIC Remote Support Services offer preventative, system-specific support, which is high efficient, flexible and profitable. The service is based on the high-performance, highly secure Siemens Remote Service (SRS) platform, which enables secure remote access to the automation system - both by Siemens experts as well as by your own system specialists or system integrators.

Features of the SRS platform

- Ultramodern, scalable security and access concept, compatible with the Industrial Security concept
- Reaction-free due to separation of the networks
- Collaboration & Customer Web portal for simple and user-friendly integration of your own service personnel or external partners
- Central monitoring, logging and reporting
- Transparent access and e-mail notification
- Certification according to TÜV and CERT

Benefits

- Excellent support from experts who can connect directly to the automation system anywhere in the world - without startup or travel time
- Secure remote connection of the automation system with the Siemens Remote Service platform
- Provision of the remote infrastructure in combination with support and maintenance
- SIMATIC Remote Support Services can be adapted step-by-step to meet the actual need

Design
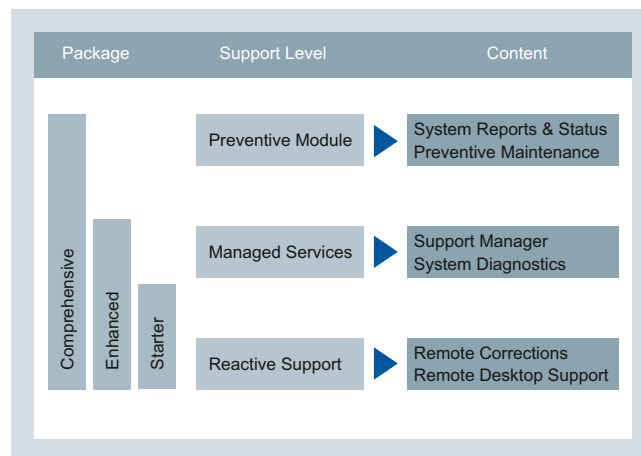
The modularity of the SIMATIC Remote Support Services allows you to tailor the scope of services exactly to your specific requirements and subsequently expand them.

Service modules in overview

- **Starter Package** (Reactive Support)
  Cost-effective introduction to modern, efficient Remote Desktop Support for a fast correction of faults on the basis of the SRS platform
- **Enhanced Package** (Reactive Support + Managed Services)
  Assignment of a dedicated representative who is familiar with the automation system, i.e., the technology, the installed products as well as the networks and their topologies. The use of special diagnostic tools increases the service efficiency
- **Comprehensive Package** (Reactive Support + Managed Services + Preventive Module)
  Inspection services in accordance with DIN 31051, including preventive check of the the system status for transparent representation of the system status and derivation of preventive measures

More information

Your local Siemens representative would be pleased to provide detailed information on SIMATIC Remote Support Services:

www.siemens.com/automation/partner

Or use the central access to our technical support

- with the Web form for the Support Request
  www.siemens.com/automation/support-request
- By phone: +49 (0) 911 895 7222
  or fax: +49 (0) 911 895 7223

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Appendix
Software Licenses

■ Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:
- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:
- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions
- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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Appendix
Conditions of sale and delivery

1. General Provisions

By using this catalog you can acquire hardware and software products described therein from Siemens AG subject to the following Terms and Conditions of Sale and Delivery (hereinafter referred to as "T&C"). Please note that the scope, the quality and the conditions for supplies and services, including software products, by any Siemens entity having a registered office outside Germany, shall be subject exclusively to the General Terms and Conditions of the respective Siemens entity. The following T&C apply exclusively for orders placed with Siemens Aktiengesellschaft, Germany.

1.1 For customers with a seat or registered office in Germany

For customers with a seat or registered office in Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office in Germany"[1] and,
- for other supplies and services, the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry"[1].

1.2 For customers with a seat or registered office outside Germany

For customers with a seat or registered office outside Germany, the following applies subordinate to the T&C:

- the "General Terms of Payment"[1] and,
- for software products, the "General License Conditions for Software Products for Automation and Drives for Customers with a Seat or Registered Office outside of Germany"[1] and
- for other supplies and/or services, the "General Conditions for Supplies of Siemens Industry for Customers with a Seat or Registered Office outside of Germany"[1].

2. Prices

The prices are in € (Euro) ex point of delivery, exclusive of packaging.

The sales tax (value added tax) is not included in the prices. It shall be charged separately at the respective rate according to the applicable statutory legal regulations.

Prices are subject to change without prior notice. We will charget the prices valid at the time of delivery.

To compensate for variations in the price of raw materials (e.g. silver, copper, aluminum, lead, gold, dysprosium and neodym), surcharges are calculated on a daily basis using the so-called metal factor for products containing these raw materials. A surcharge for the respective raw material is calculated as a supplement to the price of a product if the basic official price of the raw material in question is exceeded.

The metal factor of a product indicates the basic official price (for those raw materials concerned) as of which the surcharges on the price of the product are applied, and with what method of calculation.

An exact explanation of the metal factor can be downloaded at:
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

To calculate the surcharge (except in the cases of dysprosium and neodym), the official price from the day prior to that on which the order was received or the release order was effected is used.

To calculate the surcharge applicable to dysprosium and neodym ("rare earths"), the corresponding three-month basic average price in the quarter prior to that in which the order was received or the release order was effected is used with a one-month buffer (details on the calculation can be found in the explanation of the metal factor).

3. Additional Terms and Conditions

The dimensions are in mm. In Germany, according to the German law on units in measuring technology, data in inches apply only to devices for export.

Illustrations are not binding.

Insofar as there are no remarks on the individual pages of this catalog - especially with regard to data, dimensions and weights given - these are subject to change without prior notice.

4. Export regulations

We shall not be obligated to fulfill any agreement if such fulfillment is prevented by any impediments arising out of national or international foreign trade or customs requirements or any embargoes and/or other sanctions.

Export of goods listed in this catalog may be subject to licensing requirements. We will indicate in the delivery details whether licenses are required under German, European and US export lists. Goods labeled with "AL" not equal to "N" are subject to European or German export authorization when being exported out of the EU. Goods labeled with "ECCN" not equal to "N" are subject to US re-export authorization.

The export indications can be viewed in advance in the description of the respective goods on the Industry Mall, our online catalog system. Only the export labels "AL" and "ECCN" indicated on order confirmations, delivery notes and invoices are authoritative.

Even without a label, or with label "AL:N" or "ECCN:N", authorization may be required i .a. due to the final disposition and intended use of goods.

If you transfer goods (hardware and/or software and/or technology as well as corresponding documentation, regardless of the mode of provision) delivered by us or works and services (including all kinds of technical support) performed by us to a third party worldwide, you must comply with all applicable national and international (re-)export control regulations.

If required for the purpose of conducting export control checks, you (upon request by us) shall promptly provide us with all information pertaining to the particular end customer, final disposition and intended use of goods delivered by us respectively works and services provided by us, as well as to any export control restrictions existing in this relation.

The products listed in this catalog may be subject to European/German and/or US export regulations. Any export requiring approval is therefore subject to authorization by the relevant authorities.

Errors excepted and subject to change without prior notice.

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[1] The text of the Terms and Conditions of Siemens AG can be downloaded at
www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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System Solutions for Industry Interactive Catalog on DVD	*Catalog*
Products for Automation and Drives, Low-Voltage Power Distribution and Electrical Installation Technology	**CA 01**

Building Control	
GAMMA Building Control	ET G1

Drive Systems	
SINAMICS G130 Drive Converter Chassis Units SINAMICS G150 Drive Converter Cabinet Units	D 11
SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1
SINAMICS G180 Converters – Compact Units, Cabinet Systems, Cabinet Units Air-Cooled and Liquid-Cooled	D 18.1
SINAMICS S120 Chassis Format Units and Cabinet Modules	D 21.3
SINAMICS S150 Converter Cabinet Units	
SINAMICS DCM DC Converter, Control Module	D 23.1
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SINAMICS and Motors for Single-Axis Drives	D 31
SINAMICS G120P and SINAMICS G120P Cabinet pump, fan, compressor converters	D 35
Three-Phase Induction Motors SIMOTICS HV, SIMOTICS TN • Series H-compact • Series H-compact PLUS	D 84.1
Asynchronous Motors Standardline	D 86.1
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DC Motors	DA 12
SIMOREG DC MASTER 6RA70 Digital Chassis Converters	DA 21.1
SIMOREG K 6RA22 Analog Chassis Converters	DA 21.2
Digital: SIMOREG DC MASTER 6RM70 Digital Converter Cabinet Units	*DA 22*
SIMOVERT PM Modular Converter Systems	DA 45
SIEMOSYN Motors	DA 48
MICROMASTER 420/430/440 Inverters	DA 51.2
MICROMASTER 411/COMBIMASTER 411	DA 51.3
SIMODRIVE 611 universal and POSMO	DA 65.4
Note: Additional catalogs on SIMODRIVE or SINAMICS drive systems and SIMOTICS motors with SINUMERIK and SIMOTION can be found under Motion Control	

Low-Voltage Three-Phase-Motors

SIMOTICS Low-Voltage Motors	D 81.1
SIMOTICS FD Flexible Duty Motors	D 81.8
MOTOX Geared Motors	D 87.1
SIMOGEAR Geared Motors	MD 50.1
SIMOGEAR Gearboxes with adapter	MD 50.11

Mechanical Driving Machines

FLENDER Standard Couplings	MD 10.1
FLENDER High Performance Couplings	MD 10.2
FLENDER SIG Standard industrial gear unit	MD 30.1
FLENDER SIP Standard industrial planetary gear units	MD 31.1

Process Instrumentation and Analytics	
Field Instruments for Process Automation	FI 01
Digital: SIPART Controllers and Software	*MP 31*
Products for Weighing Technology	WT 10
Digital: Process Analytical Instruments	*PA 01*
Digital: Process Analytics, Components for the System Integration	*PA 11*

Digital: These catalogs are only available as a PDF.

Low-Voltage Power Distribution and Electrical Installation Technology	*Catalog*
SENTRON · SIVACON · ALPHA Protection, Switching, Measuring and Monitoring Devices, Switchboards and Distribution Systems	LV 10
Standards-Compliant Components for Photovoltaic Plants	LV 11
3WT Air Circuit Breakers up to 4000 A	LV 35
3VT Molded Case Circuit Breakers up to 1600 A	LV 36
Digital: SIVACON System Cubicles, System Lighting and System Air-Conditioning	*LV 50*
Digital: ALPHA Distribution Systems	*LV 51*
ALPHA FIX Terminal Blocks	LV 52
SIVACON S4 Power Distribution Boards	LV 56
Digital: SIVACON 8PS Busbar Trunking Systems	*LV 70*
Digital: DELTA Switches and Socket Outlets	*ET D1*

Motion Control	
SINUMERIK & SIMODRIVE Automation Systems for Machine Tools	NC 60
SINUMERIK & SINAMICS Equipment for Machine Tools	NC 61
SINUMERIK 840D sl Type 1B Equipment for Machine Tools	NC 62
SINUMERIK 808 Equipment for Machine Tools	NC 81.1
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SIMOTION, SINAMICS S120 & SIMOTICS Equipment for Production Machines	PM 21
Drive and Control Components for Cranes	CR 1

Power Supply	
Power supply SITOP	KT 10.1

Safety Integrated	
Safety Technology for Factory Automation	SI 10

SIMATIC HMI/PC-based Automation	
Human Machine Interface Systems/ PC-based Automation	ST 80/ ST PC

SIMATIC Ident	
Industrial Identification Systems	ID 10

SIMATIC Industrial Automation Systems	
Products for Totally Integrated Automation	ST 70
SIMATIC PCS 7 Process Control System System components	ST PCS 7
SIMATIC PCS 7 Process Control System Technology components	ST PCS 7 T
Add-ons for the SIMATIC PCS 7 Process Control System	ST PCS 7 AO

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